Does Increasing Access to Formal Credit Reduce Payday Borrowing?

Sarah Miller* Cindy K. Soo†‡

ABSTRACT

The use of high cost "payday loans" among subprime borrowers has generated substantial concern among policymakers. This paper provides the first evidence of substitution between "alternative" and "traditional" credit by exploiting an unexpected positive shock to traditional credit access among users of payday loans and other alternative credit products: the removal of a Chapter 7 bankruptcy flag. We find that the removal of a bankruptcy flag on a credit report results in a sharp increase in access to traditional credit and raises credit scores, credit card limits, and approval rates. However, despite meaningful increases in access to traditional credit, we find no evidence that borrowers reduce their use of payday loans, and our confidence intervals allow us to rule out even very small reductions in payday borrowing. Furthermore, we find evidence that flag removals increase the use of other alternative credit products such as online subprime installment loans that borrowers may have not previously qualified for. These results indicate that marginally improving access to less expensive formal credit is insufficient to meaningfully shift borrowers away from high cost subprime products. We discuss likely explanations for this including increased marketing of subprime products associated with the flag removal, low income borrowers' need for cash, information constraints, and an insufficiency in the size of the increase in credit access associated with the flag removal.

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*University of Michigan Ross School of Business

†University of Michigan Ross School of Business

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I. Introduction

The use of high-cost "payday" loans by low-income borrowers has generated substantial concern among policymakers. Some regulators argue that credit constrained borrowers are driven to use payday and other subprime loans because their access to traditional credit products is limited. These regulators view policies to encourage banks and credit unions to extend credit to low income, high risk clientele as a way to reduce the use of these payday loan products.[1] At the same time, studies have found that payday borrowing may reflect lack of knowledge or self-control problems, in which case it is not clear that improving access to traditional credit would actually change payday loan borrowing behavior.[2] Identifying the causal impact of improved credit access is challenging, as those with higher credit scores or credit card limits likely vary on unobservable dimensions such as delinquency risk, financial knowledge, or other characteristics that may affect the propensity of these borrowers to use payday loan products. Addressing this question has also been difficult empirically because the use of subprime products such as payday loans are not reported on standard credit reports. Analyzing the impact of credit access on payday borrowing behavior requires linking information on subprime credit behavior with information on traditional credit activity, as well as a source of exogenous variation in traditional credit access.

In this paper, we address this empirical challenge by linking a new administrative panel of payday loan and other "alternative" credit borrowers with their traditional credit reports. Using this linked panel, we are able to implement an identification strategy that exploits an exogenous positive "shock" to traditional credit access: the removal of a bankruptcy flag from a borrower's credit report. The Fair Credit Reporting Act requires credit bureaus to remove Chapter 7 flags after 10 years, generating a sharp increase in credit scores at the date of the flag removal. We focus on Chapter 7 rather than Chapter 13 filings in order to focus on low income borrowers who are more likely to take up alternative lending products. [3] Previous research has found that the removal of these flags immediately increases credit scores and results in higher credit limits and higher approval

[1] See, for example, "Banks Urged to Take On Payday Lenders With Small, Lower-Cost Loans" `https://www.nytimes.com/2018/02/16/your-money/banks-payday-loans.html`.

[2] For example, some borrowers use payday loans even when they are able to borrow on their credit card at much lower rates (Pagel and Olafsson (2016), Agarwal, Skiba, and Tobacman (2009), Melzer (2011)).

[3] The Bankruptcy Abuse Prevention Act imposed income means testing for Chapter 7 filings in 2005, in order to shuttle higher income borrowers into Chapter 13 filings instead. While prior studies such as Dobbie, Keys, and Mahoney (2017) have used both Chapter 7 and Chapter 13 filings, their data filings are pre-2005, and thus before the Bankruptcy Abuse Prevention Act would have been imposed.

rates (Gross, Notowidigdo, and Wang (2018); Dobbie et al. (2017); Dobbie, Goldsmith-Pinkham, Mahoney, and Song (2019); Musto (2004)).[4] Studies have also found that bankruptcy flag removals have a precise zero impact on labor market outcomes (Dobbie et al. (2019)), allowing us to rule out liquidity effects. Thus with this newly linked panel, our work provides the first evidence as to whether improving access to "traditional" credit affects payday borrowing.

We obtain payday and alternative credit outcomes from an "alternative" credit bureau, Clarity Services ("Clarity"), that specializes in provides underwriting services for the subprime consumer population, including those with typically thin or no file credit reports.[5] We link individuals in the Clarity database from 2013 to 2017 with their standard credit reports from Experian, one of the three major credit reporting agencies. These linkages allow us to see changes in both traditional and non-traditional credit product use that occurs around the time a bankruptcy flag is removed. Our data follows borrowing behavior through 4 years following the flag removal, allowing us to see longer term outcomes. Our final sample includes 30,246 alternative credit users who have had a Chapter 7 removal over our sample period. Our population of alternative credit users has limited credit access and faces higher credit constraints relative to the average borrower. The average alternative credit user in our simple has a total credit limit of less than $2000 and has used over 80 percent of their available credit, whereas the typical credit card borrower has an average total limit of $18,000 and has only used approximately 54 percent.

Using data from the traditional credit reports, we first confirm that bankruptcy flag removal did indeed create a positive shock to credit access among our sample. Credit scores jump sharply by approximately 7 points upon flag removal, and continue to be approximately 6 to 7 points above pre-flag removal trends at the end of four years. Consistent with prior studies, we find that this jump in credit scores results in a corresponding increase in credit limits and credit approvals. The total amount of credit available on credit cards increases to $63 immediately upon the removal of a bankruptcy flag and to about $500 higher than the pre-flag removal mean by the end of four years. This represents an approximately 25% increase in credit card limits by the end of our sample period. Since an individual in our sample borrowers about $340 per year in payday loans on average, this

[4]Due to the obscurity of bankruptcy flags on credit reports, survey evidence has demonstrated that the removal of these flags are unexpected by borrowers (Gross et al., 2018).

[5]Clarity Services is now a subsidiary of Experian, our standard credit bureau data source. https://www.clarityservices.com/about-us/

credit card limit increase should be enough allow individuals to fully switch all payday borrowing to less expensive credit card borrowing by the end of our sample period. We also observe significantly higher approval rates for credit applications, which increase by about 8% immediately and by about 14% by the end of our sample period. These results suggest that the flag removal did indeed make it easier for the subprime borrowers in our sample to borrow through traditional credit channels.

Despite the clear improvement in access to mainstream credit, we do not observe any reduction in payday loan usage. We do not find any evidence that the average amount borrowed decreases post-flag removal, and our confidence intervals allow us to rule out decreases in monthly payday borrowing of more than 4% (about $1.23) in the first year and more than 2% (about $0.50) by the end of our sample period. Furthermore, we find monthly credit applications for payday loans actually *increase* by 0.02 applications in the first year and continue to increase to 0.14 applications over the pre-flag removal trend by the end of four years. Furthermore, we simultaneously find that the applications and amount borrowed in online installment loans, a longer-term form of subprime credit, increased significantly post flag-removal. These results hold across a variety of specifications, sample definitions, measures of payday borrowing, and empirical approaches, as well as across many subgroups. In summary, we do not find that the improved access to less expensive, traditional credit meaningfully reduced use of "alternative" credit products; if anything, consumers increased their use of some types of alternative products for which they might not have otherwise qualified.

This result is puzzling given that credit card borrowing is substantially less expensive than payday loans. We explore three potential explanations for why we do not observe any reductions on payday borrowing: (1) the increase in credit score is insufficient to reduce alternative credit use, (2) borrowers are targeted by increased credit marketing offers post-flag removal, and (3) alternative credit users have a cash need that cannot be substituted with traditional credit loans. We find that the magnitude of credit access increases does not have any impact on reducing payday loan usage. Even subgroups that experience very large increases in credit scores of 30 to 40 points do not reduce their payday loan usage and still increase their use of subprime installment loans. We find that there are small, but statistically significant, increases in the marketing of "pre-approved" payday loans and online subprime installment loans to subprime borrowers following a bankruptcy flag removal. Finally, we discuss how the need for cash for some expenses–such as to pay rent or repay informal loans from friends or family–may be driving our sample's use of these high cost

products.

Our results imply that regulatory efforts to increase access to traditional credit are unlikely to be successful at reducing payday loan borrowing unless they are quite substantial (generating larger increases in credit access than those studied here) or they are coupled with other interventions (such as information interventions or cash transfers).

II. Background

While the payday loan industry has attracted criticism and scrutiny from both regulators and the public at large, empirical evidence on the impact of payday loans on borrowers' outcomes is mixed. A number of studies justify concerns that credit-constrained borrowers turn to payday loans as a needed source of alternative financing. Bhutta, Skiba, and Tobacman (2015), for example, find that borrowers apply for payday loans when they have limited access to mainstream credit and severely poor credit histories. In a comprehensive survey of payday customers, Lawrence and Elliehausen (2008) find that more than two-thirds turned to payday lenders after being turned down by a traditional creditor and nearly all were fully aware of the finance charges associated with the loans. Using natural disasters as an exogenous shock, Morse (2011) examines the causal effect of payday lenders on welfare and finds that payday lending mitigates foreclosures and larcenies in personal emergency situations. Some policy evaluations have found that restricting access to payday loans either has no effect (Carter and Skimmyhorn, 2017) or a deleterious effect (Zinman, 2010) on borrowers' well-being. These studies suggest that payday borrowers are credit constrained and that simply eliminating payday options would shut down a much needed alternative source of financing.

At the same time, a number of other studies have found that payday borrowers do appear to have access to liquidity and turn to payday products because of misinformation or behavioral reasons. For example, Agarwal et al. (2009) find that payday borrowers have substantial liquidity on their credit cards on the days they take out a payday loan. In another survey of payday borrowers, Bertrand and Morse (2011) find that many respondents use loans for temptation spending such as vacations, restaurants, electronics, and gifts. Using a detailed administrative dataset from Iceland, Pagel and Olafsson (2016) similarly find evidence that some payday borrowers are sufficiently liquid to borrow

money less expensively and spend payday loans on unnecessary items. The authors conclude that self-control or poor information are proximate causes of payday borrowing, rather than liquidity constraints. Bertrand and Morse (2011) and Burke, Leary, and Wang (2016) find that disclosing better information to payday borrowers reduces the take up of payday loans significantly. Melzer (2011) finds that access to payday loans actually make it more difficult for borrowers to pay other bills such as mortgages. Carrell and Zinman (2014) find reduced job performance among military members associated with payday loan access. These studies raise concerns that without proper regulation, payday lenders could mislead borrowers into taking out loans unaware of high fees and adverse consequences on their credit.

This paper uses the removal of a bankruptcy flag as an exogenous "shock" to payday borrowers ability to access traditional credit such as credit cards or personal bank loans which we describe in further detail in the next section. The removal of a bankruptcy flag has been used in other contexts to study the impact of poor credit on labor and credit market outcomes (Musto, 2004; Dobbie et al., 2017; Gross et al., 2018; Dobbie et al., 2019; Herkenhoff, Phillips, and Cohen-Cole, 2016). Musto (2004) analyzes the impact of removing bankruptcy flags on traditional credit records. He finds sharp short run effects on credit scores and credit limits. Gross et al. (2018) and Dobbie et al. (2019) build on this work and find that bankruptcy flag removals lead to not only an immediate but a persistent increase in credit scores, as well as credit card limits and credit card balances. Dobbie et al. (2019) examine effects of bankruptcy flag removals on employment, and find zero to negligible effects on employment and earnings. To our knowledge, our study is the first to use this approach to examine the substitution between "traditional" and "alternative" lending products.

III. Credit Data

To analyze the impact of credit market access on payday borrowing, we construct a unique panel dataset linking both traditional credit outcomes with a new administrative dataset of payday borrowing outcomes.

A. Traditional Credit Bureau Data

In the United States, credit reports are provided by three main nationwide credit bureaus: Equifax, TransUnion, and Experian. Lenders use credit scores and information in credit reports to evaluate a borrowers ability to repay a loan. Each credit file contains information across the following components: trade lines, public records, collections, and inquiries (Consumer Financial Protection Bureau, 2012).

Trade lines are accounts in a borrowers name furnished by lenders to the credit bureaus. Lenders generally report the type of credit (auto, mortgage, credit card), credit limit or loan amount, account balances, payment history, and defaults. These files also may include dates an account was opened or closed, whether or not an account is delinquent or in collection. The files do not contain any terms of the loans such as interest rates, points, or fees or information on a borrowers income or assets. Public records are obtained from the government and include any bankruptcies, judgements, and tax liens. Additional third-party collection items are also reported by collection agencies on behalf of lenders. Finally, inquiries are any requests to access a consumer's credit file.[6] Our data include all inquiries initiated by borrowers such as to apply for a credit card or open a bank account. Only these type of inquiries are incorporated into a consumer's credit score (Consumer Financial Protection Bureau (2012)).

All credit bureaus employ a standardized data format so that lenders can submit and use data from one bureau to another interchangeably. Lenders also typically pay an additional fee for credit bureaus to provide a credit score they use to inform their underwriting. Credit scores are calculated through bankruptcy prediction models. The most commonly known model was built by the Fair Isaac Corporation (FICO), and provides a majority of third-party generic credit scores. More recently, credit bureaus have jointly developed VantageScore, a comparable and competing scoring model. Lenders also often have their own proprietary scoring models that use information purchased from credit reports. There are numerous credit scoring models for different purposes.[7] The same attributes, however, affect credit scores across models including borrowers' payment history, delinquencies, number of accounts, and inquiries.

[6]Credit bureaus classify these as "hard" inquiries. Soft inquiries are those initiated by lenders such as for bank pre-screenings (Consumer Financial Protection Bureau (2012)).

[7]FICO, for example, has 49 different models (Consumer Financial Protection Bureau (2012)).

The most common credit scores assess the likelihood that a borrower will become over 90 days delinquent within two years. Credit scores have a significant impact on a consumer's ability to access credit. Events such as delinquencies, bankruptcy filings, and foreclosures can cause a significant drop in scores that cause a lender to only offer a borrower subprime interest rates or deny a loan altogether. Filing for bankruptcy, for example, can drop Vantage credit scores, which ranges from 501 to 900, over 200 points.[8]

The Fair Credit Reporting Act of 1970 limits how long a credit bureau can maintain negative information such as bankruptcy on a credit file. FCRA stipulates that bankruptcies cannot be listed for more than 10 years after filings.[9] Late payments, delinquencies, civil judgments, tax liens, and collections are typically removed after seven years.

B. Alternative Credit Data

The main credit bureaus typically do not, however, collect information from institutions that lend out alternative credit options such as payday loans. The utilization and characteristics of these products are thus not reflected in standard credit reporting datasets. In this paper, we present a novel dataset where we link traditional credit bureau outcomes to an administrative panel dataset of payday borrowing outcomes from Clarity Services, Inc. ("Clarity"). Clarity is a credit reporting agency that specializes in providing underwriting and information to lenders offering alternative subprime products such as a payday loans. As with traditional credit bureaus, lenders report all loan applicant information of their borrowers to Clarity for verification.[10] Clarity continues to then track all trade line activity on a subprime loan that is taken up by the borrower. Thus, the information in Clarity's trade line database is analogous to the information in standard credit reports. They similarly provide details on account type, balances, payment histories, and delinquencies except on alternative subprime products. This information is used by lenders who are interested in assessing default probabilities of applicants who are active in the alternative credit market. However, in contrast to a traditional credit bureau, Clarity only obtains this information

[8] See Figure 1 in Consumer Financial Protection Bureau (2012) and hypothetical FICO impacts at `https://www.myfico.com/credit-education/questions/credit-problem-comparison/`.

[9] 15 U.S.C. states "Cases under title 11 or under the Bankruptcy Act that, from the date of entry of the order for relief or the date of adjudication, as the case may be, antedate the report by more than 10 years."

[10] As of 2012, all identity verification and fraud detection was provided by Experian to Clarity `https://www.prnewswire.com/news-releases/experian-provides-clarity-services-with-identity-verification-and-fraud-detection-cap` `html`

for loans originating with lenders who use their underwriting services. Although Clarity covers approximately 70 percent of subprime borrowers, it may not include information on all products used by each borrower. Although it includes information from both storefront and online lenders, online lenders tend to be over-represented due to their heavier reliance on third party underwriting services.

Payday loans have been the most popular alternative credit product among borrowers in this market. Payday loans are short-term, single payment loans named after the fact that borrower's scheduled loan repayment coincides with their next payday from their employer. Payday loans are unsecured by any collateral, but require evidence of a regular income and a checking account. Lenders will typically accept a pay stub or Social Security check as income evidence. Loan amounts are typically very small, ranging from $50 to $300, and very short-term, two to four weeks, depending on the timing of the borrower's income. Fees associated with these single payment loans are typically very high relative to the loan amount, ranging from $10 to $20 per $100 borrowed. While loan maturation is usually set to the borrower's next payday, lenders often provide the option for borrowers to roll over or reborrow within a few days of the due date.

More recently, payday lenders have also offered subprime installment loans as an alternative credit option to consumers. These loans are offer repayment in a series of installments rather than a single payment option within payday loans. These loans are therefore also larger in magnitude, ranging from $500 to $5000. High-interest online installment loans have also come to market in some states to get around regulations of traditional payday lending. While some online installment lenders report to credit bureaus–and even advertise their products as a way to "rebuild your credit" –others do not.

Payday and installment loans are offered both in storefront and online, with lenders offering both storefront and online to reach a greater customer base. Online lending in particular has been responsible for the most growth in subprime credit products in recent years.[11] We present a few examples from the websites of such online lenders in the Appendix Figure A1. These lenders market their products to borrowers with bad credit, with some lenders who offer both payday and installment loans marketing the installment loans as "payday consolidation loans."

[11] Online lending has increased 20 percent in volume and 19 percent in revenue from 2006 to 2011 whereas storefront payday loan volume has decreased 7 percent in volume and 6 percent in revenue Nunez, Schaberg, Hendra, Servon, Addo, and Mapillero-Colomina (2016).

C. *Linked Data Panel*

Clarity covers over 60 million individuals, and collects data from both storefront and online lenders. We obtained a random sample of 1 million individuals who have any record with Clarity between 2013 to 2017. Clarity provides us with information on all inquiries and tradelines associated with this sample, from which we construct monthly usage rates. We then link this panel to the history of their credit file reports from Experian from June of each year over the same period.[12] This panel allows us to observe the effects on borrowing across both the mainstream credit market and alternative credit market.

From this panel, we restrict our sample to those who have had a Chapter 7 bankruptcy removal during our sample period, 2013-2017. The Fair Credit Reporting Act requires that credit bureaus remove Chapter 7 and Chapter 13 bankruptcy flags from individual credit reports after ten years. We focus on Chapter 7 rather than Chapter 13 filings in order to focus on low income borrowers who are more likely to take up alternative lending products. The Bankruptcy Abuse Prevention Act imposed income means testing for Chapter 7 filings in 2005, in order to shuttle prime borrowers into Chapter 13 filings instead.[13] Credit bureaus also voluntarily remove Chapter 13 flags after seven years, which is confounded by effects of when other delinquencies are removed.

Our final sample for analysis includes 30,246 "alternative credit" borrowers who appear both in the Clarity data and also have a Chapter 7 bankruptcy on their credit record that is removed over our sample period. The first three columns of Table I presents descriptive statistics for our analysis sample for the years prior to the removal of the bankruptcy flag. The average credit score among borrowers in our sample is 531, indicating the population is, on average, subprime. The average credit card limit (all credit cards combined) is approximately $1977 and average utilization, i.e., the percentage of total revolving credit being used, is over 80 percent, indicating a fairly credit constrained sample. Average monthly payday borrowing is approximately $29 (inclusive of months with zero borrowing); monthly subprime installment borrowing is similar. About 17% of borrowers have at least one payday loan in any given year in our sample, and about 40% have at least one

[12] In the main analysis, we use Experian credit report data from 2013 to 2017 so that the period of analysis is identical across the Clarity and Experian data. In the appendix, we show that the results are robust to using 2006 to 2017 Experian data, which allows us to observe a longer pre-flag removal period for some borrowers.

[13] While prior studies such as Dobbie et al. (2017) have used both Chapter 7 and Chapter 13 filings, their data filings are pre-2005, and thus before the Bankruptcy Abuse Prevention Act would have been imposed.

payday inquiry (i.e. payday loan application).

Table I also shows that our sample has substantially worse access to credit, lower liquidity, and more delinquencies than a typical borrower and even relative to the typical borrower with a bankruptcy flag on her credit report. Columns 4 through 6 show statistics for credit users with a bankruptcy flag from a random sample of Experian credit reports. Columns 7 and 9 show statistics for a random sample of Experian credit reports unconditional on bankruptcy flag presence. These comparisons highlight the striking difference between users of alternative subprime credit and typical borrowers. For example, on average, borrowers have credit limits across all open credit cards of about $18,182, and even borrowers with a bankruptcy flag on their credit report have credit card limits of $4,502. In contrast, our sample has a credit limit of only $1977. Similarly, utilization rates in our sample are, on average, over 80 percent, whereas they are about 54 percent in the population as a whole and 69 percent among those with a bankruptcy flag. Delinquencies exhibit similar patterns, with total balance on third party collections and amount 30 days past due or more higher in the Clarity sample relative to a typical borrower with a bankruptcy and much higher than what's observed among a typical borrower unconditional on having a bankruptcy flag. These comparisons highlight the fact that users of payday loans and other alternative credit products are meaningfully more credit constrained and delinquency prone than a typical borrower, even when compared to those with recent bankruptcies.

Figure 1 presents more information on borrowers' access to formal credit at the time they take out a payday loan.[14] This figure shows the fraction of the sample who took out a payday loan by their average utilization rate during the 6 month period in which the payday loan fell. The majority of the borrowers appear to be highly credit constrained around the time they took out a payday loan, with about 70 percent having utilization rates at 80 percent or higher at the time they take out a payday loan and 34 percent either having no credit cards on file or using 100 percent or greater of their available credit. This is consistent with other work that documents most borrowers are constrained (Bhutta et al., 2015). The fact that payday loan borrowers have limited access to formal credit suggests that we might *a priori* expect an alleviation of that constraint to result in less payday loan usage–that is, borrowers may be using expensive payday loans as a last

[14]Note that utilization rates are not defined for borrowers who have no source of revolving credit, as is the case for approximately 25% of the borrower by year observations in our data. We assign such borrowers a utilization value of 100 percent, as they have no credit available for use.

resort. At the same time, a substantial minority use payday loan products even with more than 20 percent of their credit card credit available and some payday loan users exhibit considerable formal credit availability at the time of the payday loan. Borrowers who use payday loans even when less expensive traditional credit is available may exhibit this behavior due to poor information about the costs of payday borrowing; as a result, changes in access to credit may be less salient for this group.

IV. Empirical Analysis

We employ an event-study framework following Dobkin, Finkelstein, Kluender, and Notowidigdo (2016), Gross et al. (2018), and Dobbie et al. (2019). Specifically, we exploit the required flag removal of Chapter 7 bankruptcy flags by the Fair Credit Reporting Act to examine the causal impact of traditional credit access on subprime borrowing outcomes. We first explore our outcomes graphically using the following nonparametric estimation:

$$y_{it} = \gamma_y + \gamma_c + \sum_{\tau=-12}^{16} \delta_\tau \mathbf{I}(r_{it} \in \tau) + \epsilon_{it} \tag{1}$$

where r_{it} indicates the month since bankruptcy flag removal. To reduce noise, we group these months into quarters, denoted τ. Coefficients δ_τ capture the effect of flag removal by the quarter relative to the year of flag removal. γ_y represents fixed effects for calendar year while γ_c represents cohort year fixed effects to control for individuals who declared bankruptcy in the same year. This event study estimation explores how outcomes evolve around the time of the bankruptcy flag removal after accounting for contemporaneous time trends and differences across filing cohorts.

After exploring these patterns graphically, we estimate the impact of the flag removal more formally by assuming that, in the absence of a flag removal, credit outcomes would have continued to evolve along their pre-existing trend. This approach ascribes any deviation from the pre-trend to a causal impact of the flag removal. Prior studies have shown that over time, post-bankruptcy borrowers gradually build back their new credit and overall improve their financial portfolio (Han, Keys, and Li 2013, Jagniani and Li 2014). In our graphical figures, we also plot a linear estimation

in the pre-flag removal period to look for any common pre-trends that may be occurring across borrowers before their bankruptcy flag is removed. Consistent with prior studies, we find pre-trends that are roughly linear for both traditional credit outcomes and alternative credit outcomes. Thus, our final specification further controls for this linear pre-trend, represented by αt:

$$y_{it} = \alpha t_{pre} + \gamma_y + \gamma_c + \sum_{y=1}^{4} \delta_y \mathbf{I}(r_{it} \in y) + \epsilon_{it} \tag{2}$$

We implement this pre-trend specification by excluding the pre-flag removal event time indicators in equation (1) and instead including a linear "time to removal" term, denoted t_{pre}. This term should account for any pre-existing linear time trend (Gross et al., 2018). Coefficients δ_y estimate the impact of bankruptcy flag removal on credit outcomes relative to how these outcomes would have progressed otherwise, while removing any common calendar time and mean effects across cohorts. We group these indicators into year (y), rather than reporting them by month (t), for the ease of reporting.

The interpretation of our event study design also assumes bankruptcy flag removals are an exogenous shock to credit supply that is unanticipated by borrowers. Because credit bureaus are required by the FCRA to remove flag at a set period, consumers might anticipate this removal by applying for new credit in the months immediately leading up to the flag removal. Because of the obscurity of credit reporting, however, most consumers may not even be aware of upcoming flag removals and survey evidence is consistent with the idea that these removals are a surprise to borrowers (Gross et al., 2018). Nonetheless, we can empirically test to see if borrowers anticipate flag removals by looking for a gap in the number of inquiries in the months leading up to flag removals. As we describe in the our following results, we do not find evidence of borrowers shifting the timing of their credit card applications in anticipation of the flag removal.

We conduct several "robustness checks" to confirm that our results are not sensitive to model specification or sample choices. We examine whether the results change if we include individual fixed effects in lieu of cohort fixed effects, include year by month (rather than year) fixed effects for the Clarity data,[15] if we expand the sample period in the Experian data to include years through

[15]Note that since we only observe one month of data per year for the Experian data, including year fixed effects is equivalent to including year by month fixed effects.

2007, and if we use a "control group" of bankruptcy filers whose flags were removed outside of our sample period to identify the year fixed effects in our model. These robustness checks yield results largely similar to those reported in our main specification. We discuss and report these in the Appendix, rather than the main text.

A. Impact of Bankruptcy Flag Removals on Traditional Credit Access

We first examine the impact of bankruptcy flag removals on the total number of bankruptcies and credit scores. Figure 2 first plots the impact of bankruptcy flag removals on total bankruptcies and credit scores. Figure 2 plots the event study coefficients within each event quarter across each outcomes. The x-axis in these figures denote the number of quarters since the removal of the bankruptcy flag, with 1 representing the quarter in which the flag is removed (dashed line). The solid line in each plot is a linear fit to the pre-flag removal data. Consistent with a deterministic relationship with bankruptcy flag removal, we observe a sudden drop in the number of bankruptcies on a consumer's credit report. Table II reports the corresponding estimates of δ_y. Note that we report the average annual estimate for space saving reasons. We find that the number of bankruptcies on a consumer's report falls significantly by about 0.886 in year 1, and remains lower by about 1 by year 4. Note that the number of bankruptcies does not always drop to 0, as borrowers can have multiple bankruptcies on their report.

We also observe an equally sharp increase in consumers' credit scores. The second panel of Figure 2 shows a sudden jump in credit score of an approximately 7 to 8 points. Table II reports that credit scores increase significantly by an average of 7.1 points in the first year. This increase remains high throughout our sample period, and is on average 6 points higher than the pre-flag removal trend in year 4. These magnitudes are on par with magnitudes found in Dobbie et al. (2019) (who find an initial jump of 9 points) and Gross et al. (2018) (who estimate a jump of 15 points). We would expect the difference in our estimates to be smaller, however, due to the subprime population we examine in our study.[16] The impacts on credit score remain elevated and statistically significant throughout our post flag-removal period. These "first-stage" results show that removal of bankruptcy flag does indeed mechanically drop the number of bankruptcies and

[16]Dobbie et al. (2019) examine Chapter 13 filers which on average have higher incomes and Gross et al. (2018) analyze a representative sample of chapter 7 filers.

provide sudden increase in credit access via credit scores.

Like prior studies, we find that the increase in credit scores lead to a greater supply of credit through higher credit card limits. The first plot of Figure 3 shows the impact of flag removal on the total credit limit for a consumer across all credit cards. Consistent with prior studies, impacts appear gradual, with greater diversions from the pre-flag removal trend after the first year. The estimates in Table II demonstrate that these changes in credit supply are both statistically significant and economically meaningful. Credit limits across all cards increase significantly by \$63 in the first year, but are significantly higher by \$243 in year 2 and \$490 than what would have been predicted based on the pre-flag removal trend by year 4. Prior to flag removal, the average total credit limit was \$1977. Thus, a \$490 increase represents approximately 25 percent increase in credit limits.[17] An increase in credit limits of a few hundred dollars may appear modest; however, it is important to recall that individuals in our sample only use about \$340 in payday loans per year on average (see Table I). An increase in credit limits the size of which we observe by year 3 would already allow them to switch all of their payday borrowing on to a less expensive credit card.

We proxy lender approval rates with the number of new accounts opened per credit inquiry. Like credit limits, we find trades per inquiry exhibit a small jump in the first year post flag-removal and larger increases going forward. Estimates in Table II show that these increases are still significantly higher than the pre-flag trend, in which lender approvals jump by 0.032 per inquiry in year 1 and then to 0.06 per inquiry by year 3 and 0.054 by year 4. This translates to an increase in approval rates of about 8% in the first year and about 14% by the end of our sample period, and implies about 0.26 more accounts per year on average being approved relative to the pre-flag removal period.[18]

The third plot in Figure 3 shows the impact of flag-removal on the number of credit inquiries. Inquiries are recorded when consumers submit applications for traditional credit products, and a lender requests a credit check to review an applicant's credit. Note that credit applications are often submitted in response to direct mail offers or targeted advertising, so examining inquiries combines effects coming from both borrower demand and lender supply. Figure 3 shows a jump in total number of inquiries post flag-removal, indicating that consumers are submitting more applications

[17] Dobbie et al. (2019) also find credit limits increase gradually each year following the flag removal, with an average of \$443 per year.

[18] We arrive at 0.26 as $12 \times (0.054 \times (0.385 + 0.014)$, where 0.06 is in the increase in trades per inquiry, 0.385 is the pre-flag removal average number of inquiries in a 30 day period, and 0.014 is the direct impact of the flag removal on monthly inquiries. This is multiplied by 12 to arrive at an annual, rather than monthly, number.

for traditional credit products. Importantly, the plot shows does not show evidence of a jump in demand in any months prior to flag removal, indicating borrowers are not shifting their demand for credit in anticipation of their bankruptcy flag being removed from their credit report. Estimates in Table II show that credit inquiries are significantly elevated the first year after the flag removal, and then declines after the second year. Our data likely underestimates inquiries, however, as lenders do not necessarily report every inquiry made. Auto and credit card inquiries in particular are often only reported to one or two credit bureaus.

The final plot in Figure 3 examines credit utilization – the ratio of balance to available credit. Borrowers at 100% utilization are "maxed out" and have no remaining revolving credit to use. Figure 3 shows that initially post flag-removal credit utilization patterns do not differ from their pre-flag removal trend, and by the third year utilization looks like it begins to flatten and decline relative to the pre-removal trend. Our estimates in Table II match these patterns, where estimates are not significant across the first three years and then negatively significant in year 4. In other words, we find that the increased supply borrowers receive also translates into improved liquidity across their credit cards. Our estimates are consistent with a pattern of increased availability and steady use of "traditional" credit card credit.

Our analysis of credit limits and approvals indicate a sustained increase in availability of formal credit for our sample of subprime borrowers. Given this increase in credit, we explore whether this subsequently impacts borrowers' use of formal credit. In Figure 4, we plot the impact of flag removal on borrowers credit card balance. As their credit limits increase each year, we find borrowers utilize their credit availability by taking out more credit each year. Our estimates in Table II show that credit card balances on average increase $50 in the first year, and increases to $340 over the pre-flag removal trend by year 4. However, as our utilization results in Figure 3 indicate, while borrowers take out more credit as they receive greater credit limits, they do not utilize a greater fraction of their overall credit availability.

We also observe that the removal of a bankruptcy flag results in more borrowing across other types of loans. The top panel of Figure 4 plots the number of auto loans and mortgages borrowed post flag-removal. As we might expect for our subprime sample of borrowers, we find a sharp effect on auto loan activity but a lesser impact on number of mortgage loans taken out. The number of mortgages does not change immediately after the removal of the flag, although it appears to

trend upwards two or three years after the flag is removed. This is consistent with prior studies that document and CFPBs recent concerns over high activity of subprime borrowers in the auto loan market (Adams, Einav, and Levin (2009), Berger et al 2017). These patterns are reflected in our estimated in Table II, which finds that the number of auto loans increases by 0.07 in the first year and 0.24 by year 4. Our estimates on mortgage loans are negative but essentially zero in magnitude.

Even with greater credit usage, we find that increased credit access has positive impacts on the amounts overdue our sample of borrowers hold. Access to credit may have a causal impact on a borrowers ability to remain current on their accounts if it allows them to smooth over negative shocks to earnings or expenses. The bottom panel of Figure 4 displays changes in total balance of third party collections amount past due 30 days or more at the time of the flag removal and documents a visible negative change in trajectory post-flag removal. Third party collections occur when creditors are unable to collect on a debt and sell it to a third party. A bit more than one third of such collections are medical bills, but utility bills, cell phone bills, or extremely derogatory credit card bills may also be included. Table II reports significant reductions in collections of nearly $300 in the first year, $500 in the second year, and $817 by year 4. Relative to a pre-flag removal mean of $3501, this represents a 23% reduction in total collections.

We do not, however, find significant reductions in the amounts past due over 30 days. This debt includes only credit accounts such as loans or credit cards and excludes bills like utilities or hospital bills. It also excludes accounts that have been turned over to third party collections, and instead captures delinquencies that are between 30 and, typically, 180 days past due. Figure 4 shows the amount in debt in third party collections and the amount of debt 30 days or more past due are perhaps slightly lower than their pre-flag removal trend, but the effects appear to be, if anything, quite small. The plots in Figure 4 suggest that overall delinquencies and debts were already in a declining trajectory pre-flag removal and traditional credit access had minimal, if any impact on lowering amounts past due. Estimates in Table II are negative, but none are statistically different than zero.

B. Impacts of Flag Removal on Subprime Borrowing

Now that we have established that our sample of borrowers experience an increase in formal credit access and use, we address the question of whether this reduced their use of high-risk alternative credit products. We first examine whether flag removal impacts payday loan borrowing. The top graph in Figure 5 plots the flag removal impact on payday loan inquiries. We do not find evidence that increasing access to formal credit reduced payday loan applications. Table III reports the corresponding estimates and show that, in fact, payday inquiries *increased* following the removal of the bankruptcy flag (by 0.018 per month in year 1 and 0.144 per month in year 4). [19]

Figure 5 also indicates that the flag removal did not reduce the amount of payday amount borrowed. Table 3 estimates find no significant effect on the amount borrowed in payday loans in the first 3 years, and a marginally significant increase in borrowing in year 4. The lower bound of our confidence intervals allows us to rule out that there were decreases in average monthly payday borrowing larger than $1.23 in the first year (about 4% relative to the pre-flag removal mean) and we can rule out decreases of about $0.50 in year 4 (less than 2%). This analysis demonstrates that the additional traditional credit access that resulted from the bankruptcy flag removal did not reduce reliance on payday borrowing and, if anything, may have increased it.

We find no effect of bankruptcy flag removals on the average amount of payday loan borrowing in each month. However, this null effect on average borrowing may mask important changes in the distribution of payday borrowing that minimally affect mean borrowing. For example, the flag removal may cause borrowers who only occasionally use payday loans to stop using them altogether, while leaving the behavior of heavy payday loan users unchanged. If the average amount borrowed is driven primarily by heavy users of payday loans, such changes may go undetected when examining average usage. In Appendix Figure 2, we explore the distribution of positive payday loan amounts pre- and post- flag removal graphically. Visually, the distribution of payday loan amounts borrowed appears to remain stable year to year, from pre- to post-flag removal. Appendix Table A1 tests

[19] Just like credit inquiries in our Experian dataset, it is important to note that credit inquiries for alternative credit confound the effects of borrower demand and credit supply. Loans are recorded when consumers submit applications for payday loans and a lender requests a credit check to review an applicant's credit with Clarity Services. Credit applications are often submitted in response to targeted advertising. Furthermore, websites that advertise payday loans may simultaneously query multiple lenders resulting in a high volume of inquiries through a single request.

the impact of flag removal on the probability that a borrower has any payday loan borrowing, the number of payday loans, and the probability that a borrower takes out payday loans of different sized amounts, based on the distribution of payday loan borrowing. We find little to no impact of the flag removal on the probability of having any payday loan nor on the distribution of loan sizes: borrowers are no more likely to take out smaller or larger loan amounts post flag-removal than before. Taken together, it appears the flag removal had little impact on payday loan borrowing across many measures of payday loan usage.

We also examine the impact of the bankruptcy flag removal on a second type of alternative, subprime borrowing: subprime, mostly online installment loans. Figure 6 shows how installment loan inquiries and amounts changed around the time of the flag removal. Both of these measures appear to have increased relative to the pre-flag removal trend. Table III shows installment inquiries increase at similar magnitudes to payday inquiries by 0.07 in the first year relative to the pre-flag removal trend in year 1, and increases to 0.122 by year. It is interesting to note that Figure 6 shows that these increases are relative to an *increasing* pre-trend of subprime installment inquiries, while Figure 5 shows the increases in payday inquiries are relative to a flat or slightly decreasing pre-trend. In contrast to the largely null effects on payday amounts, subprime installment amounts increase relative to their pre-flag removal trend. Figure 6 shows the amount of installment loans borrowed to increase in a sharp change of trajectory post flag removal. Table III reports that average monthly borrowing of subprime installment products increases significantly by year 2, by \$4.16, a 19% increase relative to pre-removal mean, increasing to \$7.86 by year 4, a 35% increase.

C. Heterogeneity by Borrower Characteristics

Borrowers with different characteristics may be deferentially affected by flag removals. While we do not detect any reduction in payday loan borrowing on average, it may be the case that certain groups of borrowers changed their behavior upon the removal of a bankruptcy flag. As pointed out by Dobbie et al. (2017), using an individual's pre-flag removal credit characteristics, such as their pre-removal credit score, may cause us to over-state the impact of the flag removal due to mean reversion. So, in order to conduct our heterogeneity analyses, we follow the method used in Dobbie et al. (2017) and predict pre-flag removal characteristics using variables that are not themselves affected by the flag removal: state of residence and age. We then stratify our sample based on

these predicted values, rather than the actual values, in order to avoid spurious relationships due to mean reversion.

These heterogeneity analyses are reported in Table IV. Instead of reporting the estimated coefficient for each year and each subgroup, we instead take the average effect over the 4 years via a linear combination of our estimated yearly coefficients. We report the impact of the flag removal on credit score and credit limit for each subgroup, and on payday and subprime installment inquiries and amounts, rather than the full set of outcome variables. The subgroups we examine are comprised of borrowers with higher or lower predicted income (as determined using Experian's predicted income score), credit score, credit limit, payday loan usage and predicted mortgage in the period prior to the flag removal.

Across the subgroups, we observe significant increases in credit scores of between 4.7 and 9 points, and in credit card limits of between $183 to $431. Across all of these groups, inquiries for payday loans increase following the flag removal, by between 0.074 and 0.098 inquiries per month. For most groups, average amount borrowed in payday loans does not change significantly. We do observe a significant increase in payday borrowing for those with predicted below average credit limits in the pre-flag removal period, although it is important to note that these heterogeneity tests are not adjusted for multiple comparisons.

D. Summary

Despite the fact that bankruptcy flag removals improve access to less expensive traditional borrowing options (such as credit cards), they do not reduce a borrower's use of payday loans. This is true across many measures capturing different margins of loan usage. The increased credit associated with a flag removal also does not reduce the probability that a borrower takes out any payday loan or the probability the borrower takes out loans of a particular size. We also examine the impact of flag removals across subgroups defined by their pre-removal characteristics. Across many subgroups, we see no evidence that the additional credit made available by the bankruptcy flag removal reduces payday loan usage. Instead, flag removals appear to *increase* the use of subprime, predominantly online installment loans, that they perhaps were unable to qualify for prior to the flag removal. The insensitivity of payday loan use to changes in credit access is puzzling given the high cost of these short-term loans. These results are robust across a large

number of alternative specifications and sample definitions (see Appendix). In the next section, we explore various hypotheses as to why substitution away from payday loans does not occur.

V. Why Do Borrowers Not Substitute Towards Less Expensive, Traditional Credit?

Payday loans are an expensive form of credit, with interest rates far exceeding those of credit cards or personal bank loans. However, results in the previous section indicate that, although a flag removal increases credit scores and results in a substantial increase in credit card limits and approval rates, borrowers do not reduce their use of high cost payday loans and, in fact, use subprime installment loans at a higher rate. In this section, we explore different explanations as to why this might be the case.

A. The Increase in Credit Scores Associated with Flag Removal is Insufficient

In Table II, we find that a flag removal is associated with an increase in credit score of about 7 points, and an increase in credit limits of about $63 immediately and $490 by year 4. It may be the case that such an increase in available credit (while a large increase relative to the amount typically borrowed in payday loans annually) is not enough to meaningfully alter borrowers' behavior, but that larger increases in credit scores or credit limits would result in an observable effect on payday loan borrowing.

We examine this hypothesis by expanding the heterogeneity analyses conducted in Table IV to additional subgroups. We estimate our model within many subgroups by dividing the sample into 10 age groups based on the deciles of the age distribution in our sample. Then, within each age group, we estimate our model separately by state. State by age groups with fewer than 500 observations in the Experian data are dropped. This gives us over 120 subgroups defined by state and age, and reveals that individuals with different ages, living in different states, experience different changes in credit score following a flag removal. These differences may be due to their average pre-flag removal credit characteristics as well as differences across state bankruptcy and credit regulations.[20]

[20]This exercise was inspired by the one conducted in Dobbie et al. (2017), who present a similar analysis in Appendix Table 16.

In Figure 7, we explore whether subgroups that experienced larger credit score improvements following the flag removal were more likely to reduce their reliance on payday loans and subprime installment loans. On the x-axis, we plot the average effect of the flag removal during the 4 post-removal years on credit score.[21] We observe that some of the age by state groups experienced much larger increases in credit scores than the sample average–increases exceeding 20 or 30 points–while other groups experienced smaller than average credit score increases as a result of the flag removal. On the y-axis, we plot the impact of the flag removal on the amount borrowed in payday loans (top panel) or subprime installment loans (bottom panel). We also include a fitted line on the plot showing the relationship between these two variables. Similar to the heterogeneity analysis presented in Table IV, this analysis reveals no systematic relationship between the increase in credit score experienced by the subgroup and the change in the amount of payday loans borrowed. Indeed, even subgroups that experienced very large increases in credit scores do not appear to decreased their use of payday loans in response. This pattern suggests that even large increases in credit score, around the magnitude of 20 to 40 points, still do not seem to reduce payday borrowing. Similarly, we find groups increased borrowing of subprime installment loans, with no clear pattern between the size of the credit score increase and the size of the observed impact of the flag removal on installment loan borrowing.

B. Changes in Exposure to Marketing

Previous research has documented that bankruptcy filers are often targeted for credit products via mail promotions, and that these promotions are more likely to include higher annual fees and lower credit limits relative to non-filers (Han, Keys, and Li, 2018). These descriptive statistics suggest that the removal of a bankruptcy flag may improve credit card mail offers. However, it may also be the case that a flag removal changes the marketing for payday loans that a borrower is exposed to. If lenders increase marketing to subprime borrowers after a flag is removed, this behavior may explain why borrowers are less quick to switch away from costly payday loan products and towards less expensive traditional credit.

We explore this potential explanation by using a variable in the Clarity database that captures

[21] We arrive at a single number by averaging the four yearly post-flag removal indicators estimated as in equation (1).

one type of direct to consumer marketing. Clarity's underwriting services allow lenders to "pre-screen" borrowers for payday loan or subprime installment credit offers. We use such pre-screen approvals as a measure of marketing exposure of borrowers in our sample. It is important to note that this measure captures only a small portion of the marketing experienced by borrowers; however, such direct mail efforts may be correlated with other marketing activity, making them informative about marketing exposure in general.[22]

Figure 8 shows how the number of pre-screen approvals change around the time of the bankruptcy flag removal for both payday loans and subprime installment loans. The top plot of Figure 8 shows a small increase in the number of payday loan offers that borrowers receive post flag-removal. The estimates are reported in Table V. Although the estimates are positive and significant, they are also fairly small, indicating average monthly pre-screened offers increased by only about 0.0007 per month. Similarly pre-screened offers for installment loans is positive and significant starting in year 2, but also not of significant magnitude. The plot in Figure 8 also suggests that offers for installment loans continued to increase from pre-flag removal trends.

These results suggest that borrowers were exposed to more marketing following the flag removal, but that on average these effects were small. If such small increases are correlated with increases in other types of marketing, it may be the case that this marketing for subprime products is dampening the tendency of borrowers to substitute from alternative credit to more traditional sources.

C. Payday Loans Fulfill an Alternative Need Not Met by Credit Card Liquidity

In this section, we discuss several ways in which payday loans may serve a different purpose for low-income borrowers than credit card liquidity and why these two products may not really be substitutes. While we do not have direct evidence for these hypotheses, we hope this discussion will be useful in outlining areas for future work on this topic.

First, it is important to note that payday loans and subprime installment loans grant borrowers immediate access to cash: once the payday loan is processed, borrowers either receive cash directly (if the payday loan is borrowed at a physical storefront) or the cash is deposited into the borrower's checking account, allowing the borrower to withdraw it immediately. In contrast, it can be more

[22]For example, payday loan companies spent about $277 million on television and radio advertising from June 2012 to May 2013 and online advertising for these products is also common (Bourke, Horowitz, Lake, and Roche, 2014).

difficult to get a cash advance using a credit card. Typically economists ignore such distinctions, since most goods can be purchased with a credit card. However, this distinction between cash and credit card liquidity may be meaningful for low income populations who are more reliant on cash for a larger portion of their transactions. For example, it is often not possible to pay for rent or child support with a credit card, and informal loans between friends or family may need to be paid back with cash. For these populations, we hypothesize that cash and credit are not perfect substitutes, and that payday and subprime installment loans may be fulfilling a different purpose than credit cards.

Second, interviews with borrowers who are in the Clarity database reveal that some borrowers in fact take out payday loans to pay credit card bills–that is, they substitute *from* relatively inexpensive credit card credit *to* expensive payday loan credit (Nunez et al., 2016). One reason for this is that payday loans are not reported to credit bureaus, so taking out a payday loan does not affect borrowers' credit scores. At the same time, increasing credit card balances typically does reduce credit score. For borrowers trying to rebuild their credit, this may make payday loans a more attractive option even if they are more expensive. Furthermore, payday lenders do not always send defaulted loans to third party collection agencies, in which case even defaults do not appear on credit reports. This behavior makes them a safer option for borrowers in terms of preserving their credit score.[23]

One piece of evidence consistent with the idea that borrowers are responsive to what appears on the credit report is the fact that we observe reductions in debt in collections following the flag removal. Overdue debt held in collections has a negative impact on credit score, while amounts borrowed in payday loans and subprime installment loans do not. Thus, borrowers, particularly prior bankruptcy filers, may be motivated to pay off collections debt first in order to preserve or continue to build back their credit profile. [24]

Finally, we note that often economists conceive of borrowers using credit to smooth consumption across periods. That is, borrowers may have an unanticipated expense in period t and take out a

[23]For example, Nunez et al. (2016) describe an interview with a Clarity borrower who often defaults on her payday loans. The borrower noted that lenders "stopped calling after about 3 months" and that "sometimes the loan accounts go into collections, which does affect credit, but often they do not" See page 36 of Nunez et al. (2016).

[24]Table II shows that total collections drop consistently every year by approximately $300 in the first year and by $817 by year 4. Relative to a pre-flag removal mean of $3622, this represents a 23% reduction in total collections. When we examine collections just in medical payments, we find that medical collections drop by approximately $110 per year, 15% of the pre-flag removal average.

loan to cover it, reducing consumption in future periods by a small amount rather than suffering a large reduction in consumption in t. Payday loans have historically been marketed in this way: a product to cover an unexpected expenses such as medical emergency or an auto repair. However, a 2016 survey of Clarity subprime borrowers finds that the majority of borrowers (64%) take out subprime loans to cover regular expenses such as utilities, groceries, rent, credit card and medical debt (Nunez et al., 2016). For these borrowers, loans function more as an income supplement rather than a credit product. Such borrowers may not be able to reduce use of payday loans unless they either experienced an increase in income or a reduction in monthly living costs.

VI. Conclusion

This paper is the first to examine the impact of increased access to traditional credit on the use of payday and other subprime credit products. We employ a novel data set that links traditional credit bureau outcomes with payday and subprime outcomes from a subprime credit agency. We take advantage of the unanticipated increase in access to traditional credit products that occurs at the removal of a Chapter 7 bankruptcy flag. We find that a bankruptcy flag removal results in significantly higher credit scores and better access to credit for borrowers. However, despite this improved access to traditional credit, we do not find any evidence that borrowers reduce their use of payday loans in response. Our confidence intervals allow us to rule out all but extremely small reductions in payday loan use. Across multiple subgroups, alternative specifications, sample definitions, and measures of payday loan usage, we find no evidence that increased access to traditional credit reduces payday loan behavior. Furthermore, we find evidence that borrowers significantly increase their use of a different type of alternative credit product–subprime online installment loans.

Our results suggest that policies that increase access to traditional credit for payday borrowers may not be successful in reducing their reliance on payday loans. According to survey evidence presented in Nunez et al. (2016), most payday loan borrowers use these loans to cover regular expenses such as utility bills, groceries, medical bills, or rent, rather than to pay for one-off unexpected expenses. This suggests that policymakers looking to reduce reliance on such loans may be more successful at achieving this goal if they implement policies that make it easier for low-income individuals to cover their basic needs; e.g. by improving labor market opportunities, expanding

access to low-cost health insurance, or strengthening the social safety net.

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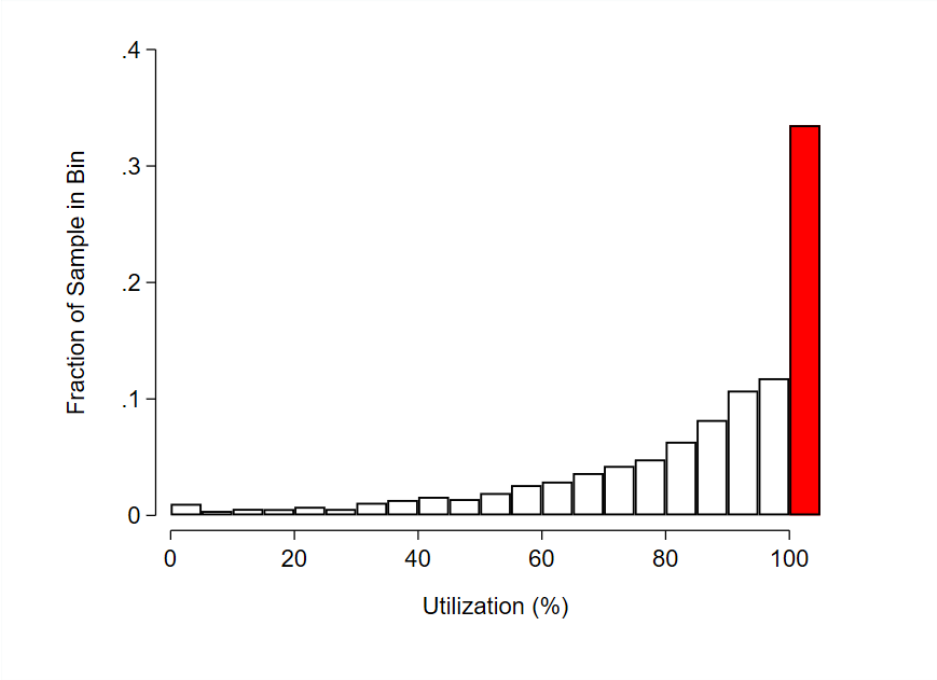
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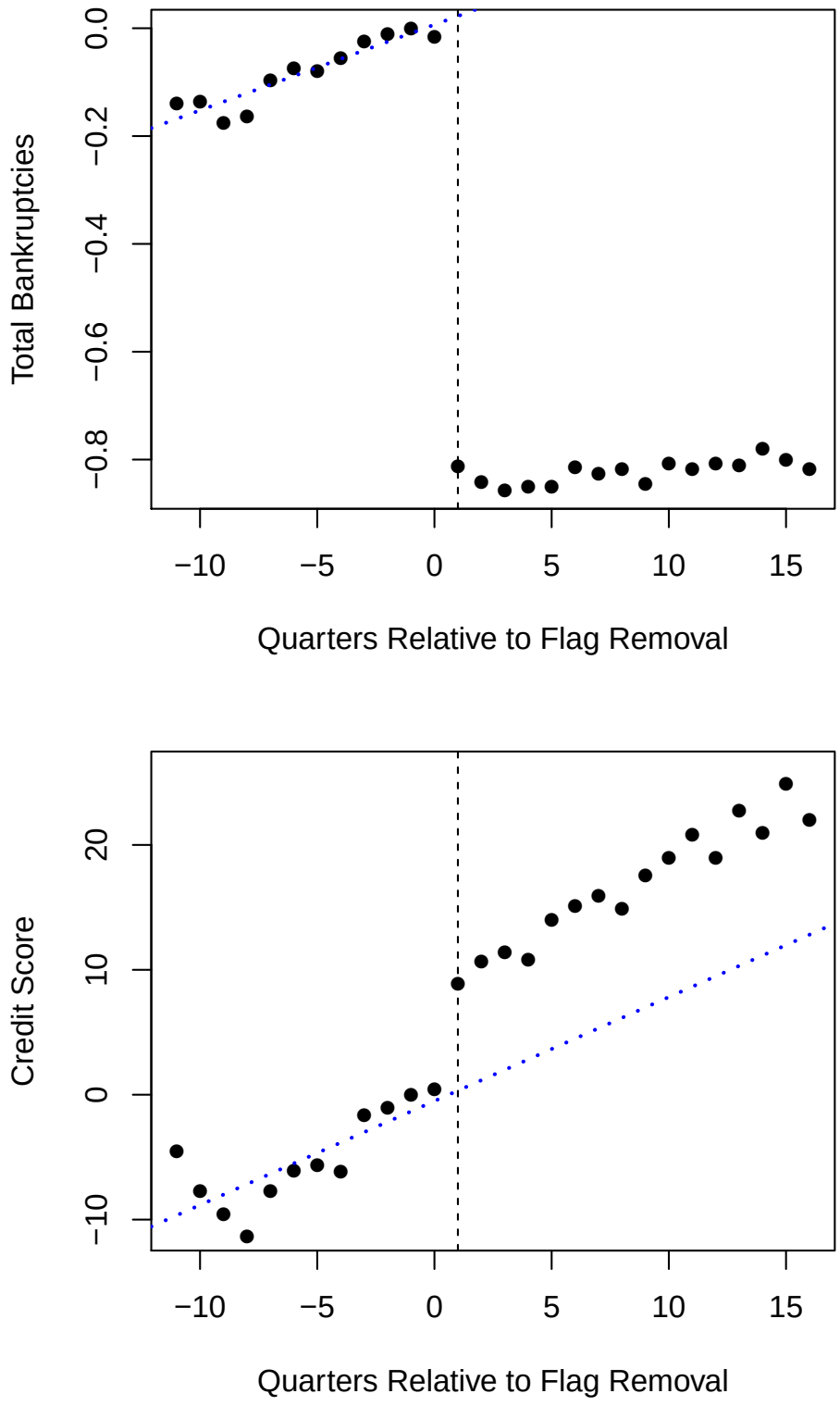
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Figure 1. Are Payday Borrowers Credit Constrained?



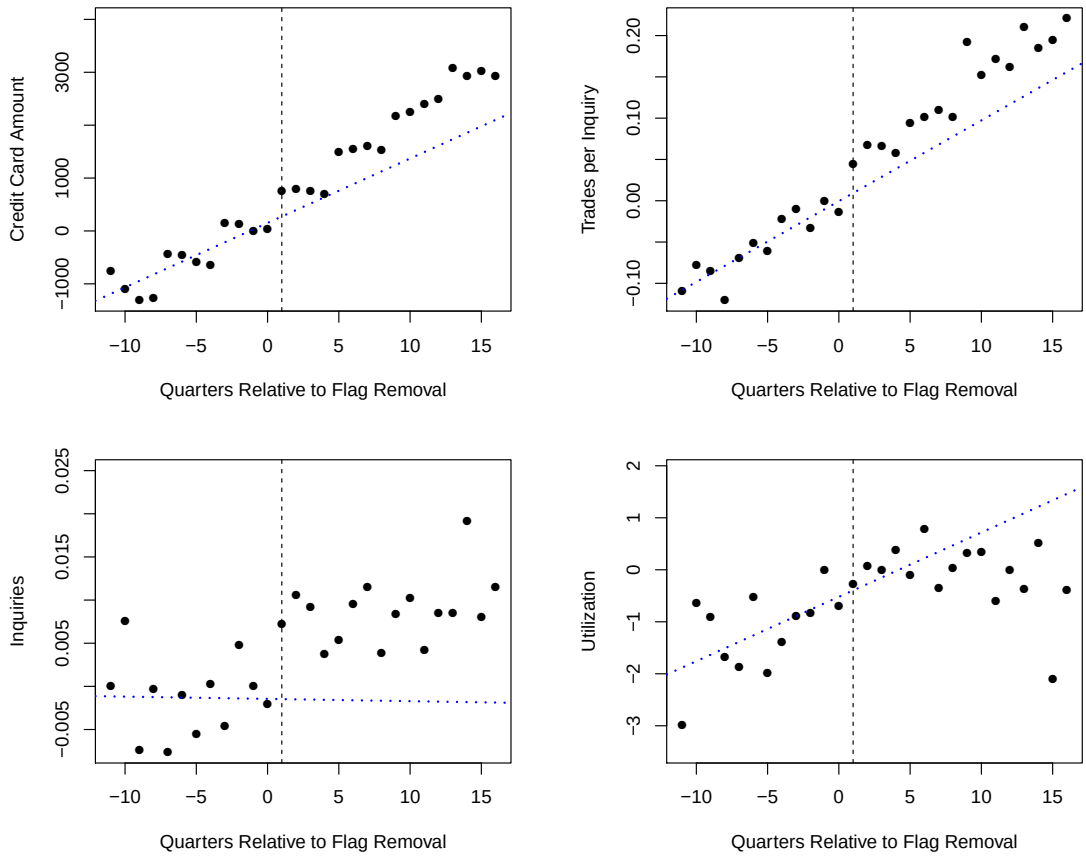
Note: Figure shows histogram of average utilization for the last 6 months of payday borrowers measured over the 6 month period during which they took out a payday loan. Red column shows borrowers who are overdrawn on their existing credit lines (that is, utilization greater than 100%), borrowers at their credit limit (utilization 100%), or borrowers with no revolving credit.

Figure 2. Direct Impact of Bankruptcy Flag Removals on Bankruptcies and Credit Access



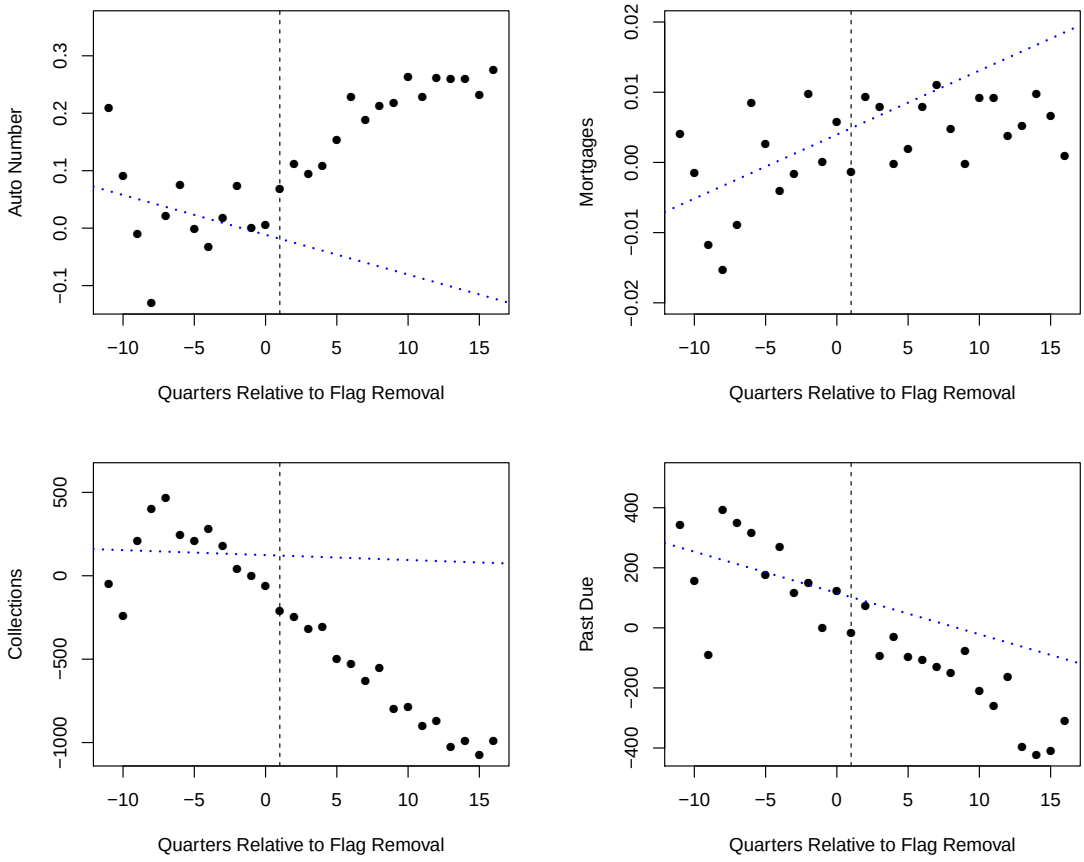
Note: Figure shows quarterly estimates from a regression that includes calendar year and year of bankruptcy fixed effects relative to the quarter in which the flag is removed (denoted quarter 1).

Figure 3. Direct Impact of Bankruptcy Flag Removals on Bankruptcies and Credit Access



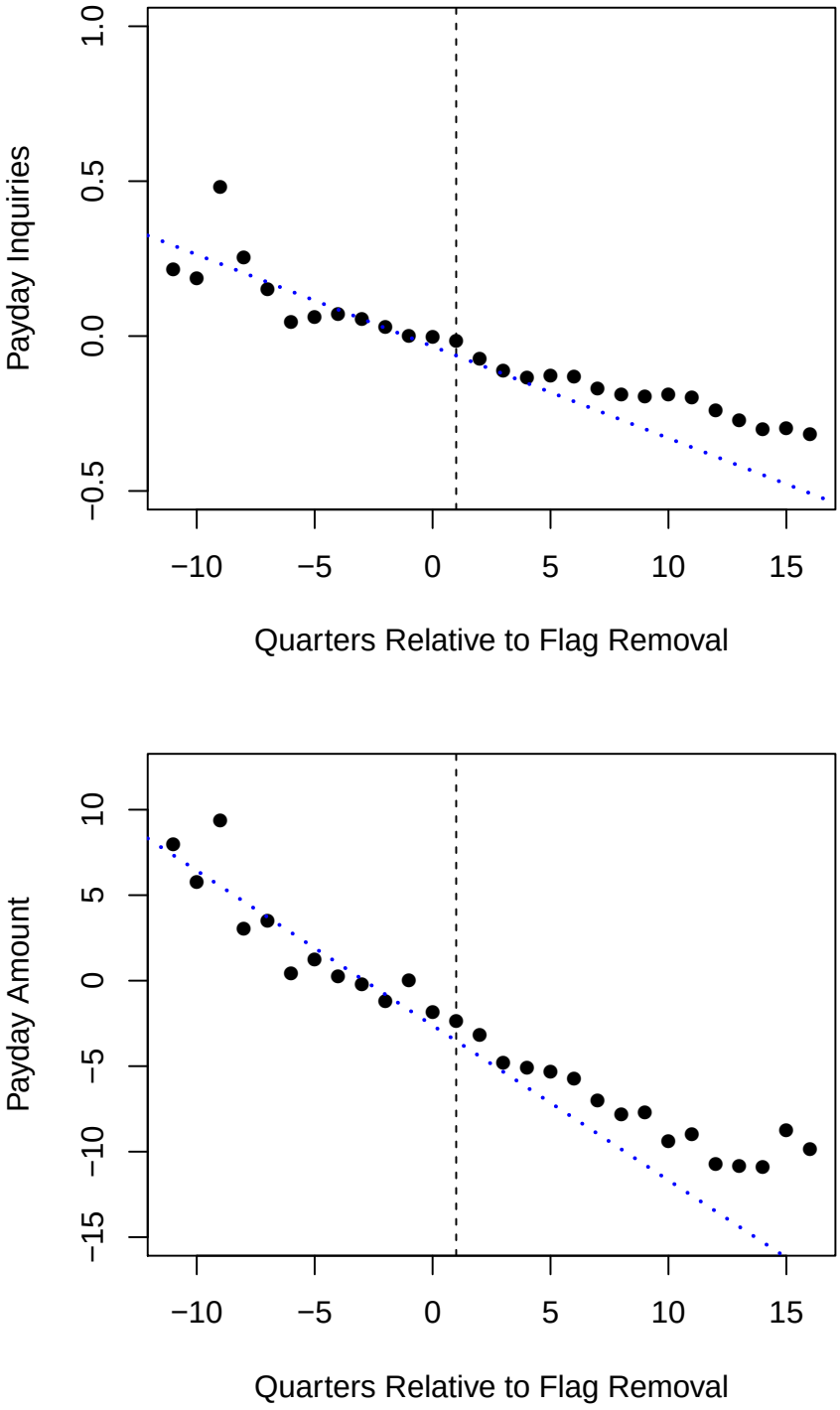
Note: Figure shows quarterly estimates from a regression that includes calendar year and year of bankruptcy fixed effects relative to the quarter in which the flag is removed (denoted quarter 1).

Figure 4. Impact of Bankruptcy Flag Removals on Traditional Credit Usage



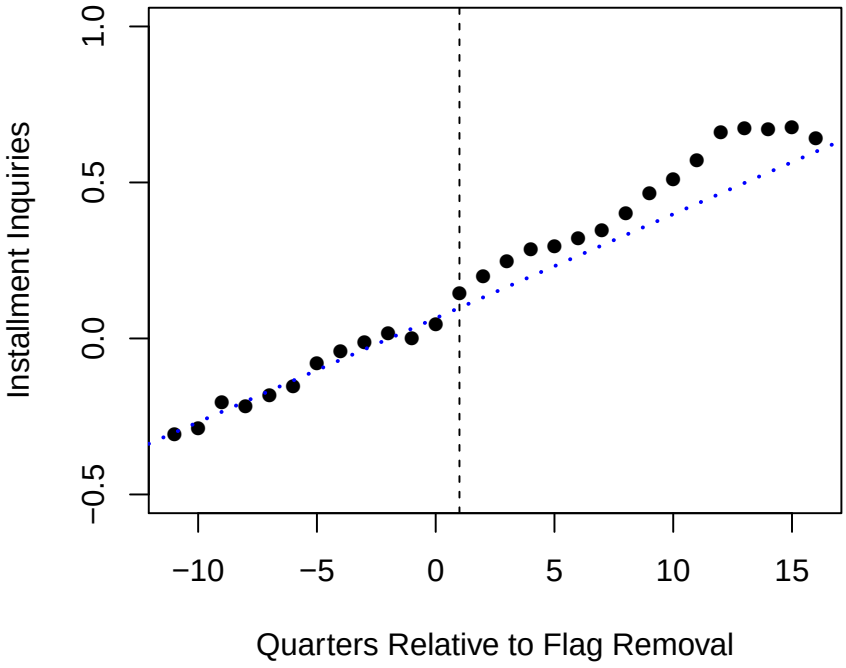
Note:Figure shows quarterly estimates from a regression that includes calendar year and year of bankruptcy fixed effects relative to the quarter in which the flag is removed (denoted quarter 1).

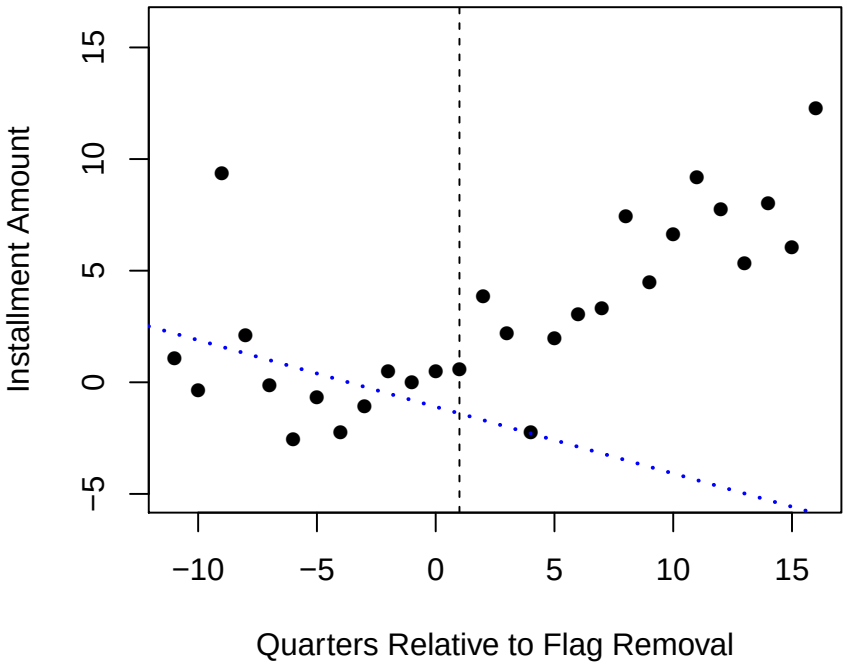
Figure 5. Impact of Bankruptcy Flag Removals on Payday Loan Usage



Note: Figure shows quarterly estimates from a regression that includes calendar year and year of bankruptcy fixed effects relative to the quarter in which the flag is removed (denoted quarter 1).

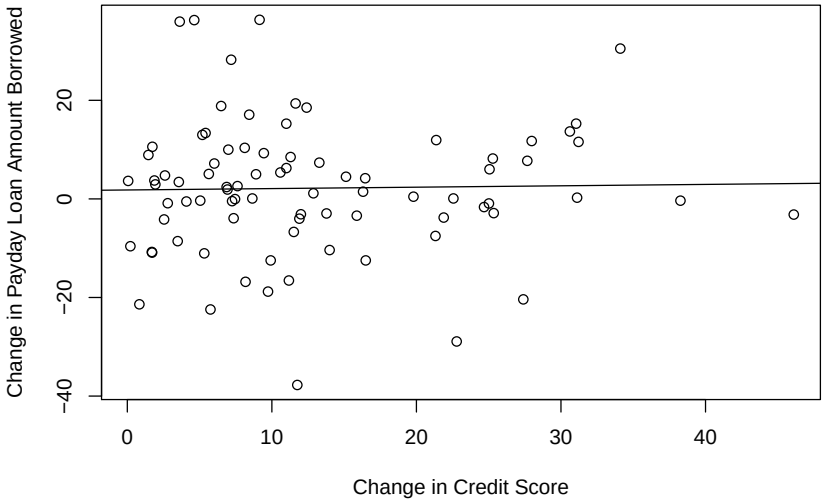
Figure 6. Impact of Bankruptcy Flag Removals on Installment Loan Usage

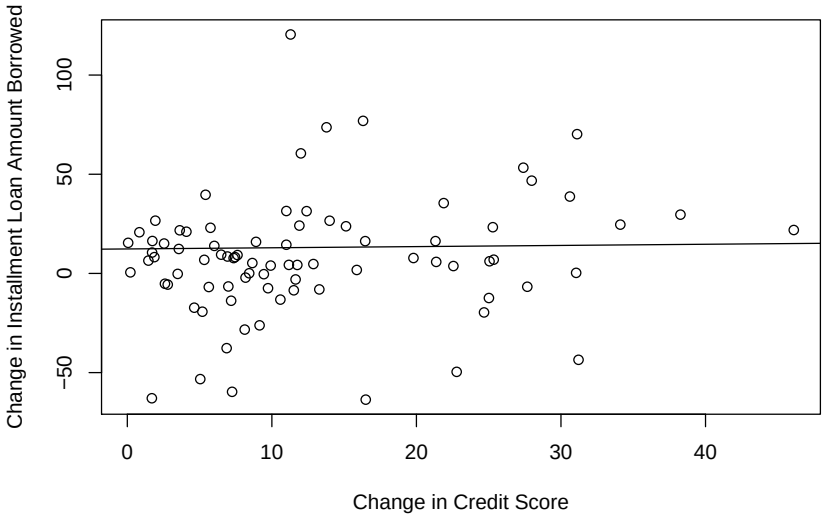




Note: Figure shows quarterly estimates from equation (**??**), which includes calendar year and year of bankruptcy fixed effects relative to the quarter in which the flag is removed (denoted quarter 1).

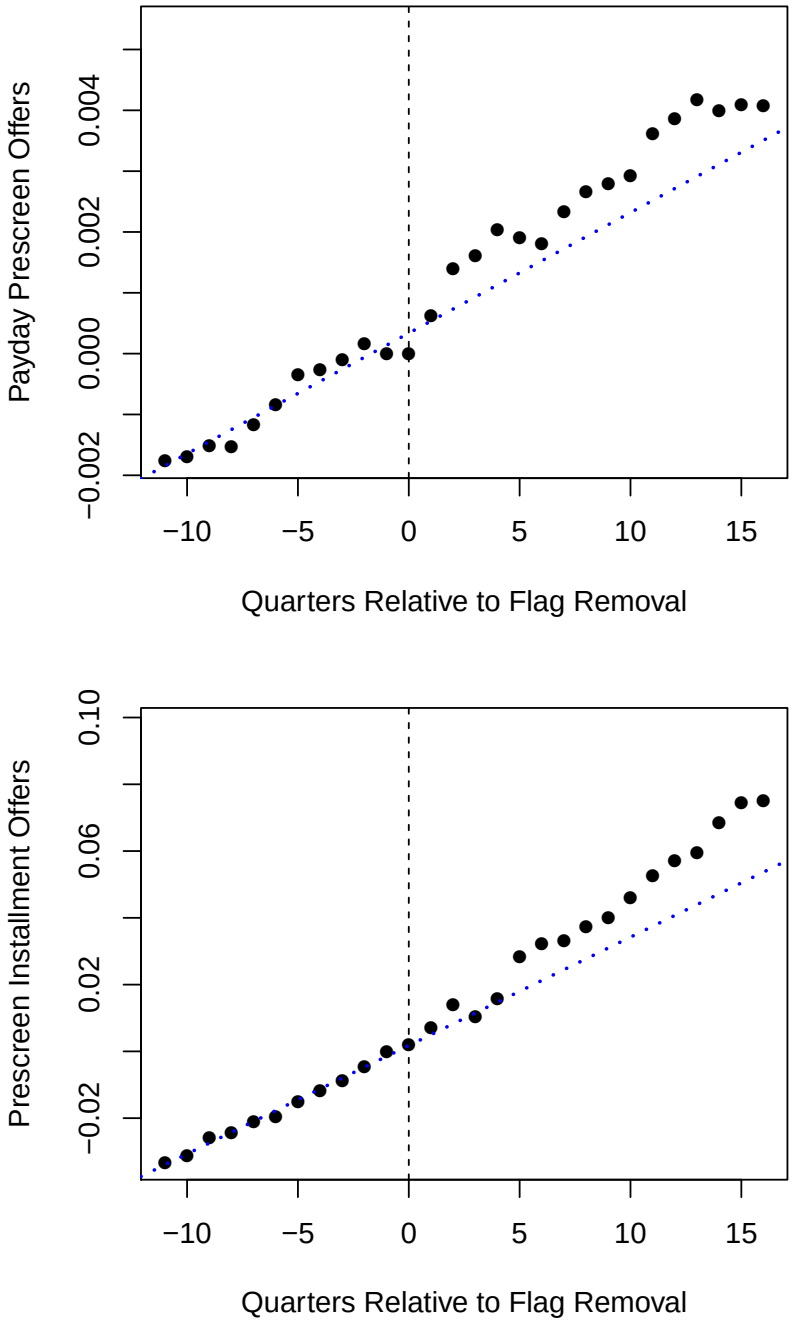
Figure 7. Impact of Flag Removal on Subprime Borrowed Amounts vs Credit Score, by Age x State Groups





Note: Figure shows estimates of impact of a flag removal on credit score (x axis) against impact of the flag removal on payday borrowing (y axis, top panel) and subprime installment loan borrowing (y axis, bottom panel) for 123 regressions estimated within groups defined by age and state. These regressions include calendar year and bankruptcy year fixed effects, as well as a linear pre-trend.

Figure 8. Impact of Bankruptcy Flag Removals on PreScreen Offers of Subprime Loans



Note:Figure shows quarterly estimates from a regression that includes calendar year and year of bankruptcy fixed effects relative to the quarter in which the flag is removed (denoted quarter 1).

Table I Descriptive Statistics (Pre-Flag Removal)

	Active Alternative Credit Users with Bankruptcy Flags			Random Sample of Credit Reports with Bankruptcy Flags			Random Sample of Credit Reports		
	Mean	SD	N	Mean	SD	N	Mean	SD	N
Traditional Credit Outcomes									
Credit Score	531.39	65.52	94,672	615.94	84.91	908,485	662.64	128.46	19,168,533
Credit Card Limit (All Cards)	1977.39	5408.47	94,672	4502.30	9121.60	908,485	18181.59	29058.92	19,168,533
Number of Inquiries Past 30 Days	0.192	0.398	94,672	0.169	0.427	908,485	0.106	0.341	19,168,533
Trades per Inquiry	0.385	0.695	47,256	3.141	6.455	323,188	3.557	7.326	4,526,254
Credit Limit on Recently Opened Card	1233.91	2350.21	35,644	-	-	-	-	-	-
Total Amount in Collections	3500.53	6332.75	94,672	1076.62	8326.93	908,485	1057.63	6362.53	19,168,533
Total Number of Bankruptcies on Credit Report	1.124	0.625	94,672	1.064	0.318	908,485	0.050	0.236	19,168,533
Utilization (%) on All Revolving Accounts	82.70	30.20	69,519	68.61	33.18	673,996	54.17	35.62	14,321,852
Amount 30 Days or More Past Due	1659.89	8769.83	94,672	1335.38	11780.91	908,485	896.76	12838.61	19,168,533
Number of Auto Trades	1.96	1.92	94,672	1.91	2.25	908,485	1.14	1.85	19,168,533
Number of Mortgages Open	0.102	0.325	94,672	0.139	0.400	908,485	0.297	0.639	19,168,533
Alternative Credit Outcomes (Monthly)									
Amount Borrowed in Payday Loans	28.57	160.01	628,793	N/A	N/A	N/A	N/A	N/A	N/A
Number of Payday Loan Applications	0.518	2.10	628,793	N/A	N/A	N/A	N/A	N/A	N/A
Amount Borrowed of Subprime Installment	22.31	233.97	628,793	N/A	N/A	N/A	N/A	N/A	N/A
Number Subprime Installment Applications	0.189	1.25	628,793	N/A	N/A	N/A	N/A	N/A	N/A

Note: N represents individual by year observations for traditional credit outcomes and individual by month observations for alternative credit outcomes. Trades per inquiry defined only for consumers with a positive number of inquiries. Utilization defined only for consumers with at least one revolving credit account.

Table II Effect of Bankruptcy Flag Removal on Access to Traditional Credit

	Year 1 Effect	Year 2 Effect	Year 3 Effect	Year 4 Effect
Bankruptcies (#)	-0.886***	-0.935***	-0.990***	-1.033***
	(0.00296)	(0.00466)	(0.00688)	(0.00929)
Credit Score	7.134***	7.306***	6.955***	5.910***
	(0.508)	(0.799)	(1.125)	(1.464)
Credit Limits	62.91**	242.9***	424.8***	490.4***
	(29.61)	(53.76)	(88.77)	(111.4)
Trades Per Inquiry	0.0320***	0.0350***	0.0622***	0.0543**
	(0.00903)	(0.0129)	(0.0176)	(0.0226)
Credit Inquiries	0.00967***	0.00966*	0.0102	0.0140
	(0.00358)	(0.00510)	(0.00689)	(0.00886)
Credit Card Balancee	49.71***	152.4***	258.9***	340.4***
	(18.81)	(32.51)	(47.45)	(64.17)
Utilization	0.194	-0.287	-0.888	-2.129***
	(0.268)	(0.408)	(0.557)	(0.718)
Auto Loans (#)	0.0734***	0.175***	0.226***	0.242***
	(0.00634)	(0.0108)	(0.0162)	(0.0218)
Mortgages (#)	-0.00510***	-0.00784***	-0.0139***	-0.0189***
	(0.00156)	(0.00255)	(0.00369)	(0.00488)
Collections	-299.1***	-503.1***	-728.8***	-817.5***
	(33.17)	(54.68)	(77.05)	(101.8)
Amount 30 Days Past Due	-76.08	-103.8	-92.93	-219.1
	(57.78)	(87.52)	(118.8)	(154.5)
N = 282,050				

Note: This table presents estimates of model (2). Each row represents estimates from a separate regression. See text for more details.

Table III Effect of Bankruptcy Flag Removal on Use of Alternative Credit Products

	Year 1 Effect	Year 2 Effect	Year 3 Effect	Year 4 Effect
Payday Inquiry	0.0182**	0.0603***	0.121***	0.144***
	(0.00774)	(0.0111)	(0.0152)	(0.0199)
Payday Amount	0.368	0.983	1.464	3.535*
	(0.813)	(1.236)	(1.614)	(2.057)
Installment Inquiry	0.0698***	0.0575***	0.129***	0.122***
	(0.00848)	(0.0127)	(0.0187)	(0.0274)
Installment Amount	1.220	4.155***	7.092***	7.863***
	(1.053)	(1.505)	(2.042)	(2.586)
N = 1,684,190				

Note: This table presents estimates of model (2). Each row represents estimates from a separate regression. See text for more details.

Table IV Effect of Bankruptcy Flag Removal: Heterogeneity by Pre-Flag Removal Characteristics

	Predicted Income		Credit Score		Credit Limits		Payday Loan Usage		Predicted Mortgage	
	Below Median	Above Median	Below Median	Above Median	Below Median	Above Median	Below Median	Above Median	Below Median	Above Median
Experian Outcomes:										
Credit Score	6.521***	7.344***	7.227***	6.507***	7.261***	6.592***	7.565***	6.316***	4.743***	9.049***
	(1.128)	(1.138)	(1.146)	(1.118)	(1.120)	(1.144)	(1.171)	(1.099)	(1.136)	(1.130)
Credit Limits	365***	252.2**	182.5*	414***	430.5***	183.7*	381***	234**	278***	331***
	(79.44)	(105.3)	(99.76)	(88.79)	(82.76)	(102.9)	(88.10)	(98.06)	(95.75)	(91.98)
N:	140,608	141,442	136,174	145,876	140,398	141,652	133,642	148,408	141,525	140,525
Alternative Outcomes:										
Payday Inquiry	0.0975***	0.0740***	0.0791***	0.0917***	0.0796***	0.0924***	0.0765***	0.0957***	0.0878***	0.0850***
	(0.0178)	(0.0182)	(0.0185)	(0.0176)	(0.0184)	(0.0177)	(0.0185)	(0.0174)	(0.0188)	(0.0172)
Payday Amount	1.237	1.953	2.080	1.079	4.503**	-1.195	1.518	1.691*	2.060	1.590
	(2.272)	(1.283)	(1.693)	(1.964)	(1.933)	(1.797)	(2.400)	(0.915)	(1.472)	(2.151)
Installment Inquiry	0.102***	0.0891***	0.132***	0.0632***	0.127***	0.0636***	0.0691***	0.122***	0.129***	0.0624***
	(0.0210)	(0.0181)	(0.0198)	(0.0195)	(0.0218)	(0.0173)	(0.0202)	(0.0190)	(0.0201)	(0.0193)
Installment Amount	6.708***	3.379	3.387	6.524***	4.342**	5.792**	2.781	7.453***	6.547***	3.665
	(1.919)	(2.638)	(2.362)	(2.235)	(2.030)	(2.527)	(1.915)	(2.667)	(2.022)	(2.521)
N:	857,745	826,445	775,454	908,736	841,333	842,857	871,315	812,875	823,459	860,731

Note: Each row represents estimates from a separate regression. See text for more details.

Table V Effect of Bankruptcy Flag Removal on "Pre-screened" Loan Offers

	Year 1 Effect	Year 2 Effect	Year 3 Effect	Year 4 Effect
Prescreen Payday Offers	0.000512***	0.000432***	0.000694***	0.000705***
	(9.79e-05)	(0.000124)	(0.000143)	(0.000180)
Prescreen Installment Offers	0.00105	0.00845***	0.0105***	0.0174***
	(0.000752)	(0.00120)	(0.00145)	(0.00188)
N = 1,684,190				

Note: Each row represents estimates from a separate regression. See text for more details.

Does Increasing Access to Formal Credit Reduce Payday Borrowing?

Appendix

Sarah Miller Cindy K. Soo

Robustness checks and alternative sample definitions

In this appendix, we verify our results do not depend on particular specifications of our empirical model by exploring a variety of alternative specifications. We show the results for these specifications for our primary outcomes related to credit access (credit score and credit limit across all credit cards) and alternative borrowing (number of inquiries and amount borrowed per month for payday loans and installment loans). Similar results for other outcomes are available from the authors upon request.

Our results for these robustness checks are reported in Appendix Table A2. In the first row under each listed outcome variable, we include individual fixed effects, rather than cohort year fixed effects, to account for any change in the composition of individuals in our sample over time.

The second row under each outcome variable shows an alternative specification in which we include a "control group" in the model, similar to the approach used in Dobbie et al. (2017). For the control group, we include borrowers who had Chapter 7 bankruptcy flags removed either prior to the beginning of our sample period (before 2013) or after the end of our sample period (after 2017). These borrowers are similar to our main sample in that they also experienced a bankruptcy in the recent past, but they do not experience a flag removal over our sample period. These borrowers can be used to identify the year effects and account for any contemporaneous year shocks that occur over our sample period, analogous to a "difference in differences" design.

The third row under the traditional credit outcomes shows results that use Experian credit report data from 2006 through 2017. In our main results, we limit the years of Experian credit report data to match those we have available in Clarity, to improve the direct comparability of these results. In this alternative version, we show that results are similar if we instead use all available years.

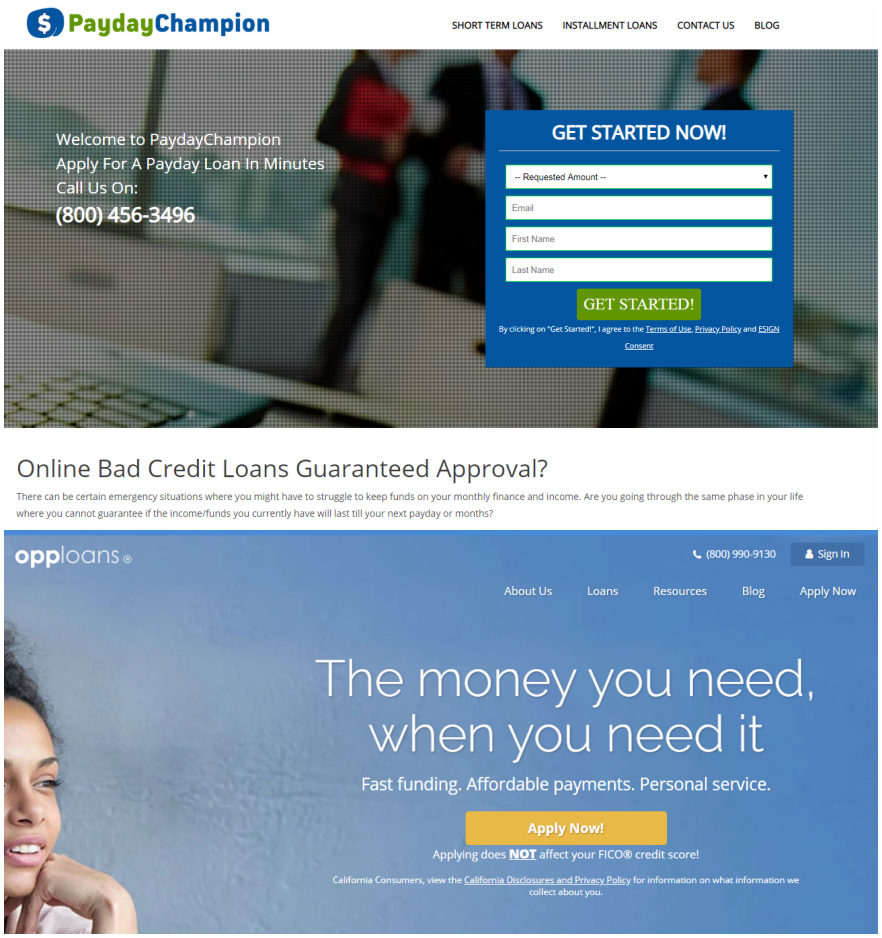
For alternative credit outcomes, the third row shows results that include year by month fixed effects, rather than year fixed effects. Note that because we only observe Experian credit reports once per year, including year fixed effects is equivalent to including year by month fixed effects. The inclusion of these fixed effects in models using the (monthly) Clarity data allows us to account for any contemporaneous time effects that occur within a calendar year.

Across all specifications, we find that the flag removal significantly increased access to traditional credit but does not significantly reduce payday loan usage, and our confidence intervals are such that we can rule out even small decreases in payday loan borrowing. We also find significant increases in online installment loan inquiries and borrowing following the flag removal. This analysis supports the results in the main text, and suggests that our qualitative results are not sensitive to changes in our model specification or sample inclusion criteria.

We also examine whether our findings on payday loan usage are dependent on the coding of our outcome variable. In our main analysis, we examine whether the total amount of payday or subprime installment borrowing changed following the removal of a bankruptcy flag. However, it may be the case that, while the average amount of alternative borrowing did not change, the probability of having very large (or small) dollar values of subprime borrowing was affected. We explore this hypothesis by coding our alternative borrowing outcome variables in the following way: whether the consumer has any payday or subprime installment borrowing, whether the amount borrowed in the month is between $1 and $299 (inclusive), between $300 and $449, between $450 and $633, and at or above $634. The end points of these bins correspond to the quartiles of the payday amount distribution in months when consumers have a positive amount of payday borrowing.

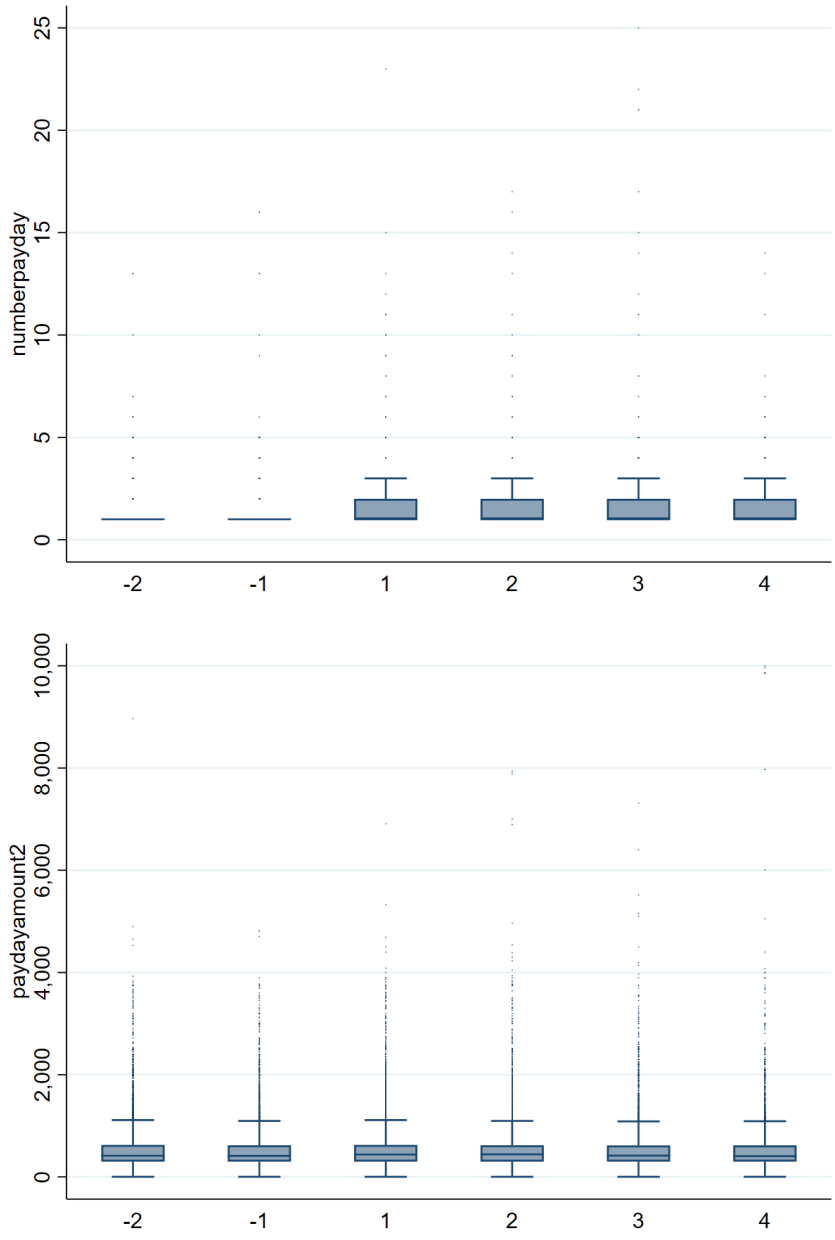
These results are reported in Appendix Table A1. We do not find statistically significant changes in the probability of taking out loans of a certain size. These results suggest that the modest effects of expanded traditional credit access we find on average monthly alternative borrowing are not masking more substantial effects at other parts of the borrowing distribution.

Figure A1. Examples of Online Payday and Subprime Installment Lenders



Note: Presents examples of advertising and presentation of online payday and installment loan lenders. Source: https://www.paydaychampion.com/ (upper panel), https://www.opploans.com/ (lower panel)

Figure A2. Changes in the Distribution of monthly borrowing amounts by year relative to flag removal



Note: Presents box and whisker plots of the monthly number of payday loans (top panel) and monthly payday borrowing amount (lower panel) by year relative to the flag removal.

Table A1 Effect of Bankruptcy Flag Removal on Taking out Any Payday Loan, Number of Payday Loans, and Probability of Taking Out Payday Loan of Different Sizes

	Year 1 Effect	Year 2 Effect	Year 3 Effect	Year 4 Effect
Any Payday	0.000412	0.00235	0.00364*	0.00530*
	(0.00107)	(0.00167)	(0.00220)	(0.00279)
Payday Loans (#)	0.00077	0.00302	0.00500	0.00698*
	(0.00161)	(0.00249)	(0.00330)	(0.00419)
Payday Amount Quartile 1	-1.42e-05	0.000549	0.000905	0.00109
	(0.000476)	(0.000711)	(0.000925)	(0.00116)
Payday Amount Quartile 2	-0.000455	-0.000280	-0.000550	4.52e-05
	(0.000493)	(0.000785)	(0.00102)	(0.00132)
Payday Amount Quartile 3	0.000476	0.00144*	0.00215**	0.00206
	(0.000506)	(0.000785)	(0.00103)	(0.00131)
Payday Amount Quartile 4	0.000405	0.000634	0.00114	0.00210
	(0.000533)	(0.000803)	(0.00105)	(0.00131)

Note: Each row represents estimates from a separate regression. See text for more details.

Table A2 Effect of a Bankruptcy Flag Removal on Traditional Credit Outcomes: Alternative Specifications and Sample Definitions

	Year 1 Effect	Year 2 Effect	Year 3 Effect	Year 4 Effect	N
Credit Score					
Individual FEs	7.094***	7.238***	7.034***	6.125***	282,050
	(0.497)	(0.773)	(1.074)	(1.390)	
Control Group	6.907***	7.144***	6.675***	5.681***	921,452
	(0.527)	(0.816)	(1.116)	(1.433)	
All Years	6.707***	6.670***	6.245***	5.098***	371,955
	(0.360)	(0.557)	(0.770)	(0.999)	
Credit Limits					
Individual FEs	74.80**	263.5***	452.1***	525.0***	282,050
	(33.23)	(60.33)	(100.5)	(125.0)	
Control Group	73.48	259.4***	457.3***	542.4***	921,452
	(55.01)	(90.26)	(118.5)	(165.7)	
All Years	21.70	179.9***	336.4***	370.6***	371,955
	(21.24)	(37.81)	(64.07)	(91.82)	
Payday Inquiries					
Individual FEs	0.0181**	0.0600***	0.123***	0.146***	1,684,190
	(0.00768)	(0.0110)	(0.0152)	(0.0199)	
Control Group	0.0161**	0.0627***	0.119***	0.139***	5,523,530
	(0.00775)	(0.0111)	(0.0152)	(0.0198)	
Year Month FEs	-0.00001	-0.00474	0.00566	-0.00766	1,684,190
	(0.00767)	(0.0111)	(0.0152)	(0.0198)	
Payday Amount					
Individual FEs	0.418	1.042	1.706	3.737*	1,684,190
	(0.828)	(1.255)	(1.626)	(2.079)	
Control Group	0.181	0.950	0.636	2.121	5,523,530
	(0.813)	(1.236)	(1.615)	(2.050)	
Year Month FEs	0.311	-0.293	-0.380	0.596	1,684,190
	(0.816)	(1.244)	(1.629)	(2.096)	
Installment Inquiries					
Individual FEs	0.0691***	0.0559***	0.127***	0.127***	1,684,190
	(0.00845)	(0.0127)	(0.0190)	(0.0281)	
Control Group	0.0715***	0.0526***	0.126***	0.120***	5,523,530
	(0.00853)	(0.0127)	(0.0187)	(0.0269)	
Year Month FEs	0.0246***	0.0326**	0.0410**	0.0488*	1,684,190
	(0.00840)	(0.0127)	(0.0189)	(0.0277)	
Installment Amount					
Individual FEs	1.203	4.256***	7.131***	8.024***	1,684,190
	(1.063)	(1.525)	(2.058)	(2.604)	
Control Group	1.113	4.130***	6.670***	7.210***	5,523,530
	(1.048)	(1.502)	(2.007)	(2.534)	
Year Month FEs	1.436	2.346	5.530***	5.027*	1,684,190
	(1.065)	(1.519)	(2.082)	(2.632)	

Note: Each row represents estimates from a separate regression. See text for more details.