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RESEARCH ARTICLE



Identifying border effects of payday-lending regulations

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ABSTRACT

Using branch-level licensing data for 13 states, we examine cross-border effects of state-level payday-lending policies on new and operating branches within border counties from January 2005 to December 2010. We hypothesize branch counts are higher in border counties adjacent to states that restrict payday lending through prohibitive fee limits due to decreased competition and higher excess profits from cross-border markets. Predicted results for effects of enabling or non-existent payday lending policy are ambiguous; cross-border markets may or may not have increased competition given established market practices. Results show border counties adjacent to prohibitive states have 14 percent more operating branches and 83 percent more new branches than interior counties, suggesting clustering and expansion in regions with access to cross-border consumers that lack in-state access to payday loans. Border counties adjacent to states with enabling regulations have 30 percent more operating branches relative to interior counties, suggesting clustering in cross-border markets.

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1. Introduction

According to the National Conference of State Legislatures, as of January 2018, 19 states and multiple territories have effectively banned payday lending through binding interest rate ceilings. In many cases, states are forcing lenders to comply with interest rate ceilings applicable to traditional loans, which collect interest rates that are no higher than 36 percent per annum (APR). Thus, payday lenders are forced to supply non-traditional loans at conventional loan prices. Policies such as these severely restrict the ability to collect fees and profit, and firms operating within the industry are eventually driven out of states with such policies. As more states begin to adopt prohibitive restrictions, loan accessibility for consumers within prohibiting states is restricted. However, adjacent states that still allow payday lending can offer nearby alternatives for consumers living in prohibitive states. For instance, when Arkansas repealed the Check-Cashers Act in 2011; the repeal also prohibited high-interest changes on installment and small consumer loans like payday loans.¹ Tennessee, a border state to Arkansas, has no prohibitive policies in place, and the payday-lending industry continues to operate. In this situation,

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¹<https://financer.com/us/loans/arkansas/>.

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consumers residing within Arkansas but near the Tennessee border still have access to payday loans.

This study seeks to answer the following questions: 1) are there differences in the number of operating and new branches between border and interior counties, and more importantly, 2) do neighbor state-level payday-lending policies affect the number of observed operating or new branches in border counties relative to interior counties. Existing studies on the payday lending industry have shown that industry concentration within a state decreases in response to more stringent state-level policy (Barth et al., 2016) and there are already existing border effects observed in the pawnbroker industry responding to payday-lending regulations (Carter, 2015). For this study, we seek to identify cross-state effects of payday-lending policy on the payday-lending industry itself.

We use a unique data set that measures payday-lending branch activity for 13 states at the county-month level from January 2005 to December 2010, for states that explicitly permitted payday-lending operations. This period represents both a phase of incredible growth (and decline) in the number of operating payday lenders across the country and an active period for establishing and updating payday-lending regulations across states (Ramirez (2014)). We categorize adjacent state regulations into one of three categories: enabling (permitting operating), prohibitive (banning operating through fee limits), or non-existent to determine if spillover policy effects exist.

Summary statistics indicate that border counties adjacent to states that prohibit payday lending have the highest average number of operating branches (12.64 branches in a county-month) relative to all other region- and adjacent-policy categories, and interior counties have the lowest observed average operating branches (5.94 branches per county month) relative to border counties regardless of adjacent-state policies. Similarly, interior counties had, on average, the fewest new branches per county-month (0.065 branches) relative to all border-county types, while the average number of new branches among border counties was statistically equal and ranged from 0.098 to 0.104 new branches per county-month. These statistics suggest that both region and neighboring-state policy may affect both the concentration and expansion of the payday-lending industry, with payday lenders strategically locating in border counties in order to access cross-border markets, in particular markets within states that prohibit potential competition.

Using a negative binomial regression estimation and calculating incidence rate ratios (IRR), we find evidence of cross-border effects and differences in the number of new and operating payday lending branches by county type and adjacent regulations. Border counties, in general, are predicted to have 18.6 percent more operating branches and 49.3 percent more new branches relative to interior counties, indicating a strategic preference for locating and expanding closer to cross-border markets. When comparing across adjacent-state regulations, border counties adjacent to states that prohibit payday lending have 13.9 percent more operating branches compared to interior branches, and border counties neighboring states that also permit payday lending have 30.2 percent more operating branches relative to interior counties, suggesting strategic advantages in locating close to cross-border markets in states with explicit policies. Border counties adjacent to states that prohibit payday lending have 83.3 percent more new branches compared to interior counties, signaling that expansion has occurred in regions where cross-market competition was completely restricted.

2. Background

Well-established evidence exists that suggests state-level policies affect both within state and neighboring state outcomes (Dube, Lester, & Reich, 2010; Hao & Cowan, 2017; Holmes, 1998; Melzer, 2011; Rohlin, Rosenthal, & Ross, 2014; Ross, 2012). Holmes (1998) and Rohlin et al. (2014) both find cross-state supply-side responses to changes in state-level business policies, such as right-to-work laws and tax policies. Many studies exploit geographic borders, where policies abruptly change, to obtain causal estimates.

The payday loan industry² has been extensively studied since the 2000s as usage, the size of the industry, and policy attention grew significantly. On research focusing on consumer welfare effects of payday-loan use, there is no consensus on and continued work to identify consumer welfare effects resulting from borrowing payday loans. Studies have found usage to give rise to negative welfare outcomes, citing negative effects on financial outcomes (Stegman and Faris (2003), Morgan, Strain, and Seblani (2012), Skiba and Tobacman (2009), Melzer (2011)). However, some studies have found positive or no effects from access and usage (Zinman (2010), Morse (2011)), allowing consumers to smooth consumption during periods of economic distress.

Because payday lending laws are primarily legislated at the state-level, a border-analysis framework can be used to examine the responsiveness of payday lender location decisions to policy changes related to the payday lending industry.³ Existing research on payday lending shows that lenders typically locate in low-income neighborhoods with high levels of minority populations (Graves, 2003). However, some evidence suggests that the percentage of the population that is African American is positively associated with the number of payday lenders while Hispanic and Asian populations are negatively associated with the incidence of lenders (Barth, Hilliard, and Jahera (2015)). Additionally, citizens of those same neighborhoods tend to have less access to traditional banking mechanisms (Graves (2003)). Melzer (2011) studies whether access to payday lending services improves short-term liquidity for households, using variation in household location and state payday lending regulations over time. His findings strongly suggest that payday lending access is associated with a greater risk of financial instability for households and that the risk increases over time as payday lending access increases.

Relevant to our questions of location preferences and cross-state effects, Carter (2015) examines whether payday loans are complementary to other non-traditional forms of credit, specifically analyzing the relation of payday lending policies to the pawn shop industry. Her results suggest that when states allow citizens to roll over payday loans, citizens are also more likely to demand the use of pawn shop loans as a means of short-term credit access. Additionally, pawnbrokers concentrate more along state borders closer to payday lenders in adjacent states, increasing their access to borrowers. Specific to the industry's response, Barth et al. (2016) show that the concentration of payday lenders is negatively affected when state-level policies become more stringent and

²Payday loans are unsecured, small-denomination, short-term loans that range from \$100 to \$500 and are extended for a period of no more than two weeks. Fees are based on loan size and typically amount to \$15 for every \$100 loaned. When calculated as an APR, fees on payday loans can exceed 300 percent (Stegman, 2007).

³Federal-level policy exists regulating lenders. Payday lenders are required to comply with Regulation Z of the Truth-in-Lending Act and the Talent-Nelson Military Lending Act. The Consumer Financial Protection Bureau has developed policies regulating lenders and payday-lending practices. As of submission, no other explicit federal policy has been enacted. See <https://www.consumerfinance.gov/payday-rule/>.

restrictive, suggesting the industry is driven away from such policy environments. Again, these findings highlight the importance of considering the interaction between state policies and industry sorting, similar to the findings from Rohlin et al. (2014). A policy targeting a specific industry within a state may have spillover effects both outside of that state and outside of that industry.

3. Framework

The central purpose of this study is to examine if neighboring-state regulations have any effect on the number of new and operating payday lending branches in a given county-month. Location decisions reveal where firms believe the highest potential profit exists and for payday lending firms, profitability is highly dependent upon loan volume (Flannery and Samolyk (2005)). State-level regulations can affect loan accessibility, either accommodating borrowers or shifting demand to other markets where payday loans are available. For markets that spillover between states, adjacent regulations may encourage or discourage competition by changing expected this profitability and the incentives to operate in border counties over interior counties. Additionally, depending on the regulation, some border counties may serve to be more profitable than others. The discussion of the predicted effects of these neighboring regulations follows.

We classify payday lending policy environments as one of three categories: 1) Prohibitive, eliminating the industry through usury laws or binding fee ceilings, 2) Enabling, authorizing the industry through explicit policy, or 3) Non-existent, where no explicit policy pertaining payday lending exists and the industry itself may operate within state borders.⁴ In understanding potential firm responses to neighboring policies, we must consider how these policies affect accessibility, potential loan volume and profitability, and potential competition within cross-border markets.

3.1. Prohibitive regulations

Prohibitive policies act as full barriers to operation by prohibiting lenders from charging profitable fees (Flannery and Samolyk (2005) find, despite high calculated APRs, payday lenders have low-profit margins in part due to high operating costs and losses from default). Therefore, in states with especially restrictive interest rates (such as 36 percent or below), payday lenders are driven out and do not operate.⁵ For markets that spillover across state borders, this represents a population of potential borrowers that can be served by payday lenders operating within a neighboring state.

Profitability is protected for these firms so long as prohibitive regulations remain enacted in adjacent states; this extreme restriction in pricing reduces the number of operating branches in adjacent states and reduces cross-state competition. Easing this prohibition by increasing allowable fees reduces these barriers, increasing the incentive for firms to populate within these markets and driving overall market profit down close to zero.⁶ For existing branches, this decreases loan volume and market shares as

⁴Regulatory data were collected from the state's consumer credit code or other relevant legislation. Classifications were guided by these regulations, the National Conference of State Legislatures (2019), and Pew (2012).

⁵See Barth et al. (2016).

⁶Flannery and Samolyk (2007).

borrowers have more choices in lenders. The incentive to operate and locate adjacent to these areas where cross-state competition is barred is extremely high and will only decrease with any deviation away from prohibition. We predict that initial licensing and operating activity to be highest in counties adjacent to prohibitive states because of this.

3.2. No regulations versus enabling regulations

The absence of payday-lending regulations at the state level does not necessarily imply that the industry is unauthorized; the industry simply operates according to market conditions and best practices, if it operates at all.⁷ What exists in these markets, however, is policy uncertainty. States have yet to explicitly signal if the industry is authorized; therefore, any effects or differences between regions are ambiguous. Firms may have the incentive to preemptively populate these areas in anticipation of policy moves (or to even influence potential policy) or intentionally avoid these areas until explicit policy is determined and enacted. However, an environment without a policy can present a more profitable environment as compared to a state with explicit regulations.

States that have passed enabling regulations are explicitly permitting the industry to exist. The variation in policies within this subset can be wide. A state may only require licensing for record-keeping purposes or a state may enact policies that define and authorize specific loan terms (such as fees, loan amount, quantity, etc.). Unlike prohibition, these policies establish “limits” that allow the industry to remain profitable even while regulated. Variations within the policy can create more profitable conditions relative to other states, even if both explicitly authorize payday lending operations. For instance, a state with higher fee limits or rollover limits will be less restrictive, thus more profitable while still explicitly regulating payday lending.

If states establish policies that already mirror existing market conditions, the cost of licensing in an enabling state would still make operation more expensive relative to operating in a state with no explicit policies. If a firm is choosing among border locations, a firm could face higher competition if adjacent to a state with no explicit policies simply because of a lack of licensing fees. However, if regulations enabled practices or loan terms that were especially lax (relative to average or best practices), pricing and product restrictions would be relatively less binding and operations could be more profitable in an enabling policy environment. Over time, it could be that these lax policies spillover across state borders and within regulation-free environments, but the initial incentive remains for firms to locate and operate within counties that have explicit regulations.⁸

Relative to prohibitive counties, the implications and incentives for firms are clear: payday lending firms have a higher incentive to operate branches in border counties that are adjacent to states that completely prohibit payday lending. In markets that cross borders, prohibitive regulations act as a barrier to increased competition, thus increasing

⁷From the Community Financial Services Association of America (CFSA), prior to explicit policies being adopted (and relevant to our time-frame of analysis), the organization required member firms to adhere to a “strict set of mandatory best business practices” that included self-imposed fee and loan limits. Currently CFSA practices mandate compliance, transparent disclosure of loan terms, and consumer protections. Best practices were established in 2000 and updated in 2018.

⁸DeYoung and Phillips (2006) identified payday-lender pricing behavior and found that established rate ceilings because focal points for firm pricing, eventually representing overall market price.

profit opportunities for firms in regions where lending is permitted. However, without knowing explicitly how loan-terms are regulated within enabling states, the incentives to operate in border counties that are adjacent states also with explicit regulations or without lending regulations are ambiguous, there may or may not be increased incentive or competition in spillover markets.

4. Data

For this study, we measure the number of operating and newly licensed payday lenders in a county-month from January 2005 to December 2010. Data were collected from state-level agencies responsible for monitoring, regulating and issuing licensees for payday lenders. Branch data for eleven states are analyzed: Arizona, Idaho, Iowa, Kansas, Missouri, Montana, Nevada, South Dakota, South Carolina, Tennessee, and Virginia. All states within our sample explicitly permitted the operation of payday lenders in our observed periods.⁹ The time period and observed states are limited due to the availability, or lack thereof, of relevant, branch-level data (including exact date of initial licensing, branch address, and date of branch closure, if applicable). The states observed within this study represent a sample of states that 1) maintained detailed licensing records for the requested years and 2) responded to information requests for license data. In total, we observe 784 unique counties over 72 months.

Counties are classified as either interior (sharing no external border to another state) or border, sharing a border with at least one other state. Border counties represent 40 percent of our sample. In addition to observed states, we observe policy information on adjacent states with a shared border. As there is the potential for a county to border multiple states, we restrict our observation of adjacent states to those: 1) with the most-restrictive payday lending policy and 2) that are the shortest distance from the border county. Therefore, in comparing policies and demographics across states, only one adjacent states are compared. This restriction allows us to measure the closest market (and market characteristics) from the state that imposes the most restrictive cross-market policy environment.

4.1. Regulations across states

Historical regulation data were collected from state-level consumer-credit code relevant to the operation of payday or deferred deposit lenders. All states with observed branch-level data have explicit enabling policies authorizing payday lending operating and do not impose restrictive or binding fee ceilings. Policies for neighboring states are categorized as one of our three environment types.

Figure 1 displays a map of the United States that categorizes observed states and neighboring states according to the observed payday-lending regulatory environment in January 2005. The states observed represent most regions within the country, though the south and north-east are noticeably absent. Observed states are surrounded by a variety of policy environments, but there are noticeable regional differences in overall payday-loan regulation. In the western region of the country, all states except for Utah and New Mexico had explicit payday lending regulation that enabled firms to operate. Over the observed time period, some western states

⁹Arizona banned payday lending beginning in June 2010. All prior periods are observed within the data.

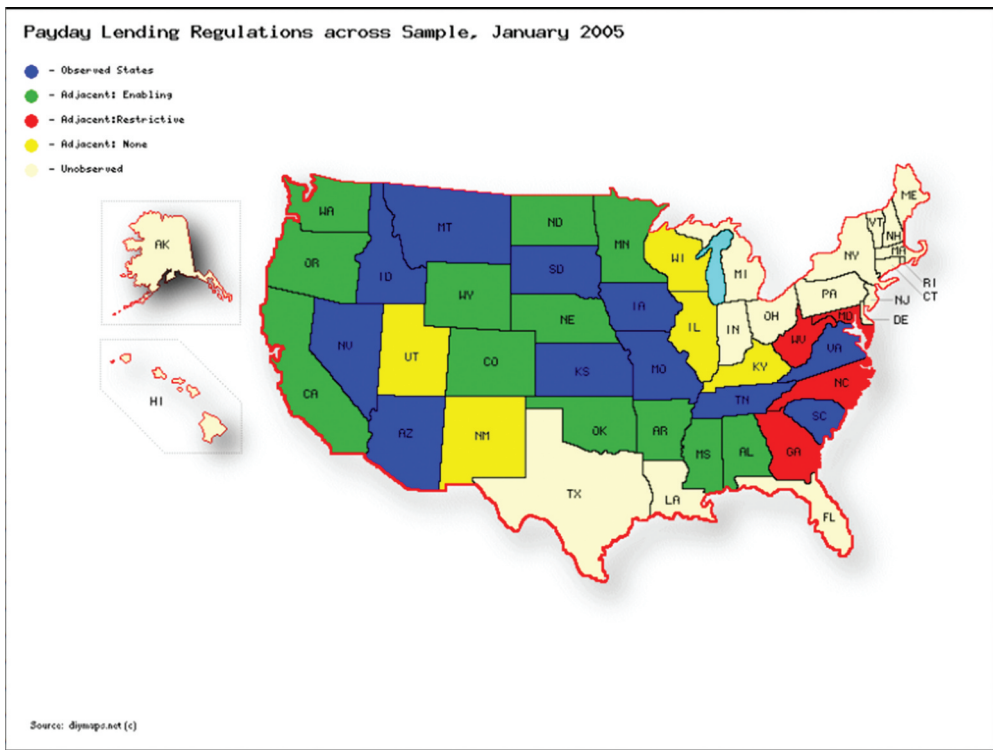


Figure 1. Payday lending regulations across sample, January 2005.

changed regulatory environments: Utah and New Mexico eventually adopted permitting policies while Arizona and Montana established restrictive policies by the end of the decade.

In the southeast regions of the country, most states have adopted some explicit policy regarding payday lending, either it is authorized (seen with our observed states) or prohibited. For these regions, this creates interesting pockets of potential market activity, states that enable payday lending are surrounded by states that prohibit the practice, notably Virginia, and South Carolina. Additionally, and unlike the western region, the close proximity of areas within the states observed creates the potential for product spillover and indirect access to payday loans for potential borrowers.

Figure 1 highlights that while payday lending occurs at the state level, accessibility and market conditions are cross-border issues. In a prohibitive state, the industry cannot operate. However, if a firm operates in a state that is adjacent to a prohibitive state, the firm may have more incentive to locate closer to the border versus interior areas to locate close to potential borrowers where in-state access, thus payday lending competition, is completely restricted.

As discussed above, all observed states within our sample explicitly permit payday-lending. Any variation in adjacent-county regulations comes from border counties and states with a shared border. Table 1 displays the number of county-pairs segmented by county-pair type for December of each year. Panel A counts all county-pairs and Panel B only counts county-pairs for the most restrictive adjacent state regulation.¹⁰ By the end

¹⁰As some counties share a border with multiple states, the total number of county-pair months observed in Panel A is greater than the total number of border counties.

Table 1. Number of county-pairs in december, by adjacent-state regulation and year.

Year	Enabling-prohibitive	Enabling-no regulation	Enabling-enabling	Total
All adjacent states				
2005	149	77	488	714
2006	149	77	488	714
2007	152	69	493	714
2008	152	69	493	714
2009	152	5	557	714
2010	172	0	480	652
Most-restrictive adjacent state				
2005	69	35	216	320
2006	69	35	216	320
2007	69	33	218	320
2008	69	33	218	320
2009	69	3	248	320
2010	81	0	213	294

of 2010, all border counties shared a border with a state that had some form of explicit payday-lending regulation as there are no “Enabling-No Regulation” county-pairs observed. Year by year, adjacent states that had not adopted explicit regulations had begun to adopt policies, both enabling and restrictive, seen in the decline in “Enabling-No Regulation” county pairs and the increase in “Enabling-Enabling” and “Enabling-Prohibited” county-pairs from Panel A. By December 2010, however, adjacent states that explicitly allowed for payday lending had imposed restrictive fee ceilings, thus further increasing the number of “Enabling-Prohibited” county-pairs.

4.2. Branch data

The number of new and operating payday-lending branches in a given county-month are measured and observed to measure the growth and size of the industry in a particular region. Tables 2 and 4 display the summary statistics for operating and new branches, respectfully.¹¹ Tables 3 and 5 present difference-in-means test statistics, comparing means across geographic and policy types.

Table 2. Summary statistics: operating branches.

Variable	Obs	Mean	Std. dev.	Min	Max
All counties					
Sample	55,754	6.626	11.645	0	90
Interior counties, enabling regulation	33,133	5.937	10.953	0	90
Border counties, prohibited	4,913	12.635	16.910	0	90
Border counties, no explicit regulation	1,981	7.466	9.433	0	62
Border counties, enabling regulation	15,727	6.094	10.716	0	90
Conditional on operating activity					
Sample	36,845	10.026	13.081	1	90
Interior counties, enabling regulation	21,653	9.085	12.449	1	90
Border counties, prohibited	4,156	14.936	17.426	1	90
Border counties, no explicit regulation	1,607	9.204	9.680	1	62
Border counties, enabling regulation	9,429	10.164	12.254	1	90

¹¹Observations were classified as outliers if the number of operating branches exceeded the 99th percentile and have been removed. All observations for new licenses are retained to maintain variation as 99-percent of observed county-months count either 1 or 0 new licenses.

Table 3. Summary statistics: difference in means, operating branches.

Groups compared	Full sample	Conditional on operating activity
Interior counties, enabling regulation	$t = -26.937^{***}$	$t = -20.659^{***}$
Border counties, prohibited		
Interior counties, enabling regulation	$t = -6.941^{***}$	$t = -0.465$
Border counties, no explicit regulation		
Interior counties, enabling regulation	$t = -1.495$	$t = -7.099^{***}$
Border counties, enabling regulation		
Border counties, prohibited	$t = 16.096^{***}$	$t = 15.816^{**}$
Border counties, no explicit regulation		
Border counties, prohibited	$t = 25.559^{***}$	$t = 15.999^{***}$
Border counties, enabling regulation		
Border counties, no explicit regulation	$t = 6.008^{***}$	$t = -3.522^{***}$
Border counties, enabling regulation		

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 4. Summary statistics: new licenses.

Variable	Obs	Mean	Std. dev.	Min	Max
All counties					
Sample	56,318	0.080	0.562	0	72
Interior counties, enabling regulation	33,362	0.065	0.440	0	24
Border counties, prohibited	5,000	0.098	0.476	0	9
Border counties, no explicit regulation	1,981	0.104	0.426	0	6
Border counties, enabling regulation	15,975	0.101	0.783	0	72
Conditional on one new license					
Sample	2,946	1.525	1.956	1	72
Interior counties, enabling regulation	1,483	1.467	1.515	1	24
Border counties, prohibited	332	1.479	1.172	1	9
Border counties, no explicit regulation	152	1.362	0.810	1	6
Border counties, enabling regulation	979	1.654	2.730	1	72

Table 5. Summary statistics: difference in means, new licenses.

Groups compared	Full sample	Conditional on one new license
Interior counties, enabling regulation	$t = -4.612^{***}$	$t = -0.154$
Border counties, prohibited		
Interior counties, enabling regulation	$t = -3.979^{***}$	$t = 1.377$
Border counties, no explicit regulation		
Interior counties, enabling regulation	$t = -5.432^{***}$	$t = -1.948$
Border counties, enabling regulation		
Border counties, prohibited	$t = -0.344$	$t = 1.273$
Border counties, no explicit regulation		
Border counties, prohibited	$t = -0.538$	$t = -1.613$
Border counties, enabling regulation		
Border counties, no explicit regulation	$t = 0.276$	$t = -2.672^{***}$
Border counties, enabling regulation		

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

4.2.1. Operating

From Table 2 and the full, unconditional sample, there is an average of 6.626 operating branches in a county-month, with a standard deviation of 11.65 branches. When conditioning on at least one operating branch, both the mean and standard deviation increase to 10.026 and 13.081, respectfully. In both cases, high means and high standard deviations suggest high levels of market occupation, competition, and potential saturation, in a given county-month.

When segmenting across geography and adjacent policies, there are clear differences in means in both the full and conditional samples. In both cases, border counties adjacent to prohibitive states have the highest average operating branches, with 12.635 branches in the full sample and 14.936 branches in the conditional sample. This comes as no surprise as prohibitive policies on payday lenders restrict potential cross-border competition. Border counties in the remaining policy categories have similar means, but flip in rank when conditioning on operating activity. While there are clear profit incentives to locate adjacent to a state restricting payday lending, there may or may not be clear profit incentives within these border counties, thus the similar statistics.

Interior counties, however, have the lowest average operating branches across both samples, but have similar (and somewhat high) variations to border counties adjacent to enabling states. This suggests county-months that have either no operating branches or county-months with extremely high levels of payday lending activity, likely in counties with higher populations and/or periods of industry expansion.

From Table 3, difference-in-means tests show that average means in border counties adjacent to restrictive states are significantly higher than all other areas, and averages in interior counties are statistically lower than all other areas, both with at least 5-percent significance. Therefore, it appears from summary statistics, market activity is not only higher in border counties, but highest when adjacent to restrictive states, in line with our theoretical predictions. Interestingly, the difference in means between counties that border enabling states versus states without explicit policies is significant and flips when conditioning on operating activity. This suggests that there may be a number of unoccupied counties that border states with enabling regulations, but populated counties are highly saturated with industry activity.

4.2.2. *New licenses*

From Table 4, over our observation period, an average of 0.80 branches opened in a given county-month, suggesting a large share of county-months with zero or single-branch entry activity. However, when conditioning on at least one new license per county-month, entry activity is higher, with a mean of 1.525 new branches per county-month and a standard deviation of 1.956 branches. Even when conditioning on at least one new branch, statistics indicate that most county-months have almost 7 or fewer new branches, but most have a single new branch per county-month. As our observed time-frame includes growth periods for the industry, this could be indicative of not only modest growth within areas already containing operating payday lending, but expansion into new areas previously unoccupied.

When segmenting by region and adjacent policy, interior counties have the lowest observed average of new licensees in both the unconditional and conditional samples (0.065 branches and 1.467 new branches, respectively). This signals that growth in interior counties was low and relatively stable. Mean new branch counts are relatively similar in the full sample, ranging between 0.098 and 0.101 averages new branches. Variation is highest in counties that border enabling states, suggesting county-months where increased expansion of the payday-lending industry occurs.

From Table 5, our difference-in-means test of full sample means shows that the average number of new licenses is statistically higher in all border counties compared to interior counties regardless of adjacent state policy, and no difference between means

in border counties, further signaling a regional preference in the decision to operate in border counties over a state's interior. However, conditioning on at least one new branch in a county-month, this significance in difference disappears and interior and all border counties, on average, are equal. There is, however, a statistical difference between the average number of new branches between border counties adjacent to states without any regulation and border counties adjacent to enabling regulation, with the latter having the higher average number of new branches. These statistics suggest not only growth in border counties, but expansion into border counties that may have been previously unoccupied by the payday-lending industry.

Table 2 through 5 do suggest that, overall, operating activity and the number of new payday-lending branches are higher in border counties over interior counties; therefore, there exist potential cross-market advantages for these firms, such as higher populations of borrowers. When examining within regulations, border counties that are adjacent to states that prohibit payday lending have the highest average number of operating branches, but the lowest average new branch count, suggesting that the payday-lending industry is expanding operations across border counties previously uninhabited, potentially with less established competition. Indeed, new branch averages are highest in border counties that share a border with fellow enabling states. This could be a function of states adopting explicit regulations and a shifted location preference within border counties.

4.2.3. Census data

To examine how state regulations affect payday-lender location decisions, we collect demographic data for geographic areas present within our sample and for adjacent states. Demographic data come from the American Community 3-year Survey for the observation years 2005 through 2007 and 2008 through 2010. Statistics are segmented by county type: interior, border, or adjacent. Table 6 presents observed means and standard deviations for observed demographics, and Table 7 presents t-statistics for a difference-in-means test for each variable across county types.

Table 6. Summary statistics: demographics by county type.

Variable	Interior		Border		Adjacent	
	Obs	Mean	Obs	Mean	Obs	Mean
Percentage of population with at least HS diploma	399	85.357 (7.389)	316	84.309 (7.803)	664	84.822 (8.026)
Total population	399	97,602.920 (284,033.700)	316	118,659.500 (211,963.500)	664	100,238.000 (245,824.900)
Percentage male	399	49.268 (1.679)	316	49.407 (1.294)	664	49.434 (1.877)
Percentage military	391	0.941 (2.974)	313	0.449 (1.302)	648	0.717 (2.012)
Median household income	399	44,028.220 (10,444.600)	316	43,251.340 (13,804.110)	664	43,620.650 (11,963.030)
Poverty rate	398	12.652 (5.543)	316	13.592 (6.005)	664	13.240 (6.381)
Percentage white	329	82.568 (14.990)	268	82.938 (14.820)	648	80.042 (17.098)
Percentage black	329	11.450 (14.924)	268	9.479 (12.882)	648	12.329 (16.233)
Unemployment rate	391	4.441 (1.631)	313	4.807 (1.717)	648	4.591 (1.702)

Table 7. Summary statistics: difference in means, demographic data.

Variable	Interior vs. border	Border vs. adjacent	Interior vs. adjacent
Percentage of population	$t = 1.8253^*$	$t = 0.5313$	$t = -0.3015$
Total population	$t = -1.1347$	$t = 1.2752$	$t = -0.1748$
Percentage male	$t = -1.2517$	$t = -1.0216$	$t = -0.5929$
Percentage military	$t = 2.9384^{***}$	$t = 1.4429$	$t = -0.4325$
Median household income	$t = 0.8298$	$t = 0.6071$	$t = -0.5224$
Poverty rate	$t = -2.1505^{***}$	$t = -0.8739$	$t = 0.1605$
Percentage white	$t = -0.3019$	$t = 2.6924^{***}$	$t = 1.3634$
Percentage black	$t = 1.7308^*$	$t = -1.7427^*$	$t = -1.0655$
Unemployment rate	$t = -2.8726^{***}$	$t = 1.4951$	$t = -1.0972$

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Most statistical differences in demographics exist between interior and border counties. Compared to border counties, interior counties have higher average shares of high-school graduates, and military and black residents. Interior counties have lower average poverty and unemployment rates compared to border counties, with at least 10-percent statistical significance. Between border and adjacent counties, border counties higher shares of white residents and lower average shares of black residents, with at least 10-percent significance. Between interior and adjacent counties, however, there are no statistical differences in the averages of observed demographics.

How should this affect our observation of payday lending activity? A higher share of minority population would increase the likely number of operating payday lenders (Burkey and Simkins (2004)); therefore, branch activity could be higher within interior counties where these values are higher and lower in border counties where shares are smaller. The percentage of military population, while small across all groups, may have mixed effects. After 2007, federal law prohibited the lending of payday loans to military personnel. As the sample straddles this period, it is unclear whether payday lenders would seek to operate in these areas or exit where lending was prohibited to this share of the population. Finally, lower poverty and unemployment rates in interior counties versus border counties signal a population's need for and ability (or inability) to repay short-term loans. Thus, it is also unclear if lenders would be attracted to or avoid these characteristics.

Interestingly, these counties are statistically equal in average population and average median income, significant drivers in the demand for liquidity and short-term lending (Lawrence and Elliehausen (2008)). Therefore, any incentives for locating in either the interior or border of a state may not be coming from significant demographic differences by regional advantages in locating closer to adjacent border populations and neighboring policies.

5. Empirical method

We are interested in answering two questions: 1) Are there significant differences between the number of operating branches or new branches in counties within states and counties that share a border with another state, and 2) does an adjacent state's payday-lending policy affect the number of operating and new branches in a border

county. Because we are interested in examining the effect of geography and adjacent policy on branch counts, the framework of choice for our analysis is Poisson Regression:

$$\mu_{ist} = E(Y_{ist} | \text{Border}_{is}, X_{it}, X_{jt}) = \exp(\alpha_1 \text{Border}_{ij} + X_{it}\beta + X_{jt}\Gamma) \quad (1)$$

where Y_{ist} is the number of new or operating payday lending branches in county i , state s , in month t . Border_{is} is an indicator variable identifying if the observed county is an interior county ($\text{Border}_{is} = 0$) or a border county ($\text{Border}_{is} = 1$) in state s . We conduct four tests in total: first, we test the full sample of our data. In this first baseline test, the value of α_1 represents the effect of geography on the number of operating or new branches observed. Three separate tests are then conducted to examine the effects of adjacent regulations and the data are segmented as follows: 1) interior counties versus border counties adjacent to prohibitive states, 2) interior counties versus border counties adjacent to states without explicit payday lending regulations, and 3) interior counties versus border counties adjacent to states with enabling regulations. As we are segmenting the sample by adjacent regulations, the value of α_1 will indicate the effect of geography and adjacent regulation on branch counts (Long and Freese, 2014).

In testing the effects of region and policy, we expect the effect of $\text{Border}_{is} = 1$ to increase the expected number of predicted branches, both new and in current operation, therefore the estimated coefficient is expected to be positive and significant in tests comparing interior counties to border counties adjacent to prohibitive states. As discussed above, state-imposed barriers to entry in spillover markets increase potential profits and incentives to operate in these border counties. We expect α_1 to be negative in tests comparing interior counties to border counties adjacent to states with no explicit regulations enacted. The potential for increased competition in spillover markets and higher operational costs within observed counties makes these particular regions, as compared to interior counties, less desirable for profitability. Finally, when testing the effects of geography and adjacent regulations when both states have explicitly permitted payday lending, the effects and results of geography are unclear. Without observing explicit measures within the regulations themselves, adjacent states may profile more stringent, less stringent, or equal policy conditions as our observed county.

X_{it} and X_{jt} are vectors of demographic characteristics for observed county i and adjacent county j , respectively. We control for previously identified drivers of both demand for and the supply of the AFS product (Graves (2003), Burkey and Simkins (2004), Prager (2009), Barth et al. (2016)) such as median household income, age, education, sex race, and county economic characteristics, such as the unemployment and poverty rates, percentage of military employed the number of traditional bank branches, the number of operating payday-lending branches in the previous period, and an indicator for the Great Recession.

While our data are observed at the county-month level, we also include controls for year- and state-level effects to control for time and geography relevant shocks to the industry. Relevant to state-level effects, given that regulations are measured in a general way (i.e. enabling, restrictive, or absent) we are not controlling for variation in state-level policy that exists within enabling regulations. Therefore, controlling for state-level fixed effects controls for uncontrolled variation resulting from the state-level difference in

enabling policy. Finally, we conduct tests for both robust and clustered standard errors, clustered at the state-pair level (i.e., Idaho-Washington, Idaho-Oregon, etc.).

While the Poisson framework is suitable for estimating the effects of geography and policy on count data, our data does not satisfy the assumptions of the Poisson distribution, mainly that observed averages and variances (both unconditional and conditional) are equal. To account for this, we extend our estimation framework to that of the negative binomial regression to control for this dispersion within the data:

$$\tilde{\mu}_{ist} = E(Y_{ist} | \text{Border}_{is}, X_{it}, X_{jt}) = \exp(\alpha_1 \text{Border}_{ij} + X_{it}\beta + X_{jt}\Gamma) \delta_{ist} \quad (2)$$

where $\delta = \exp(\epsilon_{ist})$ and ϵ_{ist} is unobserved heterogeneity that causes the aforementioned over dispersion. These statistics will be tested in addition to coefficients to determine the presence of over dispersion.

6. Results

Table 8 through 15 display incidence-rate ratios (IRR), and their respective standard errors, calculated from coefficient estimates of the negative binomial regressions on each of our dependent variables of interest: the number of operating payday-lending branches in a county-month and the number of new payday-lending branches in a county month.¹² For each dependent variable, we conduct four tests: first, on the full sample of data, then segmenting our sample according to adjacent-state regulations. Three specifications are presented: first only controlling for border status, second controlling for state- and year-level effects, and finally including all controls. These were completed for robust standard errors then repeated for standard errors clustered at the state-pair level.

Table 8. Results: operating branches, interior versus border, full sample.

	(1)	(2)	(3)	(4)	(5)	(6)
Border	1.286*** (0.019)	1.229*** (0.020)	1.186*** (0.012)	1.286 (0.308)	1.229 (0.171)	1.186*** (0.065)
Bank count			1.000 (0.000)			1.000 (0.003)
Lagged branches			1.038*** (0.000)			1.038*** (0.003)
Great Recession			1.012 (0.016)			1.012* (0.007)
α	2.717*** (0.019)	2.260*** (0.019)	0.074*** (0.002)	2.717*** (0.393)	2.260*** (0.331)	0.074*** (0.019)
Constant	5.937*** (0.060)	7.545*** (0.369)	67.721*** (22.658)	5.937*** (1.142)	7.545*** (1.382)	67.721*** (130.677)
Observations	55,754	55,754	10,034	55,754	55,754	10,034
Pseudo R-squared	0.0010	0.0268	0.2342	0.0010	0.0268	0.2342
LR Test Statistic of alpha = 0	554335.94***	431047.62***	3857.524***	554335.94***	431047.62***	3857.524***
Controls	No	No	Yes	No	No	Yes
Year dummies	No	Yes	Yes	No	Yes	Yes
State dummies	No	Yes	Yes	No	Yes	Yes
SE	Robust	Robust	Robust	Clustered	Clustered	Clustered

Standard errors in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1

¹²As our variable of interest is the change in geography, IRR reports are most logical.

Table 9. Results: operating branches, interior versus border, adjacent state policy: prohibited.

	(1)	(2)	(3)	(4)	(5)	(6)
Border	2.128*** (0.046)	1.230*** (0.030)	1.139*** (0.017)	2.128** (0.659)	1.230 (0.282)	1.139*** (0.057)
Bank count			0.999** (0.000)			0.999 (0.004)
Lagged branches			1.035*** (0.000)			1.035*** (0.004)
Great Recession			1.014 (0.019)			1.014 (0.009)
α	2.533*** (0.022)	2.100*** (0.022)	0.074*** (0.003)	2.533*** (0.504)	2.100*** (0.425)	0.074*** (0.025)
Constant	5.937*** (0.060)	8.588*** (0.767)	520.222*** (270.598)	5.937*** (1.160)	8.588*** (0.360)	520.222** (1,579.282)
Observations	38,046	38,046	7,373	38,046	38,046	7,373
Pseudo R-squared	0.0051	0.03142	0.2430	0.0051	0.0314	0.2430
LR Test Statistic of $\alpha = 0$	371310.84***	292002.2***	2727.68***	371310.84***	292002.2***	2727.68***
Controls	No	No	Yes	No	No	Yes
Year dummies	No	Yes	Yes	No	Yes	Yes
State dummies	No	Yes	Yes	No	Yes	Yes
SE	Robust	Robust	Robust	Clustered	Clustered	Clustered

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 10. Results: operating branches, interior versus border, adjacent state policy: no explicit regulation.

	(1)	(2)	(3)	(4)	(5)	(6)
Border	1.258*** (0.038)	1.033 (0.034)	1.015 (0.033)	1.258 (0.348)	1.033 (0.164)	1.015 (0.150)
Bank count			0.999 (0.001)			0.999 (0.005)
Lagged branches			1.040*** (0.001)			1.040*** (0.007)
Great Recession			1.009 (0.022)			1.009 (0.016)
α	2.643*** (0.024)	2.166*** (0.024)	0.086*** (0.003)	2.643*** (0.574)	2.166*** (0.482)	0.086*** (0.025)
Constant	5.937*** (0.060)	9.194*** (0.581)	2.794* (1.634)	5.937*** (1.162)	9.194*** (1.359)	2.794 (6.519)
Observations	35,114	35,114	5,857	35,114	35,114	5,857
Pseudo R-squared	0.0002	0.0284	0.2464	0.0002	0.0284	0.2464
LR Test Statistic of $\alpha = 0$	317715.808***	242254.630***	2515.200***	317715.808***	242254.630***	2515.200***
Controls	No	No	Yes	No	No	Yes
Year dummies	No	Yes	Yes	No	Yes	Yes
State dummies	No	Yes	Yes	No	Yes	Yes
SE	Robust	Robust	Robust	Clustered	Clustered	Clustered

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

6.1. Operating branches

From Table 8, border counties are estimated to have a higher number of operating branches compared to interior counties when testing the full sample of data. Regardless of adjacent regulations, from Columns 3 and 6 (full specification), border counties have 18.6 percent more operating payday-lending branches than interior counties, with 1-percent significance for both robust and clustered standard errors. Even without considering

Table 11. Results: operating branches, interior versus border, adjacent state policy: enabling.

	(1)	(2)	(3)	(4)	(5)	(6)
Border	1.026 (0.018)	1.244*** (0.025)	1.302*** (0.017)	1.026 (0.265)	1.244 (0.220)	1.302*** (0.109)
Bank count			1.000 (0.000)			1.000 (0.003)
Lagged branches			1.042*** (0.001)			1.042*** (0.005)
Great Recession			1.005 (0.018)			1.005 (0.010)
α	2.886*** (0.022)	2.421*** (0.022)	0.074*** (0.003)	2.886*** (0.483)	2.421*** (0.413)	0.074*** (0.019)
Constant	5.937*** (0.060)	7.161*** (0.443)	27.647*** (11.268)	5.937*** (1.143)	7.161*** (1.224)	27.647 (64.194)
Observations	48,860	48,860	7,918	48,860	48,860	7,918
Pseudo R-squared	0.0000	0.0247	0.2367	0.0000	0.0247	0.2367
LR Test Statistic of $\alpha = 0$	257938.92***	251560.54***	45490.624***	257938.92***	251560.54***	45490.624***
Controls	No	No	Yes	No	No	Yes
Year dummies	No	Yes	Yes	No	Yes	Yes
State dummies	No	Yes	Yes	No	Yes	Yes
SE	Robust	Robust	Robust	Clustered	Clustered	Clustered

Standard errors in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1

Table 12. Results: new branches, interior versus border, full sample.

	(1)	(2)	(3)	(4)	(5)	(6)
Border	1.547*** (0.091)	1.405*** (0.064)	1.493*** (0.118)	1.547 (0.482)	1.405** (0.204)	1.493*** (0.158)
Bank count			1.011*** (0.002)			1.011** (0.004)
Lagged branches			1.011*** (0.002)			1.011** (0.005)
Great Recession			0.865 (0.199)			0.865 (0.246)
α	13.672*** (0.816)	7.123*** (0.401)	2.110*** (0.182)	13.672*** (3.213)	7.123*** (1.279)	2.110*** (0.308)
Constant	0.065*** (0.002)	0.569*** (0.082)	0.030 (0.077)	0.065*** (0.016)	0.569 (0.289)	0.030 (0.125)
Observations	56,318	56,318	10,505	56,318	56,318	10,505
Pseudo R-squared	0.0035	0.0856	0.1857	0.0035	0.0856	0.1857
LR Test Statistic of $\alpha = 0$	6907.594***	4928.55***	1274.9036***	6907.594***	4928.55***	1274.9036***
Controls	No	No	Yes	No	No	Yes
Year dummies	No	Yes	Yes	No	Yes	Yes
State dummies	No	Yes	Yes	No	Yes	Yes
SE	Robust	Robust	Robust	Clustered	Clustered	Clustered

Standard errors in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1

adjacent-state payday-lending policies, this difference indicates a preference for locating closer to adjacent states and potential cross-border markets. In measuring the effects of particular market characteristics, the number of bank branches in a county has no effect on the number of operating branches, while the number of operating payday-lending branches in a previous month does. There are 3.8 percent more operating payday-lending branches in a given county-month for every one branch operating in the previous period. This is indicative of the clustering nature of payday-lending branches in a market. Only from Column 6, there are 1.2 percent more operating branches during periods of the Great

Table 13. Results: new branches, interior versus border, adjacent state policy: prohibited.

	(1)	(2)	(3)	(4)	(5)	(6)
Border	1.506*** (0.117)	1.570*** (0.138)	1.833*** (0.232)	1.506 (0.597)	1.570** (0.360)	1.833*** (0.253)
Bank count			1.010*** (0.002)			1.010* (0.005)
Lagged branches			1.021*** (0.003)			1.021*** (0.003)
Great Recession			0.514** (0.145)			0.514** (0.143)
α	14.118*** (0.957)	6.333*** (0.456)	2.068*** (0.234)	14.118*** (5.011)	6.333*** (1.529)	2.068*** (0.353)
Constant	0.065*** (0.002)	1.189 (0.183)	3,433.526* (14,562.603)	0.065*** (0.016)	1.189* (0.123)	3,433.526 (17,249.716)
Observations	38,362	38,362	7,637	38,362	38,362	7,637
Pseudo R-squared	0.0033	0.0949	0.1968	0.0033	0.0949	0.1968
LR Test Statistic of $\alpha = 0$	3761.8338***	2289.3494***	587.6702***	3761.8338***	2289.3494***	587.6702***
Controls	No	No	Yes	No	No	Yes
Year dummies	No	Yes	Yes	No	Yes	Yes
State dummies	No	Yes	Yes	No	Yes	Yes
SE	Robust	Robust	Robust	Clustered	Clustered	Clustered

Standard errors in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1

Table 14. Results: new branches, interior versus border, adjacent state policy: no explicit regulation.

	(1)	(2)	(3)	(4)	(5)	(6)
Border	1.602*** (0.158)	0.744*** (0.082)	1.112 (0.251)	1.602 (0.611)	0.744 (0.159)	1.112 (0.168)
Bank count			1.010*** (0.002)			1.010 (0.007)
Lagged branches			1.024*** (0.004)			1.024*** (0.004)
Great Recession			0.663 (0.220)			0.663 (0.252)
α	14.234*** (1.045)	6.565*** (0.493)	2.193*** (0.265)	14.234*** (5.690)	6.565*** (1.796)	2.193*** (0.459)
Constant	0.065*** (0.002)	0.914 (0.134)	67.209 (335.946)	0.065*** (0.016)	0.914 (0.247)	67.209 (277.839)
Observations	35,343	35,343	6,083	35,343	35,343	6,083
Pseudo R-squared	0.0011	0.0917	0.1963	0.0011	0.0917	0.1963
LR Test Statistic of $\alpha = 0$	16031.7322***	14576.7262***	4312.3152***	16031.7322***	14576.7262***	4312.3152***
Controls	No	No	Yes	No	No	Yes
Year dummies	No	Yes	Yes	No	Yes	Yes
State dummies	No	Yes	Yes	No	Yes	Yes
SE	Robust	Robust	Robust	Clustered	Clustered	Clustered

Standard errors in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1

Recession. Given the direct changes in lending markets and drastic decrease in available liquidity, this result comes as no surprise.

In Table 9 through 11, we test the effect of region between interior counties and the restricted set of border counties according to adjacent-state regulations. Table 9 compares interior counties to border counties adjacent to states that prohibit payday lending, Table 10 compares interior counties to border counties adjacent to states with no explicit payday-lending policy, and Table 11 compares interior states to border counties adjacent to states that also have permitting payday-lending policies. Beginning with Table 9 and

Table 15. Results: new branches, interior versus border, adjacent state policy: enabling.

	(1)	(2)	(3)	(4)	(5)	(6)
Border	1.554*** (0.111)	1.506*** (0.082)	1.166 (0.121)	1.554 (0.541)	1.506** (0.275)	1.166 (0.138)
Bank count			1.011*** (0.002)			1.011* (0.006)
Lagged branches			1.010*** (0.002)			1.010** (0.005)
Great Recession			0.838 (0.207)			0.838 (0.269)
α	14.779*** (0.965)	7.262*** (0.441)	2.013*** (0.196)	14.779*** (4.038)	7.262*** (1.509)	2.013*** (0.341)
Constant	0.065*** (0.002)	0.703** (0.107)	0.057 (0.171)	0.065*** (0.016)	0.703** (0.296)	0.057 (0.270)
Observations	49,337	49,337	8,351	49,337	49,337	8,351
Pseudo R-squared	0.0033	0.0893	0.1927	0.0033	0.0893	0.1927
LR Test Statistic of $\alpha = 0$	6244.41***	4285.824***	1112.0102***	6244.41***	4285.824***	1112.0102***
Controls	No	No	Yes	No	No	Yes
Year dummies	No	Yes	Yes	No	Yes	Yes
State dummies	No	Yes	Yes	No	Yes	Yes
SE	Robust	Robust	Robust	Clustered	Clustered	Clustered

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Columns 3 and 6, there is still a significant difference in the number of operating payday lenders in a county month in border counties: there are 13.9 percent more operating payday-lending branches in border counties adjacent to prohibitive states than interior counties with enabling regulation. From our discussion, states that prohibit lenders through interest rate ceilings also restrict cross-border competition (essentially eliminating it) for operating lenders in adjacent states that enable payday lending. Therefore, any excess profit is maintained for these branches operating in border counties of enabling states.

In comparing interior counties to border counties adjacent to states with no explicit payday-lending policies, there is no significant difference in the number of operating branches observed. Similar to the discussion above, a lack of explicit policy does not restrict competition (decreasing the incentive to operate); however, policy uncertainty may also contribute to an increased or decreased incentive to operate.

Finally, from Table 11, interestingly, there are significantly more operating branches in border counties adjacent to states with enabling policies relative to interior counties, with significance at the 1-percent level for both standard error types. Specifically, there are 30.2 percent more operating branches in these border counties. As these results are measuring policy effects on already operating branches, this positive effect could be another signal of the clustering that is observed within the payday lending industry. Enabling regulations, at the very least, are not binding, and therefore serve as a signal that there are cross-market borders to serve.

In all tables, market characteristics are relatively consistent with results from the full sample; however, only the lagged number of operating payday-lending branches is statistically significant across all tables. Finally, there is a significant level of over-dispersion observed within the tested data (as shown by the value of α and the LR significant test statistics). Naturally, dispersion decreases with increased controls and reduced observations.

6.2. New licenses

In measuring the effect of region on the number of new branches to open in a county-month, we present in Table 12 the baseline results in comparing interior counties to all border counties observed. From Columns 3 and 6, border counties have 49.3 percent more new branches compared to interior counties in our years of observation, with very high statistical significance. Our years of observation, 2005 through 2010, encompass periods of rapid expansion and the peak of operating branches during the decade (in 2007). Our results indicate there was a significant preference for locating in border counties and accessing potential spillover markets. Interestingly, more new branches entered county-months with traditional bank branches, with the number of predicted new branches being 1.1 more for every operating traditional bank in a county-month. This result is in-line with Damar (2009) that found an increased presence of payday lending branches in markets with traditional banks. Finally, and consistent with the previous discussion, county-months with previously operating branches have 1.1 more new branches (for everyone one operating branch), consistent with observed agglomeration behavior.

From Table 13 through 15, by restricting border counties according to adjacent-state policy, our results can inform as to where among border counties the expansion of the payday-lending industry was most significant. The largest and most significant difference in new branches between counties types is for border counties adjacent to states that restrict or prohibit the payday-lending industry. From Table 13, border counties adjacent to states that prohibit payday lending have an astounding 83 percent more, almost double, the number of new branch compared to interior counties. Therefore, not only is the payday-lending industry expanding into counties with potential cross-state markets, lenders are specifically looking to locate in adjacent counties where cross-state competition is eliminated through policy. These results are strong evidence of cross-border policy effects and confirm our hypothesis that firms are attracted to counties adjacent to states that completely prohibit payday lending. Current research has shown that the payday lending industry is less concentrated within states that are more prohibitive, and will exit from states that ban the industry entirely (Barth et al. (2016)). For cross-border markets, this is equivalent to an extreme barrier to entry that prevents cross-state competition entirely. This maintains profits for firms across state borders and increases the incentive to enter in these areas.

Conversely, from Tables 14 and 15, regression results show no statistical difference in the number of new branches when border counties are adjacent to states with either no explicit policies or policies that enable the industry to operate. For these particular regions, too much competition from both markets, within state and across state borders, diminishes profit potential and the incentive to enter these areas over interior counties. However, clustering behavior is still evident in all cases, with new-branch counts between 1.1 and 2.4 percent higher for every branch operating in the previous period. Once again, dispersion is observed within our sample as exhibited by the values of α and model test statistics.

7. Conclusion

The purpose of this analysis is to determine if cross-border policy effects exist within the payday lending industry, specifically if branch location decisions are affected by cross-state policies. As payday lending regulations are state-level, adjacent states can be more or

less restrictive, if explicit policy exists at all. Cross-border markets exist for many states, therefore adjacent regulations can have effects on market competition, consumer access, and overall profitability. Compared to interior counties within enabling states, we find strong evidence of cross-border effects from adjacent regulations on the number of operating and new branches to open in a county-month for border counties that are adjacent to states that prohibit payday lending. Our results show that border counties in this category will have 83 percent more new branches and 14 percent more operating branches relative to interior counties, suggesting that firms are strategically locating closer to states and cross-border markets that prohibit payday lending. Additionally, we find that border counties adjacent to states that also permit payday lending have 30 percent more operating branches than interior counties, giving evidence to the clustering nature of the payday lending industry close to cross-state markets.

Consumer welfare has been the focus of a large share of research conducted on the payday lending industry and serves as the motivation for policies that limit the operations of payday lenders in order to protect consumers. However, state-level policies are only as effective as the least-restrictive neighboring policy environment, especially if consumers have the ability to cross state borders with little or no additional cost to them. As the composition of policy changes across states, some are states re-permitting payday lending while others are moving to restrict the industry, the potential for cross-border activity will always exist. Therefore, in order to establish effective and efficient policy, the total scope of access for consumers and the likely behavior of firms must be considered.

Disclosure statement

No potential conflict of interest was reported by the authors.

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References

- Barth, J. R., Hilliard, J., & Jahera, J. S. (2015). Banks and payday lenders: Friends or foes? *International Advances in Economic Research*, 21(2), 139–153.
- Barth, J. R., Hilliard, J., Jahera, J. S., & Sun, Y. (2016). Do state regulations affect payday lender concentration? *Journal of Economics and Business*, 84, 14–29.
- Burkey, M. L., & Simkins, S. P. (2004). Factors affecting the location of payday lending and traditional banking services in North Carolina.

- Carter, S. P. (2015). Payday Loan and Pawnshop Usage: The Impact of Allowing Payday Loan Rollovers. *Journal of Consumer Affairs*, 49(2), 436–456.
- Community Financial Services Association of America. CFSA member best practices.
- Damar, H. E. (2009). Why do payday lenders enter local markets? Evidence from Oregon. *Review of Industrial Organization*, 34(2), 173–191.
- DeYoung, R., & Phillips, R. J. (2006). *Payday loan pricing*. Networks Financial Institute, 09-07.
- Dube, A., Lester, T. W., & Reich, M. (2010). Minimum wage effects across state borders: Estimates using contiguous counties. *The Review of Economics and Statistics*, 92(4), 945–964.
- Flannery, M., and K. Samolyk. 2007. “Scale Economies at Payday Loan Stores”. In *Proceedings of the Federal Reserve Bank of Chicago’s 43rd Annual Conference on Bank Structure and Competition (May 2007)*, Chicago, Illinois, 233–259.
- Flannery, M. J., & Samolyk, K. (2005, September). Payday lending: Do the costs justify the price? *FDIC Center for Financial Research Working Paper*.
- Graves, S. M. (2003). Landscapes of predation, landscapes of neglect: A location analysis of payday lenders and banks. *The Professional Geographer*, 55(3), 303–317.
- Hao, Z., & Cowan, B. (2017). *The cross-border spillover effects of recreational marijuana legalization* (No. w23426). National Bureau of Economic Research.
- Holmes, T. J. (1998). The effect of state policies on the location of manufacturing: Evidence from state borders. *Journal of Political Economy*, 106(4), 667–705.
- Lawrence, E. C., & Elliehausen, G. (2008). A comparative analysis of payday loan customers. *Contemporary Economic Policy*, 26(2), 299–316.
- Long, J. S., and J. Freese. 2014. *Regression Models for Categorical Dependent Variables in Stata*. 3rd ed. College Station, TX: Stata Press.
- Melzer, B. T. (2011). The real costs of credit access: Evidence from the payday lending market. *The Quarterly Journal of Economics*, 126(1), 517–555.
- Morgan, D. P., Strain, M. R., & Seblani, I. (2012). How payday credit access affects overdrafts and other outcomes. *Journal of money. Credit and Banking*, 44(2–3), 519–531.
- Morse, A. (2011). Payday lenders: Heroes or villains? *Journal of Financial Economics*, 102(1), 28–44.
- National Conference of State Legislators. (2019). *Payday lending legislation (various years)*. Retrieved from <http://www.ncsl.org/research/financial-services-and-commerce/payday-lending-2019-legislation.aspx>
- Prager, R. A. (2009). *Determinants of the locations of payday lenders, pawnshops and check-cashing outlets*. Washington, DC: Federal Reserve Board.
- Ramirez, S. R. (2014). Dissertation. *Essays on the industrial organization of the payday lending industry*. The University of Arizona.
- Rohlin, S., Rosenthal, S. S., & Ross, A. (2014). Tax avoidance and business location in a state border model. *Journal of Urban Economics*, 83, 34–49.
- Ross, A. (2012). Crime, police, and truth-in-sentencing: The impact of state sentencing policy on local communities. *Regional Science and Urban Economics*, 42(1–2), 144–152.
- Skiba, P. M., & Tobacman, J. (2009). Do payday loans cause bankruptcy? *Vanderbilt Law and Economics research paper* (pp. 11–13).
- Stegman, M. A. (2007). Payday lending. *The Journal of Economic Perspectives*, 21(1), 169–190.
- Stegman, M. A., & Faris, R. (2003). Payday lending: A business model that encourages chronic borrowing. *Economic Development Quarterly*, 17(1), 8–32.
- The Pew Charitable Trusts. (2012). *State payday loan regulation and usage rates* (Pew Sage Small-Dollar Loans Research Project).
- Zinman, J. (2010). Restricting consumer credit access: Household survey evidence on effects around the Oregon rate cap. *Journal of Banking & Finance*, 34(3), 546–556.