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Competition and Adverse Selection in the Small-Dollar Loan Market: Overdraft versus Payday Credit

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Abstract

We find that competition from payday lenders leads depository institutions to raise overdraft fees and reduce the availability of "free" checking accounts. We attribute this rise in prices partly to adverse selection created by banks' practice of charging a flat fee regardless of the overdraft amount—pricing that favors depositors prone to large overdrafts. Payday credit is priced per dollar borrowed, so when that option is available, depositors prone to small overdrafts switch. That selection works against banks; large overdrafts cost more to supply and, if depositors default, banks lose more, so prices rise. Consistent with this adverse selection hypothesis, we document that the average dollar amount per returned check at banks and other depository institutions increases when depositors have access to payday credit. Our findings illuminate competition and pricing frictions in the large, yet largely unstudied, small-dollar loan market.

Key words: payday credit, overdraft credit, competition, adverse selection

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I. Introduction

The small-dollar consumer loan market we study pits two very different competitors against one another. On the one side are mainstream banks and credit unions that supply overdraft credit whenever they cover check, ATM, or debit card transactions that would have overdrawn depositors' account otherwise. On the other side are payday lenders who cash and hold customers' personal checks for about two weeks, providing the check-writer with $50 to $500 of credit in the interim.

Although much maligned for its high prices, payday credit can be cheaper than overdraft credit. The median price for overdraft credit in 2006 was a flat $27 per overdraft (FDIC 2008). The typical price for payday credit is $15 *per $*100 of credit. Given two weeks of credit at those prices, payday credit is cheaper than overdraft credit for overdrafts below $180.[1] According to the FDIC (2008), the median overdraft at POS, ATM, and check transactions was $20, $60, and $66 in 2006 implying payday credit would be the cheaper substitute for at least half of depositors.

Our paper investigates how the availability of payday credit affects overdraft fees and the supply of "free" checking accounts, the base good with which overdraft services are bundled. We estimate the effect of payday credit using two different identification schemes. The first, following Morgan and Strain (2008), compares how outcomes change as states switch from allowing to prohibiting payday credit, or vice versa. The second, following Melzer (2009), focuses on states that prohibit payday credit, and compares outcomes at institutions located near the border of a state that allows payday credit with outcomes at institutions located further from

[1] $27/$180 = $15/$100. Sheila Bair (2005), now head of the Federal Deposit Insurance Corp., observed that depositories earned "enormous" fees on overdraft protection and that customers were turning to payday credit for their "cheaper product."

such a border. The identifying assumption for the first scheme is that legal changes within states are independent of overdraft outcomes, a plausible, if arguable, assumption. The identifying assumption for the second scheme is that the payday laws and location of intermediaries in one state are independent of laws in neighboring states, a less arguable assumption it strikes us. Importantly, the identifying assumptions of these two models are independent, which strengthens the overall research design.

Except perhaps in the most concentrated deposit markets, we find that banks and other depository institutions raise fees on overdraft credit and reduce the supply "free" checking accounts when payday credit is available. The changes are similar in both models, and are economically meaningful; the price of overdraft credit increases by $1, or 4 percent, and the likelihood of "free" checking falls by 5 percent.

Although we entertain other explanations for our findings, we attribute them partly to adverse selection created by the curious flat-fee pricing of overdraft credit. According to the FDIC 2008 (Table IV.2 p. 14), 98.4 percent of depository institutions charge *per* overdraft. White (2007) contends that banks eschew charging explicit interest to avoid regulation as credit and hence, usury limits. Banks may also want to avoid the adverse publicity that quadruple digit interest rates might incite.[2] Flat fee ("buffet-style") pricing of overdraft credit disadvantages depositors prone to small overdrafts, and so exposes overdraft providers to adverse selection. Once payday credit priced *ala* carte becomes available, depositors prone to smaller overdrafts switch, saddling banks and credit unions with proportionately more depositors prone to large overdrafts. That adverse selection increases costs to overdraft providers in two ways; funding

[2] Bair (2005) notes the attitude of some bank officials toward payday loans: "most bank officials we interviewed perceived the product as too high risk to offer profitably except at extremely high interest rates, thus inviting criticism from media, public policy officials, and consumer advocates."

large overdrafts costs more, and if the credit is not repaid, lenders lose more. Higher costs imply higher prices.

The adverse selection hypothesis implies that overdraft attempts should fall in number, but rise in average dollar amount when payday credit is available. Using data from Federal Reserve check processing centers, we confirm these predictions for a subset of overdraft attempts: returned checks, which are overdraft attempts that depositories refuse to pay. We extend and confirm Morgan and Strain's (2008) finding that returned checks are fewer when payday loans are allowed. In addition, we find that average amount of a returned check increases by 15% when payday loans are available. In combination, we believe that these facts are compelling evidence in favor of the adverse selection hypothesis.

A final, auxiliary finding provides indirect support for the adverse selection hypothesis: when payday credit is available, depositories reduce the availability of "free" checking accounts only for accounts *without* direct deposit. That selective tightening may represent risk management; expecting that customers who demand "free" checking without direct deposit may be anticipating large, unpaid overdrafts, depositories limit the supply of free checking without direct deposit.[3]

The interactions between overdraft providers and payday lenders may be a case where a competing class of firms educates myopic consumers about the hidden fees ("shrouded attributes") associated with another firms' product, an issue studied by Gabaix and Laibson

[3] The credit model in Riordan (1993) predicts competition in banking *per se* can increase risk and lead banks to tighten underwriting for two reasons. First, competition may degrade the quality of information banks use to screen borrowers, so more bad loans are made. Second, concerns about the winners' curse—the fact that banks may overbid (underprice) credit---will lead them to tighten underwriting standards.

(2006).[4] Whereas depository institutions may have no incentive to reveal the hidden overdraft fees associated with "free" checking, payday lenders might.[5] On that point, it is interesting to note how aggressively payday lenders have publicized the results of the FDIC (2008) study of the costs and usage of overdraft credit.[6]

As a complement to the growing literature about payday credit and consumer outcomes (Morse (2008), Morgan and Strain (2008), Melzer (2009), Skiba and Tobacman (2008), Carrell and Zinman 2008)), our work studies the effect of payday credit on the price of other types of credit. Fusaro (2008) also studies the cost of overdraft credit, but does not investigate its determinants. Hannan (2006) and Deyoung and Phillips (2009) analyze price competition for short-term credit within the banking and payday markets, respectively, but do not look at competition across the two industries. Finally, our work also bears some relation to an emerging industrial organization literature on price-increasing competition. Chen and Riordan (2008) show that competition between two differentiated products can increase each product's price in "non-exceptional" theoretical circumstances and cite evidence of price-increasing competition in two markets, food and drugs.[7] Our paper finds price-increasing competition in a third market.

Section II compares overdraft and payday credit and makes the case, based on prices and usage patterns, that they are at least partial substitutes. Section III describes the exit and entry of payday lenders that constitute the "experiments" we use to study overdraft and deposit outcomes. Section IV presents the main result—price-increasing competition—revealed by those

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[4] Indeed, they use "free" bank accounts and overdraft fees as leading examples of shrouded attributes. See footnote 22 in Gabaix and Laibson (2006).

[5] Within the "shrouded attributes" model, banks can earn more by keeping overdraft terms hidden, because informed customers will avoid the add-on or switch to another bank. Payday lenders offer only the checking account add-on, or credit in this case, so they are not subject to the same customer loss when they inform their customers about overdraft terms.

[6] For example: http://www.approvedcashadvance.com/images/highlights_fdic_bank_overdraft_programs.pdf

[7] Perloff, Suslow, and Seguin 2005; Ward et al. 2002; Thomadsen 2005

experiments. Section V presents auxiliary findings suggesting that adverse selection created by crudely (flat) priced overdraft is partly responsible the price-increasing competition we find. Section VI concludes by discussing implications for consumer welfare, policy, and future research.

II. Overdraft and Payday Credit

This section describes the two main players in the small-dollar loan market and compares the pricing and usage of their services. The key points are: overdraft and payday credit are partial substitutes; payday credit may be cheaper than overdraft credit; and both payday lenders and overdraft credit providers depend on revenues from repeat borrowing by core customers.

II.1 Overdraft Credit

Sometime in the 1990s financial advisory firms began marketing trade-marked, computer algorithms designed to automate and optimize depository institutions' (DI) traditionally *ad hoc* overdraft decisions.[8] The FDIC's (Federal Deposit Insurance Corporation) recent landmark study of bank overdraft programs reveals how ubiquitous overdraft credit programs have now become (FDIC 2008).[9] Forty percent of all banks surveyed operated automated overdraft programs. Over three-fourths of large banks (asset > $ 5 billion) had automated overdraft of one sort or another. The study shows that depository institutions offer a full "suite" of overdraft credit, ranging from lines of credit (LOC), arguably the top-of-the line, to automated discretionary overdraft protection, more familiarly known as bounce "protection," the variety we study.[10]

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[8] In a testimonial on the website of Strunk and Associates, purveyor of "Overdraft Privilege, a banker recalls "… I believe …we were the first institution in Georgia to implement the service. That was in 1998 or 1999" http://www.strunklp.com/custom.asp?id=128274&page=13. Accessed March 30, 2009.

[9] Starting with the population of banks scheduled for examination between May and December 2007, the FDIC surveyed a stratified, random sample of 462 institutions about their automated overdraft programs. Of those, a non-random sample of 39 banks were asked to provide transaction-level data.

[10] LOC are opt-in services charging interest comparable to credit card rates. "Bounce protection," by contrast, is the opt-*out* (default) choice charging flat fee rates that often imply implicit interest rates at three digit levels.

Depending on the amount of the overdraft, overdraft credit can be more expensive than payday credit. The median NSF (insufficient funds) fee charged by depository institutions *per* overdraft was $27 in 2007 (FDIC 2008, p.III, bullet 5). At that fee, the implicit annual percentage interest (APR) on a hypothetical, two week overdraft of $60 is about 1,173 percent, more than the typical APR for payday credit.[11] Repeated overdrafts are common for a subset of users (Table 1). About nine percent of depositors studied by the FDIC (2008) overdrew ten or more time *per* year, resulting in average fees incurred of $451 to $1610 *per* year. That fact is notable, as repeat ("chronic") usage of payday credit is also common and is commonly used as a critique against the industry.

Supplying overdraft credit seems profitable for depository institutions by any number of measures. The 1157 banks studied in FDIC (2008) claimed $2 billion in NSF-related fees in 2006, or $1.7 million *per* bank.[12] For the median bank, NSF fee income accounted for 43 percent of noninterest income and 21 percent of net operating income.[13] Banks and credit unions, particularly the latter, are surprisingly reliant on revenue from overdraft credit (Table 2). By Moebs' estimates, overdraft revenue accounted for 60.4 percent of credit union net operating income in 2005.

Supplying overdraft credit is not without risks or costs, however. Depository institutions involuntarily closed 30 million accounts between 2001and 2005 for "recidivist" check bouncing,

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[11] The implicit annual percentage rate is ($27/$60)*26*100. Using actual overdraft transactions on 1339 accounts at a small Midwestern depository institution, Fusaro (2008) reckons the median APR exceeded 4,000%, with "chronic" overdrafters paying $3,440 annually in fees.
[12] FDIC (2008) Table VIII-1, p. 57.
[13] FDIC (2008) Table VIII-2, p. 58.

and the trend is upward (Campbell, Jerez-Martinez, and Tufano 2008, p.1). The average loss *per* bad account in 2007 was $310 (FDIC 2008, Table VIII-5).[14]

II.2 Payday Credit

In 2007 roughly 19 million households demanded credit from about 24,000 payday lenders (Stephens 2008). As with overdraft, payday borrowers demand the credit repeatedly; many customers take out four or five loans *per* year, and a sizable fraction demand ten or twelve loans *per* year (Elliehausen and Lawrence 2001, Caskey 2002). The distribution of credit demand bears uncanny resemblance to the distribution of overdraft credit demand in Table 1.

Payday credit underwriting is minimal; applicants must prove that they have a checking account and a job. The checking account pre-requisite makes checking accounts and payday credit partial complements, implying positive correlation in the individual demand for each. Given a deposit account, however, payday credit and overdraft credit are substitutes, implying negative correlation in their individual demand. As we discuss later, that asymmetric technological relationship might help account for some of our findings.

III. Entry and Exit by Payday Lenders as "Experiments"

Because of the controversy surrounding payday credit, the state laws governing it have been in flux. Following Melzer (2009) and Morgan and Strain (2008), we use those fluctuations to identify plausibly, or at least arguably, exogenous variation in payday credit supply. We identify fluctuations or differences in regulation in 13 states. The appendix documents the regulatory differences in detail.

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[14] Charged-off deposit losses are counted in "residual charge-offs not elsewhere classified" (FDIC 2008 p. 62) Losses on charged-off deposits accounted for 12.6 percent of total gross loan and lease charge-offs in the FDIC study.

With a few exceptions, New England states have barred entry of payday lenders by strict enforcement of usury limits. Other states have closed markets outright or indirectly, *via* prohibitive usury limits, while a few have sanctioned and safe harbored the practice. Using those differences, we define two distinct indicators of DD credit availability: *Allowed* and *Access*.

$Allowed_{sy}$ equals one for institutions located in a state *s* where payday credit is allowed in year *y,* and zero otherwise. Because our regressions include state fixed effects, the variation that identifies the effect of *Allowed* comes from states that switch from prohibiting to allowing payday credit, and vice-versa. One state, New Hamphshire, switched from prohibiting to allowing in 2000. D.C. and six states switched from allowing to prohibiting payday credit between 2002 and 2008: MD, GA, NC, WV, PA, and OR.

Our identifying assumption is that political-economy decisions driving changes in *Allowed* are exogenous with respect to outcomes. While that assumption may be arguable, we find it plausible given the absence of any evidence to the contrary.

The 2nd availability measure is actually a sequence of distance-based indicators. $Access\_X\_Y_{cy}$, is a county-year level indicator equal to one if an institution is located in a county whose center is within X and Y miles of a state that allows payday lending (zero if not).[15] For example, *Access_0_10* equals one if an institution is in a county located 10 miles or less from a state that allows payday loans, and zero otherwise. *Access_10_20* and *Access_20_30* are defined analogously. The omitted category is *Access_30_plus*.

Note that *Access* varies only in states that prohibit payday lending.[16] Its effect is identified by comparing outcomes at institutions relatively near states that allow payday credit to

[15] We use the county center because we do not know the exact location of institution within the county.
[16] The 13 states that prohibit payday lending for some time during the sample period are: CT, DC, GA, MA, MD, NC, NH, NJ, NY, OR, PA, VT, WV.

outcomes at more remote institutions. The identifying assumption is that the distance between institution *i* and a state where payday credit is allowed is exogenous with respect to overdraft terms at institution *i*, a weaker assumption than needed for *Allowed*.[17]

The institutional and county characteristics defined by *Allowed* and *Access* differ in a few ways (Table 3). States with changes in *Allowed* have higher proportions of Hispanics and blacks, and relatively more savings banks (versus commercial banks). Savings banks are also over-represented (relative to commercial banks) in counties without access to payday credit (*Access_0_10 =1).* Unemployment rates are significantly lower in those counties as well. Importantly, our regression analysis controls for those differences by including institution and county-level controls.

IV. Data and Results

IV.1. Data

The data on overdraft prices and "free" checking were provided to us by Moebs $ervices of Lake Bluff, Illinois which collected the data through a telephone survey.[18] Moebs draws a random sample of institutions – stratified by region, asset size and institution type – and calls each institution's main branch to assess fees charged to customers at that specific location.[19]

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[17] Our identifying assumption requires, firstly, that payday credit regulations in bordering states are uncorrelated with characteristics of the overdraft market across the border, and secondly, that depositories do not locate based on payday credit availability in some way that alters the composition of depositories near the border. To weaken the latter assumption, we control for the institution type, institution size (log assets), and the concentration of the local deposit market. Also reassuring is that Moebs almost always surveys the main branch, a location that was typically determined long before payday lenders arrived on the scene.

[18] Moebs $ervices is an economic research firm focused on the financial services market. Their survey of fees and services at depository institutions was initiated to collect data for the Federal Reserve's Annual Report to the Congress on Retail Fees and Services of Depository Institutions (1989 to 2002), and has continued annually thereafter.

[19] Many banks with regional or national branch networks are chartered separately in each state. Moebs samples from the population of chartered institutions, so a single bank holding company might be sampled multiple times in a given year, across separately chartered subsidiaries.

The full space of data spans roughly 20,000 branch-year observations, half on commercial banks, 40 percent on credit unions, and 10 percent on savings banks. The two variables of interest are *Fee,* the fee charged per overdraft event, and *Free Checking*, a binary variable indicating whether an institution offers free checking accounts. *Fee*, measured in constant (2008) dollars, is observed at banks from 1995 to 2008, and at credit unions from 1999 to 2008.[20] *Free Checking* is observed from 2003 to 2008.

Sample statistics for the dependent variables are in Table 4. Average *Fee* is $25, but some institutions charged above $50. Although free lunches are said not to exist, "free" checking is ubiquitous; about 75 percent of depository institutions offered it.[21] Overdraft fees and the availability of "free" checking differ across types of institution. Credit unions and savings banks charge significantly lower fees, and were more likely to supply "free" checking, especially on accounts without direct deposit.

We match the Moebs survey data with balance sheet and income statement data filed by each institution with the FDIC (Federal Depository Insurance Corporation) and NCUA (National Credit Union Administration).[22] We also use the FDIC's Summary of Deposits database to calculate the HHI (Hirshman-Herfindahl index) of bank deposit market concentration for each county and year.[23] County characteristics including median income, racial composition, home ownership, population and percent urban population, are from the 2000 Census. Unemployment rates, by county and year, are from the Bureau of Labor Statistics' Local Area Unemployment Statistics.

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[20] Nominal prices are converted to real prices, in 2008 dollars, using the level of the June CPI from 1995 to 2008.
[21] "Free" checking, as distinct from free *checks,* means fees are not levied until the account balance is negative, in which case NSF or OD prices apply.
[22] These databases are populated through regulatory filings – bank and credit union Call Reports, and Thrift Financial Reports.
[23] NCUA does not collect the equivalent data for credit unions so credit union market shares cannot be calculated.

IV.2. Findings with *Allowed*

We estimate the impact of payday credit availability on *Fee* and *Free Checking* using difference-in-difference regressions of the form:

$$\text{(A) } Y_{icsy} = \alpha + a_s + a_y + \beta Allowed_{sy} + \theta HHI_{cy} + \vec{\gamma} Cnty_{cy} + \vec{\pi} Inst_{iy} + \varepsilon_{icsy.}$$

Y_{icsy} represents *Fee* or *Free checking* at institution *i* in county c*,* state *s,* at year *y*. The fixed effects (a_s and a_y) control for differences in the mean of *Y* across states and years. Some versions of (A) include a Census division-year effect to control for regional-specific trends. *HHI* (Herfindahl-Hirschman Index) measures bank deposit market concentration in each county-year. In some specifications we include an interaction, *Allowed*HHI,* to see if the payday credit effects depend on deposit market concentration. *Cnty* is a vector of eight county-level control variables, including the unemployment rate, which varies across years.[24] *Inst* controls for the natural log of assets and institution type (with dummy variables): saving bank, credit union, or commercial bank (the omitted category). The regressions are estimated by ordinary least squares, but we report probit estimates of *Free Checking* in robustness tests. Observations are grouped by state in calculating Huber-White robust standard errors.[25]

The key coefficient, β, measures how F*ee* or *Free Checking* varies with *Allowed*. Textbook theory implies $\beta < 0$, but given our adverse selection hypothesis, we reserve the possibility of $\beta > 0$.

Table 6 reports estimates of the regression model. Before considering β, note some of the other results. Credit unions and savings banks charge lower fees for overdraft than commercial

[24] The county-level Census controls are cubics in median income, population and percent urban population; percent black, white, Hispanic and Asian; percent home hownership and percent foreign born.
[25] Clustering by state addresses the Bertrand et al. (2004) concern that serially correlated outcomes bias standard error estimates in differences-in-differences regressions.

banks and are more likely to offer free checking. *LogAssets* has a significant, positive coefficient in every model, implying larger institutions charge higher overdraft fees and are more likely to offer "free" checking. By contrast, *HHI* is insignificant in every model implying *Fee* and *Free Checking* are uncorrelated with local deposit market concentration.

Now consider β. The results suggest access to payday credit is associated with higher overdraft fees in all but the most concentrated deposit markets. *Allowed* is positive in all four *Fee* regressions and is significantly different from zero in three of four specifications. The exception is specification (3), where we include census division-year fixed effects, but even in that case we find no evidence of price-decreasing competition. The estimate in column (2), the model with the maximal set of controls, implies overdraft fees increase by $1.31 when payday credit is available, a 5 percent increase relative to average overall the sample. Model (4), where we include the interaction *Allowed*HHI,* indicates that access to payday credit increases overdraft fees the most in competitive deposit markets. Based on the point estimates, payday availability decreases overdraft fees in concentrated markets, with an HHI above 0.6, a level three times the average HHI for overall the sample.

The *Free Checking* regressions indicate depository institutions are less likely to offer free checking accounts when depositors have access to payday credit. *Allowed* is negative and significant in models (5) – (6) which includes the model with census division-year fixed effects. The smallest estimate on *Allowed,* in model (5), implies depositories in states that allow payday lending are five percentage points less likely to supply free checking.[26]

Before discussing the results, we confirm that they hold using an entirely different measure of payday credit availability.

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[26] Since *Free Checking* is binary, this model assumes linear probability; we relax that assumption in a robustness exercise.

IV.3. Findings with Access

A potential concern with *Allowed* is that states endogenously liberalize their payday lending laws as OD fees increase, leading to a biased estimate. Using *Access* reduces those concerns; the identifying variation in *Access* does not depend on law changes in the institution's home state.

The regression model is:

(B) $Y_{icsy} = \alpha + a_{st} + \vec{\beta}\boldsymbol{ACCESS}_{cy} + \vec{\gamma}\boldsymbol{CNTY}_{c} + \delta BORDER_{c} + \theta HHI_{cy} + \vec{\pi}\boldsymbol{INST}_{icsy} + \varepsilon_{icsy}$.

Apart from replacing *Allowed* with *Access,* model (B) differs from (A) in two ways. First, (B) includes a state-year effect (instead of state and year effects) to isolate variation in *Access* that is unrelated to the state-level changes payday availability captured by (A). Second, some specifications of (B) include *Border*, a dummy indicating whether an institution is located in a county within 25 miles of a state border. *Border* controls for general differences between institutions located near a state border and more interior counties. To improve precision of the estimates we include all observations in the regression sample, but the identifying variation in *Access* comes from institutions in the thirteen states that prohibit payday lending at some time during the sample.

Table 6 reports regression estimates. We observe the same significant differences across types of institutions and size of institution as with regression model (A). Market concentration (HHI) is insignificant, as before.

The main results with *Access* are very similar to those with *Allowed.* Given county characteristics and type of institution, depository institutions are about 9 percentage points less likely to offer free checking if payday credit is accessible within 10 miles, with no discernible

effect at greater distances. Overdraft fees are significantly higher when payday credit is accessible. These estimates are very close to the earlier estimates; given the type and size of institutions and other controls, overdraft fees are $1.48 higher when payday credit is available within 10 miles. Access beyond ten miles does not significantly affect overdraft prices. As with *Allowed*, *Access* seems to have a larger effect on OD fees in low-HHI deposit markets, but the estimated coefficient on the HHI interaction term is quite imprecise.

IV.4. Robustness

Table 7 shows that the main findings are robust to several alternative functional forms. Estimating a probit model for *Free Checking* (panel A) yields marginal effects very similar to the linear probability estimates in the main results. A log-linear model, with *Log(Fee)* as the dependent variable, also yields an estimated effect of *Allowed* and *Access* of between four percent and six percent. This analysis confirms that the nominal to real price adjustment does not change the results. Results for model (A) are also stable when county dummy variables are used in place of the *Cnty* vector.[27]

Table 8 confirms the results of model (B) using a continuous measure, *LogDistance*, instead of *Access*. A one percent increase in the distance to a state that allows payday credit increases the probability that *Free Checking* is available by four percentage points and decreases OD fees about 50 cents.

V.1. Adverse Selection and Other Possible Explanations

How do we explain our finding of price-increasing competition? One might wonder if we are confusing cause and effect; perhaps rising overdraft prices within a state (endogenously) motivate legislators to permit payday credit? However, our second identification is less subject

[27] Results are available upon request.

to that objection. It seems implausible that the regulatory decisions in one state are driven by the overdraft conditions in counties in neighboring states, and, at that, only by those counties within 10 miles of the border, as we find.

Could access to payday credit drive up prices by increasing *demand* for overdraft credit? That prediction follows from the "debt trap" hypothesis against payday credit, the proposition that prohibitively expensive payday loans aggravate their users already strained financial condition and drives them to demand still more credit, including, perhaps, overdraft credit.[28] However, Morgan and Strain (2008) document that returned checks rates fall when payday credit is available. That finding, which we confirm and extend below, suggests access to payday credit *reduces* demand for overdraft credit, at least by some account holders.

Our findings could reflect the theoretical counter-effects of competition predicted by Chen and Riordan (2008). Analyzing a monopoly-duopoly model where consumers make discrete choices between differentiated products, they show that the customary downward pressure on prices from entry (as firms "defend" lost market share) may be offset by upward pressure arising because the duopolist's remaining customers are less price-elastic. While those effects could be operating here, we do not have any direct evidence for them.

Where we can provide direct evidence is for the adverse selection hypothesis. That hypothesis, again, is that the flat-fee pricing of overdraft credit discriminates against depositors prone to small overdrafts so they switch to payday credit when available while depositors prone to large overdrafts stick with banks and credit unions. That adverse selection hypothesis implies

[28] Melzer (2009) finds that households with geographic access to payday loan stores are more likely to report difficulty paying bills, and Skiba and Tobacman (2008) find higher rates of Chapter 13 bankruptcy filings among payday borrowers.

that the average amount *per* overdraft should increase when payday credit is available.[29] We test this prediction using data on returned checks, a subset of overdraft attempts, from Federal Reserve Regional Check Processing Centers (CPC).[30]

Some limitations of the data require discussion. Fed CPCs operate regionally; a CPC might process checks drawn on depository institutions from other states (which introduces some error in variables) and some states do not have a Fed CPC (which limits the events we can study). New Hampshire and Rhode Island have never had a CPC within their borders so we omit the changes in regulation in those states from our set of "experiments." That leaves six events, all bans, in five states (GA, NC, MD, WV, OR, and PA) with which we identify the effect of payday credit access on rates and amounts of returned checks.

With electronic payments supplanting checks, the Federal Reserve in 2004 began consolidating its check processing operations by closing some CPCs and transferring their operations to others. To maintain continuous series for those CPCs, we create *pro forma* series by combining the data for those CPCs at the beginning of the observation period. For example, the Columbia, SC CPC was closed and its operations were transferred to the Charlotte, NC in August, 2004. Combining their data at the beginning of the observation period creates a pro *forma "*Charlotte-Columbia" CPC that reflects joint activity at the CPC. Having to use *pro forma* series tends to attenuate the impact of payday lending bans on the outcomes.

To see how returned check patterns vary with access to payday credit we estimate difference-in-difference regressions of the form:

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[29] To clarify our terminology: overdraft attempts can be divided into two mutually exclusive and exhaustive categories, returned (bounced) checks and paid (protected) overdrafts.

[30] The Federal Reserve clears checks for banks, credit unions, and other depository institutions. The 45 Fed CPC operating in 2003 cleared about 38 percent of the estimated 36.6 billion checks written on all types of U.S. depository institutions that year, including credit unions and savings banks. Federal Reserve 2005 Check Restructuring Factsheet. http://www.federalreserve.gov/boarddocs/press/other/2004/20040802/attachment2.pdf.

$$\text{(C)}\quad Y_{csdt} = \alpha + a_c + a_t + \beta Allowed_{st} + \gamma Unemployment_{dt} + \kappa \text{Controls}_{\text{st}} + \varepsilon_{ct}.$$

The dependent variable, Y_{csdt}, denotes either 1) the *rate* of returned checks or 2) the average dollar amount *per* returned check at CPC *c* in state s in Federal Reserve District *d* at time (year-quarter) *t*. The rate of returned checks is measured in two ways: 1) number of returned checks *per* number of checks processed; and 2) dollar value of returned checks *per* dollar value of checks processed. The former seems more pertinent here because payday credit users, having lower than average income, are likely to write (and bounce) checks of smaller than average value, and the effect of these on the latter (dollar) measure will be muted. The regressions include a fixed effect for each CPC (a_c) and each date (a_t). *Allowed* is defined as before, except the NH and RI events are excluded. $Unemployment_{dt}$ denotes the unemployment rate in the Federal Reserve District wher CPC *c* is located at *t*. $\text{Controls}_{\text{st}}$ is a vector of controls measured at the state level: unemployment, log income, and income growth.

Summary statistics are reported in Table 9. The average rate of returned checks *per* number processed is 1.26 percent. The mean dollar amount *per* returned item is $872 and the median amount is $758. Those amounts are larger by an order of magnitude than the means and medians in FDIC (2008), presumably because the FDIC counted all overdrafts, protected or not, while our data only cover unprotected overdrafts; risk-averse banks may hesitate to cover $800 overdrafts.

The returned check regression results are reported in Table 10. Model (1) indicates that the returned check rate *per* checks processed, the measure more closely associated with small dollar check writers, declines when payday lending is allowed. Returned checks *per* dollar processed tends downward (Model 2), but the decline is not statistically significant. Those results confirm Morgan and Strain (2008). Model (3) indicates that the amount *per* returned

check rises when payday lending is permitted (significant at the ten percent level). The average amount *per* return increases by $130 dollar when payday lending is permitted, an increase of 15 percent relative to average.

The returned check regressions seem consistent with the adverse selection hypothesis.[31] When payday credit is available, depositors prone to frequently bouncing small checks may switch to less expensive payday loans. The depositors that do not switch are prone to bouncing larger checks, where overdraft is not such a bad deal.

V.2. Free Checking With Direct Deposit & Without

Recall that "free" checking is less available when payday credit is available. That finding might partly reflect that a checking account is a complement, pre-requisite actually, for payday credit, so their demand is positively correlated. While granting that possibility, we conjecture it also has to do with the possibility that "free" checking is less profitable to depository institutions when payday credit is available to depositors. Depository institutions may use "free" checking as loss leader that is compensated for by expected revenue from overdrafts. If payday credit helps depositors avoid overdrafts, the loss leader becomes a money loser. That logic predicts the decline in "free" checking will be more pronounced for deposits without direct deposit.

Consistent with that prediction, the results in Table 11 show that payday credit availability affects only the supply of "free" checking accounts without direct deposit. Also observe that institutional differences in the main results—the greater propensity for credit unions and savings banks to supply "free" checking-- is significant only for accounts without direct

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[31] In addition to changing the distribution of overdraft attempts, payday credit availability might also influence banks' policy of whether or not to cover an overdraft attempt. Changes in bank policy do not seem able to explain our findings that the average amount of returned checks increases when payday credit is available, however. To the extent banks are saddled with a riskier pool of overdrafters when payday loans are available, they would likely tighten standards and reduce the proportion of overdrafts paid, contrary to our results.

deposit. Credit unions and savings banks may rely more on overdrafts on accounts without direct deposit to compensate for providing "free" checking services.

V. Conclusion

Faced with competition from payday lenders, mainstream depository institutions charge higher overdraft fees and are less likely to offer "free" checking accounts without direct deposit. We attribute this price-increasing competition at least partly to adverse selection. When payday credit price *ala carte* is available, the small dollar overdrafters disadvantaged by the buffet pricing of overdraft credit switch, saddling banks and other depositories with proportionately more higher cost, possibly riskier large-dollar overdrafts. Depository institutions raise prices and manage the extra risk by reducing the supply of free accounts without direct deposit.

How does the competition we study affect consumer and producer welfare? Banks, credit unions, and other depository institutions appear to lose when faced with competition from payday lenders as some of their core customers—depositors prone to small, perhaps repeated overdrafts—switch to payday lending and their remaining customers overdraw, and perhaps default, in larger amounts. The depositors who switch to payday lenders would also appear to gain, assuming they are making rational, informed choices. The losers, of course, are the customers who stick with bank overdraft at the new higher price.[32] Without a model, we cannot calibrate the net welfare effect. However, Gabaix and Laibson (2006) use overdraft credit as the leading example of a "shrouded attribute," an expensive, overpriced feature of a good or service

[32] Our findings might reconcile the salutary effects of payday access in Morgan and Strain (2007) with the inimical effects in Melzer (2009); perhaps Melzer (2009) is detecting the households which stick with (now higher priced) overdraft, while Morgan and Strain (2007) are picking up the households who select away from overdraft.

that is hidden from consumers. "Debiasing," that is, educating consumers by unshrouding hidden attributes, is welfare increasing.[33]

[33]There is also a competing effect in shrouded attributes model. Shrouding only occurs when sophisticates can avoid the "add-on" at sufficiently low cost ("e"). The introduction of the substitute lowers "e" for sophisticates, making shrouding more likely, all else the same. In the context of overdraft, that implies banks are more likely to lower the price of the base good (the deposit), but charge higher add-on prices. We are finding higher add-on prices, but also higher base good prices.

References

Advance America Cash Advance Centers, Inc. (December 18, 2007). "Advance America Announces Decision to Close 66 Remaining Centers in Pennsylvania." Press release. Retrieved 2009-09-01. http://investors.advanceamerica.net/releasedetail.cfm?ReleaseID=282418.

Appelbaum, Binyamin. "Finance Companies, Banks Vying to Fill Void when People Need Cash." The Charlotte Observer. 5 Mar. 2006.

Ausubel, Lawerence. 1991, "The Failure of Competition in the Credit Card Market," *The American Economic Review,* Vol. 81, no. 1.

Bair, Sheila. 2005. Low-Cost Payday Loans: Opportunities and Obstacles. *Report Prepared for The Annie E. Casey Foundation*.

Barros, Pita P., 1999. Multimarket competition in Banking, with an example from the Portuguese market.International Journal of Industrial Organization 17, 335–352.

Bertrand, Marianne, Esther Duflo and Sendhil Mullainathan. 2004. How Much Should We Trust Differences-in-Differences Estimates? *Quarterly Journal of Economics*, 119(1): 249-75.

Berger, Allen N. and Timothy H. Hannan, 1989, "The Efficiency Cost of Market Power in Banking: a Test of the 'Quiet Life' and Related Hypotheses," *Review of Economics and Statistics* 80(3) (1998), 454-465.

Brooks, 2009, Harpers' Magazine.

Campbell, Dennis, Asis Martinez-Jerez, Peter Tufano. 2008. "Bouncing Out of the Banking System: An Empirical Analysis of Involuntary Bank Account Closures." Presented at the Federal Reserve Bank of Boston Workshop on Consumer Behavior and Payment Choice.

Campbell_____ 2007. "Central Bank: The CheXSystems Qualifile Decision," Harvard Business School Case 208-029.

Caskey, John (1994), Fringe Banking: Check-Cashing Outlets, Pawnshops and the Poor, New York: Russell Sage Foundation

Chen, Yongmin and Michael Riordan (2008), "Price Increasing Competition," *Rand Journal of Economics,* 39.

CRL (2003), "Quantifying the Economic Cost of Predatory Payday Lending," *Center for Responsible Lending*, unpublished report

Damar (2009), "Why do Payday Lenders Enter Local Markets: Evidence from Oregon, *Review of Industrial Organization,* vol. 34, issue 2, pages 173-191.

DeYoung, Robert and Phillip Ronnie J., Payday Loan Pricing (January 14, 2009). Networks Financial Institute 2006-WP-05 (revised version); FRB of Kansas City Paper No. RWP 09-07. Available at SSRN: http://ssrn.com/abstract=1066761

Fusaro, Marc (2008), "Hidden Consumer Loans: An Analysis of Implicit Interest Rates on Bounced Checks" *Journal of Economic and Family Issues*, Vol. 29, No.2, June.

Fusaro, Marc (2009), "The rank, stock, order and epidemic effects of technology adoption: an empirical study of bounce protection programs," *The Journal of Technology Transfer***,** 2009, vol. 34, issue 1, pages 24-42

GAO (2008), "Bank Fees: Federal Banking Regulators Could Better Ensure that Consumers Have Required Disclosure Documents Prior to Opening Checking or Savings Accounts," Government Accountability Office, GAO-08-281.

Hannan, Timothy H. 2006. Retail Deposit Fees and Multimarket Banking. *Journal of Banking and Finance,* 30: 2561-78.

Huckstep, Aaron (2007), "Payday Lending: Do Outrageous Prices Necessarily Mean Outrageous Profits?" Fordham Journal of Corporate and Financial Law.

Huber, P. J. 1967. The behavior of maximum likelihood estimates under non standard conditions. Proceedings of the Fifth Berkeley Symposium on Mathematical Statistics and Probability, Berkeley: University of California Press, 1, 221-233.

Melzer, Brian T. 2009. The Real Costs of Credit Access: Evidence from the Payday Lending Market. Working Paper.

Morgan, Donald and Michael Strain (2007), "Payday Holiday: How Households Fare after Payday Credit Bans," Federal Reserve Bank of New York Staff Study 309.

North Carolina Department of Justice (March 1, 2006). "Payday lending on the way out in NC." Press release. Retrieved 2009-08-27. http://www.ncdoj.gov/News-and-Alerts/News-Releases-and-Advisories/Press-Releases/Payday-lending-on-the-way-out-in-NC.aspx

Park, K., Pennacchi, G., Forthcoming, 2008. Harming Depositors and Helping Borrowers: The Disparate Impact of Bank Consolidation. *Review of Financial Studies*.

Perloff, J.M, V.Y. Suslow, and P.J. Seguin. 2006. "Higher Prices from Entry: Pricing of Brand-Name Drugs." Mimeo.

Pinho de Mello, Joao Manoel, 2005. "Information Asymmetry and Competition in Credit Markets: The Pricing of Overdraft Loans in Brazil" Working paper

Riordan, Michael, 1993, Competition and Bank Performance: A Theoretical Perspective," in C. Mayer and C. Vivess, (Eds.) *Capital Markets and Financial Intermediation,* Cambridge University Press.

Sabatini, Patricia. "Days May Be Numbered for State's Payday Lenders." Pittsburgh Post-Gazette. 26 Mar. 2006.

Thomadsen, R. 2005. "Product Positioning and Competition." UCLA working paper.

Ward, M.R., J.P. Shimshack, J.M. Perloff, and J.M. Harris. 2002. "Effects of the Private-Label Invasion in Food Industries." American Journal of Agricultural Economics 84: 961-973.

West Virginia Office of the Attorney General (May 9, 2007). "Attorney General McGraw Reaches Agreement with WV's Last Payday Lender, First American Cash Advance." Press release. Retrieved 2009-09-01. http://www.wvago.gov/press.cfm?ID=337&fx=more

White, Halbert. 1980. "A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity." *Econometrica*, 48: 817-830

White, James, 2007, "NSF Fees," Ohio State University Law Journal, Vol. 68, # 1: 185-199

Table 1: The Distribution of Deposit Overdrafts and Fees Paid to Banks in 2006

# of overdrafts per year	*% of depositors*	*Annual fees paid ($)*
0	75.0	0
1 – 4	12.0	64
4 – 9	5.0	215
10 – 19	4.0	451
20 or more	4.9	1610

Source: FDIC (2008, p. IV, Executive Summary points 2,3,4)

Table 2: Importance of Overdraft Revenues to Depository Institutions

	Overdraft (OD) Revenue ($ billions)	*Net Operating Income (NOI) ($ billions)*	*OD Revenue/NOI (percent)*
Banks	26.1	$145.8	17.9
Savings Banks	3.5	21.9	16.0
Credit Unions	3.5	5.8	60.4
Total	33.1	173.7	19.1

Source: Moebs $ervices (http://www.moebs.com/Default.aspx?tabid=125) using FDIC and NCUA 2003 Call Reports and 5300 Reports

Table 3: Average Institution and County Characteristics, by Change in *Allowed* and *Access_0_10*.

Reported are means and number of observations (N). *Allowed* =1 for states in institutions allowing payday lending , 0 otherwise. *Access_0_10* indicates whether payday loans are available within ten miles of center of county where institution is located.

	No Change *Allowed*	Change in *Allowed*	Diff. significant at 5%	*Access_0_10 = 0*	*Access_0_10 = 1*	Diff. significant at 5% level
Institution	(17,837)	(2375)		(2,830)	(391)	
Credit Union	0.41	0.41		0.44	0.49	
Commercial Bank	0.47	0.45	*	0.30	0.36	*
Savings Bank	0.12	0.14	*	0.26	0.15	*
Total Assets†	2,409,000	2,738,000		3,875,000	1,824,000	
County	(1,750)	(264)		(199)	(38)	
Median Income	36,900	37,400		42,800	42,700	
Population	126,500	132,600		283,400	198,700	
Percent urban	0.49	0.51		0.64	0.60	
Home ownership	0.73	0.72		0.69	0.71	
Percent white	0.82	0.81		0.83	0.84	
Percent black	0.07	0.13	*	0.08	0.09	
Percent hispanic	0.07	0.03	*	0.05	0.03	
Percent foreign born	0.04	0.03		0.06	0.05	
County-Year						
Unemployment Rate	0.052	0.052		0.050	0.046	*
(N)	(7,764)	(234)		(931)	(155)	
HHI	0.21	0.21		0.17	0.18	
(N)	(7,675)	(1,114)		(931)	(155)	

† N = 17,763 for no Change in *Allowed,* N= 2,374 for change in Allowed, N = 2802 for *PaydayAccess_0_10 = 0*

Table 4: Summary Statistics for Overdraft Fees and Availability of Free Checking Accounts by Type of Institution

	Panel A: All Institutions				Panel B: Banks				Panel C: Credit Unions			
	obs	mean	std dev	median	obs	mean	std dev	median	obs	mean	std dev	median
Overdraft Fee	15,089	24.98	7.32	25.95	10,345	25.73	7.33	26.80	4,744	23.34	7.00	24.59
Free Checking	10,542	0.73	0.44	1	5,253	0.66	0.47	1	5,289	0.81	0.39	1
Free Checking w/o Direct Deposit	9,626	0.62	0.48	1	4,339	0.52	0.50	1	5,287	0.71	0.46	1
Free Checking w/ Direct Deposit	9,626	0.11	0.31	0	4,339	0.12	0.33	0	5,287	0.10	0.30	0

Table 5: How Payday Credit Access Affects Overdraft Fees and Availablity of Free Checking Accounts

Reported are OLS regression estimates (robust standard errors clustered by state). *Allowed* =1 for institutions located in states allowing payday credit, zero otherwise.

	Dependent Variable (mean):							
	Overdraft Fee (24.98)				*Free Checking (0.73)*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Allowed	1.09*	1.31**	0.40	1.92***	-0.051**	-0.049**	-0.069***	-0.054
	(0.62)	(0.52)	(0.78)	(0.60)	(0.024)	(0.022)	(0.025)	(0.037)
*Allowed*HHI*				-3.27*				0.03
				(1.77)				(0.15)
HHI		-0.33	0.13	2.63		0.04	0.05	0.01
		(0.99)	(0.95)	(1.60)		(0.05)	(0.06)	(0.14)
CreditUnion		-2.38***	-2.42***	-2.38***		0.24***	0.24***	0.24***
		(0.38)	(0.38)	(0.38)		(0.03)	(0.03)	(0.03)
SavingsBank		-1.22***	-1.17***	-1.21***		0.08**	0.09**	0.08**
		(0.24)	(0.24)	(0.25)		(0.03)	(0.03)	(0.03)
LogAssets		0.96***	0.95***	0.95***		0.04***	0.04***	0.04***
		(0.09)	(0.09)	(0.09)		(0.01)	(0.01)	(0.01)
State and Year FEs?	Y	Y	Y	Y	Y	Y	Y	Y
County Controls?	N	Y	Y	Y	N	Y	Y	Y
Division-Year Trends?	N	N	Y	N	N	N	Y	N
Observations	15,072	15,041	15,041	15,041	10,524	10,505	10,505	10,505
R^2	0.19	0.32	0.34	0.32	0.04	0.10	0.11	0.10

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6:
Effects of County-Level Payday Credit Access on Overdraft Fees and Free Checking Availability

Reported are OLS estimates (robust standard errors clustered by county). *Access_X_Y* equals 1 if institution is located in county whose center is within Y and X miles of a state that allows payday lending.

Dependent Variable (Mean):	*Overdraft Fee (24.98)*			*Free Checking (0.73)*		
	(1)	(2)	(3)	(4)	(5)	(3)
Access_0_10	1.20**	1.48***	1.68***	-0.051	-0.088**	-0.09**
	(0.56)	(0.55)	(0.60)	(0.04)	(0.04)	(0.04)
Access_10_20	0.14	0.22		-0.05	-0.05	
	(0.60)	(0.66)		(0.04)	(0.04)	
Access_20_30	-0.18	-0.08		0.01	0.02	
	(0.70)	(0.58)		(0.03)	(0.03)	
*Access_0_10*HHI*			-1.59			0.07
			(2.11)			(0.14)
HHI		-0.067	1.38		0.058	0.00
		(0.67)	(2.04)		(0.06)	(0.13)
CreditUnion		-2.39**	-2.39***		0.24***	0.24***
		(0.21)	(0.21)		(0.02)	(0.02)
SavingsBank		-1.10**	-1.10***		0.09***	0.09***
		(0.21)	(0.21)		(0.02)	(0.02)
LogAssets		0.95***	0.95***		0.04***	0.04***
		(0.05)	(0.05)		(0.00)	(0.00)
Border		-0.32*	-0.30*		0.04***	0.03**
		(0.18)	(0.18)		(0.01)	(0.01)
State-Year FEs?	Y	Y	Y	Y	Y	Y
County Controls?	N	Y	Y	N	Y	Y
Observations	15,072	14,996	14,996	10,524	10,490	10,490
R^2	0.24	0.37	0.37	0.07	0.12	0.12

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 7: Robustness Relative to Functional Form

Results are provided for the following variations on the basic empirical models in Tables 5 and 6. Regressions in Panel B assume a probit functional form for Free Checking as opposed to a linear probability model. Regressions in Panels A use the log of OD as the dependent variable. Robust standard errors grouped by state are reported in parenthesis.

	Panel A		**Panel B**	
Estimation Method:	OLS		OLS	
Dependent Variable (Mean):	*Log Fee (3.19)*		*Free Checking (0.73)*	
	(1)	(2)	(1)	(2)
Allowed	0.061**		-0.063**	
	(0.026)		(0.030)	
Access_0_10		0.042*		-0.10***
		(0.024)		(0.04)
Access_10_20		-0.01		-0.06
		(0.03)		(0.05)
Access_20_30		0.00		0.02
		(0.02)		(0.04)
CreditUnion	-0.09***	-0.09***	0.25***	0.26***
	(0.02)	(0.01)	(0.02)	(0.02)
SavingsBank	-0.04***	-0.04***	0.07**	0.08***
	(0.01)	(0.01)	(0.03)	(0.02)
LogAssets	0.04***	0.04***	0.04***	0.05***
	(0.004)	(0.002)	(0.005)	(0.004)
HHI	0.03	0.04	0.06	0.08
	(0.04)	(0.03)	(0.06)	(0.07)
Border		-0.01		0.04***
		(0.01)		(0.02)
State-Year FEs?	N	Y	N	Y
State and Year FEs?	Y	NA	Y	NA
County Controls?	Y	Y	Y	Y
Observations	14,828	14,784	10,484	10,269
R^2/Pseudo-R^2	0.25	0.30	0.09	0.10

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 8: Robustness Relative to Access

Reported are regression coefficients (robust, clustered standard errors) for models use LogDistance, the natual logarithm of the distance to the nearest allowing state) instead of *Access_X_Y.*

	(1)	(2)
Dependent Variable (Mean)	*Overdraft Fee (24.98)*	*Free Checking (0.73)*
LogDistance	-0.48*	0.04*
	(0.26)	(0.02)
CreditUnion	-2.39***	0.24***
	(0.21)	(0.02)
SavingsBank	-1.12***	0.09***
	(0.22)	(0.02)
LogAssets	0.95***	0.04***
	(0.05)	(0.003)
HHI	-0.06	0.05
	(0.67)	(0.07)
Border	-0.31*	0.04***
	(0.19)	(0.01)
State-Year FEs?	Y	Y
County Controls?	Y	Y
Observations	14,903	10,390
R^2/Pseudo-R^2	0.37	0.12

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 9: Returned Check Descriptive Statistics

Monthly unemployment rates (quarterly averages) by state and by Federal Reserve district comes from BLS and the St.Louis Fed's FRED database, respectively. Quarterly Personal income per capita is from BEA. Check data come from Federal Reserve Check Processing Centers (CPC). Complaints data are monthly and come from FTC. Bankruptcy data is by state and extends from 1998:Q1 to 2008:Q4. Bounced checks data is by Federal Reserve CPC and extends from 1998:Q1 to 2008:Q3.

Variable	Obs	Mean	Median	Std. Dev.	Min	Max
# returned/# processed (%)	1325	1.29	1.17	0.65	0.34	6.01
$ returned/$ processed (%)	1325	1.21	1.10	0.62	0.11	6.16
$ returned/# returned ($ thousands)	1325	0.869	0.774	0.344	0.347	2.830
State Unemployment Rate (%)	1763	4.85	4.80	1.04	2.10	8.70
District Unemployment Rate (%)	1763	4.91	4.92	0.93	2.35	7.07
State Personal Income per Capita ($)	1763	32126	31170	6060	19953	56274
State Personal Income per Capita Growth (Q/Q, %)	1763	1.00	1.03	0.91	-2.66	5.16
Payday Permitted?	1763	0.95	1.00	0.21	0.00	1.00

Table 10: Fewer, but Larger, Returned Checks When Payday Credit is Permitted

Reported are coefficients (st. errors) estimated via OLS using returned check rates at Federal Reserve Regional Check Processing Centers (CPC) over 1998Q1-2008Q3. *Alloweed* equals one if state permitted payday lending, zero if not. *Allowed* is identified by bans over sample in six states: GA, NC, MD, WV, OR and PA. Regressions include fixed CPC and date effect. Standard errors are clustered by CPC .

Dependent variable:	#Returned/#Processed	$Returned/$Processed	$Returned/#Returned
(mean)	(1.29%)	(1.21%)	(0.869 thousand)
	(1)	(3)	(5)
Allowed	-0.33**	-0.18	0.130*
	(0.16)	(0.13)	(0.07)
State Unemployment	0.012	-0.006	0.003
	(0.06)	(0.06)	(0.02)
District Unemployment	0.026	0.029	-0.064***
	(0.09)	(0.08)	(0.02)
Log Income	-0.359	0.262	-0.531
	(1.83)	(1.52)	(0.79)
Income Growth	-0.018	-0.016	0.007
	(0.01)	(0.01)	(0.01)
Constant	5.02	-1.15	6.96
	(19.10)	(15.80)	(8.25)
Observations	1325	1325	1325
Adjusted R-squared	0.64	0.64	0.81

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 11: Differential Effects on Free Checking by Direct Deposit

Reported are regression coefficients (robust, clustered standard errors) indicating if effect of deferred deposit availability or access on free checking differs for deposits without (panel A) or with (panel B) direct deposit.

Dependent Variable: (Mean)	**Panel A** *Free Checking w/o Direct Deposit* (0.62)		**Panel B** *Free Checking w/Direct Deposit* (0.11)	
	(1)	(2)	(1)	(2)
Allowed	-0.039*		-0.0003	
	(0.020)		(0.023)	
Access_0_10		-0.10**		-0.01
		(0.05)		(0.02)
Access_10_20		-0.12**		0.04
		(0.05)		(0.03)
Access_20_30		-0.05		0.05*
		(0.04)		(0.03)
CreditUnion	0.26***	0.25***	-0.001	0.002
	(0.03)	(0.02)	(0.02)	(0.01)
SavingsBank	0.05	0.05*	0.02	0.02
	(0.04)	(0.03)	(0.01)	(0.02)
LogAssets	0.03***	0.03***	0.01***	0.01***
	(0.006)	(0.004)	(0.002)	(0.003)
HHI	0.004	0.01	0.02	0.03
	(0.06)	(0.08)	(0.03)	(0.05)
Border		0.06***		-0.03**
		(0.02)		(0.01)
State-Year FEs?	N	Y	N	Y
State and Year FEs?	Y	NA	Y	NA
County Controls?	Y	Y	Y	Y
Observations	9,589	9,576	9,589	9,576
R^2	0.11	0.13	0.03	0.05

* significant at 10%; ** significant at 5%; *** significant at 1%

APPENDIX A: PAYDAY LOAN REGULATIONS

Summary of Coding for *Allowed*:

The Moebs survey of checking account fees and services was conducted in December of 2006, and in June for every other year. Five states prohibited loans throughout the sample period (*Allowed = 0*): CT, MA, NJ, NY and VT. Seven states changed from allowing to prohibiting payday lending between 1995 and 2008 (*Allowed* = 0 beginning in the year given in parentheses): MD (2002), GA(2004), NC (2006), WV (2006), DC (2008), OR (2008) and PA (2008). One state changed from prohibiting to allowing payday lending between 1995 and 2008 (*Allowed* = 1 beginning in the year given in parentheses): NH (2000). The remaining states allowed loans throughout the sample period (*Allowed* = 1).

States that prohibited payday lending throughout 1995-2008

New Jersey and New York forbid payday loans *via* check cashing laws that prohibit advancing money on post-dated checks (N.J. Stat. 17:15A-47 and NY CLS Bank 373) and usury limits (N.J. Stat. 2C:21-19 and NY CLS Penal 190.42). Massachusetts banned payday loans through a usury limit on small loans made or brokered in the state (ALM G.L.c.140 §96 and CMR 209 26.01). Connecticut prohibited lending *via* a cap on check cashing fees (Conn. Agencies Reg. § 36a-585-1) and small loan interest rates (Conn. Gen. Stat. 36a-563). Vermont prohibited payday lending through a usury limit (8 V.S.A. § 2230 and 9 V.S.A. § 41a).

We confirmed by reading 10-K filings and company websites that the largest multistate payday store operators – Ace Cash Express, Advanced America, Cash America, Check into Cash, Check 'N Go, Money Mart and Valued Services – did not operate payday loan stores in these five states.

States that experienced a change in payday loan availability between 1995 and 2008[34]

Maryland banned payday lending through restrictions on fees charged by check cashers (MD Financial Institutions Code § 12-120) and small loan interest rates (MD Commercial Law Code § 12-306), and finally passed anti-loan brokering legislation (MD Commercial Law Code § 14-1902), effective June, 2002 to eliminate the agency payday lending model, whereby payday lenders operated as agents, arranging loans for out-of-state banks.

Georgia banned payday lending with a law that took effect in May, 2004 (O.C.G.A. § 16-17-1).

Payday lenders operated under the agent model in North Carolina and West Virginia until 2006. All remaining lenders agreed to exit North Carolina in March, 2006, after facing a series of suits filed by the state Attorney General (see NC Department of Justice press release). First American Cash Advance, the last payday lender in West Virginia, operated under the agent model until July, 2006 (see press release from WV Attorney General). North Carolina prohibits payday lending through a 36% interest rate cap on small loans (N.C. Gen. Stat. § 53-173). West Virginia prohibits payday lending by limiting fees on check cashing, prohibiting payday check cashing (W. Va. Code § 32A-3-1) and imposing a usury limit on small loans (W. Va. Code § 47-6-5b).

The District of Columbia prohibited payday lending in November, 2007, by limiting fees on check cashing and prohibiting post-dated check cashing (D.C. Code § 26-317 and 26-319).

Oregon placed a *de facto* ban on payday lending in July, 2007, by imposing a 36% interest rate cap as well as restrictions on loan renewals (ORS § 725.622).

Payday lending was ostensibly banned throughout the sample period in Pennsylvania via a cap on small loan interest rates (P.A. 7 P.S. § 6201-6219), but the agent model was permitted through a law that sanctioned loan brokering (P.A. 73 P.S. § 2181-2192). Some lenders ceased operations in the state in mid-2006, after the FDIC placed restrictions on their bank lenders (Sabatini, 2006). However, Advance America, the largest national payday lender, did not stop lending and close its Pennsylvania stores until December, 2007 (See Advance America 9/07 press release).

New Hampshire's small loan interest rate ceiling acted as a *de facto* ban on payday loans until it was removed in January, 2000 (1999 NH ALS 248), and payday lenders entered thereafter.

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[34] We have not captured every law change with *Allowed*. We include those that were binding, as confirmed through press releases, news stories and the public filings of the largest payday loan operators. In the case of one law sanctioning DD credit in Rhode Island (R.I. P.L. 2001, Ch. 371, § 4), we could not confirm the date DD lenders entered; according to a supervisor in the Division of Banking, check cashers began offering payday on transactions prior to the July 2001 law change. We do not count Rhode Island as a state with a change in *Allowed*.