HOW DO PAYDAY LOANS AFFECT CONSUMERS?

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Abstract

We analyse the effects of extending credit to marginal borrowers in the context of the payday lending market. We use a unique transaction-level dataset comprising 99% of payday loans issued in the UK over a two year period, matched to consumer credit files and a bespoke survey data. Using regression discontinuities at lender credit score thresholds we estimate the monthly time-varying causal effects of using a payday loan on an extensive range of outcomes including delinquency and credit usage; plus also survey measures, such as borrowing from family, consumption and subjective wellbeing. Our results show payday loans provide short-lived liquidity gains which benefit borrowers by raising consumption and lowering the immediate risk of non-payment on credit and debt in the first few weeks. However, in the following months payday loans cause consumers to persistently exceed bank overdraft limits, miss credit repayments, fall behind with bills and increase the share of debt in default. Results reveal no effects on subjective wellbeing, but do show high levels of regret among users of payday loans, the majority of whom repay more on their loan than they expected to. Our results are consistent with the view that in the medium term payday loans increase overall hardship for consumers.

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1. Introduction

In standard economic theory access to credit allows consumers to smooth the expected marginal utility of consumption over time. Despite this, traditional financial regulation has included usury laws restricting consumer lending in the form of bans or price limits. Such restrictions are designed to restrict lending to borrowers who are high credit risks and are therefore at the margins of lending decisions. Modern economic theories provide reasons to potentially limit credit access to higher risk, unsophisticated consumers who might suffer welfare losses from using credit, due to, for example, present-biased preferences (Laibson, 1997) or lack of financial cognition (Agarwal et al., 2009).

This paper aims to understand the welfare effects of extending credit to marginal borrowers in the context of the payday lending market. The emergence of payday loans has resulted in a surge of policy debate, focusing on the tensions between standard models, traditional regulation and modern theory. Proponents of payday loans argue they improve consumption smoothing possibilities for marginal borrowers, especially in emergencies, and that restricting access causes consumers to use more expensive inferior substitutes, such as bank overdrafts. Critics argue that consumers misunderstand borrowing costs, over-borrow due to lack of self-control and are vulnerable to 'debt spirals'. A broad range of studies using US data, mostly based on geographic variation in access to loans due to regulation, yield very mixed results on the effects of payday loans on consumers[1].

The central challenge in answering the question we pose is that of finding high quality econometric identification in representative datasets which allow the researcher to observe a broad range of outcomes. We draw upon a unique dataset comprising nearly all UK payday loan applications in 2012-13, including details of firm lending models, with matched consumer credit file records. For identification we employ a regression discontinuity approach around lender credit score thresholds which create discontinuities in the likelihood of obtaining a payday loan. We also broaden the range of outcomes we examine by commissioning a bespoke consumer survey covering a range of non-financial outcomes. We construct our survey sampling on a

[1] One set of studies find that payday loans cause financial hardship: households are more likely to miss bill payments and delay healthcare spending (Melzer 2011), make increased use of food stamps (Melzer 2014) and file for bankruptcy (Skiba et al. 2015). Payday loan access also increases local criminal arrest rates (Cuffe 2013) and causes a decline in job performance among military personnel (Carrell and Zinman 2014). However, alternative studies using similar data and methods show access to loans has positive effects on consumption smoothing (Zaki 2013) and ability to cope with disasters (Morse 2011). Studies based on state lending bans find that when bans are imposed consumers turn to bouncing checks (Morgan, Strain and Seblani 2008) using expensive bank overdrafts (Goldin and Homonoff 2013) or missing payments (Desai and Elliehausen 2014), though Bhutta (2014) and Bhutta et al. (2014) find no significant effects on consumer creditworthiness.

regression discontinuity design methodology, over-sampling loan applicants with credit scores located close to lender credit score thresholds.

The UK is the world's second largest payday lending market after the United States. In 2013 approximately 10% of the UK adult population applied for a payday loan (4.6m individuals), with 10 million payday loans provided to 1.6 million successful applications[2]. Our data on this market is exceptionally rich. The data includes loan level records for all payday loans granted in 2012-13 by the largest 37 lenders (together comprising approximately 99% of loans issued). For 11 large lenders, covering approximately 90% of loans issued, the dataset also contains details of all loan application

s, denied and accepted, including lender credit scores and thresholds for individual loan decisions. Individual customers are matched across payday lenders and to their credit bureau files[3].

We adopt a 'fuzzy' Regression Discontinuity (RD) approach and estimate Local Average Treatment Effects (LATE) of payday loans at the credit score margin of loan acceptance / denial to identify effects upon marginal borrowers. Many aspects of our data make it ideal for a RD approach. Our data provide a large number of observations of loan applications in close proximity to lender credit score discontinuities for a range of lenders in the market. In the UK market firms construct their own proprietary credit score models and discontinuities, which are unknown to consumers. Therefore we can be confident that individual consumers have no opportunity to precisely manipulate credit scores around these discontinuities. We also show the central assumption of an RD approach – continuity of baseline covariates around the threshold – holds in our design.

A novel aspect of our design is that we complement data from lenders and the credit bureau with a bespoke consumer survey which over-samples consumers around credit score thresholds, mimicking the RD approach[4]. This allows us to bring high quality identification to

[2] Cuffe (2013) estimates 5.5% of American adults took out a payday loan in the period 2008-2013. The total volume of UK payday lending is worth £2.5 billion annually with the average loan value at £260 lent for an average of 17 days. Annual Percentages Rates (APRs) on UK payday loans average around 500% (using the US APR measure). But unlike the US, most UK payday lending occurs online – often via mobile phone apps (approximately 80% of issued payday loans result from an online application) with instant electronic transfer of funds to consumers.

[3] These files contain up to six years (2008-2014) of data on mortgage and consumer credit applications, product holdings, balances, loan performance and credit bureau credit scores. We therefore have a dataset where we can track an individual over time and across the market and observe nearly every successful and unsuccessful payday loan application between 2012-13, including the details of the applications, subsequent loan performance and the credit history for a minimum of two years before, during and after loan applications.

[4] In this way we exploit variation in consumer survey measured outcomes at the fuzzy discontinuity in loan acceptance likelihood. Our consumer survey sample size is much smaller compared with consumer firm and credit

our analysis of survey based outcomes, which prior studies have found may be important[5]. In these data we observe informal borrowing, such as borrowing from family and friends or unlicensed (illegal) lenders and also measures of consumption, subjective wellbeing and other consumer experiences of using payday loans.

Crucially, with near-universal data we can accurately identify whether a loan denial resulted in an individual obtaining a payday loan from another lender. Hence we can avoid mis-classifying consumers between 'treatment' and 'control'. This is important for identification, as applying to another lender is highly likely to be endogenous to the decision received on the first application. Also, without market-wide data it is not possible to identify the first application by a customer (and in particular first success in obtaining the product), in which case the estimated treatment effect might conflate prior treatment effects[6]. Our data allows us to avoid these pitfalls.

We provide many results which together provide a comprehensive view of how payday loans affect consumers over time and explain many of the conflicting findings in the prior literature. With rich time variation in our data we estimate treatment effects at monthly time horizons up to one-year after loan application[7]. First, we find no evidence for substitution away from other forms of formal credit due to obtaining a payday loan, Results actually show using payday loans cause consumers to take on *additional* credit and debt. Estimates show that payday loan use causes consumers to apply for additional credit within the six months following payday loan acceptance, specifically seen in increased credit card and personal loan applications. Total consumer holding of non-payday credit increases, particularly personal loans, with non-payday loan balances increasing over the course of the year following payday loan acceptance. However, survey data shows some substitution for those declined for loans towards borrowing from family and friends.

bureau records and the survey response rate is low, but among our survey sample this approach allows us to exploit a balanced identification strategy uncommon in most survey settings.

[5] This broader range of outcomes examined in the literature includes financial outcomes not recorded in credit bureau credit files, such as missing household bill payments (Melzer 2011), use of food stamps (Melzer 2014), performance at work (Carrell and Zinman 2014) and consumption (Zaki 2013).

[6] This is particularly relevant in the payday lending market, in which consumers typically repeat borrow many times within the year. In our data in 2013 customers accepted for loans took on average six loans per year. In 2013 the US the typical payday loan user took on average seven loans per year (Consumer Financial Protection Bureau 2013).

[7] This is important because the time-varying effects of payday loan use are likely to be significant: a payday loan is a quickly accessible cash deposit to the consumer (loan application to money transfer online can take as little as 15 minutes for some products in the UK market). Payment of fees and charges is heavily back-loaded on the loan repayment at maturity. Hence the effects of an initial liquidity gain to the consumer may reverse when back-loaded payments become due. For example, we find payday loans initially cause a short-lived decrease in the likelihood of a consumer exceeding their bank overdraft limit, but this effect reverses after the first month.

Time-varying estimates are particularly insightful for understanding the effects of payday loans on default and creditworthiness. We examine a broad range of outcomes, including delinquency and default on other credit held by the consumers, over limit fees and charges on other credit (such as bank overdraft lines which in the UK include over limit fees) and household bill payment Results show payday loan use causes a small, short-lived decrease in the likelihood of these events in the first two-to-three months after loan acceptance. However, this pattern is reversed in subsequent months with a sharp worsening in consumer outcomes which persist over the following year.

Analysis of our consumer survey results shows payday loans do cause some substitution away from alternative forms of informal credit, in particular credit provided by a borrower's family and friends. Results show payday loan denial primarily results in foregone consumption, consistent with Zaki (2013). Nearly half of those unsuccessful in obtaining a payday loan report they (voluntarily or unwillingly) forego consumption. We find no significant effects of payday loans on self-reported wellbeing, using a range of wellbeing measures, though we do find those who obtained payday loans expressing high levels of regret that they took out a payday loan and most borrowers repay more than they expected. We explore the generalisability of our results by comparing responses from the over-sampled marginal applicants with those from a representative sample and find our main survey results generalise to the broader sample. Overall our results show payday loans are detrimental to consumers in the medium term.

The remainder of the paper is structured as follows. In Section 2 we describe the dataset we construct from lender and credit bureau records and our approach to identification based on lender credit score discontinuities, which we show in this section. In Section 3 we present results from the RD analysis in graphical and tabulated form, including time-varying estimates. Section 4 describes our consumer survey and the quasi-RD approach to identification we use in our sampling approach. This section also includes results from the survey data. Section 5 discusses the implications of our results for the effects of payday loans on consumer wellbeing. In Section 6 we present a brief conclusion.

2. Regression Discontinuity Designs Analysis of Loan Applicant Credit File Data

2.1. Data From Payday Lenders

The FCA data comprise loan-level records for applications to UK payday lenders from 1 January 2012 to 31 December 2013, including first-time and repeat applications. First, for 37 lenders operating in the payday loan market, who together comprise 99% of the total market by loan volume, the data includes records of successful loan applications and loan performance

(including information on default and late payments). Second, for 11 large lenders among the 37 who together comprise 89% of the market by loan volume, the dataset also includes details of unsuccessful applications and the credit score value assigned to each application. The dataset also includes information about firm credit decision processes, including other screening procedures such as fraud screening.

From the loan-level data provided by lenders the FCA commissioned a UK credit bureau to use their proprietary matching technology to identify unique consumers. The credit bureau matched identifying personal information (name, address, date of birth) from firm records to consumer records in their database, and when doing so also matching consumers to their credit files and provided these to the FCA. The resulting dataset is a consumer-level dataset including nearly all consumer loans and the vast majority of consumer loan applications in 2012-13 and complete credit files from 2008 to 2014. The dataset comprises approximately 4.6 million individual consumers who applied for at least one payday loan in 2012-13 (around 10% of the UK adult population), including approximately 1.5 million customers who applied for their first payday loan in 2012-13. Our analysis focuses upon these first-time loan applicants.

2.2. Credit File Data

Our main set of outcome measures are taken from credit files provided by the credit bureau. UK credit bureau files contain six-year records of all credit and debt items held by a consumer. We use the 'raw' credit file which provides item-by-item details of all credit and debt applications and products held with monthly balance and records of delinquency and default for each product. From these credit file data we construct four categories of outcome variables: First, *loan application* details which appear as credit 'checks' on customer credit files. Second, *credit balance variables* which measure the total balance of the consumer's portfolio plus individual balances on each product held (credit cards, personal loans, home credit, mail order products, hire purchase products, mortgage products, payday loan products, current accounts, household bill accounts and other products). A third category comprises measures of *bad credit events* including the total number of missed (including late) payments on all credit obligations, plus missed payments by credit product type. The fourth category is *creditworthiness outcomes* including total balances in default and delinquency, default and delinquency balances expressed as a proportion of total credit balances and indicators for personal insolvency events e.g. bankruptcy,

which is a very rare event in the UK[8]. This category also includes credit score and change in credit score.

2.3. Empirical Approach and Identification

We now explain our approach to econometric identification which uses a RD methodology, also used recently on US data by Skiba and Tobacman (2015) and Bhutta et al. (2015)[9]. Our interest is in estimating the effects of payday loans on consumers. However, payday loans are not randomly assigned to customers. Consumers whose applications are declined are higher credit risks to the firm and typically exhibit lower income and worse credit histories. Hence the observed outcomes for individuals who use (do not use) payday loans are not necessarily a good indication of counterfactual outcomes for those individuals who do not use (use) payday loans. Prior US studies have mostly addressed this identification problem by exploiting geographic variation in access to payday loans across or within states in the US as a set of natural experiments. Our exceptionally rich data on credit scores for denied and accepted loan applicants allows us to adopt an RD approach and estimate LATE effects, exploiting denied applicants with credit scores just below firm thresholds as a counterfactual for successful applicants with scores just above thresholds.

We now explain the lending decisions of UK payday lenders and how we exploit this for identification. A lender typically receives a loan application for a fixed price loan (a loan for which the price is not risk-adjusted to the applicant) from an applicant, which is then matched with the applicant's credit file provided by a credit bureau. Other data sources may also be matched into the loan application data. These, taken together, are used to calculate a lender's proprietary credit score. Some applications are declined before reaching this scoring stage. The credit score is normally a single numeric value on a continuous scale which indicates the willingness of the firm to lend to that individual given their characteristics and reflects the probability of default and expected profit of the loan[10]. The level of credit score required to be

[8] Creditworthiness data provides details of consumer performance on the loan products they hold. This includes delinquency (1-6 months in arrears) and default (non-payment after 6 months in arrears). These definitions are those used by the credit bureau. The data also includes information on formal and informal forms of personal insolvency including bankruptcy and the use of a debt management plan.

[9] Our study differs from Skiba and Tobacman (2015) and Bhutta et al. (2015) in that i) we have access to data from nearly all firms in the market, ii) we examine a broad range of financial outcomes, whereas those studies focus on credit score and bankruptcy only and, iv) we incorporate a consumer survey into our RD analysis. For detailed reviews and guides to the Regression Discontinuity Designs approach see Hahn and Van de Klaauw (2001), Imbens and Lemieux (2008), McCrary (2008), Imbens and Kalyanaram (2011), Lee and Lemieux (2010).

[10] In the payday lending market nearly all lenders offer fixed prices on their product offerings. All individuals who are successful for loans are offered loans at the same basic price (though the APR on any particular loan will depend upon amount borrowed and loan period). Hence the purpose of the credit score is solely to inform a binary choice as to whether the loan is offered, or not. Therefore, the credit score calculated by the firm will normally represent an

approved for a loan is known as the 'credit score threshold'. Applications with credit scores below this threshold are declined. Applications with credit scores at or above this threshold pass through the credit score stage onto loan approval, or possibly further stages in the decision model (including fraud screening and other checks). Hence, lender credit-score thresholds create discontinuities in the likelihood of obtaining a payday loan.

Our RD approach exploits these discontinuities in the likelihood of 'treatment'. The firm data provide a very large number of observations across the credit score distribution both within and across firms. This provides a sufficiently large number of observations close to firm lending thresholds. Crucially, the nature of the loan application process implies that individuals cannot precisely assign themselves to credit scores above or below the threshold. In particular, in the UK firms use proprietary credit score scales and models to generate scores – these firm credit score models are not known to consumers and firm credit scores do not appear on consumer credit files. Plus credit score models differ across firms and over time (the short-term nature of lending in this market provides a fast feedback loop for changing credit score models). While consumers can generally improve their credit scores through timely credit repayment and building up a history of credit usage, consumers do not have sufficient information to precisely manipulate their scores around lender thresholds.

Our 'treatment' variable of interest is receiving a payday loan. However, applicants declined due to a low credit-score at one lender may be subsequently accepted at another lender and the likelihood of applying to another lender is highly endogenous to the decision from the first lender. Hence we define the treatment variable as receiving a payday loan from *any* lender within a time period after first-loan application, with our instrument for 'fuzzy' RD identification being the firm-specific credit-score cut off threshold of the first lender to which the customer applied. We calibrate the time period by assuming that at the point of payday loan application a customer has some urgent 'need' for funds and is more short-term than other consumer credit markets (as implied by the nature of short-term, fast access, high cost loans) Our main results use a 7 day window to define the classification to treatment, however, results are robust to extending this window[11].

2.4. RD First-Stage Discontinuities

indication of the probability of default. Individuals with good credit scores (low probability of default) will be offered loans, individuals with bad credit scores (high probability of default) will be unsuccessful.

[11] A breakdown of success rates for obtaining loans is as follows: among all first-time applicants 50.7% receive a loan from their first application with their first lender, 55.3% receive a loan (from the first lender or another lender) within 3 days of first application, 56.1% within 7 days, 57.8% within 30 days, 58.8% within 60 days and 63% before the end of our sample period. Results are robust to using any of these windows.

We now show results for the 'fuzzy' first-stage discontinuities in the data which underpin our RD approach. We use the term 'lender-process' to describe a sample of applications assessed at a particular credit score threshold by a lender during our sample time period. Some lenders have one lender-process for the two-year period of our sample; other lenders varied their thresholds over the sample period. Across the 11 lenders for which we have credit score information we observe 17 lender-processes within the sample period. We are obliged to protect the anonymity of firms in our data and due to data confidentiality restrictions we cannot name which firms correspond to which lender-processes or disclose the number of loan applications made under each lender-process (as were we to do so firms could be identified).

Estimated 'fuzzy' first stage discontinuities using local polynomial regressions are shown in Table 1. For each of the 17 lender-processes we estimate the jump in likelihood of obtaining a loan at the credit score threshold, where obtaining a loan is defined as within 7 days, 30 days, or until the end of our sample period (up to 2 years). As can be seen from the table, for the majority of lender-processes, the jump in likelihood at the first-stage threshold is statistically significant at the 0.1% level. The coefficient values are interpreted as the percentage point increase in likelihood of obtaining a loan due to crossing the lender-process credit score threshold. For example, for lender-process A the likelihood of obtaining a loan from any lender within 7 days increases by 71.4 percentage points at the credit score threshold.

Lender-processes A to J exhibit increases in the likelihood of getting a loan at the credit score threshold of between 21% and 71%. Other processes exhibit weaker coefficient estimates, or no statistically significant results, indicating that credit scores were not important for lending decisions under these processes. There are two reasons for the lack of any statistically significant discontinuity in likelihood of obtaining a loan for these lender processes. First, some firms represented by these lender processes place very low weight on the credit score stage of the loan application process in final loan decisions (though this stage in the process may be important for intermediate decisions, such as whether to refer the application to underwriting). Second, the lack of any statistically significant jump may be explained by applicants declined by these firms being successful in obtaining a loan elsewhere.

We show data plots for the largest lender-processes at each of the four largest firms in the data in Figure 1. These four lender-processes comprise over half of the first-time loan applications in our data. The figure plots credit scores assigned to loan applications on the horizontal axis against the likelihood of obtaining a payday loan within 7 days on the vertical

axis. For ease of comparison the credit score threshold value is set to 0 and credit score values are scaled by standard deviation.

As described above, features of lender credit decision processes make us confident that consumers cannot precisely manipulate their credit scores around lender-process thresholds. To show that our data provides no indication of consumers manipulating their position relative to lender-process thresholds, such as credit applications bunching at credit scores just above the threshold, we plot the density of credit scores in and report estimate from the 'density test' proposed by McCrary (2008). The density test fits a local polynomial regression through the density of the running variable (here the credit score variable) to estimate any jumps in density at the threshold.

Results in Table 2 show that for each lender-process sample the estimated coefficient is statistically not significant, implying no evidence for bunching of credit scores just above or just below the threshold. Figure 2 shows plots for the density of credit scores for the four largest lender processes. A fitted local linear regression line is imposed on the plot together with lines showing 95% confidence intervals. There is no visual evidence for jumps in density at the credit score thresholds. Therefore, taken together with the features of lender credit scoring described above, we are confident that the assumption of non-manipulation holds in our data.

3. RD Analysis Results

3.1. How We Report Results From RD Analysis

This section presents the main results from the RD analysis. RD estimates for each outcome variable are estimated separately for each lender-process. We estimate instrumental variable local polynomial regressions using a triangle kernel, with bandwidth selected using the method proposed by Imbens and Kalyanaraman (2009) and standard errors clustered on the running variable. In our tables of results coefficient estimates should be interpreted as the change in the outcome variable caused by obtaining a payday loan at the margin of credit acceptance. To protect firm anonymity we report pooled results. We show illustrations for the largest lender-processes at each of the four main firms. We pool the estimated local Wald coefficients, using the lender-process sample size as the relevant weight for each process. The formula for pooling the estimated coefficients is $\beta_{pooled} = \frac{\sum_{i=1}^{9} \beta_i N_i}{\sum_{i=1}^{9} N_i}$ and the formula for pooling the estimated standard errors is $SE_{pooled} = \left(\frac{\sum_{i=1}^{9} SE_i^2 N_i^2}{\sum_{i=1}^{9} N_i}\right)^{1/2}$. Where β_i are the individual lender-process coefficients, SE_i the related standard errors and N_i are the sample sizes for each lender-process.

3.2. Results For Loan Applications

Frist we present results for loan application outcomes. The previous literature suggests consumers denied payday loans tend to turn to substitutes. However, our results show *obtaining* a payday loan causes consumers to apply for additional credit, particularly credit cards and personal loans. In the right panel of Table 3 we show pooled coefficient estimates for loan applications in the period 0-6 months and 6-12 months after the month of payday loan application. In the left panel we show falsification test results for the period 0-6 and 6-12 months before application. Coefficient estimates for total applications 0-6 months after are both positive and statistically significant at the 0.1% level, with coefficients in the falsification specifications not statistically significant. The coefficient on the number of credit checks 0 to 6 months after obtaining a payday loan is 0.61. Evaluated against a baseline value of 1.34 credit checks, on average at the time of first payday loan application, this implies a payday loan increases the number of credit checks over the subsequent six months by 46%. The coefficient of 0.126 on the credit item checks dummy implies the likelihood that a customer makes a credit check increases by 26%.

On which specific credit items do credit checks increase? Results in the remainder of the table show credit application increases occur for credit cards and personal loans. These forms of credit are cheaper than a payday loan, have higher credit limits and more flexible repayments over longer time horizons. Results show the number of credit card checks increase by 18% (0.061/0.34) in 0-6 months after obtaining a payday loan use and the number of personal loan checks increase by 97% (0.448 / 0.46) at 0-6 months and 29% (0.060 / 0.21)at 6-12 months respectively. Falsification test estimates show no pre-application differences in credit applications apart from (very small) differences in likelihood of holding home credit (which is a form of high cost credit in the UK offered to customers by sales representatives who visit the customer's home). These home credit application differences are small, reverse in sign 6-12 compared to 0-6 months before first payday loan application and are not economically significant in magnitude.

Figure 3 shows data for personal loan credit applications to display the fit of the local polynomial regressions across the four largest lender-processes. The top panel shows scatter plots for loan application credit scores and the likelihood of an individual making a personal loan application 0-6 months after first payday loan application. The lender-process credit score threshold is illustrated by the vertical red line at the credit score threshold (set to zero). Clear 'jumps' in the local polynomial regression lines can be observed for each firm. The figures also show the credit score bin values are closely aligned along the fitted regression line, which does

not turn sharply upwards or downwards close to the credit score thresholds. The bottom panel shows scatter plots for the period 0-6 months before first payday loan application. The continuity in the pre-period outcome variable is clear from no apparent jumps in the local polynomial regression lines at the threshold values.

We therefore conclude that obtaining a payday loan causes an increase in credit demand seen in increased credit applications for personal loans and credit cards. This may be due to consumers who were previously discouraged from applying for credit in expectation of rejection becoming encouraged by their payday loan application acceptance, or due to firms soliciting business from these customers. We cannot distinguish between explanations. Next we examine whether these are successful applications, and how payday loans affect consumers' holdings of other loan products.

3.3. Results For Credit Product Balances

Next we explore whether increased credit applications result in increased credit balances. Results in Table 4 show that payday loan usage causes credit balances to increase along with additional credit product holdings (this is not necessarily implied by increased product usage as consumers could obtain more credit products without utilising them e.g. credit cards). Estimates show that in the year following first loan application balances on all consumer credit increase by between 100% and 130%. This is due to increases in personal loan borrowing but also increase in overdraft usage. At 6-12 months after loan acceptance personal loan balances increase by approximately one third (0.248 / 0.75) and overdraft balances by 16%. Payday loan balances also increase at both the 0-6 and 6-12 month horizons, implying obtaining a payday loan causes consumers to use more payday loans in the future.

3.4. Results For Bad Credit Events

Results for our category of 'bad credit events' are shown in Table 5. A bad credit event is recorded on a consumer's credit file when the consumer misses a contractual payment due on a credit item- for example failing to make a personal loan repayment on time or failing to meet the minimum contractual obligation on a credit card (typically the minimum payment amount). We focus on bad credit events on non-payday credit and debt[12]. Estimates in Table 5 show that

[12] Of course, by definition the likelihood of incurring a bad credit event on a payday loan account can only increase for a first-time applicant who obtains a loan (compared with a denied applicant who does not obtain a loan). Nevertheless, an average rate of missed payment in excess of one third, which we find here, is particularly high for any consumer credit product. The results for bad credit events on 'any payday accounts' in Row 3 of Table 6 imply, however, a very large default rate on these loans among marginal customers. Coefficient estimates show obtaining a payday loan results in a 35% chance of missing a payment at least once in the 0-6 months following at 37% chance at 6-12 months.

obtaining a payday loan *increases* the likelihood of incurring a bad credit even on non-payday credit and debt.

Estimates for the non-payday accounts dummy in the second row of results imply obtaining a payday loan increases the likelihood of incurring a bad credit event on a non-payday credit or debt item. The average likelihood of a bad credit event during months 6-12 at the threshold is 51% (implying credit score marginal payday lending consumers are very high risk to lenders) but this increases by 4.5 percentage points with the addition of a payday loan. Estimate for bad credit events on specific product types reveal the bad credit events caused by payday loans are concentrated upon personal loans and exceeding overdraft limits at 6-12 months after obtaining a payday loan.

Figure 4 plots data for the dummy outcome variable for whether the consumer exceeds their overdraft limit 0-6 months before and 6-12 months after first payday loan application. For three of the four lender-processes there are clear jumps in the likelihood of an overdraft excess event at the credit score threshold, with no evidence jumps at the discontinuity in the six months prior to first loan application. Figure 5 shows plots for a variable which measures the highest number of months late on any account (within the time period), named 'worst account status' in the credit file. As can be seen from the figures, in the period 6-12 months after first loan application there is a clear upwards jump in this outcome at the credit score threshold, with no jump in the pre-period. This implies that payday loan use does not only cause new bad credit events for the consumer, but also cause more severe delinquency for the consumer (which may be on a new account or an existing account).

3.5. Results For Creditworthiness Outcomes

Results for our final set of outcome variables from the consumer credit file which describe the overall creditworthiness position of the consumer are shown in Table 6. Results show payday loan use cause the consumer's creditworthiness position to deteriorate according to a broad range of measures. For measures of delinquency and default which include payday loans, payday loan use causes these measures to worsen. This is unsurprising and somewhat mechanical by definition of loan acceptance / denial, as discussed above. But the high likelihood of delinquency and/or default on first and subsequent payday loans gives rise to large economic effects. At 6-12 months horizon payday loan use causes an increase in default balances of, on average, £174 against an average balance of £216, an 81% increase.

Payday loan use also causes delinquency and default on non-payday loan balances to increase. The estimates at 6-12 month horizon imply default balances increase by on average £33 against an average default balance of £188, an increase of 18%. Figure 6 illustrates the discontinuities in non-payday default balances expressed as percentage of total non-payday balances. Plots for lender-processes of firms 1-3 show clear upward jumps in this ratio at the credit score threshold. The plot for firm 4 also shows an upward jump, though the data points are noisier around the line. For each firm lender-process there is no evidence for pre-period discontinuities in the outcome variable.

The decline in creditworthiness caused by payday loan use is also seen in deterioration in consumer credit scores. The final row of Table 6 shows estimates for the change in credit score. The credit score variable is only available in our data at January of 2011-2014. The mean credit score change over the period is negative i.e. the creditworthiness of credit score applicants on average declines over the period. The negative coefficient implies using a payday loan causes an additional decrease in creditworthiness of 68% the mean credit score change (21.63/31.72).

3.6. Month-by-Month Results For Main Outcome Variables

In this section we further explore the time-varying effects of payday loan use on consumer outcomes. With our large data sample we are able to estimate models for outcomes defined over monthly time intervals for up to 12 months before to 12 months after first payday loan application. Figure 7 shows plots local Wald coefficients and 95% confidence intervals. We show outcomes for three outcomes: the dummy variable indicating an individual exceeded their arranged overdraft limit in the month, the ratio of non-payday default balances to all non-payday default balances in the month and, the likelihood of a worsening credit event in the month.

Results show a consistent time-varying pattern. Three features stand out. First, for the outcome variables defined over the months prior to payday loan application the estimated coefficients are at or very close to zero and the 95% confidence interval spans the horizontal axis. Second, coefficient estimates for the outcome variables approximately four-to-six months after payday loan application are in each case positive and significantly different from zero. Third, the coefficient estimates for outcome variables which capture overdraft limit excesses and worsening credit events defined in the first few months after loan application are negative, indicating the initial effect of obtaining a payday loan is to lower the likelihood of these events, but that in subsequent months these effects reverse. The estimated coefficient estimates for the worsening credit event outcome decline after 8 months. However, this is most likely due to

censoring of the variable at a maximum worst status value (default) past which the customer's bad credit status cannot decline any further.

These month-by-month results suggest some positive immediate effects from obtaining a payday loan in consumer financial outcomes. Estimates suggest the liquidity provided by a loan slightly lowers the likelihood of consumers exhausting lines of bank credit. However, when repayment of the payday loan becomes due, typically after a few weeks duration, this effect reverses. We leave a full discussion of our results until later in the paper.

4. Consumer Survey Analysis

4.1. Outcome Measures in Survey Data

In this section we complement our analysis of firm loan records and credit file data with results from a consumer survey conducted on a subset of our sample of loan applicants. Self-reported survey data may include reporting bias and is typically only available for relatively small samples. However, a range of potentially relevant financial outcomes are not recorded in credit files, such as borrowing from friends and family or from unlicensed lenders who do not report to credit bureaus. A consumer survey also allows insight into a range of non-financial outcomes such as self-reported financial distress and subjective wellbeing plus consumer experiences of using payday loans.

We classify outcome variables in the survey data into three categories. First, *household financial outcomes* not observed in credit bureau data. These include ability to manage of bills and credit commitments (responses ranging from 'keeping up without any difficulties' to 'falling behind with many bills and commitments'); 'informal borrowing' from family, friends, colleagues at work, and whether the consumer had attempted to borrow from an unlicensed lender. Second, *general wellbeing outcomes*. These consisted of the four official questions used by the UK Office for National Statistics (ONS) to measure 'national wellbeing', which ask consumers to state (0-10) how happy and anxious they felt yesterday, the extent to which they feel the things they do are worthwhile and how satisfied they are with life.

Third, *consumer experience of using payday loans*. These include questions in which consumers were asked for what how consumers planned to and actually used payday loans. This included whether the money from payday loans was used for basic items such as rent, living expenses or household bills, more unexpected items such as to repair broken items or for discretionary items such as for presents or holidays. Consumers were asked whether they were happy, indifferent or regretted their decision to use a loan. Consumers were also asked whether; if in the future, they

needed to borrow a similar amount of money for a similar purpose they would apply for a loan again, use an alternative method or 'go without'.

4.2. Consumer Survey RD Sampling Design

Our approach to identification in our consumer survey analysis is analogous to the RD methodology we apply to credit bureau data. The approach we take is to heavily over-sample first-time payday loan applicants with credit scores 'just above' and 'just below' credit score thresholds and then fit RD models to our survey data using instrumental variable regressions[13]. We also survey a representative sample of consumers accepted for loans which allows us to assess the generalisability of results at the margin to across the population. We are limited in the size of our survey sample – in total we could interview only 1,638 consumers (1,092 in the 'just above / below' groups and 546 in the representative sample) – and our survey received a relatively low response rate of 18%. The consumer survey was conducted in March 2014. The sample comprised first-time loan applicants who made their loan application in July-November 2013[14]. The survey was conducted by telephone and participants received a one-time participation fee of £25 to increase response rates.

Using this approach we obtain a sample of with 552 respondents in the 'just below' credit score group and 540 in the 'just above' group. Summary data and tests for balance in covariates for consumers in these groups are shown in Table 7. The loan acceptance rate (using the same definition as that used previously of receiving a loan from any lender within 7 days) is close to 50% for the 'just above' group and below 7% for the 'just below' group. The additional variables in the table reveal the profile of the typical marginal payday loan applicant. The p-values from test for equivalence of means between the just above and just below groups in each variable show the two groups are comparable. There are no statistically significant differences in

[13] Sampling for the 'just above' and 'just below' groups was based on a prioritisation of consumers closest to the threshold. This was implemented via 20 'priority' levels. This prioritisation sought to interview as many people as close as possible to the credit score threshold and ensure the distribution of the two groups were symmetric in order to make them as comparable as possible. The priority level determined the order in which the survey company solicited interviews from individuals.

[14] The period July-November 2013 was selected taking the following considerations into account. First, based on feedback from previous surveys, attempting to contact consumers who first took out loans before this would most likely lead to low response rates due to contact details becoming outdated. Second, consumers are less able to recall loans from a longer time period ago thereby making responses less reliable. Third, this period provided sufficient time after the point of application for a payday loan for consumers to experience the effects of payday loan use, positive and negative, and for these to be seen in reported financial and non-financial outcomes.

covariates between groups at the 1% level. At the 5% level the just above groups are more likely to be married / with a partner, have a degree (though only 1 in 5 have a degree) and earn in excess of £50,000 per annum (but only 3.5% of just above applicants are in this category).

Given the small sample size local polynomial regressions are not feasible so we estimate instrumental variable regressions. For each outcome variable of interest we estimate three specifications: first we estimate models with no control variables (estimates from these models should be unbiased as the just above and just below groups are balanced in covariates); second, we estimate from models with following controls: age dummies, employment status dummies, dummies for highest educational qualification, a set of dummy variables for housing tenure status, ethnicity dummies and income band dummies. Third, we estimate models with the addition of priority weights. Priority weights are applied to observations by dividing observations into ten groups where group 1 includes observations for credit scores closest to the lender credit score threshold and group 10 includes observations furthest away. Observations in group 1 are assigned a priority weight of 1.00 and observations in group 10 are assigned a priority weight of 0.1.

4.3. Results For Financial Outcomes

Results for financial outcomes are shown in Table 8. The first four rows present estimates from models in which the dependent variable is a series of dummy variables capturing categorical answers to the survey question 'Which one of the following statements I read out best describes how well you are keeping on top of your bills and credit commitments at the moment?'. Of the 1,092 respondents 35% answered they were keeping up 'without difficulty', 34% keeping up 'but struggling', 20% 'falling behind with some bills' and 11% 'falling behind with many bills'. The coefficient estimates show no consistent pattern. In row 2 the estimated coefficients are negative, suggesting obtaining a payday loan lowers the likelihood of an individual struggling with repayments, but only weakly statistically significant in one specification (Column 2). In the fourth row the coefficients are positive suggesting obtaining a payday loan increases the likelihood a consumer will fall behind with many bills, but only the coefficient in Column 1 is significant with no controls. The coefficients in Columns 2 and 3 are weakly significant at the 10% level.

The remaining rows in the table present estimates for the effect of using a payday loan on the likelihood of borrowing from a variety of informal sources – family, friends, colleagues or a 'loan shark' (illegal lender). The coefficient on the 'borrowed from family' dummy variable is negative in Columns 1 and 2 but statistically significant at only the 5% level. In the sample 47%

of consumers report borrowing from friends or family. The coefficient value of -0.1330 implies obtaining a payday loan lowers the likelihood of borrowing from family by 28%. The coefficients for the models estimated for the likelihood of borrowing from a friend or colleague are also negative but not statistically significant in specifications with controls or priority weights.

The final row of Table 8 reports results from models in which the dependent variable is a dummy indicating whether the individual had contacted a 'loan shark' (unlicensed lender). The term 'loan shark' is a common phase for an unlicensed lender in the UK. However, to overcome ambiguity in measurement the survey first asked respondents 'Did you consider borrowing from a 'loan shark' and then followed-up with the question 'What do you mean by the term 'loan shark'. We manually reviewed responses and screened out responses which did not refer to unlicensed lending, such as respondents naming a licensed payday lender[15].

Only 1.4% of respondents in the sample report contacting a loan shark (and less than 1% report borrowing from a loan shark). It is likely that consumers under-report borrowing from illegal lenders in survey data. However the level of reporting in our survey data is likely to underestimate use of illegal lenders, the IV estimates here are based upon a comparison of those just below and just above, for which we could expect the level of under-reporting to be very similar. Results show no statistically significant relationship between receiving a loan and considering using an illegal lender.

4.4. Results For Subjective Wellbeing

In this section we report estimates from the survey data for the effects of payday loan use on subjective wellbeing. In Table 9 we present estimates from our survey data analysis in which the dependent variables are a series of questions used to measure subjective wellbeing developed by the UK Office for National Statistics. We use four questions in which survey respondents choose on a 10 point scale (where 0 is 'not at all' and 10 is 'completely) in answer to the following questions: 'overall, how anxious did you feel yesterday?', 'overall, to what extent do you feel the things you do in your life are worthwhile?', 'overall, how satisfied or dissatisfied are you with your life nowadays?' and 'overall, how happy were you yesterday'. The top four rows present results in which the dependent variables are expressed in continuous scales from 0-10. In the bottom four rows for each outcome dummy variables are created to indicate high levels of association (7-10).

[15] In the UK opponents of payday lending sometimes describe the industry as 'legal loan sharking', a phrase which sometimes appears in the news media.

Results suggest no statistically significant effects of payday loan use on subjective wellbeing. Results for the continuous dependent variables show only one specification in which the estimated coefficient is statistically significant, for the life satisfaction measure, at that only at the 5% level. With the inclusion of covariates in Columns 2 and 3 the coefficient estimate remains positive and of similar magnitude but is no longer statistically significant. Results for the dummy variable specifications also show no consistent pattern. The coefficient estimate for the specification without controls with the anxiety dummy as the dependent variable is positive and statistically significant at the 1% level, but again the addition of control variables renders the estimated coefficient not statistically significant.

4.5. What Do Consumer Experiences Reveal About Payday Loan Use?

In this final section we adopt an alternative approach to exploring the effects of payday loans on consumer welfare using our consumer survey. We added into the survey a series of questions which ask consumers directly about their experience of their first payday loan application and subsequent denial / acceptance. These questions are particularly revealing for understanding the psychology of consumer borrowing. However, responses may be subject to a variety of biases arising from *ex post* rationalisation. We seek to address this potential biases through a counterfactual strategy of asking equivalent questions both to consumers who were accepted for and denied loans. We also asked these questions of consumers in the representative sample group for comparison away from the margin of lending.

In some cases we ask identical questions to those who did and did not obtain loans e.g. why did you apply for the loan? We find similar responses among those who accepted and denied, suggesting (but not proving) that experience of receiving a loan does not confound answers. In other cases where the wording of the question itself is conditional upon the loan application outcome we ask consumers who obtained loans about their actual experience and consumers who did not obtain loans about a hypothetical counterfactual. For example, we ask consumers who obtained a loan what they *hypothetically would have done* had they been declined. We ask consumers who did not obtain a loan what they *actually did* when they were declined.

We present results from a range of questions on consumer experiences in Table 10. The sample comprises the 1,092 consumers in the just above and just below groups and 546 in the representative sample group. We divide the marginal sample by whether the applicant was successful in obtaining a loan into a ‘marginal successful’ group and ‘marginal unsuccessful’ group. Self-reported ability to recall the first-loan application differs between the groups, with 85% of respondents in both the marginal successful and representative sample groups stating

they could recall the experience of applying for their first payday loan fairly or very well, compared with 53% in the of marginal unsuccessful group. This suggests some differences in responses across groups may arise due to differences in recall. This result is unsurprising as taking out a loan would be expected to be a more memorable event than applying for one.

All the groups exhibit very similar intended uses for the loan. Approximately half of respondents stated they used / would have used loan to finance regular expenses, with fewer than one in five citing a luxury item as the intended / actual use of the loan. When asked what their response would be to being declined little less than half respondents in each group would delay expenditure – either through foregoing current consumption by choice or because no substitute source of funds were available. Again, the similarity in responses between those who did and did not obtain loans and those in the representative sample strongly suggests that payday loans raise immediate consumption for approximately half the households who receive a loan.

When asked whether the money from the loan was something they could 'easily go without', 'possible go without' or 'definitively couldn't go without' those who obtained loans were much more likely to cite they 'definitively couldn't go without' (55% in the marginal successful group and 50% in the representative sample group, compared with 25% among those who did not obtain loans). This suggests those who obtain loans might overestimate the utility loss from being unable to borrow.

However, when asked 'looking back, are you happy with your decision to use a payday loan or do you now regret this' 41% of those marginal successful and 30% of the representative sample report regret at choosing to borrow. Are these proportions 'high'? Although we know of no prior studies on economic decision against which we might compare this figure, prior studies from the psychological literature suggest the figure is very high compared with survey responses on other life choices such as those relating to education, financial choices and career choices[16]. In addition a significant proportion of those who obtained loans report they paid more for the loan than they expected - 39% in the marginal successful group and 28% in the representative sample group.

The high level of regret and unexpectedly high repayment costs among those who obtained loans contrasts with the response of those declined loans. Among those declined for a loan the majority – 63% - consider it 'for the best' that they were declined. Hence the consumer experience of those obtaining loans is a mixture of reported dependence upon payday loans

[16] Gilovich and Medvec (2005) survey a sample of US individuals on their experience of regret relating to a range of choices. They find the most commonly regretted actions are not pursuing additional education (21%) and lack of commitment to family life (12%). Among their sample only 8% cite regret in their financial choices and 6% in their career choices. Our survey question and sample is not directly comparable, but these results suggest our finding of 41% of consumers expressing regret at using a payday loan is high.

combined with regret, compared with declined applicants who, on average, consider being declined for the loan to have been a better outcome.

5. Discussion

Our analysis of lender and consumer survey data presents a broad range of results. Can we reconcile our results with a particular view on how payday loans affect consumers? Here we discuss how our results relate to three contrasting views which emerge from the prior literature. First, the view that payday loans are better for consumers than the alternatives they turn to when denied access. Second, the so-called 'debt trap' hypothesis that payday loans create a cycle of worsening hardship for consumers. Third, the view that payday loans provide essential emergency consumption insurance to consumers.

The first view gains support from previous US studies based on state lending bans which show consumers turn to 'inferior' substitutes such as overdraft limits when payday loan access is removed (Morgan & Strain 2008; Goldin & Homonoff 2013; Desai & Elliehausen 2014). Our results directly conflict with this view as they show little or no substitution effects towards other forms of 'inferior' credit for those denied loans. Instead some consumers denied loans obtain funds from family and friends but the majority delay consumption. Indeed, *obtaining* a loan causes consumers to apply for, and obtain, additional credit and debt and these consumers are more likely to hit their overdraft limits in the medium run.

Our results are more consistent with the second view that payday loans create a cycle of hardship for consumers (Melzer 2011; Melzer 2014; Carrell and Zinman 2014; Skiba et al. 2015). While we show obtaining a loan lowers the likelihood of breaching an overdraft limit or incurring a worsening credit event in the immediate time period, this risk increases significantly and persistently over many months. A large share of consumers who obtain loans report they regret taking the loan and most pay more in interest and charges than they expected. Obtaining a loan also raises the likelihood of financial hardship. For this pattern of outcomes to be consistent with increased lifetime utility the short-term liquidity provided by the payday loan must be of extremely high value, however, this appears inconsistent with no evidence for positive effects upon self-reported wellbeing.

This leads us to the third view – that payday loans provide essential emergency consumption insurance. This view finds particular support in analysis of economic emergencies in Morse (2011). Use of funds for emergency expenses is less prevalent in our data, with three

quarters of consumers granted loans in our data citing loan funds as used for either regular living expenses or luxury spending (only 10% citing the intended use of funds as for an emergency repair). It may be the case that the negative medium-term effects of using payday loans do not apply to consumers facing emergency consumption needs, or that those risks are consistent with lifetime utility maximisation for such consumers. An important question, which we do not explore in our analysis here, is whether our LATE estimates average out heterogeneous treatment effects across consumer types including consumers facing an emergency consumption need.

Do our results generalise to consumers located away from the threshold of acceptance and rejection? Marginal applicants are drawn from the bottom of the credit quality distribution and are strongly subprime risks to lenders. We cannot generalise our results based on firm data as there is little movement in firm credit score thresholds and firms do not use a common credit score (e.g. a FICO score) which would allow comparison. However, our survey results for non-marginal applicants indicate the consumer experiences of a representative sample are close to those of marginal successful applicants, suggesting our estimates for other outcomes might also generalise to the wider population of consumers.

6. Conclusion

Using a unique dataset comprising near all UK payday loan applications in 2012-13, combined with customer credit files and a bespoke consumer survey, we estimate the impact of payday loan use on consumers at the margin of lending. We employ a Regression Discontinuity Designs methodology which exploits lender-specific idiosyncratic credit score discontinuities. We also commission a consumer survey which over-samples loan applicants located around firm credit score discontinuities and capture a range of outcomes not available in consumer credit files. Our exceptionally rich data allows us to model the effects of payday loans on a broad range of outcomes.

Our results together form a rich picture of how payday loans affect consumers over time. We find payday loan use causes consumers to apply for additional credit card and personal loan credit within six months following payday loan acceptance. This results in successful loan applicants taking out more non-payday loans and total non-payday credit increases, particularly for personal loans. But payday loans cause deterioration in consumer creditworthiness. The likelihood of delinquency on non-payday debt increases. After a small one month decrease, payday loan use persistently increases the likelihood that a consumer will exceed their arranged

overdraft limit; the percentage of non-payday loan balances in default increases and consumers' credit bureau credit score decline.

Results from our consumer survey show payday loans cause some substitution away from informal credit. Instrumental Variables (IV) regression estimates show payday loans cause a reduction in the use of credit from family and friends. The primary form of substitution is away from foregone consumption: nearly half of those unsuccessful in obtaining a payday loan report they decided to forego consumption or had no other borrowing option available. Many consumers regret taking out loans and the majority that were denied loans believed in retrospect that it was for the best.

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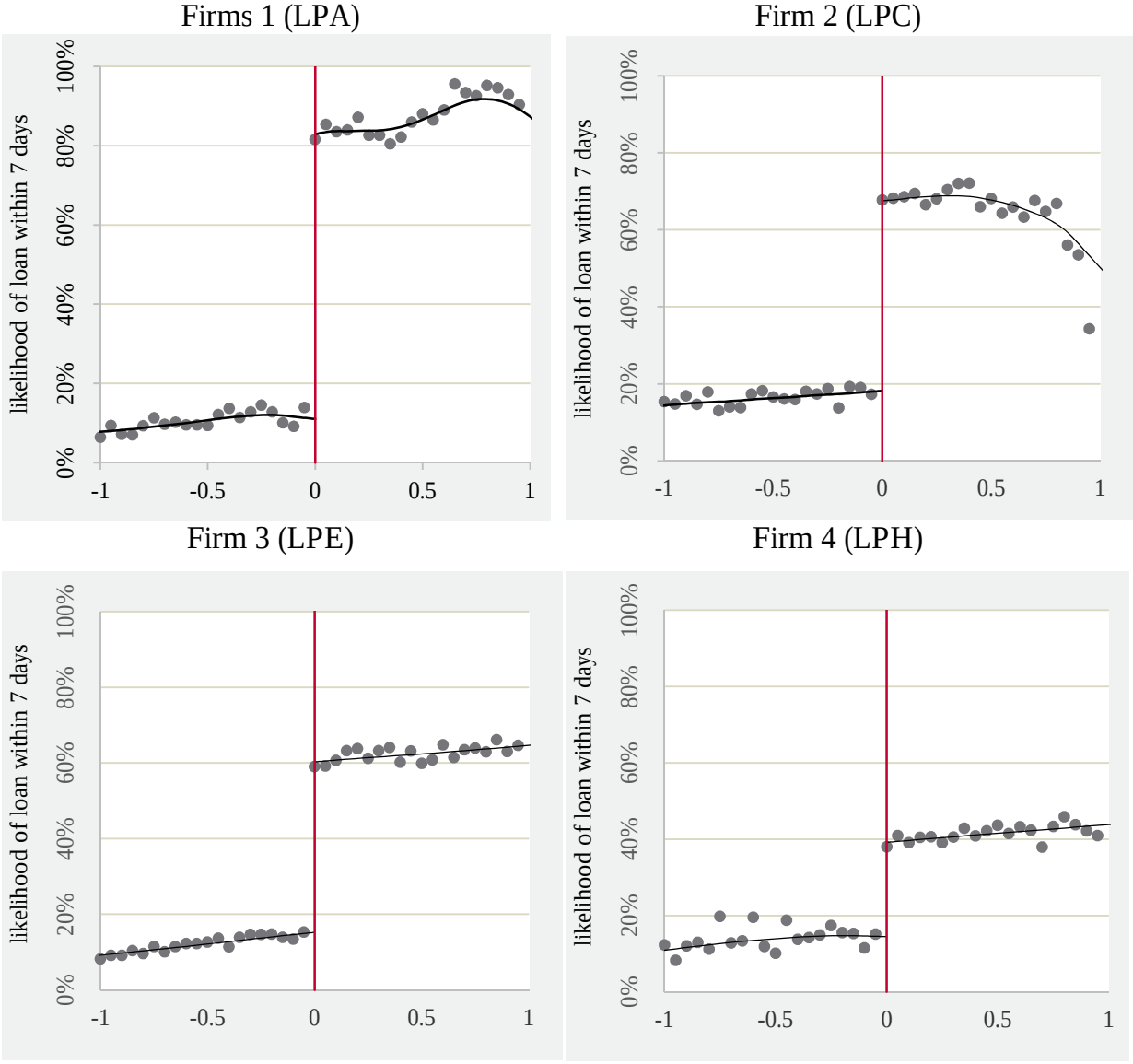
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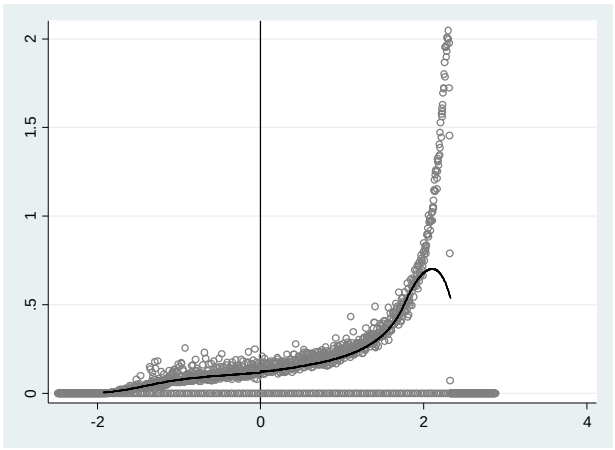
Figure 1: RD First-Stage 'Fuzzy' Discontinuities For Largest Lender-Processes



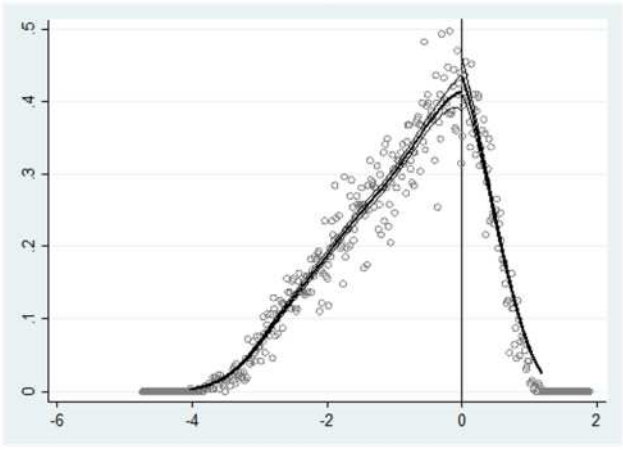
Notes: lender processes A, C, E and H are the largest lender-processes by applicant volume for the four largest firms among the 11 firms comprising the second part of the firm data request. The horizontal axis shows standard deviations of the firm credit score, with the credit score threshold value set to 0, that value shown as the vertical red line. The vertical axis shows the likelihood of an individual applicant obtaining a loan from any lender in the market within 7 days. Each data bin represents a set of loan applications within the two-year sample period.

Figure 2: Distribution of Running Variable (Credit Score) For Largest Lender-Processes

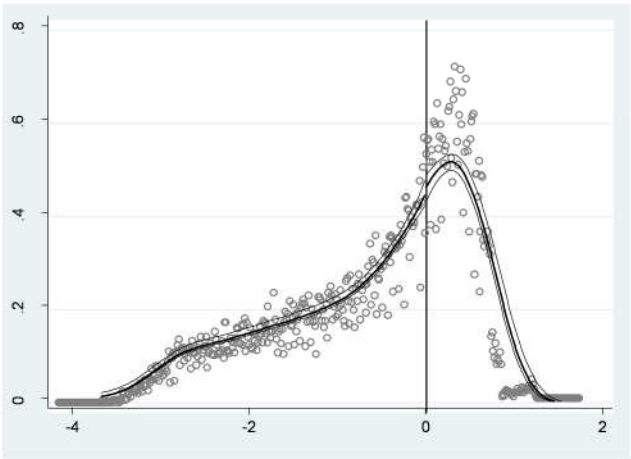
Firm 1 (LPA)



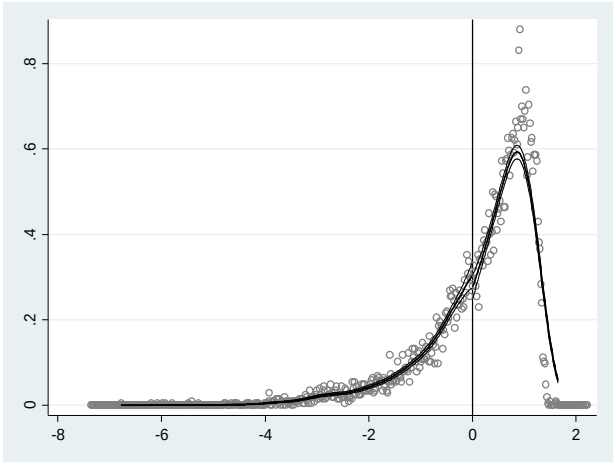
Firm 2 (LPC)



Firm 3 (LPE)



Firm 4 (LPH)

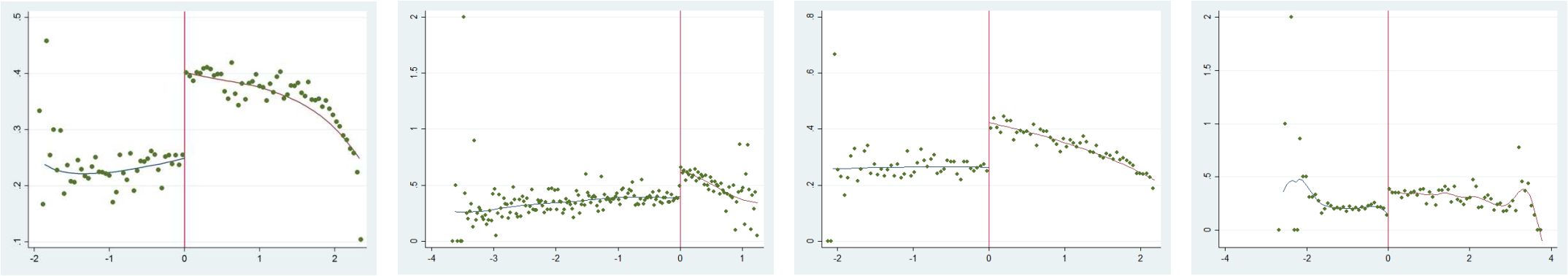


Notes: lender processes A, C, E and H are the largest lender-processes by applicant volume for each of the four largest firms among the 11 firms comprising the second part of the firm data request. Each figure plots the density of credit scores assigned to first-time loan applications within the 2-year sample period. The horizontal axis shows standard deviations of the credit score, which is set to a value of 0 at the threshold. The vertical axis shows density. A fitted local polynomial regression line is shown in each figure, together with 95% confidence intervals.

Figure 3: Distribution of 1/0 Outcome Variable For Any Personal Loan Credit Applications 0-6 Months After and Before First Payday Loan Application

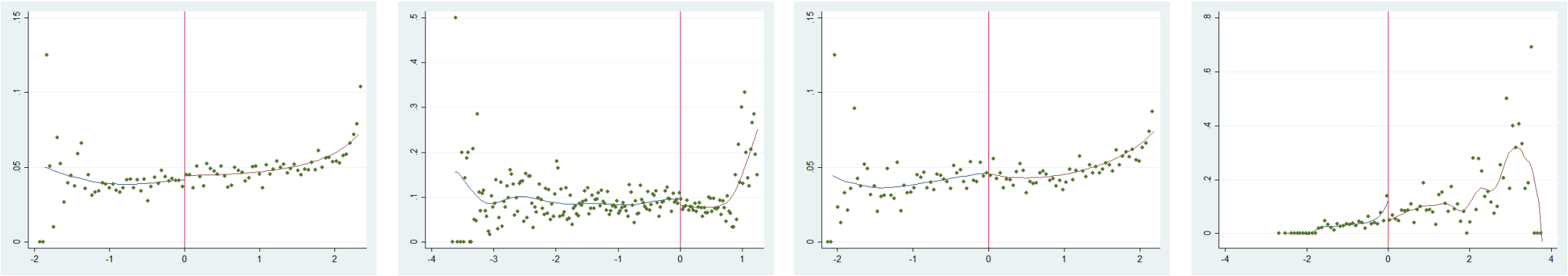
0-6 Months AFTER First Payday Loan Application

Firm 1 Firm 2 Firm 3 Firm 4



0-6 Months BEFORE First Payday Loan Application

Firm 1 Firm 2 Firm 3 Firm 4

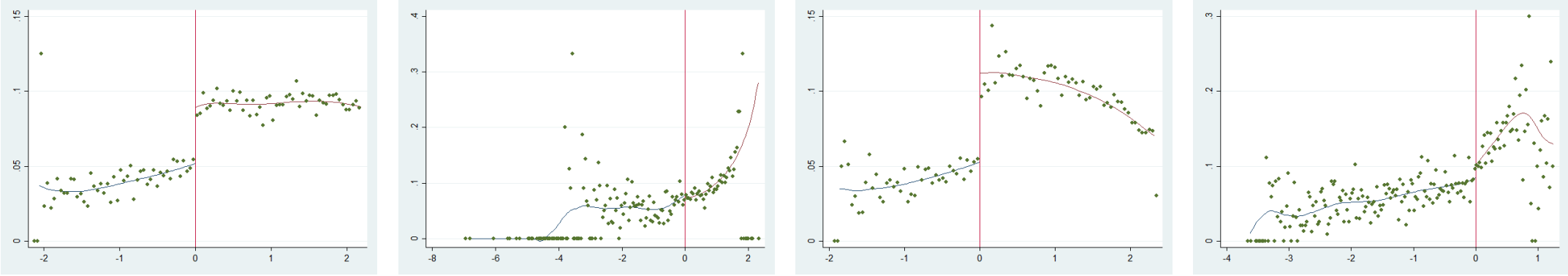


Notes: lender processes A, C, E and H are the largest lender-processes by applicant volume for the four largest firms among the 11 firms comprising the second part of the firm data request. The horizontal axis shows standard deviations of the firm credit score, with the credit score threshold value set to 0, that value shown as the vertical red line. The vertical axis shows the likelihood of an individual applying for a personal loan 0-6 months after first payday loan application (top panel) and after application (bottom panel). Each data bin represents a set of loan applications within the two-year sample period. Fitted loan linear regression lines are shown either side of the credit-score threshold.

Figure 4: Distribution of 1/0 Outcome Variable For Exceeding Overdraft Limit 6-12 Months After and 0-6 Before First Payday Loan Application

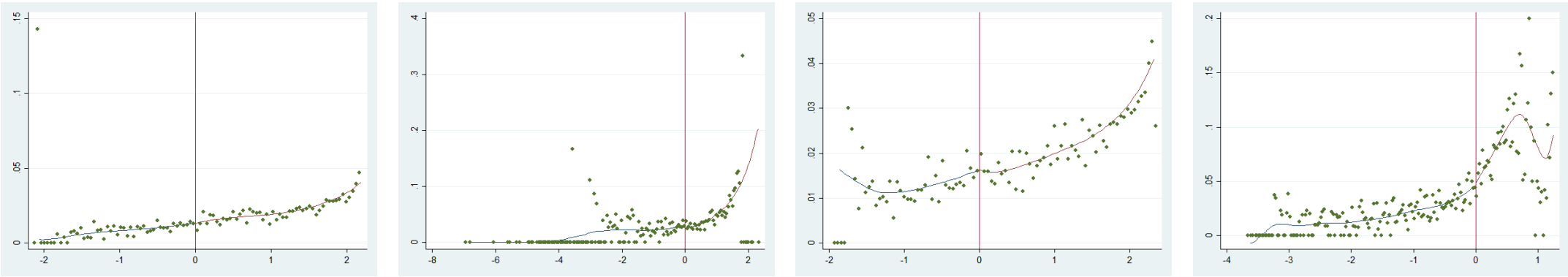
6-12 Months AFTER First Payday Loan Application

Firm 1 Firm 2 Firm 3 Firm 4



0-6 Months BEFORE First Payday Loan Application

Firm 1 Firm 2 Firm 3 Firm 4

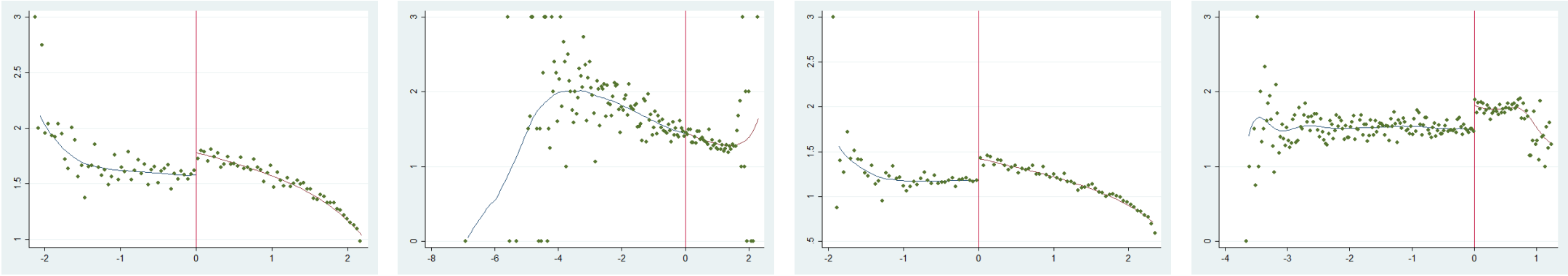


Notes: lender processes A, C, E and H are the largest lender-processes by applicant volume for the four largest firms among the 11 firms comprising the second part of the firm data request. The horizontal axis shows standard deviations of the firm credit score, with the credit score threshold value set to 0, that value shown as the vertical red line. The vertical axis shows the likelihood of an individual exceeding an authorised overdraft limit on a personal current account (bank account) held in their name 0-6 months after first payday loan application (top panel) and after application (bottom panel). Each data bin represents a set of loan applications within the two-year sample period. Fitted loan linear regression lines are shown either side of the credit-score threshold.

Figure 5: Distribution of Highest Number of Months Late on Any Account 6-12 Months After and 0-6 Before First Payday Loan Application

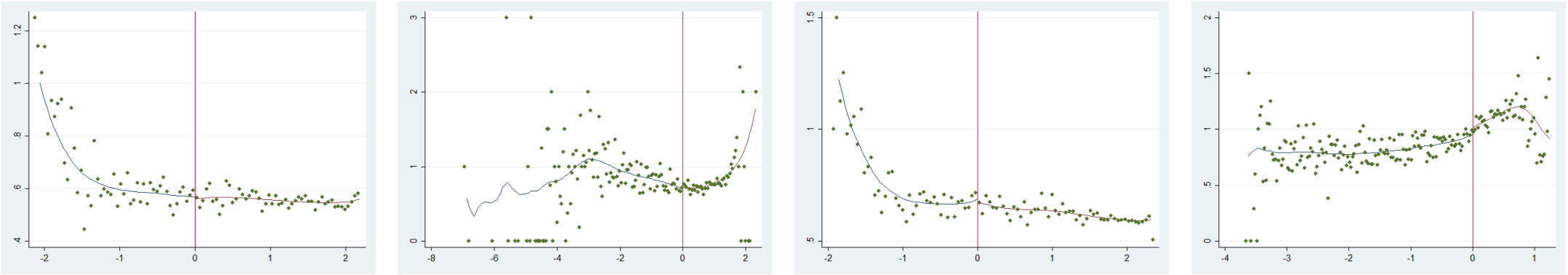
6-12 Months AFTER First Payday Loan Application

Firm 1 Firm 2 Firm 3 Firm 4



0-6 Months BEFORE First Payday Loan Application

Firm 1 Firm 2 Firm 3 Firm 4

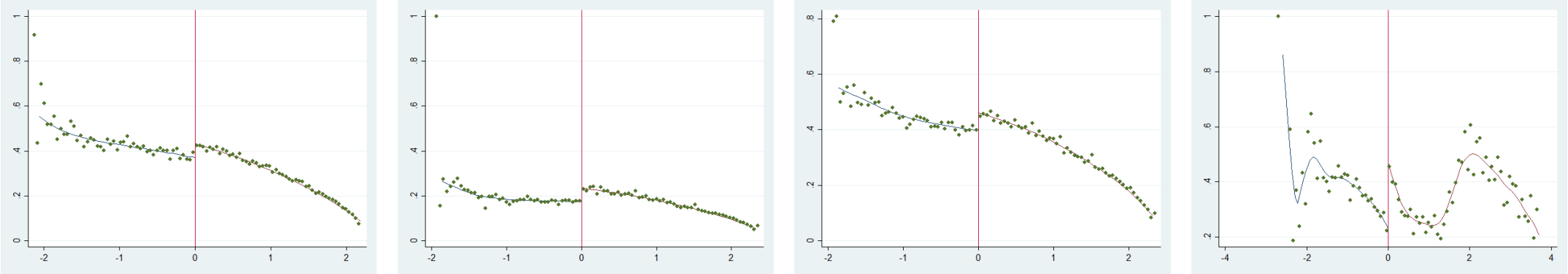


Notes: lender processes A, C, E and H are the largest lender-processes by applicant volume for the four largest firms among the 11 firms comprising the second part of the firm data request. The horizontal axis shows standard deviations of the firm credit score, with the credit score threshold value set to 0, that value shown as the vertical red line. The vertical axis shows the highest number of months late (after due payment) across all accounts on the consumer's credit file 0-6 months after first payday loan application (top panel) and after application (bottom panel). Each data bin represents a set of loan applications within the two-year sample period. Fitted loan linear regression lines are shown either side of the credit-score threshold.

Figure 6: Distribution of Non-Payday Default Balances as a % Total Non-Payday Balances

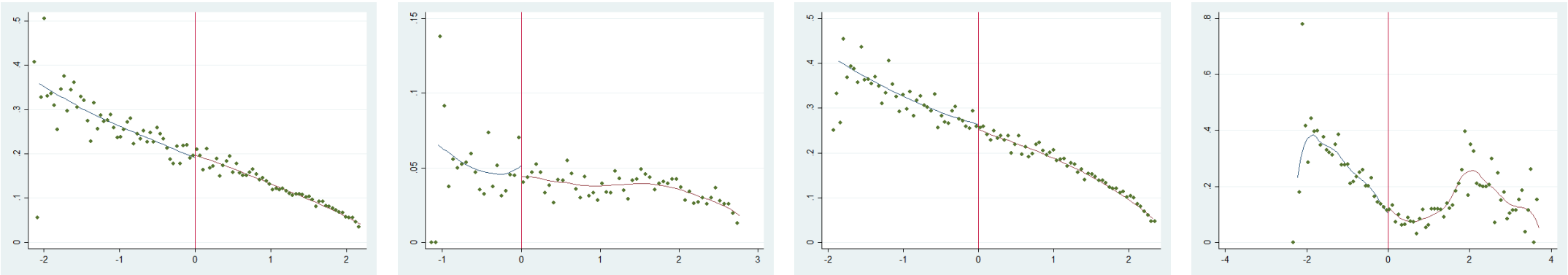
6-12 Months AFTER First Payday Loan Application

Firm 1 Firm 2 Firm 3 Firm 4



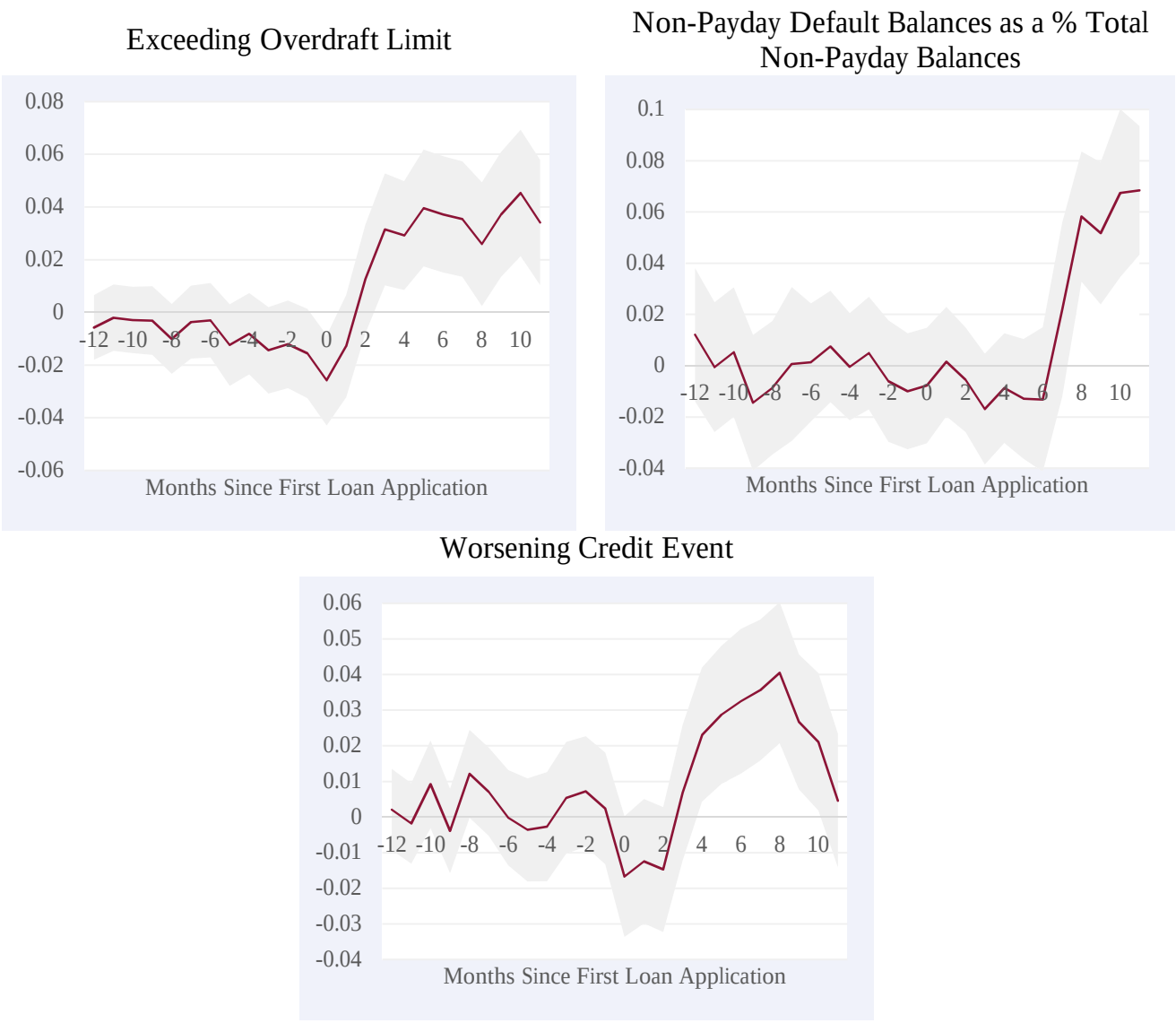
0-6 Months BEFORE First Payday Loan Application

Firm 1 Firm 2 Firm 3 Firm 4



Notes: lender processes A, C, E and H are the largest lender-processes by applicant volume for the four largest firms among the 11 firms comprising the second part of the firm data request. The horizontal axis shows standard deviations of the firm credit score, with the credit score threshold value set to 0, that value shown as the vertical red line. The vertical axis shows the non-payday default balances as a proportion of total non-payday balances on the consumer's credit file 0-6 months after first payday loan application (top panel) and after application (bottom panel). Each data bin represents a set of loan applications within the two-year sample period. Fitted loan linear regression lines are shown either side of the credit-score threshold.

Figure 7: RD Estimates for Main Outcomes Defined at Monthly Intervals



Notes: figure line graphs show pooled RD estimates from IV local polynomial regressions for four outcomes from credit bureau data analysis where outcome is defined at monthly intervals relative to month of first payday loan application (separate regression estimated for each monthly outcome). Sample comprises all first-time payday loan applications within sample period. 95% confidence interval illustrated in grey.

Table 1: RD First-Stage 'Fuzzy' Discontinuity Estimates by Lender-Process and Outcome Period			
Lender-process	Local Wald Statistic		
	7 Days	30 Days	Up to 2 Years
LPA	0.714***	0.671***	0.618***
	(0.0710)	(0.0623)	(0.0539)
LPB	0.482***	0.478***	0.477***
	(0.0420)	(0.0329)	(0.0142)
LPC	0.489***	0.481***	0.478***
	(0.0392)	(0.0375)	(0.0394)
LPD	0.481***	0.468***	0.466***
	(0.0213)	(0.0248)	(0.0318)
LPE	0.446***	0.432***	0.429***
	(0.0372)	(0.0358)	(0.0305)
LPF	0.438***	0.429***	0.427***
	(0.0243)	(0.0219)	(0.0429)
LPG	0.425***	0.420***	0.416***
	(0.0184)	(0.0274)	(0.0184)
LPH	0.251***	0.246***	0.236***
	(0.0423)	(0.0148)	(0.0201)
LPI	0.234***	0.225***	0.220***
	(0.0284)	(0.0201)	(0.0249)
LPJ	0.210***	0.201***	0.196***
	(0.0259)	(0.0149)	(0.0172)
LPK	0.0216	0.0208	0.0208
	(0.0203)	(0.0159)	(0.0204)
LPL	0.0143	0.0132	0.0130
	(0.0195)	(0.0101)	(0.0194)
LPM	0.00305	0.00290	0.00284
	(0.0139)	(0.0134)	(0.0219)
LPN	0.00120	0.00101	0.00100
	(0.0293)	(0.0198)	(0.00159)
LPO	-0.0297	-0.0315	-0.0316
	(0.0593)	(0.0245)	(0.0294)
LPP	-0.0103	-0.0108	-0.0111
	(0.0329)	(0.0111)	(0.0134)
LPQ	-0.0714	-0.0709	-0.0708
	(0.0832)	(0.0938)	(0.0639)

Notes: Table shows local polynomial regression estimated change in likelihood of obtaining a payday loan (from any lender in the market within 7 days, 30 days and up to 2 years) at each lender-process threshold. Lender-processes A to Q comprise all lender-processes for the 11 firms included in the second part of the firm data request. Sample comprises all first-time loan applicants. Statistical significance denoted at * 5%, ** 1% and ***0.1% levels.

Table 2: RD First-Stage 'McCrary Test' Discontinuity-in-Density Estimates by Lender-Process	
Lender-process	Local Wald Statistic
LPA	0.018
	(0.021)
LPB	0.024
	(0.043)
LPC	0.014
	(0.21)
LPD	0.019
	(0.27)
LPE	0.027
	(0.34)
LPF	0.020
	(0.14)
LPG	0.051
	(0.38)
LPH	-0.012
	(0.10)
LPI	-0.020
	(0.21)

Notes: Table shows estimates from 'McCrary Test' for jump in density of running variable (credit score) at lender-process credit score thresholds. Test results shown for the 9 lender-process samples used in second-stage analysis. Statistical significance denoted at * 5%, ** 1% and ***0.1% levels.

Table 3: RD Estimates for Effect of Payday Loans on Non-Payday Loan Credit Applications							
		Falsification Test Before First Loan Application		Estimated Effect After First Loan Application			
	Dummy	6-12 Months	0-6 Months	0-6 Months	Mean	6-12 Months	Mean
Total Applications							
Number of Credit Items	No	-0.0665 (0.0393)	-0.0439 (0.0252)	0.608*** (0.0453)	1.34	0.0451 (0.0301)	0.80
Any Credit Items	Yes	-0.0037 (0.0105)	-0.0081 (0.00989)	0.126*** (0.0102)	0.49	0.0116 (0.00963)	0.34
Number of Applications for Credit Products							
Credit Card	No	-0.0194 (0.0124)	-0.0168 (0.0167)	0.061*** (0.0171)	0.34	-0.008 (0.0121)	0.22
Personal Loan	No	-0.0052 (0.00547)	0.0111 (0.00932)	0.448*** (0.0194)	0.46	0.060*** (0.0136)	0.21
Revolving Credit	No	-0.0038 (0.00354)	0.0026 (0.00463)	0.0043 (0.00495)	0.03	-0.008 (0.00391)	0.02
Home Credit	No	0.00173* (0.00096)	-0.00232* (0.000643)	-0.001 (0.000863)	0.001	0.001 (0.000583)	0.0002
Mortgage	No	-0.0007 (0.00160)	-0.0018 (0.00184)	0.0002 (0.00171)	0.004	-0.001 (0.00187)	0.005
Whether Applied for Specific Credit Products							
Credit Card	Yes	-0.0116 (0.00664)	-0.0157 (0.00801)	0.025*** (0.0171)	0.21	-0.005 (0.00712)	0.14
Personal Loan	Yes	-0.0061 (0.00410)	0.0108 (0.00592)	0.187*** (0.00911)	0.25	0.0316** (0.00730)	0.17
Revolving Credit	Yes	-0.0028 (0.00333)	0.0037 (0.00433)	0.003 (0.00473)	0.03	-0.006 (0.00372)	0.02
Home Credit	Yes	0.0020* (0.000962)	-0.0013* (0.000644)	-0.001 (0.00574)	0.001	0.001 (0.00834)	0.002
Mortgage	Yes	-0.0003 (0.00118)	-0.0016 (0.00132)	-0.001 (0.00141)	0.004	0.001 (0.00131)	0.003

Notes: table reports pooled local wald statistics from IV local polynomial regression estimates for jump in outcome variables at lender credit-score thresholds. Each row shows a different outcome variable with each cell reporting the local wald statistic from a separate set of pooled coefficients. The column labelled dummy indicates whether the outcome variable is a 1/0 dummy variable or is continuous. The column labelled mean states the mean value of the outcome variable at the threshold. Statistical significance denoted at * 5%, ** 1% and ***0.1% levels.

Table 4: RD Second Stage Estimates for Credit Portfolio Balances						
	Falsification Test Before First Loan Application		Estimated Effect After First Loan Application			
	6-12 Months	0-6 Months	0-6 Months	Mean	6-12 Months	Mean
Log Total Balances						
All Consumer Credit	-0.0331 (0.0688)	0.0298 (0.0751)	1.30*** (0.0725)	4.05	1.05*** (0.0715)	4.16
All Non-Payday Credit	-0.0088 (0.0688)	0.0093 (0.0758)	0.051 (0.0774)	3.79	0.147* (0.0716)	3.94
All Payday	-	-	2.38*** (0.0294)	0.55	2.01*** (0.0394)	0.62
Log Credit Product Balances						
Credit Cards	-0.0745 (0.0688)	0.0546 (0.0751)	-0.004 (0.0423)	1.07	-0.0844* (0.0430)	1.09
Personal loans	-0.0514 (0.0279)	-0.0081 (0.0324)	0.014 (0.0382)	0.63	0.248*** (0.0431)	0.75
Home Credit	0.0067 (0.0176)	0.0285 (0.0341)	0.042 (0.0403)	0.62	0.046 (0.0422)	0.63
Mail Orders	0.0162 (0.0197)	0.0058 (0.0270)	0.008 (0.0324)	0.52	-0.006 (0.0298)	0.61
Hire Purchases	-0.0088 (0.0066)	0.0093 (0.0132)	0.033* (0.0158)	0.14	0.007 (0.0325)	0.1y
Cash Advances	-0.0001 (0.00182)	0.0069 (0.0293)	0.00125 (0.0183)	0.05	0.00219 (0.0823)	0.04
Overdrafts	-0.0025 (0.0102)	0.0094 (0.00928)	0.0991 (0.0718)	1.34	0.161*** (0.0239)	1.46
Credit Limit						
Credit Limit All Credit	-19.5408 (44.0)	-25.1791 (46.8)	-44.8 (47.7)	1125	-21.5 (50.3)	1150

Notes: table reports pooled local wald statistics from IV local polynomial regression estimates for jump in outcome variables at lender credit-score thresholds. Each row shows a different outcome variable with each cell reporting the local wald statistic from a separate regression. The column labelled dummy indicates whether the outcome variable is a 1/0 dummy variable or is continuous. Statistical significance denoted at * 5%, ** 1% and ***0.1% levels.

Table 5: RD Second Stage Estimates for Bad Credit Events							
		Falsification Test Before First Loan Application		Estimated Effect After First Loan Application			
	Dummy	6-12 Months	0-6 Months	0-6 Months	Mean	6-12 Months	Mean
Sum of Events							
Any All Accounts	Yes	0.0628 (0.100)	-0.0292 (0.0146)	0.121*** (0.0123)	0.51	0.168*** (0.0115)	0.53
Any Non-payday Accounts	Yes	0.0614 (0.101)	-0.0472 (0.0146)	-0.002 (0.0192)	0.45	0.045*** (0.00485)	0.51
Any Payday Accounts	Yes	-	-	0.348*** (0.00772)	0.06	0.367*** (0.00686)	0.15
Whether Any Events on Specific Products							
Credit Card	Yes	0.0262 (0.0260)	-0.0026 (0.00545)	0.0003 (0.00715)	0.11	-0.004 (0.00668)	0.12
Personal Loans	Yes	0.0008 (0.00106)	0.00261 (0.00326)	-0.0041 (0.00382)	0.05	0.078*** (0.0139)	0.07
Home Credit	Yes	0.0100 (0.0829)	0.0014 (0.00319)	0.0031 (0.0104)	0.1	0.0084 (0.00938)	0.11
Household Bills	Yes	0.0042 (0.00671)	0.0047 (0.00862)	0.001 (0.0101)	0.28	0.009 (0.0104)	0.24
Missed Mortgage Payments	Yes	0.0007 (0.00318)	0.0003 (0.00314)	-0.005 (0.00323)	0.03	0.002 (0.00292)	0.02
Exceeded Overdraft	Yes	-0.0083 (0.00727)	-0.0174 (0.00920)	0.021* (0.0103)	0.29	0.026** (0.00973)	0.27
Mobile Accounts	Yes	-0.0046 (0.00464)	-0.0038 (0.00432)	-0.001 (0.00123)	0.001	-0.001 (0.00867)	0.0001
Worst Account Measures (excluding payday)							
Worsening Credit	Yes	0.0097 (0.00923)	-0.0008 (0.0112)	0.008 (0.0134)	0.46	0.056*** (0.0103)	0.44
Worsening Household Bills	Yes	0.0085 (0.00645)	0.0063 (0.00816)	0.004 (0.00958)	0.21	0.006 (0.00908)	0.24
Worst Account Status	No	-0.0007 (0.0281)	-0.0085 (0.0319)	0.250*** (0.0353)	1.18	0.537*** (0.0332)	1.36

Notes: table reports pooled local wald statistics from IV local polynomial regression estimates for jump in outcome variables at lender credit-score thresholds. Each row shows a different outcome variable with each cell reporting the local wald statistic from a separate regression. The column labelled dummy indicates whether the outcome variable is a 1/0 dummy variable or is continuous. The column labelled mean states the mean value of the outcome variable at the threshold. Statistical significance denoted at * 5%, ** 1% and ***0.1% levels.

Table 6: RD Second Stage Estimates for Other Creditworthiness Outcomes						
	Falsification Test Before First Loan Application		Estimated Effect After First Loan Application			
	6-12 Months	0-6 Months	0-6 Months	Mean	6-12 Months	Mean
Delinquency and Default Balances incl. payday						
All Default Balances	-2.10 (3.67)	1.78 (5.94)	3.44 (8.24)	108	174*** (13.3)	216
All Delinquent Balances	2.31 (2.53)	-1.07 (3.46)	38.2*** (5.43)	79	40.3*** (5.69)	101
Log All Default Balances	0.0010 (0.0333)	-0.0247 (0.0452)	0.013 (0.0536)	0.92	1.14*** (0.0634)	1.56
Log All Delinquent Balances	0.0010 (0.0234)	0.0016 (0.0306)	0.338*** (0.0371)	0.68	0.278*** (0.0378)	0.83
Default Balances as % Total Balances	-0.0002 (0.0106)	-0.0094 (0.00986)	-0.078*** (0.00776)	0.16	0.117*** (0.0109)	0.29
Delinquent Balances as % Total Balances	0.0031 (0.00636)	0.0057 (0.00887)	0.015*** (0.00446)	0.09	-0.039 (0.00532)	0.10
Delinquency and Default Balances excl. payday						
Default Balances	-2.6988 (3.666)	0.6839 (5.858)	0.586 (8.194)	107	33.2** (12.3)	188
Log Default Balances	-0.0026 (0.0332)	-0.0283 (0.0450)	-0.020 (0.0535)	0.90	0.211*** (0.0623)	1.4
Default Balances as % Total Balances	-0.0005 (0.0663)	-0.0100 (0.0584)	-0.013* (0.0584)	0.18	0.031** (0.0103)	0.28
Delinquent Balances as % Total Balances	0.0061 (0.00882)	0.0027 (0.00634)	-0.009 (0.00523)	0.10	-0.0006 (0.00647)	0.13
Change in Credit Score* (0-12 months)					-21.63*** (0.429)	-31.72

Notes: table reports pooled local wald statistics from IV local polynomial regression estimates for jump in outcome variables at lender credit-score thresholds. Each row shows a different outcome variable with each cell reporting the local wald statistic from a separate regression. The column labelled mean states the mean value of the outcome variable at the threshold. Statistical significance denoted at * 5%, ** 1% and ***0.1% levels.

Table 7: 'Just Above' and 'Just Below' Threshold Survey Group Balance			
	Just Below	Just Above	p-value from test for equivalence of means
Number of successful interviews	552	540	-
Loan acceptance rate	6.7%	49.1%	0.000
Survey Response Rates	16.4%	15.6%	0.417
CRA credit score Jan 2013	658	680	0.008
Demographic Characteristics			
Age	33.01	33.25	0.747
Male = 1	62.3%	57.9%	0.135
Married / With Partner	63.9%	69.8%	0.049
Has Children = 1	40.7%	39.6%	0.703
Ethnically White British = 1	68.1%	68.8%	0.802
Home Owner Outright = 1	2.4%	1.7%	0.409
Home Owner Mortgage = 1	6.0%	8.6%	0.113
Education and Employment			
Full-Time Employed = 1	44.7%	48.9%	0.169
Part-Time Employed = 1	16.7%	15.9%	0.721
Unemployed = 1	19.8%	19.3%	0.816
High School = 1	26.2%	22.4%	0.215
Degree = 1	15.3%	21.5%	0.021
Income Level			
Under £6,000 = 1	2.2%	2.1%	0.251
£6,000 - £12,000 = 1	22.3%	21.0%	0.632
£12,000 - £18,000 = 1	27.6%	25.8%	0.516
£18,000 - £24,000 = 1	13.4%	14.3%	0.672
£24,000 - £36,000 = 1	10.9%	11.9%	0.652
£36,000 - £50,000 = 1	2.8%	0.5%	0.093
Over £50,000 = 1	1.4%	3.5%	0.037

Notes: Table shows mean values for consumer survey respondent characteristics among respondents in 'just below' and 'just above' lender-process credit score threshold samples. Right-hand column reports p-values from test for equivalence of mean statistics for 'just above' and 'just below' samples.

Table 8: IV Regression Estimates For Effects of Payday Loan Use On Financial Outcomes			
Dependent Variable	Instrumental Variable Regressions		
	1) No controls	2) Controls, no weights	3) Controls, priority weights
Financial Commitments			
Keeping up with no difficulty = 1	0.0279	0.0390	-0.0320
	(0.0676)	(0.0829)	(0.0839)
Keeping up but struggling = 1	-0.0447	-0.1440*	-0.0649
	(0.0663)	(0.0854)	(0.0856)
Falling behind some bills = 1	-0.0701	0.0383	0.0206
	(0.0559)	(0.0690)	(0.0759)
Falling behind many bills = 1	0.0869**	0.0669	0.0763
	(0.0377)	(0.0492)	(0.0492)
Informal Borrowing			
Borrowed from family = 1	-0.1330*	-0.1430*	0.1220
	(0.0694)	(0.0870)	(0.0884)
Borrowed from friend = 1	-0.1470*	-0.0856	-0.1240
	(0.0606)	(0.0752)	(0.0776)
Borrowed from colleague = 1	-0.0193	-0.0201	-0.0240
	(0.0310)	(0.0405)	(0.0416)
Considered using a 'loan shark' = 1	-0.0405	-0.0067	-0.0291
	(0.0281)	(0.0343)	(0.0360)

Notes: table shows coefficient estimates (standard errors in brackets) from instrumental variable regressions. Dependent variables for each regression are shown in rows. Each cell represents a coefficient estimate and standard error from a separate regression. Instrumented variable is a 1/0 dummy variable indicating whether the applicant's first loan application as successful. Instrument is 1/0 dummy variable indicating whether loan application met lender-process credit score threshold. Sample comprises all survey respondents in 'just above' and 'just below' groups, n = 1092. Column 1 reports estimates from models with no control variables; column 2 reports estimates from models with following controls: age dummies, employment status dummies, dummies for highest educational qualification, a set of dummy variables for housing tenure status, ethnicity dummies and income band dummies; column 3 reports estimates from models with the same control variables as column 2 in which priority weights are applied. Priority weights are applied to observations by dividing observations into ten groups where group 1 includes observations for credit scores closest to the lender credit score threshold and group 10 includes observations furthest away. Observations in group 1 are assigned a priority weight of 1.00 and observations in group 10 are assigned a priority weight of 0.1. Statistical significance denoted at * 5%, ** 1% and ***0.1% levels.

Table 9: IV Regression Estimates For Effects of Payday Loan Use On Self-Reported Wellbeing			
Dependent Variable	Instrumental Variable Regressions		
	1) No controls	2) Controls, no weights	3) Controls, priority weights
Wellbeing scales (0-10)			
Happy	0.0307	0.0378	-0.0709
	(0.0352)	(0.0127)	(0.0436)
Anxious	-0.0576	0.0127	0.0539
	(0.0457)	(0.0570)	(0.0582)
Life Worthwhile	0.0206	0.0555	0.0517
	(0.0342)	(0.0429)	(0.0402)
Satisfied	0.0593*	0.0509	0.0389
	(0.0346)	(0.0418)	(0.0402)
Wellbeing Indicators (=1 if response in range 7-10)			
Happy	0.0769	-0.0342	-0.0271
	(0.0696)	(0.0866)	(0.0902)
Anxious	0.1440**	0.0801	0.0320
	(0.0694)	(0.0878)	(0.0880)
Life Worthwhile	0.0128	0.0799	-0.0322
	(0.0688)	(0.0882)	(0.0879)
Satisfied	0.0606	0.0106	-0.0433
	(0.0377)	(0.0852)	(0.0865)

Notes: table shows coefficient estimates (standard errors in brackets) from instrumental variable regressions. Dependent variables for each regression are shown in rows. Each cell represents a coefficient estimate and standard error from a separate regression. Instrumented variable is a 1/0 dummy variable indicating whether the applicant's first loan application was successful. Instrument is 1/0 dummy variable indicating whether loan application met lender-process credit score threshold. Sample comprises all survey respondents in 'just above' and 'just below' groups, n = 1092. Column 1 reports estimates from models with no control variables; column 2 reports estimates from models with following controls: age dummies, employment status dummies, dummies for highest educational qualification, a set of dummy variables for housing tenure status, ethnicity dummies and income band dummies; column 3 reports estimates from models with the same control variables as column 2 in which priority weights are applied. Priority weights are applied to observations by dividing observations into ten groups where group 1 includes observations for credit scores closest to the lender credit score threshold and group 10 includes observations furthest away. Observations in group 1 are assigned a priority weight of 1.00 and observations in group 10 are assigned a priority weight of 0.1. Statistical significance denoted at * 5%, ** 1% and ***0.1% levels.

Table 10: Consumer Experiences of Using a Payday Loan			
	Marginal Unsuccessful	Marginal Successful	Representative Sample Successful
N	790	302	546
Recall of applying for the loan			
Very well = 1	19.8%	50.2%	46.8%
Fairly well = 1	33.7%	35.5%	38.2%
Not very well = 1	28.9%	10.0%	11.7%
Not at all well = 1	17.5%	4.3%	3.3%
Intended use for the loan			
Regular living expenses = 1	47.3%	54.1%	55.1%
Repairs to car / vehicle / household item = 1	16.1%	11.4%	8.2%
Luxury spending = 1	16.2%	19.7%	20.1%
(Hypothetical) Response to being declined			
Forego consumption = 1	20.3%	20.5%	24.4%
No substitute available = 1	23.4%	26.5%	22.3%
Borrow from friends or family = 1	25.3%	17.5%	22.3%
(Hypothetical) Need for loan			
Definitely couldn't go without = 1	25.3%	54.9%	50.2%
Possibly go without = 1	46.6%	33.2%	38.2%
Easily go without = 1	28.1%	11.9%	11.6%
Reflection on decision to use a payday loan			
Happy with decision = 1	-	52.7%	63.1%
Regret decision = 1	-	41.0%	30.5%
Neither = 1	-	6.3%	6.4%
Reflection on being declined for a payday loan			
Declined for the best = 1	63.2%	-	-
Better to have been approved = 1	28.1%	-	-
Neither = 1	8.7%	-	-
Amount repaid compared with expected			
Repaid less = 1	-	5.1%	10.4%
Repaid expected = 1	-	55.6%	61.7%
Repaid more = 1	-	39.2%	28.0%

APPENDIX TABLES – ONLINE ONLY

TABLE A1: Sensitivity of RD Estimates to Bandwidth Choice

TABLE A2: Sensitivity of RD Estimates to Kernel Choice

TABLE A3: Consumer Experience of Payday Loan Use Survey Questions

Table A1: RD Robustness Bandwidth Choice					
	Time Period	Pooled Wald Coefficient 0.25	0.5	2	3
Loan Application Outcomes					
Number of Applications					
Credit Card	0-6	0.0538	0.0749**	0.0776***	0.0803***
Personal Loan	0-6	0.4287***	0.4418***	0.4484***	0.4998***
Personal Loan	6-12	0.0701*	0.0746***	0.0480***	0.0451***
Any Applications (1/0)					
Credit Cards	0-6	0.0039	0.0234*	0.0321***	0.0322***
Personal Loan	0-6	0.1800***	0.1861***	0.1901***	0.2008***
Personal Loan	6-12	0.0271	0.0362***	0.0270***	0.0221***
Credit Portfolio Balances					
Credit Product Balances (Log)					
Personal Loan	6-12	0.1774	0.1939**	0.1706***	0.0368
Bad Credit Events					
Sum of Events					
Any Non-payday Accounts	6-12	0.0065	0.0342*	0.0421***	0.0471***
Whether Any Events on Specific Products					
Any Personal Loans	6-12	0.0658***	0.0727***	0.0875***	0.0974***
Any Exceeded Overdraft	6-12	0.0175	0.0283*	0.0342***	0.0409***
Worst Account Measures					
Any Worsening Credit	6-12	0.0296	0.0544***	0.0561***	0.0592***
Worst Account Status	0-6	0.2202**	0.2203***	0.2705***	0.3313***
Worst Account Status	6-12	0.4589***	0.4911***	0.5309***	0.6277***
Other Creditworthiness Outcomes					
Delinquency and Default Bal. non- HCSTC					
Default Balances	6-12	-12.1295	6.5434	43.947***	49.316***
Log Default Balances	6-12	-0.0788	0.0574	0.2618***	0.3620***
Default Balances as % Total Balances	6-12	0.0003	0.0193	0.0446***	0.0604***
Personal Insolvency Outcomes					
Credit Score (change)	n/a	-27.02***	-24.43***	-21.61***	-28.63***

Table A2: RD Robustness Kernel Choice		
	Time Period	Pooled LWald Coefficient Rectangular Kernel
Loan Application Outcomes		
Number of Applications for Specific Credit Products		
# Credit Cards	0-6	0.0627***
# Personal Loan	0-6	0.4478***
# Personal Loan	6-12	0.0717***
Whether Applied for Specific Credit Products		
Any Credit Cards	0-6	0.0315***
Any Personal Loan	0-6	0.1836***
Any Personal Loan	6-12	0.0322***
Credit Portfolio Balances		
Credit Product Balances (Log)		
Log Personal loans	6-12	0.2467***
Log Current Accounts	6-12	0.2007***
Bad Credit Events		
Sum of Events		
Any Non-HCSTC Accounts	6-12	0.0551***
Whether Any Events on Specific Products		
Any Personal Loans	6-12	0.0844***
Any Exceeded Overdraft	6-12	0.0292**
Worst Account Measures		
Any Worsening Credit	6-12	0.0579***
Worst Account Status	0-6	0.2504***
Worst Account Status	6-12	0.5485***
Other Creditworthiness Outcomes		
Delinquency and Default Bal. non- HCSTC		
Default Balances	6-12	40.3899**
Log Default Balances	6-12	0.2436***
Default Balances as % Total Balances	6-12	0.0354**
Personal Insolvency Outcomes		
Credit Score change†	n/a	-20.9282***

TABLE A3: Full Text of Survey Questions in Table 10

1. Recall of applying for the loan question: 'How well would you say you remember the experience of [taking out/applying for] this loan?' With possible answers 'very well', 'fairly well', 'not very well' and 'not at all well'

2. Intended use question: 'At the time of application what did you plan to use the loan for, even if you ended up using it for something else?' With possible answers: rent or mortgage payments, living expenses in general, household bills, consumer electronics, repair/replace broken items, car/vehicle, to help family friend or member, present/gift, holiday going out of socialising, to pay off another payday loan, to pay off other debt, business purposes, gambling.

3. Hypothetical / Actual response to being decline question: 'If you had not been able to get a payday loan on this occasion, what do you think you would have done instead?' / 'When you were not able to get a payday loan on this occasion, what did you do instead? With possible answers: Made a decision to go without the money, Nothing - had nowhere else to borrow the money from, Sold something, Used savings I already had, Saved up until I had the money that I needed, Borrowed from friends/family, Asked a friend or relative to give you the money or buy things on your behalf, Borrowed from another payday lender, Borrowed in some other way/overdraft/credit card, Defaulted on another loan/bill/payment, Cut back on spending, Requested more time for money that I owed, Something else (specify).

4. Hypothetical / Actual need for the loan question: 'And, can I just check, would you say that this money was something..'. With possible answers: 'That you definitely couldn't have gone without', 'That you could possibly have gone without', 'that you could easily have gone without?

5. Reflection on decision to apply for a payday loan question: 'Looking back, do you feel that it was for the best that [LENDER NAME] declined your loan application or would it have been better for you if the loan had been approved?' With possible answers 'For the best that the lender declined', 'Would have been better if loan had been approved', 'Neither'.

6. Reflection on being declined for the loan question: 'Looking back, are you happy with your decision to use a payday loan, or do you now regret this? With possible answers 'happy with decision', 'regret decision' and 'neither'.

7. Amount repaid compared with expected question: 'Taking everything into account, was the total amount that you had to repay more than, less than, or about what you originally expected?' With possible answers 'More', Less', and 'About what I expected'.