Demand, Regulation, and Welfare on the Margin of Alternative Financial Services*

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Abstract

We exploit a nonlinear reduction in a bank's check-cashing fees to identify the elasticity of demand for check cashing across two policy-relevant margins. First, we find that consumers are nearly two and a half times more responsive to price than travel costs. Second, we find that an extra day of check-clearing time makes an account holder 65.5% more likely to cash a check than to deposit it. We use these elasticities to evaluate two counterfactual policies: (i) reducing New York's rate cap while simultaneously expanding check cashers' protected territories and (ii) mandating faster check-clearing times.

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JEL: D14, G12

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1 Introduction

Paper checks remain a ubiquitous form of payment in the United States, with 18.3 billion written each year and 40% of Americans regularly receiving them (Federal Reserve System 2013). At the same time, nearly 8% of U.S. adults do not have access to a checking account and another 20% are "underbanked" — they have a bank account but still use alternative financial services (AFS) such as check cashing or money orders (Burhouse et al. 2014). This population faces a fundamental choice of how to convert their payments into a useful medium of exchange, with many using a check casher to meet this need: approximately 8% of Americans paid a total of $1.8 billion in fees to cash $51.7 billion worth of checks in 2012 (FINRA Investor Education Foundation 2013, Schneider & Longjohn 2014).

In this paper, we provide novel, policy-relevant evidence on how service fees, travel costs, and check-clearing times affect individuals on the margin between AFS and the mainstream banking system. To do so, we draw on a five-and-a-half year panel of transaction data from Spring Bank, a bank with headquarters in the South Bronx, N.Y., that offers both mainstream checking accounts and the alternative financial service of check cashing. Data from a firm that offers both types of services presents a unique opportunity to study the choice between AFS and mainstream banking because the vast majority of banks do not offer AFS and AFS providers cannot offer mainstream products. By studying a firm that offers customers an explicit choice between both types of services, we can isolate the effects of check-cashing fees and check-hold times from other factors that might lead a marginal consumer to favor AFS over traditional bank accounts, such as convenience, financial acumen, or distrust of the banking system (Schneider & Longjohn 2014, Burhouse et al. 2014). In addition, Spring Bank introduced a large, nonlinear change to its check-cashing fees during our sample period, generating the variation necessary to cleanly identify the impact of check-cashing prices on demand.

Our results offer new insights about the economics of alternative financial services and have important implications for policymakers. By merging location, price, and transaction data, we show that check-cashing fees affect demand nearly two and a half times as much as travel costs.[1] Furthermore, we show that lower-income consumers are less sensitive to check-cashing prices,

[1] Rhine et al. (2006), Berry (2005) and Barr (2012) each use cross-sectional survey responses to model the choice of whether to have a mainstream account or use AFS. Rhine et al. (2006) and Berry (2005) focus on demographic predictors. Barr (2012) adds geographic proximity and, like our study, does not find a strong association with choice. Our price data, price variation, and longitudinal data allow us to quantify the relative effect of price versus distance, which gives a richer characterization of demand and more guidance for policy.

likely because they have less discretion over how they convert their checks into cash. Taken together, these findings highlight a tension between regulations that limit check-cashing fees and public initiatives that promote a greater use of mainstream deposit accounts among the 28% percent of Americans who are "un-banked" or "under-banked."

As a second contribution, we show that many deposit-account holders willingly pay high fees to accelerate access to their funds, with customers becoming much more likely to cash their checks than deposit them when they have to wait longer for them to clear through the banking system: an extra day of check-clearing time makes Spring Bank account holders 65.5% more likely to choose check cashing over making a deposit. Our estimates imply that the average customer is willing to pay the equivalent of $11.17 per day to speed up access to his or her cash, and this willingness to pay is even higher among low-income households. Our main results are robust to specifications that account for the potential confound of weekend and holiday effects. Notably, these estimates are the first in the literature derived from individual choice data — rather than from surveys — that show how accelerating the availability of funds would impact consumers, helping illuminate the potential impact of the Federal Reserve's recent initiatives to expedite the federal accounts clearing house payment system (Estep 2014, Federal Reserve System 2015).

A key reason to study why households use AFS is that the costs of using AFS tend to be very high relative to mainstream products. For instance, payday loans often have implicit APRs exceeding 400%, which is more than ten times greater than the rate found on most credit cards (Bertrand & Morse 2011). For check cashing, implicit APRs can be even more staggering. Paying 2% of a check's face value to receive cash today rather than depositing the check and waiting two days for it to clear through the banking system corresponds to an effective APR of 3992%.[2]

The high fees associated with AFS have sparked controversy and calls for reform. Many consumer advocates view them as predatory, arguing that AFS providers abuse their market power to exploit a vulnerable and financially unsophisticated population: people of color, with less education, and with lower incomes are all more likely to use AFS (Caskey 1994, Rhine

[2]Check cashing is usually thought of as a transaction product rather than a credit product, though payday loans and check cashing share many important features. In payday lending, the consumer receives cash today "secured" by a check post-dated by a week or two, while the lender faces the risk that the borrower's check does not clear when it is subsequently cashed. In check cashing, the consumer receives cash today "secured" by an endorsed check that the check casher then deposits in its own business checking account within a day. Once the check clears, the check casher is repaid; the check casher faces the risk that the endorsed check fails to clear. Each accounts for about $50 billion of AFS's $320 billion total volume (Bradley et al. 2009).

et al. 2006, Berry 2005, Burhouse et al. 2014). And because the poor spend a disproportionate amount of their incomes on basic financial transactions, high AFS fees may impose a particularly large burden on this group (Fellowes & Mabanta 2008). To this point, Rhine et al. (2006) argue that, "Consumer participation in mainstream financial markets can improve their ability to build assets and create wealth, can protect them from theft and discriminatory, predatory, or otherwise unsavory lending practices, and may promote economic stability and vitality in the communities where they reside. By more fully understanding consumers' financial decisions, policies can be better directed to improve the effectiveness of legislation...in encouraging mainstream financial market participation."

Check-cashing services are regulated on multiple levels in the United States. Historically, the states regulated check cashing individually (Fox & Woodall 2006). More recently, the U.S. Congress created the Consumer Financial Protection Bureau (CFPB) "to stand on the side of consumers and ensure they are treated fairly in the financial marketplace" (Cordray 2014), with Dodd-Frank explicitly including the regulation of check cashers in the CFPB's purview (Hawkins 2011). The Federal Reserve Board has also taken a strong interest in protecting consumers through its research departments and community affairs programs. Alongside these regulations, several public policies seek to protect the financial well-being of consumers by promoting the use of mainstream banking products, such as BankOn Chicago and BankOn New York. The Federal Deposit Insurance Corporation (FDIC) also has a major policy and research program led by its Advisory Committee on Economic Inclusion to shift consumers from AFS to mainstream accounts.

Previous studies have examined the impact of AFS regulations, mostly in the context of payday loans. Campbell et al. (2011) provide a comprehensive review of this topic and lay out a case for stronger protections, especially given the vulnerability of many AFS users. To this point, Lusardi & Scheresberg (2013) find that individuals with limited financial literacy, "lacking basic numeracy and knowledge of basic financial concepts," are more likely to use high-cost AFS-types of credit. Behavioral biases also impact consumers in this market, with Bertrand & Morse (2011) finding that customers with more information about fees think less narrowly (over time) about finance costs and borrow less, while Skiba & Tobacman (2008) find that payday borrowers exhibit partially-naive quasi-hyperbolic discounting. Others have studied how access to payday lenders correlates with measures of financial distress, finding mixed results.[3] Despite

[3]Melzer (2011) shows that access to payday loans leads to difficulty in meeting financial obligations like mortgage

the extensive work already done in this area, central questions about the presence of market failures, the impact of behavioral biases, and the need for consumer protection remain open (Mullainathan & Shafir 2009, Mani et al. 2013).

We seek to fill a gap in the literature on AFS by studying the choice consumers make between using check-cashing services and mainstream checking accounts, which in turn can guide regulators. Although others have employed survey-based approaches to study this topic (Rhine et al. 2006, Berry 2005, Barr 2012, Schneider & Longjohn 2014), no prior work has used data from individuals' transactions to examine (i) how consumers respond to check-cashing fees or (ii) why many households with access to traditional checking accounts nevertheless choose to pay high check-cashing fees instead of depositing their checks and then withdrawing funds later at no additional charge. As the answers to these two questions lie at the heart of AFS regulations, evaluating microlevel transaction data can provide insights for policymakers beyond what can be learned from surveys.

We use our demand estimates to evaluate the welfare implications of two key financial regulations. First, New York State restricts both check cashers' fees and locations, so we consider the impact of reducing the state's rate cap while simultaneously increasing the area of check cashers' local monopolies. Because consumers prefer lower fees to traveling less, such a policy would enhance social welfare if check cashers remain indifferent between charging high fees in a small territory or lower fees in a larger territory, so long as profits remain constant. As such, we calculate that doubling an incumbent's monopoly territory from 0.3 to 0.6 miles while reducing the state's rate ceiling from 2.01% to 0.73% would improve consumer welfare by up to 26.0% under reasonable assumptions about how the new policy would affect the distance traveled by a typical customer.

In addition, because deposit-account holders become less likely to cash their checks when they face a shorter wait to access their funds following a deposit, we argue that the choice to pay relatively high AFS fees is driven in large part by the desire for immediate access to cash. We estimate that changing the maximum check-hold time to one day would reduce the use of check cashing by 55.0% for deposit-account holders, while increasing the state rate cap to 3% in conjunction with shorter check-hold times would reduce it by 70.1%.

payments. Morse (2011) shows that the presence of payday lenders mitigates financial distress following a natural disaster. Dobbie & Skiba (2013) show that payday borrowers are less likely to default on larger loans. Zinman (2010) shows that restricting access to payday loans worsened the overall financial condition of Oregon households. Fusaro & Cirillo (2011) show that repayment and renewal rates for payday loans are not affected by the interest rate a borrower is charged.

In the next section, we provide background details for our empirical setting, while in Section 3 we discuss the data used in our analysis. In Section 4, we estimate a demand model for check cashing, and continue in Section 5 with the choice to deposit or cash a check. We then consider two counterfactual policy simulations in Section 6 and conclude in Section 7.

2 Background on Check Cashing

Surveys of low-income communities show that the demand for check cashing typically comes from two distinct groups (Berry 2005, Barr 2012, Rhine et al. 2006). First, those who lack a traditional bank account rely on check cashers for their everyday financial transactions, like cashing checks or paying utility bills. Among this group are individuals who have been excluded from the mainstream banking system as a result of past misconduct and those who actively avoid it for various reasons. Second, even those who have a traditional bank account may still use a check casher if they want cash in excess of their current balances or simply find using a check casher more convenient.

As described in Caskey (1994, 2002), the typical check-cashing outlet is a free-standing business, although some retailers such as Wal-Mart offer similar services. In addition to cashing checks, check-cashing outlets commonly provide other financial services, including utility payments, pre-paid debit cards, money orders, and wire transfers. In some states, check cashers also offer payday loans. These other products notwithstanding, Caskey (1994) reports that check cashers derive the majority of their revenue from check-cashing fees.

AFS fees tend to be high compared to those for equivalent transactions in a mainstream account, in part because the costs of providing AFS are large relative to the size of the transaction. For instance, most check cashers remain open for 10-12 hours per day, resulting in long idle periods for staff. Moreover, because they advance funds on checks that must be subsequently cleared through the banking system, check cashers incur interest expenses on any advanced funds and face the risk that some cashed checks will be uncollectible due to insufficient funds or fraud.

Check cashers use both manual and automated processes to manage the risk of cashing bad checks. They require new customers to present photo identification; only accept checks issued by corporations, organizations, and government agencies, generally refusing personal and third-party-endorsed checks; manually verify a check's authenticity by calling payers or issuing

banks; and use commercial data vendors to assess a customer's risk profile. As a result of these safeguards, modern check-cashing outlets tend to suffer negligible losses from bad checks. In an analysis of data from Dollar Financial, the nation's largest publicly-traded check-cashing company, Bradley et al. (2009) find that net write-offs of bad checks were just 0.31% of face value in 2008 compared to average fees of 3.11%. They conclude that, "given the generally low-risk nature of most checks cashed, losses tend to be low." This resonates with Spring Bank's own experience. Since its founding, the bank has only cashed two bad checks.

Check Cashing in New York All check cashers in New York must obtain a license from the state's Department of Financial Services (DFS), which oversees 166 check-cashing companies operating 646 stores, of which over 90% are in New York City. As outlined in Neiman (2007), the aggregate face value of checks cashed statewide was $14.9 billion in 2006, essentially the same in real terms as in 1993. During this time, however, inflation-adjusted check-cashing fees increased 58%, reaching $222 million in 2006. As opposed to other states, notable retailers such as Wal-Mart do not offer check cashing in New York, and New York check cashers do not offer payday loans, in part due to the state's comparatively low 25% APR cap on interest rates.

New York places two major regulations on check cashers, a rate cap and a bar against opening within 0.3 miles (about 6-7 blocks) of an incumbent check casher. These two regulations are purportedly designed to complement one another: the rate cap is meant to protect consumers from exorbitant prices, while the local monopoly protects check cashers' "reasonable" profitability and continued operation.

Each year in February, New York updates its ceiling for check-cashing rates, which since 1993 has risen from 1.1% of face value (or $1 for small checks) to the current rate of 2.01%.[4] Check cashers typically charge the maximum price allowed by state law. Fox & Woodall (2006), for instance, surveyed 21 check cashers in New York and found that 20 charged the state maximum of 1.64% that year, with the other charging 1.58%. Similarly, the three New York check cashers surveyed by Ciaglo & Fox (1987) all charged the prevailing state cap at the time.

New York also prevents check cashers from competing head-to-head with one another. Since 1993, state law has precluded check cashers from opening within 0.3 miles walking distance of any existing check casher without the incumbent's consent. Under the protection of this

[4]The check-cashing industry association successfully lobbied to have the cap indexed to inflation starting in 2004. Although an indexed price cap may appear reasonable at first glance, the cap is inherently indexed because it is defined as a percent of each check's nominal face value. Indexing the percent-of-face-value cap means that fees now rise faster than inflation.

regulation, check cashers have effectively partitioned the city into small monopoly territories.

Banks face different regulations and could provide direct competition to check cashers. Banks can open full-service branches close to check cashers and offer all of the same services (subject to approval from their own regulators), though very few have done so.[5] Most banks refuse to cash government checks for those without deposit accounts because they would incur costs in handling the checks, worry about crowding their lobbies with public aid recipients, and fear that some fraudulently claimed income-tax refund checks might be cashed for which they would not be reimbursed (U.S. General Accounting Office 1988). Even for their own account holders, banks generally require that they first deposit the check and then make the funds available only after the check clears, which can take up to five business days. Federal regulations cap how long a bank can hold funds from a deposited check, and most banks adhere to the maximum length.

Check cashers in New York also face limited competition from banks because bank branches are absent from large parts of the city. According to Neiman (2007), 52% of check cashers operate in areas not served by a mainstream bank. As check cashers locate predominately in low-income areas, their local markets have not experienced the same influx of bank branches that the more-affluent parts of the city have: the number of bank branches in New York City's low-income census tracts has been largely unchanged in recent years, whereas the number of bank branches in higher-income areas has grown extensively.

Spring Bank Spring Bank (formerly CheckSpring Bank) opened in 2007 with a mission to serve the needs of the "under-banked" population by spanning the divide between traditional banking and AFS. As the first bank since 1982 to open with headquarters in the Bronx, it operates in an area otherwise devoid of mainstream banks. According to an American Banker article, "While one can't throw a stone in Manhattan without hitting a bank branch, it's not the same in the neighborhood of CheckSpring's flagship branch at 167th street and Gerard Avenue, about six blocks north of Yankee Stadium, which is home to five check-cashing stores. 'The most important way [we've reached the unbanked] is that we're here,' [co-founder Charlie Wilcox] says. 'There is not another bank branch within a half a mile of us' (Malakian 2008)." The area immediately surrounding Spring Bank is populated primarily by people of color on the financial margins: 75% have no discretionary income and 50% do not have a bank account.

[5] A 2001 state law prevents banks from operating stand-alone retail check-cashing operations or automatic teller machines (ATMs) that offer check-cashing within 0.3 miles of an incumbent check casher, out of concern that check cashers might face unfair competition.

Moreover, the Bronx has few full-service banks, with just 1 per 20,000 residents compared to a rate of 1 per 3,000 in Manhattan.

Just like at a check-cashing outlet, customers without a deposit account at Spring Bank can cash their checks there for a fee. Also, checking- and savings-account customers can cash a check without waiting for it to clear if they do not have enough covering funds in their accounts; instead, the bank charges a fee only on the uncovered portion of the cash. To our knowledge, only one other bank in New York provides this type of service.

3 Data and Preliminary Analysis of Check Cashing

Our main data come from transactions that took place between October 2008 and March 2014 at Spring Bank's headquarters branch from customers with checks between $100 and $10,000 and primary addresses within 3 miles of the bank, measured by walking distance. To protect customers' privacy, Spring Bank removed all identifying information from the data and provided an anonymized index number that links each customer to her transactions. For each check-cashing transaction, we have data on the customer's index number, distance from Spring Bank, and deposit-account status; the date; the check's face value; and the fee paid.

Aggregate monthly summary statistics from the data appear in Table 1. In a typical month, Spring Bank cashes an average of 468 checks with a total face value of $253,000. Moreover, Spring Bank serves 239 unique check-cashing customers who cash an average of two checks with a face value of $549 each. Of these 239 customers, about 70 (29.3%) also have a deposit account at Spring Bank.

Spring Bank's check-cashing prices have varied throughout its history, often diverging widely from competitors' at the state cap. Between October 2008 and February 2012, New York's cap for cashing a check above $100 increased from 1.75% to 1.86%, and all check cashers that we and the bank staff are aware of always charged the maximum amount allowed. Initially, Spring Bank also charged the state cap, but held steady at 1.75% when the state re-indexed its rate each February. Then, in March 2012, Spring Bank implemented a substantial change to its fee structure, as shown in Figure 1. Under the new pricing scheme, checks up to $1000 could be cashed for a $1 fee and checks above $1000 for 1% of face value.[6] Spring Bank's new menu stayed

[6] As a director of Spring Bank, Sojourner witnessed and participated in the decision-making process that led the organization to make these price changes. The strategy and mission of the bank is to serve the financial-service needs of community members. The purpose of the price cut was to bring more customers into the bank by stealing market share

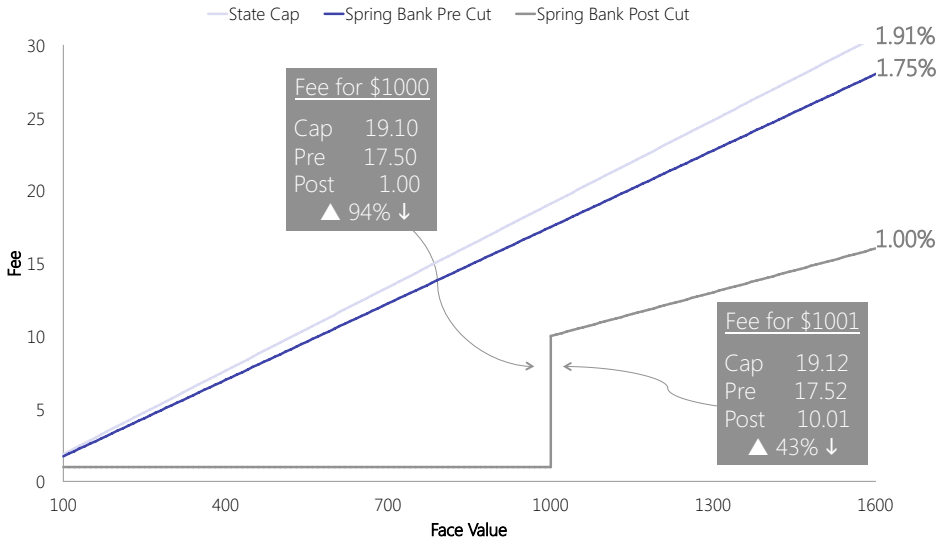
Table 1: Monthly summary statistics for check-cashing transactions at Spring Bank.

Variable	Mean	Std. Dev.	Min.	Max.
Transactions	468.3	212.4	89	901
Total Face Value	252599.15	120960.58	38420.57	594566.8
Average Face Value	548.86	157.07	412.21	1163.99
Total Fees	2671.21	1615.15	672.36	8500.64
Average Fee	7.09	4.408	1.35	20.37
Average Rate	0.012	0.007	0.003	0.018
Average Rate Cap	0.019	0.001	0.018	0.02
Unique CC Customers	238.77	68.116	75	351
Unique CC Customers with DA	69.5	28.912	20	123
Distance to Spring Bank	0.692	0.065	0.567	0.829
N		66		

Note: CC refers to check cashing, DA to deposit account.

in place until January 1, 2014, when Spring Bank began charging non-account holders a uniform 1% for all checks and charging account holders $1 on all checks as long as they maintained a minimum balance of $100.

Figure 1: Spring Bank's price schedule before and after the price cut in March 2012.



from competing check cashers. This would create the opportunity to build relationships with community members and offer them a fuller range of financial services. The $1 & 1% price policy was chosen because it would be simple to communicate, simple to compare, and clearly attractive relative to competitors' prices; $1 was also management's estimate of the marginal cost to cash a check, primarily due to staff time. The price cut was advertised primarily with banners in the window, sandwich boards on the sidewalk, and handbilling in front of the branch. No paid marketing was done. Bank staff were uncertain whether competitors would respond. There is a strong norm that all check cashers always charge the maximum allowable by law, so it seemed somewhat unlikely.

Spring Bank's fee cut increased demand considerably, as shown in Table 2. Following the price cut, the number of monthly transactions more than doubled, climbing from 326 to 702. Total volume in dollar terms, however, saw less than a twofold increase, with the average face value falling from $562 to $527. Most notably, the average fee fell by more than two-thirds, dropping from $9.84 to $2.57. This resulted in much lower check-cashing revenue for Spring Bank, with total fees declining by almost half, from $3,259 to $1,707. New deposit accounts, one of Spring Bank's primary motivations for implementing the price cut, did not increase meaningfully. To the best of our knowledge, Spring Bank's competitors did not respond to the price cut by cutting their own prices or changing their services in any way. We surveyed the closest 5 check cashers in the months before and after the price change and none changed their price or operations noticeably — all charged the state cap during this entire period.

Table 2: Monthly summary statistics for check-cashing transactions before and after the price cut.

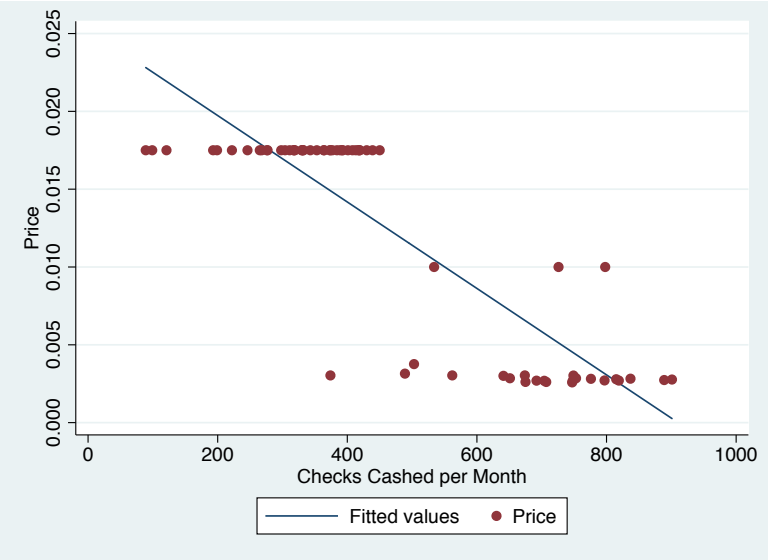
Variable	Pre-Cut Mean	Post-Cut Mean	t-stat
Transactions	325.56	702.44	12.84
Total Face Value	186234.73	361436.80	8.70
Average Face Value	562.15	527.08	-0.97
Total Fees	3259.11	1707.06	-4.85
Average Fee	9.84	2.57	-12.60
Average Rate	0.018	0.004	-29.10
Average Rate Cap	0.018	0.019	15.95
Unique CC Customers	196.83	307.56	11.95
Unique CC Customers with DA	49.29	102.64	17.60
New Deposit Accounts	0.829	1	0.70
Distance to Spring Bank	0.66	0.746	6.46
N	41	25	

Note: CC refers to check cashing, DA to deposit account.

A useful byproduct of the price cut is that it allows us to identify the elasticity of demand for check cashing. Without the price cut, it would not be possible to do so because all check cashers charge the same fees, the state cap. Given the price variation induced by Spring Bank's cut, however, we can — for the first time in the literature — estimate a demand curve for check cashing, as shown in Figure 2. This demand curve implies a price elasticity of -2.0 at that state cap, but does not control for important factors such as distance and deposit-account status. As such, we consider a more detailed analysis of demand in the following section.

Individual-level summary statistics for Spring Bank customers appear in Table 3. For the 3,302 unique customers in our data, the average number of transactions is 9.4 and ranges from

Figure 2: Demand curve estimated from Spring Bank's monthly transaction volume.



1 to 257 (nearly 4 per month at the maximum). Spring Bank's customers have cashed checks with an average aggregate face value of $5,049, while their average check is $717 with a fee of $9.64. The typical customer resides within 0.8 miles of Spring Bank and has had an account there for 39 months.

Table 3: Customer-level summary statistics for check-cashing customers.

Variable	Mean	Std. Dev.	Min.	Max.
Transactions	9.36	19.70	1	257
Total Face Value	5048.92	10703.06	100	199217.66
Average Face Value	717.11	916.69	100	8911.050
Average Fee	9.64	15.11	1	139.3
Distance to Spring Bank	0.820	0.812	0.034	2.996
Distance to Competitor	0.678	0.691	0.002	2.803
Has Deposit Account	0.255	0.436	0	1
Account Length	38.57	18.90	1	66
N		3302		

Approximately 26% of check-cashing customers also have a deposit account at Spring Bank. In keeping with previous studies of the unbanked, those who have a deposit account in our data differ in notable ways from those who do not. As shown in Table 4, deposit-account holders have made 4 more transactions overall (≈50%) with a total face value that is also more than one and a half times as large, though the difference in average face values is not statistically significant.

Perhaps not surprisingly, those with deposit accounts live 0.2 miles closer to Spring Bank — the more frequent interaction associated with a deposit account presumably makes travel costs a more prominent concern for this group.

Table 4: Conditional summary statistics based on having a deposit account at Spring Bank.

Variable	No Deposit Account	Has Deposit Account	t-stat
Transactions	8.23	12.67	4.97
Total Face Value	4341.03	7117.12	5.24
Average Face Value	705.92	749.61	1.22
Average Fee	9.80	9.18	-1.08
Distance to Spring Bank	0.874	0.663	-7.01
Account Length	39.01	37.30	-2.18
N	2460	842	

4 The Impact of Price and Travel Costs on Check Cashing

We use the fee cut introduced by Spring Bank to identify how check-cashing demand is influenced by prices and the distance customers would have to travel to an outlet. We will then use our estimates from this section to evaluate New York State policies regulating check cashers' prices and locations in Section 6.

4.1 Demand Model

We consider an aggregate demand model to estimate the responsiveness of check-cashing demand to price and distance.[7] In our application, we take as the dependent variable the number of checks, Y_{jt}, cashed in a given demand cell, where the j component comprises checks of a given face value ($50 increments from $100 to $8920, N = 177) for a given distance from Spring Bank (0.5 mile increments from 0 to 3 miles, N = 6) for a given account status (those with and without a deposit account, N = 2). The t component then comprises the month of the transaction (from October 2008 to March 2014, N = 66) on a given day of the week (Monday-Saturday, N = 6). In total, we have N = 177 x 6 x 2 x 66 x 6 = 841,104 demand cells, or markets, from which we observe checks being cashed.

[7] Although a micro-level demand model would have some advantages, we lack data on customers' transactions occurring outside Spring Bank. This means that we would have to infer a counterfactual check sequence to estimate, for instance, a logit demand model, a key limitation. In Section 5 when we evaluate the choice between cashing and depositing checks, we estimate a micro-level logit model because we observe the full complement of transactions.

Based on this construction, the main estimating equation is

$$Y_{jt} = \alpha Fee_{jt} + \beta Distance_j + \gamma X_{jt} + \varepsilon_{jt}, \tag{1}$$

where Fee_{jt} is the fee a customer pays for cashing check of a given face value (defined as the midpoint of the increment for the demand cell) that depends on the prevailing Spring Bank price and his account status. Here, we consider the dollar amount of the fee rather than the rate based on Loewenstein & Thaler (1989)'s finding that individuals focus on the absolute amount of money they must pay to speed up payment, rather than the percentage rate. For $Distance_j$, we use the distance between the customer's residence and Spring Bank (also defined as the midpoint of the increment for the demand cell). For X_{jt}, we use a series of controls that include, depending on the specification, a customer's deposit-account status, the check's face value, the fee that customer would pay at the state cap (i.e., his outside option), the month of the year, and the day of the week. These control for different tendencies between the unbanked and underbanked, as well as other factors that might influence demand beyond fees and distance. Finally, ε_{jt} is the error term. Summary statistics for the estimation are in Table 5, including conditional means for cells that do and do not have transactions.

Table 5: Summary statistics of data used for estimating the check-cashing model.

	Full Sample				Trans = 0	Trans > 0
Variable	Mean	Std. Dev.	Min.	Max.	Mean	Mean
Transactions	0.037	0.362	0	35	0	1.872
Fee	66.169	42.192	1	156.188	67.334	8.02
Distance	1.5	0.854	0.25	2.75	1.512	0.924
Fee at State Cap	84.446	47.775	2.188	176.715	85.879	12.894
Face Value	4525	2554.736	125	8925	4601.88	685.946
Has Deposit Account	0.5	0.5	0	1	0.503	0.34
N		841104			824591	16513

In estimation, we assume (1) follows a Poisson distribution, where the left-hand side is the number of checks cashed at Spring Bank for that demand cell. Under this specification, α reflects how much fees affect a customer's decision to cash a check holding distance and other controls constant. Similarly, β reflects how much the distance a customer has to travel to Spring Bank affects his decision to cash a check holding price and other controls constant. We define a customer's relevant market as the area immediately surrounding his home. Previous studies have found that the proximity of a bank to one's home is the primary criteria customers use

when choosing a provider, which is more than two and a half times more important than the proximity to one's work (Devlin & Gerrard 2005).

One mild assumption we make is that all competitors always charge fees at the state cap, so the alternative to cashing a check at Spring Bank is doing so at a fee corresponding to the cap. As discussed in Section 3, we assessed this assumption by calling each of the five closest competitors to Spring Bank before and after the price cut. Evidence from these calls and from historical survey data from Fox & Woodall (2006) discussed in Section 2 suggest our assumption is valid.

In regards to identification, Spring Bank's price cut provides extensive and exogenous price variation across our panel and across face-value amounts, with prices changing by different amounts at different face values. Intuitively, we relate the change in demand to the change in price by exploiting all that price variation and summarizing it as an elasticity.

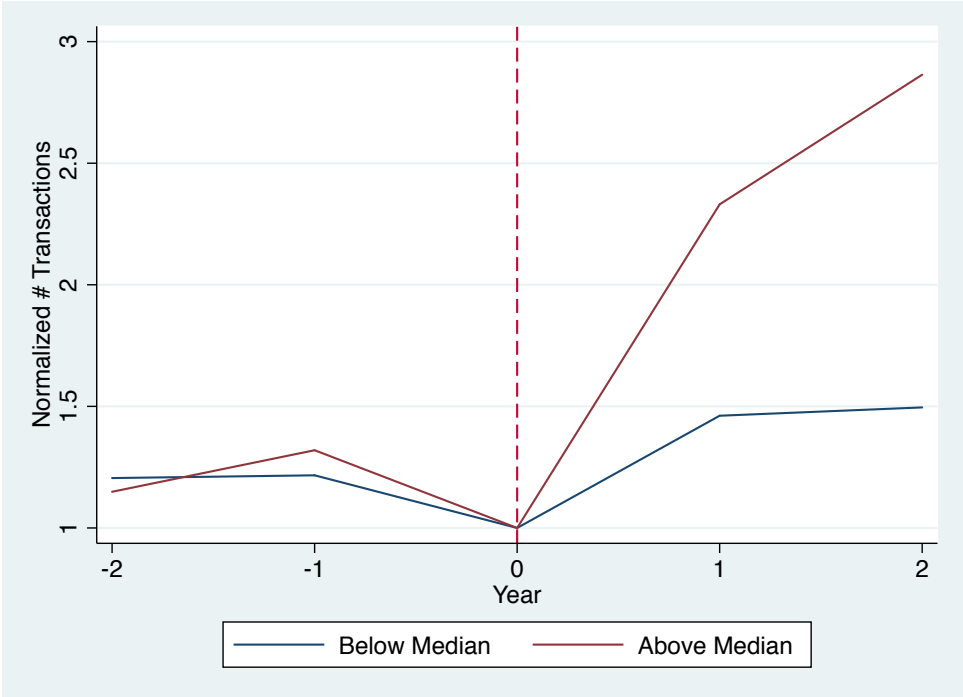
We identify the relative importance of distance, again summarized in a different elasticity, based on how demand changes as a function of a customer's distance from Spring Bank conditional on the price change. That is, we identify travel costs based on the differences in how far customers travel conditional on how much they could save on fees. This is identified because customers' locations remain fixed in relation to Spring Bank, but the number of transactions from customers coming from farther away increases following the price cut. Incorporating a distance measure helps calibrate the price coefficient in the absence of a traditional "outside good" because the outside good in this case is the opportunity cost of any additional time spent traveling. As this distance elasticity allows us to evaluate the impact of territory regulations on consumer welfare — a primary motivation of our work — we do not consider a specification with customer-level fixed effects. Including individual fixed effects would eliminate the ability to identify an elasticity with respect to distance because people do not move much.

The key identifying assumption is that mean of unobserved influences on demand, ε_{jt}, is independent of price and distance levels conditional on other observed variables. Therefore, we implicitly assume that the arrival of checks to consumers is exogenous and not influenced by check-cashing fees; for instance, that customers do not respond to price changes for check-cashing by asking their employers to pay them via direct deposit or cash. We also assume that customers without a deposit account at Spring Bank also do not have one elsewhere — if they did, this would alter their outside options. Although we cannot be certain, we and the bank believe that few of their customers have a deposit account at another institution because (i) very

few banks operate in the vicinity and (ii) Spring Bank offers competitive terms for its accounts, so a typical customer who uses Spring Bank's check-cashing service and also wants a deposit account likely would use Spring Bank's. As we show below, customers with deposit accounts are more price sensitive, likely because depositing a check is the primary alternative to cashing a check for this group. In light of this, we will consider their check-cashing decisions separately in Section 5.

Taken together, these features of the data — the panel, the price changes, and the customers' locations — provide a compelling identification strategy for estimating customers' sensitivity to check-cashing prices. For example, the fee for cashing a $1,000 check varies abruptly and exogenously from $17.50 to $1 during our sample period, while unobservable transaction determinants — neighborhood population, local economic conditions, and substitute products — remain stable. And because Spring Bank did not devise the price change to target demand from specific check sizes or customer locations, the variation in fees cleanly identifies the elasticity of demand on both margins.

Figure 3: Trends in Spring Bank's annual check-cashing volume normalized to the year immediately prior to the March 2012 price cut for the set of check face values that experienced above-median and below-median percent price cuts at that time



To this point, we offer a simple falsification exercise based on a difference-in-differences logic.

For each $50 increment of face value, we calculate the percentage change in price that occurs after the price cut and categorize bins based on whether the change is above or below the median. In Figure 3, we show the trends in check-cashing transaction volume for these two sets of bins normalized to their levels in the year immediately prior to the cut. As expected, after the price cut, demand rises more for facevalues that experienced above-median price cuts. Further, these differences do not reflect differences in pre-existing trends. In the years leading up to the price cut, demand trends are very similar.

4.2 Results

Results from a series of Poisson regressions appear in Table 6. In all specifications, we include fixed effects for the day of the week and month of the transaction. We also include the check's face value to control for the incidence of transactions, where large checks are comparatively less common. In addition, we control for the fee corresponding to the prevailing state cap, which captures the price of the most likely alternative to cashing a check at Spring Bank. We cluster all standard errors by grouping demand cells based on their respective pricing regimes.[8] Doing so helps account for within-period correlation in standard errors across demand cells that might otherwise lead us to overstate the statistical significance of our coefficients.

In Specification (1), we find the check-cashing fees have a large impact on demand. The implied elasticity of demand with respect to price at the mean values is -4.193. Distance also has a large effect, though it is relatively less elastic at -1.872. The respective elasticities for price and distance imply that customers are more than twice as sensitive to check cashing fees as travel costs, and that an extra mile of travel is worth about $19.68 to the average customer.

We next add a control for having a deposit account in Specification (2) and find that those with deposit accounts are less likely to cash checks, presumably because they have the option of depositing them at no additional charge. Here, the price elasticity increases to -4.487 and the implied cost of travel falls to $18.41 per mile. Because it includes the full series of controls, we consider this our benchmark specification and will use it as the basis of our counterfactual welfare analysis in Section 6.

[8] Recall that prices varied through out our sample period, with the state reindexing each February. Our six periods are: period 1 from October 2008 – February 2009 when the state cap was 1.75%; period 2 from March 2009 – February 2010 when the state cap was 1.82%; period 3 from March 2010 – February 2011 when the state cap was 1.83%; period 4 from March 2011 – February 2012 when the state cap was 1.86%; period 5 from March 2012 – February 2013 when the state cap was 1.91%; and period 6 from March 2013 – March 2014 when the state cap was 1.95%.

In Specification (3), we restrict our sample to those who do not have a deposit account at Spring Bank. These unbanked customers have an elasticity of demand with respect to price of -4.280 and to distance of -1.772. By contrast, those with deposit accounts at Spring Bank, the underbanked, have an elasticity of demand with respect to price of -4.922 and to distance of -2.134 in Specification (4). That those with deposit accounts are slightly more sensitive to price (though the difference is not statistically significant at conventional levels) perhaps reflects that the unbanked have fewer alternatives for converting checks to cash compared to deposit account holders who can instead deposit their checks when check-cashing prices are too high. The difference in the distance coefficient is statistically significant ($p<0.01$), perhaps because those with deposit accounts travel to Spring Bank more often, making them more sensitive to the amount of time spent traveling there.

For Specifications (5) and (6), we construct a crude measure of a customer's annual income by summing the face value of all checks for those making between 6 and 24 transactions in a calendar year, which we use as a proxy for having a regular paycheck. While this is a flawed measure, it is the best we have available that allows us to uncover some novel findings. Those with incomes estimated below $20,000 (approximately the federal poverty level for a family of three) are less price sensitive than those above that figure, with an elasticity of -3.642 in Specification (5) compared to -10.471 in Specification (6). Perhaps reflecting that those with lower incomes have a more pressing need for immediate access to cash, they are comparatively less price sensitive; those with higher incomes presumably seek out alternatives to check cashing (e.g., deposits) when prices are too high, as we discuss further in the following section.

In Specification (7), rather than using data from the whole time period as in prior specifications, we restrict the sample to the year immediately before and the year immediately after the price cut. This restriction holds fixed any unobserved macroeconomic conditions that might influence our results over a longer time horizon (e.g., incomes have increased, the number of paper checks has declined, etc.). The effects in the shorter panel are largely the same as in Specification (5), with an estimated price elasticity of -5.167 and travel elasticity of -1.920, suggesting that time trends potentially confounded with the price change do not bias our results. The fact that we exploit a wide range of price changes at different face values makes our analysis less vulnerable to this threat in any case.

Our estimates of price elasticity also remain broadly robust to a sample restricted to checks with face values around the discontinuity in the fee schedule, as shown in Specification (8)

Table 6: Model results for cashing check at Spring Bank.

DV: # Checks Cashed	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Fee	-0.0634***	-0.0678***	-0.0647***	-0.0744***	-0.0550***	-0.1582***	-0.0833*	-0.0441***	-0.0687***	-0.0596***
	(0.0137)	(0.0148)	(0.0165)	(0.0137)	(0.0085)	(0.0117)	(0.0381)	(0.0158)	(0.0142)	(0.0131)
	-4.193	*-4.487*	*-4.280*	*-4.922*	*-3.642*	*-10.471*	*-5.167*	*-0.577*	*-4.547*	*-3.942*
Distance	-1.248***	-1.248***	-1.182***	-1.423***	-1.286***	-1.015***	-1.280***	-0.585***	-1.810***	-2.788***
	(0.0572)	(0.0572)	(0.0682)	(0.0579)	(0.0642)	(0.1330)	(0.101)	(0.0683)	(0.114)	(0.134)
	-1.872	*-1.872*	*-1.772*	*-2.134*	*-1.929*	*-1.522*	*-1.920*	*-0.878*	*-1.810*	*-1.394*
Fee at State Cap	0.126	0.0952	0.0567	0.177	-0.037	0.969	-0.359	-0.105	0.0774	0.115
	(0.172)	(0.170)	(0.153)	(0.238)	(0.130)	(0.793)	(1.276)	(0.223)	(0.166)	(0.154)
Face Value	-0.00382	-0.00319	-0.00255	-0.00453	-0.00096	-0.01851	0.00549	-0.00133	-0.00287	-0.00373
	(0.00359)	(0.00356)	(0.00323)	(0.00494)	(0.00269)	(0.01583)	(0.0252)	(0.00545)	(0.00348)	(0.00324)
Has Deposit Account		-0.882***			-0.930***	-0.589**	-0.790***	-0.671***	-0.854***	-0.818***
		(0.0800)			(0.0920)	(0.2273)	(0.0710)	(0.199)	(0.0823)	(0.0859)
Constant	0.768***	1.108***	1.008***	0.452**	1.097***	1.705***	1.167***	1.263	1.424***	1.872***
	(0.155)	(0.139)	(0.143)	(0.216)	(0.139)	(0.136)	(0.613)	(1.902)	(0.135)	(0.142)
Observations	841104	841104	420552	420552	841104	841104	305856	9504	560736	280368
Pseudo R^2	0.548	0.566	0.581	0.515	0.562	0.426	0.566	0.103	0.587	0.603

(Robust standard errors clustered by price period)

Elasticity calculated at mean values

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Poisson regressions in which the dependent variable is the number of checks cashed at Spring Bank. All specifications include day and month fixed effects. Specifications (1) – (2) includes the entire sample of transactions as described in Section 3. Specification (3) uses a sample restricted to customers who do not have a deposit account at Spring Bank. Specification (4) uses a sample restricted to customers with a deposit account at Spring Bank. Specification (5) uses a sample restricted to customers who make between 6-24 transactions in a calendar year with an aggregate face value less than $20,000. Specification (6) uses a sample restricted to customers who make between 6-24 transactions in a calendar year with an aggregate face value greater than $20,000. Specification (7) uses a sample restricted to the year immediately before and the year immediately after the price cut. Specification (8) uses a sample restricted to checks with face values between $950-1050. Specification (9) uses a sample restricted to customers residing within 2 miles of Spring Bank. Specification (10) uses a sample restricted to customers residing within 1 mile of Spring Bank.

which uses only checks with face values within $50 on either side of $1000. Here, our identification strategy depends on any unobserved characteristics being inconsequential for those making transactions just above and just below the $1000 threshold; rather, it is the large price discrepancy around the threshold that drives check-cashing choices, as the fee is $1 on the left-hand side of the threshold after the price cut compared to ≈$10 on the right-hand side, though $950 checks should be nearly identical to $1050 checks in terms of any unobserved characteristics. In this robustness check, the elasticities are much lower than in Specification (2) but still have the expected sign. Furthermore, for the coefficient on fee, we cannot reject that it is equal to its counterpart in Specification (2), with $p > 0.10$. It is important to note, however, that fewer than 10% of checks cashed at Spring Bank have face values greater than $1000, making this sample less representative of a typical check-cashing transaction.

Specifications (9) and (10) consider the same estimation as Specification (2) but restricted to customers residing within 2 miles and 1 mile of Spring Bank, respectively. In both cases, the estimated price elasticities are nearly identical to those from the full sample that included customers residing up to 3 miles away from Spring Bank. That both of the price elasticities from the narrower territories fall within the 95% confidence interval of the full sample provides reassurance that selection bias related to customers' locations does not undermine our results.

5 Substituting Between Cashing and Depositing Checks

As opposed to a checking account that bundles together payment and savings features, check cashers' offerings separate these two functions: at a check casher, a customer can immediately convert his checks to cash which he can then use to purchase money orders for making payments. An important choice for deposit-account holders at Spring Bank, then, is whether to cash their checks for a fee and receive funds straightaway, or whether to avoid fees by depositing their checks and then waiting until they clear through the banking system before making payments.

Spring Bank offers several types of checking accounts, with many designed specifically for underbanked customers. Spring Bank's "Basic Checking" account, for instance, requires an initial deposit of just $20 and has a monthly maintenance fee of $3 (equivalent to cashing one $150 check each month at the state cap), which is waived for balances above $500.

Spring Bank follows federal banking regulations for making funds available after deposit: same day availability for direct deposits, wire transfers, cash, and checks drawn on Spring

Bank; next business day availability for cashier's, certified, teller's, or government checks, and the first $200 of other checks; second business day availability for the remaining balance of other checks up to $5000; and fourth business day availability for the amount over $5000.[9]

Summary statistics for those with deposit accounts appear in Table 7. The data include 46,669 transactions from 2,494 unique customers. Among these checks, the vast majority, 81.97%, were deposited, with the remainder cashed for a fee.[10] The average implicit fee is $10.22, which includes the hypothetical fee that would have been charged on deposited checks had they been cashed instead; for checks that were actually cashed, the average fee is only $5.04. The average check in this sample has a face value of $840.19, which is well above the average of approximately $550 from a typical check-cashing transaction in the previous section and is consistent with previous findings that deposit-account holders have higher incomes than the unbanked. Checks on average would take 2.6 days to clear completely, with most — 51.9% — needing two days. Much of the variation in check-hold times comes from deposits made on Fridays that require a four-day hold for checks greater than $200, which make up approximately 25.7% of transactions. A small portion, 3.5%, would take five days to clear because they were deposited the day before a three-day holiday weekend (e.g., on the Friday before Memorial Day). Because unobserved factors associated with weekends and holidays may cause an atypical shift in the demand for cash (e.g., Christmas shopping), we consider three specifications below to test if our results are robust to such confounds.

Table 7: Summary statistics of transactions from customers with deposit accounts at Spring Bank.

Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**
Cash Check	0.18	0.384	0	1
Check Cashing Fee	10.218	14.593	1	87.5
Face Value	840.190	959.582	100.01	5000
Distance	0.736	0.851	0.012	2.996
Days Until Check Clears	2.571	1.099	1	5
Days Until Check Clears – 1	0.119	0.323	0	1
Days Until Check Clears – 2	0.519	0.5	0	1
Days Until Check Clears – 3	0.07	0.256	0	1
Days Until Check Clears – 4	0.257	0.437	0	1
Days Until Check Clears – 5	0.035	0.184	0	1
Post Check Cashing Price Cut	0.513	0.5	0	1
N		46669		

[9] We only consider checks under $5000.

[10] Our data exclude ATM and direct deposits, as we focus on transactions conducted at the window.

Panel A of Table 8 shows that, following Spring Bank's price cut on check-cashing services, the raw likelihood of cashing a check instead of depositing it increased from 13.62% to 22.22% overall. Notably, this propensity varies over the potential hold time a customer faces. In the pre-cut period, the share cashed ranged from 7.11% for checks facing a potential one-day hold to 20.69% for those facing a potential five-day hold. These shares went to 12.63% and 34.60% post cut. In other words, nearly one-third of checks that would take five days to clear in the post-cut period are cashed rather than deposited.

Table 8: Percentage of checks cashed rather than deposited by number of days until check clears.

	Days Until Full Check Clears					
	1	2	3	4	5	Total
A. By Period						
Pre Price-Cut	7.11	10.70	18.49	20.61	20.69	13.62
Post Price-Cut	12.63	17.90	24.85	32.48	34.60	22.22
B. By Income						
Low Income	8.90	19.25	19.97	30.92	33.82	21.15
High Income	4.84	4.41	3.12	5.04	5.13	4.56
C. By Check Size on Non-Holiday Monday–Wednesday						
\$150-200	7.07					
\$200-250		16.31				

As shown in Panel B, an account holder's income also relates to his decision to cash or deposit a check. Low-income account holders (once again defined as those with between 6 and 24 checks in a year and incomes less than \$20,000) opt for check cashing more than 20% of the time, which compares to less than 5% of the time for those making more than \$20,000. This propensity also depends on check-hold times, as the rate for those with high incomes increases by less than half a percentage point for longer holds, whereas it increases by nearly twenty-four percentage points for those with low incomes.

Finally, in Panel C we consider a preliminary robustness check regarding potential holiday and weekend confounds. We restrict the sample in Panel C to checks between \$150 and \$250 for non-holiday transactions occurring Monday through Wednesday. Given the federal banking regulations, the first \$200 of these checks will be made available the next business day, while the remainder above \$200 will be made available in two business days. For such a narrow range of face values, all unobservable features of these transactions should be equivalent except that

checks above $200 require an extra day to clear fully. This provides a plausibly exogenous increase in check-clearing time not confounded by holiday or weekend effects. Note that customers with checks between $200 and $250 are more than twice as likely to cash their checks than those with checks between $150 and $200, suggesting that the extra day of waiting required before withdrawing the full amount has a considerable influence.

Similar to our demand model for check cashing in Section 4, we consider the demand for cashing a check relative to depositing it among deposit-account holders. A key distinction, however, is that we can now formulate a micro-level demand model because we observe the full complement of banking transactions for these customers, whereas in the previous section we observed only a subset, requiring us to aggregate transactions to demand cells. In this section, we consider the following utility of cashing a check as

$$U_{ict} = \alpha Fee_{ict} + \lambda Days_{ct} + \beta Distance_{it} + \gamma X_{ict} + \varepsilon_{ict}, \tag{2}$$

where the key new variable is the number of days it would take the check to clear if deposited and transactions are index by customer, i, for check, c, at time, t. Here, a longer potential check-hold time should prompt more customers to favor cashing a check over depositing it, making our expected estimate of λ positive.[11] Identification of α comes from differences in these choices as the price of check-cashing changes.

Table 9 shows the results from a series of logit regressions in which the dependent variable is one if the customer cashes a check and zero if he deposits it. Across all specifications, we control for the day of the week, the month, and a check's face value. We cluster the standard errors by customer.

Our estimates imply that higher check-cashing fees make customers less likely to cash their checks and longer potential check-hold times make them more likely. In Specification (1), an extra day of holding time increases the likelihood of cashing a check by 65.5%. Fees affect this decision in the expected way, though the elasticity of demand is only -0.5. As a benchmark, the estimated parameters suggest that adding an extra day of potential hold time — from one day to two — is equivalent to a fee increase of $11.17. On an average check of $840.19, that

[11] Some customers have balances that exceed the face value of their checks and would not incur check-cashing fees if they withdrew available funds equal to the amount of the check immediately. They do not actually face a choice between depositing and cashing a check unless they want more funds than currently available. In that case, we will understate the elasticity of substitution because that customer's choice is deposit by default, making our estimate conservative.

represents a daily discount rate of 1.3% — or an effective annualized discount rate of 11,054%.[12]

Specification (2) shows that, all else equal, the likelihood of cashing a check increased 78.2% in the post-cut period, whereas the impact of an extra day of holding time is largely the same as in Specification (1), at 73.2%. In Specification (3), we restrict our sample to only those customers who made at least one transaction before Spring Bank's price cut. They are less sensitive to check-clearing times, with an extra day associated with a 41.2% probability of cashing a check for this group. Given the standard errors, however, we cannot reject that this coefficient is the same as the one from the full sample in Specification (1), with $p>0.10$, suggesting that selection into the sample following the price cut is not biasing our results

In Specification (4), we find that those with low incomes are 232.9% more likely to cash a check than those with incomes above $20,000. Further, Specification (5) includes an interaction term between having a low income and the number of days until a check clears, showing that the check-hold times have a stronger, statistically significant effect on the poor.

We also consider three specifications to test whether our results are confounded by unobserved factors associated with weekends and holidays that may cause an atypical shift in the demand for cash (e.g., holiday shopping). First, we restrict our sample to checks between $150 and $250 for non-holiday transactions occurring on Monday, Tuesday, or Wednesday. As discussed for Panel C in Table 8, all unobservable features of these transactions should be equivalent except that checks above $200 require an extra day to clear fully. This provides a plausibly exogenous increase in check clearing time not confounded by holiday or weekend effects and the likelihood of cashing a check more than doubles when the check-clearing time increases by a day, as shown in Specification (6).

As a second robustness check, we consider a specification that considers only transactions that occur Monday through Thursday. Doing so removes any "weekend effect" from the set of possible confounding factors, with identification coming solely from variation generated by holidays that occur during the week. As shown in Specification (7), an extra day of holding time given this sample restriction increases the demand for check cashing by 91.1%.

Finally, we consider a sample restricted to transactions made on the last business day before holidays that occur on different days of the week depending on the year: Independence Day, Christmas Day, New Year's Day, and Veteran's Day. In this restriction, the potential confounding factors related to holiday effects on demand remain fixed, but because these holidays occur

[12]Calculation based on annualized discount rate of $(1.013)^{365} - 1$.

Table 9: Model results for choice to cash or deposit check among deposit account holders.

DV: 1(Cash Check)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Check Cashing Fee	-0.0526***	0.0168	-0.0516***	-0.0564***	-0.0564***	-0.275***	-0.0474***	-0.0384
	(0.0124)	(0.0173)	(0.0138)	(0.0129)	(0.0129)	(0.0917)	(0.0142)	(0.0373)
Days Until Check Clears	0.587***	0.644***	0.476***	0.629***	0.345**	1.485***	0.761***	1.800***
	(0.0750)	(0.0727)	(0.101)	(0.0791)	(0.161)	(0.219)	(0.0926)	(0.365)
Distance	-0.173	-0.179	-0.105	-0.0369	-0.0382	0.0475	-0.116	-0.352**
	(0.158)	(0.158)	(0.151)	(0.0978)	(0.0978)	(0.356)	(0.181)	(0.176)
Post Cut		0.758***						
		(0.162)						
Low Income				1.426***	0.654			
				(0.366)	(0.478)			
Low Income X Days					0.288**			
					(0.144)			
Constant	-2.659***	-3.088***	-1.788***	-4.174***	-3.416***	-1.780***	-3.074***	-5.585***
	(0.186)	(0.193)	(0.240)	(0.400)	(0.499)	(0.603)	(0.218)	(1.004)
Observations	46669	46669	14905	16662	16662	3940	30315	549
Pseudo R^2	0.090	0.097	0.043	0.068	0.068	0.063	0.076	0.152

(Robust standard errors clustered by customer)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Logit regressions in which the dependent variable is equal to 0 if the customer deposits a check and 1 if he cashes it. All specifications include day and month fixed effects and a control for the check's face value. The variable *Post Cut* is equal to 0 if the transaction occurred before Spring Bank's price cut, and 1 after. The variable *Low Income* is equal to 0 if a deposit-account holder makes between 6-24 transactions in a calendar year with an aggregate face value exceeding $20,000, and 1 if he makes between 6-24 transactions in a calendar year with an aggregate face value less than $20,000. Specifications (1) & (2) include the entire sample of transactions among deposit-account holders. Specification (3) uses a sample restricted to customers who made a transaction in the pre-cut period. Specifications (4) & (5) use a sample restricted to those customers making between between 6-24 transactions in a calendar year. Specification (6) uses a sample restricted to checks between $150 and $250 for transactions made on a non-holiday Monday, Tuesday, or Wednesday. Specification (7) uses a sample restricted to weekdays. Specification (8) uses a sample restricted to holidays that occur on different days of the week.

on different days of the week each year, the number of days needed to clear a check varies. In Specification (8), we find that an extra day of check-clearing time during one of these floating holidays leads to a nearly fivefold increase in the demand for check cashing.

From a policy standpoint, because Spring Bank's customers exhibit a strong preference for immediate access to cash and because our Table 9 estimates suggest that higher check-cashing prices increase demand for deposit accounts, New York's regulations that limit check-cashing fees may actually be forestalling a wider adoption of mainstream bank accounts. This conflicts with policies aimed at promoting such accounts, which we discuss in the following section. Absent a mechanism to address this population's urgent desire for liquidity, any such policy seems unlikely to gain meaningful traction.

6 Evaluating the Impact of Check-Cashing Regulations

Our analysis in Sections 4 and 5 allows us to consider two separate policy changes. First, New York, along with other states, regulates check cashers' fees and protected territories. In this section, we use the estimated parameters from our demand model to evaluate how further restricting fees while simultaneously expanding exclusive territories would affect consumer welfare. We take the current regulatory framework — a mix of rate ceilings and entry restrictions — as given and consider perturbations of the status-quo policy that may be Pareto-improving based on our analysis. We do not consider a wholesale repeal of either regulation, as we do not have the relevant variation in policies to do so credibly. Instead, our counterfactual analysis provides a benchmark for how welfare would change as a result of a policy adjustment given that the dual regulations of New York check cashers remain in force.

In our second counterfactual, we consider the impact of expediting check-clearing times. Federal regulations specify check-clearing times based on the day a check is deposited, and consumer advocates have called for reducing maximum hold times (Fox & Woodall 2006). As shown above, consumers strongly prefer a shorter wait for accessing their funds, and we estimate the extent to which mandating a maximum one-day hold would drive substitution away from check cashing and towards deposits.

6.1 Rate and Territory Regulations

The estimates in Section 4 show that, given a choice, customers would favor lower check-cashing fees over traveling shorter distances to cash a check. Based on this, we measure the impact of a policy change that decreases New York's rate cap while simultaneously expanding check cashers' protected territories. In short, customers in our counterfactual scenario trade off more travel time for lower fees, which they prefer on balance.

At the same time, check cashers may also prefer a larger protected territory because it pushes them towards a more efficient scale. Because we have not modeled check cashers' entry decisions, however, we do not consider a full counterfactual welfare analysis. Firms will of course re-optimize in light of any new regulations, and we cannot say whether they will do so in a way that improves social welfare by closing redundant locations and spreading their remaining fixed costs over a larger customer base. Note also that the following calculations may only apply to New York City — which nevertheless represents the bulk of check-cashing outlets — because the location restrictions do not bind in less-densely populated areas. In those areas, any further reduction in fees could drive stores out of business, leaving our welfare calculations ambiguous if customers lose access to financial services as a result of the policy change.

At the heart of our welfare calculation is the revealed profit assumption that all operating check cashers at least break even so that

$$\Pi_j = \text{Revenue}_j - \text{Costs}_j > 0. \tag{3}$$

Further, assume a check casher's revenue depends on the state rate cap and its market share, which is directly tied to the exclusive territory dictated by regulation, such that (3) becomes

$$\Pi_j = \alpha(\pi r^2)(p - c) - FC, \tag{4}$$

where α represents the "per-square-mile" volume in a market, πr^2 is the size of the potential market governed by an exclusive territory of radius r (which is 0.3 miles in NY), p represents the rate cap (which is currently 2.01% in New York), c is the marginal cost per transaction (assume this to be 0.3% of face value), and FC are the fixed costs of operating a check casher.

The intuition behind our analysis is that expanding the exclusive territory by increasing r — as depicted in Figure 4 — will lead to more transactions for any given check casher because

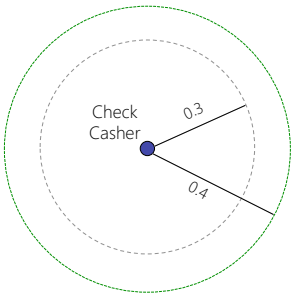


Figure 4: Example of how a regulatory change would affect a check casher's protected territory.

it has a larger captive market from which to draw customers. To the extent that the marginal cost per transaction stays constant along with fixed costs, a check casher should be indifferent between generating π_j with more volume but lower fees or at a level with less volume but higher fees. In this case, expanding r will allow regulators to reduce p, benefiting consumers without making check cashers worse off under the assumption that redundant check chasers will be the ones to close (note that most companies in New York operate multiple outlets, often in close proximity to one another). For any change in r, equation (4) dictates the associated equal-profit price ceiling.

Because our estimates imply that consumers value reductions in fees more than reductions in travel costs, they would be better off in a scenario in which regulators reduced the fee cap (p) even if they increased check cashers' exclusive territories (r) enough to keep profits constant. Table 10 presents these welfare calculations for the average customer with two different check sizes, \$500 and \$1000. The top panel shows the benefits consumers will receive (in dollar terms) from expanding the territory by a given amount while reducing the fee cap so that the equal-profit condition still holds.

With an expanded territory, some outlets will likely close and customers may have to travel farther as a result. In recognition of this, the table provides a range of travel scenarios. In the base case where the cap remains fixed at 2.01% and a customer travels 0.8 miles to cash a check, the total cost (fee plus travel cost, which in Specification (2) in Section 4 we estimate to be \$18.41 per mile) is \$24.69 for the average customer with a check of \$500. For that same customer who has to travel an additional half mile to cash a check, the cost increases to \$33.89. Customers with a larger check of \$1000 have comparatively higher costs: \$34.74 at the base case of no extra travel and \$43.94 for an extra half mile.

The second row presents a scenario in which regulators increase the exclusive territory one-

Table 10: Counterfactual consumer welfare analysis.

	Equal-profit	Additional Travel by Average Consumer											
Δ r	rate	0.0	0.1	0.2	0.3	0.4	0.5	0.0	0.1	0.2	0.3	0.4	0.5
		A. Total Cost Per Transaction for $500 Check ($)						*B. Total Cost Per Transaction for $1000 Check ($)*					
0.0	2.01%	24.69	26.53	28.37	30.21	32.05	33.89	34.74	36.58	38.42	40.26	42.10	43.94
0.1	1.26%	20.95	22.79	24.63	26.47	28.31	30.15	27.25	29.10	30.94	32.78	34.62	36.46
0.2	0.92%	19.21	21.05	22.90	24.74	26.58	28.42	23.79	25.63	27.47	29.31	31.16	33.00
0.3	0.73%	18.27	20.11	21.96	23.80	25.64	27.48	21.91	23.75	25.59	27.43	29.27	31.12
0.4	0.61%	17.71	19.55	21.39	23.23	25.07	26.91	20.78	22.62	24.46	26.30	28.14	29.98
0.5	0.54%	17.34	19.18	21.02	22.86	24.70	26.54	20.04	21.88	23.72	25.56	27.40	29.25
0.6	0.49%	17.09	18.93	20.77	22.61	24.45	26.29	19.54	21.38	23.22	25.06	26.90	28.74
		C. Change in Consumer Welfare for $500 Check						*D. Change in Consumer Welfare for $1000 Check*					
0.0	2.01%	0.00%	-7.46%	-14.92%	-22.37%	-29.83%	-37.29%	0.00%	-5.30%	-10.60%	-15.90%	-21.20%	-26.50%
0.1	1.26%	15.15%	7.70%	0.24%	-7.22%	-14.68%	-22.14%	21.54%	16.24%	10.94%	5.64%	0.34%	-4.96%
0.2	0.92%	22.17%	14.71%	7.25%	-0.21%	-7.66%	-15.12%	31.51%	26.21%	20.91%	15.61%	10.31%	5.01%
0.3	0.73%	25.98%	18.52%	11.06%	3.60%	-3.85%	-11.31%	36.92%	31.62%	26.32%	21.02%	15.72%	10.42%
0.4	0.61%	28.27%	20.82%	13.36%	5.90%	-1.56%	-9.01%	40.19%	34.89%	29.59%	24.29%	18.99%	13.69%
0.5	0.54%	29.76%	22.31%	14.85%	7.39%	-0.07%	-7.52%	42.31%	37.01%	31.71%	26.41%	21.11%	15.81%
0.6	0.49%	30.79%	23.33%	15.87%	8.41%	0.96%	-6.50%	43.76%	38.46%	33.16%	27.86%	22.56%	17.26%

tenth of a mile to 0.4 miles. With this larger protected territory, check cashers will break even at a lower rate cap of 1.26%, assuming their costs do not change. Fixing a base case here in which the customer does not travel farther following the regulatory change, the all-in cost to cash a check drops to $20.95 for a $500 check and to $27.25 for $1000. Presumably, though, larger protected territories will require some customers to travel farther, increasing their travel costs. For a customer that has to travel 0.1 additional miles, for instance, his total transaction costs will climb to $22.79 and $29.10 for checks of $500 and $1000, respectively.

Doubling the protected territory from 0.3 to 0.6 miles but dropping the fee ceiling to 0.73% would lead to additional gains in consumer welfare. For a $500 check, welfare would improve by 26.0% if no extra travel were required and by 3.6% if customers had to incur additional travel equal to the full increase in the protected territory. The gains would be 36.9% to 21.0% for this range of travel for $1000 checks. For larger territories and lower fee caps, the gains in consumer welfare increase even further.

For extremely large protected territories, many outlets would have to close, and for even modest increases, say 0.2 miles, the number of closures could potentially be large: approximately two-thirds of stores would exit if the proportional allocation of stores to the available territories remains fixed at its current ratio. This is the most extreme case, however, as densely populated areas will likely see comparatively few exits as stores instead choose to relocate to satisfy the new restrictions. To the extent that the market is currently over-saturated with redundant stores, this could even enhance welfare in and of itself. We do not consider entry and exit here, however, leaving this analysis for a subsequent paper.

Many of the assumptions in this counterfactual exercise necessarily affect our calculations. Namely, α likely will not stay fixed in a counterfactual scenario where check-cashing prices fall. For instance, α may increase as more customers substitute away from making bank deposits due to lower check-cashing fees, which would increase check cashers' profits. Conversely, α may fall if some marginal customers on the edge of a territory substitute away from check cashing as a result of the longer travel times, though our territories remain small and we have estimated a strong willingness to trade off more travel for greater fee savings in Section 4.

Assumptions about costs in our counterfactual analysis are harder to evaluate. A larger protected territory may require check cashers to operate larger facilities, though given the general slack we have observed throughout the industry, this does not seem binding. More likely, the remaining check cashers will benefit from spreading their fixed costs over a larger volume

of transactions. Changes in variable costs, on the other hand, may be more consequential, especially at peak times when the increased volume of checks associated with larger territories could require stores to hire additional staff. Based on Spring Bank's experience, any impact on operations will likely be modest, as the bank did not need to hire any additional staff despite a twofold increase in volume following their price cut.

6.2 Promoting Deposit Accounts Over Check Cashing

As we show in Section 5, lower check-cashing fees prompt more customers to cash their checks rather than deposit them, with this decision directly tied to how long their checks take to clear through the banking system. Because many states cap check-cashing rates, they actually may be reducing the use of mainstream deposit accounts because check cashing is seen as a better overall value compared to waiting several days to access funds. To encourage a greater take-up of mainstream accounts, our analysis suggests that an effective policy would be to make deposited funds available more quickly. From a practical standpoint, such a policy seems feasible in light of innovations that automate most check processing and make 3-day holding periods over a weekend superfluous. Banks clearly profit from the float, but long check-hold times harm consumers, especially the poorest and most credit-constrained, which has spurred proposals to improve the banking system by accelerating check-clearing times (cf., Federal Reserve System's January 2015 report "Strategies for Improving the U.S. Payment System").

Given this motivation, we consider a counterfactual scenario in which all deposits at Spring Bank are cleared within one day, rather than making depositors wait up to five days to access their funds. Based on our results from Table 9, a universal one-day hold would result in a decrease in check cashing from 18.0% of transactions to 8.1% among deposit-account holders, a 55.0% reduction. To provide a sense of scale, we can extrapolate the findings from Spring Bank to the national level, where a 9.9 percentage point decline in check cashing among deposit-account holders would amount to a savings of $52.6 million in check-cashing fees for this population each year based on the estimates from Schneider & Longjohn (2014).[13] In addition, given the estimated willingness to pay of $11.17 per day to accelerate check clearing among the underbanked in Specification (1) of Table 9, a maximum hold of one day would generate $312

[13] In the Spring Bank data, 29.5% of check-cashing transactions are from deposit account holders. Assuming 29.5% of $1.8 billion nationwide check-cashing fees according to Schneider & Longjohn (2014) are attributable to this group, saving 9.9% of that each year is worth $52.6 million.

in extra consumer surplus per underbanked household each year, or $10.6 billion in aggregate.[14]

Another policy lever to promote deposit accounts would be to make check cashing less attractive by increasing the rate cap. Although this would reduce consumer welfare based on our calculations in Section 4, it would nevertheless move more customers towards mainstream accounts; policy makers can then decide how to tradeoff these competing objectives. Increasing the rate cap to 3.0%, for instance, would reduce the number of checks cashed instead of deposited to 12.2%, a 32.3% decline. Using both levers simultaneously would have an even larger effect, bringing the number of checks cashed by deposit-account holders down to 5.4%, a 70.1% reduction.

7 Conclusion

Many Americans face a choice between using mainstream bank accounts or alternative financial services. In this paper, we have specifically examined those on the margin between these two types of providers. We have two main findings, each with implications for regulators and others interested in low-income households' financial decisions.

First, check-cashing customers are much more sensitive to service fees than travel costs: the demand for check-cashing services is nearly two and a half times more elastic with respect to price than it is to distance. As both check cashers' prices and locations are regulated, our finding provides concrete evidence on a way to improve consumer welfare by reducing prices while increasing check cashers' protected territories. Changing both together could keep extant check-cashing providers from being harmed and allow them to operate fewer locations at larger, more efficient scales.

Second, households in our dataset exhibit a strong preference for receiving cash immediately rather than waiting to access their funds. Based on our analysis of customers who choose between depositing and cashing checks, we estimate that deposit-account holders are on average willing to pay the equivalent of 1.3% per day to avoid waiting for their checks to clear — which compounds to a staggering 11,000% effective APR. Low-income customers have an even higher willingness to pay to receive their cash immediately, which could stem from time preferences in

[14] Assumption based on the latest twelve-month period for Spring Bank deposit-account holders who cash at least one check (i.e., are underbanked). Burhouse et al. (2014) estimate that there are 34 million underbanked households nationwide and Spring Bank's underbanked customers average 6.9 checks with two-day holds, 1.4 with three-day holds, 5.3 with four-day holds, and 0.6 with five-day holds in the latest twelve-month period.

the form of either a high discount rate or present-bias (Laibson 1997). Alternatively, low-income account holders are likely credit-constrained and may urgently need access to their funds to avoid incurring late fees or penalties. These customers would greatly value shorter hold times, and accelerating the paym to low-income consumers. Recently proposed reforms and technological innovations may facilitate this transition.

Whether policymakers should protect users of AFS by mandating lower check-cashing fees or by nudging them towards deposit accounts through shorter hold times remains an open question. As it stands, current initiatives appear to work at cross-purposes: low check-cashing rate caps and long check-hold times prompt many consumers to favor AFS, while other efforts seek to move AFS users into the mainstream banking system. These potentially conflicting goals notwithstanding, our results provide novel evidence on the likely impacts of such reforms and can serve as a guide for financial regulators who have previously relied exclusively on surveys as a basis for their policies.

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