

DON'T SWIPE the SMALL STUFF.

RESEARCH REPORT

An Evaluation of the Impacts of Two “Rules of Thumb” for Credit Card Revolvers

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ABOUT THE URBAN INSTITUTE

The nonprofit Urban Institute is dedicated to elevating the debate on social and economic policy. For nearly five decades, Urban scholars have conducted research and offered evidence-based solutions that improve lives and strengthen communities across a rapidly urbanizing world. Their objective research helps expand opportunities for all, reduce hardship among the most vulnerable, and strengthen the effectiveness of the public sector.



ABOUT D2D FUND

D2D is a mission-driven nonprofit organization that works to improve the economic well-being of millions of financially vulnerable Americans through innovation. They generate practical ideas for financial products, services and policies; pilot test ideas, and pursue scale strategies to reach millions of households. They work collaboratively with the financial services industry, government agencies, federal and state legislators, national non-profit groups, grassroots community agencies, and public policy organizations.



1700 G Street NW, Washington, DC 20552

July 2016

Dear Colleagues,

The mission of the Consumer Financial Protection Bureau (CFPB) is to make markets for consumer financial products and services work for consumers by making rules more effective, by consistently and fairly enforcing those rules, and by empowering consumers to take more control over their economic lives. Empowering consumers includes supporting their ability to make financial decisions and to choose and use financial products in ways that will help them to meet their own life goals.

There has been a growing call in the financial education field for more evidence to indicate how and when financial education strategies can improve consumer financial decision making. The CFPB has taken up this challenge.

We are pleased to have commissioned this pioneering research on the impact of exposing consumers to financial guidelines on how consumers manage their financial lives. With this study, we set out to learn more about how low-touch financial education interventions might help improve consumers' financial well-being.

Specifically, this study rigorously assessed the impact of two financial guidelines on the credit card account management of consumers carrying revolving, or month to month, credit card debt. The guideline statements were delivered via mail, email, or the financial institution's website

The study's findings suggested that exposure to a financial guideline reminding consumers to be cognizant of credit card usage led to lower credit card balances.

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Though the reductions in credit card balances resulting from exposure to the rules were modest, these findings are quite promising. Moreover, these low-touch messages were provided for relatively little cost – well under \$1 per recipient.

A study like this is a significant undertaking, and we are thankful to Arizona Federal Credit Union, whose participation in the study demonstrated a deep commitment to understanding ways to improve consumer financial well-being. We also acknowledge the researchers at Urban Institute, who conducted this rigorous study under contract with the CFPB, and their subcontractor the Doorways to Dreams Fund, who thoughtfully developed the financial rules of thumb.

Consumers face many complex and consequential financial decisions throughout their lives. Thanks to the work of these organizations, we have learned that rules of thumb may hold promise as a simple, cost-effective way to improve consumer financial outcomes and that these interventions are well worth further investment and investigation.

This study is part of our broader range of research on effective financial education approaches and new ways to measure and support consumer financial well-being. CFPB research and reports on this topic can be found at www.consumerfinance.gov/adult-financial-education. The Bureau also offers direct-to-consumer tools and educational resources to support consumer financial decision-making and skill building, including consumer resources on several “financial rules to live by.” We invite you to explore all of these resources at www.consumerfinance.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Gail Hillebrand". The signature is fluid and cursive, with the first name "Gail" being more prominent than the last name "Hillebrand".

Gail Hillebrand

Associate Director for Consumer Education and Engagement

Consumer Financial Protection Bureau

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We would also like to thank the staff at the Doorways to Dreams Fund, who played the leading role in designing, pretesting, and refining the rules of thumb that were the basis of this study. Beyond Joanna Smith-Ramani and Amanda Hahnel, a special thanks to Tim Flacke for the leadership he lent to this work and to Sarika Abbi and Kara Kaminski for their work on partner selection and rule design.

At the Urban Institute, thanks to Doug Wissoker for methodological advice. Thanks also to several behavioral, financial education, and credit card financing experts to whom we spoke in advance of designing the rules: Marla Blow, Gerd Gigerenzer, Eric Johnson, George Loewenstein, John Lynch, Rebecca Ratner, Carolyn Yoon, and Wei Zhang.

Executive Summary

Rules of thumb–based education techniques have been proposed as a way to simplify financial education and make it more effective by providing simple, easily implemented decision guidelines, generally based more on *what* consumers should do and less on *why* they should do it. Presumably, rules of thumb are easier, cheaper, and more effective at engaging consumers than many other types of financial education. They can also be delivered closer in time to the desired behavior change than classroom- or counseling-based education.

In this study, the Urban Institute, in partnership with D2D Fund, performed the first rigorous test of rules of thumb–based financial education on consumer financial behavior. The rules of thumb were targeted at credit card revolvers—individuals who carry debt on their credit card from month to month. The first rule told participants to use cash instead of credit for purchases under \$20, and the second reminded them that paying with a credit card can add approximately 20 percent to the total cost of the purchase (for a typical revolver).

Results indicated that rules of thumb can be effective at altering consumer behavior and that they can be delivered at a very low cost. Although effect sizes were relatively modest, the fact that any effect was found for such a minimally invasive and inexpensive intervention is a testament to the potential usefulness of rules of thumb–based interventions. This is particularly the case as the population on which they were tested was not ideal because they were infrequent users of their credit cards. Further, we were unable to observe whether the participants actually read and applied the rules. Had we been able to measure this, we could have estimated the effect of actually applying the rules (the treatment on the treated) rather than only the effect of being offered the rules (the intent to treat). Future studies should test a larger number of rules of thumb on a more targeted population and estimate the treatment on the treated effects to determine the full potential of this education technique.

What Are Rules of Thumb?

Although “rules of thumb” was initially derived from the fact that carpenters and farmers took approximate and quick measurements by using their thumbs as a measurement device, the term has evolved to include all types of simple heuristics that are useful for decisionmaking but are not intended

to be strictly accurate or reliable in every situation. For example, one common rule of thumb suggests selecting housing that costs less than 30 percent of one's income. This rule helps keep rent costs reasonably low, but it can be modified based on the individual's specific situation.

We all use other less obvious rules of thumb in our everyday lives when choosing between French fries and broccoli, which route to take to work, and the number of gallons of milk to purchase each week. These rules help us to make decisions more quickly than if we were to carefully calculate every decision and weigh out every possible alternative—a task that would likely mean we would not be able to make more than a few decisions each week. Similarly, financial education relying on rules of thumb may be effective at improving financial outcomes because they are easy to understand and easier to follow and stick with than complex financial calculations.

Techniques similar to rules of thumb such as messaging reminders have been shown to be effective at improving financial outcomes (Bracha and Meier 2014; Karlan et al. 2010; Kast, Meier, and Pomeranz 2010; Stango and Zinman 2011). Messaging reminders are often personalized to the individual, with notes about goals or updates on bank balances and credit scores. Similar to rules of thumb, messaging reminders can be sent to recipients close in time to the decisionmaking point, and they can also be simple and short.

Before this study, only two papers directly examined the effectiveness of a rules of thumb-based approach to financial education. In the first, Drexler, Fischer, and Schoar (2014) used a randomized controlled trial approach to compare the effects of standard accounting-based financial business management education to a rules of thumb-based program for microentrepreneurs in the Dominican Republic. They found that the participants who received rules of thumb-based training were significantly more likely to keep accounting records, calculate monthly revenues, and improve their business management practices overall; participants in the traditional training did not change their practices. This study showed that rules of thumb held promise for improving business practices, but they had not yet been tested on consumers.

The second study, by Skimmyhorn and colleagues (2015), examined the effect of classroom-based rules of thumb financial education on self-reported measures and found that although rules of thumb increased cognitive measures of knowledge and noncognitive measures of self-efficacy, motivation to learn, and willingness to take financial risks, this approach produced few differences in these outcomes from principles-based financial education. In the few cases in which outcomes differed, principles-based education actually performed better. However, this study was not able to examine impacts on financial

behavior, nor did it exploit the ability of rules of thumb to be delivered close in time to the desired behavior change.

How Did We Deliver the Rules?

We partnered with Arizona Federal Credit Union (Arizona Federal), a large credit union based in Phoenix, Arizona, to draw a sample and deliver the rules. We created two rules of thumb and sent them to revolvers in their customer base. The rules were as follows:

- the cash under \$20 rule: “Don’t swipe the small stuff. Use cash when it’s under \$20.”
- the 20 percent added rule: “Credit keeps charging. It adds approximately 20% to the total.”

We delivered these rules via one, two, or three delivery channels in a randomized fashion. A control group received no rules. The three delivery modes were e-mail, online web banners at log-in, and a physical mailer (calendar magnet) (figure ES.1). We collected monthly, individual-level financial data on the study participants from Arizona Federal, and we purchased additional demographic and financial data on the individuals before and after the intervention from a large credit bureau.

Arizona Federal sent participants the rules via e-mail twice each month, with half receiving the rules on a random date in the first and second half of each month and the other half always on a Friday, once early in the month and once late in the month. This practice allowed us to test whether sending the rules on a random date would have a different effect than always sending them on the same day of the week—in this case, a day that is often associated with receiving a paycheck and/or spending money on nonessential items.

Arizona Federal placed the online portal messages on the home page of the participants’ online banking site in either a moving banner or a static ad, with variations in type and style throughout the intervention period.

The physical mailer incorporated the rules into a magnetic calendar that Arizona Federal had already planned to send to their customers as an end-of-the-year gift. Study participants randomized to receive the rules via physical mail had one of the rules printed at the top of the magnet. Arizona Federal credit card customers not in the study or randomized to not receive the rules via physical mail received a magnet with the Arizona Federal logo instead of a rule.

FIGURE ES.1

E-mail Versions of the Rules

**Arizona Federal**

DON'T SWIPE
the SMALL STUFF.

Use cash
when it's
UNDER
\$20.

[Find out why >](#)

**Arizona Federal**

CREDIT
keeps
CHARGING.

It adds about
20%
to the TOTAL.


[Find out why >](#)

Online Banner Versions of the Rules

DON'T SWIPE the SMALL STUFF.

CREDIT keeps **CHARGING.**


Physical Mailer Versions of the Rules

**Arizona Federal**

DON'T SWIPE the SMALL STUFF

Use cash when it's **\$20**
UNDER

2015						
JANUARY		FEBRUARY		MARCH		
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				
APRIL		MAY		JUNE		
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				
JULY		AUGUST		SEPTEMBER		
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				
OCTOBER		NOVEMBER		DECEMBER		
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

**Arizona Federal**

CREDIT KEEPS CHARGING.

It adds approximately
20% to the total.

2015						
JANUARY		FEBRUARY		MARCH		
S	M	T	W	T	F	S
1	2	3	4	5	6	7
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JULY		AUGUST		SEPTEMBER		
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OCTOBER		NOVEMBER		DECEMBER		
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29	30	31				

Who Did We Test the Rules On?

The participants for this study were credit card revolvers drawn from Arizona Federal's credit card customer base. We defined a credit card revolver as someone who carried a credit card balance for at least two of the six preintervention months, not necessarily consecutively. The full sample consisted of 13,957 people.

For the most part, study participants were working-age adults in their forties and fifties who were married with at least one child. Their average household income was somewhat higher than the average in the Phoenix metropolitan area, and most of them were homeowners. The sample had somewhat more males than females.

The study participants had relatively high levels of credit card debt on average. Participants did not typically spend large amounts each month on their Arizona Federal credit card, but they held high balances. Sixteen percent made no purchases on their Arizona Federal credit card during the preintervention months, and 41 percent spent less than \$100 on their credit card every month. Twenty-nine percent made no purchases under \$20 during the preintervention period, and another 28 percent made on average less than one purchase under \$20 a month during the preintervention period. This pattern of credit card use was unknown when the sample was drawn and likely caused the effects to be smaller than they would have been on a more active population. At baseline, the typical revolver in this study made payments sufficient to cover the cost of new purchases, interest, and a small share of the outstanding principal, but he or she was not making quick strides in retiring existing credit card debt.

How Did We Analyze the Data?

We could not directly observe whether the participants read and implemented the rules (which would inform an analysis approach referred to as the “treatment on the treated”), so we instead estimated the effect of the opportunity to read and apply the rules (the “intent to treat”). Although the intent to treat effect almost certainly understates the impacts on subjects who actually absorbed the messages, it most accurately reflects the effects to be expected across a portfolio of consumers who would likely receive such an intervention.

Because the information we received was panel data (data that follow the same individuals over time), we were able to estimate a fixed-effects model that looks at changes in participant outcomes over time. This method allowed us to control for individuals' starting level of debt and other financial

measures and allowed us to account for differences that might be related to assignment. Likewise, any variations that occurred by month—such as higher spending around the holidays or higher savings around tax refund time—were controlled for by the month fixed effects and by the control group also being subject to these monthly variations.

We used this fixed-effects intent to treat analysis to estimate the effect of treatment overall, treatment for each rule separately, treatment for each of the three delivery mechanisms, treatment by the count of the number of delivery mechanisms (0, 1, 2, or 3), and treatment by month. In a supplemental memo to this report, we will report on how these effects were maintained or decayed by analyzing information about study participants for the six months after the intervention ended.

Finally, we looked at whether the intervention had varying effects on different groups of people. The subgroups we examined were defined by age, number of credit card purchases during preintervention months, number of credit card purchases under \$20 during preintervention months, and initial credit score. The age and credit score subgroups helped us determine whether rules of thumb worked better for some groups of people than others, and the subgroups based on number of purchases (and number of purchases under \$20) helped us determine whether effects were masked by participants who habitually made few or no purchases on their cards each month.

Our main outcome of interest was the amount of revolving credit card debt that participants held from month to month. We also estimated the effect of the rules on the underlying behaviors that might have affected this debt, such as credit card spending, credit card bill payment, and use of alternative payment sources such as cash and debit. Finally, we estimated the effect of the rules on aggregate debt levels and credit to determine whether the rules affected the participants' overall financial standing.

Were the Rules of Thumb Effective at Improving Credit Card Outcomes?

We found that the cash under \$20 rule was successful at reducing participants' revolving debt on their Arizona Federal credit card by an average of \$104, but the 20 percent added rule did not reduce participants' Arizona Federal credit card debt (table ES.1) that we could detect. The \$104 balance reduction for the cash under \$20 rule means that, on average, these revolvers had credit card balances that were 2 percent lower than their baseline average. For some subgroups, this effect was even more pronounced. For example, participants under 40 exposed to either rule saw a 5 percent lower credit card balance than they would have in the absence of treatment.

TABLE ES.1

Intent to Treat Effect of Rules of Thumb on Credit Card Debt and Behaviors

	(1) Credit card balance	(2) Number of credit card purchases	(3) Number of credit card payments	(4) Total savings
\$20 rule	-104.2** (51.74)	-0.167 (0.122)	-0.025* (0.014)	-52.33 (101.2)
20% rule	-57.58 (51.11)	-0.110 (0.122)	-0.014 (0.014)	-90.47 (103.2)
Number of participants	12,322	13,658	13,556	13,430
	(5) Number of inquiries within 12 months	(6) Aggregate balance for open revolving trades	(7) Aggregate credit for open revolving trades	(8) Balance-to-credit ratio for open revolving trades
\$20 rule	-0.076 (0.072)	-144.5 (154.9)	-595.4*** (198.6)	0.388 (0.634)
20% rule	-0.213*** (0.072)	-74.83 (154.8)	-679.3*** (199.7)	0.267 (0.638)
Number of participants	13,738	13,782	13,790	13,709

Source: Arizona Federal administrative data and pre- and postintervention credit record data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

In broad terms, revolving debt could be reduced because consumers spent less or paid down more of their balance. We did not detect a statistically significant change in purchases or payments for either rule, so we cannot definitively say what the mechanism was behind the change in credit card debt. We did, however, find that participants under 40 years old—for whom lower credit card balances were most evident—both made fewer purchases and had higher savings. For some other subgroups, savings went down but net savings went up. This finding suggests that the mechanism behind the reduction in credit card debt was likely a reduction in purchases with some substitution from credit to cash, and that the overall effect was a net gain.

The 20 percent added rule also affected the number of credit inquiries for treatment participants, perhaps because the implied action is to not use credit. Additionally, both rules caused available credit, or the total amount of credit available for all accounts held by the participant, to be lower than it would have been in the absence of treatment. This change in available credit did not lead to a detectable change in overall credit utilization ratios, however, and the rules had no effect on overall credit scores or aggregate debt levels.

Interestingly, there was no clear winner in terms of delivery mode (e-mail, online, or physical mailer), although receiving the rule via fewer channels seemed to work better than receiving them via all three. Receiving the rules via too many channels could have resulted in overexposure and fatigue, making the rules less compelling to the participants.

The effects of the rules increased over time for credit card balance and interest accrued. This result may be due more to the compounding and cumulative nature of these variables than to an increase in behavior change over time. (The monthly effects for noncumulative variables such as number of credit card payments and total savings did not follow this pattern.)

The rules tended to work better for participants 40 years old or younger. Participants under 40 who were exposed to either rule had lower credit card balances and fewer purchases than their control group counterparts, and those under 40 who received the cash under \$20 rule had higher savings and higher net savings (savings minus credit card balance). Participants in this age group also made slightly fewer credit card payments than they would have made in the absence of treatment, perhaps because they had lower balances and therefore needed to pay less frequently. Their overall payment amount was no lower than it would have been otherwise; only the frequency with which they paid decreased.

Generally, effects were stronger for participants who made a larger number of purchases on their credit card at baseline, both for overall purchases and for purchases under \$20. This finding supports the belief that the rules would likely have had a larger impact on a population of more active credit card users and that our results are understated.

What Were the Study's Implications?

Tips, rules, nudges, and reminders are set to become more prevalent as we move to managing more of our financial lives on mobile platforms. Lenders are already making ample use of these strategies, and so too are personal financial management platforms (like Mint.com). But it is not only the big players that will communicate with us in these ways; the potential for mobile-based apps is limited only by our collective imagination (and fatigue).

Although their use is growing, the evidence base around rules of thumb is quite limited. This study demonstrates that rules of thumb can work as a cost-effective method of financial improvement and behavior change. The effects of the rules in this study were moderate, but the costs of delivering the rules were, by many accounts, trivial, making the benefit-cost trade-off sizable. In addition, this study's

results may underestimate the effects of the intervention if applied in other settings because the participants in this study were generally infrequent users of their credit cards and therefore may have been harder to influence using purchase-oriented messages. Study participants also had fairly good financial standing in terms of credit score and on-time payment history before the intervention, which might have made a rules of thumb approach less effective than it would be for a study population that was more financially disadvantaged.

The rules we created and tested serve only as an example of what the impact of rules of thumb might be, rather than as a conclusive analysis of the best rules to use. More research is needed to tease out the mechanisms behind these effects and to determine for which types of consumers these approaches can best work. In addition, energy should be devoted toward developing and testing specific rules of thumb to determine which rules are the most effective at improving financial behaviors and outcomes. More work is needed to understand how these rules can complement other financial behavior and education interventions, or if there are settings in which rules are preferred substitutes for other approaches. Overall, given the low marginal cost of implementation, rules of thumb provide a promising method of delivering financial education and improving financial health.

Chapter 1. Introduction and Background

Many American consumers make expensive choices that impede their long-term financial health. For example, over half of all credit cardholders carried a balance on their cards from month to month in 2010 (Board of Governors of the Federal Reserve System 2012). To be sure, managing spending with a low and/or variable income is difficult, and holding credit card debt can be better than an alternative of not enough food, utilities being shut off, or eviction. But credit card borrowers—even those with good credit histories—pay interest rates that far exceed those of other major categories of consumer credit.

Research into the efficacy of financial education programs meant to improve these behaviors has provided mixed results at best, suggesting that how financial education is structured is important for determining its effect on financial outcomes (Hastings, Madrian, and Skimmyhorn 2013). Providing individuals with information can help, but only if it comes at the right time and in doses that do not overload consumers.¹

Rules of thumb-based education has been proposed as a way to simplify and improve financial education. Rules of thumb are simple, easily implemented decision guidelines, generally based more on *what* consumers should do and less on *why* they should do it. They can be delivered close to the time of decisionmaking, and consumers may find them easier to remember and access when faced with a related financial decision. Presumably, rules of thumb are simpler, cheaper, and perhaps more effective at engaging consumers. Rules of thumb-based education may be particularly appropriate for improving credit card behaviors because credit card decisions are repetitive and frequent, making it easier for the behavior to turn into a habit.

To study the effectiveness of a rules of thumb-based approach to financial education and behavior change, the Consumer Financial Protection Bureau awarded a contract to the Urban Institute, with D2D Fund as a subcontractor, to conduct a randomized controlled trial (RCT) evaluation of the effectiveness of a rules of thumb-based approach to financial education for credit card revolvers—individuals who carry debt on their credit card from month to month. This report is the culmination of that effort. The Urban Institute led the project, including study design, data analysis, and reporting findings. D2D led the partner selection and development of the rules of thumb.

Until now there has been limited empirical evidence to show whether rules of thumb interventions can be successful at improving financial outcomes for consumers. One study showed that rules of thumb may be more successful than comprehensive financial principles education at improving financial practices and outcomes for small business owners in the Dominican Republic (Drexler, Fischer, and Schoar 2014), but it is unclear whether these results are generalizable to other populations and settings. Another study found that rules of thumb-based education performed no better than principles-based education at boosting financial literacy (Skimmyhorn et al. 2015). However, the rules for this study were delivered in a classroom setting rather than in digestible bites close in time to the point of decisionmaking. The authors were also unable to directly observe the effect of the rules on financial behaviors or outcomes.

We extended the previous research to evaluate the effectiveness of a rules of thumb-based approach to financial education for American consumers by using short messages. Our partner sent the rules via e-mail, physical mailer, and online banner and directly observed their impact on financial behaviors and outcomes. This report details our study design, methodologies, and findings. It is laid out as follows. The rest of this chapter provides background information on rules of thumb and credit card behaviors and some guidelines for developing such rules. Chapter 2 provides an overview of the rule design process for our study and documents the program elements of the intervention. Chapter 3 reviews the study design and randomization procedures that we developed for this work, and chapter 4 outlines the methodology and data sources used in the analysis. Chapter 5 presents an overview of study participants, and chapter 6 provides information on the rule delivery statistics and opportunities for individuals to opt out. Chapter 7 details the program impacts, including impacts on credit card behaviors, savings behaviors, and overall debt and credit health. Chapter 8 concludes with a discussion of the implications of this research for practice and policy and some closing remarks.

Rules of Thumb

What Are Rules of Thumb?

Rules of thumb are simple heuristics or problem-solving techniques with broad application that are not intended to be strictly accurate or reliable in every situation. The term originally referred to the use of the thumb as a measurement device for carpenters and farmers. Thumb width was an imprecise, yet reliable and convenient standard with which to measure the cut of wood or the depth of planting.

In one of the seminal pieces on rules of thumb, Baumol and Quandt (1964) argued that rules of thumb are among the more efficient methods for optimal decisionmaking. They define rules of thumb as a set of rules describing a decision procedure with the following characteristics:

- The variables that are employed in the decision criteria are objectively measurable.
- The decision criteria are objectively communicable, and decisions do not depend on the judgment of individual decisionmakers.
- Every logically possible configuration of variables corresponds to a determinate decision.
- The calculation of the appropriate decision is simple, inexpensive, and well-suited for frequent repetition and for spot checking by management in higher echelons.

Baumol and Quandt (1964) and Day (1967) argued that rules of thumb can be efficient economic strategies when decisionmaking is costly and when decisionmakers have imperfect information. Rules of thumb are argued to be a more realistic way that people make decisions than rational choice, in which the choice maker weighs all costs and benefits (Etzioni 1987). In many cases, these variables are unknown or too many.

Rules of thumb can reduce information search costs. Frank (1987) argues that to gather the information and do the calculations required for a rational choice decision would consume more time and energy than anyone has. Rational choice decisionmaking would lead to the ability to make only a few decisions each week, leaving many important decisions unmade. Rules of thumb reduce this cost and allow for quicker decisionmaking. They can produce optimally imperfect decisions in which the marginal cost of additional information gathering is equal to its marginal gross yield (Baumol and Quandt 1964). Rules of thumb are used either due to rational trade-offs between accuracy and effort or due to cognitive limitations because of difficulty in decisionmaking (Gigerenzer and Gaissmaier 2011).

Rules of thumb are generally provided to individuals through informal communication or learned behavior within their families, communities, or the organizations they participate in; or they are products of their previous experience. Rules of thumb and their underlying core capacities can be hardwired by evolution, created through individual learning, or created through social learning. Gigerenzer, Todd, and ABC Research (1999) hypothesize that natural selection has set humans up with a set of heuristics, each of which we can readily learn to apply as appropriate to a specific environment, or that the building blocks of heuristics might be readily recombined to create novel heuristics suitable for a novel task. An important component of both human and animal environments is social, and many rules are likely derived from others (Hutchinson and Gigerenzer 2005). In this way, our study attempts

to “short circuit” the informal communication or learned behavior way rules of thumb have been historically developed and instead tests rules that we designed and delivered through online and physical channels.

Rules of thumb are most effective for decisions that are frequent and involve learning. They may not be successful when applied to infrequent decisions such as taking out a mortgage for a house or a loan for a car. However, it is unclear how many times and how frequently a rule of thumb must be repeated before it becomes a habit.

Pereira-Mendoza (1980) examined the effectiveness of teaching heuristics to 10th grade math students and found that heuristics alone performed better than heuristics combined with content. The author found that students can be taught to apply at least one heuristic to a novel problem and that it is better to teach heuristics alone than to combine the instruction with the teaching of mathematical lessons. It is unclear how these findings generalize to other contexts.

In a similar vein, Hutchinson and Gigerenzer (2005) found that humans use simple heuristics and that they work surprisingly well. Simplicity may be the key in heuristic creation.

Regularly Applied Rules

Rules of thumb have been found to be a successful method for optimal decisionmaking in many areas (Baumol and Quandt 1964; Fischer, Drexler, and Schoar 2014). They are used in the medical profession to help doctors handle the huge number of decisions they encounter (Andre et al. 2002). They have also been found to be used by animals to evaluate the benefits and costs associated with a particular behavior (Barnard and Brown 1981; Bergelson 1985; Blaustein and O'Hara 1982; Pyke 1978; Stamps 1988). For example, Bouskila and Blumstein (1992) found that natural selection will not always favor perfect estimates because there is some cost in acquiring accurate information. The authors found that there is a zone of tolerance in which inaccurate perceptions, such as rules of thumb, perform just as well as perfect knowledge for predation.

There is a fairly expansive literature examining what types of rules of thumb are used in everyday decisionmaking. Most authors describe rules of thumb synonymously with heuristics (Andre et al. 2002; Gigerenzer and Gaissmaier 2011; Winter, Schlafmann, and Rodepeter 2011). Rules of thumb, or heuristics, are shortcuts to simplify search and choice. These general rules of thumb may be distinguished from those used in an educational setting in which an underlying motivation or rationale is given for applying the rule.

Gigerenzer and Gaissmaier (2011) summarized the most commonly used heuristics in everyday life, as well as what research exists on them, examining how often and when people use them and how close they are to optimal decisionmaking. These heuristics are distinguished from rules that might be transferred, but they are helpful to understand when creating transferable rules. They argue that individual decisionmaking heuristics fall into the following categories and subcategories: recognition-based decisionmaking, one-reason decisionmaking, and trade-off heuristics.

Rules Used in Financial Decisionmaking

Consumers are likely to use rules in complex decision environments in several situations: (1) when they wish to reduce perceived risk in their product purchase or investment, (2) when they lack expertise to evaluate complex information, and (3) when involvement is low (Benartzi and Thaler 1999; Foxall and Pallister 1998; Martenson 2005). Hauser and colleagues (2009) tested different models of heuristics and found that the sequential use of heuristics predict consumer choices well. In particular, heuristics are important early in the decision process to form a consideration set, which consists of eliminating most products from further consideration. Once the consideration set is formed, consumers evaluate the remaining options more carefully (Gaskin et al. 2007; Reisen, Hoffrage, and Mast 2008).

It is of little surprise that financial investors also use heuristics to help them make decisions. Simon (1955) argued that investors “satisfice,” or attain acceptable approximations to their optimum positions, through trial-and-error processes based on the use of behavioral heuristics. Lo (2004) added that when markets change, participants move toward the new satisficing portfolios by using heuristics in a trial-and-error process.

Two studies have examined the use of rules of thumb on stock market performance and found contradictory outcomes. Boyd (2001) found that the use of heuristics in investment choices leads to disappointing results in a down market and that heuristics can actually be beat by pure ignorance. Ortmann and colleagues (2008), however, found that simple heuristics beat various capital stock-picking contest indices. They responded to Boyd’s conclusions by arguing that the difference in results was due to a difference in the subject pool (pedestrians versus college students) and that participants’ recognition of stocks was idiosyncratic and resulted in disproportionate losses or gains.

Considerably less research exists examining which heuristics consumers use in debt and spending management. Kahneman and Tversky (2000) found that individuals may tend to overvalue certainty. In addition, people tend to misjudge the likelihood of low-probability events. People tend to ignore very

low probability events, but then act after their occurrence as if the probabilities were temporarily higher than in actuality. This tendency may factor into consumers' errant predictions of future adverse events such as job loss or illness (Kahneman and Tversky 2000; Tversky and Kahneman 1982).

Research identifying useful rules of thumb for credit card usage is extremely limited. Memorable rules related to credit card use in particular are difficult to find. That said, we were able to identify a small set of tips for credit card usage that have already been advanced. We list some examples below.

- Don't apply for multiple credit cards at the same time (because of the effects of "hard pulls" on credit scores)—*Forbes*
- Use one or two credit cards responsibly (not none)—*Forbes*
- Pay two times the minimum monthly payment—Bank of America
- Pay credit card bills twice a month rather than once to avoid missing due dates—Bankrate.com
- Pay 3 to make 3: to pay off a debt in about three years, pay off new charges plus triple the initial monthly interest owed—Soll, Keeney, and Larrick (2013)
- Follow the 20-10 rule: limit credit card debt to 20% of annual income, and credit card payments to 10% of monthly income—USBank
- Don't use more than 30% of your available credit limit on a single card—*Forbes*
- Never let your credit card balance reach its credit limit—USBank
- Don't buy things that you don't need immediately; wait 48 hours—Creditcards.com

Financial Education and Rules of Thumb

Financial education relying on rules of thumb may be effective at improving credit card usage for a number of reasons. Rules of thumb are easy to understand, and consumers may grasp the point of the rules of thumb and adopt it more readily than a complex financial calculation. They may also be more likely to implement the rule of thumb correctly, making it more effective than conventional financial education approaches. Rules of thumb are also easy to follow, which increases the probability that consumers will adopt new behaviors and stick with them.

Timing and Frequency

One benefit of a rule of thumb intervention is that it can be implemented at different times during the consumer choice process. For instance, a rule could be delivered at the time of decisionmaking, before the decision, or at frequent or infrequent intervals throughout the process.

Priming at the point of purchase may be the most effective time to deliver a rule of thumb. Some observers believe the rule should be implemented as close in time to (but before) the decision as possible and that the timing of the effect should be measured closely.² Further, an experiment could test how long the behavior changes after a rule is delivered to determine whether the effects of a rules of thumb intervention decay more slowly than do the effects of a more complicated message.

Little research exists to help guide decisions about the timing and frequency of rules of thumb. One study found it did not matter much whether a message reminder was sent on the payment due date or one or two days before the due date (Karlan, Morten, and Zinman 2012). However, these results should be tested for robustness. More research is also needed to determine how many times a rule must be repeated before it becomes a habit.

Delivery Mechanisms and Channels

Rules of thumb can be delivered through various mechanisms and channels, including e-mail, online portal, physical mailer, text messaging, and phone application.

E-mail messaging. E-mail messaging is a minimally intrusive method for delivering messaging, and it allows for more space for text and images than do alternative methods of messaging. However, e-mail messages are easier to ignore or miss because people generally tend to receive more junk e-mails than other types of messages. In addition, it is fairly easy to opt out of e-mail messaging, which could potentially create a high attrition rate for a study.

Online portal. Another option for delivering rules to consumers is via banners in the online portal of their bank accounts. Delivering the message via online portal allows for rule delivery close in time to when participants are reviewing their balances, which may be an opportune time to prime them because it is when they are most aware of their debt levels.

Physical mailer. Although physical mail has a reputation of being ineffective in an electronic age, some studies have not confirmed this assumption. These studies show that physical mailers are twice as likely as an e-mail to motivate a customer to recommend an offer to a friend or acquaintance. E-mail,

however, performed strongest in activating recipients to search for further information on specific offers. Surprisingly, older respondents were shown to value e-mail advertisements more than younger respondents, because younger respondents see e-mails “disappearing in the flood of advertisements they receive.”³

Text messaging. Text message-based interventions have been found to be successful at altering a number of behaviors, including inducing weight loss (Patrick et al. 2009), promoting sexual health (Lim et al. 2009), and reducing smoking (Rodgers et al. 2005). Unlike e-mail, text messages usually do not have a subject line that can be read without opening the message (Rettie, Grandcolas, and Deakins 2004), which makes it more likely that the recipient will read the entire message.

Text messaging, however, is an intrusive delivery mechanism that is likely to have high attrition rates due to people asking to be removed from the service. In addition, financial institutions may be hesitant to deliver messages via text because their customers might be unhappy to receive such an intrusive message. Recipients may also be charged for the text by their phone provider, which may also create unease among their customers. It is possible to have the sender pay for the text message for some carriers through “free to end user messaging,” but not all carriers allow for this option, and the sender may not know the recipient’s service provider.

In addition, many financial institutions do not have the phone number of each client in their database, and when they do they may not know whether it is for a cell phone or a home phone. These factors may make a broader rules of thumb program using text messaging less feasible.

Another disadvantage of text as a delivery mechanism is that there is a 160-character limit, which limits the amount of explanation that can go along with the rule. MMS messages (an extension to standard text messaging) can incorporate pictures or video clips, but this option may be more costly (Rettie, Grandcolas, and Deakins 2004).

Phone application. A phone application (app) could also be used to deliver rules; for example, an app could be created that would allow the user to interact with the rules and see them at specified times. The app could send the rules to consumers when the consumer enters a store, if it is synced with the user’s GPS.

Phone applications can provide greater timing benefits than text messaging, and they may have advantages beyond short texts. For instance, the Merry Miser app allows users to track their expenditures and savings over time. It also helps users control spending by prompting their assessments of

purchases before purchase and then at intervals after the purchase. Interactive interfaces may also provide additional entertainment for the consumer, which may increase uptake of the rule.

Rules of Thumb for Credit Card Revolvers

Rules of thumb-based education techniques may be especially appropriate for improving credit card literacy and behavior because credit card decisions are repetitive and frequent. A rules of thumb approach for credit card revolvers could be successful for two main reasons. First, rules of thumb are simple to follow. Second, the effect of rules of thumb may decay less rapidly than those of traditional financial literacy training because they can be designed to be simple and easy to remember. It is possible that rules will remain with a consumer much longer than traditional education would, changing behavior for a longer period of time.

Only two studies have examined the effectiveness of using rules of thumb in financial education. Drexler, Fischer, and Schoar (2014) undertook an RCT comparing the effects of standard accounting-based financial business management education to a rules of thumb-based program for microentrepreneurs in the Dominican Republic. They found that the participants who received rules of thumb-based training were significantly more likely to keep accounting records, calculate monthly revenues, and improve their business management practices overall. Participants in the traditional training did not change their practices. However, both of the tested interventions also included a training component, so it is unclear whether the results were in response to the rules alone or the training component as well; the results may not hold for rules of thumb in isolation. No evidence is available as to whether the study results generalize to other classes of individuals (i.e., non-small-business owners) and countries.

The second paper, by Skimmyhorn and colleagues (2015), estimated the effects of two financial education methodologies (principles based and rules of thumb based) by using a field experiment in a sample of high-performing undergraduate students. They found that both teaching methods increased cognitive and noncognitive measures of financial literacy. However, they found few differences between the two methods, and when differences did exist, principles-based education won out. In particular, principles-based education generated larger gains in self-efficacy, and the rules of thumb method actually reduced individuals' willingness to seek advice. They suspect the rules of thumb approaches may be more effective for audiences with lower levels of human capital, but because their sample included mostly students with high levels of human capital, they could not detect this effect.

A limitation of the study is that Skimmyhorn and colleagues (2015) only looked at self-reported financial outcomes and measures and test scores, not actual behaviors. In addition, they tested rules of thumb only in a classroom setting rather than through messaging, which can be delivered closer in time to the point of decisionmaking and comes in bites that are more easily digestible and memorable. Delivering rules via messaging can also involve repetition, making it more likely that the participant will remember the rule and turn it into a habit.

This current study extended the previous research by testing the effectiveness of a messaging-based rules of thumb intervention, taking advantage of the “just in time” potential of the method. We measured behaviors and financial outcomes rather than self-reported measures by examining a variety of detailed administrative data over time. We focused on several aspects of credit card usage and repayment, but not on credit card selection or application. (Consequently, we do not discuss literature related to card selection or application processes.)

Chapter 2. Rule Design Process

To design the rules of thumb and delivery methods for this study, we drew on guidelines from previous research and collected data directly from consumers. At each step in the process, we took a consumer-centric approach to developing the rules of thumb. That is, we looked at the problem and potential solutions from the perspective of the intended beneficiaries and obtained consumer input to develop and refine the final product.

Our design process had six phases:

1. *learning from previous research and experts*—improving our knowledge of what works when designing a rule of thumb
2. *listening to consumers*—gaining deeper insight into the behaviors and attitudes of the project's target audience
3. *brainstorming ideas*—generating a wide range of possibilities for further testing
4. *vetting the ideas*—reviewing the possibilities internally and externally to narrow the focus
5. *identifying a testing partner*—finding a suitable entity to implement the experiment
6. *finalizing the intervention*—working with the implementation partner and consumers to refine what would be tested

This chapter lays out the process by which we selected the rules and designed the intervention. We expect this chapter will be useful for practitioners and those interested in designing a rule of thumb intervention; others can skip ahead to chapter 3 on study design and randomization, while making note of the finalized rules we tested.

Learning from Previous Research and Experts

To begin, we drew on the literature and expert opinion in behavioral economics, psychology, and marketing to guide the design of the study; this learning is outlined in the introductory chapter of this report. From this research, we compiled insights to help guide the design and delivery of the rules of thumb-based intervention and prevent unintended consequences. These insights include the following:

- Keep the rule simple.
- Use the rule for behaviors that are frequent and repetitive.

- Appeal to the individual's intuition rather than reason.
- Frame risk in such a way that the consumer understands it.
- Deliver the rule as close in time to the decision as possible.
- When choosing a delivery channel, weigh the intrusiveness of the message against the likelihood the customer will read the rule.
- Avoid unintended consequences such as debt reshuffling and selection of inferior alternatives.

Listening to Consumers: In-Depth Interviews

We next performed in-depth interviews with an independent set of credit card revolvers to gain a richer understanding of their credit card use and the potential effectiveness of various rules of thumb. These interviews focused on the following issues:

- attitudes toward credit cards and perceptions of their own credit card use
- challenges faced in managing credit card use
- spending and payment behaviors, especially how they use cards for discretionary spending, and their coping strategies for managing credit card debt
- awareness and use of rules of thumb to help manage credit card use
- behaviors that could be most influenced by a rule of thumb
- effective ways that we could deploy rules of thumb, including source and channel for delivery

We recruited four consumers through Focus on Boston, a consumer interview recruiting firm. Face-to-face conversations enabled us to observe emotional and physical reactions to questions in addition to obtaining verbal responses. To ensure an effective process, we developed an interview guide with clear objectives and specific questions, but we also allowed the consumers to tell their stories and engage in conversation. We asked interviewees to bring a copy of a recent credit card statement so we could compare perceived or desired behaviors with actual activity.

We employed a screening tool that helped select interview subjects who met specific criteria.

Potential subjects

- carried a credit card balance for at least three consecutive months in the last six months
- generally used credit cards for nonessential spending
- generally did not pay off the full card balance
- were the primary household spender and payer of credit card bills
- had an annual household income between \$25,000 and \$100,000

The following findings were gleaned from the discussions with these consumers.

Attitudes

All respondents found credit cards to be a useful financial tool. They saw the benefits of credit card use to include increasing their credit score, accessing certain products and services, and earning rewards. They also acknowledged drawbacks that could result in overuse, including easy access for impulse spending and the temptation of cash-back rewards. One consumer rarely used cash and considered the credit card an essential tool for everyday life.

Challenges

The credit card debt of those interviewed ranged from \$800 to over \$10,000. Respondents were aware of their need to manage card use better and address the debt, but it was clear that this desire did not always control their behavior. One consumer's card had gone to collections, forcing her to rely on family to help pay down the debt. Another was relying on his card as he coped with debt, a divorce, and a struggling business. Another counted on using his tax refund each year to pay off his card balance but did not receive a large enough refund one year.

Spending Behaviors

All the subjects interviewed used their card for discretionary spending but were trying to limit card use for small nonessential spending. One consumer had largely shifted those purchases to her debit card,

but another consumer who reported trying the same strategy had many small transactions on his credit card statement. Another who said she only used her card for large purchases explained the small transactions on her statement as emergency uses (when she did not have cash or debit card on hand).

Payment Behaviors

The interviewed consumers usually paid more than the minimum payment each month but less than the outstanding balance. Their thoughts varied on how much more than the minimum payment they wanted to pay. One tried to pay at least \$10 more than her \$20 minimum payment; for others, the amount varied depending on factors such as balance amounts of other cards. One consumer was trying to make two payments a month. Most were not paying close attention to their statements (for items such as accrued interest) and were unaware of the Credit Card Act disclosures.

Rule of Thumb Awareness

Consumers were not aware of any specific rules of thumb for credit card use, but some had their own rules: not to charge small items so they would not be paying interest on things such as coffee, not to use the card for regular expenses such as gas and food, spending only what can be paid off every month, and paying a little more than the minimum payment each month.

Behavior Targets

Based on the conversations with consumers, a few behaviors stood out to consider addressing through rules of thumb designs:

- translation of awareness of interest accrual into an understanding of the true total cost of purchases
- reminders to avoid card use for small nonessential spending and to curb impulse buying
- demonstrating significant benefits of even slight changes in payment behavior (increasing the amount paid above the minimum each month or increasing the frequency of payment)

Delivering Rules of Thumb

Although consumers expressed openness to receiving rules of thumb from a financial institution with which they had a trusted relationship, one was skeptical that the institution's incentives and his could be aligned. All were already using online banking for their credit cards to some extent. They varied in their relative interest in hearing rules of thumb through online content, e-mail, or text alerts.

Brainstorming Rules of Thumb

The concepts and ideas that we discovered in the first phase of work served as a springboard for thinking creatively and generating a large number of potential rules of thumb. The research and interviews pointed to the following topic areas, which became the focus of brainstorming sessions:

- limiting credit card use for nonessential spending
- managing credit card use for impulse spending
- understanding the cost of card use
- strengthening awareness of credit card use
- paying down credit card debt faster
- improving management of credit card debt

We purposefully allowed for a wide-ranging conversation with the goal of generating as many ideas as possible. The brainstorming resulted in over 30 possible rules of thumb among the six topic areas, covering a breadth of behaviors focused on very specific challenges faced by credit card revolvers.

Vetting the Ideas and Selecting the Rules

We next vetted the rules based on the goals for the project, the plans for evaluation, and what we learned from the research and consumer interviews. We used this shorter list of rules in a second round of in-depth consumer interviews with the goal of identifying just two rules of thumb for testing.

This phase of our design process involved several steps:

- developing a set of evaluation criteria for internal use

- applying the criteria to eliminate less promising potential rules of thumb
- creating a ranked list for external testing segmented into categories of spending behavior and payment behavior, editing those categories for clarification, and adding possible research variations
- testing the proposed rules of thumb with consumers
- selecting the most promising proposed rules of thumb

For the internal review process, the evaluation criteria were as follows:

- *design strength*: Is the rule simple? Is it actionable? Is it objectively measurable?
- *relevance*: Does the rule address a problem to solve or a behavior to change? Does it help fill a knowledge gap in the understanding of rules of thumbs?
- *deliverability*: How would the rule need to be communicated to consumers? What would be the timing and frequency considerations?
- *data requirements*: What type of data would be required to evaluate impact effectively? Are those data available? Are they feasible to collect?
- *consumer insights*: Do the rules reflect the knowledge gained from the in-depth interviews and review of the literature about consumer behavior and decisionmaking?

The internal evaluation process resulted in a ranked list of six possible rules of thumb that became the focus of the in-depth interviews with consumers. We tested the proposed rules of thumb with consumers through a second round of in-depth interviews to gauge consumer reactions. To do so, we randomized the order of the proposed rules of thumb and recorded reactions from the consumers. We focused on these questions:

- Would they use the rule of thumb?
- How would the rule of thumb influence their behavior?
- What specific behavior would the rule of thumb change?
- Does the rule of thumb have the potential to effectively change the targeted behavior?
- What variation (if applicable) would be most effective to test?

At this stage, we interviewed seven consumers. Based on the consumer feedback, we selected the four potential rule of thumb concepts shown in box 2.1 for further review.

BOX 2.1

Potential Rule of Thumb Concepts

1. Use cash instead of your credit card when making a purchase below \$20.
 2. Before making a purchase on your credit card, ask yourself how many hours you have to work to pay for this purchase. Is the purchase worth it?
 3. Every time you use your credit card for a purchase, consider that you are paying at least an additional 20 percent on your purchase.
 4. Pay off your entire credit card balance each month or pay at least two times your monthly minimum payment.
-

Eventually, after discussions with the testing partner (see below), we selected the first and third rules of thumb in box 2.1 for presentation to the testing partner. Both rules address spending, rather than payment, behaviors.

The dollar amount in the cash under \$20 rule was chosen based on the initial in-depth interviews in which participants indicated that \$20 was the amount that resonated well and the amount of cash they felt comfortable carrying. We reviewed the testing partner's transaction data to ensure that a sufficient percentage of revolver purchases were below \$20 to maximize the likelihood that this rule would be effective. However, we were not aware that the overall number of purchases was lower than national averages. The selection of 20 percent as the amount to use in the 20 percent added rule was chosen based on the calculations of interest paid on average outstanding credit card balances. The first set of calculations was made based on national data, and the second set used data from the test partner.

For the national estimates, we chose the beginning balance for the calculation of \$3,364 based on the April 2013 Federal Reserve G.19 Consumer Credit Report and the US Census Bureau's 2012 population estimate.⁴ We chose an APR of 13.02 percent based on the current fixed interest rate according to Bankrate. Finally, because there were no data or literature to inform the choice of the average payment over the minimum, we chose a payment of \$25 above the minimum based on our

knowledge of the market and robustness checks. The final calculation of percentage paid above purchase price based on these assumptions is 22 percent.

The second set of calculations was based on data from the test partner on their members. From the data, we see that the average beginning balance among their credit card revolvers was \$5,715, the average APR was 10.11 percent (with a minimum and maximum of 6 and 17.99 percent, respectively), the average amount paid was \$396, and the average amount of fees incurred was \$5. Using these numbers, we calculated that a revolver paying the minimum balance each month would be paying about 22 percent above the purchase price of an item in interest and fees over a three-year period; a customer paying the average payment would pay about 16 percent above the purchase price of an item over three years. These numbers led us to conclude that 20 percent was a reasonable estimate as long as qualifiers are used to emphasize that the number is just an estimate and is only relevant for revolvers. Furthermore, 20 percent is a familiar number for people to use, it is easy to calculate, and it should be large enough to produce a behavior change on the part of consumers.

Identifying a Test Partner

To select an implementation partner, we explored a range of partner types including banks, personal financial management sites, credit unions, and nonfinancial institutions such as online retailers. Finding more interest among credit unions than banks or personal financial management sites, we narrowed the list to four potential credit union partners that fulfilled the partner criteria and showed interest in the study. Arizona Federal Credit Union (Arizona Federal) was selected as the final partner because they met and exceeded all the stated criteria and displayed characteristics that made it clear they were engaged and invested in undertaking the study. Most importantly, they demonstrated a sincere interest in helping their customers improve their finances through a rules of thumb approach.

Selection Criteria

The criteria we developed for selecting a testing partner are shown in table 2.1.

TABLE 2.1

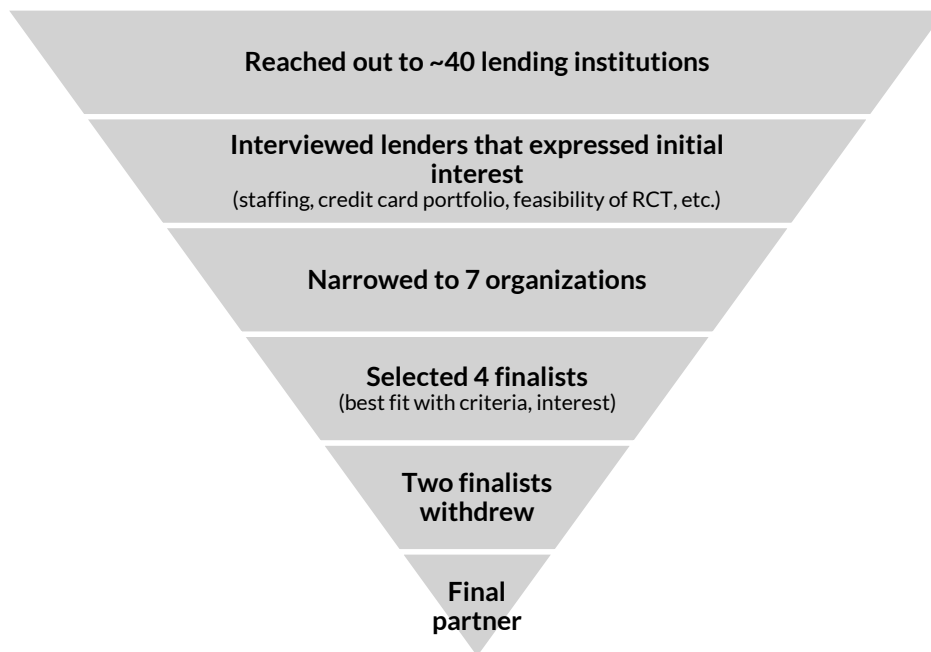
Criteria for Partner Selection

Aspect	Purpose	Metrics
Demographics	Partner needs to serve financially vulnerable consumers	Demographics of credit card consumers; current financial education efforts
Regulatory	Partner not under primary authority of the Consumer Financial Protection Bureau	Total assets do not exceed \$10 billion
Implementation	Partner must be able to implement the test as designed	Staff interest in rule of thumb intervention; resources available; at least 10,000 credit card customers with at least 3,000 revolvers; capacity and experience delivering messages to borrowers via SMS, e-mails, and web ads; able to implement study within timeline
Evaluation	Partner must be interested in evaluation and able to meet evaluation needs, including data sharing and customer segmentation	Administrative and transaction-level data available and possible to share; survey collection possible; randomization feasible; able to target and track subset of consumers

We cast a wide net to attract interested partners, reaching out through connections with the Filene Research Institute, the National Credit Union Foundation, state credit union leagues, and individual credit unions. The criteria provided the basis for an interview guide to ensure initial conversations accurately gauged the suitability of each potential partner. We conducted follow-up interviews with promising candidates to strengthen our understanding of the institution, its customers, and its overall ability to satisfy the criteria. We then held multiple rounds of interviews with a smaller set of the most promising partners. Figure 2.1 illustrates the selection process and the number of institutions involved at each stage.

FIGURE 2.1

Partner Selection Process



Based on the criteria established for the project and the motivation of the institution's key stakeholders, we chose Arizona Federal as our testing partner. Arizona Federal was the most engaged candidate from the beginning of the selection process. They were interested in the project both for the immediate benefits it would provide their membership and for the robust evaluation design of the study, which they believed would produce informative and reliable results to help assist their members long term. Arizona Federal also provided an ample number of credit card revolvers. This large sample population combined with extensive use of technology by Arizona Federal also offered the greatest level of flexibility with delivery channel design.

Arizona Federal was established in October 1936 with fewer than 50 members and an average account balance of \$5. The credit union has since expanded to over 147,000 member accounts (for 106,000 members) at 17 branches throughout the metropolitan Phoenix area and manages over \$1.3 billion in assets. They are a member-owned, not-for-profit financial cooperative for those who live, work, worship, or attend school in either Maricopa County or Pinal County.

Pinal and Maricopa Counties, in which the majority of Arizona Federal clients live, are demographically diverse. According to the 2010 US Census, Pinal County is 58.2 percent non-Hispanic white (white), 4.5 percent non-Hispanic African American (African American), 4.5 percent non-Hispanic Native American (Native American), 2.0 percent non-Hispanic multiracial (multiracial), 1.9 percent non-

Hispanic Asian American (Asian American), and 29 percent Hispanic of any race. Pinal County's demography almost exactly mirrors that of Arizona as a whole. The share of Pinal County's residents who are African American is about 9 points lower than the national average, and the Asian American share is also lower than the national average. There are sizable Native American communities in Pinal County and Arizona, including parts of the Tohono O'odham Nation, the Gila River Indian Community, and the San Carlos Apache Indian Reservation, as well as the entire Ak-Chin Indian Community.

Maricopa County has a very similar demography to Pinal County, though the share of Native American residents is slightly lower and the share of Asian American residents slightly higher. Phoenix is entirely contained in Maricopa County.

Arizona Federal has a robust technology infrastructure that involves collecting information and analyzing data to improve their member services. In 2012 and 2013 they underwent a realignment that included an upgraded technology infrastructure, quarterly credit reporting, and a push toward digital services. Clients can interact with Arizona Federal online through an Internet banking portal, e-mail, phone application, or text message account alerts. Their technology infrastructure offered diverse delivery channel options with the ability to tailor and randomize interactions with their customers. As all of Arizona Federal's data sit in-house, they were able to format the data, deidentify them, and share them readily.

Finalizing the Intervention

The final step in designing the rules was to take the selected concepts and transform them into an actual product to be used for the intervention. This step required the input of creative professionals to refine the language, craft designs, and build mechanisms for delivery.

We worked with a team of copywriters to craft rules of thumb with the features identified as preferable, including memorable language that is clear, easy to understand, and encourages taking action. We also compared what we had learned through the literature review and consumer interviews about effective delivery mechanisms with Arizona Federal's capabilities and experience. We contracted with a design firm to create design families of advertisements with variations to which consumers would be exposed.

The rules of thumb the copywriters created typically included three sentences. The first—created to be the most memorable—was a general statement designed to tell consumers what action to take,

but it gave very little information about the specifics. The second sentence provided additional direction and detail, and the final sentence was a clear reframing to reduce any confusion. Figure 2.2 shows an example of the three-sentence rule construction.

FIGURE 2.2

Example of Three-Sentence Rule Construction

	Purpose	Phrase
1.	Memorable general statement	Don't swipe the small stuff.
2.	Additional content	Use cash when it's under \$20.
3.	Reframing for clarification	Avoid credit cards for smaller purchases.

The copywriters produced three versions of each rule of thumb (see box 2.2) for consumer review to test which framings were most effective. Each variation played off common sayings.

BOX 2.2

Initial Options for the Cash under \$20 Rule and the 20 Percent Added Rule

Option 1	Option 2	Option 3
The cash under \$20 rule		
■ Don't swipe the small stuff.	■ Below \$20?	■ Cash puts you in charge.
■ Use cash when it's under \$20.	■ Show some bill power.	■ Use real money below \$20.
■ Avoid credit cards for smaller purchases.	■ Use cash to pay for smaller purchases.	■ Pay cash instead of charging smaller purchases.
The 20 percent added rule		
■ Credit comes with approximately a 20% cover charge.	■ Credit cards take tips—approximately 20% for every purchase.	■ Credit keeps charging.
■ Every time you charge a purchase, you get charged, too.	■ Include credit costs when you're adding up the total price.	■ It adds approximately 20% to the total.
		■ Credit cards add additional costs to every purchase.

Although we initially identified text messages, e-mails, phone calls, direct mail, and web banner ads as possible implementation channels, consumer feedback told us phone calls were considered too invasive. Arizona Federal did not have enough consumers participating in text messages for that method to add value for evaluation. Consequently, the team created design families for three delivery

channels: physical mailer, web advertisement, and e-mail. Within these delivery modes, designs were created for magnetic calendar mailers, dynamic and static banner advertisements for the web, and multiple versions of e-mails.

The design firm created four design families to consider:

- a traditional green color scheme that closely replicated current financial advertising
- a trendy scheme that included icons designed to appeal to younger consumers
- a chalkboard design
- a bold blue design using large block lettering and simple colors to emphasize the messaging

When consulted, Arizona Federal did not request any changes and expressed willingness to implement any designs chosen by consumers. To improve the feedback from consumers, we eliminated one of the four proposed design families (trendy) to avoid offering an excessive number of choices.

We then recruited 11 new consumers for testing and presented them with unformatted rules of thumb to obtain feedback on the individual variations in language and find out what they thought the rule of thumb was asking them to do (figure 2.3). We asked them to share their preferred rule of thumb, the most memorable rule of thumb, and the rule of thumb that seemed most trustworthy, and to provide any other feedback they wished. When presenting the rules of thumb, we randomized their order. We then took each consumer's preferred rule of thumb, put it into the design family environments, and shared those in a randomized order (each design family consisted of web ads in a fake account management screen and a printed magnet). We asked for feedback about preference, trustworthiness, and likelihood of paying attention. Finally, we exposed consumers to three e-mail design themes and asked for feedback on readability, preferences, and trustworthiness.

FIGURE 2.3

Preferred Message



Consumers greatly preferred “don’t swipe the small stuff” and “credit keeps charging” over the other rules of thumb. Among the design families, consumers overwhelmingly preferred the bold, blue theme for its eye-catching look and for providing the best balance of being engaging, interesting, and trustworthy.

The design firm created three types of e-mails to increase the variation to which consumers would be exposed. A typography-driven version was in blue and featured large font and a bold contrast, a tip-driven version had a tip on the top with additional text, and an imagery-focused design had a large picture. Consumer feedback leaned toward the typography-driven e-mail style. The majority of consumers said they tend to read only headlines and larger font portions of e-mails and rarely read text blocks, and they indicated a preference for boldfaced font.

Defining a Revolver and Choosing the Sample

We chose to define revolvers based on Arizona Federal’s internal definition and in such a way that our definition would correspond with the definition put forth in the Credit Card Accountability, Responsibility, and Disclosure (CARD) Act (CARD Act Report 2013). Arizona Federal described a problematic revolver as someone who has revolved more than 2 months out of the past 12 months (i.e., the person is revolving in a suboptimal manner). Because we had only 6 months of preintervention data,

however, we designated revolvers as those people who revolved at least 2 months of the 6 months of the preintervention period.

The CARD Act defines a revolver as someone who is not a “transactor” (i.e., someone who pays their balances in full for two consecutive months). Thus “revolvers are consumers who are required to make a payment but do not pay their balance in full for two consecutive months” (CARD Act Report 2013, 95). However, the CARD Act does not define a specific period within which this revolving must take place, and taking their strict definition of someone who revolved just once would place some people in our sample who may not be problematic revolvers—that is, they may be acting in their own best interest. For example, at certain times during the year sales on large items are so great that it is better for someone to purchase the sale item with a credit card and pay interest on that credit card debt rather than wait to purchase the item at full cost. Only including individuals who revolved for at least two of the six months of preintervention data helped us reduce the likelihood of including utility-maximizing revolvers in the study.

Delivery Mechanisms

We elected to deliver rules via e-mail, online banner, and physical mailer. E-mails were sent twice a month to each participant, with two subgroups for each rule to examine differences in delivery timing (discussed below).

From the in-depth interviews, we learned it is imperative to feature the rule in the subject line of the e-mail to optimize the penetration rate. But we also learned to vary the title and content of the e-mail so the recipient would not get fatigued with the same phrasing. Finally, we included a link to a more in-depth explanation of each rule on Arizona Federal’s website to provide more information should the participant be skeptical of the rule or want to learn more.

We also delivered the rules to some participants via a banner in the online portal of their bank accounts, which is also an inexpensive option for the financial institution. This option allowed us to examine whether a more constant reminder can be as effective as a message that is delivered at a specific point in time.

Arizona Federal is capable of randomizing what consumers see on various screens after members log in as well as in their online mailbox. Their online portal can deliver targeted messages to specified segments in the form of a pop-up, rollover, banner, or static ad. The messages remained on the user’s page throughout the course of the study, varying each month. The placement and design of the message

changed monthly to reduce the likelihood of marketing fatigue. These placement design changes were consistent across all intervention groups.

The final method we used to deliver the rules was physical mail. To increase the likelihood of the read rate of the physical mailer the rule was placed on a magnetized calendar the customer could keep and read multiple times. We sent the 2015 physical mailer once in December 2014 to coincide with the usual holiday gift that Arizona Federal sends to its members. December is a prime time to send a magnetized calendar to households because they can put it up in the New Year and keep it up all year long to reinforce the message.

Rule Timing

Participants received at most two messages per month through any one delivery mechanism. The in-depth interview research showed that the threshold for message fatigue was two messages of the same form in one month and that any higher frequency would be considered annoying.

The first subgroup within each rule always received the e-mail on a Friday to test whether delivery on a day that is likely to be a payday and/or a high-spending day would have a greater effect on behaviors. The second subgroup within each rule received the rule on a random day in the first and third week of each month.

Because it was beyond the study's technological capacity to deliver the rule at the time of purchase, we instead delivered the rules at random intervals throughout the study period.

We tested a variable delivery schedule, which the psychology literature reports as an effective learning schedule for acquiring and maintaining new behavior or halting negative behaviors (Hanley, Iwata, and Thompson 2001; Jenkins and Clayton 1949; Keesey and Kling 1961). This variable delivery schedule was tested against a more unvarying schedule in which the rules were always sent on a Friday.

The Final Product

We made a few refinements to the near-final products to allow for greater variation and improve consumer engagement. No changes were made to the physical mailer (the annual calendar magnet). For the web ads, we added a white, bold dynamic ad to the two blue, bold designs (one static and one dynamic). We added tip-driven e-mails and created three versions of those and of the typography-

driven style e-mail. Although the tip-driven e-mails did not test quite as well with consumers in the interviews, we kept them to add variety.

Arizona Federal wanted each rule of thumb to be supported by background content for the consumer, so a landing page was created for each rule of thumb to provide details about the source and the rule. The landing page could be reached through a “Learn Why” button in the e-mails and web ads.

The design process yielded two rules of thumb: “don’t swipe the small stuff” and “credit keeps charging.” We developed these rules in a blue, bold design family available through three channels: magnetic calendar, web ads, and e-mails (with several variations for the web ads and e-mails). Images of the final product are included in appendix A.

We selected the wording of the rules such that they would not imply that debit cards are a preferred method of payment over credit cards. Because the intervention targeted spending rather than bill payment, we anticipated that debt reshuffling due to the intervention was unlikely. However, to verify that the rules did not induce debt reshuffling, we purchased and analyzed debt data from a large credit bureau to ensure any effects on the Arizona Federal cards were not due to debt being reshuffled to other lines of credit.

Additionally, we worked with Arizona Federal to understand their overdrafting rules, and found that most of their customers have set up their accounts in such a way that they do not incur charges from overdrafting their accounts. For instance, many Arizona Federal clients have selected into an “overdraft path” that allows money to be automatically deducted from another source when their debit card source is empty, such as from a line of credit, a credit card, or from a savings path, in any order. Customers may also sign up for “overdraft privilege,” which allows them to overdraft up to \$750 with a fee of \$35 for every purchase.

We also examined Arizona Federal’s ATM fee structure to determine whether we induced customers to pay additional fees by withdrawing cash from other banks’ ATMs rather than using their credit cards for purchases. Arizona Federal is a member of the CO-OP network, so if their members use that nationwide network they are not charged a fee by the ATM owner. Members are, however, responsible if the ATM owner or institution is outside the network and charges a fee. In addition, if the member uses a non-Arizona Federal ATM more than four times in one month they are charged \$2.00 for each additional withdrawal at one of these ATMs. Unfortunately, we were not able to directly test whether the rules affected ATM fees because Arizona Federal does not collect individual-level data on these fees. However, we were able to test whether ATM withdrawals increased as a result of the rules.

Chapter 3. Study Design and Randomization

To rigorously test the efficacy of a rules of thumb–based financial literacy intervention on financial behaviors and outcomes among credit card revolvers, we designed the study as a factorial RCT experiment. Participants were randomly assigned to one or more treatments or the control group, and the impact of the interventions was measured by differences in financial behaviors and outcomes between the treatment groups and the control group. By using an RCT approach, we ensured that any improvement in the treatment groups' outcomes beyond that of the control group was directly attributable to participation in the intervention, thus providing the financial capability field with an empirical foundation for what strategies are effective for improving outcomes.

To implement the study, we partnered with Arizona Federal to draw and randomize a sample, deliver the rules, and collect detailed financial data on the study participants. We also collected data from a credit bureau on both the financial and demographic characteristics of the study participants.

As discussed in chapter 2, we tested two rules:

- the cash under \$20 rule: “Don’t swipe the small stuff. Use cash when it’s under \$20.”
- the 20 percent added rule: “Credit keeps charging. It adds approximately 20% to the total.”

We delivered either the cash under \$20 rule or the 20 percent added rule to randomly assigned groups within Arizona Federal’s revolver base by using various combinations of the following delivery mechanisms: online portal, e-mail, and physical mail.

We sent each program participant not in the control group either the cash under \$20 rule or the 20 percent added rule, using one or more delivery methods, for a 6-month period. Individuals in the control group received no intervention. We then examined the participants’ behavior and financial outcomes for 18 months: 6 months before the intervention, during the 6-month intervention, and 6 months after the intervention. (Postintervention results are not included in this report, but they will be analyzed in a supplemental memo.)

This chapter provides a detailed description of the study design and randomization procedure, including intervention details and randomization statistics.

RCT Design

To test multiple rules, delivery mechanisms, and timing, we employed a randomized full factorial design. A randomized factorial design has two or more factors (in this case, delivery mechanisms), each with discrete possible values or levels. A full factorial design includes all possible combinations of these levels across all the factors, and a fractional factorial design includes only some combinations of factors. An RCT with factorial design allows for combinations of treatment types, rather than administering just one type of treatment for each participant. This method would not allow us to examine the interaction effects of various delivery methods, as the factorial design does.

We had four main factors: online portal, e-mail, physical mail, and rule type (A or B). The full factorial design for these four factors can be seen in table 3.1.

TABLE 3.1

Full Factorial Design with Four Factors

Experimental condition number	Factor			
	Online portal	E-mail	Physical mail	Rule
1	Yes	No	No	A
2	Yes	Yes	No	A
3	Yes	Yes	Yes	A
4	Yes	No	Yes	A
5	No	Yes	Yes	A
6	No	No	Yes	A
7	No	Yes	No	A
8	Yes	No	No	B
9	Yes	Yes	No	B
10	Yes	Yes	Yes	B
11	Yes	No	Yes	B
12	No	Yes	Yes	B
13	No	No	Yes	B
14	No	Yes	No	B
15 (control) ^a	No	No	No	A
16 (control) ^a	No	No	No	B

^a These experimental conditions are shown for completeness, but they are considered controls because they were assigned no treatment.

This type of design is a 2^4 factorial design, because there are four factors and each factor has two levels (yes or no). The design has $2^4 = 16$ experimental conditions. However, because the rule factor is A/B rather than yes/no, and because the rule cannot be delivered in the absence of a delivery mechanism, neither experimental condition 15 or 16 is feasible. Therefore, combined, these two experimental conditions represent the control group in this study. This exception leaves 15 groups, including the control.

We further split the e-mail recipients into two subgroups that varied depending on the timing of rule delivery. E-mail subgroup 1 received the e-mails on a random day early in the month and a random day late in the month. E-mail subgroup 2 received the e-mails on a Friday early in the month and a Friday late in the month. We therefore had 23 treatment groups including the control group and the e-mail subgroups. This design allowed us to examine whether random delivery is more effective than a set delivery and whether delivering the rules on a Friday, when people often get paid and/or spend their money in the evening or on the weekend, is more effective. The Friday test was an attempt to deliver the rule as close to the time of decisionmaking as possible.

The full factorial design (including e-mail subgroups and the single control group) can be seen in table 3.2.

TABLE 3.2

Full Factorial Design with Four Factors and E-mail Subgroups

Treatment group	Factor			Rule
	Online portal	E-mail	Physical mail	
1	Yes	No	No	A
2.1	Yes	Yes (group 1)	No	A
2.2	Yes	Yes (group 2)	No	A
3.1	Yes	Yes (group 1)	Yes	A
3.2	Yes	Yes (group 2)	Yes	A
4	Yes	No	Yes	A
5.1	No	Yes (group 1)	Yes	A
5.2	No	Yes (group 2)	Yes	A
6	No	No	Yes	A
7.1	No	Yes (group 1)	No	A
7.2	No	Yes (group 2)	No	A
8	Yes	No	No	B
9.1	Yes	Yes (group 1)	No	B
9.2	Yes	Yes (group 2)	No	B
10.1	Yes	Yes (group 1)	Yes	B
10.2	Yes	Yes (group 2)	Yes	B
11	Yes	No	Yes	B
12.1	No	Yes (group 1)	Yes	B
12.2	No	Yes (group 2)	Yes	B
13	No	No	Yes	B
14.1	No	Yes (group 1)	No	B
14.2	No	Yes (group 2)	No	B
15 (control)	No	No	No	Not applicable

Randomization and Stratification

Randomization for this evaluation was conducted jointly by the project team and Arizona Federal. Arizona Federal assigned each sampled eligible credit card holder a unique project identifier and then transferred the list to us in a deidentified fashion by using a secure FTP site.

We then stratified the sample and randomized participants into the different treatment groups and the control group as discussed below. Finally, we transferred the data with these assignments back to Arizona Federal staff, who used the assignments to administer the treatments to the participants in each group.

Stratifying, or blocking, involves grouping participants based on some combinations of their baseline characteristics and then randomizing within each strata. Stratifying can improve the randomization process, thus increasing the internal validity of the results. Our purpose in stratifying the sample was not to differentially select customers (e.g., selecting older clients at a higher rate than

younger). Rather, stratifying helped ensure that we selected customers into each group in proportion to their share of the sample of revolvers. Stratifying is helpful because randomization can still result in differential selection into groups, especially in instances with a small number of assigned cases.

We stratified the sample based on two measures: number of months revolved and age. Stratifying based on number of months revolved ensured that those people who consistently revolve were not disproportionately represented in any of the treatment groups or the control group. Participants who always revolve may be less motivated to implement the rules of thumb, and thus should be represented in all experimental conditions equally so the results are not biased. Similarly, stratifying based on age ensured that participants in each experimental condition were represented by different age groups, because it is possible certain age groups will be more receptive to certain delivery methods than others, particularly based on the delivery mechanisms (e.g., online versus physical mailer). In addition, we wanted to ensure random assignment for analyses conducted within a subgroup based on age or number of months revolved.

Based on available descriptive statistics, we stratified the sample on whether the person revolved for all six months or revolved five or fewer months. We segmented age into under 30 and 30 and older. The age of 30 corresponds to a basic definition of millennial and provides an appropriate cutoff for technology adoption and receptiveness to different types of delivery methods.

We then sorted participants into different strata based on these variables and randomized them into treatment groups. To verify that we stratified properly, we undertook balance checks to ensure each strata was equally represented in each treatment (and the control group).

Table 3.3 shows the overall distribution of participants between treatment groups, and table 3.4 shows the number of participants in each treatment cross-section that we analyze. We chose to include twice as many participants in the control group as in each treatment group because treatment group samples can be combined for increased power to look at delivery modes and other subcategories. The sample for each treatment group is quite large (872) by the standards of many RCT studies, and more so when we aggregate treatment groups to examine overall effects by delivery mode or rule.

TABLE 3.3

Distribution of Participants into Treatment Groups

Treatment group	Frequency	Percent	Cumulative percent
1	872	6.25	6.25
2.1	438	3.14	9.39
2.2	434	3.11	12.50
3.1	434	3.11	15.61
3.2	438	3.14	18.74
4	872	6.25	24.99
5.1	438	3.14	28.13
5.2	434	3.11	31.24
6	873	6.25	37.49
7.1	435	3.12	40.61
7.2	438	3.14	43.75
8	873	6.25	50.00
9.1	438	3.14	53.14
9.2	435	3.12	56.26
10.1	435	3.12	59.38
10.2	438	3.14	62.51
11	872	6.25	68.76
12.1	436	3.12	71.89
12.2	436	3.12	75.01
13	872	6.25	81.26
14.1	436	3.12	84.38
14.2	436	3.12	87.50
15	1,744	12.50	100.00
Total	13,957	100.00	100.00

Source: Urban Institute analysis of Arizona Federal administrative data.

TABLE 3.4

Number of Participants in Each Treatment Cross-Section

Treatment cross-section	\$20 Rule	20% Rule
Delivery mode		
<i>Mail</i>	3,489	3,489
<i>E-mail</i>	3,489	3,490
Variable delivery	1,745	1,745
Always on Friday	1,744	1,745
<i>Online</i>	3,488	3,491
Number of delivery modes		
One	2,618	2,617
Two	2,616	2,617
Three	872	873

Source: Arizona Federal administrative data.

Note: Numbers may vary by outcome due to data trimming.

Randomization Tests

Once we received complete preintervention data from Arizona Federal, we used treatment and control subjects' characteristics at baseline to evaluate the quality of the randomization process. If the assignment to treatment and control groups was successful, then the treatment and control groups would demonstrate descriptive characteristics that were statistically indistinguishable at baseline.

Results from this analysis can be seen in tables 3.5 and 3.6. The far-left column in these tables lists the measures of interest. The subsequent columns show the means for the control group, all the treated individuals combined, those who received the cash under \$20 rule, those who received the 20 percent added rule, and those who received e-mail, physical, and online delivery of the rules. For each measure, below these means is the difference between the treatment group mean and the control group mean, and below that is the p value for the difference in means; statistically significant differences are denoted by asterisks.

With only a small number of exceptions, the treatment group means are not statistically different from the control group means, indicating that randomization occurred properly. Tables with randomization tests for each individual treatment group are in appendix B. A few means are statistically different from each other, but such a finding is inevitable with the large number of outcome measures and treatment groups in this study. These means are based on trimmed data, that is, we removed outliers from the sample. The methodology we used to remove outliers is discussed in chapter 4.

TABLE 3.5

Baseline Randomization Tests of Treatment versus Control Mean: Administrative Data

	Control mean	All treatment	\$20 Rule	20% Rule	E-mail	Mail	Online
Sample size	1,744	12,213	6,106	6,107	6,979	6,978	6,979
Arizona Federal credit card debt							
<i>Credit card balance</i>	\$4,969	\$4,858	\$4,852	\$4,865	\$4,919	\$4,811	\$4,871
Difference		-\$111	-\$117	-\$104	-\$50	-\$158	-\$98
<i>Credit card interest accrued</i>	39.83	39.12	39.13	39.11	39.18	38.81	39.17
Difference		-0.71	-0.70	-0.72	-0.65	-1.02	-0.66
<i>Any balance revolved</i>	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Difference		0.00	0.00	0.01	0.00	0.00	0.00
Purchases with Arizona Federal account							
<i>Credit card purchase amount</i>	\$296	\$286	\$283	\$290	\$285	\$289	\$284
Difference		-\$10	-\$13	-\$7	-\$11	-\$7	-\$12
<i>Number of credit card purchases</i>	4.72	4.75	4.74	4.76	4.73	4.76	4.71
Difference		0.02	0.01	0.03	0.00	0.03	-0.01
<i>Number of credit card purchases <\$20</i>	1.81	1.82	1.82	1.83	1.79	1.85	1.81
Difference		0.01	0.01	0.01	-0.02	0.04	-0.01
<i>Percent of credit card purchases <\$20</i>	0.31	0.32	0.32	0.31	0.32	0.32	0.32
Difference		0.01	0.01	0.01	0.01	0.01	0.01
Cash advances on Arizona Federal account							
<i>Total cash advance amount</i>	\$2.79	\$3.36	\$3.36	\$3.37	\$3.31	\$3.30	\$3.09
Difference		\$0.58	\$0.57	\$0.58	\$0.52	\$0.52	\$0.30
<i>Total number cash advances</i>	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Difference		0.00	0.00	0.00	0.00	0.00	0.00
<i>Every received cash advance</i>	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Difference		0.00	0.00	0.00	0.00	0.00	0.00
Fees on Arizona Federal account							
<i>Number of fees paid</i>	3.49	3.49	3.52	3.45	3.54	3.54	3.45
Difference		0.00	0.03	-0.04	0.05	0.06	-0.04
<i>Ever paid fees</i>	0.27	0.28	0.28	0.28	0.28	0.28	0.27
Difference		0.01	0.01	0.00	0.01	0.01	0.00
Payments on Arizona Federal account							
<i>Number of credit card payments</i>	1.32	1.36	1.37	1.34	1.35	1.36	1.36
Difference		0.04**	0.05***	0.03	0.04**	0.04***	0.04**
<i>Credit card payment amount</i>	\$457	\$458	\$461	\$455	\$459	\$454	\$455
Difference		\$1	\$4	-\$2	\$2	-\$3	-\$2
<i>Ever paid credit card late</i>	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Difference		0.00	0.00	0.00	0.00	0.00	0.00
<i>Percent of credit card balance paid</i>	0.24	0.24	0.25	0.24	0.24	0.25	0.24
Difference		0.00	0.01	-0.01	0.00	0.00	-0.01

TABLE 3.5 CONTINUED

	Control mean	All treatment	\$20 Rule	20% Rule	E-mail	Mail	Online
Arizona Federal checking and savings accounts							
<i>Total savings</i>	\$3,752	\$4,028	\$3,963	\$4,092	\$4,014	\$4,059	\$3,966
Difference		\$276	\$211	\$341	\$263	\$307	\$215
<i>Savings less credit card balance</i>	-\$1,402	-\$967	-\$1,031	-\$902	-\$1,047	-\$904	-\$1,022
Difference		\$435*	\$371	\$500*	\$355	\$498*	\$380
<i>Number of deposits</i>	7.19	7.27	7.24	7.29	7.33	7.26	7.26
Difference		0.08	0.05	0.10	0.14	0.07	0.07
<i>Sum of deposits</i>	\$4,377	\$4,267	\$4,285	\$4,249	\$4,230	\$4,260	\$4,247
Difference		-\$110	-\$92	-\$129	-\$147	-\$117	-\$130
<i>Number of withdrawals</i>	47.57	46.55	46.45	46.65	46.70	46.38	46.47
Difference		-1.02	-1.12	-0.92	-0.87	-1.19	-1.10
<i>Sum of withdrawals</i>	\$4,509	\$4,384	\$4,381	\$4,386	\$4,347*	\$4,380	\$4,370
Difference		-\$125	-\$128	-\$123	-\$162	-\$130	-\$139
<i>Number of debit card transactions</i>	34.14	33.54	33.40	33.69	33.77	33.36	33.42
Difference		-0.59	-0.73	-0.45	-0.37	-0.78	-0.72
<i>Sum of debit card transactions</i>	\$1,345	\$1,340	\$1,348	\$1,333	\$1,358	\$1,341	\$1,333
Difference		-\$4	\$3	-\$11	\$13	-\$4	-\$11
<i>Number of debit card transactions <\$20</i>	16.69	16.25	16.17	16.34	16.31	16.18	16.29
Difference		-0.44	-0.52	-0.36	-0.38	-0.52	-0.40
Overdrafts on Arizona Federal accounts							
<i>Total overdraft transfer amount</i>	\$77	\$83	\$81	\$85	\$83	\$83	\$83
Difference		\$6	\$4	\$8	\$5	\$6	\$6
<i>Total overdraft transfer count</i>	0.70	0.72	0.71	0.73	0.71	0.71	0.74
Difference		0.02	0.00	0.03	0.01	0.00	0.04
<i>Ever overdrafted</i>	0.27	0.27	0.27	0.28	0.27	0.27	0.27
Difference		0.00	0.00	0.01	0.01	0.00	0.00
Stratification variables							
<i>Months revolved</i>	5.15	5.19	5.18	5.20	5.20	5.19	5.17
Difference		0.03	0.02	0.04	0.05	0.03	0.02
<i>Age</i>	46.73	46.84	46.80	46.89	46.85	46.79	46.87
Difference		0.11	0.06	0.16	0.12	0.06	0.14
Additional characteristics							
<i>Living in Phoenix Metro</i>		0.73	0.74	0.74	0.73	0.74	0.74
Difference			0.00	0.01	0.00	0.00	0.00
<i>Living in Arizona</i>		0.93	0.94	0.94	0.94	0.94	0.94
Difference			0.00	0.01	0.00	0.01	0.00

Source: Arizona Federal administrative data.

Note: Asterisks denote statistical significance for t-tests of the difference between treatment means and control means.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE 3.6

Baseline Randomization Tests of Treatments versus Control Mean: Credit Bureau Data

	Control mean	All treatment	\$20 Rule	20% Rule	E-mail	Mail	Online
Sample size	1,728	12,137	6,066	6,071	6,935	6,935	6,928
Credit card behavior							
<i>Credit score</i>	699.42	698.99	699.11	698.87	698.01	699.41	699.32
Difference		-0.43	-0.31	-0.55	-2.06*	0.73	0.56
<i>Number of inquiries within 12 months</i>	2.08	2.11	2.07	2.16	2.09	2.13	2.14
Difference		0.04	-0.01	0.08	-0.03	0.03	0.063
All trades							
<i>Number of trades</i>	20.81	20.78	20.71	20.85	20.77	20.80	20.81
Difference		-0.03	-0.10	0.04	-0.03	0.03	0.05
<i>Number of trades with balance >0</i>	6.31	6.37	6.35	6.40	6.35	6.39	6.35
Difference		0.07	0.04	0.09	-0.03	0.05	-0.03
<i>Aggregate balance for open trades</i>	\$137,107	\$134,283	\$134,664	\$133,902	\$134,451	\$133,190	\$135,506
Difference		-\$2,824	-\$2,443	-\$3,205	-\$368,561	-\$2,891	\$1,738
<i>Aggregate balance for open status trades</i>	\$137,536	\$134,740	\$135,140	\$134,342	\$134,809	\$133,673	\$135,942
Difference		-\$2,796	-\$2,397	-\$3,195	-\$560.93	-\$2,833	\$1,704
<i>Aggregate credit for open trades</i>	\$170,682	\$167,007	\$167,667	\$166,350	\$166,901	\$165,662	\$168,471
Difference		-\$3,675	-\$3,015	-\$4,332	-\$1,131.61	-\$3,609	\$2,005
<i>Balance-to-credit ratio for open trades</i>	74.45	74.47	74.34	74.60	74.34	74.38	74.50
Difference		0.02	-0.11	0.15	-0.247	-0.17	0.06
<i>Number of collection trades with balance >\$200</i>	0.42	0.41	0.41	0.42	0.41	0.42	0.40
Difference		-0.01	-0.014	0.00	-0.01	0.00	-0.03
<i>Aggregate balance for collection status codes</i>	439.95	433.18	426.87	439.50	425.34	417.31	399.71
Difference		-6.77	-13.09	-0.46	-17.37	-33.44	-68.61**

TABLE 3.6 CONTINUED

	Control mean	All treatment	\$20 Rule	20% Rule	E-mail	Mail	Online
Revolving trades							
<i>Number of revolving trades</i>	10.71	10.69	10.75	10.62	10.71	10.66	10.72
Difference		-0.02	0.05	-0.08	0.04	-0.05	0.06
<i>Number of revolving trades with balance >0</i>	3.27	3.24	3.24	3.24	3.22	3.24	3.25
Difference		-0.03	-0.03	-0.03	-0.045	-0.01	0.02
<i>Aggregate balance for open revolving trades</i>	\$10,015	\$10,036	\$10,133	\$9,940	\$9,920	\$9,993	\$10,134
Difference		\$21	\$118	-\$75	-\$227	-\$82	\$201
<i>Aggregate balance for open status revolving trades</i>	\$10,281	\$10,285	\$10,389	\$10,181	\$10,180	\$10,237	\$10,389
Difference		\$4	\$108	-\$99	-\$210	-\$97	\$208
<i>Aggregate credit for open revolving trades</i>	\$24,690	\$24,632	\$24,755	\$24,509	\$24,440	\$24,523	\$24,866
Difference		-\$58	\$65	-\$181	-\$398	-232.392	\$452
<i>Balance-to-credit ratio for open revolving trades</i>	50.81	50.39	50.58	50.20	50.83	49.89	50.48
Difference		-0.42	-0.23	-0.61	0.77	-1.10**	0.08
Balance transfers							
<i>Number of bankcards with balance transfer</i>	0.29	0.31	0.32	0.30	0.31	0.31	0.31
Difference		0.01	0.03	0	0	0	0
<i>Number of bankcard balance transfers within 0-6 months</i>	0.02	0.03	0.03	0.03	0.03	0.02	0.03
Difference		0	0	0	0	0	0
<i>Number of bankcard balance transfers within 7-12 months</i>	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0

TABLE 3.6 CONTINUED

	Control mean	All treatment	\$20 Rule	20% Rule	E-mail	Mail	Online
Late payments							
<i>Number of trades 30 days past due</i>	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0
<i>Number of trades 90+ days past due</i>	0.02	0.03	0.02	0.03	0.03	0.02	0.03
Difference		0.00	0.00	0.00	0.00	0.00	0.00
<i>Total balance on trades 30 days delinquent</i>	\$379	\$449	\$418	\$480	\$468	\$466	\$486
Difference		\$70	\$39	\$101	\$56	\$52	\$92
<i>Total balance on trades 90–180 days delinquent</i>	\$135	\$199	\$187	\$212	\$211	\$207	\$185
Difference		\$64	\$52	\$77	\$40	\$32	-\$13
<i>Revolving trades 30 days delinquent</i>	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0
<i>Total number of revolving trades 90–180 days delinquent</i>	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0
<i>Total number of 30- to 180-day delinquencies in last two years</i>	0.22	0.26	0.29	0.24	0.31	0.27	0.23
Difference		0.05	0.07	0.02	0.10	0.03	-0.06

Source: Credit bureau data.

Note: Asterisks denote statistical significance for t-tests of the difference between treatment means and control means.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Chapter 4. Methodology and Data Sources

To examine the impact of the rules of thumb intervention, we implemented a factorial RCT. Investigating the effects of rules of thumb by using an RCT design is valuable as it allows us to understand the causal effects of the rules and the ways in which they were delivered. This chapter describes the data and analysis techniques used to estimate the effects of the intervention.

Data

The evaluation relied on two main sources of information: administrative data collected from Arizona Federal and financial and demographic data collected from a large credit bureau. Definitions for each of the variables within these datasets can be found in the data dictionary in appendix C.

Administrative Data

We relied heavily on administrative data for this analysis. Evidence suggests administrative data are more accurate than self-reported financial data. Karlan and Zinman (2010) found that relying strictly on self-reported data may lead to a biased inference, because nearly 50 percent of recent borrowers did not report their high-interest consumer loans. Zinman (2009) found that credit card use data from the Survey of Consumer Finances always yield much lower estimates of revolving debt than industry data—the 2004 Survey of Consumer Finances, for example, showed only half of the revolving credit card debt total implied by industry data. Some evidence suggests this discrepancy has grown over time.

The administrative data came directly from Arizona Federal and included information about each revolver's age and accounts (including credit, checking, and savings). The data also included information about online logins and opt-outs. Descriptive statistics for these data can be found both in the baseline t-tests in the study design and randomization chapter (table 3.5) and in the descriptive tables in the program participants chapter (table 5.3).

Arizona Federal collected and transferred these data to us monthly for six months before the intervention, six months during the intervention, and six months after the intervention was complete. These detailed monthly data allow us to account for individual-level trends and baseline characteristics and to examine whether the intervention's effects varied throughout the course of the study period and whether and how quickly the effects decayed. For example, the monthly data during the intervention period allow us to examine whether the rules had a stronger effect early on before fatigue set in, or whether they had a greater effect after a few months of delivery, once habits had been formed.

Credit Bureau Data

We also examined participants' overall credit standing and demographic characteristics using data collected from a large credit bureau agency. Because participants may hold accounts at more than one bank and through nonbank channels, it is important to test whether their overall finances changed as a result of the intervention and whether potential negative consequences, such as debt reshuffling, occurred. We also collected data from the credit bureau on demographic measures such as income, education level, and gender for each participant.

To purchase these data, we worked directly with a credit bureau to choose the variables of interest. The credit bureau then transferred the data to Arizona Federal, which stripped the data of any personally identifiable information before sending them to us.

FINANCIAL CREDIT BUREAU DATA

To examine both pre- and postintervention credit measures, we pulled data from November 2014 (the month before the beginning of the intervention) and August 2015 (two months after the intervention ended). The credit bureau suggested that we wait until August to pull the second set of data to ensure that any behaviors that occurred in the last month of the intervention were captured in the postintervention data.

The data include credit measures pertaining to debt, credit, delinquencies, and a FICO credit score. We describe each credit record measure used for impact analysis in appendix C.

The credit bureau was able to successfully match 13,870 study participants (99 percent) at baseline and follow-up. The credit bureau was unable to provide data on 77 study participants (1 percent) out of the full sample of 13,957 study participants, and 10 were suppressed by the consumer. Of the 77 study participants not matched in the credit bureau data, 60 were not entered into the system for processing

due to unclear identifying information, and 17 were input into the credit bureau data system but were not matched.

The most common reason the credit bureau was unable to provide data on an Arizona Federal customer was a failed list conversion, which could occur if the identifying name or information was not matched with credit bureau input criteria or there were too many names in the input name field, thus disqualifying the input.

Descriptive statistics for the financial data from the credit bureau can be seen in tables 3.6 and 5.4.

DEMOGRAPHIC CREDIT BUREAU DATA

The credit bureau also collects demographic information on individuals either directly from lenders, tax assessors, and deeds (for variables like homeownership status); from self-reported sources (for variables like renter status); or derived from other information (such as education level based on occupational information).

When there are insufficient data to match a customer's record, the credit bureau assigns a median value based on other households or individuals living in the same ZIP+4 area code or zip region (in the rare cases when ZIP+4 is not available). Sometimes the measure is calculated using a predictive model (for variables like homeownership). Similarly, household income is estimated using several individual- and household-level variables by using multiple statistical methodologies to predict the income for the living unit. When there are insufficient data to match a customer's record to income, a median estimated income in thousands is used based on the modeled incomes assigned to other living units in the same ZIP+4 area.

Baseline results for these measures are also reported in tables 3.6 and 5.4, and the definitions and data sources for each can be found in the data dictionary in appendix C.

Outliers and Data Trimming

Because extreme outliers existed for several continuous outcome measures, we trimmed the data to ensure that these individuals did not skew the results. To do so, we removed the top and bottom 0.5 percent of each continuous variable when the top or bottom value was not zero. In cases in which the top or bottom values were zero, we trimmed only one side of the variable's distribution by 0.5 percent.

We examined each continuous measure individually and determined whether this trimming adequately removed the extreme outliers to improve robustness.

For each variable, if an individual fell outside of the top or bottom 0.5 percent in any month, as shown by the combined months' intervention data, the variable was set to missing for that person for all months to keep the panel balanced. When an individual's data were dropped for one variable, their data for other measures were still included except for when the missing variables were an input into credit card balance. When an individual was missing an input into credit card balance, all variables that combine to create credit card balance (previous month's balance, payments, and purchases) were set to missing for that individual. This procedure allowed us to clearly analyze the mechanisms that went into the reduction in credit card balance without varying who we were looking at by measure.

In some cases, fields like purchase amount, which normally had positive values, showed negative values due to reversals. Occasionally trimming data from the bottom 0.5 percent of fields like this still left some reversals in the data. In these cases, we removed the remaining reversals, even though they were not in the bottom 0.5 percent of the data.

In keeping with the standard used to trim the Arizona Federal administrative data, we determined that a 0.5 percent trim would also be appropriate for the credit bureau data. We trimmed continuous variables that did not have a predetermined range of minimum to maximum values. For example, credit score was not included in a trimming of the credit data. All tables in this report are based on these trimmed data.

Analysis

In an RCT, differences in outcomes between treatment and control groups can be causally attributed, on average, to program availability rather than to differences in unobserved characteristics between program participants and nonparticipants. Randomizing subjects in an RCT minimizes systematic preexisting differences (both observable and unobservable) between subjects receiving the treatment and those not receiving the treatment. RCT studies are often needed to determine causal impact in the absence of any natural experiment in which exposure to the program or policy arguably resembles random assignment. To our knowledge, no such natural experiment of rules of thumb delivery exists.

We estimated a number of models that allowed us to examine not only whether the intervention worked, but for whom, over what time period, and for how long. These models are detailed below.

Intent to Treat Analysis

Our primary method for estimating the impact of the delivery of rules of thumb on financial outcomes was to compare the average outcomes for participants to whom Arizona Federal delivered rules with the outcomes for those who did not receive rules. This model is referred to as the intent to treat (ITT) model. It estimates the effect of the “intent to treat,” which in this case is the opportunity for subjects in the treatment group to get the rules of thumb treatment even if they did not actually read and implement them.

Assuming the randomization process was carried out properly, the causal effects of delivery of the rules of thumb are simply the differences in financial outcomes between the treatment and control subjects. We calculated these differences by using administrative and credit bureau data and calculated the confidence intervals for these differences by using standard distributional assumptions.

In some cases, a comparison of mean changes in outcomes between the treatment and control groups in an RCT can provide an estimate of the causal effect of the program of interest. However, using a regression-based approach can increase the precision of the estimates. Therefore, we also estimated ITT using this approach.

Because there were multiple treatment groups, we estimated ITT by using a multivalued treatment effects model. The average treatment effect (ATE) for a multivalued treatment effect model is as follows:

$$ATE_g = E(y_g - y_0)$$

or the expected value of the outcome variable for those offered a particular treatment group (g) minus the expected value for those that were in the control group.

To analyze the data in a regression format, we assigned each treatment group a number (0, 1, 2, ...) and then estimated the following equation:

$$Y_{i,t} = c + \beta G_{i,t} + \gamma_i + \lambda_t + \varepsilon_{i,t},$$

where $Y_{i,t}$ is the outcome variable for participant i in month t ; c is a constant term; $G_{i,t}$ is a vector of treatment groups; γ_i and λ_t are individual and month fixed effects, respectively; and $\varepsilon_{i,t}$ is the error term. We also ran the models using pooled ordinary least squares, and results were robust to this modeling approach. We calculated standard errors clustered at the individual level that are robust to heteroskedasticity and arbitrary forms of error correlation within each individual. The fixed effects allowed us to remove any unobserved heterogeneity that exists for that individual that may be related to their financial outcomes. For instance, if a particular individual is more or less motivated, this

tendency would be controlled for in the fixed effects. Likewise, any effects that occur by month, such as higher spending around the holidays, will be controlled for in the month fixed effects. Estimating this as a panel fixed-effects model allows us to compare an individual to himself or herself over time rather than comparing one individual to another, who may be very different in unobservable ways.

Outcome Measures

Our primary outcome of interest was the amount of revolving debt on individuals' Arizona Federal credit cards, or "credit card balance." We expected that both rules would cause this debt to be lower than it would have been in the absence of treatment.

The ways in which the rules achieved this outcome, however, may vary. The cash under \$20 rule was meant to induce participants to use cash instead of credit for small purchases (or careless spending), and therefore we expected to see a reduction in credit card purchases under \$20 and a reduction in savings (or increase in cash withdrawals) as a result of this rule. The 20 percent added rule was meant to increase awareness of the costs of credit card spending and consequently reduce overall credit card purchases.

We therefore also examined the effect of the rules on credit card purchases and checking and saving behaviors. Although the rules did not directly target credit card bill payment, we expected that there may be an indirect effect on payment behaviors caused by a reminder effect; that is, the rules may simply remind the recipients that they need to pay their bill. Additionally, the 20 percent added rule may have induced participants to pay off their credit card by increasing their awareness of the cost of this debt. Therefore we also estimated the effect of the rules on credit card payments.

Finally, we estimated the effect of the rules on aggregate debt and credit to determine whether the rules affected individuals' overall financial health.

Control Variables

Including control variables in the regression analysis of RCT data can reduce the variance and increase the precision of the impact estimates when outcome variables are correlated with observable factors such as age or education level. Including control variables that are strongly correlated with the outcome variable can reduce the amount of unexplained variance and sample size needed to detect an effect.

However, because including covariates that are influenced by the treatment can cause bias in the estimates, the control variables must be collected before randomization occurs.

Because our models are fixed-effects models, any time-invariant controls will drop from the equation, and therefore we do not include them in the models. Further, any time-varying controls could be endogenous (affected by the intervention) and are not valid to include, and as a result we also exclude these measures. Instead, we include person- and month-level fixed effects.

Effects of the Different Rules

We examined whether the cash under \$20 rule or the 20 percent added rule was more effective at improving financial outcomes for participants. To do so, we examined the means for those receiving the cash under \$20 rule versus the 20 percent added rule versus the control group, and we also estimated the following equation:

$$Y_{i,t} = c + \beta R_{i,t} + \gamma_i + \lambda_t + \varepsilon_{i,t},$$

where $R_{i,t}$ was a vector of dummy variables for each of the two rules that equaled 1 during treatment months if the participant received that rule and 0 otherwise. We then tested whether the coefficients for the effect of each rule were different from one another.

Effects over Time

Because Arizona Federal provided monthly data, we were able to examine how the rules worked over time. For instance, it is possible the rules had the strongest effect toward the beginning months of the intervention before fatigue set in. Alternatively, the rules may have been more effective after they had a chance to soak in for a few months and for new behaviors to become habits.

To test for effects over time, we estimated the following equation:

$$Y_{i,t} = c + \sum_{m=-6}^6 \beta_m T_{i,t-m} + \gamma_i + \lambda_t + \varepsilon_{i,t},$$

where $T_{i,t-m}$ was a dummy variable for treatment that equaled one for all months for anyone who received treatment (by rule), and

$$\sum_{m=-6}^6 \beta_m T_{i,t-m}$$

is a series of coefficients and indicators for each month before and during treatment (six months before treatment began and six months during treatment). In the six months before the intervention, β_t should be equal to zero. If the rule was effective, β_t should have positive or negative values (depending on the variable) in the six months after the treatment began. This equation provided a valuable test of the randomization and allowed us to measure the effect of the intervention in each month.

Effects of Different Delivery Mechanisms

We were also interested in examining whether certain delivery mechanisms were more effective at improving financial outcomes than others. We estimated the effect of each delivery mechanism by comparing the means of the participants who received each individual mechanism to the control, as well as through the following regression analysis:

$$Y_{i,t} = c + \beta \text{Del}_{i,t} + \gamma_i + \lambda_t + \varepsilon_{i,t},$$

where $\text{Del}_{i,t}$ is a vector of the three delivery mechanisms (online, e-mail, or physical mailer). Some treatment groups received the rules via more than one delivery mechanism (e.g., both via e-mail and the calendar magnet). In such cases, the effect of each delivery mechanism would be parsed out into the three separate coefficients.

We also ran a separate set of regressions that included dummy variables for the count of delivery mechanisms through which a rule was received (0, 1, 2, or 3), where instead of including a dummy for e-mail, physical mailer, and online, we included a dummy variable that indicated whether the individual received a rule via one, two, or three mechanisms.

Heterogeneous Treatment Effects

The treatment may have had different effects on distinct groups within the population, such as for older versus younger participants. To assess this possibility, we estimated the following equation separately for each of the subgroups:

$$Y_{i,t} = c + \beta_1 T_{i,t} + \beta_2 A_i T_{i,t} + \gamma_i + \lambda_t + \varepsilon_{i,t}.$$

To examine these heterogeneous effects, we analyzed different subgroups along the dimensions thought to be associated with differential effects: age, preintervention number of purchases under \$20,

total number of preintervention purchases, and initial credit score. Descriptive statistics for participants in each of these subgroups can be found in tables B.5 through B.8 in appendix B.

We chose the variables on which to create subgroups for several reasons. We chose age because there is reason to believe that different delivery mechanisms may work better for certain age groups than others. Based on the distribution of the sample, we divided age into three categories: 40 years or younger, between 40 and 60 years old, and 60 years or older.

We chose the number of preintervention purchases under \$20 as another subgroup to determine whether the cash under \$20 rule worked better for participants who often made credit card purchases under \$20. If participants infrequently made purchases under \$20, detecting an effect of the rule on this subgroup would probably have been more difficult.

We also looked at the total number of preintervention purchases for similar reasons—if participants did not make many purchases in total, it was likely more difficult to affect their behavior with these rules. In particular, participants who used their cards primarily as a place to hold debt rather than as a means of transacting would be very difficult to influence via the rules.

Finally, we chose to look at initial credit score as a basis for subgroup analysis because rules of thumb have been hypothesized to work better for people who have low levels of financial standing. However, this sample held very few consumers with poor credit, so we were unable to fully decipher these effects by credit score. Analyzing the effects by low (670 or less), medium (between 670 and 730), and high (730 or greater) credit score groups helped us to partially test this hypothesis.

Multiple Outcomes Analysis

When testing multiple outcomes, the probability of a type I error (a “false positive”) increases. In other words, the probability of estimating that treatment has a significant effect on at least one outcome increases as the number of outcomes examined increases. To adjust for this, we follow Kling, Liebman, and Katz (2007), Karlan and Valdivia (2011), and Drexler, Fischer, and Schoar (2014) and use a summary measure of standardized treatment effects for each category of outcomes. This methodology rescales each outcome within a category by its mean and standard deviation and then combines them. Specifically, we calculate the following for each outcome y_k in each category k :

$$z_{ik} = \frac{(y_{ik} - \mu_k)}{\sigma_k},$$

where μ_k is the mean for outcome y_k for the control group, and σ_k is the standard deviation. We create a summary variable W_{ik} for each category k by using the following formula:

$$W_{ik} = \frac{\sum_{k=1}^K z_{ik}}{K},$$

where K is the total number of outcome variables in a category. We then run the same fixed-effects regression as outlined in the section above on ITT analysis by using W_{ik} as the outcome of interest for each of the categories of outcomes. The categories we test are Arizona Federal credit card debt, Arizona Federal credit card purchases, Arizona Federal credit card payments, Arizona Federal checking and savings, Arizona Federal debit card usage, aggregate debt, and aggregate credit.

Chapter 5. Study Participants

The participants for this study were drawn from credit card revolvers in Arizona Federal's credit card customer base. We defined a credit card revolver as someone who carried a credit card balance for at least two of the six preintervention months (not necessarily consecutively). In this chapter, we present the demographic and preintervention characteristics of these revolvers.

Demographic Characteristics

Age

The sample population consisted primarily of working-age adults in their forties and fifties. More than two-thirds of the sample of credit card revolvers were over the age of 40, with an average age of 46 and median age of 47. This age distribution is older than one might expect given that research has shown that age is negatively associated with credit card revolving (Canner and Cynrak 1985; Choi and Devaney 1995; Hamilton and Kahn 2001; Steidle 1994; Wasberg, Hira, and Fanslow 1992). However, more recent research has shown that older Americans had the highest average credit card balances of any age group in the aftermath of the Great Recession (Traub and Ruetschlin 2012). Similarly, in this sample we found that amount revolved was higher for older individuals. Before the intervention, participants under 40 had on average \$3,400 per month in revolved credit card balances, and those over 40 had on average \$5,700 per month in revolved credit card balances (table B.5 in appendix B).

Gender

According to the credit bureau demographic data, the sample had somewhat more males than females, at 55 percent and 45 percent, respectively. Other research has documented that women with low financial literacy are more likely to revolve than men with low financial literacy, but there are no differences between men and women with high financial literacy (Mottola 2012). The data showed that the women in the sample revolved as often as men.

Household Composition

According to the credit bureau data, the vast majority (79 percent) of the sample were married, and most had at least one child. Other evidence demonstrates that married consumers are more likely to revolve than nonmarried consumers because they have higher expenditures (Kinsey 1981; Steidle 1994). This finding is consistent with the high share of married couples in this sample.

Income and Homeownership

The annual household income for study participants was relatively high, with a median of \$72,500 and a mean of \$81,000. These incomes are somewhat higher than the median and mean annual household incomes (\$53,365 and \$72,867, respectively) in the Phoenix-Mesa-Scottsdale metropolitan area in 2014 according to data from the Census Bureau's American Community Survey. More than three-quarters of study participants lived in owner-occupied homes, with a median and average estimated current home value of around \$194,000 and \$215,000, respectively. Descriptive statistics for baseline data from June 2014 through November 2014 are in tables 5.1 and 5.2.

TABLE 5.1

Demographic and Housing Baseline Statistics

Demographic data	N	Mean	Median	Minimum	Maximum	SD
Average age	13,957	46	47	1	95	13.8
Number of adults in household	13,949	2	2	1	8	1
Female (Y/N)	13,513	45%				50%
Married (Y/N)	10,989	79%				40%
Presence of children (Y/N)	11,112	67%				47%
College graduate (Y/N)	13,854	26%				44%
Homeowner (Y/N)	12,007	84%				36%
Est. current home value	11,253	\$214,772	\$194,977	\$0	\$3,152,963	\$134,336

Sources: The average age data are from Arizona Federal administrative data; All other demographic data are from credit bureau data.

Notes: SD = standard deviation; Est. = estimated. All credit bureau data include real and imputed values. The 1-year-old in the sample is the account holder for a trust account.

TABLE 5.2

Income Baseline Statistics

Income bracket	N	Percent
Under \$50,000	4,403	32
50,000–\$99,999	6,129	44
\$100,000–\$199,999	2,987	21
\$200,000 or more	405	3
Total	13,924	100

Source: Credit bureau data.

Financial Characteristics

Credit Card Behavior

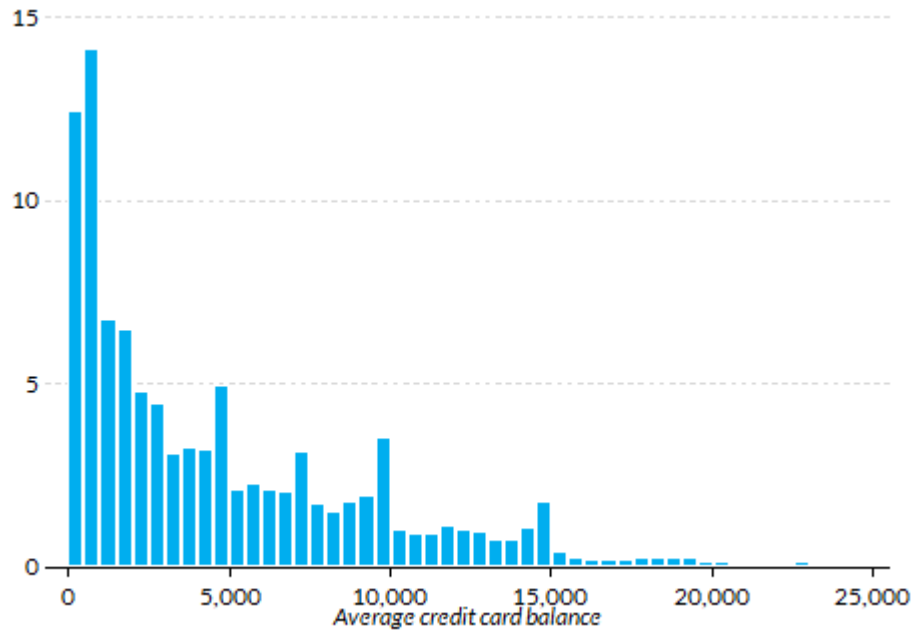
CREDIT CARD BALANCE

Study participants had relatively high levels of debt on their Arizona Federal credit card and across all their revolving accounts combined. The median balance on participants' Arizona Federal credit cards at baseline was \$3,180, with a mean of \$4,872. The distribution of this debt is displayed in figure 5.1. The majority of these debt holders had a substantial amount of credit card debt of between \$1,000 and \$8,000. A significant portion, roughly one-quarter, had credit card debts above \$8,000.

FIGURE 5.1

Distribution of Average Credit Card Balance on Arizona Credit Cards at Baseline

Percent



Source: Arizona Federal administrative data.

Notes: These values are calculated using person-level averages across the preintervention period from June 2014 through November 2014. Spikes near \$5,000, \$10,000, and \$15,000 likely represent participants nearing their credit limits.

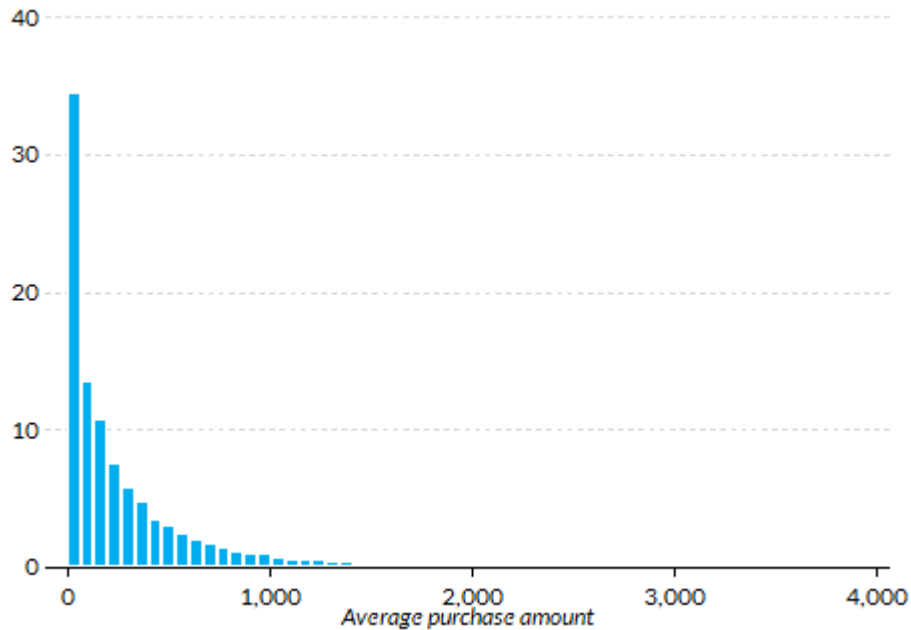
CREDIT CARD PURCHASES

Although the study participants had fairly high levels of revolved credit card debt, they made relatively few purchases on their credit cards (figure 5.2). Participants in the sample made approximately five credit card purchases per month on average during the preintervention period, and roughly one-third made less than one purchase on their credit card on average per month during that period. Although this seems like a large number of people not using their cards at all, it is actually fewer than the average number of people who do not use their cards nationally: in 2012, just 56 percent of credit cards had purchase activity (meaning they were used for bill payments or purchases at least once a month) (Federal Reserve 2014). Less than one-fifth of the Arizona Federal revolver sample made more than eight purchases on their credit card per month.

FIGURE 5.2

Distribution of Average Purchase Count on Arizona Credit Cards at Baseline

Percent



Source: Arizona Federal administrative data.

Note: These values are calculated using person-level averages across the preintervention period from June 2014 through November 2014.

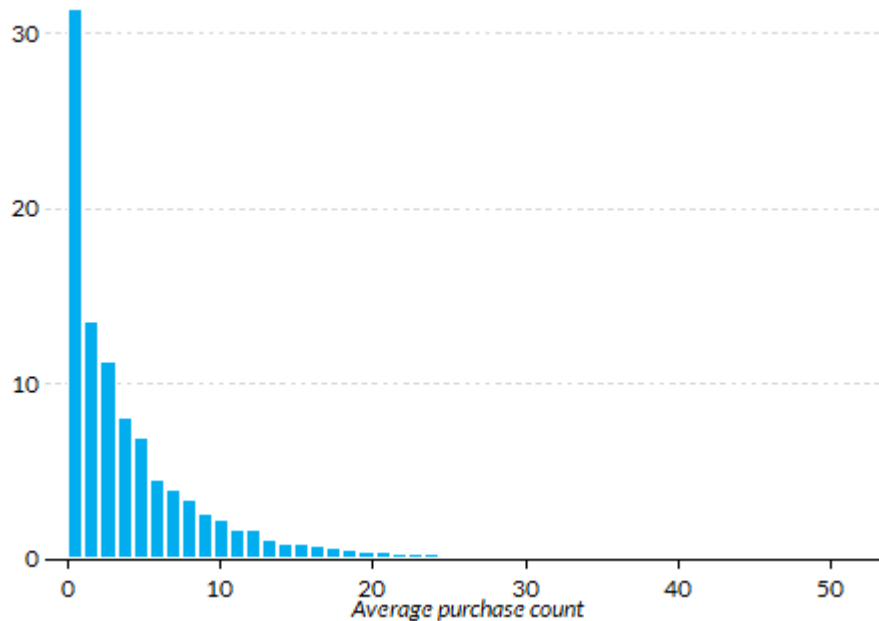
Sixty percent of the sample made less than one purchase under \$20 on their credit card each month (figure 5.3). On average, about 31 percent of purchases were under \$20 (an average of two purchases less than \$20 per month). The mean is skewed by the large number of “under \$20” purchases made by a small number of individuals. Only one-fifth of the sample made more than three under \$20 credit card purchases per month during the preintervention period.

The total dollar amount of purchases made by credit card was moderate, with the median credit card purchase amount per month equal to \$144 and the mean at \$288. These numbers are somewhat below national averages. For example, according to one estimate, average monthly spending on a credit card without a rewards program is \$465.⁵ Together these statistics imply that the majority of the individuals in this sample did not use their credit cards very frequently.

FIGURE 5.3

Distribution of Average Purchase Amount on Arizona Credit Cards at Baseline

Percent



Source: Arizona Federal administrative data.

Note: These values are calculated using person-level averages across the preintervention period from June 2014 through November 2014.

CASH ADVANCES

Most individuals (95 percent) in the sample did not receive any cash advances in the six-month period before the intervention. Of the 5 percent who obtained any cash advances, the amount was relatively small, with a mean of \$255 and a maximum of \$994. As discussed below, most of these individuals had sufficient checking and savings account balances that they may not have needed to take out cash advances.

CREDIT CARD PAYMENTS AND FEES

Although study participants in general made at least one on-time payment per month, most did not pay down a large share of their credit card debt with those payments. Instead, they paid a small fraction of their statement balance every month, with the median individual paying just 6 percent of his or her total credit card balance, or about \$300. In other words, most of the participants paid enough to cover their monthly credit card purchases and perhaps some interest, but not enough to reduce the size of their total revolved balance. Although sample participants often paid at least once per month, they

frequently incurred late fees. About half the sample, 52 percent, paid late fees at some point during the preintervention period. The average fee paid was quite low at \$3.49.

Savings and Checking Account Behavior

BALANCE

Most study participants did not have sufficient funds at Arizona Federal to fully pay down their credit card debt. More than 60 percent had more credit card debt than they had savings at Arizona Federal. However, nearly 35 percent did have sufficient funds in their Arizona Federal accounts to fully pay off their debt.

The median revolver had roughly \$1,400 in his or her savings accounts at Arizona Federal. The average savings level was approximately \$4,000; the mean was driven up by a few individuals with high checking and savings account balances. Individuals in this sample deposited about \$4,280 per month on average and withdrew slightly more than that: \$4,400 every month. In other words, they took out slightly more than they put in every month over the six months before the intervention started.

DEBIT CARD USE

The sample appears to have been heavy users of cash and debit cards. They made a substantial number of withdrawals from checking and savings accounts, on average 47 per month, and a substantial number of debit card transactions, on average 34 per month. They appear to have made most of their day-to-day purchases on their debit card—about 16 purchases under \$20 per month. They spent an average of \$1,341 in purchases per month on their debit card. Study participants often overdrafted on their checking and savings accounts. On average, individuals in the sample overdrafted at least once during two of the six preintervention months. The average overdraft amount was \$82.

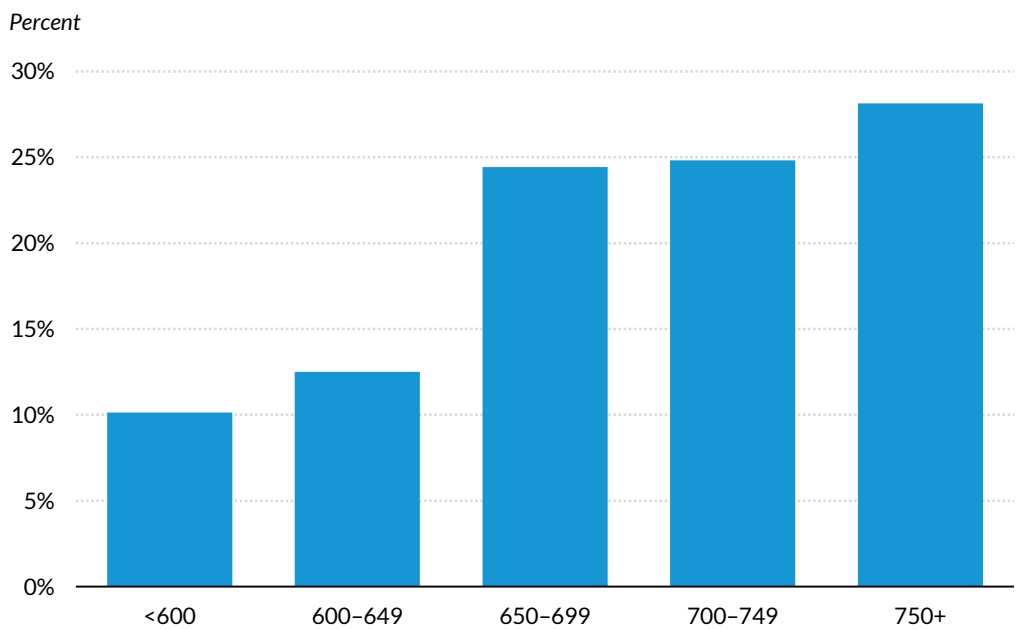
However, many of Arizona Federal's clients have selected into an "overdraft path" that allows money to be automatically deducted from another source, such as from a line of credit, a credit card, or from a savings path (in any order), when their debit card source is empty. Therefore, these overdraft amounts do not always come with a cost.

Financial Status

CREDIT SCORE

The average credit score in the sample was relatively high at 699, with a median of 706. This score was higher than the state average of 676 reported for Arizona.⁶ The average Arizona Federal revolver’s credit score would fall in the “fair” to “good” range by most standards. As seen in figure 5.4, more than half the sample, 53 percent, had “good” or “excellent” credit with FICO scores above 700. Another 24 percent of our sample had “fair” credit, with FICO scores between 650 and 699, and 23 percent had “poor” or “bad” credit, with FICO scores below 650. In addition, more than 50 percent of the individuals had less than one credit score inquiry in the last 12 months.

FIGURE 5.4
Distribution of FICO Credit Scores



Source: Credit bureau data.

TRADE LINES

Study participants on average had 21 trade lines, or debt accounts, although most of these had a zero balance. The average number of trade lines with a nonzero balance was six, implying six outstanding loans. The average aggregate balance for these trades was \$134,599, the majority of which, as would be expected, was not revolving. On average, participants revolved only \$10,034 of the balance on these

trades. This amount suggests these individuals were paying off their larger debts, such as their mortgages or student loans, every month but revolving their smaller balances, such as their credit card balances. The average amount of overall debt they revolved was about twice the average amount they revolved at Arizona Federal, and they had on average about three trades that were revolving with a nonzero balance. This finding implies that many people in the sample were revolving other credit card debt besides their Arizona Federal credit card debt. The vast majority of study participants never had a balance transfer or a late payment. No one in the sample had any trades over 30 days past due in the preintervention period, and 78 percent had no balance transfers.

In summary, the sample comprised primarily financially responsible, if indebted, families. The sample was largely made up of individuals who were married and homeowners in their forties and fifties with at least one child. These households, generally, had somewhat higher household incomes relative to the Phoenix-Mesa-Scottsdale metropolitan area. They also generally had fair or good credit scores. However, they frequently revolved a substantial balance, both at Arizona Federal and elsewhere. They made a substantial number of purchases through their Arizona Federal debit card and made very few purchases on their Arizona Federal credit card. This finding suggests they may be strategically revolving at Arizona Federal due to the low interest rate this credit union offers on credit card balances. However, there is no evidence that these balances were transferred from other cards because balance transfers were infrequent.

Tables 5.3 and 5.4 provide descriptive statistics for the baseline period for the Arizona Federal administrative data and the credit bureau data, respectively.

TABLE 5.3

Baseline Statistics Drawn from Arizona Federal Data

Monthly averages	N	Mean	Median	Minimum	Maximum	SD
Arizona Federal credit card debt						
Credit card balance	12,322	\$4,872	\$3,180	\$1	\$25,101	\$4,765
Credit card interest accrued	13,957	\$39	\$26	\$0	\$403	\$40
Any balance revolved	13,957	90%	100%	0%	100%	21%
Purchases with Arizona Federal credit card						
Credit card purchase amount	12,322	\$288	\$144	\$0	\$3,287	\$402
Number of credit card purchases	13,658	4.74	2.50	0.00	53.17	6.49
Number of credit card purchases <\$20	13,664	1.82	0.67	0.00	28.33	3.10
Percent of credit card purchases <\$20	11,270	31%	27%	0%	100%	27%
Cash advances on Arizona Federal credit card						
Cash advance amount	13,297	\$3	\$0	\$0	\$450	\$22
Number of cash advances	13,507	0.01	0.00	0.00	1.00	0.05
Ever received cash advance	13,507	0.01	0.00	0.00	1.00	0.05
Fees on Arizona Federal credit card						
Number of fees paid	12,830	3.49	0.24	0.00	43.70	5.45
Ever paid fees	12,830	0.28	0.17	0.00	1.00	0.37
Payments on Arizona Federal account						
Number of credit card payments	13,556	1.35	1.17	0.17	6.17	0.60
Credit card payment amount	12,322	\$458	\$267	-\$414	\$10,916	\$618
Ever paid credit card late	13,957	0.02	0.00	0.00	1.00	0.08
Percent of credit card balance paid	13,242	24%	6%	1%	570%	45%
Arizona Federal checking and savings accounts						
Total savings	13,480	\$3,993	\$1,367	-\$251	\$90,582	\$7,960
Savings less credit card balance	13,096	-\$1,021	-\$1,275	-\$24,904	\$83,730	\$9,382
Number of deposits	13,524	7.26	6.67	0.00	28.67	4.56
Sum of deposits	13,216	\$4,281	\$3,604	\$0	\$28,837	\$3,536
Number of withdrawals	13,593	46.68	44.00	0.00	162.67	34.08
Sum of withdrawals	13,259	\$4,400	\$3,729	\$0	\$27,995	\$3,572
Number of debit card transactions	13,593	33.62	29.33	0.00	134.50	29.13
Sum of debit card transactions	12,727	\$1,341	\$1,184	\$0	\$6,180	\$1,145
Number of debit card transactions <\$20	13,630	16.31	11.50	0.00	85.83	16.77
Overdrafts on Arizona Federal accounts						
Overdraft transfer amount	13,416	\$82.47	\$2.21	\$0.00	\$2,905	\$183.84
Overdraft transfer count	13,556	0.72	0.17	0.00	13.83	1.32
Ever overdrafted	13,556	0.27	0.17	0.00	1.00	0.33
Stratification variables						
Months revolved	13,957	5.18	6.00	0.00	6.00	1.94
Age	13,957	46	47	1	95	13.8
Additional characteristics						
Percent living in Phoenix Metro	13,957	0.74	1.00	0.00	1.00	0.44
Percent living in Arizona	13,957	0.94	1.00	0.00	1.00	0.24

Source: Arizona Federal administrative data.

Notes: SD = standard deviation. These values are calculated using person-level averages across the preintervention period from June 2014 through November 2014. The 1-year-old in the sample is the account holder for a trust account.

TABLE 5.4

Baseline Statistics Drawn from Credit Bureau Data

Baseline credit data	N	Mean	Median	Minimum	Maximum	SD
Credit score	13,823	699	706	486	829	72
Number of inquiries within 12 months	13,859	2	1	0	16	3
All trades						
Number of trades	13,859	21	20	1	58	11
Number of trades with balance >0	13,859	6	6	1	23	4
Agg. balance for open trades	13,859	\$134,599	\$105,746	\$0	\$726,692	\$129,010
Agg. balance for open status trades	13,859	\$135,053	\$105,920	\$0	\$726,692	\$129,303
Agg. credit for open trades	13,859	\$167,428	\$141,362	\$500	\$810,833	\$147,559
Agg. balance-to-credit ratio for open trades	13,859	74%	82%	0%	115%	22%
Number of collection trades with credit amount or balance ≥\$200	13,859	0	0	0	8	1
Agg. balance for collection status codes	13,859	\$434	\$0	\$0	\$23,240	\$1,816
Revolving trades						
Number of revolving trades	13,859	11	9	1	39	7
Number of revolving trades with balance >0	13,859	3	3	0	15	2
Agg. balance for open revolving trades	13,859	\$10,034	\$6,699	\$0	\$64,448	\$10,504
Agg. balance for open status revolving trades	13,859	\$10,285	\$6,856	\$0	\$66,422	\$10,788
Agg. credit for open revolving trades	13,859	\$24,638	\$18,488	\$0	\$132,350	\$22,490
Agg. balance-to-credit ratio for open revolving trades	13,859	50%	50%	0%	103%	31%
Balance transfers						
Number of bankcards with balance transfer	13,859	0	0	0	3	1
Number of bankcard balance transfers within 0–6 months	13,859	0	0	0	1	0
Number of bankcard balance transfers within 7–12 months	13,859	0	0	0	0	0
Late payments						
Number of trades 30 days past due	13,859	0	0	0	0	0
Number of trades 90+ days past due	13,859	0	0	0	2	0
Total balance on trades 30 days delinquent	13,850	\$440	\$0	\$0	\$132,012	\$5,842
Total balance on trades 90–180 days delinquent	13,850	\$191	\$0	\$0	\$51,460	\$2,276
Total number of revolving trades 30 days delinquent	13,842	0	0	0	0	0
Total number of revolving trades 90–180 days delinquent	13,842	0	0	0	0	0
Total number of 30- to 180-day delinquencies in last two years	277	0	0	0	5	1

Source: Credit bureau data.

Notes: SD = standard deviation; Agg. = aggregate.

^aDenotes current delinquency at the time of reporting within the last six months.

Chapter 6. Rule Delivery

The rules of thumb for this study were delivered to participants via three channels: e-mail, online banner, and physical mailer, as specified in chapter 3 on study design and randomization. In this chapter, we describe the effectiveness of these methods at reaching consumers by analyzing e-mail open rates, banner click-through rates, and landing page view statistics. We also provide information on opt-outs and rule design and delivery costs.

E-mail Messaging

Arizona Federal sent rules of thumb with varying content twice a month during the intervention period (mid-December 2014 through mid-June 2015) to those treatment groups randomized into receiving e-mail messaging. As described in chapter 3, the e-mail treatment groups were split into two subgroups. One group was sent the e-mails on a random date in the first two weeks of the month and a random date in the last two weeks of the month, and the second group was sent the e-mails on a Friday early in the month and a Friday later in the month.

The content of the e-mails differed depending on the rule, but they contained consistent branding and layout. The messages contained a short description of the rule, a static ad containing the rule and Arizona Federal branding, and a link to an external landing page with more information about the logic and meaning of the rule. We constructed landing pages for both rules with mirrored structure and as little variance as possible outside of the actual language.

E-mail Open Rates

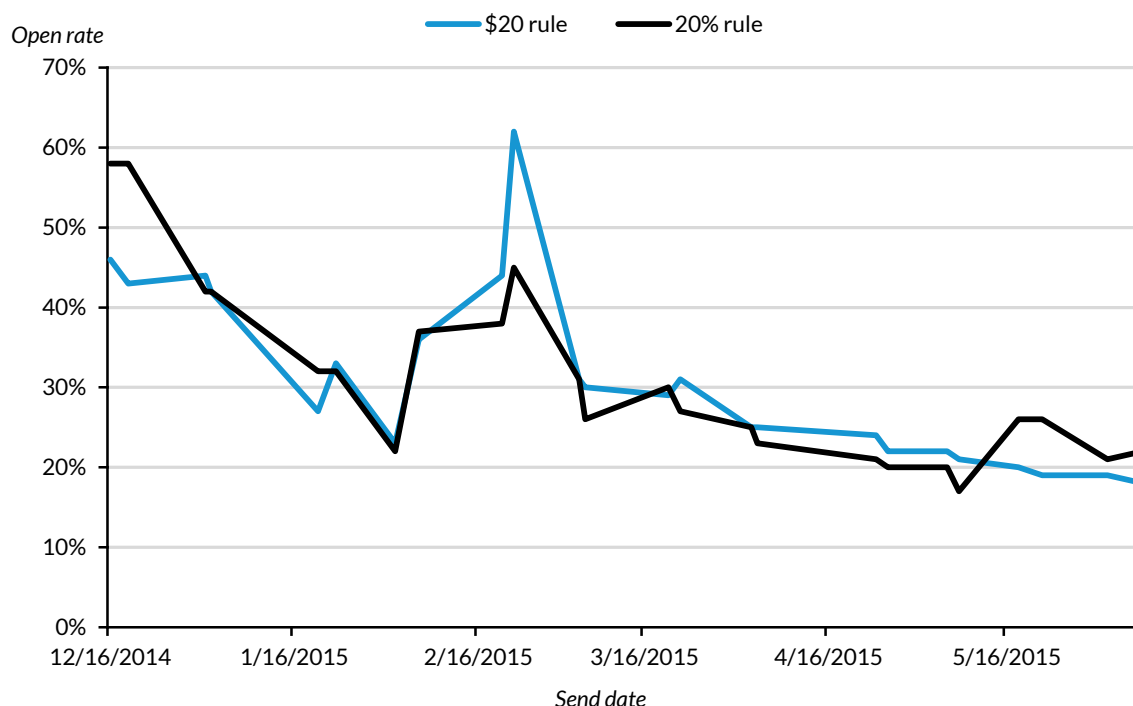
We were able to track both overall e-mail open rates and landing page views. Unfortunately, Arizona Federal was unable to track these measures by individual, so only aggregate statistics are available.

Figure 6.1 displays the e-mail open rates broken down by rule. Overall, the open rates were very high, with an overall average of 31 percent during the intervention period. Industry standards in the United States list an e-mail open rate of around 15 to 20 percent as a goal (“2013 Email Marketing Metrics” 2013). Open rates in this study were well above this rate.

The open rates underwent a steady decline in activity throughout the course of the intervention, which was to be expected. Open rates began extremely high at 46 percent for the cash under \$20 rule and 58 percent for the 20 percent added rule. By the end of the study the rates had declined to 18 and 22 percent, respectively, with an overall average of 31 percent for both rules over the entire intervention period.

FIGURE 6.1

E-mail Open Rates by Rule



The e-mail open rates spiked to 62 percent for the cash under \$20 rule and 45 percent for the 20 percent added rule on Sunday, February 22, 2015. On that date, the group (which included recipients of both rules) sent the e-mails on a random day of the week received an e-mail with the subject line “Avoid unnecessary credit costs.” This was the highest-performing e-mail subject line following the initial month of e-mails. The lowest-performing subject line for both the cash under \$20 rule and the 20 percent added rule, which was sent to group 1 on Monday, February 2, 2015, read “Have you tried this tip?” Each subject line sent to study participants was used only once during the intervention.

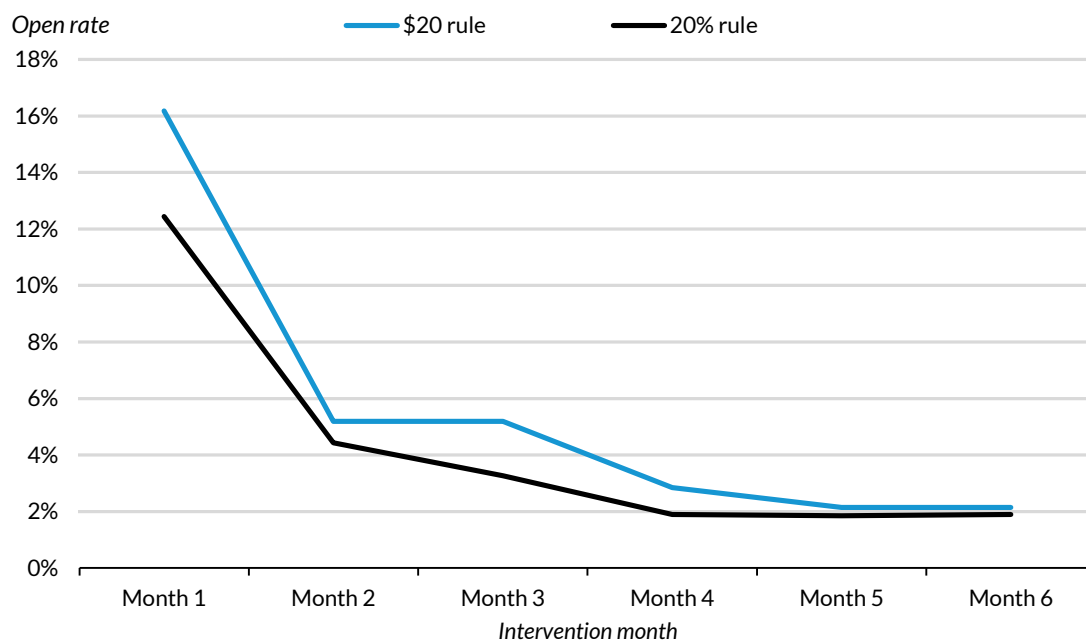
Overall, there was some fluctuation in the open rates before March 2015, but after the mailing on March 5, 2015, the rates hovered between 20 and 30 percent. The full table of statistics for open rates and bounce rates can be seen in table D.2 in appendix D.

Landing Page Visits from E-mail

Recipients could navigate to an informational landing page through a “learn more” button in the e-mails or by clicking on the online banners that displayed the rules within their web portal. Figure 6.2 shows the number of people who visited the informational landing page each month for the duration of the intervention. These counts represent landing page visits from any origination source, whether through the online portal or an e-mail. Landing page visits were aggregated to intervention month, so that month 1 is the period from December 15, 2014, through January 15, 2015, and so on. Tables D.3 and D.4 in appendix D displays the full list of landing page visits by day.

FIGURE 6.2

Landing Page View Rates by Rule



Note: The view rate is the number of landing page visits divided by the total number of e-mail only, online only, or e-mail and online recipients.

These data show that the individual page views followed a similar trend as the e-mail open rates, with declining activity throughout the study period and little to no change in activity after March 15, 2015 (month 4). The total number of page views remained between 95 and 150 for each of these latter months, dropping off from a total of 847 page views for the cash under \$20 rule and 651 page views for the 20 percent added rule in the first month of the intervention. The significant drop in page view counts after month 1 followed expectations because the landing pages did not vary during the course of

the study, so once a recipient visited the landing page they were less likely to visit it again. The cash under \$20 rule consistently drew more landing page visits than the 20 percent added rule, but not by much. Although not shown here, we see in the daily page view counts that visits to the landing page spiked on days when e-mails were delivered and often in the days following.

Table 6.1 shows the number of page views clicked to from each rule and e-mail version, as well as the average time spent on the landing page for each origination source. E-mail version C (table 6.2) drew the most landing page hits, but it was also the first e-mail to be sent and the one to be sent most often, so the elevated level of visits is likely due to timing and frequency rather than e-mail content. Versions E and B were the next to be sent, followed by D, A, C again, E again, A again, C again, and then finally E again in the final month.

TABLE 6.1

Landing Page Visits by E-mail Type

Origination source	\$20 Rule			20% Rule		
	Number of page views	Number of unique page views	Avg. time on page (sec)	Number of page views	Number of unique page views	Avg. time on page (sec)
E-mail, version A	189	182	109	114	105	90
E-mail, version B	60	56	207	84	84	21
E-mail, version C	387	372	192	105	102	68
E-mail, version D	69	65	50	148	141	254
E-mail, version E	134	124	81	108	106	141
Overall	839	799	145	559	538	129

Source: Arizona Federal administrative data.

Notes: Avg. = average; sec = seconds. Origination sources are listed in order of delivery or start data.

These data also show that most visitors did not visit the landing page more than once, as demonstrated by the similarity of the total page views and unique page views. On average, the amount of time spent on the landing page was around two and a half minutes, meaning that visitors did not navigate to the page and immediately navigate away, instead reading the content of the page.

TABLE 6.2

Summary of E-mail Versions

E-mail version	E-mail title 1	E-mail title 2	E-mail title 3	Visual
A	Avoid unnecessary credit costs	Gain control of your finances		
B	Ready to control your finances?	Spring into health financial habits		
C	Don't swipe the small stuff	Keep your finances on track	Remember: Don't swipe the small stuff	
D	Have you tried this tip?	Help yourself keep credit costs down		
E	Start the new year right with this simple tip	Want to get ahead? Remember this simple tip	Build healthy financial habits	

Note: Larger versions of visual e-mail content can be found in appendix A.

Online Portal Messaging

Some participants were also shown the rules of thumb via a banner in their online portal when they completed online transactions. At any given time on their portal's main page, customers saw either a

static advertisement or a dynamic banner advertisement, all of which aligned with the rules of thumb and Arizona Federal branding. Updated banners were posted in accordance with the delivery schedule to vary the advertisements on the portal main page.

Throughout the intervention, customers saw either a blue banner across the top of the page, a blue static banner on the right side of the page, or a white static banner on the right side of the page. The messages on the banner were variations of the rules, depending on the customer's treatment group. Clicking on any of the advertisements led to the same landing page (described above), which contained information about the logic and meaning of the rule. We were able to track these click-through rates on each of the three banners and track how long customers stayed on the landing page to which they were directed.

Table 6.3 shows these click-through rates and landing page visits broken down by rule and banner type. The blue online static banner on the right side of the page had the most hits for the cash under \$20 rule, and the white online banner on the top of the page had the most hits for the 20 percent added rule. Again, though, these banners were up for different amounts of time, so hits by banner type likely reflect the timing rather than the type.

Compared to table 6.1, which shows these same statistics for the e-mail landing page originations, we see from table 6.3 that the e-mails drove more visits to the landing pages for the cash under \$20 rule than did the online banner advertisements. However, the average time spent on the landing page was higher for users that had been directed to the landing page via the online banners.

TABLE 6.3

Landing page visits by online banner type origination source	\$20 Rule			20% Rule		
	Number of page views	Number of unique page views	Avg. time on page (sec)	Number of page views	Number of unique page views	Avg. time on page (sec)
Online banner, blue, top of page	222	208	196	182	166	95
Online banner, blue, right of page	365	352	183	59	48	143
Online banner, white, top of page	105	102	103	373	355	241
Overall (online origination only)	692	662	175	614	569	188
Overall (online and e-mail origination)	1,531	1,461	159	1,173	1,107	160

Source: Arizona Federal administrative data.

Notes: Avg. = average; sec = seconds. Origination sources are listed in order of delivery or start data.

Physical Mail Messaging

Of the 23 treatment groups, 12 groups received a physical mailer with a rule on it as part of the study. All the participants received a mailer, but only those randomized into these treatment groups received the mailer with the rule attached.

Traditionally, Arizona Federal sends its customers an end-of-the-year token of appreciation. Before agreeing to participate in this study, Arizona Federal had already planned to send a magnetic calendar for the upcoming year. Arizona Federal agreed to send those customers in treatment groups receiving mailers a 2015 magnetic calendar with either the cash under \$20 rule or the 20 percent added rule printed across the top. Customers not eligible for the study or not in groups receiving mailers received the same Arizona Federal 2015 magnetic calendar, but without any rules.

These mailers were sent at the beginning of the intervention and were expected to arrive at homes on or after December 15, 2014. Postage reports for the magnets showed that the number of magnets delivered was 3,475 out of 3,489 for the cash under \$20 rule and 3,465 out of 3,490 for the 20 percent added rule. Magnets that were not received were undeliverable because of incorrect mailing addresses for those accounts. Because there is no way to gauge whether these mailers were opened or posted in recipients' homes, there is no measurement for the rate of uptake for this delivery mechanism. The calendar also did not direct recipients to the landing pages, so we cannot examine click-through rates from the calendars.

Opt-Outs

Throughout the course of the study, we received only 32 opt-outs from study participants stating they did not wish to receive further rules of thumb messaging via e-mail. These individuals were removed from the e-mail messaging distribution lists and were removed from our analysis. Many of the participants who opted out of receiving e-mail messaging still received the physical mailer in December 2014 or online banner messaging for the remainder of the intervention. However, we removed these people from the study. Given the large sample size, we do not have concerns that the omission of these individuals biased the results.

Costs of Delivering the Rules

The total estimated cost of the intervention was \$9,135 for design and \$10,591 for delivery (table 6.4). This total cost estimate includes \$7,500 in Arizona Federal hours: \$6,500 to execute the web and e-mail delivery (130 hours), and another \$1,000 to manage and coordinate the mailings. These cost estimates include the costs that we think are most likely to be incurred by an institution delivering similar rules, but not those that were extra due to the evaluation nature of the project. For instance, the estimates do not include the costs of developing the rules using the in-depth interviews and iterative processes, but they do include the cost of hiring a copywriter and visual designer to design them. They also include the labor hours needed to deliver the rules in a randomized fashion, as we do not know what labor hours would be required under a different non-RCT approach. The labor costs of implementation would likely be even lower than what is shown here.

The \$9,135 for design included \$5,435 for visual designers and \$3,700 for copywriters, who made the wording of the rules memorable and catchy. These numbers do not include the costs of brainstorming and testing the rules, but they do include design costs for rules that did not make it to the final stages and involved multiple rounds of design and review. We expect a financial institution or other organization delivering rules of thumb would likely either use rules that were already created and designed by others or only design one or two of their own.

The relevant cost for an organization that wanted to implement such a program, therefore, would likely be the cost of delivery and production, because they could start from “white label” rules that others have created. This cost is just \$0.47 per recipient for e-mail or online (these costs cannot be differentiated) and \$0.59 per person for physical mailer, with the marginal cost of additional recipients even lower. For the physical mailer, the costs are ones that Arizona Federal would have spent anyway, as they were already planning to send magnets to all their customers as an end-of-the-year gift. Other institutions could similarly integrate rules of thumb into their other marketing efforts at very low cost.

TABLE 6.4

Rule Design and Delivery Costs

	Design costs	Delivery costs
Design		
Visual designers	\$5,435	
Copywriters	\$3,700	
Total for design	\$9,135	
E-mail and online banner delivery		
Staff hours for Arizona Federal		\$6,500
Total for e-mail and online banner		\$6,500
Number of e-mail banner recipients		6,979
Number of online banner recipients		6,979
Cost per person per e-mail or online delivery channel		\$0.47
Physical mailer production and delivery		
Production		\$1,428
Staff hours for Arizona Federal		\$1,000
Postage		\$1,663
Total for physical mailer		\$4,091
Number of physical mailer recipients		6,978
Cost per physical mailer recipient		\$0.59
Total	\$9,135	\$10,591

Chapter 7. Impacts of Rule Delivery

In this chapter, we detail the impact findings from the evaluation. Our main outcome of interest was the amount of revolving credit card debt that participants held from month to month on their Arizona Federal credit card. We also estimated the effect of the rules on the underlying behaviors that might have affected this debt, such as credit card spending, credit card bill payment, and use of alternative sources of payment such as cash and debit. Finally, we estimated the effect of the rules on aggregate debt levels and credit score to determine whether the rules affected participants' overall financial standing.

We expected that both rules would reduce credit card spending and therefore reduce the amount of revolving debt held by participants on their Arizona Federal credit card from month to month. We did not expect to see much of an effect on credit card payments because the rules did not directly target payments. However, we thought that there might be some small effect on payments simply due to increased attention to the credit card caused by the rules (i.e., the recipients of the rules may be reminded that they have to pay their credit card bill simply by seeing mention of their credit card).

For each outcome, we present the results of the regression-adjusted ITT estimates. To account for within-person correlation, we estimated a fixed-effects model clustered at the individual level. We draw conclusions from the regression results rather than the tests of differences in means (appendix E) because any pretreatment differences in outcome measures affect the *t*-test results but are controlled for in the fixed-effects models.

In addition to estimating the impacts on the full population of participants (and by treatment group in appendix F), we estimated the impacts by month of the intervention (appendix G) and by subgroups based on age, number of total purchases, number of purchases under \$20, and credit score (appendix H). (Age is the only demographic measure that we have for participants from the Arizona Federal administrative data; the other demographic measures were provided by the credit bureau and were sometimes imputed.)

A brief summary of the findings is as follows. We found that the cash under \$20 rule caused participants to reduce their revolving debt on their Arizona Federal credit card, an important accomplishment for a “light touch” intervention like a rule of thumb. However, the 20 percent added rule did not lead to reduced revolving debt. The reason for this discrepancy is not known, but it may be

because the 20 percent added rule was less direct than the cash under \$20 rule; that is, the implied behavior (don't use credit) was not stated directly.

We did not detect a statistically significant change in purchases or payments for either rule, so we cannot definitively say what the mechanism was behind the change in credit card debt. We did, however, find that participants under 40 years of age—for whom lower credit card balances were most evident—made fewer purchases and had higher savings. Other subgroups, such as participants between the ages of 40 and 60 and those who made between 1 and 10 purchases a month at baseline or greater than 5 purchases under \$20 a month at baseline saw a significantly lower amount of savings than they would have in the absence of treatment. This finding suggests that the mechanisms behind the reduction in credit card debt were likely both a reduction in purchases and a partial substitution of savings for credit.

When we looked only at participants who were more frequent users of their credit cards (those who made between 1 and 10 purchases per month at baseline), we found that number of purchases overall and number of purchases under \$20 went down. This was also the group that saw the largest reduction in aggregate credit for open revolving trades.

Both rules also caused aggregate available credit for open trades (as indicated from the credit bureau data) to be lower than it would have been in the absence of treatment, perhaps because fewer credit cards were opened, as indicated by a lower level of credit inquiries for some participants offered access to treatment. This change in available credit did not lead to a detectable change in overall credit utilization ratios, however, and the rules had no effect on overall credit score or other credit measures.

In the sections below we describe these findings in greater detail.

Arizona Federal Credit Card Debt

Balance on Arizona Federal Credit Card

The main goal of the intervention was to reduce the amount of revolving debt held by participants. We found that this reduction did occur, at least for the cash under \$20 rule. Participants offered access to this rule—those to whom Arizona Federal sent the rule of thumb—had an average of \$104 less in debt on their Arizona Federal credit card per month than they would have had in the absence of treatment

(table 7.1). We did not detect statistically significant changes when examining the 20 percent added rule alone. However, the effects for the cash under \$20 rule and the 20 percent added rule were not statistically different from one another, so we cannot say with certainty that the cash under \$20 rule was more effective at reducing revolving debt than was the 20 percent added rule.

TABLE 7.1

ITT Effect of Rules of Thumb on Credit Card Balance

	Credit card balance (\$)
\$20 rule	-104.2** (51.74)
20% rule	-57.58 (51.11)
Number of participants	12,322

Source: Arizona Federal administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

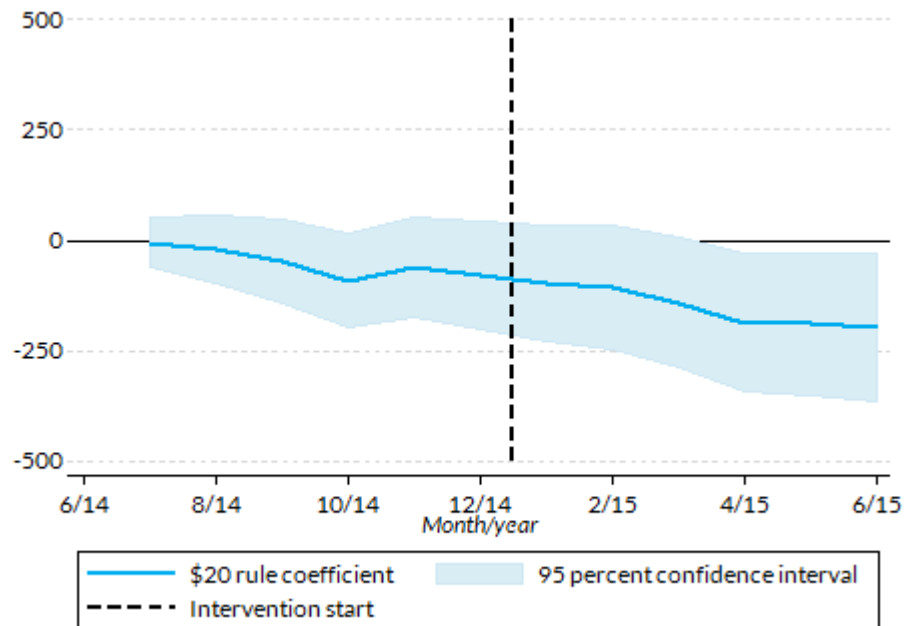
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Figures 7.1 and 7.2 show the results of the month-by-month model. The center line shows the coefficient over time for the effect of the rule on participants' Arizona Federal credit card balances. The dotted lines above and below this line show the 95 percent confidence intervals for these coefficients. When the 95 percent confidence interval crosses the y axis at zero, the coefficient is statistically significant and the rule had an effect on the outcome in that month. For example, in figure 7.1 the cash under \$20 rule had a detectable impact on credit card balance in April, May, and June of 2015, but not before then.

The month-by-month model shows that the effect of the cash under \$20 rule increased over time. In March 2015, individuals exposed to the cash under \$20 rule owed \$102 less than those in the control groups; and by June, the difference increased to \$161 (figure 7.1). This change may be because the credit card balance is cumulative and compounded, rather than because the behavior change was stronger over time. The effect of the 20 percent added rule was not significant in any month, although the coefficients were in the negative direction (i.e., decreasing balance; see figure 7.2). Trends before the intervention appear to be toward decreasing credit card balances, but a robustness check that included time trends produced the same point estimates as above, indicating that these trends did not bias the results.

FIGURE 7.1

Effect of the Cash under \$20 Rule on Credit Card Balance by Month

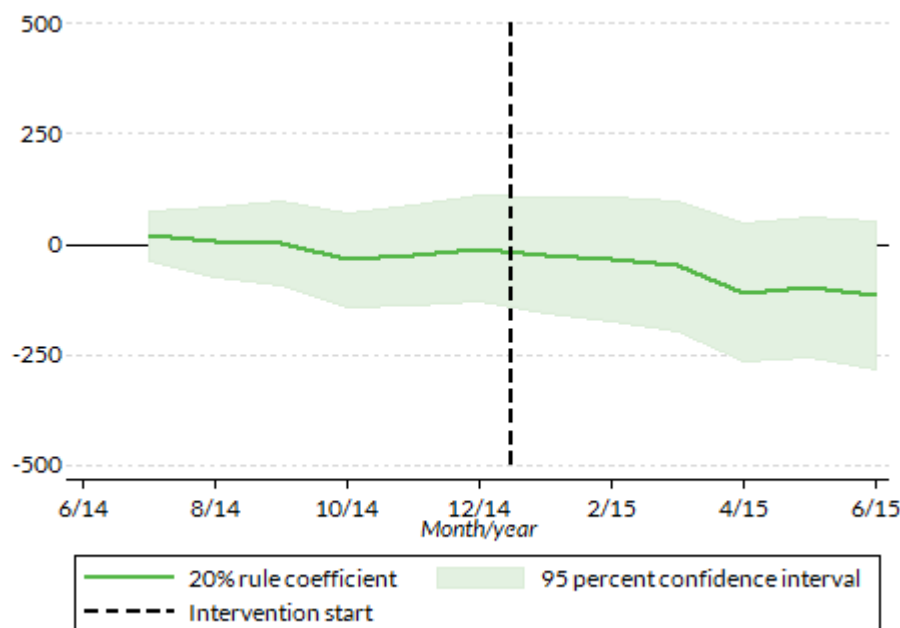


Source: Arizona Federal administrative data.

Notes: The solid line is coefficients from a month-by-month model of the effect of the rule on the outcome measure. The shaded area shows the 95 percent confidence intervals for these coefficients. When the 95 percent confidence interval crosses the y axis at zero, the coefficient is statistically significant and the rule had an effect on the outcome in that month. The vertical dotted line indicates the beginning of treatment: the intervention began December 15, 2014, which showed up in the data in January 2015.

FIGURE 7.2

Effect of the 20 Percent Added Rule on Credit Card Balance by Month



Source: Arizona Federal administrative data.

Notes: The solid line is coefficients from a month-by-month model of the effect of the rule on the outcome measure. The shaded area shows the 95 percent confidence intervals for these coefficients. When the 95 percent confidence interval crosses the y axis at zero, the coefficient is statistically significant and the rule had an effect on the outcome in that month. The vertical dotted line indicates the beginning of treatment: the intervention began December 15, 2014, which showed up in the data in January 2015.

Credit Card Interest Accrued

Individuals receiving the cash under \$20 rule accrued \$0.70 less interest on their credit card monthly than did those in the control group (table 7.2). Though not a precise estimate, this decrease, maintained over six months, would result in a balance reduction of roughly \$4.20. There was no effect for the 20 percent added rule, but again, the coefficients were not distinguishable from one another so we cannot say for certain whether the cash under \$20 rule worked better than the 20 percent added rule.

Monthly results show that effects for the cash under \$20 rule began in April 2015 (month 4) and remained fairly constant until the end of the intervention. Some evidence suggests this effect varied across subgroups, but all effect sizes are small, less than \$2. Figures 7.3 and 7.4 show the effects of the cash under \$20 rule and the 20 percent added rule, respectively, on credit card interest accrual by month.

TABLE 7.2

ITT Effect of Rules of Thumb on Credit Card Interest Accrued Monthly

	Credit card interest accrued (\$)
\$20 rule	-0.695* (0.414)
20% rule	-0.353 (0.412)
Number of participants	13,957

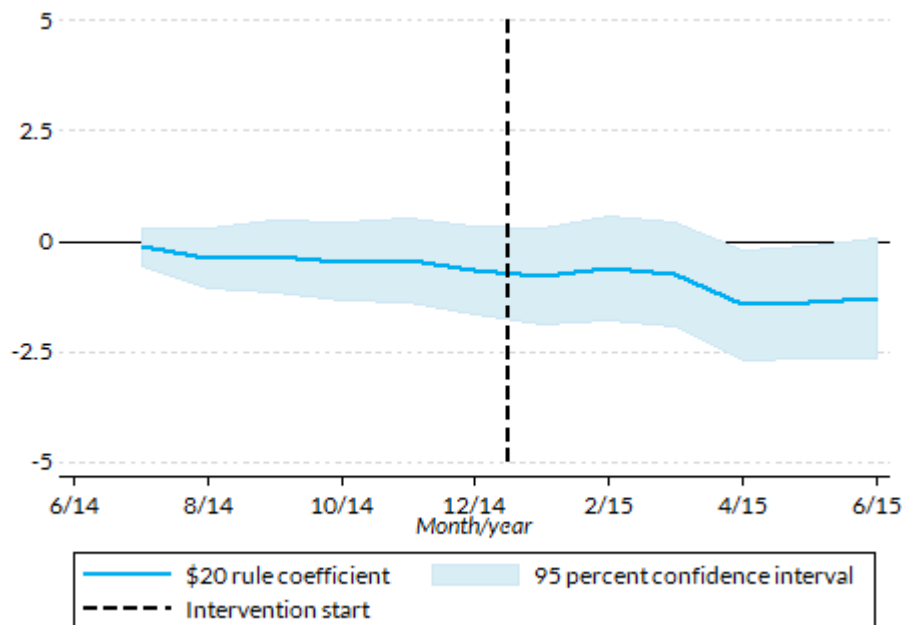
Source: Arizona Federal administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$ ***; $p < 0.01$

FIGURE 7.3

Effect of the Cash under \$20 Rule on Credit Card Interest Accrued by Month

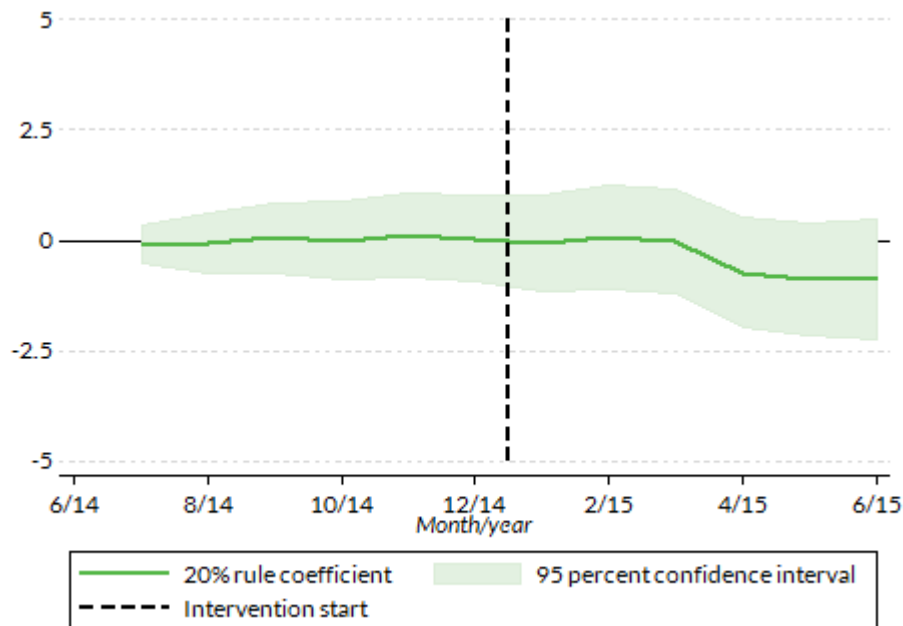


Source: Arizona Federal administrative data.

Notes: The solid line is coefficients from a month-by-month model of the effect of the rule on the outcome measure. The shaded area shows the 95 percent confidence intervals for these coefficients. When the 95 percent confidence interval crosses the y axis at zero, the coefficient is statistically significant and the rule had an effect on the outcome in that month. The vertical dotted line indicates the beginning of treatment: the intervention began December 15, 2014, which showed up in the data in January 2015.

FIGURE 7.4

Effect of the 20 Percent Added Rule on Credit Card Interest Accrued by Month



Source: Arizona Federal administrative data.

Notes: The solid line is coefficients from a month-by-month model of the effect of the rule on the outcome measure. The shaded area shows the 95 percent confidence intervals for these coefficients. When the 95 percent confidence interval crosses the y axis at zero, the coefficient is statistically significant and the rule had an effect on the outcome in that month. The vertical dotted line indicates the beginning of treatment: the intervention began December 15, 2014, which showed up in the data in January 2015.

Credit Card Revolving

We did not detect an effect on the likelihood of paying off the balance in full, that is, of ceasing to be a revolver (table 7.3). This result was expected given the large levels of credit card debt held by many revolvers in this study relative to the size of the decrease in balances generated by a rule of thumb. It may be, however, that over a longer time horizon, these rules of thumb would be capable of decreasing the likelihood of revolving as the outstanding balance reaches zero.

TABLE 7.3

ITT Effect of Rules of Thumb on Any Balance Revolved

	Any balance revolved ^a
\$20 rule	0.002 (0.006)
20% rule	0.001 (0.006)
Number of participants	12,332

Source: Arizona Federal administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

^a Results robust to logit specification.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Purchases

Although both rules aimed to change individual behaviors surrounding spending, we did not detect an overall effect on a number of measures related to purchases. There was no difference in amount purchased, number of purchases, number of purchases under \$20, or percentage of purchases under \$20 on participants' Arizona Federal credit card. The first three measures are displayed in table 7.4, and the fourth is shown in table I.1 in appendix I.

Although there was no effect detected on the full sample, for individuals 40 years or younger, exposure to either the cash under \$20 rule or the 20 percent added rule resulted in 0.5 fewer credit card purchases per month than their control group counterparts, and participants under 40 exposed to the 20 percent added rule had \$24 less in purchase amount per month (tables H.1 and H.2 in appendix H). Therefore, the rules seem to have affected spending for younger participants.

TABLE 7.4

ITT Effect of Rules of Thumb on Purchases

	Credit card purchase amount	Number of credit card purchases ^a	Number of credit card purchases under \$20 ^a
\$20 rule	1.884 (8.737)	-0.167 (0.122)	-0.071 (0.060)
20% rule	2.303 (8.740)	-0.110 (0.122)	-0.059 (0.060)
Number of participants	12,322	13,658	13,664

Source: Arizona Federal administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. SE = standard error. Robust standard errors are shown in parentheses, clustered at the individual level.

^a Results robust to Poisson specification.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Credit Card Payments

We did not detect an overall effect in total credit card payment amount, percentage of credit card balance paid (table I.2 in appendix I), or whether an individual made a late payment on their Arizona Federal credit card (table I.2 in appendix I). Very small effects were found on payment behaviors, but in the opposite direction from those expected. Individuals who received the cash under \$20 rule made, on average, 0.03 fewer credit card payments each month than they would have made in the absence of treatment (table 7.5). This difference could be because participants' balances were lower, generating less of a perceived need to pay off these balances as frequently. In any case, recipients of the cash under \$20 rule decreased their balances despite making a very small number of fewer payments. The effect of the 20 percent added rule on the number of credit card payments was not significant, but neither was it distinguishable from the effect of the cash under \$20 rule on payments.

We did not see evidence of a discernable pattern when looking at number of credit card payments by month. We detected statistically significant decreases in the number of credit card payments in January 2015 and May 2015, but the magnitude of the changes was very low (table G.3 in appendix G).

TABLE 7.5

ITT Effect of Rules of Thumb on Credit Card Payments at Arizona Federal

	Number of credit card payments ^a	Credit card payment amount
\$20 rule	-0.025* (0.014)	-12.88 (16.60)
20% rule	-0.014 (0.014)	-3.541 (16.63)
Number of participants	13,556	12,322

Source: Arizona Federal administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

^a Results robust to Poisson specification.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Checking and Savings Accounts

To determine whether participants offered access to treatment were using cash instead of credit and to assess whether they were substituting debit transactions for credit transactions, we also examined their checking and savings account behaviors on their Arizona Federal accounts. We found that the rules did not have a statistically significant effect on savings (table 7.6). We also estimated the effect of the intervention on participants' net savings at Arizona Federal, or their savings balance minus their credit card debt, and found no detectable effect. We did not detect any effects for withdrawal or deposit behaviors or any change in the number of debit card transactions under \$20.

TABLE 7.6

ITT Effect of Rules of Thumb on Checking and Savings Accounts

	Total savings	Savings less credit card balance
\$20 rule	-52.33 (101.2)	76.51 (119.5)
20% rule	-90.47 (103.2)	-53.12 (120.9)
Number of participants	13,430	13,049

Source: Arizona Federal administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Aggregate Debt and Credit

Aggregate Debt

In an effort to evaluate each individual's full financial standing, we also estimated the impact of the intervention on financial data obtained from a large credit bureau. Although the rules were effective at reducing balances and interest accrued on participants' Arizona Federal credit cards, we did not detect an effect on participants' aggregate debt on all revolving trades (which includes debt from accounts outside of Arizona Federal) (table 7.7). We also examined aggregate balance on all open trades, aggregate balance for open status trades, and aggregate balance for open status revolving trades, finding similar results. We also did not detect any effects on collections or delinquencies (table I.2 in appendix I).

TABLE 7.7

ITT Effect of Rules of Thumb on Aggregate Balance for Open Revolving Trades

	Aggregate balance for open revolving trades
\$20 rule	-144.5 (154.9)
20% rule	-74.83 (154.8)
Number of participants	13,782

Source: Pre- and postintervention credit record data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

Credit Inquiries and Available Credit

We found that the 20 percent added rule reduced the number of credit inquiries. On average, participants who received the 20 percent added rule had on average 0.213 fewer inquiries than they would have had otherwise (a 9 percent change from the baseline average number of inquiries). (Of note, the effect of the 20 percent added rule is not statistically distinguishable from the effect of the cash under \$20 rule.) These results suggest that although the 20 percent added rule—"Credit keeps charging. It adds approximately 20% to the total"—was intended to target spending, it appears to have discouraged participants from applying for new debt.

This reduction in credit inquiries may have driven participants to take on fewer new revolving debts than they would have in the absence of treatment, at least for the 20 percent added rule. And for that rule, though also for the \$20 rule, we see that participants had an aggregate credit line for open revolving trades of \$595 less (\$20 rule) or \$679 less (20 percent added rule) on average than they would have had in the absence of treatment (table 7.8).

Although credit for revolving trades decreased, we found no effect on the aggregate balance-to-credit ratio for open revolving trades (i.e., the utilization ratio). This finding may imply that although available credit decreased, so too did aggregate balance, just not by enough for it to be detectable on its own.

TABLE 7.8

ITT Effect of Rules of Thumb on Available Credit, Utilization, and Credit Inquiries

	No. of inquiries within 12 months ^a	Aggregate credit for open revolving trades	Balance-to-credit ratio for open revolving trades
\$20 rule	-0.076 (0.072)	-595.4*** (198.6)	0.388 (0.634)
20% rule	-0.213*** (0.072)	-679.3*** (199.7)	0.267 (0.638)
Number of participants	13,738	13,790	13,709

Source: Pre- and postintervention credit record data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

^aResults robust to Poisson specification.

* $p < 0.1$; ** $p < 0.05$; *** $p < .01$

Credit Score

We did not detect an impact of either rule on credit scores for participants (table 7.9). This apparent lack of effect is likely both because credit scores are slow to move and because the intervention did not affect several main drivers of credit scores, including on-time payment behavior, length of credit history, and types of credit used.

TABLE 7.9

ITT Effect of Rules of Thumb on FICO Credit Score

	FICO credit score
\$20 rule	-1.458 (1.094)
20% rule	-0.687 (1.096)
Number of participants	13,616

Source: Pre- and postintervention credit record data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Rule Wording, Delivery Modes, Effects over Time, and Subgroups

Rule Wording

This study provides some evidence that rule wording matters, because the effects of the cash under \$20 rule were generally larger and more often significant than the effects of the 20 percent added rule. It may be that the cash under \$20 rule was more effective because the intended action was stated explicitly in the rule (“Use cash when it’s under \$20”), whereas the 20 percent added rule’s command was implied rather than stated directly (the implied action is to not use credit, but no alternative is suggested). This implied action may be why participants who received the 20 percent added rule had fewer credit inquiries: they did not want any more lines of revolving credit because they were told it was an expensive form of debt. However, they did not use cash instead of credit because that was not directly suggested.

We have no definitive evidence about why the cash under \$20 rule was more effective than the 20 percent added rule. It is worth reiterating that the e-mail open rates for the cash under \$20 rule were no higher on average than for the 20 percent added rule, though landing page visits were higher in the first and third months of the intervention. Future research should examine which types of rules work better than others and why.

Delivery Mode and Frequency

Interestingly, there was no clear winner in terms of delivery mode (e-mail, online, or physical mailer) (appendix J). The three approaches are clearly different, yet, at least for this sample and intervention, they achieved comparable results. For instance, for the main outcome of interest (credit card balance), online worked best for the cash under \$20 rule, and mail and e-mail worked best for the 20 percent added rule, but none of these coefficients were significantly different from one another (table J.1). For other outcomes such as aggregate credit for open revolving trades, all modes had a statistically significant effect for the first rule, and all but mail did for the second rule (table J.8).

Although revolver behavior was not differentially affected by the three delivery modes, receiving a rule via fewer channels actually seemed to work better than receiving it via all three (appendix K). This result could be because participants who received the rules via too many channels were inundated and fatigued, making the rules less compelling. However, there were fewer participants who received the rule via three modes than two or one, so the results may be a reflection of sample size and power rather than true effects.

Additionally, in results analyzed but not included in this report, we found no outcome differences whether the e-mails were sent using a variable delivery schedule or always on a Friday (the two e-mail subgroups).

Effects over Time

The effects of the rules increased over time for credit card balance, but they did not show any discernible pattern for the other outcome measures. It is therefore likely that this observed effect is due to the compounding and cumulative nature of balance rather than to an increase in behavior change over time. Postintervention results, which will be presented in a subsequent memo accompanying this report, will provide insight into whether the rules produced behavior changes that lasted beyond the end of the intervention and whether these effects decayed over time.

Age

To examine what age groups rules of thumb might work best for, we separated the sample into three groups: participants who were 40 years old or younger at baseline, those who were between 40 and 60 years old, and those who were 60 or older. There were 4,874 participants in the under 40 group, 6,181

in the 40 to 60 group, and 2,892 in the 60 and older group. Descriptive statistics for participants in each of the age groups can be found in table B.5 in appendix B.

Analysis based on these groupings showed that the rules tended to work better for participants who were 40 years or younger (tables H.1 through H.3 in appendix H). Participants in this age group who were exposed to either rule had lower credit card balances and fewer purchases than their control group counterparts, and those under 40 who received the cash under \$20 rule had higher savings and higher net savings (savings minus credit card balance). Participants in this group also made slightly fewer credit card payments than they would have made in the absence of treatment, perhaps because they had lower balances and therefore less need to pay as frequently (and anecdotally we were told that some customers pay their bill after every purchase, so if there were fewer purchases, they would have paid less frequently).

Baseline Number of Purchases

Because the population may not have been ideal in terms of how frequently its members used their credit cards prior to treatment, we estimated the effects of the intervention for subgroups of participants based on how frequently they made purchases on their credit cards prior to treatment. We separated the sample into participants who made 1 purchase or less on average per month in the six months prior to treatment, between 1 and 10 purchases, and 10 or more purchases (descriptive statistics for these groups are in table B.7 in appendix B). We also divided the sample into groups based on their baseline number of purchases below \$20, because those were the purchases targeted by the first rule. The groupings for these were 1 purchase or less under \$20 on average per month in the six pretreatment months, between 1 and 5 purchases, and 5 or more purchases (descriptive statistics for these groups are in table B.6 in appendix B).

Generally, effects were stronger for participants who made a greater number of purchases on their credit card at baseline (tables H.4 and H.5 in appendix H). Although we detected no clear effect on credit card balance based on the total purchase subgroups, we did find that participants who were more frequent users of their credit cards (those who made between 1 and 10 purchases per month pretreatment) had fewer total purchases and fewer purchases under \$20 as a result of the rules. This was also the group that saw the largest reduction in aggregate credit for open revolving trades and who had a reduction in total savings and a reduction in aggregate balance for open trades (at least for those who received the 20% added rule). Less clear patterns of effects were detected for the highest

purchase-volume group (those who made more than 10 purchases per month at baseline), but this is likely because this group was the smallest of the three.

No discernable pattern was found for subgroups based on average number of pretreatment purchases under \$20.

Baseline Credit Score

Finally, to examine whether effects were stronger for participants who began with a higher or lower level of overall financial standing, we estimated effects by subgroup of initial credit score. We divided study participants into three subgroups of close to equal size: one subgroup for participants with credit scores 670 or less, another with scores between 670 and 730, and another with scores of 730 or greater (descriptive statistics are in table B.8 in appendix B). However, this sample included mostly participants with decent credit scores (an average of 699 preintervention). Even a score of 670 is not poor—it is generally considered fair. Poor credit is between 600 and 649, and bad credit is below 600. We did not have enough participants with poor or bad credit scores to examine them by subgroup.

That being said, most of the effects of the rules were driven by participants with credit scores between 670 and 730, that is, those with fair to good credit (table H.6 in appendix H). This finding opposes our hypothesis that rules of thumb work better for those with lower financial standing, which has been suggested in previous studies. However, it may be that a population with lower initial financial status would perform differently. In addition, participants with a baseline credit score of 730 or greater actually had a marginally lower credit score than they would have had in the absence of treatment, which mirrors results found in Bracha and Meier (2014).

Multiple Outcomes Analysis

Given the large number of outcomes we analyzed, we conducted a multiple outcome analysis. As the number of outcomes one examines increases, the probability of estimating that treatment has a significant effect on at least one outcome increases. To adjust for this, we use a summary measure of standardized treatment effects for each category of outcomes, rescaling each outcome within a category by its mean and standard deviation and then combining them. This methodology tests the impact of the treatment on the overall category; the results are presented in tables 7.10 and 7.11. We

found a significant effect on the Arizona Federal credit card debt category and on the credit category, but none of the other outcome categories were significant.

TABLE 7.10

Multiple Outcomes Adjustment for Effect of Rules of Thumb on Arizona Federal Credit Card Debt, Purchases, Payments, and Checking and Savings Accounts

	Credit card debt	Credit card purchases	Credit card payments	Checking and savings	Debit card usage
\$20 rule	-0.019* (0.010)	-0.015 (0.016)	-0.008 (0.007)	0.000 (0.007)	-0.005 (0.009)
20% rule	-0.011 (0.010)	-0.004 (0.016)	-0.004 (0.007)	-0.006 (0.007)	0.006 (0.009)
Number of participants	12,322	10,106	11,453	11,783	12,310

Source: Arizona Federal administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE 7.11

Multiple Outcomes Adjustment for Effect of Rules of Thumb on Aggregate Debt and Credit

	Debt	Credit
\$20 rule	0.006 (0.013)	-0.027* (0.015)
20% rule	-0.001 (0.013)	-0.055*** (0.015)
Number of participants	13,624	13,657

Source: Pre- and postintervention credit record data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Chapter 8. Conclusions and Implications

Tips, rules, nudges, and reminders are set to become more prevalent as we move to managing more of our financial lives on mobile platforms. Lenders are already making ample use of these strategies, and so too are personal financial management platforms (like Mint.com). But it is not only the big players that will communicate with us in these ways—the potential for mobile-based apps is limited only by our collective imagination (and fatigue).

Although their use is growing, the evidence base around rules of thumb is quite limited. This study demonstrates that rules of thumb can work as a cost-effective method of financial improvement and behavior change. The effects of the rules in this study were moderate, but the costs of delivering the rules were, by many accounts, trivial, making the benefit–cost trade-off sizable. This study shows that rules of thumb hold promise as a method of financial education.

The first rule of thumb (the cash under \$20 rule) helped to lower participants' credit card debt by \$104, or about 2 percent from the baseline average. For participant under 40 years of age, this effect was even more pronounced: participants under 40 exposed to either rule saw a 5 percent lower credit card balance than they would have in the absence of treatment. Moreover, the rules had a delivery and production cost of around \$0.50 per person, with the marginal cost of adding an additional recipient essentially zero.

Although we found that the cash under \$20 rule reduced revolving debt for participants, we did not detect a change in the underlying behaviors that might have caused this reduction in debt. We expected that this rule would reduce credit card purchases (particularly for purchases below \$20), but we did not find an effect on either overall purchases or purchases under \$20. Although we cannot definitively say what the mechanism was behind the change in credit card debt, we did find that participants under 40 years of age—for whom lower credit card balances were most evident—both made fewer purchases and had higher savings. For some other subgroups, savings went down but net savings went up, suggesting that the mechanism behind the reduction in credit card debt was likely a reduction in purchases with some substitution from credit to cash, and that the overall effect was a net gain.

We also found that both rules reduced how much available credit participants had overall (for all their credit cards and accounts), suggesting that the rules influenced their behavior surrounding expanding available credit and/or opening and closing lines of revolving credit.

The participants in this sample did not use their credit cards very frequently before (or during) the intervention, making them perhaps not the best-poised group to take advantage of the rules. In that way, the effects demonstrated here may understate those that could be achieved with revolvers who make larger numbers of purchases via credit card. These two rules had a greater impact on participants who used their cards more frequently, which supports this hypothesis. In addition, the study participants had fairly high credit scores and financial standing to begin with, which may have also made it more difficult for the intervention to alter their financial outcomes.

One additional element that made it difficult for us to detect effects was that we were unable to observe whether or not the participants actually read and applied the rules. Had we been able to measure this, we could have estimated the effect of actually applying the rules (the treatment on the treated) rather than only the effect of being offered the rules (the intent to treat).

The rules we created and tested serve only as examples of what the potential impact of rules of thumb might be, rather than as a conclusive analysis of the best rules to use. We selected the two rules based on what the in-depth interviews and previous literature suggested would have the greatest effect. In this way we understand this study as a test of rules of thumb in concept, rather than a thorough test of rule framing, wording, and topics. Future research should test more rules on varying populations to determine which work best for whom.

Nevertheless, we found suggestive evidence that the different rules had differential effects on financial outcomes, although sometime these effects were not statistically different from one another. The different effects imply that attention to wording, topic, and framing can matter. The evidence also suggests that the effects of the rules were not simply due to a reminder effect (reminding the consumer about their credit card in general), for if that had been the case, we expect the effect would have been the same for both rules. We likely also would have seen an increase in payments had that been the case, which we did not see even for subgroups within the sample. The effect appears to be at least partially a true effect of the rules themselves. This is not to say that the reminder effect is null, but rather that it appears not be the sole driver of the results.

We were able to test three delivery mechanisms (e-mail, online banner, and physical mailer) to determine which worked the best, and in the end, no one mechanism was definitively superior. In addition, whether the e-mails were sent using a variable delivery schedule or always on a Friday did not

produce a distinct effect. However, receiving a rule via fewer channels seemed to work better than receiving it via two or three channels, indicating that overexposure to a rule can nullify any benefit. Delivery modes such as text messaging or phone apps, which could get the rules to consumers even closer in time to their purchase or payment decisions, might work even better. These alternative delivery modes should also be tested in future studies.

Although the results overall were moderate, the per person costs were trivial. The total estimated cost of delivering the rules and producing the physical mailer was \$10,951. This equates to around \$0.50 per person, with the marginal cost of additional recipients less than this overall cost, particularly for e-mail and online delivery. Additionally, these costs are higher than they would have been without the added time needed to randomize the sample and deliver the rules differently to each of the treatment groups.

The process of selecting and designing rules of thumb could take many forms. It could involve sending out rules that were already created and designed by another group, or it could involve starting from scratch and creating new rules and designs targeted at a specific population. The cost of an intervention would depend heavily on which method is chosen. The rule design costs for this study totaled \$9,135, or \$0.75 per recipient, but these costs included multiple rounds of testing and copyediting that would likely not be incurred by a financial institution implementing a rules of thumb education program.

This study's results demonstrate that rules of thumb can work as a method of financial improvement and behavior change. The effects of rules of thumb are moderate. Although it would be difficult to imagine rules fully replacing other types of financial education and capability supports, like financial coaching (Theodos et al. 2015), the rules could be used as complements to these approaches. More research is needed to tease out the mechanisms behind these effects and to determine for whom a rules of thumb intervention can best work. In addition, effort should be spent toward developing and testing specific rules of thumb to determine which are the most effective at improving financial behaviors and outcomes. Overall, given their low marginal cost of implementation, rules of thumb provide a promising method of delivering financial education and improving financial health.

Appendix A. Images of Final Product

FIGURE A.1

Calendar Physical Mailer for Cash under \$20 and 20 Percent Added Rules

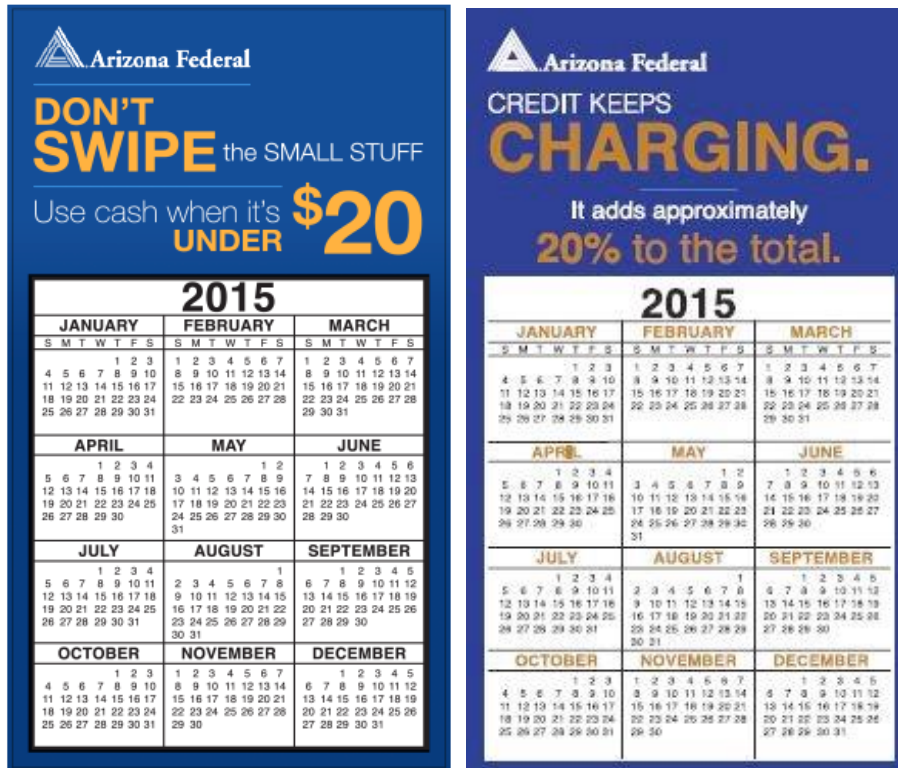


FIGURE A.2

Banner Ads Online for Rules A and B

Blue and White Top Ad Versions



Blue Side Ad Versions

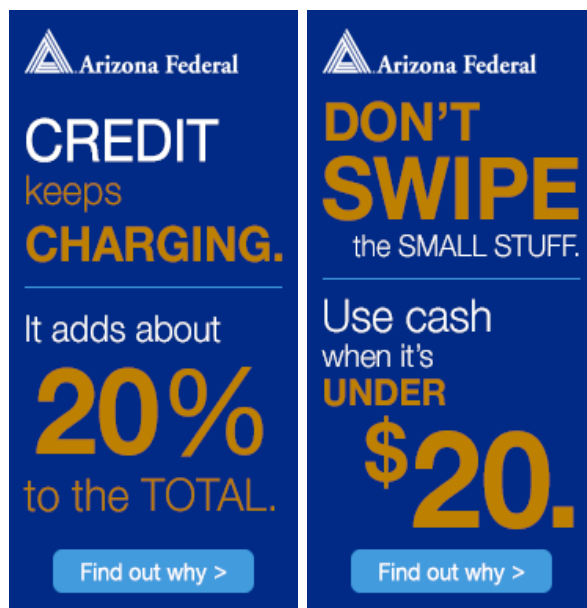


FIGURE A.3

E-mail Content for Cash under \$20 Rule

E-mail A



E-mail B



E-mail C

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 Experience the *power of us.*

DON'T SWIPE

the **SMALL STUFF.**

Use cash when it's **UNDER \$20.**



Developing the habit of using **cash** instead of **credit cards** for purchases under \$20 helps you **manage your spending** and improve your financial health.


Avoid credit cards for smaller purchases.

[Find out why >](#)

*Disclaimer: solor et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

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Arizona Federal
 Experience the *power of us.*





tip:

Don't swipe the small stuff.
Use cash when it's under \$20.

Avoid credit cards for smaller purchases.

- Using your credit card for **purchases under \$20**, like a cup of coffee or movie ticket, can lead to spending that is hard to manage.
- **Arizona Federal Credit Union** would like to support you in building healthy financial habits.

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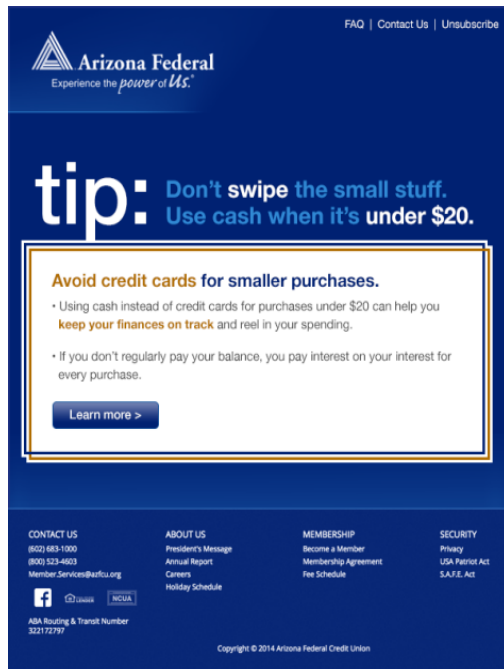


FIGURE A.4

E-mail Content for 20 Percent Added Rule

E-mail A



E-mail B

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Experience the *power of Us.*

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CREDIT KEEPS CHARGING.

It adds approximately
20% to the total.

After adding interest, a **\$100** shopping trip could **cost around \$120** if your bill isn't paid in full.

Credit cards add additional costs when you don't pay your balance in full.

[Find out why >](#)

E-mail C

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Experience the *power of Us.*

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CREDIT KEEPS CHARGING.

It adds approximately
20% to the total.




Everyone knows that **you accrue interest** when you don't pay off your balance. But did you know you **pay interest on your interest** if you don't regularly pay your balance?
Approximately 20%.

Credit cards add additional costs when you don't pay your balance in full.

[Find out why >](#)

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tip:





Credit keeps charging. It adds approximately 20% to the total.

Credit cards add additional costs when you don't pay your balance in full.

- Reducing your credit card balance by paying a little more on every bill can help **lower the amount of interest** and fees you're charged.
- **Arizona Federal Credit Union** is here to support you in building healthy financial habits.

[Learn more >](#)

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tip:





Credit keeps charging. It adds approximately 20% to the total.

Credit cards add additional costs when you don't pay your balance in full.

- When your card balance isn't regularly paid in full, a \$100 shopping trip **could cost you around \$120** because of the added interest and fees.
- Research shows using credit cards instead of cash **increases the amount spent** on purchases.

[Learn more >](#)

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FIGURE A.5

Landing Page Content for Cash under \$20 and 20 Percent Added Rules

My Settings Help Support Logout


[My Accounts](#) [Bill Pay](#) [Move Money](#) [Manage Money](#) [Additional Services](#) [Member Benefits](#) [TaxBotax](#)



DON'T SWIPE

the SMALL STUFF.

Charging purchases **under \$20** can lead to out-of-control spending.




Using your credit card for smaller items can make it difficult to track and manage your spending.

Studies have shown that you're comfortable **spending more when you pay with credit**. Even a \$5 cup of coffee seems less expensive when you charge it!

Avoid having an unmanageable credit card balance down the road by **paying with cash instead of credit** the next time you buy something like eggs, gas or tickets to a movie. **Using cash for small purchases** can help you keep track of your finances and help you reel in your spending.

Spontaneous transactions are also hard to budget for and can add up quickly, especially if you're open to paying more. **Stay on top of your spending by choosing to pay with cash.**

Arizona Federal Credit Union wants to help you make smart financial decisions.
Remember this rule of thumb to help build a **healthier and more secure financial future.**



APPENDIX A

97



CREDIT KEEPS CHARGING.

Credit cards add **additional costs** when you don't pay your balance in full.



Did you know that you **add approximately 20%** in accrued interest costs when you **don't pay off your credit card** each month?

That means the price tags you see in the store **can be deceiving**. Whether you're grabbing a gallon of milk or picking up a new shirt, **the interest adds up**. For example, a **\$100** shopping trip could actually end up **costing you around \$120**.

Use your credit card less to reduce the amount of interest you'll be charged. With more manageable debt, you can work on **paying off more of your balance**.

Arizona Federal Credit Union wants to help you develop good spending and payment habits. Remembering this rule of thumb could help you build a **healthier and more secure financial future**.

Appendix B. Baseline Treatment versus Control Means by Treatment Groups

TABLE B.1

Arizona Federal Account Baseline Treatment versus Control Means by Treatment Group, the Cash under \$20 Rule

Variable	Control mean	\$20 Rule										
		1	2.1	2.2	3.1	3.2	4	5.1	5.2	6	7.1	7.2
Sample size	1,744	872	437	434	434	438	872	438	434	873	435	438
Credit card debt												
<i>Credit card balance</i>	\$4,969	\$4,729	\$4,842	\$5,139	\$4,968	\$4,995	\$4,720	\$5,153	\$4,642	\$4,713	\$5,001	\$4,856
Difference		-239.8	-126.9	170.3	-1.368	26.04	-249.3	183.9	-326.8	-256.0	31.57	-113.0
<i>Credit card interest accrued</i>	39.83	38.91	37.41	42.52	39.38	38.33	37.38	41.80	38.45	38.72	39.18	40.75
Difference		-0.925	-2.422	2.689	-0.453	-1.501	-2.454	1.969	-1.381	-1.109	-0.656	0.919
<i>Any balance revolved</i>	0.897	0.897	0.894	0.894	0.904	0.896	0.899	0.902	0.897	0.897	0.882	0.902
Difference		0.000	-0.003	-0.003	0.007	-0.001	0.002	0.005	-0.001	0.000	-0.015	0.005
Purchases												
<i>Credit card purchase amount</i>	\$296.0	\$293.7	\$262.7	\$298.3	\$271.9	\$280.8	\$297.9	\$290.7	\$295.6	\$261.7	\$285.5	\$270.5
Difference		-\$2.345	-\$33.30	\$2.290	-\$24.13	-\$15.29	\$1.815	-\$5.332	-\$0.427	-\$34.30*	-\$10.53	-\$25.50
<i>Number of credit card purchases</i>	4.723	4.787	4.464	4.741	4.502	4.621	4.952	4.753	4.548	4.698	4.805	4.995
Difference		0.064	-0.260	0.018	-0.221	-0.102	0.228	0.030	-0.175	-0.025	0.081	0.272
<i>Number of credit card purchases <\$20</i>	1.814	1.888	1.773	1.793	1.591	1.900	1.869	1.764	1.676	1.930	1.749	1.842
Difference		0.074	-0.041	-0.020	-0.223	0.086	0.055	-0.049	-0.138	0.116	-0.064	0.028
<i>Percent of credit card purchases <\$20</i>	0.307	0.326	0.310	0.316	0.310	0.322	0.309	0.330	0.315	0.320	0.303	0.317
Difference		0.018	0.002	0.008	0.002	0.015	0.002	0.022	0.007	0.013	-0.005	0.010
Cash advances												
<i>Total cash advance amount</i>	\$2.79	\$3.475	\$4.048	\$1.627	\$4.111	\$3.304	\$2.590	\$3.500	\$3.497	\$4.747	\$2.021	\$3.278
Difference		\$0.688	\$1.260	-\$1.161	\$1.324	\$0.517	-\$0.197	\$0.712	\$0.710	\$1.959*	-\$0.766	\$0.491
<i>Total number of cash advances</i>	0.010	0.009	0.016	0.011	0.010	0.009	0.010	0.008	0.009	0.010	0.006	0.013
Difference		-0.002	0.006**	0.001	-0.001	-0.001	-0.001	-0.002	-0.001	0.000	-0.004	0.003
<i>Ever received cash advance</i>	0.010	0.009	0.016	0.011	0.010	0.009	0.010	0.008	0.009	0.010	0.006	0.013
Difference		-0.002	0.006**	0.001	-0.001	-0.001	-0.001	-0.002	-0.001	0.000	-0.004	0.003

TABLE B.1 CONTINUED

Variable	Control mean	\$20 Rule										
		1	2.1	2.2	3.1	3.2	4	5.1	5.2	6	7.1	7.2
Fees												
Number of fees paid	3.489	3.413	3.242	3.609	3.288	3.600	3.255	3.710	3.663	3.668	3.730	3.815
Difference		-0.076	-0.247	0.120	-0.201	0.111	-0.234	0.221	0.174	0.179	0.241	0.326
Ever paid fees	0.270	0.269	0.267	0.295	0.236	0.278	0.262	0.303	0.298	0.288	0.281	0.275
Difference		-0.002	-0.004	0.025	-0.034*	0.007	-0.008	0.033	0.027	0.017	0.011	0.004
Payments												
Number of credit card payments	1.318	1.386	1.372	1.377	1.351	1.413	1.355	1.361	1.394	1.346	1.352	1.341
Difference		0.067**	0.054*	0.059*	0.032	0.095***	0.036	0.043	0.076**	0.027	0.034	0.023
Credit card payment amount	457.0	484.4	430.6	519.9	434.4	498.3	446.0	456.8	463.2	424.0	492.3	442.2
Difference		27.43	-26.43	62.91	-22.58	41.26	-10.96	-0.190	6.25	-33.01	35.30	-14.84
Ever paid credit card late	0.015	0.018	0.016	0.024	0.013	0.017	0.020	0.016	0.018	0.015	0.017	0.023
Difference		0.002	0.001	0.008*	-0.002	0.002	0.005	0.001	0.003	-0.001	0.001	0.008*
Percent of credit card balance paid	0.245	0.222	0.259	0.257	0.237	0.237	0.270	0.262	0.255	0.243	0.303	0.221
Difference		-0.022	0.015	0.012	-0.008	-0.008	0.025	0.017	0.010	-0.002	0.058**	-0.024
Checking and savings accounts												
Total savings	\$3,752	\$3,742	\$4,187	\$4,175	\$4,317	\$3,660	\$3,862	\$3,836	\$3,679	\$4,045	\$4,189	\$4,134
Difference		-\$10.10	\$435.6	\$423.0	\$564.9	-\$91.40	\$110.3	\$84.15	-\$72.94	\$293.8	\$437.5	\$382.7
Savings less credit card balance	-\$1,402	-\$1,192	-\$799.3	-\$917.6	-\$914.3	-\$1,340	-\$885	-\$1,419	-\$1,212	-\$996.2	-\$830.4	-\$862.3
Difference		\$209.8	\$603.0	\$484.6	\$487.9	\$62.15	\$516.8	-\$16.38	\$189.9	\$406.0	\$571.9	\$540.0
Number of deposits	7.190	7.114	7.194	7.672	7.477	7.173	7.092	6.947	7.444	7.312	7.418	7.025
Difference		-0.076	0.004	0.482*	0.287	-0.017	-0.098	-0.243	0.254	0.122	0.228	-0.165
Sum of deposits	\$4,377	\$4,245	\$4,200	\$4,482	\$4,174	\$4,201	\$4,278	\$3,930	\$4,291	\$4,469	\$4,521	\$4,226
Difference		-\$132.1	-\$176.9	\$104.6	-\$203.5	-\$175.9	-\$99.54	-\$447.2**	-\$86.26	\$91.77	\$143.8	-\$151.3
Number of withdrawals	47.57	45.85	44.37	49.75	46.72	43.30	46.63	44.79	48.79	46.57	49.23	45.39
Difference		-1.712	-3.196*	2.185	-0.850	-4.262**	-0.935	-2.774	1.219	-0.992	1.666	-2.180
Sum of withdrawals	\$4,509	\$4,389	\$4,226	\$4,707	\$4,332	\$4,253	\$4,383	\$4,030	\$4,271	\$4,568	\$4,556	\$4,295
Difference		-\$119.8	-\$283.6	\$197.4	-\$177.2	-\$256.6	-\$126.6	-\$479.4**	-\$238.1	\$58.43	\$46.43	-\$214.1
Number of debit card transactions	34.14	32.34	31.53	36.70	33.99	30.61	33.37	32.65	35.46	33.35	35.93	32.78
Difference		-1.792	-2.608*	2.560	-0.148	-3.528**	-0.769	-1.483	1.323	-0.785	1.796	-1.354
Sum of debit card transactions	\$1,345	\$1,295	\$1,266	\$1,484	\$1,391	\$1,281	\$1,342	\$1,319	\$1,382	\$1,314	\$1,498	\$1,350
Difference		-\$49.78	-\$78.40	\$139.1**	\$46.70	-\$63.66	-\$2.98	-\$25.97	\$37.51	-\$30.85	\$152.9	\$5.152

TABLE B.1 CONTINUED

Variable	Control mean	\$20 Rule										
		1	2.1	2.2	3.1	3.2	4	5.1	5.2	6	7.1	7.2
<i>Number of debit card transactions <\$20</i>	16.69	15.94	14.62	18.08	16.61	15.12	16.32	16.19	17.03	15.91	16.85	15.59
Difference		-0.750	-2.072**	1.388	-0.085	1.575*	-0.375	-0.498	0.335	-0.786	0.154	-1.103
Overdrafts and fees												
<i>Total overdraft transfer amount</i>	\$77.48	\$78.63	\$80.47	\$98.68	\$72.17	\$79.12	\$75.21	\$87.62	\$88.11	\$84.10	\$82.11	\$73.82
Difference		\$1.153	\$2.996	\$21.20*	-\$5.303	\$1.648	-\$2.268	\$10.144	\$10.633	\$6.627	\$4.630	-\$3.655
<i>Total overdraft transfer count</i>	0.703	0.705	0.667	0.873	0.715	0.759	0.644	0.613	0.747	0.698	0.673	0.753
Difference		0.002	-0.037	0.169**	0.012	0.056	-0.060	-0.090	0.044	-0.005	-0.031	0.050
<i>Ever overdrafted</i>	0.268	0.252	0.251	0.297	0.260	0.277	0.239	0.261	0.271	0.275	0.287	0.280
Difference		-0.016	-0.017	0.029	-0.009	0.009	-0.029**	-0.008	0.003	0.007	0.019	0.012
Stratification variables												
<i>Months revolved</i>	5.153	5.232	5.153	5.332*	5.111	5.189	5.119	5.231	5.281	5.105	5.126	5.132
Difference		0.786	0.880	0.251	0.937	0.026	0.936	0.433	0.640	298.09	14.13	-19.96
<i>Age</i>	46.73	46.79	47.14	46.44	47.71	46.13	47.00	47.56	46.13	46.61	47.06	46.17
Difference		-47.48	-151.9	16.05	-192.7	-175.9	41.19	-215.5	-155.9	-130.7	114.4	-75.48
Additional characteristics												
<i>Living in Phoenix Metro</i>	0.73	0.74	0.73	0.77	0.74	0.77	0.74	0.75	0.73	0.75	0.72	0.73
Difference		0.00	0.00	0.03	0.00	0.03	0.01	0.02	0.00	0.01	-0.01	0.00
<i>Living in Arizona</i>	0.93	0.94	0.95	0.95	0.94	0.96	0.95	0.95	0.94	0.93	0.92	0.93
Difference		0.00	0.01	0.02	0.00	0.02	0.01	0.01	0.00	0.00	-0.01	0.00

Source: Arizona Federal Credit Union administrative data.

Note: Asterisks indicate whether the treatment group mean is statistically different from the control group mean.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE B.2

Arizona Federal Account Baseline Treatment versus Control Means by Treatment Group, the 20 Percent Added Rule

Variable	Control mean	20% Rule										
		8	9.1	9.2	10.1	10.2	11	12.1	12.2	13	14.1	14.2
Sample size	1,744	873	438	435	435	438	872	436	436	872	436	436
Credit card debt												
<i>Credit card balance</i>	\$4,969	\$4,758	\$5,432	\$4,891	\$4,846	\$4,912	\$4,742	\$4,439	\$4,671	\$4,994	\$4,935	\$4,985
Difference		-211.2	462.6	-78.14	-123.1	-57.27	-226.7	-530**	-298.5	25.32	-34.07	16.22
<i>Credit card interest accrued</i>	39.83	39.21	42.05	40.08	39.50	38.42	39.06	36.03	36.84	40.96	38.49	37.67
Difference		-0.617	2.220	0.251	-0.328	-1.415	-0.770	-3.806*	-2.990	1.127	-1.337	-2.163
<i>Any balance revolved</i>	0.897	0.906	0.902	0.913	0.909	0.905	0.900	0.896	0.899	0.905	0.895	0.907
Difference		0.008	0.005	0.015	0.012	0.007	0.003	-0.001	0.002	0.008	-0.002	0.010
Purchases												
<i>Total credit card purchase amount</i>	\$296.0	\$261.9	\$264.2	\$288.9	\$264.8	\$309.2	\$296.8	\$280.3	\$285.3	\$317.5	\$270.5	\$335.0
Difference		-\$34.12*	-\$31.88	-\$7.112	-\$31.21	\$13.107	\$0.758	-\$15.760	-\$10.730	\$21.417	-\$25.59	\$38.95
<i>Number of credit card purchases</i>	4.723	4.583	4.690	4.804	4.692	4.871	4.687	4.629	4.931	4.936	4.371	5.199
Difference		-0.140	-0.034	0.081	-0.031	0.147	-0.036	-0.094	0.207	0.212	-0.353	0.476
<i>Number of credit card purchases <\$20</i>	1.814	1.785	1.693	1.575	1.887	1.914	1.843	1.874	2.009	1.891	1.638	1.946
Difference		-0.028	-0.121	-0.238	0.073	0.100	0.029	0.060	0.195	0.077	-0.176	0.132
<i>Percent of credit card purchases <\$20</i>	0.307	0.316	0.315	0.307	0.342	0.322	0.316	0.291	0.322	0.305	0.313	0.307
Difference		0.008	0.008	-0.001	0.034**	0.014	0.009	-0.016	0.014	-0.002	0.005	-0.001
Cash advances												
<i>Total cash advance amount</i>	\$2.79	\$3.097	\$3.814	\$3.509	\$2.530	\$2.019	\$3.058	\$3.330	\$2.464	\$3.646	\$3.230	\$6.698
Difference		\$0.310	\$1.026	\$0.721	-\$0.257	-\$0.768	\$0.271	\$0.543	-\$0.323	\$0.859	\$0.443	\$3.911**
<i>Total number of cash advances</i>	0.010	0.010	0.015	0.013	0.009	0.010	0.008	0.009	0.010	0.013	0.011	0.011
Difference		0.000	0.004	0.003	-0.001	0.000	-0.002	-0.002	0.000	0.003	0.001	0.000
<i>Ever received cash advance</i>	0.010	0.010	0.015	0.013	0.009	0.010	0.008	0.009	0.010	0.013	0.011	0.011
Difference		0.000	0.004	0.003	-0.001	0.000	-0.002	-0.002	0.000	0.003	0.001	0.000
Fees												
<i>Number of fees paid</i>	3.489	3.299	3.366	3.604	3.672	3.558	3.668	3.435	4.161	3.228	3.293	2.857
Difference		-0.190	-0.123	0.115	0.183	0.069	0.179	-0.054	0.672**	-0.261	-0.196	-0.632**
<i>Ever paid fees</i>	0.270	0.256	0.304	0.275	0.268	0.312	0.273	0.291	0.324	0.255	0.258	0.253
Difference		-0.015	0.034*	0.005	-0.003	0.042**	0.002	0.021	0.054**	-0.015	-0.012	-0.017

TABLE B.2 CONTINUED

Variable	Control mean	20% Rule										
		8	9.1	9.2	10.1	10.2	11	12.1	12.2	13	14.1	14.2
Payments												
Number of credit card payments	1.318	1.335	1.324	1.330	1.318	1.337	1.360	1.387	1.330	1.356	1.336	1.351
Difference		0.016	0.006	0.012	0.000	0.018	0.041*	0.069**	0.012	0.038	0.018	0.033
Total credit card payment amount	457.0	420.8	459.5	459.9	385.7	442.8	472.7	453.9	464.6	483.1	452.5	490.3
Difference		-36.18	2.474	2.868	-71.26**	-14.24	15.74	-3.053	7.604	26.09	-4.501	33.27
Ever paid credit card late	0.015	0.020	0.019	0.021	0.013	0.027	0.017	0.015	0.019	0.017	0.016	0.015
Difference		0.005	0.004	0.006	-0.003	0.012**	0.002	-0.001	0.003	0.001	0.000	-0.001
Percent of credit card balance paid	0.245	0.214	0.238	0.234	0.221	0.239	0.246	0.257	0.231	0.253	0.236	0.228
Difference		-0.030*	-0.007	-0.011	-0.024	-0.006	0.001	0.012	-0.014	0.008	-0.008	-0.017
Checking and savings accounts												
Total savings	\$3,752	\$4,100	\$3,748	\$3,653	\$3,872	\$4,138	\$4,142	\$4,421	\$4,152	\$4,381	\$4,072	\$3,974
Difference		\$348.2	-\$3.612	-\$98.21	\$120.5	\$386.1	\$390.4	\$669.7*	\$400.2	629.2*	\$320.5	\$222.2
Savings less credit card balance	-\$1,402	-\$767.3	-\$1,698	-\$1,416	-\$1,423	-\$819.4	-\$686.8	-\$262.5	-\$702.0	-\$629.6	-\$933.6	-\$1,249
Difference		\$634.9*	-\$295.8	-\$13.37	-\$20.96	\$582.8	\$715.4*	\$1140**	\$700.2	\$772.6*	\$468.6	\$153.0
Number of deposits	7.190	7.143	7.248	7.612	7.072	7.614	7.186	7.242	7.360	7.304	7.227	7.480
Difference		-0.047	0.057	0.422*	-0.118	0.423*	-0.004	0.052	0.169	0.113	0.037	0.290
Sum of deposits	\$4,377	\$4,220	\$4,175	\$4,345	\$3,993	\$4,261	\$4,318	\$4,205	\$4,243	\$4,364	\$4,221	\$4,231
Difference		-\$157.4	-\$202.4	-\$31.62	-\$384.0*	-\$116.5	-\$59.12	-\$171.8	-\$134.6	-\$12.83	-\$155.9	-\$145.8
Number of withdrawals	47.57	46.83	45.05	47.61	47.28	47.49	46.74	45.98	46.92	45.47	47.97	46.75
Difference		-0.740	-2.513	0.041	-0.290	-0.075	-0.828	-1.589	-0.643	-2.097	0.400	-0.815
Sum of withdrawals	\$4,509	\$4,277	\$4,312	\$4,447	\$4,107	\$4,462	\$4,488	\$4,393	\$4,364	\$4,490	\$4,352	\$4,452
Difference		-\$231.8	-\$197.1	-\$62.69	-402.2*	-\$46.84	-\$21.64	-\$116.6	-\$145.6	-\$19.07	-\$157.1	-\$57.64
Number of debit card transactions	34.14	34.59	32.26	33.53	33.61	34.86	33.56	33.08	34.37	32.27	35.04	34.06
Difference		0.457	-1.877	-0.609	-0.523	0.721	-0.577	-1.060	0.233	-1.865	0.902	-0.077
Sum of debit card transactions	\$1,345	\$1,306	\$1,297	\$1,341	\$1,328	\$1,430	\$1,317	\$1,315	\$1,402	\$1,330	\$1,343	\$1,302
Difference		-\$38.91	-\$47.29	-\$3.902	-\$17.06	\$85.38	-\$28.10	-\$29.31	\$57.22	-\$14.35	-\$1.987	-\$42.76
Number of debit card transactions <\$20	16.69	16.91	15.53	16.21	16.36	16.59	16.65	15.93	16.62	15.33	17.04	16.69
Difference		0.221	-1.166	-0.483	-0.331	-0.099	-0.047	-0.765	-0.071	-1.362**	0.345	-0.005

TABLE B.2 CONTINUED

Variable	Control mean	20% Rule										
		8	9.1	9.2	10.1	10.2	11	12.1	12.2	13	14.1	14.2
Overdrafts and fees												
Total overdraft transfer amount	\$77.48	\$91.50	\$82.74	\$85.55	\$78.40	\$95.20	\$85.67	\$77.89	\$87.33	\$88.18	\$77.12	\$75.64
Difference		\$14.02*	\$5.262	\$8.068	\$0.919	\$17.72*	\$8.197	\$0.416	\$9.853	\$10.706	-\$0.356	-\$1.837
Total overdraft transfer count	0.703	0.796	0.684	0.800	0.677	0.843	0.761	0.583	0.616	0.767	0.711	0.725
Difference		0.092*	-0.019	0.097	-0.027	0.140**	0.058	-0.120*	-0.087	0.063	0.007	0.021
Ever overdrafted	0.268	0.293	0.289	0.280	0.273	0.307	0.280	0.258	0.260	0.275	0.266	0.261
Difference		0.025*	0.021	0.012	0.005	0.039**	0.011	-0.010	-0.008	0.007	-0.002	-0.007
Stratification variables												
Months revolved	5.153	5.095	5.110	5.198	5.099	5.251	5.218	5.112	5.323*	5.250	5.280	5.264
Difference		24.49	-6.614	-11.02	20.25	8.447	-5.190	-21.97	2.500	-5.386	-17.02	12.67
Age	46.73	46.78	48.09*	46.92	47.19	46.27	46.45	46.43	46.43	47.34	46.94	47.06
Difference		-97.77	-196.5	-90.08	-138.6	-88.29	-98.82	-203.5	-24.59	-73.01	-99.74	-23.74
Additional characteristics												
Living in Phoenix Metro	0.73	0.75	0.71	0.72	0.72	0.75	0.72	0.75	0.75	0.73	0.71	0.73
Difference		0.02	-0.03	-0.02	-0.02	0.01	-0.01	0.02	0.02	0.00	-0.02	-0.01
Living in Arizona	0.93	0.94	0.95	0.93	0.92	0.93	0.93	0.94	0.94	0.93	0.95	0.94
Difference		0.01	0.01	-0.01	-0.01	0.00	-0.01	0.01	0.01	0.00	0.01	0.01

Source: Arizona Federal Credit Union administrative data.

Note: Asterisks indicate whether the treatment group mean is statistically different from the control group mean.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE B.3

Credit Bureau Baseline Treatment versus Control Means by Treatment Group, the Cash under \$20 Rule

Variable	Control mean	\$20 Rule										
		1	2.1	2.2	3.1	3.2	4	5.1	5.2	6	7.1	7.2
Sample size	1,728	864	435	433	429	435	863	434	432	872	432	437
FICO credit score	699.42	701.54	703.82	691.46	697.02	698.44	703.73	699.07	697.97	698.51	697.02	695.12
Difference		2.13	4.40	-7.95**	-2.40	-0.97	4.32	-0.35	-1.45	-0.90	-2.39	-4.30
Number of inquiries within 12 months	2.08	2.01	2.05	2.17	2.08	2.28	2.02	1.86	1.97	2.17	2.09	2.09
Difference		-0.07	-0.03	0.094	0.01	0.21	-0.057	-0.21	-0.10	0.10	0.02	0.018
All trades												
Number of trades	20.81	20.36	21.29	20.84	20.81	20.99	20.66	21.10	19.91	20.99	20.51	20.49
Difference		-0.45	0.48	0.03	0.00	0.18	-0.15	0.29	-0.90	0.18	-0.31	-0.32
Number of trades with balance >0	6.31	6.15	6.19	6.33	6.20	6.35	6.37	6.58	5.98	6.65	6.44	6.46
Difference		-0.16	-0.12	0.02	-0.11	0.05	0.06	0.27	-0.33*	0.34**	0.14	0.15
Aggregate balance for open trades	\$137,107	\$136,664	\$133,471	\$144,523	\$125,394	\$143,803	\$134,546	\$136,816	\$136,221	\$131,285	\$128,539	\$131,468
Difference		-\$443	-\$3,636	\$7,416	-\$11,713*	\$6,695	-\$2,561	-\$291	-\$886	-\$5,823	-\$8,568	-\$5,639
Aggregate balance for open status trades	\$137,536	\$137,200	\$133,794	\$144,066	\$125,886	\$144,111	\$135,180	\$137,362	\$136,496	\$132,174	\$129,097	\$131,974
Difference		-\$336	-\$3,742	\$6,529	-\$11,650*	\$6,575	-\$2,356	-\$174	-1040.286	-\$5,362	-\$8,440	-\$5,563
Aggregate credit for open trades	\$170,682	\$170,385	\$166,733	\$178,173	\$155,779	\$178,573	\$168,380	\$170,610	\$166,686	\$164,860	\$160,623	\$162,858
Difference		-\$297	-\$3,949	\$7,491	-\$14,903*	\$7,891	-\$2,302	-\$73	-\$3,997	-\$5,822	-\$10,060	-\$7,824
Aggregate balance-to-credit ratio for open trades	74.45	74.14	72.91	76.27	73.40	74.43	73.99	75.24	75.78	73.62	73.65	75.57
Difference		-0.31	-1.54	1.82	-1.053	-0.02	-0.46	0.79	1.33	-0.84	-0.80	1.12
Number of collection trades with balance ≥\$200	0.42	0.35	0.30	0.38	0.46	0.43	0.37	0.44	0.37	0.43	0.54	0.47
Difference		-0.07	-0.13**	-0.04	0.04	0.01	-0.05	0.02	-0.05	0.01	0.12*	0.05
Aggregate balance in collections	439.95	427.69	365.24	512.05	309.79	346.88	340.27	467.28	309.11	487.20	544.77	608.93
Difference		-12.27	-74.72	72.10	-130.16	-93.08	-99.69	27.33	-130.85	47.24	104.81	168.98

TABLE B.3 CONTINUED

Variable	Control mean	\$20 Rule										
		1	2.1	2.2	3.1	3.2	4	5.1	5.2	6	7.1	7.2
Revolving trades												
Number of revolving trades	10.71	10.65	11.50	10.92	10.70	10.74	10.75	10.87	10.46	10.80	10.46	10.50
Difference		-0.06	0.80**	0.21	-0.01	0.03	0.05	0.16	-0.25	0.09	-0.25	-0.21
Number of revolving trades with balance >0												
	3.27	3.22	3.27	3.21	3.00	3.19	3.33	3.42	3.17	3.28	3.07	3.30
Difference		-0.05	0.00	-0.06	-0.27**	-0.08	0.06	0.154	-0.10	0.02	-0.20	0.03
Aggregate balance for open revolving trades												
	\$10,015	\$10,320	\$10,018	\$10,093	\$9,364	\$10,269	\$10,599	\$10,670	\$9,889	\$9,923	\$9,633	\$10,237
Difference		\$305	\$3	\$78	-\$651	\$254	\$584	\$655	-\$126	-\$92	-\$382	221.389
Aggregate balance for open status revolving trades												
	\$10,281	\$10,521	\$10,174	\$10,397	\$9,439	\$10,511	\$10,836	\$11,004	\$10,108	\$10,159	\$9,928	\$10,843
Difference		\$240	-\$107	\$116	-\$842	\$231	\$555	723.455	-\$172	-\$121	-\$353	561.786
Aggregate credit for open revolving trades												
	\$24,690	\$24,955	\$25,621	\$23,379	\$23,476	\$25,812	\$26,085	\$24,489	\$23,917	\$24,435	\$24,015	\$24,892
Difference		\$265	\$932	-\$1,311	-\$1,214	1122.573	\$1,396	-\$201	-\$773	-\$255	-\$675	\$202
Balance-to-credit ratio for open revolving trades												
	50.81	50.23	49.13	53.90	50.33	48.33	49.61	52.22	52.47	49.44	51.56	51.60
Difference		-0.57	-1.67	3.10*	-0.47	-2.48	-1.19	1.41	1.665	-1.37	0.76	0.79
Balance transfers												
Number of bankcards with balance transfer												
	0.29	0.36	0.33	0.30	0.28	0.31	0.31	0.41	0.27	0.30	0.35	0.30
Difference		0.06**	0.03	0.01	-0.02	0.02	0.01	0.12***	-0.03	0.01	0.05	0.01
Number of bankcard balance transfers within 0–6 months												
	0.02	0.03	0.04	0.02	0.01	0.03	0.02	0.04	0.01	0.03	0.03	0.02
Difference		0.01	0.01	0.00	-0.01	0.01	-0.01	0.02*	-0.01	0.01	0.01	0.00
Number of bankcard balance transfers within 7–12 months												
	0	0	0	0	0	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0	0	0	0	0	0
Late payments												
Number of trades 30 days past due												
	0	0	0	0	0	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0	0	0	0	0	0
Number of trades 90+ days past due												
	0.02	0.04	0.03	0.03	0.03	0.01	0.02	0.01	0.02	0.02	0.03	0.02
Difference		0.01*	0.00	0.01	0.00	-0.01	0.00	-0.01	0.00	0.00	0.01	0.00

TABLE B.3 CONTINUED

Variable	Control mean	\$20 Rule										
		1	2.1	2.2	3.1	3.2	4	5.1	5.2	6	7.1	7.2
Total balance on trades 30 days delinquent ^a	\$379	\$301	\$322	\$905	\$280	\$878	\$200	\$563	\$483	\$449	\$363	\$152
Difference		-\$78	-\$57	\$526	-\$99	\$499	-\$179	\$184	\$104	\$70	-\$15	-\$226
Total balance on trades 90–180 days delinquent ^a	\$135	\$109	\$195	\$116	\$374	\$116	\$150	\$59	\$242	\$220	\$328	\$228
Difference		-\$26	\$60	-\$19	\$239*	-19.03	\$15	-\$76	\$107	\$85	\$193*	\$93
Total number of revolving trades 30 days delinquent ^a	0	0	0	0	0	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0	0	0	0	0	0
Total number of revolving trades 90–180 days delinquent ^a	0	0	0	0	0	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0	0	0	0	0	0
Total number of 30- to 180-day delinquencies in last two years	0.22	0.39	0.00	0.00	0.45	0.00	0.33	0.55	0.00	0.27	0.00	1.00
Difference		0.17	-0.22	-0.22	0.24	-0.22	0.12	0.33	-0.22	0.05	-0.22	0.78**

Source: Preintervention credit record data.

Note: Asterisks indicate whether the treatment group mean is statistically different from the control group mean.

^aDenotes current delinquency at the time of reporting within the last six months.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE B.4

Credit Bureau Baseline Treatment versus Control Means by Treatment Group, the 20 Percent Added Rule

Variable	Control Mean	20% Rule										
		8	9.1	9.2	10.1	10.2	11	12.1	12.2	13	14.1	14.2
Sample size	1,728	871	434	429	433	434	868	436	435	864	433	434
<i>FICO credit score</i>	699.42	698.74	696.59	695.50	699.31	699.28	699.83	699.04	697.51	699.38	700.15	700.85
Difference		-0.68	-2.83	-3.92	-0.11	-0.14	0.41	-0.38	-1.91	-0.03	0.73	1.43
<i>Number of inquiries within 12 months</i>	2.08	2.18	2.18	2.34	2.10	2.09	2.28	2.19	2.07	2.20	2.08	1.82
Difference		0.10	0.10	0.26*	0.02	0.02	0.20*	0.12	-0.01	0.13	0.01	-0.25*
All trades												
<i>Number of trades</i>	20.81	20.55	20.82	21.51	20.57	20.47	21.24	20.65	20.60	20.97	21.35	20.40
Difference		-0.26	0.01	0.70	-0.24	-0.34	0.43	-0.16	-0.21	0.16	0.54	-0.41
<i>Number of trades with balance >0</i>	6.31	6.40	6.33	6.59	6.37	6.41	6.51	6.37	6.27	6.33	6.45	6.28
Difference		0.09	0.02	0.29	0.07	0.11	0.20	0.07	-0.04	0.02	0.15	-0.03
<i>Aggregate balance for open trades</i>	\$137,107	\$133,039	\$143,134	\$134,196	\$127,521	\$132,308	\$137,551	\$133,559	\$125,895	\$131,299	\$139,206	\$134,998
Difference		-\$4,069	\$6,026	-\$2,912	-\$9,586	-\$4,799	\$444	-\$3,548	-\$11,212	-\$5,808	\$2,099	-\$2,109
<i>Aggregate balance for open status trades</i>	\$137,536	\$133,674	\$143,760	\$134,576	\$127,868	\$132,724	\$138,029	\$133,850	\$126,211	\$131,665	\$139,675	\$135,345
Difference		-\$3,862	\$6,224	-\$2,960	-\$9,668	-\$4,813	\$492	-\$3,686	-\$11,326*	-\$5,871	\$2,138	-\$2,191
<i>Aggregate credit for open trades</i>	\$170,682	\$166,815	\$175,886	\$166,716	\$162,534	\$159,852	\$170,020	\$165,089	\$160,025	\$162,482	\$172,020	\$168,164
Difference		-\$3,867	\$5,204	-\$3,966	-\$8,148	-\$10,830	-\$663	-\$5,593	-\$10,657	-\$8,200	\$1,337	-\$2,518
<i>Aggregate balance-to-credit ratio for open trades</i>	74.45	74.72	74.78	75.68	72.26	74.86	75.82	72.90	73.31	75.54	75.20	73.25
Difference		0.27	0.33	1.23	-2.19*	0.41	1.37	-1.55	-1.14	1.09	0.75	-1.20
<i>Number of collection trades with balance ≥\$200</i>	0.42	0.46	0.35	0.47	0.35	0.37	0.45	0.42	0.40	0.44	0.34	0.42
Difference		0.04	-0.07	0.05	-0.07	-0.05	0.03	0.00	-0.02	0.02	-0.08	0.00
<i>Aggregate balance in collections</i>	439.95	410.21	359.60	414.60	388.00	329.35	506.64	457.57	419.52	489.65	490.23	481.84
Difference		-29.75	-80.36	-25.35	-51.95	-110.60	66.69	17.62	-20.44	49.69	50.28	41.89

TABLE B.4 CONTINUED

Variable	Control Mean	20% Rule										
		8	9.1	9.2	10.1	10.2	11	12.1	12.2	13	14.1	14.2
Revolving trades												
Number of revolving trades	10.71	10.44	10.74	10.81	10.74	10.18	10.77	10.43	10.73	10.56	11.07	10.47
Difference		-0.27	0.03	0.11	0.04	-0.52	0.06	-0.27	0.03	-0.14	0.37	-0.23
Number of revolving trades with balance >0	3.27	3.24	3.38	3.33	3.39	3.07	3.30	3.05	3.26	3.21	3.25	3.14
Difference		-0.03	0.11	0.06	0.12	-0.20	0.03	-0.217*	-0.01	-0.06	-0.02	-0.13
Aggregate balance for open revolving trades	\$10,015	\$10,172	\$11,074	\$9,519	\$9,969	\$9,691	\$9,980	\$9,041	\$9,682	\$10,156	\$10,491	\$9,066
Difference		\$157	\$1,059*	-\$496	-\$46	-\$324	-\$35	-\$974*	-\$333	\$141	\$476	-\$949*
Aggregate balance for open status revolving trades	\$10,281	\$10,450	\$11,317	\$9,850	\$10,192	\$10,216	\$10,250	\$9,242	\$9,900	\$10,342	\$10,471	\$9,258
Difference		\$169	\$1,036*	-\$431	-\$89	-\$64	-\$31	-\$1,039*	-\$380	\$61	\$190	-\$1,023*
Aggregate credit for open revolving trades	\$24,690	\$24,394	\$25,851	\$25,228	\$24,648	\$22,478	\$25,244	\$22,859	\$24,723	\$24,221	\$25,283	\$24,357
Difference		-\$296	\$1,162	\$539	-\$42	-\$2,212*	\$554	-\$1,830	\$33	-\$469	\$593	-\$333
Balance-to-credit ratio for open revolving trades	50.81	50.37	52.38	52.92	50.06	50.50	49.86	50.37	47.51	49.33	50.18	49.77
Difference		-0.44	1.58	2.11	-0.75	-0.31	-0.94	-0.44	-3.29**	-1.48	-0.63	-1.04
Balance transfers												
Number of bankcards with balance transfer	0.29	0.29	0.27	0.29	0.29	0.32	0.31	0.29	0.33	0.29	0.28	0.31
Difference		0.00	-0.02	-0.01	-0.01	0.03	0.01	0.00	0.04	0.00	-0.01	0.02
Number of bankcard balance transfers within 0–6 months	0.02	0.03	0.04	0.02	0.02	0.02	0.03	0.03	0.04	0.02	0.01	0.03
Difference		0.01	0.01	0.00	-0.01	0.00	0.01	0.00	0.01	0.00	-0.01	0.01
Number of bankcard balance transfers within 7–12 months	0	0	0	0	0	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0	0	0	0	0	0
Late payments												
Number of trades 30 days past due	0	0	0	0	0	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0	0	0	0	0	0
Number of trades 90+ days past due	0.02	0.02	0.03	0.03	0.03	0.04	0.02	0.04	0.02	0.03	0.04	0.02
Difference		0.00	0.01	0.01	0.00	0.01	-0.01	0.01	0.00	0.01	0.01	0.00

TABLE B.4 CONTINUED

Variable	Control Mean	20% Rule										
		8	9.1	9.2	10.1	10.2	11	12.1	12.2	13	14.1	14.2
Total balance on trades 30 days delinquent ^a	\$379	\$587	\$425	\$587	\$708	\$257	\$620	\$456	\$522	\$383	\$150	\$437
Difference		\$208	\$46	\$208	\$329	-\$122	\$241	\$77	\$144	\$4	-\$229	\$58
Total balance on trades 90–180 days delinquent ^a	\$135	\$201	\$114	\$157	\$160	\$440	\$181	\$162	\$191	\$239	\$89	\$413
Difference		\$66	-\$21	\$22	\$25	\$305**	\$46	\$27	\$56	\$104	-\$46	\$278**
Total number of revolving trades 30 days delinquent ^a	0	0	0	0	0	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0	0	0	0	0	0
Total number of revolving trades 90–180 days delinquent ^a	0	0	0	0	0	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0	0	0	0	0	0
Total number of 30- to 180-day delinquencies in last two years	0.22	0.11	0.00	0.56	0.00	0.80	0.08	0.75	0.14	0.08	0.43	0.10
Difference		-0.11	-0.22	0.34	-0.22	0.58*	-0.14	0.53*	-0.08	-0.14	0.21	-0.12

Source: Preintervention credit record data.

Note: Asterisks indicate whether the treatment group mean is statistically different from the control group mean.

^aDenotes current delinquency at the time of reporting within the last six months.

* $p < 0.1$; ** $p < 0.05$; *** $p < .01$

TABLE B.5

Baseline Monthly Averages by Age Subgroups

	Age (years)		
	<40	40–60	>60
Sample size	4,874	6,181	2,892
Demographics			
Age	33	50	67
Arizona Federal credit card debt			
Credit card balance	\$3,356	\$5,760	\$5,712
Credit card interest accrued			
Any balance revolved	90%	90%	90%
Purchases with Arizona Federal credit card			
Credit card purchase amount	\$225	\$316	\$340
Number of credit card purchases	4.54	4.83	4.91
Number of credit card purchases <\$20	2.13	1.72	1.54
Percent of credit card purchases <\$20	41%	30%	26%
Cash advances on Arizona Federal credit card			
Cash advance amount	\$2	\$3	\$6
Number of cash advances	0.01	0.01	0.01
Ever received cash advance	0.01	0.01	0.01
Fees on Arizona Federal credit card			
Number of fees paid	3.93	3.52	2.72
Ever paid fees	0.34	0.26	0.21
Payments on Arizona Federal account			
Number of credit card payments	1.37	1.36	1.29
Credit card payment amount	\$345	\$524	\$520
Ever paid credit card late	0.01	0.02	0.02
Percent of credit card balance paid	25%	22%	24%
Arizona Federal checking and savings accounts			
Total savings	\$2,472	\$4,354	\$5,752
Savings less credit card balance	-\$993	-\$1,559	\$19
Number of deposits	7.08	7.59	6.83
Sum of deposits	\$3,606	\$4,817	\$4,256
Number of withdrawals	49.99	48.12	38.05
Sum of withdrawals	\$3,694	\$4,915	\$4,466
Number of debit card transactions	38.92	34.21	23.62
Sum of debit card transactions	\$1,373	\$1,428	\$1,098
Number of debit card transactions <\$20	21.69	15.55	8.97
Overdrafts on Arizona Federal accounts			
Overdraft transfer amount	\$76.15	\$96.37	\$63.64
Overdraft transfer count	0.80	0.77	0.48
Ever overdrafted	0.31	0.28	0.19

TABLE B.5 CONTINUED

	Age (years)		
	<40	40–60	>60
Baseline credit data			
Credit score	679	702	729
Number of inquiries within 12 months	3	2	1
All trades			
Number of trades	18	23	21
Number of trades with balance >0	6	7	6
Agg. balance for open trades	\$104,425	\$163,602	\$123,743
Agg. balance for open status trades	\$104,645	\$164,249	\$124,184
Agg. credit for open trades	\$122,627	\$202,297	\$168,872
Agg. balance-to-credit ratio for open trades	78%	76%	65%
Number of collection trades with credit amount or balance ≥\$200	1	0	0
Agg. balance for collection status codes	\$564	\$407	\$269
Revolving trades			
Number of revolving trades	8	12	13
Number of revolving trades with balance >0	3	3	3
Agg. balance for open revolving trades	\$6,819	\$11,770	\$11,821
Agg. balance for open status revolving trades	\$6,988	\$12,083	\$12,082
Agg. credit for open revolving trades	\$14,527	\$28,299	\$34,187
Agg. balance-to-credit ratio for open revolving trades	56%	50%	42%
Balance transfers			
Number of bankcards with balance transfer	0	0	0
Number of bankcard balance transfers within 0–6 months	0	0	0
Number of bankcard balance transfers within 7–12 months	0	0	0
Late payments			
Number of trades 30 days past due	0	0	0
Number of trades 90+ days past due	0	0	0
Total balance on trades 30 days delinquent	\$545	\$448	\$237
Total balance on trades 90–180 days delinquent	\$265	\$171	\$110
Total number of revolving trades 30 days delinquent	0	0	0
Total number of revolving trades 90–180 days delinquent	0	0	0

Source: Preintervention administrative and credit record data.

Note: Agg. = aggregate.

TABLE B.6

Baseline Monthly Averages by Purchases under \$20 Subgroups

	Number of Credit Card Purchases under \$20		
	Low (<1)	Middle (1-5)	High (5+)
Sample size	8,280	3,916	1,468
Demographics			
Age	48	46	45
Arizona Federal credit card debt			
Credit card balance	\$4,964	\$4,765	\$4,810
Credit card interest accrued			
Any balance revolved	92%	89%	85%
Purchases with Arizona Federal credit card			
Credit card purchase amount	\$160	\$382	\$670
Number of credit card purchases	1.55	6.64	17.28
Number of credit card purchases <\$20	0.24	2.46	9.05
Percent of credit card purchases <\$20	17%	42%	54%
Cash advances on Arizona Federal credit card			
Cash advance amount	\$3	\$3	\$4
Number of cash advances	0.01	0.01	0.01
Ever received cash advance	0.01	0.01	0.01
Fees on Arizona Federal credit card			
Number of fees paid	3.77	3.32	2.66
Ever paid fees	0.27	0.28	0.27
Payments on Arizona Federal account			
Number of credit card payments	1.23	1.41	1.79
Credit card payment amount	\$375	\$482	\$774
Ever paid credit card late	0.27	0.28	0.27
Percent of credit card balance paid	17%	27%	42%
Arizona Federal checking and savings accounts			
Total savings	\$3,882	\$4,093	\$4,103
Savings less credit card balance	-\$1,172	-\$834	-\$996
Number of deposits	7.39	7.03	6.97
Sum of deposits	\$4,344	\$4,115	\$4,155
Number of withdrawals	47.59	46.31	43.17
Sum of withdrawals	\$4,459	\$4,238	\$4,273
Number of debit card transactions	34.55	33.47	29.84
Sum of debit card transactions	\$1,427	\$1,272	\$1,079
Number of debit card transactions <\$20	16.17	16.86	15.6
Overdrafts on Arizona Federal accounts			
Overdraft transfer amount	\$99.96	\$52.06	\$61.85
Overdraft transfer count	0.84	0.51	0.60
Ever overdrafted	0.31	0.21	0.22

TABLE B.6 CONTINUED

	Number of Credit Card Purchases under \$20		
	Low (<1)	Middle (1-5)	High (5+)
Baseline credit data			
Credit score	697	701	707
Number of inquiries within 12 months	2	2	2
All trades			
Number of trades	22	20	19
Number of trades with balance >0	7	6	6
Agg. balance for open trades	\$139,678	\$128,134	\$126,667
Agg. balance for open status trades	\$140,138	\$128,566	\$127,142
Agg. credit for open trades	\$174,537	\$158,497	\$156,084
Agg. balance-to-credit ratio for open trades	74%	75%	75%
Number of collection trades with credit amount or balance ≥\$200	0	0	0
Agg. balance for collection status codes	\$445	\$419	\$425
Revolving trades			
Number of revolving trades	11	10	10
Number of revolving trades with balance >0	3	3	3
Agg. balance for open revolving trades	\$10,460	\$9,588	\$9,215
Agg. balance for open status revolving trades	\$10,733	\$9,831	\$9,393
Agg. credit for open revolving trades	\$25,603	\$23,312	\$23,490
Agg. balance-to-credit ratio for open revolving trades	50%	51%	50%
Balance transfers			
Number of bankcards with balance transfer	0	0	0
Number of bankcard balance transfers within 0-6 months	0	0	0
Number of bankcard balance transfers within 7-12 months	0	0	0
Late payments			
Number of trades 30 days past due	0	0	0
Number of trades 90+ days past due	0	0	0
Total balance on trades 30 days delinquent	\$575	\$281	\$191
Total balance on trades 90-180 days delinquent	\$219	\$160	\$150
Total number of revolving trades 30 days delinquent	0	0	0
Total number of revolving trades 90-180 days delinquent	0	0	0

Source: Preintervention administrative and credit record data.

Note: Agg. = aggregate.

TABLE B.7

Baseline Monthly Averages by Number of Purchases Subgroups

	Number of Credit Card Purchases		
	Low (<1)	Middle (1–10)	High (10+)
Sample size	4,351	7,452	1,855
Demographics			
Age	47	47	48
Arizona Federal credit card debt			
Credit card balance	\$4,955	\$4,689	\$5,512
Credit card interest accrued			
Any balance revolved	93%	90%	85%
Purchases with Arizona Federal credit card			
Credit card purchase amount	\$40	\$284	\$854
Number of credit card purchases	0.28	4.11	17.78
Number of credit card purchases <\$20	0.06	1.46	7.03
Percent of credit card purchases <\$20	21%	32%	40%
Cash advances on Arizona Federal credit card			
Cash advance amount	\$4	\$3	\$3
Number of cash advances	0.01	0.01	0.01
Ever received cash advance	0.01	0.01	0.01
Fees on Arizona Federal credit card			
Number of fees paid	4.28	3.34	2.56
Ever paid fees	0.29	0.28	0.25
Payments on Arizona Federal account			
Number of credit card payments	1.18	1.33	1.79
Credit card payment amount	\$344	\$388	\$951
Ever paid credit card late	0.03	0.01	0.01
Percent of credit card balance paid	12%	23%	44%
Arizona Federal checking and savings accounts			
Total savings	\$3,014	\$4,147	\$5,323
Savings less credit card balance	-\$2,006	-\$669	-\$431
Number of deposits	7.85	6.9	7.18
Sum of deposits	\$4,501	\$3,987	\$4,668
Number of withdrawals	51.3	45.22	42.51
Sum of withdrawals	\$4,582	\$4,113	\$4,832
Number of debit card transactions	37.49	32.92	28.74
Sum of debit card transactions	\$1,525	\$1,292	\$1,147
Number of debit card transactions <\$20	18.09	15.99	13.75
Overdrafts on Arizona Federal accounts			
Overdraft transfer amount	\$149.25	\$48.68	\$63.49
Overdraft transfer count	1.26	0.46	0.53
Ever overdrafted	0.45	0.19	0.19

TABLE B.7 CONTINUED

	Number of Credit Card Purchases		
	Low (<1)	Middle (1–10)	High (10+)
Baseline credit data			
Credit score	684	701	721
Number of inquiries within 12 months	2	2	2
All trades			
Number of trades	22	20	20
Number of trades with balance >0	7	6	6
Agg. balance for open trades	\$140,723	\$128,223	\$144,783
Agg. balance for open status trades	\$141,234	\$128,641	\$145,239
Agg. credit for open trades	\$173,372	\$160,217	\$181,240
Agg. balance-to-credit ratio for open trades	76%	74%	73%
Number of collection trades with credit amount or balance ≥\$200	1	0	0
Agg. balance for collection status codes	\$524	\$426	\$288
Revolving trades			
Number of revolving trades	11	10	10
Number of revolving trades with balance >0	4	3	3
Agg. balance for open revolving trades	\$10,742	\$9,660	\$9,990
Agg. balance for open status revolving trades	\$11,124	\$9,877	\$10,088
Agg. credit for open revolving trades	\$24,329	\$23,997	\$27,796
Agg. balance-to-credit ratio for open revolving trades	55%	49%	46%
Balance transfers			
Number of bankcards with balance transfer	0	0	0
Number of bankcard balance transfers within 0–6 months	0	0	0
Number of bankcard balance transfers within 7–12 months	0	0	0
Late payments			
Number of trades 30 days past due	0	0	0
Number of trades 90+ days past due	0	0	0
Total balance on trades 30 days delinquent	\$801	\$328	\$118
Total balance on trades 90–180 days delinquent	\$281	\$170	\$97
Total number of revolving trades 30 days delinquent	0	0	0
Total number of revolving trades 90–180 days delinquent	0	0	0

Source: Preintervention administrative and credit record data.

Note: Agg. = aggregate.

TABLE B.8

Baseline Monthly Averages by Credit Score Subgroups

	Credit Score		
	Low (<670)	Middle (670–730)	High (730+)
Sample size	4,320	4,146	5,114
Demographics			
Age	43	46	52
Arizona Federal credit card debt			
Credit card balance	\$4,154	\$5,398	\$5,275
Credit card interest accrued			
Any balance revolved	94%	91%	86%
Purchases with Arizona Federal credit card			
Credit card purchase amount	\$163	\$269	\$422
Number of credit card purchases	3.53	4.6	5.93
Number of credit card purchases <\$20	1.59	1.84	2.01
Percent of credit card purchases <\$20	41%	33%	27%
Cash advances on Arizona Federal credit card			
Cash advance amount	\$3	\$4	\$3
Number of cash advances	0.01	0.01	0.01
Ever received cash advance	0.01	0.01	0.01
Fees on Arizona Federal credit card			
Number of fees paid	4.49	3.59	2.69
Ever paid fees	0.36	0.28	0.21
Payments on Arizona Federal account			
Number of credit card payments	1.31	1.35	1.39
Credit card payment amount	\$285	\$452	\$630
Ever paid credit card late	0.02	0.02	0.02
Percent of credit card balance paid	17%	21%	30%
Arizona Federal checking and savings accounts			
Total savings	\$2,040	\$3,151	\$6,043
Savings less credit card balance	-\$2,242	-\$2,324	\$685
Number of deposits	7.27	7.15	7.36
Sum of deposits	\$3,842	\$4,310	\$4,661
Number of withdrawals	49.87	46.82	44.29
Sum of withdrawals	\$3,938	\$4,426	\$4,800
Number of debit card transactions	37.55	33.67	30.68
Sum of debit card transactions	\$1,453	\$1,334	\$1,265
Number of debit card transactions <\$20	19.08	16.81	13.76
Overdrafts on Arizona Federal accounts			
Overdraft transfer amount	\$78.18	\$96.48	\$76.36
Overdraft transfer count	0.92	0.75	0.53
Ever overdrafted	0.38	0.28	0.17

TABLE B.8 CONTINUED

	Credit Score		
	Low (<670)	Low (<670)	Low (<670)
Baseline credit data			
Credit score	614	700	770
Number of inquiries within 12 months	3	2	1
All trades			
Number of trades	21	21	20
Number of trades with balance >0	8	6	5
Agg. balance for open trades	\$112,086	\$141,446	\$150,550
Agg. balance for open status trades	\$112,713	\$141,874	\$150,858
Agg. credit for open trades	\$130,412	\$170,294	\$198,489
Agg. balance-to-credit ratio for open trades	82%	76%	68%
Number of collection trades with credit Amount or balance ≥\$200	1	0	0
Agg. balance for collection status codes	\$1,231	\$121	\$2
Revolving trades			
Number of revolving trades	10	11	11
Number of revolving trades with balance >0	4	3	3
Agg. balance for open revolving trades	\$9,464	\$11,878	\$9,326
Agg. balance for open status revolving trades	\$9,872	\$12,146	\$9,417
Agg. credit for open revolving trades	\$14,612	\$24,136	\$33,832
Agg. balance-to-credit ratio for open revolving trades	71%	53%	32%
Balance transfers			
Number of bankcards with balance transfer	0	0	0
Number of bankcard balance transfers within 0–6 months	0	0	0
Number of bankcard balance transfers within 7–12 months	0	0	0
Late payments			
Number of trades 30 days past due	0	0	0
Number of trades 90+ days past due	0	0	0
Total balance on trades 30 days delinquent	\$1,316	\$20	\$0
Total balance on trades 90–180 days delinquent	\$537	\$0	\$2
Total number of revolving trades 30 days delinquent	0	0	0
Total number of revolving trades 90–180 days delinquent	0	0	0

Source: Preintervention administrative and credit record data.

Note: Agg. = aggregate.

Appendix C. Data Dictionary

TABLE C.1

Variable name	Description	Data source
Arizona Federal credit card debt		
Credit card balance	Calculated field. Calculation: Old balance + purchase charges - payment amount + interest.	Arizona Federal
Credit card interest accrued	Calculated field. Sum of Purchase Interest Charged and Cash Interest Charged, system calculates during the statement cycle process.	Arizona Federal
Purchases with Arizona Federal account		
Credit card purchase amount	Calculated field. Based on transaction history during statement cycle, sum of purchase transactions. Subaction code must be a P or V (P = purchase; V = voucher). Reversals are not excluded as they will net out of the total sum.	Arizona Federal
Number of credit card purchases	Calculated field. Based on transaction history during statement cycle, sum of purchase transactions. Subaction code must be a P or V (P = purchase; V = voucher). Reversals are excluded as to not increase the transaction count.	Arizona Federal
Number of credit card purchases under \$20	Counts any purchase transaction \$19.99 or less.	Arizona Federal
Percent of purchases under \$20	Calculated by Urban. Percent of the total purchase count that was under \$20.	Arizona Federal
Cash advances on Arizona Federal account		
Total cash advance amount	Calculated field. Based on transaction history during statement cycle, sum of cash advance transactions. Subaction code must be a C or Null (C = cash; Null = cash). Reversals are not excluded as they will net out of the total sum. Exclude any that have descriptions like "To Share"; those are counted as Overdraft Transfers.	Arizona Federal
Total number of cash advances	Calculated field. Based on transaction history during statement cycle, sum of cash transactions. Subaction code must be a C or Null (C = cash; Null = cash). Reversals are excluded as to not increase the transaction count. Exclude any that have descriptions like "To Share"; those are counted as Overdraft Transfers.	Arizona Federal
Ever received cash advance	Calculated by Urban. Y/N were any cash advances withdrawn in this period?	Arizona Federal

TABLE C.1 CONTINUED

Variable name	Description	Data source
Fees on Arizona Federal account		
Number of fees paid	Calculated field. Review history during cycle period and sum Payments, Payment Adjustments, and Payoffs that have fees as part of the payment into one field, FeesPaid. This field includes ISA, Insurance Fees, and Late Fees.	Arizona Federal
Ever paid fees	Calculated by Urban. Y/N were any fees paid in this period?	Arizona Federal
Payments on Arizona Federal account		
Number of credit card payments	Calculated field. Review history during cycle period and count Payments, Payment Adjustments, and Payoffs; combine into one field, PaymentCount.	Arizona Federal
Credit card payment amount	Calculated Field. Review history during cycle period and sum Payments, Payment Adjustments and Payoffs combine into one field.	Arizona Federal
Any balance revolved	Identifies if member paid Credit Card Balance in full	Arizona Federal
Ever paid credit card late	Yes/No variable, days delinquent from Episys Loan Record as of last day of the reporting month	Arizona Federal
Percent of credit card balance paid	Based on the sum of all payments received during statement cycle divided by previous statement ending balance	Arizona Federal
Arizona Federal checking and savings accounts		
Total savings	Calculated by Urban. Sum of all accounts' Total Savings from raw Share Month End file	Arizona Federal
Savings less credit card balance	Calculated by Urban. Savings Less Credit Card Balance for total Share Month End accounts; see generated variables list for formula	Arizona Federal
Number of deposits	Calculated by Urban. Sum of all accounts' number of deposits from raw Share Month End file	Arizona Federal
Sum of deposits	Calculated by Urban. Sum of all accounts' sum of deposits from raw Share Month End file	Arizona Federal
Number of withdrawals	Calculated by Urban. Sum of all accounts' number of withdrawals from raw Share Month End file	Arizona Federal
Sum of withdrawals	Calculated by Urban. Sum of all accounts' sum of withdrawals from raw Share Month End file	Arizona Federal
Number of debit card transactions	Calculated by Urban. Sum of all accounts' number of debit card transactions from raw Share Month End file	Arizona Federal
Sum of debit card transactions	Calculated by Urban. Sum of all accounts' sum of debit card transactions from raw Share Month End file	Arizona Federal
Number of debit card transactions under \$20	Calculated by Urban. Sum of all accounts' number of debit card transactions under \$20 from raw Share Month End file	Arizona Federal

TABLE C.1 CONTINUED

Variable name	Description	Data source
Overdrafts on Arizona Federal accounts		
Total overdraft transfer amount	Calculated field. Based on transaction history during statement cycle, sum of cash advance transactions. Subaction code must be a C or Null (C = cash; Null = cash) and description must include "To Share." Reversals are not excluded as they will net out of the total sum.	Arizona Federal
Total overdraft transfer count	Calculated field. Based on transaction history during statement cycle, sum of cash transactions. Subaction code must be a C or Null (C = cash; Null = cash) and description must include "To Share." Reversals are excluded as to not increase the transaction count.	Arizona Federal
Ever overdrafted	Calculated by Urban. Y/N were any overdrafts incurred in this period?	Arizona Federal
Stratification variables		
Months revolved	Calculated by Urban. Counts the number of months in the preintervention period for which credit card balance is greater than zero.	Arizona Federal
Age	Age of primary account holder	Arizona Federal
Additional characteristics		
Living in Phoenix Metro	Calculated by Urban. Binary variable counts whether primary account holder lives in Phoenix, Mesa, Chandler, Gilbert, Glendale, Scottsdale, Tempe, or Peoria.	Arizona Federal
Living in Arizona	Calculated by Urban. Binary variable counts whether primary account holder lives in Arizona.	Arizona Federal
Aggregate credit data		
Credit score	FICO classic V2 base score (quest)	Credit bureau
Number of inquiries within 12 months	Number of inquiries within 12 months	Credit bureau
All trades		
Number of trades	Number of trades	Credit bureau
Number of trades with balance >0	Number of trades with balance greater than 0	Credit bureau
Aggregate balance for open trades	Aggregate balance for open trades	Credit bureau
Aggregate credit for open trades	Aggregate credit for open trades	Credit bureau
Aggregate balance-to-credit ratio for open trades	Aggregate balance-to-credit ratio for open trades	Credit bureau
Aggregate balance for open status trades	Aggregate balance for open status trades	Credit bureau

TABLE C.1 CONTINUED

Variable name	Description	Data source
Revolving trades		
Number of revolving trades	Number of revolving trades	Credit bureau
Number of revolving trades with balance >0	Number of revolving trades with a balance greater than 0	Credit bureau
Aggregate balance for open revolving trades	Aggregate balance for open revolving trades	Credit bureau
Aggregate credit for open revolving trades	Aggregate credit for open revolving trades	Credit bureau
Balance-to-credit ratio for open revolving trades	Aggregate balance-to-credit ratio for open revolving trades	Credit bureau
Aggregate balance for open status revolving trades	Aggregate credit for open status revolving trades	Credit bureau
Balance transfers		
Number of bankcards with balance transfer	Number of bankcards with balance transfer	Credit bureau
Number of bankcard balance transfers within 0–6 months	Number of bankcard balance transfers within the last six months	Credit bureau
Number of bankcard balance transfers within 7–12 months	Number of bankcard balance transfers within 7–12 months	Credit bureau
Late payments		
Number of trades 30 days past due	Number of trades currently 30 days past due	Credit bureau
Number of trades 90+ days past due	Number of trades currently over 90 days past due	Credit bureau
Number of collection trades with balance ≥\$200	Number of collections trades with a balance greater than \$200	Credit bureau
Aggregate balance in collections	Aggregate balance for collection status codes	Credit bureau
Total balance on trades 30 days delinquent	Total balance on trades presently 30 days delinquent reported in the last six months	Credit bureau
Total balance on trades 90–180 days delinquent	Total balance on trades presently 90–180 days delinquent reported in the last six months	Credit bureau
Total number of revolving trades 30 days delinquent	Total number of revolving trades presently 30 days delinquent reported in the last six months	Credit bureau
Total number of revolving trades 90–180 days delinquent	Total number of revolving trades presently 90–180 days delinquent reported in the last six months	Credit bureau
Total number of 30- to 180-day delinquencies in last two years	Total number of occurrences of 30–180 days delinquency in the last 24 months on utility trades, excluding derogatory trades	Credit bureau

TABLE C.1 CONTINUED

Variable name	Description	Data source
Demographic indicators		
Gender	Gender information is applied during the conversion before enhancement. Approximately 5 to 8 percent of the client records are coded as gender unknown because of ambiguous or unisex names. Records coded as gender both include those with prefixes of Mr. & Mrs. and/or first names like John & Mary.	Credit bureau
Marital status	Marital Status is determined based on the composition of the living unit or through the application of a predictive model. Note: Single refers to an individual who has never married and is not single because of divorce or spouse's death.	
Number of adults in household	Number of Adults in Household is calculated from the number of records in a household. An adult is anyone 19 years old or older living in a household. Values of zero indicate that the only adult individual in the user on file is deceased.	Credit bureau
Number of children in household	Number of Children in Household is calculated from the number of records in a household that indicate children whose age is 18 or younger.	
Estimated current home value	Estimated Current Home Value (ECHV) is the credit bureau's proprietary model that predicts the current home value. The ECHV model uses county, state, and national trends in home sale prices and assessed home values to determine property appreciation rates and current home values. Data were examined at county level and the model inputs (such as sale price, sale year, or assessed price of the property), that were acquired from realty deed records and county tax assessor records.	Credit bureau
Estimated household income	Estimated Household Income (in thousands) is the total estimated income for a living unit; it incorporates several highly predictive individual- and household-level variables. The income estimation is determined using multiple statistical methodologies to predict the income estimate for the living unit.	Credit bureau

Appendix D. Detailed Rule Delivery Statistics

TABLE D.1

E-mail Delivery Dates

Study month	E-mail Group 1			E-mail Group 2		
	Week	Weekday	Date	Week	Weekday	Date
Month 1: 15-Dec-14 to 14-Jan-15	Week 1	Tuesday	16-Dec-14	Week 1	Friday	19-Dec-14
	Week 3	Thursday	1-Jan-15	Week 3	Friday	2-Jan-15
Month 2: 15-Jan-15 to 14-Feb-15	Week 1	Tuesday	20-Jan-15	Week 1	Friday	23-Jan-15
	Week 3	Monday	2-Feb-15	Week 3	Friday	6-Feb-15
Month 3: 15-Feb-15 to 14-Mar-15	Week 1	Sunday	22-Feb-15	Week 1	Friday	20-Feb-15
	Week 3	Thursday	5-Mar-15	Week 3	Friday	6-Mar-15
Month 4: 15-Mar-15 to 14-Apr-15	Week 1	Sunday	22-Mar-15	Week 1	Friday	20-Mar-15
	Week 3	Saturday	4-Apr-15	Week 3	Friday	3-Apr-15
Month 5: 15-Apr-15 to 14-May-15	Week 1	Sunday	26-Apr-15	Week 1	Friday	24-Apr-15
	Week 3	Wednesday	6-May-15	Week 3	Friday	8-May-15
Month 6: 15-May-15 to 14-Jun-15	Week 1	Monday	18-May-15	Week 1	Friday	22-May-15
	Week 3	Tuesday	2-Jun-15	Week 3	Friday	5-Jun-15

Source: Arizona Federal administrative data.

TABLE D.2

E-mail Open Rates by Send Date

Send Date	\$20 Rule				20% Rule			
	Sent	Bounced	Opened	Open	Sent	Bounced	Opened	Open
12/16/2014	1,740	15	787	46%	1,745	8	1,004	58%
12/19/2014	1,740	1	741	43%	1,747	0	1,017	58%
1/1/2014	1,743	32	748	44%	1,747	29	721	42%
1/2/2015	1,740	34	715	42%	1,743	32	719	42%
1/20/2015	1,740	34	455	27%	1,744	34	552	32%
1/23/2015	1,733	35	567	33%	1,742	32	555	32%
2/2/2015	1,740	29	401	23%	1,744	31	375	22%
2/6/2015	1,733	2	621	36%	1,741	0	638	37%
2/20/2015	1,733	15	748	44%	1,742	14	650	38%
2/22/2015	1,740	4	1,076	62%	1,744	1	776	45%
3/5/2015	1,729	31	519	31%	1,731	29	521	31%
3/6/2015	1,717	22	502	30%	1,728	35	440	26%
3/20/2015	1,717	31	491	29%	1,728	17	512	30%
3/22/2015	1,729	33	520	31%	1,731	35	466	27%
4/3/2015	1,718	27	428	25%	1,729	34	418	25%
4/4/2015	1,729	29	419	25%	1,731	32	392	23%
4/24/2015	1,718	18	415	24%	1,729	11	363	21%
4/26/2015	1,729	23	380	22%	1,731	16	342	20%
5/6/2015	1,729	26	382	22%	1,732	19	351	20%
5/8/2015	1,718	18	350	21%	1,730	41	283	17%
5/18/2015	1,714	5	342	20%	1,706	4	440	26%
5/22/2015	1,700	22	325	19%	1,714	11	446	26%
6/2/2015	1,712	31	323	19%	1,704	35	358	21%
6/8/2015	1,696	33	294	18%	1,712	36	373	22%
Average	1,727	23	523	31%	1,732	22	530	31%

Source: Arizona Federal administrative data.

Note: The open rates for e-mails sent in previous months are updated each month and are reflected in the table.

TABLE D.3

The Cash under \$20 Rule and B Landing Page Visits by Day (Navigated to from Both E-mail and Online Banner), Months 1–3

Month 1			Month 2			Month 3		
Day	A	B	Day	A	B	Day	A	B
12/15/2014	49	28	1/15/2014	8	3	2/15/2014	1	2
12/16/2014	127	110	1/16/2014	7	8	2/16/2014	4	-
12/17/2014	51	44	1/17/2014	1	-	2/17/2014	8	-
12/18/2014	84	73	1/18/2014	4	1	2/18/2014	1	-
12/19/2014	101	91	1/19/2014	8	2	2/19/2014	8	2
12/20/2014	52	31	1/20/2014	24	30	2/20/2014	38	26
12/21/2014	19	20	1/21/2014	9	13	2/21/2014	5	9
12/22/2014	38	25	1/22/2014	8	7	2/22/2014	46	20
12/23/2014	18	11	1/23/2014	37	27	2/23/2014	48	34
12/24/2014	8	3	1/24/2014	6	8	2/24/2014	15	10
12/25/2014	10	2	1/25/2014	6	3	2/25/2014	5	2
12/26/2014	15	12	1/26/2014	5	5	2/26/2014	3	1
12/27/2014	8	4	1/27/2014	6	3	2/27/2014	4	2
12/28/2014	7	4	1/28/2014	10	6	2/28/2014	-	1
12/29/2014	19	5	1/29/2014	9	6			
12/30/2014	13	9	1/30/2014	8	4			
12/31/2014	5	9	1/31/2014	3	2			
1/1/2015	22	36	2/1/2014	4	2	3/1/2014	3	2
1/2/2015	55	49	2/2/2014	14	12	3/2/2014	5	2
1/3/2015	22	19	2/3/2014	16	14	3/3/2014	3	1
1/4/2015	17	5	2/4/2014	5	2	3/4/2014	3	-
1/5/2015	18	14	2/5/2014	3	5	3/5/2014	19	19
1/6/2015	14	8	2/6/2014	30	35	3/6/2014	24	14
1/7/2015	11	3	2/7/2014	6	8	3/7/2014	4	1
1/8/2015	12	7	2/8/2014	5	5	3/8/2014	7	7
1/9/2015	10	5	2/9/2014	6	8	3/9/2014	6	4
1/10/2015	6	6	2/10/2014	4	4	3/10/2014	-	-
1/11/2015	2	2	2/11/2014	8	2	3/11/2014	2	7
1/12/2015	13	7	2/12/2014	3	3	3/12/2014	3	2
1/13/2015	10	6	2/13/2014	5	3	3/13/2014	4	2
1/14/2015	11	3	2/14/2014	4	1	3/14/2014	3	1
Total month 1	847	651	Total month 2	272	232	Total month 3	272	171

Source: Arizona Federal administrative data.

Notes: Visits were not necessarily unique visits. Some visits were test visits or index or data scraping bots.

TABLE D.4

The Cash under \$20 Rule and B Landing Page Visits by Day (Navigated to from Both E-mail and Online Banner), Months 4–6

Month 4			Month 5			Month 6		
Day	A	B	Day	A	B	Day	A	B
3/15/2015	1	1	4/15/2015	1	-	5/15/2015	2	-
3/16/2015	1	3	4/16/2015	1	3	5/16/2015	1	1
3/17/2015	1	1	4/17/2015	1	1	5/17/2015	1	-
3/18/2015	4	1	4/18/2015	1	-	5/18/2015	8	6
3/19/2015	4	2	4/19/2015	1	-	5/19/2015	14	7
3/20/2015	14	18	4/20/2015	3	1	5/20/2015	6	1
3/21/2015	8	12	4/21/2015	3	1	5/21/2015	5	4
3/22/2015	14	10	4/22/2015	2	2	5/22/2015	14	15
3/23/2015	17	6	4/23/2015	-	1	5/23/2015	4	7
3/24/2015	5	3	4/24/2015	16	13	5/24/2015	-	1
3/25/2015	3	-	4/25/2015	2	6	5/25/2015	2	-
3/26/2015	5	1	4/26/2015	5	6	5/26/2015	1	2
3/27/2015	5	2	4/27/2015	4	7	5/27/2015	3	1
3/28/2015	4	-	4/28/2015	3	3	5/28/2015	2	-
3/29/2015	3	-	4/29/2015	2	-	5/29/2015	1	1
3/30/2015	3	-	4/30/2015	4	2	5/30/2015	2	1
3/31/2015	1	1				5/31/2015	-	-
4/1/2015	7	6	5/1/2015	7	5	6/1/2015	2	3
4/2/2015	8	-	5/2/2015	3	2	6/2/2015	10	10
4/3/2015	1	13	5/3/2015	3	7	6/3/2015	6	2
4/4/2015	12	9	5/4/2015	3	1	6/4/2015	6	3
4/5/2015	7	-	5/5/2015	3	2	6/5/2015	6	2
4/6/2015	3	4	5/6/2015	17	10	6/6/2015	4	2
4/7/2015	4	3	5/7/2015	10	7	6/7/2015	2	1
4/8/2015	1	1	5/8/2015	2	1	6/8/2015	3	10
4/9/2015	1	-	5/9/2015	7	6	6/9/2015	2	3
4/10/2015	4	2	5/10/2015	3	3	6/10/2015	1	5
4/11/2015	2	-	5/11/2015	4	-	6/11/2015	2	4
4/12/2015	1	-	5/12/2015	-	4	6/12/2015	2	4
4/13/2015	4	-	5/13/2015	1	-	6/13/2015	-	2
4/14/2015	1	-	5/14/2015	-	3	6/14/2015	-	1
						6/15/2015	4	4
Total month 4	149	99	Total month 5	112	97	Total month 6	112	99

Source: Arizona Federal administrative data.

Notes: Visits were not necessarily unique visits. Some visits were test visits or index or data scraping bots.

Appendix E. Treatment and Control Means during and after Rule Delivery

Intervention Arizona Federal Administrative Data, December 2014–June 2015

TABLE E.1

Intervention Administrative Treatment versus Control Means, Summary Level

Variable	Control mean	Summary Group			Delivery Method		
		All	\$20 Rule	20% Rule	E-mail	Mail	Online
Sample size	1,744	12,213	6,106	6,107	6,979	6,978	6,979
Credit card debt							
<i>Credit card balance</i>	\$5,118	\$4,926	\$4,896	\$4,956	\$4,985	\$4,892	\$4,954
Difference		-\$192	-\$222	-\$162	-\$133	-\$226*	-\$164
<i>Credit card interest accrued</i>	40.31	39.07	38.91	39.23	39.14	38.79	39.25
Difference		-1.24	-1.40	-1.08	-1.17	-1.52	-1.06
<i>Any balance revolved</i>	0.84	0.84	0.84	0.85	0.84	0.84	0.85
Difference		0.01	0.00	0.01	0.00	0.01	0.01
Purchases							
<i>Credit card purchase amount</i>	\$295	\$288	\$284	\$291	\$290	\$291	\$285
Difference		-\$8	-\$11	-\$4	-\$6	-\$5	-\$10
<i>Total number of credit card purchases</i>	4.65	4.53	4.49	4.57	4.53	4.55	4.46
Difference		-0.12	-0.16	-0.08	-0.11	-0.10	-0.18
<i>Number of credit card purchases <\$20</i>	1.76	1.70	1.69	1.71	1.67	1.72	1.68
Difference		-0.06	-0.07	-0.05	-0.08	-0.03	-0.08
<i>Percent of credit card purchases <\$20</i>	0.30	0.31	0.31	0.31	0.31	0.31	0.31
Difference		0.01	0.01	0.01	0.01	0.01	0.01
Cash advances							
<i>Total cash advance amount</i>	\$4.02	\$2.97	\$3.15	\$2.78	\$3.20	\$2.88	\$2.96
Difference		-\$1.05	-\$0.87	-\$1.23	-\$0.81	-\$1.14	-\$1.06
<i>Total number of cash advances</i>	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Difference		0.00	0.00	0.00	0.00	0.00	0.00

TABLE E.1 CONTINUED

Variable	Control mean	Summary Group		Delivery Method			
		All	\$20 Rule	All	\$20 Rule	All	\$20 Rule
<i>Ever received cash advance</i>	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Difference		0.00	0.00	0.00	0.00	0.00	0.00
Fees							
<i>Number of fees paid</i>	3.07	3.09	3.10	3.07	3.09	3.15	3.04
Difference		0.02	0.03	0.01	0.02	0.08	-0.02
<i>Ever paid fees</i>	0.24	0.25	0.25	0.25	0.25	0.25	0.25
Difference		0.01	0.01	0.01	0.01	0.01	0.00
Payments							
<i>Number of credit card payments</i>	1.25	1.27	1.28	1.26	1.27	1.27	1.27
Difference		0.02	0.02	0.01	0.02	0.02	0.01
<i>Credit card payment amount</i>	\$482	\$475	\$473	\$476	\$480	\$471	\$472
Difference		-\$8	-\$9	-\$6	-\$3	-\$11	-\$10
<i>Ever paid credit card late</i>	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Difference		0.00	0.00	0.00	0.00	0.00	0.00
<i>Percent of credit card balance paid</i>	0.42	0.89	1.30	0.48	1.18	1.20	0.99
Difference		0.47	0.88	0.06	0.76	0.78	0.57
Checking and savings accounts							
<i>Total savings</i>	\$4,240	\$4,429	\$4,385	\$4,474	\$4,378	\$4,473	\$4,337
Difference		\$190	\$146	\$235	\$139	\$234	\$98
<i>Savings less credit card balance</i>	-\$1,085	-\$649	-\$648	-\$650	-\$777	-\$583	-\$767
Difference		\$435*	\$436	\$435	\$308	\$502*	\$317
<i>Number of deposits</i>	7.44	7.45	7.43	7.46	7.54	7.42	7.43
Difference		0.01	0.00	0.03	0.10	-0.01	0.00
<i>Sum of deposits</i>	\$4,868	\$4,697	\$4,723	\$4,672	\$4,682	\$4,692	\$4,665
Difference		-\$171	-\$145	-\$196*	-\$186*	-\$176	-\$203*
<i>Number of withdrawals</i>	47.59	46.49	46.22	46.77	46.89	46.23	46.39
Difference		-1.09	-1.37	-0.82	-0.70	-1.36	-1.20
<i>Sum of withdrawals</i>	\$4,844	\$4,666	\$4,681	\$4,651	\$4,656	\$4,668	\$4,638
Difference		-\$177*	-\$162	-\$192*	-\$187*	-\$175	-\$206*
<i>Number of debit card transactions</i>	34.07	33.37	33.03	33.71	33.75	33.18	33.20
Difference		-0.70	-1.04	-0.36	-0.32	-0.90	-0.88
<i>Sum of debit card transactions</i>	\$1,378	\$1,365	\$1,371	\$1,359	\$1,386	\$1,365	\$1,360
Difference		-\$13	-\$7	-\$19	\$8	-\$12	-\$17
<i>Number of debit card transactions <\$20</i>	16.53	16.04	15.83	16.25	16.11	15.93	16.06
Difference		-0.49	-0.70	-0.28	-0.42	-0.60	-0.47

TABLE E.1 CONTINUED

Variable	Control mean	Summary Group			Delivery Method		
		All	\$20 Rule	All	\$20 Rule	All	\$20 Rule
Overdrafts and fees							
Total overdraft transfer amount	\$77	\$78	\$79	\$78	\$78	\$78	\$78
Difference		\$1.29	\$1.63	\$0.95	\$1.15	\$1.10	\$0.84
Total overdraft transfer count	0.63	0.62	0.62	0.62	0.62	0.60	0.63
Difference		-0.01	-0.02	-0.01	-0.01	-0.03	0.00
Ever overdrafted	0.25	0.23	0.23	0.24	0.24	0.23	0.23
Difference		-0.01	-0.02*	-0.01	-0.01	-0.02*	-0.01

Source: Arizona Federal Credit Union administrative data.

Note: Asterisks indicate whether the treatment group mean is statistically different from the control group mean.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE E.2

Intervention Administrative Data Treatment versus Control Means by Treatment Group, the Cash under \$20 Rule

	Control mean	\$20 Rule										
		1	2.1	2.2	3.1	3.2	4	5.1	5.2	6	7.1	7.2
Sample size	1,744	872	437	434	434	438	872	438	434	873	435	438
Credit card debt												
<i>Credit card balance</i>	5,118	4,696	4,850	5,147	5,062	4,992	4,856	5,106	4,667	4,768	4,957	5,118
Difference		-422.0**	-267.9	28.99	-56.33	-126.2	-262.3	-12.19	-451.7*	-350.3	-160.9	0.19
<i>Credit card interest accrued</i>	40.31	38.60	37.11	42.17	39.26	37.73	37.84	41.36	38.00	38.13	38.38	41.57
Difference		-1.709	-3.201	1.861	-1.046	-2.582	-2.473	1.052	-2.313	-2.183	-1.928	1.259
<i>Any balance revolved</i>	0.837	0.837	0.840	0.846	0.855	0.822	0.846	0.854	0.840	0.845	0.828	0.841
Difference		0.000	0.003	0.009	0.018	-0.014	0.009	0.017	0.003	0.008	-0.009	0.004
Purchases												
<i>Credit card purchase amount</i>	\$295.4	\$286.12	\$280.50	\$299.93	\$290.85	\$286.18	\$290.28	\$272.89	\$302.63	\$276.95	\$269.59	\$271.15
Difference		-\$9.27	-\$14.88	\$4.55	-\$4.53	-\$9.21	-\$5.11	-\$22.49	\$7.25	-\$18.43	-\$25.80	-\$24.23
<i>Number of credit card purchases</i>	4.645	4.478	4.099	4.653	4.372	4.457	4.462	4.352	4.273	4.799	4.782	4.399
Difference		-0.168	-0.546	0.008	-0.274	-0.188	-0.184	-0.293	-0.372	0.154	0.137	-0.247
<i>Number of credit card purchases <\$20</i>	1.758	1.750	1.560	1.771	1.546	1.756	1.642	1.562	1.551	1.911	1.773	1.528
Difference		-0.008	-0.198	0.013	-0.212	-0.002	-0.116	-0.196	-0.207	0.153	0.015	-0.230
<i>Percent of credit card purchases <\$20</i>	0.302	0.313	0.291	0.315	0.310	0.302	0.305	0.323	0.303	0.315	0.329	0.312
Difference		0.011	-0.011	0.012	0.008	0.000	0.003	0.021	0.000	0.012	0.027*	0.009
Cash advances												
<i>Total cash advance amount</i>	\$4.02	\$2.78	\$1.46	\$6.28	\$4.88	\$3.02	\$2.45	\$3.87	\$3.35	\$2.67	\$2.86	\$2.71
Difference		-\$1.24	-\$2.56	\$2.26	\$0.87	-\$1.00	-\$1.57	-\$0.15	-\$0.67	-\$1.35	-\$1.16	-\$1.31
<i>Total number of cash advances</i>	0.007	0.007	0.006	0.008	0.008	0.005	0.009	0.010	0.008	0.005	0.005	0.009
Difference		0.000	-0.001	0.001	0.001	-0.002	0.002	0.002	0.001	-0.002	-0.002	0.002
<i>Ever received cash advance</i>	0.007	0.007	0.006	0.008	0.008	0.005	0.008	0.009	0.008	0.005	0.005	0.009
Difference		0.000	-0.001	0.001	0.001	-0.002	0.001	0.002	0.001	-0.002	-0.002	0.002

TABLE E.2 CONTINUED

	Control mean	\$20 Rule										
		1	2.1	2.2	3.1	3.2	4	5.1	5.2	6	7.1	7.2
Fees												
<i>Number of fees paid</i>	3.065	3.067	2.860	2.737	2.840	3.010	3.225	3.331	3.044	3.264	3.113	3.328
Difference		0.002	-0.206	-0.329	-0.225	-0.056	0.160	0.266	-0.021	0.199	0.048	0.263
<i>Ever paid fees</i>	0.243	0.240	0.240	0.249	0.215	0.244	0.250	0.281	0.264	0.267	0.250	0.241
Difference		-0.004	-0.003	0.006	-0.028	0.000	0.006	0.037*	0.020	0.023	0.006	-0.003
Payments												
<i>Number of credit card payments</i>	1.253	1.250	1.266	1.305	1.281	1.311	1.274	1.270	1.322	1.276	1.275	1.234
Difference		-0.003	0.013	0.052	0.027	0.058*	0.020	0.016	0.069**	0.023	0.021	-0.019
<i>Credit card payment amount</i>	482.4	494.4	463.6	537.3	475.4	489.7	453.1	462.9	493.0	449.8	441.1	462.6
Difference		12.01	-18.83	54.92	-6.94	7.33	-29.27	-19.47	10.58	-32.63	-41.25	-19.75
<i>Ever paid credit card late</i>	0.018	0.019	0.019	0.019	0.018	0.013	0.019	0.019	0.016	0.016	0.017	0.024
Difference		0.001	0.001	0.001	0.000	-0.005	0.001	0.001	-0.002	-0.002	-0.001	0.006
<i>Percent of credit card balance paid</i>	0.417	0.321	0.345	0.294	0.368	8.563	1.273	0.303	2.927	0.326	0.378	1.119
Difference		-0.096	-0.072	-0.123	-0.049	8.146**	0.856	-0.114	2.510*	-0.091	-0.039	0.702*
Checking and savings accounts												
<i>Total savings</i>	\$4,240	\$4,198	\$4,424	\$4,516	\$4,675	\$4,243	\$4,183	\$4,289	\$4,148	\$4,588	\$4,751	\$4,410
Difference		-\$41.34	\$184.77	\$276.8	\$435.6	\$3.155	-\$56.38	\$49.53	-\$91.31	\$348.6	\$511.8	\$170.8
<i>Savings less credit card balance</i>	-\$1,085	-\$724.9	-\$650.5	-\$529.1	-\$664.9	-\$799.6	-\$718.0	-\$939.4	-\$679.4	-\$430.3	-\$242.7	-\$818.2
Difference		\$359.7	\$434.1	\$555.5	\$419.7	\$285.0	\$366.6	\$145.2	\$405.2	\$654.3	\$841.9	\$266.4
<i>Number of deposits</i>	7.435	7.194	7.487	7.971	7.612	7.396	7.313	7.152	7.685	7.344	7.666	7.384
Difference		-0.241	0.051	0.536**	0.176	-0.039	-0.122	-0.283	0.249	-0.091	0.231	-0.051
<i>Sum of deposits</i>	\$4,868	\$4,629	\$4,574	\$5,037	\$4,701	\$4,486	\$4,708	\$4,466	\$4,783	\$4,888	\$4,981	\$4,652
Difference		-\$239.27	-\$294.19	\$168.94	-\$167.19	-\$382.02*	-\$159.92	-\$402.46*	-\$85.17	\$20.21	\$113.28	-\$216.06

TABLE E.2 CONTINUED

	Control mean	\$20 Rule										
		1	2.1	2.2	3.1	3.2	4	5.1	5.2	6	7.1	7.2
<i>Number of withdrawals</i>	47.59	45.96	44.45	49.55	46.24	43.55	46.18	44.45	49.12	45.96	48.70	44.89
Difference		-1.625	-3.136*	1.957	-1.352	-4.039**	-1.404	-3.139*	1.528	-1.629	1.112	-2.695
<i>Sum of withdrawals</i>	\$4,844	\$4,590	\$4,470	\$5,050	\$4,637	\$4,497	\$4,699	\$4,405	\$4,757	\$4,817	\$4,808	\$4,714
Difference		-\$254.1	-\$374.0*	\$206.6	-\$206.3	-\$347.1	-\$145.0	-\$438.3*	-\$86.26	-\$26.46	-\$35.29	-\$129.92
<i>Number of debit card transactions</i>	34.07	32.34	31.10	36.06	33.11	31.05	32.91	32.05	35.51	32.96	35.28	32.01
Difference		-1.738	-2.978*	1.990	-0.961	-3.021*	-1.164	-2.020	1.433	-1.111	1.205	-2.066
<i>Sum of debit card transactions</i>	\$1,378	\$1,335	\$1,278	\$1,514	\$1,412	\$1,318	\$1,358	\$1,357	\$1,433	\$1,341	\$1,497	\$1,324
Difference		-\$42.35	-\$100.0	\$136.6**	\$33.78	-\$59.59	-\$19.97	-\$20.39	\$55.07	-\$37.30	\$118.7*	-\$53.47
<i>Number of debit card transactions <\$20</i>	16.53	16.14	14.32	17.31	15.69	15.27	16.00	15.61	16.58	15.65	16.27	15.07
Difference		-0.397	-2.216**	0.777	-0.846	-1.260	-0.536	-0.921	0.043	-0.883	-0.261	-1.466*
Overdrafts and fees												
<i>Total overdraft transfer amount</i>	\$77.21	\$76.32	\$75.75	\$99.10	\$76.16	\$69.68	\$72.96	\$73.49	\$83.31	\$84.18	\$77.47	\$81.71
Difference		-\$0.885	-\$1.460	\$21.89**	-\$1.048	-\$7.530	-\$4.248	-\$3.719	\$6.103	\$6.973	\$0.267	\$4.501
<i>Total overdraft transfer count</i>	0.632	0.621	0.660	0.737	0.599	0.619	0.550	0.522	0.668	0.597	0.606	0.679
Difference		-0.011	0.028	0.106	-0.033	-0.013	-0.081*	-0.110*	0.036	-0.035	-0.026	0.047
<i>Ever overdrafted</i>	0.245	0.212	0.221	0.259	0.227	0.241	0.206	0.217	0.248	0.231	0.245	0.260
Difference		-0.033**	-0.024	0.013	-0.018	-0.004	-0.039**	-0.029*	0.003	-0.015	-0.001	0.015

Source: Arizona Federal Credit Union administrative data.

Note: Asterisks indicate whether the treatment group mean is statistically different from the control group mean.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE E.3

Intervention Administrative Data Treatment versus Control Means by Treatment Group, the 20 Percent Added Rule

Variable	Control mean	20% Rule										
		8	9.1	9.2	10.1	10.2	11	12.1	12.2	13	14.1	14.2
Sample size	1,744	873	438	435	435	438	872	436	436	872	436	436
Credit card debt												
<i>Credit card balance</i>	5,118	4,831	5,588	5,020	5,060	4,935	4,922	4,490	4,867	5,002	4,983	4,929
Difference		-287.0	469.4	-97.95	-58.67	-183.7	-196.5	-628.4**	-251.6	-116.3	-135.3	-188.8
<i>Credit card interest accrued</i>	40.31	39.08	42.70	39.97	40.64	38.54	39.41	35.14	37.61	40.84	38.63	37.39
Difference		-1.229	2.388	-0.341	0.329	-1.768	-0.901	-5.172**	-2.694	0.529	-1.677	-2.922
<i>Any balance revolved</i>	0.837	0.857	0.843	0.861	0.866	0.843	0.842	0.825	0.832	0.851	0.822	0.840
Difference		0.020*	0.006	0.024	0.029**	0.006	0.005	-0.012	-0.005	0.014	-0.015	0.003
Purchases												
<i>Credit card purchase amount</i>	\$295.4	\$268.94	\$260.86	\$295.53	\$292.33	\$321.00	\$272.33	\$273.09	\$302.26	\$314.94	\$289.67	\$326.81
Difference		-\$26.45	-\$34.52	\$0.15	-\$3.05	\$25.62	-\$23.05	-\$22.29	\$6.88	\$19.56	-\$5.71	\$31.43
<i>Number of credit card purchases</i>	4.645	4.281	4.500	4.778	4.485	4.601	4.514	4.378	5.022	4.633	4.387	4.973
Difference		-0.365	-0.146	0.133	-0.161	-0.044	-0.131	-0.267	0.376	-0.013	-0.258	0.328
<i>Number of credit card purchases <\$20</i>	1.758	1.618	1.637	1.550	1.653	1.791	1.762	1.739	1.917	1.720	1.563	1.900
Difference		-0.140	-0.120	-0.208	-0.105	0.033	0.004	-0.019	0.159	-0.038	-0.194	0.142
<i>Percent of credit card purchases <\$20</i>	0.302	0.314	0.317	0.289	0.309	0.331	0.325	0.327	0.325	0.297	0.313	0.321
Difference		0.012	0.015	-0.013	0.006	0.028*	0.022*	0.025	0.023	-0.006	0.011	0.019
Cash advances												
<i>Total cash advance amount</i>	\$4.02	\$2.12	\$4.56	\$1.84	\$1.28	\$1.40	\$3.99	\$2.30	\$3.90	\$1.89	\$2.23	\$5.44
Difference		-\$1.90	\$0.54	-\$2.18	-\$2.74	-\$2.62	-\$0.02	-\$1.72	-\$0.12	-\$2.12	-\$1.79	\$1.42
<i>Total number of cash advances</i>	0.007	0.005	0.007	0.005	0.008	0.005	0.008	0.008	0.007	0.006	0.006	0.007
Difference		-0.003*	0.000	-0.002	0.001	-0.002	0.001	0.000	-0.001	-0.001	-0.001	0.000
<i>Ever received cash advance</i>	0.007	0.005	0.007	0.005	0.008	0.005	0.007	0.008	0.007	0.006	0.006	0.007
Difference		-0.002*	0.000	-0.002	0.001	-0.002	0.000	0.001	-0.001	-0.001	-0.001	0.000

TABLE E.3 CONTINUED

Variable	Control mean	20% Rule										
		8	9.1	9.2	10.1	10.2	11	12.1	12.2	13	14.1	14.2
Fees												
Number of fees paid	3.065	2.890	3.022	3.326	3.266	3.032	3.090	3.277	3.445	2.961	3.036	2.716
Difference		-0.176	-0.044	0.261	0.201	-0.034	0.024	0.211	0.379	-0.105	-0.030	-0.349
Ever paid fees	0.243	0.230	0.274	0.254	0.249	0.281	0.241	0.270	0.289	0.237	0.230	0.227
Difference		-0.013	0.030	0.011	0.006	0.037*	-0.003	0.026	0.046**	-0.007	-0.014	-0.016
Payments												
Number of credit card payments	1.253	1.259	1.242	1.288	1.247	1.254	1.255	1.284	1.269	1.275	1.220	1.328
Difference		0.006	-0.012	0.035	-0.007	0.001	0.001	0.030	0.016	0.022	-0.034	0.074**
Credit card payment amount	482.4	438.2	458.7	474.6	468.8	499.3	458.6	428.7	466.8	513.5	465.6	582.9
Difference		-44.23	-23.69	-7.78	-13.62	16.91	-23.79	-53.73	-15.61	31.07	-16.77	100.5*
Ever paid credit card late	0.018	0.021	0.018	0.019	0.017	0.016	0.024	0.017	0.015	0.019	0.013	0.019
Difference		0.003	0.000	0.001	-0.001	-0.002	0.006	-0.001	-0.003	0.001	-0.005	0.001
Percent of credit card balance paid	0.417	0.315	0.378	0.412	0.530	0.310	0.398	0.834	0.532	0.372	0.628	0.939
Difference		-0.102	-0.039	-0.005	0.113	-0.107	-0.019	0.417	0.115	-0.045	0.211	0.522
Checking and savings accounts												
Total savings	\$4,240	\$4,349	\$4,003	\$4,307	\$4,389	\$3,892	\$4,739	\$4,590	\$4,468	\$4,933	\$4,333	\$4,609
Difference		\$109.7	-\$236.6	\$67.49	\$149.7	-\$347.1	\$499.4	\$350.3	\$228.1	\$693.8**	\$93.75	\$369.4
Savings less credit card balance	-\$1,085	-\$636.3	-\$1,627	-\$849.1	-\$1,261	-\$1,230.9	-\$266.4	-\$144.6	-\$601.1	-\$92.6	-\$830.5	-\$594.1
Difference		\$448.2	-\$542.6	\$235.5	-\$176.5	-\$146.3	\$818.2*	\$939.9*	\$483.5	\$992.0*	\$254.1	\$490.5
Number of deposits	7.435	7.278	7.345	7.791	7.302	7.814	7.299	7.397	7.387	7.531	7.519	7.697
Difference		-0.157	-0.090	0.356	-0.133	0.379	-0.137	-0.038	-0.049	0.096	0.084	0.262
Sum of deposits	\$4,868	\$4,522	\$4,657	\$4,854	\$4,500	\$4,704	\$4,707	\$4,588	\$4,540	\$4,851	\$4,649	\$4,760
Difference		-\$345.83**	-\$211.57	-\$14.38	-\$367.75	-\$163.89	-\$161.0	-\$280.2	-\$328.4	-\$17.22	-\$218.9	-\$108.4
Number of withdrawals	47.59	46.24	45.99	47.87	47.77	48.34	45.89	46.58	46.51	45.53	48.61	47.82
Difference		-1.345	-1.597	0.283	0.178	0.753	-1.699	-1.014	-1.079	-2.055	1.022	0.235
Sum of withdrawals	\$4,844	\$4,486	\$4,663	\$4,713	\$4,392	\$4,809	\$4,710	\$4,657	\$4,536	\$4,775	\$4,584	\$4,814
Difference		-\$357.8**	-\$180.4	-\$130.7	-\$452**	-\$35.08	-\$133.5	-\$187.1	-\$307.5	-\$68.74	-\$259.4	-\$29.69

TABLE E.3 CONTINUED

Variable	Control mean	20% Rule										
		8	9.1	9.2	10.1	10.2	11	12.1	12.2	13	14.1	14.2
<i>Number of debit card transactions</i>	34.07	33.85	33.04	33.48	33.75	35.51	32.94	33.58	34.20	32.22	35.50	34.89
Difference		-0.221	-1.029	-0.591	-0.324	1.436	-1.133	-0.498	0.127	-1.855	1.428	0.813
<i>Sum of debit card transactions</i>	\$1,378	\$1,328	\$1,337	\$1,361	\$1,371	\$1,484	\$1,326	\$1,334	\$1,413	\$1,337	\$1,382	\$1,363
Difference		-\$50.24	-\$40.70	-\$16.65	-\$7.26	\$105.73	-\$52.01	-\$43.94	\$34.81	-\$40.69	\$4.06	-\$14.47
<i>Number of debit card transactions <\$20</i>	16.53	16.35	15.95	15.90	16.21	16.81	16.30	16.04	16.39	15.22	17.38	17.12
Difference		-0.187	-0.587	-0.635	-0.318	0.275	-0.230	-0.495	-0.143	-1.311**	0.849	0.587
Overdrafts and fees												
<i>Total overdraft transfer amount</i>	\$77.21	\$84.00	\$74.93	\$67.91	\$70.43	\$92.39	\$77.83	\$80.14	\$83.85	\$76.60	\$72.98	\$74.44
Difference		\$6.791	-\$2.279	-\$9.298	-\$6.774	\$15.184	\$0.623	\$2.929	\$6.641	-\$0.603	-\$4.225	-\$2.770
<i>Total overdraft transfer count</i>	0.632	0.700	0.590	0.669	0.575	0.734	0.613	0.550	0.547	0.641	0.571	0.587
Difference		0.068	-0.042	0.037	-0.057	0.102	-0.019	-0.082	-0.085	0.010	-0.061	-0.045
<i>Ever overdrafted</i>	0.245	0.252	0.248	0.248	0.239	0.254	0.231	0.230	0.225	0.230	0.221	0.218
Difference		0.007	0.003	0.002	-0.007	0.009	-0.015	-0.016	-0.020	-0.015	-0.025	-0.027*
<i>Credit card debt</i>	305.49	299.38	299.24	314.15	308.48	332.33	297.66	283.75	314.94	306.35	311.50	336.11
Difference		-6.10	-6.25	8.66	3.00	26.85	-7.83	-21.74	9.45	0.86	6.01	30.62

Source: Arizona Federal Credit Union administrative data.

Note: Asterisks indicate whether the treatment group mean is statistically different from the control group mean.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Postintervention Credit Data Treatment versus Control Means, August 2015

TABLE E.4

Postintervention Credit Data Treatment versus Control Means by Summary Groups

Variable	Control mean	Summary Group			Delivery Method		
		All	\$20 Rule	20% Rule	E-mail	Mail	Online
Sample size	1,728	12,137	6,066	6,071	6,935	6,935	6,928
FICO credit score	703.70	702.42	702.20	702.65	701.91	702.68	703.09
Difference		-1.28	-1.51	-1.05	-1.346	0.20	1.01
Number of inquiries within 12 months	2.08	1.97	2.00	1.95	1.96	2.01	1.97
Difference		-0.11*	-0.08	-0.13*	-0.05	0.04	-0.04
All trades							
Number of trades	19.92	19.93	19.89	19.96	19.90	19.97	19.95
Difference		0.00	-0.03	0.03	-0.05	0.09	0.05
Number of trades with balance >0	6.26	6.33	6.34	6.32	6.30	6.35	6.31
Difference		0.07	0.08	0.06	-0.05	0.05	-0.02
Aggregate balance for open trades	\$139,810	\$136,043	\$136,979	\$135,109	\$135,701	\$136,117	\$136,801
Difference		-\$3,767	-\$2,831	-\$4,701	-\$1,624	-\$792	\$576
Aggregate balance for open status trades	\$140,270	\$136,504	\$137,405	\$135,605	\$136,092	\$136,627	\$137,212
Difference		-\$3,766	-\$2,865	-\$4,665	-\$1,764	-\$694	\$475
Aggregate credit for open trades	\$176,966	\$172,365	\$173,715	\$171,020	\$171,781	\$172,183	\$173,451
Difference		-\$4,601	-\$3,251	-\$5,946	-\$2,320	-\$1,513	\$1,020
Aggregate balance-to-credit ratio for open trades	71.80	72.18	72.03	72.34	72.02	72.20	72.26
Difference		0.39	0.23	0.54	-0.22	0.13	0.25
Number of collection trades with balance ≥\$200	0.42	0.41	0.41	0.41	0.40	0.42	0.40
Difference		-0.01	-0.01	-0.01	-0.01	0.02	-0.02
Aggregate balance in collections	429.73	415.24	413.78	416.70	393.53	409.73	392.24
Difference		-14.49	-15.95	-13.03	-47.02	-14.64	-49.61*

TABLE E.4 CONTINUED

Variable	Control mean	Summary Group			Delivery Method		Control mean
		All	\$20 Rule	20% Rule	E-mail	Variable	
Revolving trades							
Number of revolving trades	10.55	10.50	10.57	10.44	10.51	10.48	10.55
Difference		-0.05	0.01	-0.12	0.01	-0.06	0.08
Number of revolving trades with balance >0	3.19	3.20	3.21	3.19	3.17	3.18	3.21
Difference		0.00	0.01	-0.01	-0.06	-0.02	0.03
Aggregate balance for open revolving trades	\$10,109	\$10,013	\$10,075	\$9,950	\$9,945	\$9,949	\$10,139
Difference		-\$97	-\$34	-\$160	-\$159	-\$152	\$228
Aggregate balance for open status revolving trades	\$10,470	\$10,320	\$10,388	\$10,252	\$10,243	\$10,251	\$10,449
Difference		-\$150	-\$82	-\$218	-\$191	-\$175	\$220
Aggregate credit for open revolving trades	\$27,541	\$26,834	\$26,998	\$26,670	\$26,591	\$26,801	\$27,046
Difference		-\$706	-\$542	-\$870	-\$662*	-\$243	\$248
Balance-to-credit ratio for open revolving trades	45.79	45.68	45.93	45.44	46.15	45.11	45.89
Difference		-0.10	0.14	-0.35	0.91*	-1.18**	0.39
Balance transfers							
Number of bankcards with balance transfer	0.24	0.25	0.25	0.25	0.24	0.26	0.25
Difference		0.01	0.01	0	0	0	0
Number of bankcard balance transfers within 0–6 months	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Difference		0	0	0	0	0	0
Number of bankcard balance transfers within 7–12 months	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0
Late payments							
Number of trades 30 days past due	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0
Number of trades 90+ days past due	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Difference		0.00	0.00	0.00	0.00	0.00	0.00
Total balance on trades 30 days delinquent ^a	\$452	\$389	\$427	\$350	\$375	\$402	\$372
Difference		-\$63	-\$25	-\$101	-\$42	\$10	-\$48

TABLE E.4 CONTINUED

Variable	Control mean	Summary Group			Delivery Method		Control mean
		All	\$20 Rule	20% Rule	E-mail	Variable	
<i>Total balance on trades 90–180 days delinquent^a</i>	\$228	\$202	\$211	\$193	\$184	\$215	\$196
Difference		-\$25	-\$17	-\$34	-\$43	\$20	-\$18
<i>Total number of revolving trades 30 days delinquent^a</i>	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0
<i>Total number of revolving trades 90–180 days delinquent^a</i>	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0
<i>Total number of 30- to 180-day delinquencies in last two years</i>	0.13	0.25	0.23	0.27	0.28	0.23	0.25
Difference		0.13	0.11	0.15	0.09	-0.02	0.02

Source: Postintervention credit record data.

Note: Asterisks indicate whether the treatment group mean is statistically different from the control group mean.

^aDenotes current delinquency at the time of reporting within the last six months.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE E.5

Postintervention Credit Data Treatment versus Control Means by Treatment Group, the Cash under \$20 Rule

Variable	Control mean	\$20 Rule										
		1	2.1	2.2	3.1	3.2	4	5.1	5.2	6	7.1	7.2
Sample size	1,728	864	435	433	429	435	863	434	432	872	432	437
FICO credit score	703.70	706.19	707.20	694.89	702.20	703.30	706.21	701.27	701.60	699.29	701.04	695.92
Difference		2.49	3.50	-8.81**	-1.51	-0.40	2.51	-2.44	-2.11	-4.42	-2.67	-7.78**
Number of inquiries within 12 months	2.08	1.87	1.94	1.99	2.08	2.13	2.05	1.76	2.07	2.09	1.87	2.11
Difference		-0.21**	-0.14	-0.09	0.00	0.05	-0.03	-0.32**	-0.01	0.01	-0.21	0.03
All trades												
Number of trades	19.92	19.42	20.54	19.97	19.84	20.18	19.88	20.10	19.29	20.28	19.72	19.72
Difference		-0.50	0.62	0.04	-0.09	0.25	-0.05	0.18	-0.63	0.36	-0.20	-0.21
Number of trades with balance >0	6.26	6.16	6.17	6.32	6.18	6.38	6.34	6.42	5.96	6.66	6.46	6.57
Difference		-0.10	-0.09	0.06	-0.08	0.12	0.08	0.16	-0.30	0.40**	0.20	0.31
Aggregate balance for open trades	\$139,810	\$137,874	\$132,011	\$142,639	\$131,864	\$142,529	\$137,549	\$136,463	\$145,372	\$137,741	\$124,993	\$135,466
Difference		-\$1,936	-\$7,799	\$2,829	-\$7,946	\$2,719	-\$2,261	-\$3,347	\$5,562	-\$2,069	-\$14,816**	-\$4,344
Aggregate balance for open status trades	\$140,270	\$138,340	\$132,395	\$141,746	\$132,300	\$142,858	\$138,280	\$137,031	\$145,728	\$138,382	\$125,481	\$136,089
Difference		-\$1,930	-\$7,875	\$1,476	-\$7,970	\$2,588	-\$1,990	-\$3,239	5458.356	-\$1,888	-\$14,789**	-\$4,181
Aggregate credit for open trades	\$176,966	\$174,802	\$170,364	\$178,944	\$166,325	\$182,865	\$175,592	\$173,531	\$178,864	\$174,700	\$160,956	\$169,944
Difference		-\$2,164	-\$6,602	\$1,978	-\$10,641	\$5,898	-\$1,374	-\$3,436	\$1,898	-\$2,266	-\$16,010**	-\$7,023
Aggregate balance-to-credit ratio for open trades	71.80	71.87	69.55	74.46	71.36	72.32	71.61	72.98	73.03	72.12	70.30	73.16
Difference		0.08	-2.24*	2.67**	-0.436	0.52	-0.19	1.18	1.23	0.32	-1.49	1.36
Number of collection trades with balance ≥\$200	0.42	0.35	0.28	0.40	0.42	0.44	0.40	0.43	0.37	0.46	0.49	0.44
Difference		-0.07	-0.13**	-0.02	0.00	0.03	-0.02	0.02	-0.05	0.05	0.08	0.03

TABLE E.5 CONTINUED

Variable	Control mean	\$20 Rule										
		1	2.1	2.2	3.1	3.2	4	5.1	5.2	6	7.1	7.2
<i>Aggregate balance in collections</i>	429.73	447.82	327.54	394.32	306.83	357.45	366.31	378.86	345.24	535.57	432.73	547.29
Difference		18.09	-102.19	-35.41	-122.91	-72.28	-63.42	-50.87	-84.50	105.83	3.00	117.55
Revolving trades												
<i>Number of revolving trades</i>	10.55	10.44	11.39	10.68	10.46	10.64	10.59	10.57	10.40	10.57	10.26	10.31
Difference		-0.11	0.83**	0.13	-0.09	0.09	0.04	0.02	-0.16	0.02	-0.29	-0.24
<i>Number of revolving trades with balance >0</i>	3.19	3.18	3.25	3.26	2.99	3.22	3.25	3.25	3.09	3.27	3.08	3.33
Difference		-0.01	0.06	0.07	-0.201	0.02	0.06	0.061	-0.11	0.08	-0.11	0.14
<i>Aggregate balance for open revolving trades</i>	\$10,109	\$10,205	\$9,807	\$10,097	\$9,740	\$10,342	\$10,288	\$10,535	\$9,647	\$10,072	\$9,653	\$10,099
Difference		\$95	-\$303	-\$13	-\$369	\$233	\$178	\$425	-\$462	-\$38	-\$457	-\$10
<i>Aggregate balance for open status revolving trades</i>	\$10,470	\$10,477	\$9,970	\$10,473	\$9,809	\$10,613	\$10,608	\$10,894	\$9,937	\$10,356	\$10,051	\$10,788
Difference		\$7	-\$500	\$3	-\$661	\$143	\$138	\$424	-\$533	-\$114	-\$419	\$319
<i>Aggregate credit for open revolving trades</i>	\$27,541	\$27,106	\$28,292	\$25,230	\$25,813	\$28,308	\$28,325	\$26,590	\$26,252	\$26,738	\$26,166	\$26,971
Difference		-\$434	\$752	-\$2,311*	-\$1,728	\$768	\$784	-\$951	-\$1,289	-\$803	-\$1,375	-\$570
<i>Balance-to-credit ratio for open revolving trades</i>	45.79	45.22	43.63	50.38	46.71	43.42	44.65	47.90	46.00	45.73	46.81	46.90
Difference		-0.57	-2.16	4.59***	0.93	-2.36	-1.13	2.12	0.215	-0.06	1.02	1.12
Balance transfers												
<i>Number of bankcards with balance transfer</i>	0.24	0.28	0.25	0.24	0.22	0.23	0.26	0.32	0.22	0.25	0.26	0.23
Difference		0.04*	0.01	-0.01	-0.02	-0.01	0.02	0.08***	-0.02	0.01	0.02	-0.01

TABLE E.5 CONTINUED

Variable	Control mean	\$20 Rule										
		1	2.1	2.2	3.1	3.2	4	5.1	5.2	6	7.1	7.2
<i>Number of bankcard balance transfers within 0–6 months</i>	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.01
Difference		0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	0.00	0.00	-0.01
<i>Number of bankcard balance transfers within 7–12 months</i>	0	0	0	0	0	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0	0	0	0	0	0
Late payments												
<i>Number of trades 30 days past due</i>	0	0	0	0	0	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0	0	0	0	0	0
<i>Number of trades 90+ days past due</i>	0.03	0.04	0.01	0.03	0.05	0.03	0.03	0.04	0.02	0.03	0.03	0.04
Difference		0.01	-0.02*	0.00	0.02	-0.01	0.00	0.01	-0.02	0.00	0.00	0.01
<i>Total balance on trades 30 days delinquent^a</i>	\$452	\$56	\$221	\$308	\$827	\$492	\$532	\$323	\$150	\$704	\$576	\$503
Difference		-\$396**	-\$231	-\$144	\$375	\$40	\$80	-\$129	-\$301	\$252	\$124	\$51
<i>Total balance on trades 90–180 days delinquent^a</i>	\$228	\$292	\$71	\$128	\$276	\$73	\$265	\$279	\$67	\$289	\$106	\$267
Difference		\$64	-\$156	-\$99	\$48	-\$155	\$37	\$51	-\$161	\$61	-\$122	\$39
<i>Total number of revolving trades 30 days delinquent^a</i>	0	0	0	0	0	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0	0	0	0	0	0
<i>Total number of revolving trades 90–180 days delinquent^a</i>	0	0	0	0	0	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0	0	0	0	0	0

TABLE E.5 CONTINUED

Variable	Control mean	\$20 Rule										
		1	2.1	2.2	3.1	3.2	4	5.1	5.2	6	7.1	7.2
Total number of 30- to 180-day delinquencies in last two years	0.13	0.33	0.00	0.00	0.10	0.00	0.35	0.00	0.00	0.14	0.46	1.14
Difference		0.21	-0.13	-0.13	-0.03	-0.13	0.23	-0.13	-0.13	0.02	0.34	1.02***

Source: Postintervention credit record data.

Note: Asterisks indicate whether the treatment group mean is statistically different from the control group mean.

^aDenotes current delinquency at the time of reporting within the last six months.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE E.6

Postintervention Credit Data Treatment versus Control Means by Treatment Group, the 20 Percent Added Rule

Variable	Control mean	20% Rule										
		8	9.1	9.2	10.1	10.2	11	12.1	12.2	13	14.1	14.2
Sample size	1,728	871	434	429	433	434	868	436	435	864	433	434
FICO credit score	703.70	701.84	700.44	701.15	703.09	703.13	702.83	704.84	702.26	702.35	703.93	704.30
Difference		-1.87	-3.26	-2.55	-0.61	-0.57	-0.87	1.14	-1.44	-1.35	0.23	0.59
Number of inquiries within 12 months	2.08	1.87	1.90	2.17	1.88	1.77	2.01	1.97	2.03	2.06	1.88	1.79
Difference		-0.21**	-0.18	0.09	-0.20	-0.31**	-0.07	-0.11	-0.05	-0.02	-0.20	-0.29**
All trades												
Number of trades	19.92	19.72	19.87	20.53	19.79	19.68	20.36	19.63	19.78	20.11	20.34	19.40
Difference		-0.21	-0.05	0.61	-0.13	-0.24	0.44	-0.30	-0.15	0.19	0.42	-0.52
Number of trades with balance >0	6.26	6.29	6.31	6.53	6.22	6.43	6.43	6.12	6.28	6.33	6.34	6.07
Difference		0.03	0.05	0.27	-0.04	0.17	0.18	-0.14	0.02	0.07	0.08	-0.19
Aggregate balance for open trades	\$139,810	\$134,811	\$145,875	\$134,913	\$130,864	\$131,943	\$137,816	\$135,429	\$130,720	\$133,200	\$136,480	\$133,592
Difference		-\$4,998	\$6,065	-\$4,897	-\$8,946	-\$7,867	-\$1,994	-\$4,381	-\$9,090	-\$6,610	-\$3,330	-\$6,218

TABLE E.6 CONTINUED

Variable	Control mean	20% Rule										
		8	9.1	9.2	10.1	10.2	11	12.1	12.2	13	14.1	14.2
<i>Aggregate balance for open status trades</i>	\$140,270	\$135,315	\$146,474	\$135,226	\$131,231	\$132,432	\$138,389	\$135,872	\$131,173	\$133,613	\$137,324	\$134,044
Difference		-\$4,955	\$6,204	-\$5,044	-\$9,039	-\$7,838	-\$1,881	-\$4,398	-\$9,097	-\$6,657	-\$2,946	-\$6,226
<i>Aggregate credit for open trades</i>	\$176,966	\$172,038	\$182,197	\$172,164	\$168,537	\$161,809	\$173,553	\$170,322	\$168,645	\$168,214	\$172,821	\$170,183
Difference		-\$4,929	\$5,230	-\$4,802	-\$8,429	-\$15,156*	-\$3,414	-\$6,644	-\$8,321	-\$8,753	-\$4,145	-\$6,783
<i>Aggregate balance-to-credit ratio for open trades</i>	71.80	72.78	72.54	72.83	70.93	72.95	73.32	71.01	71.20	72.66	72.99	70.77
Difference		0.98	0.75	1.03	-0.86	1.16	1.52	-0.79	-0.60	0.86	1.20	-1.03
<i>Number of collection trades with balance ≥ \$200</i>	0.42	0.44	0.34	0.44	0.38	0.41	0.43	0.41	0.45	0.41	0.35	0.37
Difference		0.02	-0.08	0.03	-0.03	-0.01	0.01	0.00	0.03	0.00	-0.07	-0.05
<i>Aggregate balance in collections</i>	429.73	436.66	352.25	426.59	376.51	376.12	427.96	416.41	435.99	449.81	424.77	396.53
Difference		6.92	-77.48	-3.15	-53.22	-53.62	-1.77	-13.32	6.26	20.07	-4.96	-33.20
Revolving trades												
<i>Number of revolving trades</i>	10.55	10.36	10.55	10.58	10.51	10.00	10.57	10.24	10.55	10.40	10.77	10.25
Difference		-0.20	0.00	0.02	-0.04	-0.55	0.02	-0.31	-0.01	-0.16	0.22	-0.30
<i>Number of revolving trades with balance >0</i>	3.19	3.23	3.33	3.21	3.21	3.08	3.26	2.89	3.21	3.23	3.20	3.05
Difference		0.03	0.14	0.02	0.02	-0.11	0.07	-0.31**	0.02	0.04	0.01	-0.14
<i>Aggregate balance for open revolving trades</i>	\$10,109	\$10,181	\$11,392	\$9,595	\$9,970	\$9,799	\$10,059	\$8,994	\$9,697	\$9,812	\$10,889	\$8,844
Difference		\$72	\$1,282**	-\$514	-\$139	-\$310	-\$50	-\$1,115**	-\$412	-\$298	\$779	-\$1,266**
<i>Aggregate balance for open status revolving trades</i>	\$10,470	\$10,506	\$11,783	\$9,872	\$10,282	\$10,311	\$10,436	\$9,174	\$9,895	\$10,153	\$10,911	\$9,102
Difference		\$36	\$1,313**	-\$598	-\$188	-\$159	-\$33	-\$1,296**	-\$575	-\$317	\$441	-\$1,368**

TABLE E.6 CONTINUED

Variable	Control mean	20% Rule										
		8	9.1	9.2	10.1	10.2	11	12.1	12.2	13	14.1	14.2
<i>Aggregate credit for open revolving trades</i>	\$27,541	\$26,474	\$27,419	\$27,996	\$26,505	\$24,747	\$27,308	\$24,946	\$26,892	\$27,007	\$26,859	\$26,460
Difference		-\$1,067	-\$121	\$456	-\$1,035	-\$2,793**	-\$233	-\$2,595**	-\$648	-\$534	-\$682	-\$1,081
<i>Balance-to-credit ratio for open revolving trades</i>	45.79	45.88	49.28	46.09	46.05	47.68	44.73	43.46	41.99	44.15	47.39	44.72
Difference		0.09	3.49**	0.301	0.26	1.89	-1.06	-2.32	-3.80**	-1.64	1.60	-1.07
Balance transfers												
<i>Number of bankcards with balance transfer</i>	0.24	0.25	0.23	0.23	0.25	0.27	0.27	0.22	0.28	0.26	0.21	0.24
Difference		0.01	-0.01	-0.01	0.01	0.03	0.03	-0.023	0.04	0.02	-0.03	0.00
<i>Number of bankcard balance transfers within 0–6 months</i>	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.03
Difference		-0.01	-0.01	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	-0.01	0.00
<i>Number of bankcard balance transfers within 7–12 months</i>	0	0	0	0	0	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0	0	0	0	0	0
Late payments												
<i>Number of trades 30 days past due</i>	0	0	0	0	0	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0	0	0	0	0	0
<i>Number of trades 90+ days past due</i>	0.03	0.04	0.03	0.02	0.02	0.05	0.02	0.02	0.02	0.03	0.04	0.01
Difference		0.01	-0.005	-0.01	-0.01	0.02	-0.01	-0.01	-0.01	0.00	0.01	-0.02

TABLE E.6 CONTINUED

Variable	Control mean	20% Rule										
		8	9.1	9.2	10.1	10.2	11	12.1	12.2	13	14.1	14.2
Total balance on trades 30 days delinquent ^a	\$452	\$657	\$398	\$61	\$407	\$151	\$302	\$608	\$23	\$188	\$49	\$904
Difference		\$205	-\$53	-\$391	-\$45	-\$301	-\$150	\$156	-\$428*	-\$264	-\$403	\$453
Total balance on trades 90–180 days delinquent ^a	\$228	\$147	\$116	\$142	\$271	\$275	\$192	\$163	\$195	\$177	\$280	\$229
Difference		-\$80	-\$111	-\$85	\$44	\$47	-\$36	-\$65	-\$32	-\$51	\$52	\$1
Total number of revolving trades 30 days delinquent ^a	0	0	0	0	0	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0	0	0	0	0	0
Total number of revolving trades 90–180 days delinquent ^a	0	0	0	0	0	0	0	0	0	0	0	0
Difference		0	0	0	0	0	0	0	0	0	0	0
Total number of 30- to 180-day delinquencies in last two years	0.13	0.14	0.00	0.63	0.29	1.00	0.21	0.44	0.25	0.00	0.33	0.09
Difference		0.02	-0.13	0.50*	0.16	0.88***	0.08	0.32	0.13	-0.13	0.21	-0.03

Source: Postintervention credit record data.

Note: Asterisks indicate whether the treatment group mean is statistically different from the control group mean.

^aDenotes current delinquency at the time of reporting within the last six months.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Appendix F. Outcomes by Treatment Group

TABLE F.1

Arizona Federal Credit Card Debt

Treatment group	Credit card balance	Credit card interest accrued	Any balance revolved
T1: \$20 rule, online	-183.2** (81.58)	-0.787 (0.668)	0.000 (0.010)
T2: \$20 rule, online e-mail1	-140.3 (105.0)	-0.774 (0.865)	0.006 (0.012)
T3: \$20 rule, online e-mail2	-141.5 (118.0)	-0.832 (1.024)	0.012 (0.012)
T4: \$20 rule, online e-mail1 mailer	-53.39 (104.9)	-0.582 (0.872)	0.011 (0.013)
T5: \$20 rule, online e-mail2 mailer	-130.1 (110.6)	-0.969 (0.818)	-0.014 (0.014)
T6: \$20 rule, online mailer	-15.83 (83.14)	-0.032 (0.643)	0.008 (0.010)
T7: \$20 rule, e-mail1 mailer	-195.2* (103.4)	-0.919 (0.775)	0.012 (0.012)
T8: \$20 rule, e-mail2 mailer	-125.2 (107.7)	-0.934 (0.756)	0.004 (0.013)
T9: \$20 rule, mailer	-94.55 (78.81)	-1.084* (0.639)	0.009 (0.010)
T10: \$20 rule, e-mail1	-192.9* (108.5)	-1.274 (0.821)	0.006 (0.014)
T11: \$20 rule, e-mail2	114.6 (98.45)	0.361 (0.815)	-0.001 (0.013)
T12: 20% rule, online	-74.28 (79.59)	-0.595 (0.663)	0.012 (0.010)
T13: 20% rule, online e-mail1	7.496 (90.27)	0.169 (0.715)	0.001 (0.012)
T14: 20% rule, online e-mail2	-19.29 (99.48)	-0.596 (0.805)	0.008 (0.012)
T15: 20% rule, online e-mail1 mailer	65.29 (96.24)	0.664 (0.859)	0.017 (0.012)
T16: 20% rule, online e-mail2 mailer	-126.0 (121.0)	-0.348 (0.868)	-0.001 (0.013)
T17: 20% rule, online mailer	29.77 (75.95)	-0.131 (0.659)	0.002 (0.010)
T18: 20% rule, e-mail1 mailer	-98.98 (106.5)	-1.368* (0.825)	-0.010 (0.013)
T19: 20% rule, e-mail2 mailer	46.06 (95.66)	0.287 (0.789)	-0.007 (0.013)

TABLE F.1 CONTINUED

Treatment group	Credit card balance	Credit card interest accrued	Any balance revolved
T20: 20% rule, mailer	-140.8* (83.42)	-0.595 (0.671)	0.006 (0.010)
T21: 20% rule, e-mail1	-102.0 (94.38)	-0.344 (0.733)	-0.013 (0.014)
T22: 20% rule, e-mail2	-204.7* (104.8)	-0.758 (0.877)	-0.007 (0.014)
Number of participants	12,322	13,957	13,957

Source: Arizona Federal Credit Union administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE F.2

Purchases with Arizona Federal Credit Card

Treatment group	Credit card purchase amount	Number of credit card purchases	Number of credit card purchases under \$20	Percent of credit card purchases under \$20
T1: \$20 rule, online	-6.738 (13.61)	-0.225 (0.197)	-0.075 (0.103)	-0.007 (0.009)
T2: \$20 rule, online e-mail1	18.47 (15.89)	-0.285 (0.223)	-0.155 (0.106)	-0.017 (0.012)
T3: \$20 rule, online e-mail2	1.997 (16.66)	-0.011 (0.250)	0.034 (0.129)	-0.017 (0.013)
T4: \$20 rule, online e-mail1 mailer	19.52 (18.80)	-0.055 (0.232)	0.012 (0.112)	-0.008 (0.012)
T5: \$20 rule, online e-mail2 mailer	5.782 (18.14)	-0.093 (0.226)	-0.092 (0.104)	-0.011 (0.012)
T6: \$20 rule, online mailer	-7.299 (12.79)	-0.413** (0.180)	-0.169** (0.086)	-0.008 (0.009)
T7: \$20 rule, e-mail1 mailer	-16.96 (16.57)	-0.325 (0.219)	-0.147 (0.103)	-0.006 (0.012)
T8: \$20 rule, e-mail2 mailer	7.693 (20.64)	-0.192 (0.222)	-0.066 (0.104)	-0.018 (0.011)
T9: \$20 rule, mailer	16.18 (13.13)	0.181 (0.182)	0.040 (0.096)	-0.014 (0.009)
T10: \$20 rule, e-mail1	-15.50 (17.47)	0.051 (0.203)	0.079 (0.101)	0.010 (0.011)
T11: \$20 rule, e-mail2	1.812 (16.69)	-0.504* (0.258)	-0.244* (0.128)	0.002 (0.012)
T12: 20% rule, online	7.557 (13.39)	-0.230 (0.180)	-0.113 (0.092)	0.004 (0.009)
T13: 20% rule, online e-mail1	-2.701 (16.55)	-0.114 (0.233)	0.001 (0.113)	0.005 (0.011)

TABLE F.2 CONTINUED

Treatment group	Credit card purchase amount	Number of credit card purchases	Number of credit card purchases under \$20	Percent of credit card purchases under \$20
T14: 20% rule, online e-mail2	7.268 (16.76)	0.051 (0.236)	0.031 (0.107)	-0.006 (0.012)
T15: 20% rule, online e-mail1 mailer	28.03* (15.63)	-0.127 (0.232)	-0.170 (0.123)	-0.034*** (0.012)
T16: 20% rule, online e-mail2 mailer	12.42 (19.41)	-0.195 (0.215)	-0.067 (0.107)	0.005 (0.012)
T17: 20% rule, online mailer	-23.55* (13.03)	-0.087 (0.174)	-0.020 (0.092)	0.000 (0.009)
T18: 20% rule, e-mail1 mailer	-6.843 (16.83)	-0.172 (0.243)	-0.076 (0.127)	0.019 (0.013)
T19: 20% rule, e-mail2 mailer	17.36 (17.32)	0.159 (0.231)	-0.042 (0.126)	-0.002 (0.012)
T20: 20% rule, mailer	-1.849 (14.13)	-0.228 (0.191)	-0.116 (0.092)	-0.014 (0.009)
T21: 20% rule, e-mail1	20.09 (17.97)	0.095 (0.245)	-0.015 (0.112)	0.002 (0.012)
T22: 20% rule, e-mail2	-7.534 (17.44)	-0.150 (0.224)	0.010 (0.103)	0.008 (0.012)
Number of participants	12,322	13,658	13,664	11,573

Source: Arizona Federal Credit Union administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE F.3

Payments on Arizona Federal Account

Treatment group	Number of credit card payments	Credit card payment amount	Percent of credit card balance paid	Ever paid credit card late
T1: \$20 rule, online	-0.069*** (0.022)	-15.03 (26.03)	-0.072 (0.086)	-0.001 (0.003)
T2: \$20 rule, online e-mail1	-0.041 (0.027)	7.614 (28.54)	-0.098 (0.087)	0.001 (0.004)
T3: \$20 rule, online e-mail2	-0.007 (0.027)	-8.533 (40.03)	-0.125 (0.085)	-0.007 (0.005)
T4: \$20 rule, online e-mail1 mailer	-0.005 (0.025)	15.44 (29.90)	-0.043 (0.104)	0.002 (0.004)
T5: \$20 rule, online e-mail2 mailer	-0.037 (0.029)	-34.20 (32.62)	8.505 (8.248)	-0.006 (0.004)
T6: \$20 rule, online mailer	-0.016 (0.020)	-18.60 (23.95)	0.616 (0.739)	-0.003 (0.003)

TABLE F.3 CONTINUED

Treatment group	Credit card purchase amount	Number of credit card purchases	Number of credit card purchases under \$20	Percent of credit card purchases under \$20
T7: \$20 rule, e-mail1 mailer	-0.026 (0.026)	-19.56 (31.50)	-0.106 (0.093)	0.000 (0.005)
T8: \$20 rule, e-mail2 mailer	-0.008 (0.026)	4.241 (32.13)	2.590 (2.649)	-0.005 (0.004)
T9: \$20 rule, mailer	-0.006 (0.021)	0.953 (23.34)	-0.090 (0.084)	-0.002 (0.003)
T10: \$20 rule, e-mail1	-0.011 (0.027)	-76.69** (36.40)	-0.114 (0.088)	-0.002 (0.005)
T11: \$20 rule, e-mail2	-0.037 (0.028)	-3.104 (29.98)	0.321 (0.373)	-0.002 (0.005)
T12: 20% rule, online	-0.010 (0.021)	-8.161 (22.93)	-0.081 (0.091)	-0.002 (0.003)
T13: 20% rule, online e-mail1	-0.018 (0.026)	-26.37 (42.39)	-0.034 (0.126)	-0.004 (0.004)
T14: 20% rule, online e-mail2	0.022 (0.026)	-10.95 (27.91)	-0.007 (0.110)	-0.005 (0.005)
T15: 20% rule, online e-mail1 mailer	-0.005 (0.026)	57.66 (35.39)	0.150 (0.226)	0.002 (0.004)
T16: 20% rule, online e-mail2 mailer	-0.018 (0.023)	31.05 (28.87)	-0.106 (0.085)	-0.014*** (0.005)
T17: 20% rule, online mailer	-0.038* (0.022)	-38.31* (22.91)	-0.018 (0.123)	0.004 (0.003)
T18: 20% rule, e-mail1 mailer	-0.038 (0.025)	-50.98 (36.52)	0.363 (0.381)	0.000 (0.004)
T19: 20% rule, e-mail2 mailer	0.003 (0.028)	-23.44 (32.89)	0.098 (0.155)	-0.006 (0.004)
T20: 20% rule, mailer	-0.015 (0.020)	5.179 (26.80)	-0.059 (0.103)	0.000 (0.003)
T21: 20% rule, e-mail1	-0.048* (0.025)	-11.17 (28.14)	0.222 (0.346)	-0.005 (0.004)
T22: 20% rule, e-mail2	0.040 (0.027)	67.21** (33.43)	0.573 (0.661)	0.002 (0.004)
Number of participants	13,556	12,322	13,243	13,957

Source: Arizona Federal Credit Union administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

** $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE F.4

Arizona Federal Checking and Savings Accounts, Part I

Treatment group	Total savings	Savings less credit card balance	Number of deposits	Sum of deposits	Number of withdrawals
T1: \$20 rule, online	-128.5 (84.32)	151.5 (198.5)	-0.169* (0.0932)	-112.3 (90.00)	0.0328 (0.540)
T2: \$20 rule, online e-mail1	-35.52 (104.0)	-169.9 (249.4)	0.0455 (0.117)	-118.7 (122.3)	0.0485 (0.619)
T3: \$20 rule, online e-mail2	-182.5 (118.0)	71.21 (247.4)	0.0552 (0.131)	66.19 (126.2)	-0.214 (0.625)
T4: \$20 rule, online e-mail1 mailer	-22.14 (109.6)	-70.14 (232.0)	-0.112 (0.129)	34.38 (131.7)	-0.507 (0.622)
T5: \$20 rule, online e-mail2 mailer	-121.6 (105.4)	196.7 (257.3)	-0.0289 (0.124)	-212.1 (134.2)	0.144 (0.692)
T6: \$20 rule, online mailer	-20.92 (82.43)	-149.6 (190.0)	-0.0250 (0.0901)	-62.49 (95.59)	-0.549 (0.485)
T7: \$20 rule, e-mail1 mailer	-145.3 (100.1)	160.8 (263.1)	-0.0369 (0.118)	44.84 (135.7)	-0.357 (0.568)
T8: \$20 rule, e-mail2 mailer	-176.3 (110.5)	211.4 (263.0)	-0.0153 (0.125)	4.222 (131.4)	0.336 (0.683)
T9: \$20 rule, mailer	-115.0 (81.65)	251.8 (208.3)	-0.211** (0.0921)	-71.17 (108.1)	-0.598 (0.553)
T10: \$20 rule, e-mail1	-166.2 (109.1)	276.1 (251.5)	0.00725 (0.111)	-29.56 (129.8)	-0.551 (0.628)
T11: \$20 rule, e-mail2	95.43 (96.81)	-272.9 (285.8)	0.129 (0.126)	-55.99 (127.5)	-0.454 (0.719)
T12: 20% rule, online	-34.77 (80.23)	-187.7 (212.4)	-0.105 (0.0970)	-186.3* (97.50)	-0.554 (0.545)
T13: 20% rule, online e-mail1	28.06 (92.25)	-248.1 (201.7)	-0.147 (0.127)	-7.426 (120.1)	0.928 (0.697)
T14: 20% rule, online e-mail2	-67.34 (95.54)	249.1 (273.0)	-0.0508 (0.119)	28.36 (137.8)	0.354 (0.679)
T15: 20% rule, online e-mail1 mailer	214.0** (105.8)	-156.6 (249.9)	-0.0139 (0.113)	18.52 (112.0)	0.508 (0.613)
T16: 20% rule, online e-mail2 mailer	-47.01 (110.7)	-731.8*** (273.1)	-0.0427 (0.124)	-49.35 (115.3)	0.828 (0.658)
T17: 20% rule, online mailer	64.95 (77.83)	103.1 (191.2)	-0.128 (0.0961)	-99.06 (107.3)	-0.823 (0.528)
T18: 20% rule, e-mail1 mailer	-118.4 (108.0)	-206.2 (315.4)	-0.0893 (0.122)	-113.1 (139.3)	0.631 (0.688)
T19: 20% rule, e-mail2 mailer	55.16 (106.6)	-217.1 (271.2)	-0.213 (0.133)	-191.6* (114.0)	-0.413 (0.731)
T20: 20% rule, mailer	-98.88 (86.77)	213.3 (203.9)	-0.0116 (0.0930)	-5.495 (102.2)	0.0762 (0.508)
T21: 20% rule, e-mail1	19.58 (93.32)	-208.4 (268.1)	0.0726 (0.118)	-50.44 (123.4)	0.729 (0.674)
T22: 20% rule, e-mail2	-172.3 (114.9)	337.4 (278.3)	-0.0259 (0.119)	37.38 (127.9)	1.067* (0.639)
Number of participants	13,564	13,098	13,527	13,219	13,596

Source: Arizona Federal Credit Union administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE F.5

Arizona Federal Checking and Savings Accounts, Part II

Treatment group	Sum of withdrawals	Number of debit card transactions	Sum of debit card transactions	Number of debit card transactions under \$20
T1: \$20 rule, online	-139.5 (86.22)	0.00850 (0.487)	6.084 (21.49)	0.329 (0.268)
T2: \$20 rule, online e-mail1	-91.36 (108.4)	-0.382 (0.582)	-21.10 (27.09)	-0.152 (0.351)
T3: \$20 rule, online e-mail2	10.65 (108.9)	-0.559 (0.596)	-2.623 (28.81)	-0.610* (0.361)
T4: \$20 rule, online e-mail1 mailer	-30.82 (122.0)	-0.815 (0.556)	-12.91 (28.98)	-0.763** (0.348)
T5: \$20 rule, online e-mail2 mailer	-95.97 (121.2)	0.439 (0.589)	1.380 (27.32)	0.278 (0.344)
T6: \$20 rule, online mailer	-27.11 (88.48)	-0.464 (0.437)	-17.53 (20.90)	-0.207 (0.268)
T7: \$20 rule, e-mail1 mailer	40.91 (110.1)	-0.531 (0.510)	6.053 (23.81)	-0.421 (0.333)
T8: \$20 rule, e-mail2 mailer	155.1 (115.5)	0.155 (0.625)	19.40 (27.43)	-0.274 (0.398)
T9: \$20 rule, mailer	-83.93 (99.60)	-0.301 (0.502)	-5.347 (22.85)	-0.0818 (0.310)
T10: \$20 rule, e-mail1	-80.37 (103.5)	-0.597 (0.584)	-34.09 (28.53)	-0.420 (0.369)
T11: \$20 rule, e-mail2	93.55 (116.8)	-0.670 (0.640)	-55.82* (31.10)	-0.350 (0.361)
T12: 20% rule, online	-123.3 (88.89)	-0.638 (0.492)	-10.69 (21.49)	-0.388 (0.301)
T13: 20% rule, online e-mail1	18.15 (108.1)	0.861 (0.633)	6.200 (28.30)	0.594* (0.361)
T14: 20% rule, online e-mail2	-57.93 (110.7)	0.0956 (0.587)	-9.420 (28.50)	-0.118 (0.361)
T15: 20% rule, online e-mail1 mailer	-46.46 (109.5)	0.229 (0.572)	11.62 (27.58)	0.0242 (0.353)
T16: 20% rule, online e-mail2 mailer	10.48 (110.7)	0.715 (0.613)	20.14 (27.58)	0.372 (0.378)
T17: 20% rule, online mailer	-108.4 (92.76)	-0.522 (0.470)	-22.24 (22.10)	-0.166 (0.279)
T18: 20% rule, e-mail1 mailer	-73.70 (127.9)	0.599 (0.603)	-13.34 (27.22)	0.296 (0.378)
T19: 20% rule, e-mail2 mailer	-158.4 (108.7)	-0.0862 (0.629)	-21.07 (29.92)	-0.0638 (0.380)
T20: 20% rule, mailer	-44.84 (93.59)	0.0333 (0.457)	-24.63 (21.68)	0.0606 (0.275)
T21: 20% rule, e-mail1	-86.99 (115.1)	0.585 (0.613)	9.025 (28.61)	0.523 (0.380)

TABLE F.5 CONTINUED

Treatment group	Sum of withdrawals	Number of debit card transactions	Sum of debit card transactions	Number of debit card transactions under \$20
T22: 20% rule, e-mail2	28.44 (112.5)	0.900 (0.581)	29.00 (27.63)	0.591 (0.361)
Number of participants	13,262	13,596	12,730	13,633

Source: Arizona Federal Credit Union administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE F.6

Aggregate Debt and Credit, Part I

Treatment group	Aggregate balance for open revolving trades	Number of collection trades with balance ≥\$200	Aggregate balance in collections
T1: \$20 rule, online	-195.8 (242.6)	0.004 (0.022)	30.63 (52.01)
T2: \$20 rule, online e-mail1	-303.2 (310.7)	-0.006 (0.022)	-27.73 (50.65)
T3: \$20 rule, online e-mail2	-68.21 (313.6)	0.022 (0.030)	-106.8 (77.46)
T4: \$20 rule, online e-mail1 mailer	283.8 (288.3)	-0.042 (0.032)	7.008 (50.12)
T5: \$20 rule, online e-mail2 mailer	-34.32 (321.9)	0.028 (0.028)	21.25 (60.20)
T6: \$20 rule, online mailer	-403.1 (253.9)	0.031 (0.021)	36.01 (43.41)
T7: \$20 rule, e-mail1 mailer	-211.9 (295.6)	-0.006 (0.033)	-78.24 (95.45)
T8: \$20 rule, e-mail2 mailer	-333.8 (323.1)	0.001 (0.024)	46.10 (57.12)
T9: \$20 rule, mailer	56.73 (244.1)	0.033 (0.025)	58.34 (61.27)
T10: \$20 rule, e-mail1	-45.43 (290.7)	-0.037 (0.031)	-100.0 (66.98)
T11: \$20 rule, e-mail2	-229.7 (324.4)	-0.022 (0.029)	-51.67 (50.47)
T12: 20% rule, online	-82.98 (246.5)	-0.023 (0.022)	36.42 (53.85)
T13: 20% rule, online e-mail1	234.6 (330.7)	-0.009 (0.028)	3.463 (72.01)
T14: 20% rule, online e-mail2	-16.61 (283.4)	-0.028 (0.031)	21.90 (51.24)
T15: 20% rule, online e-mail1 mailer	-90.72 (314.9)	0.036 (0.029)	-1.520 (48.62)

TABLE F.6 CONTINUED

Treatment group	Aggregate balance for open revolving trades	Number of collection trades with balance ≥\$200	Aggregate balance in collections
T16: 20% rule, online e-mail2 mailer	26.96 (278.6)	0.042 (0.029)	56.63 (64.15)
T17: 20% rule, online mailer	10.64 (258.6)	-0.015 (0.024)	-67.21 (48.22)
T18: 20% rule, e-mail1 mailer	-138.7 (304.3)	-0.002 (0.029)	-30.23 (50.66)
T19: 20% rule, e-mail2 mailer	-60.96 (351.6)	0.052 (0.034)	27.46 (65.95)
T20: 20% rule, mailer	-436.2* (234.2)	-0.024 (0.024)	-29.87 (58.33)
T21: 20% rule, e-mail1	328.3 (299.5)	0.017 (0.031)	-54.50 (82.79)
T22: 20% rule, e-mail2	-314.4 (292.6)	-0.046 (0.033)	-75.34 (67.91)
Number of participants	13,782	13,758	13,777

Sources: Pre- and postintervention credit record data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE F.7

Aggregate Debt and Credit, Part II

Treatment group	Aggregate credit for open revolving trades	Balance-to-credit ratio for open revolving trades	Number of inquiries within 12 months	FICO credit score
T1: \$20 rule, online	-670.3** (285.3)	0.052 (0.980)	-0.138 (0.108)	-0.136 (1.656)
T2: \$20 rule, online e-mail1	-175.0 (377.2)	-0.491 (1.262)	-0.110 (0.146)	-0.578 (2.210)
T3: \$20 rule, online e-mail2	-958.0** (406.1)	1.570 (1.171)	-0.179 (0.147)	-1.291 (2.141)
T4: \$20 rule, online e-mail1 mailer	-509.5 (359.1)	1.393 (1.294)	-0.008 (0.143)	0.449 (2.104)
T5: \$20 rule, online e-mail2 mailer	-376.8 (418.1)	0.159 (1.231)	-0.150 (0.149)	0.0844 (2.030)
T6: \$20 rule, online mailer	-606.8** (308.5)	0.056 (0.960)	0.023 (0.107)	-2.130 (1.682)
T7: \$20 rule, e-mail1 mailer	-750.3** (350.5)	0.816 (1.148)	-0.103 (0.137)	-2.279 (2.099)
T8: \$20 rule, e-mail2 mailer	-511.0 (412.9)	-1.454 (1.300)	0.092 (0.144)	-0.887 (2.169)
T9: \$20 rule, mailer	-542.8* (311.3)	1.306 (0.979)	-0.085 (0.115)	-3.432** (1.694)

TABLE F.7 CONTINUED

Treatment group	Aggregate credit for open revolving trades	Balance-to-credit ratio for open revolving trades	Number of inquiries within 12 months	FICO credit score
T10: \$20 rule, e-mail1	-651.5* (351.9)	0.280 (1.300)	-0.219 (0.142)	-0.616 (2.101)
T11: \$20 rule, e-mail2	-767.4* (401.1)	0.321 (1.274)	0.0127 (0.135)	-3.882* (2.160)
T12: 20% rule, online	-766.0** (300.3)	0.529 (1.044)	-0.316*** (0.111)	-1.387 (1.703)
T13: 20% rule, online e-mail1	-1,227*** (417.2)	1.804 (1.171)	-0.273** (0.132)	-0.870 (2.034)
T14: 20% rule, online e-mail2	-90.91 (373.9)	-1.781 (1.246)	-0.171 (0.151)	1.095 (2.246)
T15: 20% rule, online e-mail1 mailer	-988.4*** (355.5)	1.005 (1.236)	-0.216 (0.146)	-0.625 (2.228)
T16: 20% rule, online e-mail2 mailer	-571.7 (367.0)	2.231* (1.237)	-0.328** (0.141)	-0.890 (2.188)
T17: 20% rule, online mailer	-800.2** (324.3)	-0.0575 (1.011)	-0.275** (0.113)	-1.242 (1.669)
T18: 20% rule, e-mail1 mailer	-786.2* (434.1)	-1.841 (1.375)	-0.226 (0.140)	1.608 (2.327)
T19: 20% rule, e-mail2 mailer	-638.8* (386.3)	-0.463 (1.190)	-0.048 (0.140)	0.355 (2.091)
T20: 20% rule, mailer	-60.08 (295.9)	-0.167 (0.993)	-0.147 (0.106)	-1.425 (1.620)
T21: 20% rule, e-mail1	-1,213*** (427.5)	2.215* (1.173)	-0.205 (0.153)	-0.847 (1.986)
T22: 20% rule, e-mail2	-743.7** (368.7)	-0.037 (1.294)	-0.039 (0.140)	-1.316 (2.163)
Number of participants	13,790	13,709	13,738	13,616

Sources: Pre- and postintervention credit record data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Appendix G. Outcomes by Rule, Month by Month

TABLE G.1

Arizona Federal Credit Card Balance by Rule, Month by Month

	Credit Card Balance		Interest Accrued		Any Balance Revolved	
	\$20 rule	20% rule	\$20 rule	20% rule	\$20 rule	20% rule
July 2014	-5.854 (29.26)	18.43 (29.52)	-0.119 (0.222)	-0.104 (0.223)	0.005 (0.009)	0.008 (0.009)
August 2014	-21.23 (39.90)	5.039 (40.82)	-0.392 (0.346)	-0.0762 (0.345)	0.008 (0.010)	0.010 (0.010)
September 2014	-48.37 (48.89)	3.634 (48.61)	-0.342 (0.411)	0.0583 (0.408)	-0.004 (0.010)	-0.002 (0.010)
October 2014	-92.30* (54.23)	-35.31 (53.70)	-0.460 (0.458)	-0.0195 (0.451)	-0.002 (0.010)	0.007 (0.010)
November 2014	-61.67 (58.75)	-25.04 (58.63)	-0.423 (0.487)	0.120 (0.480)	0.007 (0.011)	0.018* (0.011)
December 2014	-78.71 (61.67)	-9.696 (61.55)	-0.641 (0.512)	0.0464 (0.507)	-0.002 (0.011)	0.008 (0.011)
January 2015	-98.52 (66.95)	-24.55 (67.08)	-0.786 (0.557)	-0.0682 (0.553)	0.012 (0.011)	0.019* (0.011)
February 2015	-105.6 (72.15)	-35.40 (72.10)	-0.615 (0.597)	0.0672 (0.596)	0.007 (0.011)	0.009 (0.011)
March 2015	-140.7* (75.35)	-48.71 (74.90)	-0.739 (0.603)	-0.0430 (0.602)	0.005 (0.012)	0.001 (0.012)
April 2015	-186.0** (79.85)	-109.1 (79.09)	-1.433** (0.636)	-0.730 (0.636)	0.009 (0.012)	0.007 (0.012)
May 2015	-189.6** (81.71)	-98.99 (80.76)	-1.374** (0.651)	-0.890 (0.653)	0.010 (0.012)	0.007 (0.012)
June 2015	-198.8** (85.92)	-115.9 (85.11)	-1.307* (0.697)	-0.883 (0.699)	0.012 (0.012)	0.010 (0.012)
Number of participants	12,322	12,322	13,957	13,957	13,957	13,957

Source: Arizona Federal Credit Union administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE G.2

Purchases with Arizona Federal Credit Card by Rule, Month by Month

	Credit Card Purchase Amount		Number of Credit Card Purchases		Number of Credit Card Purchases under \$20		Percent of Credit Card Purchases under \$20	
	\$20 rule	20% rule	\$20 rule	20% rule	\$20 rule	20% rule	\$20 rule	20% rule
July 2014	-2.511 (16.23)	15.21 (16.41)	0.097 (0.169)	0.167 (0.170)	0.118 (0.091)	0.059 (0.092)	-0.007 (0.011)	-0.007 (0.011)
August 2014	-11.27 (17.29)	-1.830 (17.42)	0.397** (0.191)	0.324* (0.192)	0.182* (0.102)	0.064 (0.102)	0.009 (0.012)	0.012 (0.012)
September 2014	-16.43 (17.01)	-1.886 (17.18)	0.238 (0.192)	0.151 (0.194)	0.134 (0.102)	0.072 (0.104)	0.013 (0.012)	0.021* (0.012)
October 2014	-0.366 (17.86)	4.743 (17.80)	0.035 (0.198)	0.046 (0.199)	-0.046 (0.104)	-0.100 (0.105)	-0.002 (0.012)	0.003 (0.012)
November 2014	18.71 (17.47)	16.56 (17.37)	0.225 (0.198)	0.167 (0.199)	0.079 (0.108)	0.007 (0.109)	0.001 (0.012)	0.006 (0.012)
December 2014	20.38 (18.66)	25.80 (18.61)	0.212 (0.223)	0.179 (0.223)	0.053 (0.111)	0.007 (0.112)	-0.002 (0.012)	0.011 (0.012)
January 2015	-3.145 (18.69)	6.848 (18.64)	-0.005 (0.224)	0.043 (0.226)	0.090 (0.109)	0.0234 (0.110)	-0.001 (0.013)	0.007 (0.013)
February 2015	2.230 (17.68)	5.664 (17.69)	-0.116 (0.215)	-0.177 (0.215)	-0.007 (0.112)	-0.084 (0.112)	-0.014 (0.013)	0.000 (0.013)
March 2015	0.394 (18.06)	3.467 (17.98)	0.0124 (0.210)	-0.024 (0.211)	0.0635 (0.111)	-0.030 (0.111)	-0.007 (0.013)	0.004 (0.013)
April 2015	-7.035 (18.67)	-9.469 (18.56)	-0.328 (0.223)	-0.281 (0.225)	-0.125 (0.119)	-0.202* (0.120)	-0.006 (0.013)	0.000 (0.013)
May 2015	-14.95 (18.97)	2.274 (19.04)	-0.007 (0.215)	0.164 (0.217)	-0.051 (0.113)	-0.030 (0.114)	0.000 (0.013)	0.005 (0.013)
June 2015	1.378 (20.99)	19.86 (21.06)	0.223 (0.213)	0.323 (0.214)	0.027 (0.113)	0.024 (0.113)	-0.015 (0.013)	0.002 (0.013)
Number of participants	12,322	12,322	13,658	13,658	13,664	13,664	11,573	11,573

Source: Arizona Federal Credit Union administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE G.3

Payments on Arizona Federal Account by Rule, Month by Month

	Number of credit card payments		Credit card payment amount		Percent of credit card balance paid		Ever paid credit card late	
	\$20 rule	20% rule	\$20 rule	20% rule	\$20 rule	20% rule	\$20 rule	20% rule
July 2014	-0.017 (0.026)	-0.010 (0.026)	-33.96 (35.09)	-21.58 (36.01)	0.003 (0.026)	0.002 (0.024)	-0.004 (0.004)	-0.005 (0.004)
August 2014	0.018 (0.027)	0.009 (0.027)	-26.81 (37.30)	-16.07 (38.24)	-0.004 (0.027)	-0.003 (0.025)	-0.007* (0.004)	-0.004 (0.004)
September 2014	0.028 (0.026)	0.013 (0.026)	-19.31 (36.00)	-46.03 (35.42)	0.010 (0.028)	0.010 (0.025)	-0.007 (0.004)	-0.006 (0.004)

TABLE G.3 CONTINUED

	Number of credit card payments		Credit card payment amount		Percent of credit card balance paid		Ever paid credit card late	
	\$20 rule	20% rule	\$20 rule	20% rule	\$20 rule	20% rule	\$20 rule	20% rule
October 2014	0.001 (0.028)	0.004 (0.027)	-0.586 (33.38)	2.390 (33.62)	-0.014 (0.032)	-0.023 (0.030)	-0.002 (0.004)	0.002 (0.004)
November 2014	-0.009 (0.028)	-0.007 (0.027)	-52.02 (38.35)	-41.47 (39.02)	-0.023 (0.037)	-0.014 (0.033)	-0.001 (0.004)	0.001 (0.004)
December 2014	-0.012 (0.031)	-0.036 (0.031)	-35.98 (34.75)	-67.35* (34.54)	0.064 (0.067)	-0.006 (0.030)	-0.007** (0.003)	-0.005 (0.003)
January 2015	-0.043 (0.030)	-0.041 (0.030)	-8.960 (34.53)	-4.737 (35.18)	0.014 (0.034)	-0.003 (0.029)	-0.001 (0.004)	0.002 (0.004)
February 2015	-0.016 (0.029)	0.013 (0.029)	-55.81 (41.53)	-34.50 (43.11)	0.083 (0.067)	0.015 (0.029)	-0.007 (0.004)	-0.004 (0.004)
March 2015	-0.005 (0.029)	-0.003 (0.029)	-17.31 (36.38)	-20.99 (36.28)	0.063 (0.069)	0.002 (0.033)	-0.003 (0.004)	-0.005 (0.004)
April 2015	-0.026 (0.030)	-0.006 (0.030)	4.657 (40.92)	25.74 (41.84)	-0.036 (0.039)	-0.004 (0.038)	-0.005 (0.004)	-0.002 (0.004)
May 2015	-0.050 (0.031)	-0.049 (0.031)	-80.74* (42.57)	-47.22 (43.51)	0.026 (0.035)	0.040 (0.034)	-0.006 (0.004)	-0.006 (0.004)
June 2015	-0.001 (0.030)	0.038 (0.030)	-51.20 (40.24)	-19.03 (40.76)	5.813 (4.535)	0.390 (0.733)	-0.010** (0.005)	-0.009* (0.005)
Number of participants	13,556	13,556	12,322	12,322	13,243	13,243	13,957	13,957

Source: Arizona Federal Credit Union administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE G.4

Arizona Federal Checking and Savings Accounts by Rule, Month by Month, Part I

	Total Savings on Accounts Held		Savings Less Credit Card Balance		Number of Deposits		Sum of Deposits	
	\$20 rule	20% rule	\$20 rule	20% rule	\$20 rule	20% rule	\$20 rule	20% rule
July 2014	8.615 (86.23)	12.28 (83.91)	62.67 (93.17)	46.94 (90.97)	0.0154 (0.103)	0.086 (0.103)	42.16 (122.8)	-23.28 (123.0)
August 2014	145.4 (99.41)	112.5 (97.84)	234.8** (110.8)	154.3 (108.9)	0.0180 (0.106)	0.0607 (0.106)	167.0 (122.5)	70.38 (121.4)
September 2014	106.9 (114.1)	214.0* (117.8)	228.9* (127.5)	278.6** (130.4)	-0.0373 (0.106)	0.0455 (0.106)	3.610 (127.1)	14.45 (127.1)
October 2014	267.3** (122.9)	362.9*** (126.3)	361.0*** (137.2)	449.9*** (140.5)	-0.103 (0.116)	-0.045 (0.115)	-5.853 (133.0)	27.64 (134.0)
November 2014	267.3** (125.3)	308.3** (124.2)	375.2*** (142.1)	354.9** (141.1)	-0.132 (0.112)	-0.083 (0.112)	-97.06 (135.0)	-123.9 (134.6)
December 2014	140.5 (141.8)	174.0 (142.9)	345.2** (159.6)	291.7* (160.5)	-0.169 (0.118)	-0.099 (0.119)	64.35 (122.7)	35.22 (124.4)
January 2015	168.3 (154.2)	98.59 (153.4)	331.7* (175.5)	183.1 (174.7)	-0.0850 (0.118)	-0.029 (0.119)	-55.91 (139.3)	-68.38 (140.2)

TABLE G.4 CONTINUED

	Total Savings on Accounts Held		Savings Less Credit Card Balance		Number of Deposits		Sum of Deposits	
	\$20 rule	20% rule	\$20 rule	20% rule	\$20 rule	\$20 rule	20% rule	\$20 rule
February 2015	127.3 (169.9)	37.77 (169.6)	317.0* (190.9)	104.7 (190.2)	-0.0355 (0.116)	-0.016 (0.116)	-42.34 (147.1)	-106.3 (146.2)
March 2015	74.84 (149.1)	119.8 (150.7)	311.4* (173.9)	234.6 (174.7)	-0.185 (0.124)	-0.155 (0.124)	-13.10 (146.6)	48.32 (147.4)
April 2015	29.88 (168.4)	26.99 (168.6)	233.1 (193.4)	87.51 (192.7)	-0.070 (0.121)	-0.082 (0.121)	-4.270 (143.5)	-111.3 (142.9)
May 2015	104.6 (165.8)	105.5 (167.0)	331.2* (193.2)	200.3 (194.2)	-0.0570 (0.126)	-0.019 (0.126)	63.50 (131.5)	31.01 (131.3)
June 2015	-176.1 (262.8)	-130.5 (263.9)	52.83 (287.0)	-70.37 (288.0)	-0.0571 (0.126)	-0.028 (0.126)	-264.7 (281.1)	-326.4 (280.5)
Number of participants	13,482	13,482	13,098	13,098	13,527	13,527	13,219	13,219

Source: Arizona Federal Credit Union administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE G.5

Arizona Federal Checking and Savings Accounts by Rule, Month by Month, part II

	Number of Withdrawals		Sum of Withdrawals		Number of Debit Card Transactions		Sum of Debit Card Transactions		Number of Debit Card Transactions under \$20	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule
July 2014	0.273 (0.397)	0.098 (0.398)	-70.51 (109.8)	-84.90 (110.5)	0.336 (0.362)	0.161 (0.362)	6.534 (21.20)	-0.796 (21.23)	0.061 (0.237)	-0.105 (0.238)
August 2014	-0.216 (0.440)	0.238 (0.441)	8.296 (107.8)	-112.6 (107.1)	-0.060 (0.406)	0.349 (0.407)	1.462 (22.99)	0.783 (22.98)	0.0285 (0.261)	0.212 (0.261)
September 2014	-0.303 (0.464)	0.0326 (0.467)	13.23 (104.8)	11.47 (106.2)	-0.239 (0.431)	0.0141 (0.432)	-15.55 (23.10)	-25.08 (23.16)	-0.090 (0.278)	0.197 (0.279)
October 2014	-0.370 (0.495)	-0.415 (0.496)	-176.5 (117.3)	-157.8 (118.3)	-0.101 (0.458)	-0.097 (0.456)	-55.49** (23.91)	-52.47** (23.87)	0.041 (0.291)	-0.013 (0.291)
November 2014	-0.215 (0.495)	-0.409 (0.498)	-16.72 (111.2)	-72.34 (112.2)	-0.0896 (0.464)	-0.147 (0.465)	-36.82 (25.04)	-44.47* (25.09)	-0.239 (0.290)	-0.273 (0.291)
December 2014	-0.607 (0.548)	-0.697 (0.551)	7.661 (109.4)	-20.98 (110.8)	-0.640 (0.517)	-0.648 (0.517)	-55.54** (26.58)	-63.53** (26.58)	-0.402 (0.312)	-0.371 (0.314)
January 2015	-0.651 (0.531)	-0.203 (0.536)	-221.1* (120.4)	-224.5* (121.8)	-0.530 (0.496)	-0.019 (0.497)	-17.85 (25.25)	-7.886 (25.45)	-0.428 (0.313)	-0.215 (0.314)
February 2015	-0.528 (0.557)	-0.04 (0.561)	-45.45 (124.7)	-118.3 (125.0)	-0.436 (0.513)	0.0817 (0.514)	-39.09 (27.96)	-37.95 (28.21)	-0.180 (0.320)	0.0722 (0.321)
March 2015	-0.158 (0.588)	0.339 (0.593)	63.74 (125.1)	28.15 (125.3)	-0.120 (0.538)	0.339 (0.541)	6.806 (27.60)	7.158 (27.83)	-0.163 (0.329)	0.177 (0.330)

TABLE G.5 CONTINUED

	Number of Withdrawals		Sum of Withdrawals		Number of Debit Card Transactions		Sum of Debit Card Transactions		Number of Debit Card Transactions under \$20	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule
April 2015	-0.242 (0.584)	0.264 (0.588)	-115.5 (126.9)	-221.4* (126.8)	-0.152 (0.535)	0.451 (0.538)	-14.87 (27.08)	-20.60 (27.13)	-0.073 (0.334)	0.308 (0.337)
May 2015	-0.143 (0.606)	0.570 (0.612)	24.53 (118.1)	-44.37 (118.4)	0.00397 (0.557)	0.674 (0.560)	-5.306 (28.57)	-26.41 (28.41)	0.031 (0.341)	0.580* (0.344)
June 2015	-0.531 (0.597)	0.262 (0.602)	-248.4 (217.0)	-344.5 (215.3)	-0.543 (0.545)	0.276 (0.547)	-57.29** (27.92)	-33.82 (28.28)	-0.329 (0.342)	0.0853 (0.342)
Number of participants	13,596	13,596	13,262	13,262	13,596	13,596	12,730	12,730	13,633	13,633

Source: Arizona Federal Credit Union administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

** $p < 0.1$; *** $p < 0.05$; **** $p < 0.01$

Appendix H. Outcomes by Subgroup

TABLE H.1

Outcomes by Age

	≤40 Years Old		40–60 Years Old		≥60 Years Old	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule
Arizona Federal credit card debt						
Credit card balance	-173.0**	-160.3**	-5.728	70.30	-219.2**	-169.6
	(78.89)	(77.26)	(84.41)	(83.41)	(107.3)	(107.7)
Number of participants	4,470		5,351		2,492	
Credit card interest accrued	-0.961	-0.930	-0.233	0.447	-1.470*	-1.257
	(0.658)	(0.649)	(0.669)	(0.663)	(0.800)	(0.829)
Number of participants	4,874		6,181		2,892	
Any balance revolved	0.006	-0.002	0.014	0.016*	-0.016	-0.022
	(0.011)	(0.011)	(0.010)	(0.010)	(0.013)	(0.013)
Number of participants	4,874		6,181		2,892	
Purchases with Arizona Federal credit card						
Credit card purchase amount	-8.173	-23.99*	1.466	18.33	20.26	14.80
	(13.78)	(13.90)	(13.23)	(13.32)	(21.07)	(20.59)
Number of participants	4,470		5,351		2,492	
Number of credit card purchases	-0.518**	-0.545**	0.104	0.239	-0.216	-0.198
	(0.240)	(0.239)	(0.163)	(0.163)	(0.256)	(0.257)
Number of participants	4,745		6,046		2,857	
Number of credit card purchases <\$20	-0.234*	-0.246*	0.102	0.151**	-0.193*	-0.225**
	(0.134)	(0.134)	(0.072)	(0.073)	(0.112)	(0.113)
Number of participants	4,723		6,064		2,867	
Percent of credit card purchases <\$20	-0.013	-0.002	-0.009	0.001	-0.003	-0.007
	(0.011)	(0.011)	(0.009)	(0.009)	(0.011)	(0.011)
Number of participants	3,977		5,053		2,535	
Payments on Arizona Federal account						
Number of credit card payments	-0.049*	-0.058**	-0.013	0.012	-0.017	0.002
	(0.027)	(0.027)	(0.019)	(0.019)	(0.024)	(0.023)
Number of participants	4,679		6,028		2,839	

TABLE H.1 CONTINUED

	≤40 Years Old		40–60 Years Old		≥60 Years Old	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule
<i>Credit card payment amount</i>	15.19	20.61	-34.23	-25.05	-13.96	3.741
	(24.63)	(24.54)	(27.71)	(27.39)	(33.53)	(35.31)
Number of participants	4470		5351		2492	
<i>Percent of credit card balance paid</i>	0.326	0.080	1.615	-0.003	0.046	0.195**
	(0.319)	(0.100)	(1.385)	(0.209)	(0.048)	(0.096)
Number of participants	4,617		5,853		2,763	
<i>Ever paid credit card late</i>	-0.004	-0.003	0.003	0.001	-0.011**	-0.008*
	(0.003)	(0.003)	(0.003)	(0.004)	(0.005)	(0.005)
Number of participants	4,874		6,181		2,892	
Arizona Federal checking and savings accounts						
<i>Total savings</i>	282.9**	66.87	-310.9*	-144.9	-75.83	-257.7
	(118.5)	(126.9)	(163.1)	(166.3)	(295.8)	(293.5)
Number of participants	4,710		5,975		2,788	
<i>Savings less credit card balance</i>	479.5**	222.0	-310.4	-272.5	244.1	-31.24
	(155.5)	(161.4)	(190.9)	(194.2)	(332.4)	(327.9)
Number of participants	4,615		5,769		2,705	
<i>Number of deposits</i>	0.147	0.077	-0.179**	-0.171*	-0.111	-0.090
	(0.113)	(0.114)	(0.091)	(0.091)	(0.105)	(0.108)
Number of participants	4,713		5,952		2,852	
<i>Sum of deposits</i>	119.4	112.0	-142.0	-153.4	-159.9	-186.5
	(99.25)	(99.92)	(102.7)	(101.3)	(189.0)	(190.5)
Number of participants	4,728		5,775		2,707	
<i>Number of withdrawals</i>	0.298	0.3697	-0.359	0.131	-1.094**	-0.249
	(0.680)	(0.691)	(0.512)	(0.510)	(0.510)	(0.517)
Number of participants	4,702		6,005		2,880	
<i>Sum of withdrawals</i>	23.83	9.318	-104.9	-149.0	19.15	-5.880
	(110.0)	(110.7)	(94.48)	(93.70)	(122.7)	(122.7)
Number of participants	4,737		5,799		2,716	
<i>Number of debit card transactions</i>	0.116	0.283	-0.357	0.204	-1.030**	-0.388
	(0.638)	(0.645)	(0.458)	(0.456)	(0.442)	(0.445)
Number of participants	4,685		6,020		2,882	

TABLE H.1 CONTINUED

	≤40 Years Old		40–60 Years Old		≥60 Years Old	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule
Sum of debit card transactions	26.62	40.20	-43.03**	-42.08*	5.283	-0.583
	(26.45)	(26.54)	(22.01)	(21.98)	(24.42)	(24.61)
Number of participants	4,403		5,612		2,707	
Number of debit card transactions <\$20	-0.240	0.003	0.090	0.298	-0.744**	-0.280
	(0.402)	(0.406)	(0.267)	(0.268)	(0.232)	(0.232)
Number of participants	4,675		6,063		2,886	
Aggregate debt and credit						
Aggregate balance for open trades	-3654	-2943	294.416	-2394.798	3985	2725
	(2772)	(2834)	(2762)	(2727)	(3408)	(3433)
Number of participants	4,856		6,094		2,826	
Aggregate balance for open revolving trades	-53.77	-228.1	-206.7	19.87	-115.6	44.80
	(231.2)	(231.4)	(247.4)	(247.5)	(349.0)	(348.6)
Number of participants	4,856		6,101		2,815	
No. of collection trades with balance ≥ \$200	-0.011	-0.009	0.017	0.004	0.007	-0.014
	(0.030)	(0.030)	(0.021)	(0.022)	(0.024)	(0.024)
Number of participants	4,795		6,115		2,838	
Aggregate balance in collections	-103.8**	-92.38*	95.18*	60.34	-61.00	-49.16
	(52.67)	(51.24)	(57.42)	(58.75)	(46.51)	(42.82)
Number of participants	4,826		6,109		2,832	
Aggregate credit for open revolving trades	-31.83	-342.1	-877.8**	-1061***	-785.7*	-249.6
	(311.1)	(310.3)	(309.9)	(314.8)	(438.8)	(437.1)
Number of participants	4,860		6,118		2,802	
Balance-to-credit ratio for open revolving trades	0.068	-0.743	0.276	0.775	1.324	1.055
	(1.237)	(1.250)	(0.894)	(0.890)	(1.185)	(1.208)
Number of participants	4,754		6,110		2,835	
No. of inquiries within 12 months	-0.272**	-0.423**	0.125	-0.032	-0.212	-0.291**
	(0.136)	(0.136)	(0.104)	(0.105)	(0.135)	(0.135)
Number of participants	4784		6110		2834	

TABLE H.1 CONTINUED

	≤40 Years Old		40–60 Years Old		≥60 Years Old	
	\$20 Rule	20% Rule	\$20 Rule	\$20 Rule	20% Rule	\$20 Rule
<i>FICO credit score</i>	-1.176	-0.5198	-1.313	-0.979	-2.403	-0.339
	(2.051)	(2.048)	(1.544)	(1.544)	(2.260)	(2.282)
Number of participants	4,789		6,065		2,753	

Source: Arizona Federal Credit Union administrative data and pre- and postintervention credit record data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE H.2

Outcomes by Delivery Mode and Age, the Cash under \$20 Rule

	≤40 Years Old			40–60 Years Old			≥60 Years Old		
	E-mail	Mail	Online	E-mail	Mail	Online	E-mail	Mail	Online
Arizona Federal credit card debt									
Credit card balance	-49.43	-245.8*	-221.1*	-28.32	15.30	-222.6	-94.29	-87.02	-63.51
	(123.1)	(137.4)	(123.5)	(133.9)	(106.8)	(140.3)	(161.6)	(196.0)	(148.8)
Number of participants	2,506			3,050			1,356		
Credit card interest accrued	-0.381	-1.563	-1.009	-0.649	-0.6875	-0.703	-0.591	-1.459	-0.831
	(1.007)	(1.025)	(1.030)	(1.060)	(0.988)	(1.150)	(1.159)	(1.416)	(1.146)
Number of participants	2727			3534			1583		
Any balance revolved	-0.006	0.006	0.001	0.019	0.015	0.010	-0.016	-0.001	-0.021
	(0.018)	(0.019)	(0.018)	(0.015)	(0.014)	(0.015)	(0.023)	(0.022)	(0.020)
Number of participants	2,727			3,534			1,583		
Purchases with Arizona Federal credit card									
Credit card purchase amount	-38.12*	3.940	-26.04	20.68	27.87	-23.48	-5.859	14.20	62.86**
	(20.55)	(18.96)	(23.21)	(20.78)	(20.02)	(20.12)	(30.91)	(34.47)	(29.80)
Number of participants	2,506			3,050			1,356		
Number of credit card purchases	-0.856**	-0.093	-0.530	0.274	0.518*	-0.198	-0.258	-0.152	0.153
	(0.352)	(0.343)	(0.417)	(0.243)	(0.268)	(0.257)	(0.373)	(0.338)	(0.325)
Number of participants	2,659			3,460			1,563		
Number of credit card purchases <\$20	-0.328*	-0.120	-0.197	0.154	0.247*	-0.045	-0.182	-0.169	0.030
	(0.192)	(0.201)	(0.236)	(0.112)	(0.131)	(0.123)	(0.164)	(0.161)	(0.149)
Number of participants	2,649			3,470			1,572		

TABLE H.2 CONTINUED

	≤40 Years Old			40–60 Years Old			≥60 Years Old		
	E-mail	Mail	Online	E-mail	Mail	Online	E-mail	Mail	Online
<i>Percent of credit card purchases <\$20</i>	-0.016	-0.013	-0.017	0.017	-0.019	-0.007	0.014	-0.004	0.009
	(0.016)	(0.018)	(0.017)	(0.014)	(0.013)	(0.013)	(0.016)	(0.019)	(0.017)
Number of participants		2,241			2,891			1,388	
Payments on Arizona Federal account									
<i>Credit card payment amount</i>	12.87	3.300	-28.27	-90.00*	-13.45	-24.23	-32.22	31.73	34.99
	(36.06)	(35.58)	(36.95)	(47.80)	(36.68)	(44.66)	(45.33)	(54.13)	(55.18)
Number of participants			2,506			3,050			1,356
<i>Number of credit card payments</i>	-0.054	-0.05	-0.106**	-0.006	0.019	-0.054*	-0.014	0.011	-0.041
	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)
Number of participants			2614			3444			1558
<i>Percent of credit card balance paid</i>	-0.047	-0.031	-0.070	0.234	-0.182	-0.123	0.141	-0.012	0.064
	(0.072)	(0.071)	(0.065)	(0.452)	(0.172)	(0.178)	(0.194)	(0.050)	(0.053)
Number of participants			2,582			3,352			1,510
<i>Ever paid credit card late</i>	-0.007	-0.001	-0.005	0.007	0.005	0.001	-0.013	-0.018**	-0.001
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.008)	(0.009)	(0.006)
Number of participants		2,727			3,534			1,583	
Arizona Federal checking and savings accounts									
<i>Total savings</i>	161.7	532.6**	556.0**	-150.4	-382.0	-300.3	-212.9	272.4	-413.0
	(185.1)	(254.2)	(268.5)	(321.7)	(242.8)	(251.9)	(378.5)	(601.7)	(372.2)
Number of participants			2,627			3,435			1,534
<i>Savings less credit card balance</i>	305.5	732.9**	788.6**	-164.4	-301.0	-145.0	-61.50	718.2	-225.9
	(244.3)	(298.4)	(313.6)	(376.8)	(256.3)	(317.8)	(441.2)	(678.8)	(416.8)
Number of participants			2,576			3,318			1,484
<i>Number of deposits</i>	0.222	0.006	-0.015	0.037	-0.299**	-0.292**	-0.106	-0.379**	-0.153
	(0.171)	(0.167)	(0.175)	(0.137)	(0.138)	(0.140)	(0.165)	(0.177)	(0.159)
Number of participants			2,641			3,397			1,565
<i>Sum of deposits</i>	69.88	149.75	192.12	-148.9	-98.15	-321.8**	-6.670	-400.3	-198.4
	(138.2)	(162.7)	(126.4)	(163.6)	(169.8)	(142.0)	(260.5)	(257.5)	(230.2)
Number of participants			2,649			3,311			1,488
<i>Number of withdrawals</i>	-0.487	0.311	1.236	0.008	-1.124	-0.652	-1.604*	-1.0417	-0.6759
	(1.033)	(1.177)	(0.989)	(0.732)	(0.757)	(0.853)	(0.922)	(0.777)	(0.817)
Number of participants			2,637			3,432			1,576

TABLE H.2 CONTINUED

	≤40 Years Old			40–60 Years Old			≥60 Years Old		
	E-mail	Mail	Online	E-mail	Mail	Online	E-mail	Mail	Online
<i>Sum of withdrawals</i>	9.74	24.02	66.17	-10.41	-76.02	-311.6**	67.72	-291.9	-128.0
	(145.1)	(160.4)	(132.8)	(136.2)	(159.2)	(135.1)	(190.2)	(201.7)	(199.0)
Number of participants			2,653			3,321			1,492
<i>Number of debit card transactions</i>	-0.654	0.483	1.051	-0.163	-0.83	-0.647	-1.597**	-0.505	-0.471
	(0.956)	(1.100)	(0.930)	(0.663)	(0.667)	(0.761)	(0.801)	(0.665)	(0.657)
Number of participants			2,623			3,437			1,577
<i>Sum of debit card transactions</i>	-44.86	55.02	51.76	-30.69	-52.49*	-34.30	-69.39*	2.054	18.78
	(41.27)	(47.47)	(38.33)	(35.09)	(31.08)	(34.09)	(41.22)	(39.03)	(35.92)
Number of participants			2,448			3,229			1,484
<i>Number of debit card transactions <\$20</i>	-0.7392	0.250	0.371	0.147	-0.350	0.561	-0.905**	-0.082	-0.293
	(0.580)	(0.696)	(0.581)	(0.400)	(0.407)	(0.362)	(0.429)	(0.355)	(0.353)
Number of participants		2,621			3,456			1,581	
Aggregate debt and credit									
<i>Aggregate balance for open trades</i>	-4924	317.0	-3510	-2532	8899**	-4618	2849	-1641	7723
	(4023)	(4897)	(4383)	(3669)	(4383)	(4119)	(4467)	(5508)	(5379)
Number of participants			2,716			3,478			1,546
<i>Aggregate balance for open revolving trades</i>	-100.37	179.8	-104.2	-171.9	192.9	-423.8	-113.5	-397.6	169.2
	(316.3)	(340.8)	(331.9)	(412.6)	(362.0)	(430.9)	(536.4)	(676.1)	(459.3)
Number of participants			2,717			3,487			1,537
<i>No. of collection trades with balance ≥ \$200</i>	-0.054	-0.021	-0.023	-0.015	0.061*	0.012	-0.014	0.054	0.032
	(0.047)	(0.047)	(0.048)	(0.033)	(0.036)	(0.028)	(0.030)	(0.050)	(0.034)
Number of participants			2,683			3,496			1,552
<i>Aggregate balance in collections</i>	-286.3**	-126.44	50.27	64.3	176.72*	25.73	-21.40	95.30	-17.15
	(96.92)	(111.17)	(101.24)	(65.15)	(96.12)	(79.64)	(35.60)	(94.88)	(53.26)
Number of participants			2,700			3,492			1,548
<i>Aggregate credit for open revolving trades</i>	39.52	122.4	-289.82	-1158**	-506.0	-1196**	-857.2	-1619*	-12.09
	(429.1)	(451.1)	(457.9)	(490.6)	(453.7)	(442.4)	(647.7)	(854.6)	(632.0)
Number of participants			2,719			3,498			1,533

TABLE H.2 CONTINUED

	≤40 Years Old			40–60 Years Old			≥60 Years Old		
	E-mail	Mail	Online	E-mail	Mail	Online	E-mail	Mail	Online
<i>Balance-to-credit ratio for open revolving trades</i>	-0.406	1.682	1.126	1.122	0.539	-1.398	-0.144	2.434	1.657
	(1.877)	(1.950)	(1.954)	(1.411)	(1.397)	(1.383)	(1.914)	(1.668)	(1.653)
Number of participants			2,658			3,489			1,550
<i>No. of inquiries within 12 months</i>	-0.29	-0.363	-0.324	0.159	0.144	0.057	-0.333*	-0.179	-0.289
	(0.193)	(0.228)	(0.213)	(0.165)	(0.165)	(0.151)	(0.200)	(0.182)	(0.192)
Number of participants			2673			3491			1551
<i>FICO credit score</i>	-6.021**	-2.100	0.763	0.692	-4.077*	-0.581	-1.689	-4.078	-0.960
	(3.013)	(3.101)	(3.049)	(2.378)	(2.458)	(2.396)	(3.416)	(3.475)	(3.346)
Number of participants		2,683			3,456			1,506	

Source: Arizona Federal Credit Union administrative data and pre- and postintervention credit record data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE H.3

Outcomes by Delivery Mode and Age, the 20 Percent Added Rule

	≤40 Years Old			40–60 Years Old			≥60 Years Old		
	E-mail	Mail	Online	E-mail	Mail	Online	E-mail	Mail	Online
Arizona Federal credit card debt									
<i>Credit card balance</i>	-197.8	-211.0*	-135.5	-12.54	-4.000	20.9	-383.1**	-315.6*	-196.0
	(121.6)	(119.4)	(109.3)	(121.6)	(136.3)	(131.2)	(170.0)	(187.4)	(191.4)
Number of participants		2,504			3,004			1,425	
<i>Credit card interest accrued</i>	-1.095	-1.1025	-0.5786	0.660	-0.064	0.469	-2.323	-1.008	-3.101*
	(0.999)	(0.987)	(0.949)	(0.952)	(1.132)	(1.003)	(1.424)	(1.331)	(1.728)
Number of participants		2,733			3,467			1,647	
<i>Any balance revolved</i>	-0.015	-0.009	0.004	0.006	0.039**	0.035**	-0.036	-0.041*	-0.025
	(0.019)	(0.017)	(0.017)	(0.015)	(0.015)	(0.015)	(0.022)	(0.021)	(0.021)
Number of participants		2,733			3,467			1,647	
Purchases with Arizona Federal credit card									
<i>Credit card purchase amount</i>	-13.21	-14.15	-18.86	7.782	12.81	24.00	39.20	-5.340	19.00
	(21.39)	(21.26)	(22.81)	(21.57)	(21.52)	(20.50)	(30.61)	(34.52)	(27.56)
Number of participants		2,504			3,004			1,425	
<i>Number of credit card purchases</i>	-0.159	-0.178	-0.747**	-0.027	-0.105	0.379	0.101	-0.599	-0.713*
	(0.367)	(0.383)	(0.346)	(0.255)	(0.254)	(0.249)	(0.335)	(0.392)	(0.367)
Number of participants		2,652			3,396			1,628	
<i>Number of credit card purchases <\$20</i>	-0.146	-0.048	-0.311	0.122	-0.008	0.135	-0.075	-0.470**	-0.339**
	(0.172)	(0.200)	(0.197)	(0.120)	(0.118)	(0.119)	(0.152)	(0.166)	(0.162)
Number of participants		2,637			3,404			1,632	
<i>Percent of credit card purchases <\$20</i>	0.005	-0.007	0.003	0.008	-0.009	0.000	-0.002	-0.033*	0.014
	(0.018)	(0.017)	(0.018)	(0.014)	(0.014)	(0.014)	(0.016)	(0.018)	(0.017)
Number of participants		2,211			2,838			1,445	
Payments on Arizona Federal account									
<i>Credit card payment amount</i>	52.18	53.45	26.88	2.78	-49.90	-24.76	43.86	45.43	-31.96
	(38.07)	(34.85)	(32.03)	(38.40)	(44.76)	(36.59)	(52.56)	(62.22)	(57.21)
Number of participants		2,504			3,004			1,425	
<i>Number of credit card payments</i>	-0.028	-0.047	-0.066*	0.021	-0.020	0.038	-0.022	0.036	-0.022
	(0.040)	(0.038)	(0.039)	(0.030)	(0.029)	(0.032)	(0.034)	(0.036)	(0.035)
Number of participants		2,625			3,382			1,615	

TABLE H.3 CONTINUED

	≤40 Years Old			40–60 Years Old			≥60 Years Old		
	E-mail	Mail	Online	E-mail	Mail	Online	E-mail	Mail	Online
<i>Percent of credit card balance paid</i>	0.405	-0.060	-0.067	0.567	-0.270	-0.218	0.035	0.359	0.203
	(0.499)	(0.075)	(0.066)	(0.757)	(0.169)	(0.168)	(0.060)	(0.257)	(0.179)
Number of participants		2,592			3,279			1,570	
<i>Ever paid credit card late</i>	-0.007*	-0.005	-0.007	0.006	0.006	0.002	-0.009	-0.004	-0.005
	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.007)	(0.006)	(0.007)
Number of participants		2,733			3,467			1,647	
Arizona Federal checking and savings accounts									
<i>Total savings</i>	143.5	286.6	-310.4	-205.3	-123.8	-71.82	79.58	117.9	-388.2
	(207.0)	(247.7)	(307.5)	(250.4)	(289.7)	(292.1)	(542.0)	(408.7)	(390.7)
Number of participants		2,649			3,341			1,583	
<i>Savings less credit card balance</i>	290.3	535.5*	-236.1	-331.6	-198.2	-60.00	599.5	603.3	-245.3
	(261.4)	(294.5)	(338.9)	(307.5)	(331.7)	(344.4)	(600.7)	(465.8)	(422.9)
Number of participants		2,594			3,220			1,532	
<i>Number of deposits</i>	0.132	0.215	0.005	-0.165	-0.168	-0.095	0.239	-0.008	-0.285
	(0.169)	(0.171)	(0.186)	(0.136)	(0.140)	(0.138)	(0.173)	(0.172)	(0.179)
Number of participants		2,630			3,342			1,623	
<i>Sum of deposits</i>	111.21	100.04	-108.28	-163.59	-52.53	-280.97*	129.99	-80.77	-106.3
	(138.4)	(149.9)	(147.3)	(146.2)	(159.2)	(147.7)	(278.1)	(253.7)	(248.5)
Number of participants		2,650			3,236			1,542	
<i>Number of withdrawals</i>	0.885	-0.573	-0.169	0.889	0.498	-0.494	0.843	0.1602	-1.374*
	(1.085)	(1.004)	(1.151)	(0.704)	(0.741)	(0.741)	(0.779)	(0.849)	(0.786)
Number of participants		2,634			3,371			1,640	
<i>Sum of withdrawals</i>	-10.24	24.27	-133.9	-153.7	-190.7	-252.8*	221.6	187.3	186.1
	(142.5)	(150.0)	(148.6)	(136.4)	(147.5)	(141.3)	(210.6)	(196.2)	(173.8)
Number of participants		2,660			3,251			1,548	
<i>Number of debit card transactions</i>	0.76	-0.631	-0.306	0.858	0.511	-0.591	0.403	0.001	-1.347**
	(1.015)	(0.925)	(1.052)	(0.630)	(0.671)	(0.667)	(0.663)	(0.701)	(0.664)
Number of participants		2,631			3,378			1,641	
<i>Sum of debit card transactions</i>	64.7	-22.83	57.04	-13.80	-36.85	-79.12**	20.08	8.233	20.87
	(41.73)	(39.81)	(40.00)	(32.02)	(33.46)	(32.54)	(38.92)	(37.44)	(35.90)
Number of participants		2,491			3,137			1,540	

TABLE H.3 CONTINUED

	≤40 Years Old			40–60 Years Old			≥60 Years Old		
	E-mail	Mail	Online	E-mail	Mail	Online	E-mail	Mail	Online
Number of debit card transactions <\$20	0.4468	-0.109	-0.63	0.835**	0.246	0.144	0.077	-0.178	-1.150**
	(0.654)	(0.590)	(0.679)	(0.372)	(0.396)	(0.382)	(0.371)	(0.346)	(0.367)
Number of participants	2,617			3,415			1,643		
Aggregate debt and credit									
Aggregate balance for open trades	-2,999	-1,423	-3,806	-6,822*	1,472	-2,392	-2,459	-3,435	6,889
	(4011)	(4456)	(4640)	(4063)	(3880)	(3768)	(5176)	(5193)	(4507)
Number of participants	2,725			3,422			1,608		
Aggregate balance for open revolving trades	-98.28	-646.5*	-333.9	118.7	-263.2	52.30	22.86	-351.2	98.60
	(300.3)	(333.5)	(338.4)	(366.5)	(367.3)	(405.5)	(595.0)	(565.8)	(583.2)
Number of participants	2,724			3,419			1,601		
No. of collection trades with balance ≥ \$200	-0.020	-0.039	-0.026	-0.020	-0.012	-0.006	0.003	-0.023	-0.052
	(0.049)	(0.051)	(0.040)	(0.038)	(0.033)	(0.033)	(0.029)	(0.039)	(0.033)
Number of participants	2,692			3,428			1,616		
Aggregate balance in collections	-93.30	-190.6*	11.89	-84.70	137.5	87.84	-0.800	-110.6	-53.47
	(93.80)	(108.46)	(78.70)	(104.73)	(87.43)	(102.31)	(39.32)	(99.95)	(37.20)
Number of participants	2,711			3,427			1,612		
Aggregate credit for open revolving trades	-84.90	-479.86	-1001**	-1376**	-53.98	-759.8*	-1383*	755.7	-197.2
	(424.9)	(443.8)	(443.8)	(479.9)	(494.5)	(457.8)	(787.3)	(584.1)	(755.3)
Number of participants	2,727			3,429			1,594		
Balance-to-credit ratio for open revolving trades	-0.235	-0.796	-0.035	1.764	-0.14	0.567	1.896	0.803	1.526
	(1.843)	(2.031)	(2.103)	(1.371)	(1.353)	(1.446)	(1.829)	(1.831)	(1.814)
Number of participants	2,670			3,428			1,614		
No. of inquiries within 12 months	-0.496**	-0.348*	-0.504**	0.131	-0.052	-0.066	-0.118	-0.077	-0.559**
	(0.220)	(0.197)	(0.209)	(0.163)	(0.162)	(0.157)	(0.194)	(0.187)	(0.220)
Number of participants	2,688			3,423			1,613		
FICO credit score	0.438	-2.256	-3.251	-1.413	-1.054	-2.060	-2.328	-0.560	3.299
	(2.864)	(2.958)	(3.138)	(2.441)	(2.269)	(2.438)	(3.234)	(3.563)	(3.488)
Number of participants	2,687			3,404			1,566		

Source: Arizona Federal Credit Union administrative data and pre- and postintervention credit record data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE H.4

Outcomes by Total Number of Arizona Federal Credit Card Purchases in Six Months prior to the Intervention

	<1 Purchase		1–10 Purchases		>10 Purchases	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule
Arizona Federal credit card debt						
<i>Credit card balance</i>	-62.61	-36.44	-89.27	-56.34	-313.0	-159.8
	(89.86)	(88.80)	(62.91)	(62.09)	(192.4)	(189.1)
Number of participants	4,095		6,514		1,541	
<i>Credit card interest accrued</i>	-0.087	-0.523	-0.705	-0.219	-2.045	-0.903
	(0.771)	(0.778)	(0.496)	(0.486)	(1.380)	(1.385)
Number of participants	4,351		7,452		1,855	
Any balance revolved	0.000	-0.009	0.008	0.004	0.014	0.021
	(0.011)	(0.011)	(0.009)	(0.009)	(0.019)	(0.019)
Number of participants	4,351		7,452		1,855	
Purchases with Arizona Federal credit card						
<i>Credit card purchase amount</i>	1.456	0.468	-2.126	-1.867	22.82	34.36
	(8.420)	(8.199)	(11.78)	(11.94)	(37.01)	(36.12)
Number of participants	4,095		6,514		1,541	
<i>Number of credit card purchases</i>	-0.034	-0.078	-0.281*	-0.256*	-0.152	0.348
	(0.094)	(0.090)	(0.152)	(0.153)	(0.570)	(0.566)
Number of participants	4,351		7,452		1,855	
<i>Number of credit card purchases <\$20</i>	0.013	0.004	-0.121*	-0.133*	-0.160	0.005
	(0.037)	(0.036)	(0.069)	(0.069)	(0.310)	(0.307)
Number of participants	4,350		7,432		1,791	
<i>Percent of credit card purchases <\$20</i>	-0.005	0.013	-0.007	0.001	-0.015	-0.018
	(0.025)	(0.025)	(0.007)	(0.007)	(0.011)	(0.011)
Number of participants	2,350		7,432		1,791	
Payments on Arizona Federal account						
<i>Number of credit card payments</i>	-0.008	-0.005	-0.024	-0.030*	-0.073	0.031
	(0.022)	(0.022)	(0.017)	(0.017)	(0.051)	(0.051)
Number of participants	4,327		7,318		1,700	

TABLE H.4 CONTINUED

	<1 Purchase		1–10 Purchases		>10 Purchases	
	\$20 Rule	20% Rule	\$20 Rule		\$20 Rule	20% Rule
<i>Credit card payment amount</i>	18.90	18.08	-16.55	-19.35	-63.58	23.45
	(30.84)	(31.33)	(18.27)	(18.34)	(62.31)	(60.91)
Number of participants	4,095		6,514		1,541	
<i>Percent of credit card balance paid</i>	0.121	0.278**	0.193	-0.141	5.390	0.391
	(0.083)	(0.127)	(0.388)	(0.155)	(4.597)	(0.356)
Number of participants	4,202		7,075		1,712	
<i>Ever paid credit card late</i>	-0.011**	-0.008*	0.001	0.001	0.003	-0.002
	(0.004)	(0.004)	(0.003)	(0.003)	(0.006)	(0.006)
Number of participants	4,351		7,452		1,855	
Arizona Federal checking and savings accounts						
<i>Total savings</i>	-69.81	263.4	-14.08	-271.9*	-281.8	-240.6
	(162.7)	(174.0)	(149.8)	(148.8)	(288.0)	(299.4)
Number of participants	4,213		7,261		1,807	
<i>Savings less credit card balance</i>	-71.80	239.3	145.8	-181.0	68.20	-165.2
	(187.7)	(198.0)	(170.2)	(167.8)	(375.0)	(384.7)
Number of participants	3,995		7,083		1,741	
<i>Number of deposits</i>	-0.058	-0.036	0.051	-0.017	-0.443**	-0.36**
	(0.119)	(0.119)	(0.079)	(0.080)	(0.162)	(0.161)
Number of participants	4,122		7,302		1,811	
<i>Sum of deposits</i>	56.21	93.82	-44.23	-59.57	-291.4	-378.6*
	(106.767)	(108.673)	(96.792)	(96.567)	(195.7)	(196.0)
Number of participants	4,139		7,099		1,718	
<i>Number of withdrawals</i>	-0.901	-0.117	0.259	0.390	-0.291	0.354
	(0.661)	(0.669)	(0.463)	(0.465)	(0.828)	(0.813)
Number of participants	4,206		7,282		1,818	
<i>Sum of withdrawals</i>	49.66	19.33	0.091	-40.63	-333.7*	-373.4**
	(107.0)	(106.3)	(84.44)	(84.69)	(173.0)	(172.4)
Number of participants	4,155		7,113		1,727	
<i>Number of debit card transactions</i>	-0.821	-0.181	0.094	0.322	-0.344	0.384
	(0.597)	(0.602)	(0.426)	(0.426)	(0.731)	(0.721)
Number of participants	4,199		7,289		1,819	

TABLE H.4 CONTINUED

	<1 Purchase		1–10 Purchases		>10 Purchases	
	\$20 Rule	20% Rule	\$20 Rule	\$20 Rule	20% Rule	\$20 Rule
Sum of debit card transactions	-5.538	-19.11	1.214	8.201	-39.73	-20.13
	(26.30)	(26.39)	(19.60)	(19.76)	(38.08)	(36.68)
Number of participants	3,920		6,836		1,704	
Number of debit card transactions <\$20	-0.542	-0.188	0.038	0.288	-0.017	0.126
	(0.358)	(0.360)	(0.257)	(0.259)	(0.431)	(0.429)
Number of participants	4,235		7,290		1,820	
Aggregate debt and credit						
Aggregate balance for open trades	4304	3310	-3691	-5364**	3392	2390
	(3040)	(2992)	(2420)	(2444)	(4565)	(4501)
Number of participants	4,294		7,372		1,825	
Aggregate balance for open revolving trades	-148.4	-42.79	-56.49	17.97	-453.5	-513.3
	(281.9)	(282.2)	(197.8)	(198.2)	(493.8)	(479.8)
Number of participants	4,292		7,367		1,826	
No. of collection trades with balance ≥ \$200	0.008	0.007	-0.012	-0.021	0.051	0.035
	(0.028)	(0.028)	(0.019)	(0.020)	(0.042)	(0.042)
Number of participants	4,294		7,336		1,831	
Aggregate balance in collections	52.81	44.90	-42.82	-54.11	7.717	19.93
	(80.46)	(79.07)	(39.84)	(40.79)	(54.25)	(53.84)
Number of participants	4,292		7,354		1,834	
Aggregate credit for open revolving trades	-593.5	-713.2*	-587.0**	-770.1**	-607.7	-428.6
	(363.3)	(366.8)	(254.1)	(256.1)	(624.2)	(621.0)
Number of participants	4,298		7,361		1,834	
Balance-to-credit ratio for open revolving trades	-0.059	-0.86	0.546	0.472	-0.282	1.091
	(1.108)	(1.125)	(0.872)	(0.879)	(1.711)	(1.658)
Number of participants	4,236		7,341		1,835	
No. of inquiries within 12 months	-0.174	-0.308**	-0.080	-0.186*	-0.013	-0.253
	(0.131)	(0.132)	(0.100)	(0.100)	(0.174)	(0.172)
Number of participants	4,285		7,322		1,833	

TABLE H.4 CONTINUED

	<1 Purchase		1–10 Purchases		>10 purchases	
	\$20 Rule	20% Rule	\$20 Rule	\$20 Rule	20% Rule	\$20 Rule
<i>FICO credit score</i>	-1.677	0.304	-1.878	-1.700	0.461	-0.003
	(2.088)	(2.111)	(1.466)	(1.459)	(2.702)	(2.703)
Number of participants	4,247		7,260		1,815	

Source: Arizona Federal Credit Union administrative data and pre- and postintervention credit record data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE H.5

Outcomes by Total Number of Arizona Federal Credit Card Purchases under \$20 in Six Months prior to the Intervention

	<1 Purchase under \$20		1–5 Purchases under \$20		>5 purchases under \$20	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule
Arizona Federal credit card debt						
Credit card balance	-80.75	-78.59	-145.0	-17.38	-177.7	-60.72
	(62.70)	(61.87)	(101.0)	(99.10)	(201.7)	(201.6)
Number of participants	7,434		3,430		1,237	
Credit card interest accrued	-0.491	-0.517	-0.866	0.175	-1.378	-0.760
	(0.510)	(0.509)	(0.779)	(0.771)	(1.540)	(1.536)
Number of participants	8,280		3,916		1,468	
Any balance revolved	0.005	0.002	0.008	0.010	0.005	-0.015
	(0.008)	(0.008)	(0.012)	(0.012)	(0.022)	(0.022)
Number of participants	8,280		3,916		1,468	
Purchases with Arizona Federal credit card						
Credit card purchase amount	8.016	8.192	-1.609	-1.499	-10.61	-15.66
	(8.681)	(8.780)	(19.01)	(19.08)	(38.96)	(38.49)
Number of participants	7,434		3,430		1,237	
Number of credit card purchases	0.008	-0.039	-0.364	-0.258	0.158	0.051
	(0.087)	(0.085)	(0.251)	(0.255)	(0.690)	(0.684)
Number of participants	8,275		3,910		1,388	
Number of credit card purchases <\$20	0.005	-0.004	-0.191	-0.123	-0.116	-0.188
	(0.034)	(0.034)	(0.120)	(0.121)	(0.396)	(0.394)
Number of participants	8,280		3,916		1,468	

TABLE H.5 CONTINUED

	<1 Purchase under \$20		1–5 Purchases under \$20		>5 purchases under \$20	
	\$20 Rule	20% Rule	\$20 Rule	\$20 Rule	20% Rule	\$20 Rule
<i>Percent of credit card purchases <\$20</i>	-0.014	-0.007	-0.001	0.014	-0.009	-0.028**
	(0.009)	(0.009)	(0.010)	(0.010)	(0.012)	(0.012)
Number of participants	6,275		3,910		1,388	
Payments on Arizona Federal account						
<i>Number of credit card payments</i>	-0.006	-0.007	-0.044*	-0.043*	-0.063	0.055
	(0.015)	(0.015)	(0.025)	(0.025)	(0.061)	(0.060)
Number of participants	8,209		3,800		1,341	
<i>Credit card payment amount</i>	20.96	18.05	-58.56**	-49.58*	-66.02	5.308
	(20.15)	(20.59)	(29.78)	(29.10)	(68.07)	(67.08)
Number of participants	7,434		3,430		1,237	
<i>Percent of credit card balance paid</i>	0.408	0.175**	-0.287	-0.311	6.469	0.401
	(0.331)	(0.076)	(0.286)	(0.286)	(5.690)	(0.472)
Number of participants	7,923		3,698		1,363	
<i>Ever paid credit card late</i>	-0.006**	-0.005*	0.005	0.005	0.003	-0.003
	(0.003)	(0.003)	(0.004)	(0.004)	(0.006)	(0.006)
Number of participants	8,280		3,916		1,468	
Arizona Federal checking and savings accounts						
<i>Total savings</i>	-184.3	-20.51	303.0	-195.9	-593.0*	-288.6
	(138.2)	(142.5)	(186.6)	(180.5)	(319.3)	(340.6)
Number of participants	7,919		3,802		1,421	
<i>Savings less credit card balance</i>	-132.0	-7.216	518.4**	-169.0	-220.4	-62.94
	(155.5)	(159.6)	(226.2)	(216.8)	(424.1)	(449.0)
Number of participants	7,716		3,715		1,388	
<i>Number of deposits</i>	-0.008	-0.049	0.000	-0.024	-0.351*	-0.237
	(0.078)	(0.078)	(0.114)	(0.115)	(0.191)	(0.188)
Number of participants	7,971		3,840		1,435	
<i>Sum of deposits</i>	-81.75	-79.58	49.72	18.93	-163.1	-133.0
	(88.37)	(88.47)	(127.8)	(127.3)	(194.9)	(202.9)
Number of participants	7,851		3,722		1,375	
<i>Number of withdrawals</i>	-0.719*	-0.320	0.786	1.031	-0.201	0.636
	(0.435)	(0.439)	(0.661)	(0.663)	(1.143)	(1.141)
Number of participants	8,044		3,830		1,440	

TABLE H.5 CONTINUED

	<1 Purchase under \$20		1–5 Purchases under \$20		>5 purchases under \$20	
	\$20 Rule	20% Rule	\$20 Rule	\$20 Rule	20% Rule	\$20 Rule
<i>Sum of withdrawals</i>	-67.43	-88.26	107.6	11.63	-240.7	-178.8
	(80.95)	(80.31)	(114.2)	(115.4)	(177.5)	(182.4)
Number of participants	7,879		3,730		1,379	
<i>Number of debit card transactions</i>	-0.763*	-0.386	0.520	0.980	-0.029	0.570
	(0.395)	(0.398)	(0.610)	(0.606)	(1.010)	(1.022)
Number of participants	8,053		3,825		1,437	
<i>Sum of debit card transactions</i>	-23.55	-26.75	24.29	32.11	-9.561	11.26
	(18.44)	(18.50)	(27.55)	(27.59)	(44.07)	(43.86)
Number of participants	7,536		3,588		1,345	
<i>Number of debit card transactions <\$20</i>	-0.409*	-0.193	0.262	0.686*	-0.065	0.162
	(0.233)	(0.236)	(0.375)	(0.373)	(0.616)	(0.624)
Number of participants	8,108		3,823		1,425	
Aggregate debt and credit						
<i>Aggregate balance for open trades</i>	1477	614.1	-2148	-6102*	-4683	-3292
	(2,268)	(2,270)	(3,321)	(3,325)	(4,924)	(4,888)
Number of participants	8,167		3,877		1,451	
<i>Aggregate balance for open revolving trades</i>	-105.8	-17.64	33.85	209.2	-872.9	-1215**
	(192.5)	(191.8)	(295.2)	(297.0)	(566.4)	(564.2)
Number of participants	8,164		3,877		1,450	
<i>No. of collection trades with balance ≥ \$200</i>	-0.001	-0.01	-0.015	-0.023	0.065	0.064
	(0.018)	(0.018)	(0.029)	(0.029)	(0.056)	(0.055)
Number of participants	8,167		3,855		1,447	
<i>Aggregate balance in collections</i>	20.40	-4.733	-62.58	-31.10	15.20	5.807
	(49.67)	(49.58)	(50.84)	(52.26)	(64.31)	(58.91)
Number of participants	8,173		3,863		1,450	
<i>Aggregate credit for open revolving trades</i>	-621.8**	-767.1**	-173.8	-358.6	-1695**	-1282**
	(257.8)	(258.4)	(364.3)	(371.1)	(635.5)	(636.0)
Number of participants	8,168		3,876		1,455	

TABLE H.5 CONTINUED

	<1 Purchase under \$20		1–5 Purchases under \$20		>5 purchases under \$20	
	\$20 Rule	20% Rule	\$20 Rule	\$20 Rule	20% Rule	\$20 Rule
<i>Balance-to-credit ratio for open revolving trades</i>	0.064	-0.051	0.575	0.480	0.561	0.476
	(0.780)	(0.785)	(1.229)	(1.246)	(2.222)	(2.206)
Number of participants	8,115		3,853		1,451	
<i>No. of inquiries within 12 months</i>	-0.086	-0.172*	-0.028	-0.202	-0.144	-0.478**
	(0.092)	(0.092)	(0.140)	(0.142)	(0.229)	(0.227)
Number of participants	8,154		3,846		1,449	
<i>FICO credit score</i>	-1.446	-0.565	-0.313	-0.677	-6.152*	-2.972
	(1.415)	(1.417)	(2.087)	(2.104)	(3.209)	(3.186)
Number of participants	8,077		3,808		1,445	

Source: Arizona Federal Credit Union administrative data and pre- and postintervention credit record data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

** $p < 0.1$; * $p < 0.05$; *** $p < 0.01$

TABLE H.6

Outcomes by Baseline Credit Score

	Credit score <670		Credit score 670–730		Credit score >730	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule
Arizona Federal credit card debt						
<i>Credit card balance</i>	-30.99	-43.95	-178.6*	-87.54	-70.99	-8.227
	(66.03)	(63.78)	(99.50)	(98.72)	(103.6)	(102.5)
Number of participants	4,042		3,670		4,278	
<i>Credit card interest accrued</i>	-0.151	-0.492	-1.600**	-0.730	-0.087	0.337
	(0.698)	(0.692)	(0.768)	(0.763)	(0.723)	(0.724)
Number of participants	4,320		4,146		5,114	
<i>Any balance revolved</i>	0.012	0.001	-0.002	-0.006	0.012	0.017
	(0.011)	(0.011)	(0.011)	(0.011)	(0.012)	(0.012)
Number of participants	4,320		4,146		5,114	
Purchases with Arizona Federal credit card						
<i>Credit card purchase amount</i>	-10.21	-7.751	7.076	8.369	11.52	11.78
	(11.30)	(11.15)	(15.88)	(15.56)	(17.95)	(18.20)
Number of participants	4,042		3,670		4,278	

TABLE H.6 CONTINUED

	Credit score <670		Credit score 670–730		Credit score >730	
	\$20 Rule	20% Rule	\$20 Rule	\$20 Rule	20% Rule	\$20 Rule
<i>Number of credit card purchases</i>	-0.192	-0.202	-0.169	-0.050	-0.128	-0.049
	(0.208)	(0.208)	(0.240)	(0.238)	(0.200)	(0.200)
Number of participants	4,266		4,053		4,968	
<i>Number of credit card purchases <\$20</i>	0.035	0.011	-0.059	-0.025	-0.170*	-0.137
	(0.106)	(0.105)	(0.118)	(0.119)	(0.097)	(0.096)
Number of participants	4,238		4,052		5,006	
<i>Percent of credit card purchases <\$20</i>	-0.003	0.007	-0.016	-0.009	-0.010	-0.006
	(0.014)	(0.014)	(0.010)	(0.011)	(0.009)	(0.009)
Number of participants	3,372		3,454		4,425	
Payments on Arizona Federal account						
<i>Number of credit card payments</i>	-0.012	-0.027	-0.047**	-0.009	-0.011	0.004
	(0.024)	(0.024)	(0.024)	(0.023)	(0.024)	(0.024)
Number of participants	4,182		4,045		4,962	
<i>Credit card payment amount</i>	-0.434	5.924	0.224	22.18	-44.75	-36.72
	(23.54)	(22.96)	(30.86)	(30.63)	(32.14)	(32.77)
Number of participants	4,042		3,670		4,278	
<i>Percent of credit card balance paid</i>	0.314	0.098	0.657	0.183*	1.707	0.125
	(0.334)	(0.104)	(0.655)	(0.098)	(1.612)	(0.155)
Number of participants	4,154		3,975		4,768	
<i>Ever paid credit card late</i>	-0.001	0.000	-0.001	-0.003	-0.001	-0.003
	(0.004)	(0.004)	(0.003)	(0.003)	(0.004)	(0.004)
Number of participants	4,320		4,146		5,114	
Arizona Federal checking and savings accounts						
<i>Total savings</i>	-56.27	-102.2	-156.9	-61.18	-56.91	-153.5
	(145.5)	(150.0)	(192.3)	(197.0)	(188.1)	(195.5)
Number of participants	4,049		4,079		5,014	
<i>Savings less credit card balance</i>	0.292	-47.38	114.2	55.30	-40.35	-245.7
	(168.2)	(171.0)	(228.2)	(229.7)	(224.8)	(232.6)
Number of participants	3,972		3,960		4,841	

TABLE H.6 CONTINUED

	Credit score <670		Credit score 670–730		Credit score >730	
	\$20 Rule	20% Rule	\$20 Rule	\$20 Rule	20% Rule	\$20 Rule
<i>Number of deposits</i>	0.053	-0.036	-0.145	0.000	-0.078	-0.140
	(0.125)	(0.125)	(0.107)	(0.107)	(0.088)	(0.089)
<i>Number of participants</i>	4,186		3,995		4,979	
<i>Sum of deposits</i>	19.365	-0.833	-33.05	50.53	-111.8	-175.8
	(100.7)	(101.6)	(127.5)	(126.5)	(129.6)	(129.6)
<i>Number of participants</i>	4,173		3,921		4,767	
<i>Number of withdrawals</i>	-0.249	-0.379	-0.103	0.832	-0.251	0.168
	(0.772)	(0.779)	(0.636)	(0.634)	(0.436)	(0.439)
<i>Number of participants</i>	4,147		4,033		5,043	
<i>Sum of withdrawals</i>	31.52	0.509	-6.507	-17.48	-89.34	-130.6
	(99.10)	(99.89)	(117.3)	(116.8)	(110.7)	(110.4)
<i>Number of participants</i>	4,193		3,930		4,781	
<i>Number of debit card transactions</i>	-0.295	-0.391	-0.313	0.591	-0.174	0.281
	(0.701)	(0.706)	(0.589)	(0.588)	(0.390)	(0.389)
<i>Number of participants</i>	4,136		4,033		5,054	
<i>Sum of debit card transactions</i>	-21.99	-25.45	3.504	14.22	-6.234	1.338
	(30.73)	(31.07)	(26.03)	(25.62)	(20.24)	(20.20)
<i>Number of participants</i>	3,888		3,735		4,764	
<i>Number of debit card transactions <\$20</i>	-0.431	-0.297	-0.109	0.313	-0.034	0.240
	(0.435)	(0.436)	(0.343)	(0.342)	(0.236)	(0.236)
<i>Number of participants</i>	4,131		4,068		5,064	
Aggregate debt and credit						
<i>Aggregate balance for open trades</i>	318.8	1826	-1694	-5780*	369.7	-492.1
	(2836)	(2808)	(3329)	(3318)	(2981)	(3002)
<i>Number of participants</i>	4,299		4,117		5,079	
<i>Aggregate balance for open revolving trades</i>	-138.2	-232.4	-489.5*	-427.0	137.0	340.0
	(250.8)	(243.3)	(294.6)	(298.4)	(262.7)	(264.1)
<i>Number of participants</i>	4,297		4,100		5,095	
<i>No. of collection trades with balance ≥ \$200</i>	0.004	0.004	0.021	-0.013	0.012*	0.006
	(0.045)	(0.045)	(0.014)	(0.015)	(0.006)	(0.004)
<i>Number of participants</i>	4,223		4,145		5,114	

TABLE H. 6 CONTINUED

	Credit score <670		Credit score 670–730		Credit score >730	
	\$20 Rule	20% Rule	\$20 Rule	\$20 Rule	20% Rule	\$20 Rule
<i>Aggregate balance in collections</i>	-67.59	-85.94	62.47	46.79	22.84**	13.14
	(97.42)	(97.80)	(43.78)	(44.39)	(11.11)	(11.16)
Number of participants	4,244		4,138		5,113	
<i>Aggregate credit for open revolving trades</i>	-301.3	-248.6	-919.9**	-1208***	-485.3	-551.7
	(276.6)	(272.8)	(344.7)	(352.2)	(371.7)	(374.8)
Number of participants	4,315		4,131		5,054	
<i>Balance-to-credit ratio for open revolving trades</i>	0.494	-0.476	-0.869	-1.080	1.215	2.249**
	(1.317)	(1.316)	(1.200)	(1.205)	(0.838)	(0.844)
Number of participants	4,204		4,133		5,111	
<i>No. of inquiries within 12 months</i>	-0.225	-0.239	-0.016	-0.231*	0.006	-0.179**
	(0.162)	(0.162)	(0.128)	(0.127)	(0.091)	(0.091)
Number of participants	4,223		4,123		5,112	
<i>FICO credit score</i>	-2.300	-0.049	0.290	-0.309	-2.224*	-1.662
	(2.322)	(2.311)	(1.972)	(1.995)	(1.340)	(1.331)
Number of participants	4,320		4,146		5,114	

Source: Arizona Federal Credit Union administrative data and pre- and postintervention credit record data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Appendix I. Additional Outcomes

TABLE I.1

ITT Effect of Rules of Thumb on Purchases with Arizona Federal Credit Card

	Percent of credit card purchases under \$20
\$20 rule	-0.009 (0.006)
20% rule	-0.002 (0.006)
Number of participants	11,573

Source: Arizona Federal administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

** $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE I.2

ITT Effect of Rules of Thumb on Payments on Arizona Federal Account

	Percent of credit card balance paid	Ever paid credit card late
\$20 rule	0.863 (0.633)	-0.002 (0.002)
20% rule	0.038 (0.091)	-0.002 (0.002)
Number of participants	13,193	13,957

Source: Arizona Federal administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE I.3

ITT Effect of Rules of Thumb on Arizona Federal Checking and Savings Accounts

	Number of deposits	Sum of deposits	Number of withdrawals	Sum of withdrawals	Number of debit card transactions	Sum of debit card transactions	Number of debit card transactions under \$20
\$20 rule	-0.046 (0.060)	-32.31 (63.93)	-0.216 (0.344)	-38.90 (62.20)	-0.239 (0.312)	-11.34 (14.43)	-0.125 (0.187)
20% rule	-0.068 (0.061)	-41.09 (63.87)	0.195 (0.346)	-68.04 (62.13)	0.207 (0.313)	-6.036 (14.45)	0.137 (0.188)
Number of participants	13,513	13,169	13,587	13,210	13,586	12,651	13,620

Source: Arizona Federal administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Appendix J. Outcomes by Delivery Mode

TABLE J.1

Arizona Federal Credit Card Debt

	Credit Card Balance		Credit Card Interest Accrued		Any Balance Revolved	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule
Mail	-94.54	-140.8*	-1.084*	-0.595	0.012	0.002
	(-78.81)	(83.42)	(0.639)	(0.671)	(0.010)	(0.010)
E-mail	-38.66	-153.2**	-0.455	-0.551	0.005	-0.012
	(-79.98)	(77.33)	(0.632)	(0.626)	(0.011)	(0.010)
Online	-183.2**	-74.26	-0.786	-0.595	-0.007	0.014
	(81.58)	(79.59)	(0.668)	(0.664)	(0.010)	(0.010)
Number of participants	6,917	6,937	7,850	7,851	6,917	6,937

Source: Arizona Federal administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE J.2

Purchases with Arizona Federal Credit Card

	Credit Card Purchase Amount		Number of Credit Card Purchases		Number of Credit Card Purchases under \$20		Percent of Credit Card Purchases under \$20	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule
Mail	16.18	-1.851	0.181	-0.228	0.040	-0.116	-0.013	-0.014
	(13.13)	(14.13)	(0.182)	(0.191)	(0.096)	(0.092)	(0.009)	(0.009)
E-mail	-6.820	6.315	-0.228	-0.027	-0.083	-0.002	0.006	0.005
	(13.24)	(13.66)	(0.181)	(0.183)	(0.090)	(0.085)	(0.009)	(0.009)
Online	-6.739	7.560	-0.225	-0.230	-0.075	-0.113	-0.007	0.004
	(13.61)	(13.39)	(0.197)	(0.180)	(0.103)	(0.092)	(0.009)	(0.009)
Number of participants	6,917	6,937	7,688	7,680	7,697	7,677	6,524	6,498

Source: Arizona Federal administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE J.3

Payments on Arizona Federal Account

	Number of Credit Card Payments		Credit Card Payment Amount		Percent of Credit Card Balance Paid		Ever Paid Credit Card Late	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule
Mail	-0.006 (0.021)	-0.015 (0.020)	0.933 (23.34)	5.183 (26.80)	-0.073 (0.082)	-0.053 (0.100)	-0.002 (0.003)	0.000 (0.003)
E-mail	-0.024 (0.021)	-0.004 (0.020)	-39.82 (25.80)	27.96 (24.23)	0.122 (0.200)	0.079 (0.185)	-0.002 (0.004)	-0.001 (0.003)
Online	-0.069*** (0.021)	-0.010 (0.021)	-15.05 (26.03)	-8.146 (22.93)	-0.050 (0.085)	-0.061 (0.089)	-0.001 (0.003)	-0.002 (0.003)
Number of participants	7,622	7,626	6,917	6,937	7,421	7,417	7,850	7,851

Source: Arizona Federal administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE J.4

Arizona Federal Checking and Savings Accounts, Part I

	Total savings		Savings Less Credit Card Balance		Number of Deposits		Sum of Deposits	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule
Mail	56.03 (183.7)	83.63 (175.5)	247.5 (205.4)	237.5 (202.6)	-0.202** (0.092)	-0.006 (0.093)	-54.97 (104.7)	27.55 (98.90)
E-mail	-64.65 (169.8)	-53.30 (171.0)	9.957 (203.8)	68.93 (202.8)	0.076 (0.092)	0.026 (0.092)	-21.77 (97.92)	19.22 (95.81)
Online	-11.15 (163.8)	-182.7 (183.9)	175.0 (197.0)	-162.9 (211.3)	-0.158* (0.093)	-0.102 (0.097)	-90.99 (86.37)	-160.3* (94.25)
Number of participants	7,572	7,546	7,355	7,321	7,603	7,589	7,422	7,401

Source: Arizona Federal administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE J.5

Arizona Federal Checking and Savings Accounts, Part II

	Number of Withdrawals		Sum of Withdrawals		Number of Debit Card Transactions	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule
Mail	-0.545 (0.552)	0.130 (0.507)	-89.70 (99.35)	-41.30 (93.29)	-0.259 (0.498)	0.122 (0.455)
E-mail	-0.449 (0.524)	0.952* (0.512)	9.717 (87.61)	-29.52 (89.71)	-0.545 (0.475)	0.832* (0.465)
Online	0.084 (0.539)	-0.500 (0.544)	-143.2* (86.19)	-122.3 (88.81)	0.101 (0.485)	-0.549 (0.490)
Number of participants	7,642	7,646	7,441	7,431	7,632	7,650

Source: Arizona Federal administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE J.6

Arizona Federal Checking and Savings Accounts, Part II

	Sum of Debit Card Transactions		Number of Debit Card Transactions under \$20	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule
Mail	-8.432 (22.66)	-17.47 (21.35)	-0.025 (0.309)	0.117 (0.273)
E-mail	-48.92** (23.00)	17.34 (21.90)	-0.328 (0.283)	0.614** (0.286)
Online	6.413 (21.58)	-13.38 (21.59)	0.424 (0.266)	-0.331 (0.299)
Number of participants	7,123	7,125	7,653	7,671

Source: Arizona Federal administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE J.7

Aggregate Credit and Debt, Part I

	Aggregate Balance for Open Trades		Aggregate Balance for Open Revolving Trades		No. of Collection Trades with Balance \geq \$200		Aggregate Balance in Collections	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule
Mail	3,727 (2,845)	-827.8 (2,568)	56.73 (244.1)	-436.2* (234.1)	0.0331 (0.025)	-0.024 (0.024)	58.34 (61.26)	-29.87 (58.32)
E-mail	-2,192 (2,354)	-4,639* (2,536)	-138.0 (237.9)	8.824 (230.4)	-0.030 (0.023)	-0.015 (0.024)	-75.53 (46.75)	-64.96 (57.45)
Online	-1,626 (2,643)	-955.9 (2,525)	-195.8 (242.6)	-82.98 (246.4)	0.004 (0.022)	-0.023 (0.022)	30.63 (51.99)	36.42 (53.83)
Number of participants	7,746	7,759	7,747	7,748	7,737	7,740	7,746	7,754

Source: Pre- and postintervention credit record data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE J.8

Aggregate Credit and Debt, Part II

	Aggregate Credit for Open Revolving trades		Balance-to-Credit Ratio for Open Revolving trades		No. of Inquiries within 12 Months		FICO Credit Score	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule
Mail	-542.8* (311.2)	-60.08 (295.8)	1.306 (0.979)	-0.167 (0.993)	-0.0846 (0.114)	-0.147 (0.106)	-3.432** (1.694)	-1.425 (1.620)
E-mail	-709.8** (294.6)	-978.5*** (308.6)	0.300 (0.992)	1.086 (0.959)	-0.102 (0.108)	-0.122 (0.113)	-2.251 (1.656)	-1.084 (1.621)
Online	-670.3** (285.3)	-766.0** (300.2)	0.0515 (0.980)	0.529 (1.044)	-0.138 (0.108)	-0.316*** (0.111)	-0.136 (1.656)	-1.387 (1.703)
Number of participants	7,756	7,754	7,703	7,716	7,721	7,728	7,650	7,661

Source: Pre- and postintervention credit record data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Appendix K. Outcomes by Number of Delivery Modes

TABLE K.1

Arizona Federal Credit Card Debt

No. of delivery mechanisms	Credit Card Balance		Credit Card Interest Accrued		Any Balance Revolved	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule
One	-105.9* (59.00)	-123.3** (58.99)	-0.775 (0.475)	-0.581 (0.478)	0.003 (0.008)	0.001 (0.007)
Two	-106.4* (60.37)	-0.336 (57.20)	-0.587 (0.478)	-0.295 (0.466)	0.004 (0.007)	0.002 (0.007)
Three	-92.26 (82.59)	-32.12 (83.94)	-0.776 (0.649)	0.156 (0.661)	-0.007 (0.010)	-0.002 (0.010)
Number of participants	6,917	6,937	7,850	7,851	6,917	6,937

Source: Arizona Federal administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE K.2

Purchases with Arizona Federal Credit Card

No. of delivery mechanisms	Credit Card Purchase Amount		Number of Credit Card Purchases		Number of Credit Card Purchases under \$20		Percent of Credit Card Purchases under \$20	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule
One	0.794 (9.930)	3.980 (10.11)	-0.091 (0.140)	-0.162 (0.139)	-0.039 (0.071)	-0.077 (0.068)	-0.005 (0.007)	-0.002 (0.007)
Two	-0.549 (9.918)	-5.241 (9.822)	-0.273** (0.136)	-0.042 (0.137)	-0.112* (0.066)	-0.021 (0.069)	-0.012* (0.007)	0.002 (0.007)
Three	12.56 (14.14)	20.08 (13.64)	-0.074 (0.179)	-0.161 (0.176)	-0.041 (0.085)	-0.118 (0.090)	-0.009 (0.009)	-0.014 (0.009)
Number of participants	6,917	6,937	7,688	7,680	7,697	7,677	6,524	6,498

Source: Arizona Federal administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE K.3

Payments on Arizona Federal Account

No. of delivery mechanisms	Number of Credit Card Payments		Credit Card Payment Amount		Percent of Credit Card Balance Paid		Ever Paid Credit Card Late	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule
One	-0.033** (0.016)	-0.010 (0.015)	-18.01 (18.83)	8.511 (18.67)	-0.001 (0.101)	-0.012 (0.100)	-0.002 (0.002)	-0.001 (0.002)
Two	-0.019 (0.015)	-0.018 (0.016)	-8.859 (18.88)	-31.31 (19.10)	0.605 (0.514)	0.081 (0.110)	-0.003 (0.002)	-0.001 (0.003)
Three	-0.021 (0.021)	-0.012 (0.019)	-9.712 (24.49)	44.11* (25.03)	4.232 (4.111)	0.041 (0.134)	-0.002 (0.003)	-0.006* (0.003)
Number of participants	7,622	7,626	6,917	6,937	7,421	7,417	7,850	7,851

Source: Arizona Federal administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE K.4

Arizona Checking and Savings Accounts, part I

No. of delivery mechanisms	Total Savings		Savings Less Credit Card Balance		Number of Deposits		Sum of Deposits	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule
One	-6.565 (121.9)	-51.28 (123.9)	143.8 (143.1)	47.34 (144.8)	-0.094 (0.069)	-0.027 (0.069)	-55.85 (72.47)	-38.28 (72.32)
Two	-114.8 (116.8)	-49.64 (120.5)	8.045 (138.2)	-30.33 (141.2)	0.007 (0.069)	-0.119* (0.070)	2.872 (72.17)	-59.98 (73.86)
Three	-0.815 (157.1)	-330.5* (178.0)	81.59 (187.3)	-424.1** (198.8)	-0.062 (0.097)	-0.037 (0.091)	-67.68 (100.9)	7.315 (88.12)
Number of participants	7,572	7,546	7,355	7,321	7,603	7,589	7,422	7,401

Source: Arizona Federal administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE K.5

Arizona Checking and Savings Accounts, part II

No. of delivery mechanisms	Number of Withdrawals		Sum of Withdrawals		Number of Debit Card Transactions	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule
One	-0.304 (0.399)	0.190 (0.391)	-74.75 (69.87)	-64.52 (69.57)	-0.235 (0.361)	0.132 (0.354)
Two	-0.158 (0.377)	0.035 (0.398)	6.133 (68.39)	-89.43 (69.45)	-0.286 (0.344)	0.163 (0.355)
Three	-0.127 (0.513)	0.690 (0.498)	-66.21 (94.84)	-14.46 (87.39)	-0.107 (0.450)	0.560 (0.462)
Number of participants	7,642	7,646	7,441	7,431	7,632	7,650

Source: Arizona Federal administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE K.6

Arizona Checking and Savings Accounts, part III

No. of delivery mechanisms	Sum of Debit Card Transactions		Number of Debit Card Transactions under \$20	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule
One	-16.94 (16.65)	-4.356 (16.29)	0.023 (0.214)	0.131 (0.214)
Two	-6.162 (16.00)	-14.93 (16.52)	-0.254 (0.209)	0.110 (0.213)
Three	-10.03 (21.75)	15.12 (21.55)	-0.185 (0.272)	0.237 (0.283)
Number of participants	7,123	7,125	7,653	7,671

Source: Arizona Federal administrative data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE K.7

Aggregate Credit and Debt, Part I

No. of delivery mechanisms	Aggregate Balance for Open Trades		Aggregate Balance for Open Revolving Trades		No. of Collection Trades with Balance \geq \$200		Aggregate Balance in Collections	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule
One	-23.60 (1,967)	-2,142 (1,932)	-91.85 (177.8)	-170.4 (175.8)	0.003 (0.017)	-0.020 (0.017)	4.749 (39.37)	-19.34 (40.65)
Two	-767.4 (1,942)	-1,011 (1,982)	-286.9 (179.1)	6.375 (181.4)	0.012 (0.016)	-0.003 (0.017)	-15.96 (38.43)	-18.64 (36.75)
Three	-221.1 (2,667)	-1,245 (2,719)	123.4 (236.4)	-31.54 (230.7)	-0.006 (0.023)	0.039* (0.022)	14.20 (44.48)	27.62 (45.40)
Number of participants	7,746	7,759	7,747	7,748	7,737	7,740	7,746	7,754

Source: Pre- and postintervention credit record data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

TABLE K.8

Aggregate Credit and Debt, Part II

No. of delivery mechanisms	Aggregate Credit for Open Revolving Trades		Balance-to-Credit Ratio for Open Revolving Trades		No. of Inquiries within 12 Months		FICO Credit Score	
	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule	\$20 Rule	20% Rule
One	-640.8*** (223.8)	-601.8*** (225.9)	0.555 (0.729)	0.483 (0.736)	-0.108 (0.082)	-0.195** (0.082)	-1.942 (1.246)	-1.299 (1.237)
Two	-601.0*** (226.5)	-724.2*** (232.1)	0.0931 (0.715)	-0.399 (0.728)	-0.042 (0.082)	-0.211** (0.082)	-1.548 (1.248)	-0.052 (1.250)
Three	-442.6 (302.6)	-778.1*** (284.3)	0.775 (0.976)	1.618* (0.959)	-0.080 (0.113)	-0.272** (0.111)	0.265 (1.613)	-0.759 (1.704)
Number of participants	7,756	7,754	7,703	7,716	7,721	7,728	7,650	7,661

Source: Pre- and postintervention credit record data.

Notes: Results are from a fixed-effects model with account level and monthly fixed effects included. Robust standard errors are shown in parentheses, clustered at the individual level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

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