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

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July 2015

Abstract

We exploit a nonlinear reduction in a bank's check-cashing fees to identify the elasticity of demand for check cashing across two key margins. First, we find that a 1% change in price affects demand more than six times as much as a 1% change in travel costs. Second, we find that an extra day of check-clearing time makes an account holder 14.3% more likely to cash a check than to deposit it, implying that consumers are willing to pay an effective annual interest rate of 1127% to expedite access to their funds. Using these elasticities, we evaluate the welfare implications of two counterfactual policies: (i) reducing New York's rate cap while simultaneously expanding check cashers' protected territories and (ii) mandating faster check-clearing times.

Keywords: Alternative Financial Services, Check Cashing, Financial Regulation
JEL: D14, G12

*We thank Josh Garcia and Demetris Giannoulias of Spring Bank for their help acquiring the data, Brian McManus for his helpful feedback, and seminar participants at Collegio Carlo Alberto, the Consumer Financial Protection Bureau, EIEF, Kellogg School of Management, and the Minneapolis Fed for their productive comments. Sojourner is a director of Spring Bank.

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1 Introduction

Nearly 10 million households in the United States do not have a checking account (Burhouse et al. 2014). Instead, they use alternative financial service (AFS) providers, such as check cashers, payday lenders, and pawn shops, for their everyday financial transactions, as do another 25 million households that have bank accounts but still use AFS each year. Of the 40% of Americans who receive paper checks that must be converted to cash, those who lack access to a checking account primarily look to 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 study the decision to use a check-cashing outlet instead of a mainstream checking account, providing novel evidence on how service fees, travel costs, and check-clearing times affect the underbanked population.

To do so, we use a five-and-a-half year panel of transaction data from Spring Bank, a bank in the South Bronx, N.Y., that is particularly well suited for our purposes. First, the bank offers a distinctive product mix that includes both mainstream and alternative financial services, whereas most banks offer only mainstream products. Second, in the midst of our panel, the bank introduced a large, nonlinear change to its check-cashing fees, which allows us to cleanly identify consumers' responsiveness to check-cashing prices. Third, focusing on those individuals with checking accounts, we use variation in check-clearing times to identify the elasticity of substitution between cashing and depositing a check.

Our data provide a unique vantage point for understanding consumers' choices between mainstream and alternative financial services. Most notably, they allow us to model the choice between depositing or cashing a check in a way that is not confounded by the choice between using a mainstream bank or a check-cashing outlet, which differ in ways beyond just fees and the time it takes to access funds. Because Spring Bank offers both services, these other characteristics remain constant for any given transaction, and we can focus squarely on the influence of check-cashing fees and check-hold times in driving consumers' choices. From our analysis, we find that it is an urgent desire for cash that prompts many to pay high fees to receive immediate access to their funds while holding fixed many alternative explanations for the popularity of AFS, such as more convenient locations and hours, a more courteous staff, a distrust of banks, a lack of awareness about fees, or anticompetitive practices among providers (Schneider & Longjohn 2014, Burhouse et al. 2014).

Our results provide 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 a 1% change in check-cashing fees impacts demand more than six times as much as a 1% change in distance, which underscores a stark distinction between the importance of monetary fees and travel costs for users of AFS.[1] Furthermore, we show that the most frequent users of check cashing are even more sensitive to fees, as are those with lower incomes. Taken together, these findings highlight a tension between current policies that act to limit check-cashing fees and more recent initiatives that seek to promote a greater use of deposit accounts among the underbanked population.

As a second contribution, we show that the typical deposit-account holder at Spring Bank is willing to pay a relatively large amount to accelerate access to his funds. Namely, customers become much more likely to cash their checks for a fee when the wait for them to clear through the banking system grows longer: those facing a three-day hold over a weekend are 28% more likely to cash a check than someone facing a one-day hold during the week. Our estimates imply that the average customer is willing to pay the equivalent of an 1127% effective APR for check cashing, and this willingness to pay is even higher among low-income consumers. We provide the first estimates in the literature derived from individual choice data — rather than surveys — that show how accelerating the availability of funds would impact consumers, which relates to the Federal Reserve's initiatives to accelerate the federal accounts clearing house payment system. (Estep 2014, Federal Reserve System 2015).

A key reason to study the choice to use AFS providers instead of the traditional banking system is that the costs of using AFS tend to be very high relative to mainstream products. For instance, payday loans often have implicit annual percentage rates (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 — in some cases more than *ten times higher* than in payday lending. For example, 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]

[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.

[2] Check cashing is usually thought of as a transaction product rather than a credit product, though payday loans

The high fees associated with AFS have sparked controversy and calls for reform. Many consumer advocates, researchers, and policymakers view them as predatory, arguing that AFS providers abuse their market power by exploiting 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 et al. 2006, Berry 2005, Burhouse et al. 2014). And because the poor spend a disproportionate amount of their limited incomes on basic financial transactions, high AFS fees may have a particularly large impact on the welfare of this population (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."

In keeping with such aims, several recent efforts have focused on regulating AFS and encouraging the use of mainstream products. Since 2006, the Federal Deposit Insurance Corporation (FDIC) has had a major policy and research program led by its Advisory Committee on Economic Inclusion to move consumers away from AFS and towards mainstream accounts. The Federal Reserve Board has also taken a strong interest in protecting consumers through its research departments and community affairs programs. In 2010, 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 majority of states also regulate check cashing in some manner (Fox & Woodall 2006), while many cities and states have programs designed to encourage the use of mainstream accounts, such as BankOn Chicago and BankOn New York.

Previous studies of AFS have focused primarily on payday lending. Much of the existing research in this area has examined how information and behavioral biases influence the uptake of high-cost, small-dollar loans, such as Bertrand & Morse (2011) who use a field experiment

and check cashing share many important features. Each accounts for about $50 billion of AFS's $320 billion total volume (Bradley et al. 2009). 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.

at a payday lender to show that giving customers more information about fees makes them think less narrowly (over time) about finance costs and results in less borrowing. Others have studied how access to payday lenders correlates with measures of financial distress: Melzer (2011) shows that access to payday loans leads to difficulty in meeting financial obligations like mortgage 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; and Zinman (2010) shows that restricting access to payday loans worsened the overall financial condition of Oregon households. Furthermore, in contrast to claims that high interest rates trap borrowers in endless debt cycles, Fusaro & Cirillo (2011) use randomly assigned payday loans to show that repayment and renewal rates are not affected by the interest rate a borrower is charged.

Other work has examined the impact of AFS regulations. Campbell et al. (2011) provide a comprehensive review of this topic and lay out a case for stronger protections. Relatedly, Lusardi & Scheresberg (2013) find that individuals with less financial literacy, "lacking basic numeracy and knowledge of basic financial concepts," are more likely to use high-cost, AFS-types of credit, while an analysis of transaction data from payday lenders provides evidence consistent with partially-naive quasi-hyperbolic discounting (Skiba & Tobacman 2008). Despite 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 in their quest to enact effective reforms. 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 with checking accounts nevertheless choose to pay such high fees to cash their checks when they could deposit them 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 strongly 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 low fees in a large territory, so long as their profits remain constant. With this as motivation, 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 40-56% without making extant check cashers worse off.

In addition, because deposit-account holders become less likely to cash their checks when they face a shorter wait to access the funds following a deposit, we argue that the choice to pay relatively high AFS fees is driven in 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 11.4% for deposit-account holders, while increasing the state rate cap to 3% in conjunction with shorter check-hold times would reduce it by 33.0%.

2 Background on Check Cashing

Surveys of low-income communities have found 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 bank account rely on check cashers for their everyday financial transactions. For instance, many individuals are excluded from the mainstream banking system as a result of misconduct in the past or actively avoid it because they lack the proper documentation to open an account, though they still need ways to cash checks or pay utility bills. 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 at length in Caskey (1994, 2002), the typical check-cashing outlet is a free-standing storefront business, though retailers such as Wal-Mart occasionally offer many of the same services. In addition to cashing checks, check-cashing outlets commonly sell a variety of other financial products, including utility payments, pre-paid debit cards, public-transit fare cards, postage stamps, money orders, and wire transfers; in many states, check cashers also offer payday loans. These other products notwithstanding, check cashers derive the majority of their revenue from check-cashing fees (Caskey 1994).

AFS fees tend to be high compared to those for equivalent transactions in a mainstream account, in part because the cost of providing AFS is large relative to the size of the transaction.

For instance, most check cashers remain open for 10-12 hours per day, which results in long idle periods for attendants. In addition, 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 providers to assess a customer's riskiness. As a result of these safeguards, modern check-cashing outlets suffer few losses from bad checks. For instance, Bradley et al. (2009) analyze data from Dollar Financial, the nation's largest publicly-traded check-cashing company, and report that net write-offs of bad checks were just 0.31% of face value compared to average fees of 3.11% in 2008. They conclude that, "given the generally low-risk nature of most checks cashed, losses tend to be low."

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, check-cashing fees increased 58% in real terms, 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, partially 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 increases its check-cashing rate ceiling, which since 1993 has risen from 1.1% of face value (or $1 for small checks) to the current rate of 2.01%.[3] Check

[3]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

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.

New York also restricts 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 regulation, check cashers have essentially 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 chosen to do so.[4] For instance, most banks refuse to cash government checks for those without deposit accounts because they would incur costs in handling the checks, do not want to crowd their lobbies with government aid recipients seeking only to cash entitlement checks, 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 deposit the check and make the cash available only days later, after the check clears according to FDIC regulations.

Furthermore, check cashers 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 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 census tracts with median incomes less than half of the MSA median has been largely unchanged in recent years, while 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 with headquarters in the Bronx to open since 1982, it

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.

[4] 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.

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. 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 conventional check casher, customers without a deposit account at Spring Bank can cash their checks 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, very few other banks in New York provide this service.

3 Data and Preliminary Analysis of Check Cashing

Our main data come from the transactions at Spring Bank that took place between October 2008 and March 2014 from customers with checks between $100 and $10,000 and primary addresses within 3 miles of the bank. To protect customers' privacy, Spring Bank removed all identifying information from the data and provided us with an anonymized index number that links each customer to her transactions and to a close approximation of her home address. For each check-cashing transaction, we have data on the customer's index number, the date, the check's face value, and the fee paid. In addition, we measure the walking distance from each customer's home to Spring Bank, as well as to the five competing check cashers nearest to Spring Bank.

Aggregate monthly summary statistics from the data appear in Table 1. Since inception, Spring Bank has cashed an average of 468 checks each month with a total face value of $253,000. In a typical month, 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, nearly 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%, with most operators (in fact, all that we are aware of) always charging 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 $1 and checks above $1000 for 1% of face value. This new menu stayed in place until January 2014 when Spring Bank began charging non-account holders a uniform 1% for all checks, while account holders continued to pay $1 if they maintained a minimum balance of $100.

Spring Bank's fee cut had a significant impact on demand, 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, experienced 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 after the price cut, 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.

A useful byproduct of the price cut is that it allows us to estimate the elasticity of demand for check cashing. Prior to Spring Bank's price cut, there had not been enough price variation to do so because the vast majority of check cashers all charged fees at the state cap. Given the variation induced by Spring Bank's price cut, however, we can — for the first time in the literature — estimate a demand curve for check cashing, as shown in Figure 2. We will explore this further 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, which ranges from 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 is 0.7 miles away from another check casher. The average customer has had a relationship with Spring Bank for 39 months.

Approximately 26% of check-cashing customers also have a deposit account at Spring Bank. In keeping with previous studies of the unbanked, we find that those who have a deposit account at Spring Bank differ from those who do not in notable ways. As shown in Table 4, deposit-account holders have made 4 more transactions overall ($\approx$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, as the more frequent interaction with Spring Bank that comes with having a deposit account presumably makes travel costs a more prominent concern for this group.

4 The Impact of Price and Travel Costs on Check Cashing

Demand for check cashing depends primarily on its price and the distance customers have to travel to an outlet. In this section, we use the fee cut introduced by Spring Bank to identify how demand is influenced by both of these dimensions. Because New York regulates check cashers' prices and locations, we will then use our estimates from this section to evaluate the state's policies in Section 6.

4.1 Demand Model

Let U_{icjt} be the utility for customer i cashing check c at store j at time t such that

$$U_{icjt} = \gamma_j + \alpha Fee_{icjt} + \beta Distance_{ijt} + \varepsilon_{icjt}, \tag{1}$$

where γ_j is a check-casher specific intercept; Fee_{icjt} is the fee customer i pays for cashing check c at outlet j at time t; $Distance_{ijt}$ is the distance between the customer's residence and outlet j at time t; and ε_{icjt} is the error term observed by the consumer but not the researcher. 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.

In estimation, we assume a logit form for (1), where the left-hand side is 1 if the customer uses Spring Bank and 0 otherwise. Under this specification, α has the natural interpretation that a customer receiving a larger relative savings at Spring Bank compared to a competitor charging the state cap would be more likely to use Spring Bank, and similarly for β that being closer to Spring Bank compared to another check-cashing outlet increases a customer's likelihood of using Spring Bank. Because we do not observe which competing outlet a customer uses, we assume that the distance is based on the closest of the five outlets other than Spring Bank for that customer

Assumptions Our most crucial assumption relates to the unique nature of check cashing whereby a customer is not making a purchase per se, but instead, out of necessity, is converting a check to a useful medium of exchange. In a sense, this makes the demand for cashing a check perfectly inelastic because a check in and of itself is worthless if not converted to cash. For that reason, the typical outside option of "no purchase" does not fit our context well because an increase in customers following a price cut comes exclusively from stealing market share from nearby operators or cannibalizing deposits from a checking account, not expanding the market. As such, we construct a simulated check sequence for customers who only enter the sample after the price cut by using their check history in the post-cut period to infer what it would have been in the pre-cut period had they come to Spring Bank, assuming that they received the same stream of checks in both periods. For customers who appear before the price cut, we assume that we observe their full check history because they were predisposed to using Spring Bank even when the bank charged fees near the cap.

Our use of a hypothetical check stream is similar in spirit to the typical assumption in IO that the outside good is "no purchase" even if a full record of transactions is not actually observed. In our case, cashing a check at Spring Bank is the inside good, while cashing a counterfactual check at the nearest competing check casher is the outside good. In essence, our justification for this assumption is that the customers we do not observe until after Spring Bank's price cut were most likely cashing their checks at at another outlet and that the checks they cashed during this time most likely mirror the checks we observe subsequently.

As an alternative to a discrete choice demand model, we could use a demand model that takes the aggregate number of cashed checks as its dependent variable, as in Figure 2. Such a model has an advantage in the sense that we would not have to explicitly incorporate simulated checks into our demand system, but comes with several (arguably more problematic) tradeoffs and also implicitly assumes a similar type of outside good. In the appendix, we consider demand aggregated by month and show that this approach (i) does not allow for a meaningful estimation of travel costs and (ii) does not lend itself naturally to estimating price effects given that each transaction's price varies based on the check's face value. For these reasons, we favor estimating the microlevel demand model discussed above.

Another main assumption of our model is that all competitors 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. All evidence from our personal phone calls before and after the price cut, along with historical

survey data from Fox & Woodall (2006), suggests this is a valid assumption. If in practice this is not the case, we would be understating the true price elasticity because customers are actually responding to an even smaller fee difference than we had assumed, making ours a conservative estimate.

We also implicitly assume that the arrival of checks is exogenous and not influenced by check-cashing fees. This implies that customers do not respond to price changes at check-cashing outlets by requesting to receive payment in direct deposit or cash.

In addition, we assume that a customer chooses a check casher from the set of those immediately surrounding his home. Previous studies have found that the proximity of a bank to one's home is the primary criteria for customers 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). For that reason, we feel that Spring Bank and the five nearest check cashers represent a reasonable approximation of the relevant choice set for customers in this market.

Finally, we 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 these customers are unlikely to have a deposit account at another institution because (i) few full-service banks operate in the immediate vicinity and (ii) Spring Bank offers competitive terms for its accounts, which suggests that a typical customer who uses Spring Bank's check-cashing service and also wants a deposit account would use Spring Bank's. As we show below, customers with deposit accounts are much less price sensitive, implying that an aggregate analysis will understate the true elasticity of demand, likely because depositing a check is the primary substitute for this group. For that reason, we will consider their check-cashing decisions separately in Section 5.

Identification Spring Bank's price cut provides extensive price variation throughout our panel. In addition, the nonlinear price schedule provides clean variation in prices around the discontinuity. Taken together, these features of our data provide a compelling identification strategy for estimating customers' sensitivity to check-cashing prices, as we observe, for example, the fee for cashing a $1000 check vary from $1 to $17.50, while all unobservable characteristics of the transaction remain similar for a given face value.

We identify travel costs based on differences in how far customers travel conditional on the amount they could save on fees. That is, customers' and check cashers' locations remain fixed,

but we see customers traveling farther to come to Spring Bank following the price cut. Incorporating a distance measure helps calibrate the price coefficient in the absence of a traditional "outside good" because we can think of the outside good in this case as being the opportunity cost of any additional time spent traveling.

Data for Estimation Summary statistics for the estimation are in Table 5. Including the hypothetical checks for customers who entered our sample only after the price cut, the number of transactions is 50,379, with 61.4% of these occurring at Spring Bank (i.e., 38.6% are simulated based on the post-cut check stream of new customers). The average fee difference is $2.88, while customers are approximately 0.1 miles closer to a competitor than to Spring Bank. The average transaction has a face value of $523, and 20% of transactions are made by customers who also have deposit accounts at Spring Bank.

4.2 Results

Results from a series of logit regressions appear in Table 6, with all specifications including fixed effects for the day of the week and month of the transaction. In our benchmark Specification (1), the elasticity of demand with respect to price is 5.801, while for distance it is relatively less elastic at 0.898. This implies that customers are more than six times more sensitive to check cashing fees than travel costs. In dollar terms, these parameters suggest that an extra mile of travel is worth about $2.03 to the average customer. At a walking rate of three miles per hour, this corresponds to an hourly cost of $6.09, nearly 16% less than New York's average minimum wage of $7.25 per hour during this period. Not surprisingly, having a deposit account at Spring Bank is correlated with a greater likelihood of cashing a check at Spring Bank, perhaps reflecting a switching cost to using an alternative check casher or an innate preference for Spring Bank.

Specification (2) considers a sample restricted to those without a deposit account at Spring Bank.[5] In keeping with previous studies of the unbanked, they are much more sensitive to price, with an elasticity of demand of 7.399, and also to travel costs, with an elasticity of 1.092. This group values a mile of travel at $1.92, suggesting that they place a greater weight on paying lower fees than on traveling less.

In Specification (3), those with deposit accounts respond to prices and travel costs much

[5]Estimations using a sample restricted to those customers who *never* have a deposit account at Spring Bank yield nearly identical results, reducing concerns over selection bias related to the choice of opening a bank account.

differently: they have an estimated price elasticity of demand nearly one-third less than those without deposit accounts and an elasticity of travel lower by half. Consequently, they value a mile at $2.87. Given their revealed preference for having a relationship with Spring Bank in the form of a deposit account, the larger relative impact of travel costs is perhaps to be expected since they will be making more frequent trips there. Moreover, a key decision for these customers is whether to cash their checks or deposit them and endure a wait to access funds, a decision which we analyze separately in the next section.

In Specification (4), we show that frequent users (those making at least 6 transactions per calendar year) without a deposit account are much more responsive to price, with an elasticity of 9.772, seemingly because their greater reliance on check cashing makes them more sensitive to fees. They are also more sensitive to travel costs, with an elasticity of 1.460.

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. Those with incomes estimated below $20,000 (approximately the federal poverty level for a family of three) are more price sensitive than those above that figure, with an elasticity of 7.484 in Specification (5) compared to 2.641 in Specification (6). Perhaps reflecting that those with higher incomes have a greater opportunity cost of time, customers earning more than $20,000 a year value a mile of travel at $8.55 (though the standard error on distance is large) versus $2.39 for those earning less than $20,000.

In Specification (7), we restrict our sample to the year immediately before and the year immediately after the price cut. This restriction helps control for 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, with an estimated price elasticity of 7.826 and travel elasticity of 1.390, suggesting that any changing trends do not bias our results.

Our estimates of price elasticity also remain robust to a sample restricted to checks with face values around the discontinuity in the fee schedule, as shown in Specification (8) for a window of $50 at $1000 and Specification (9) for a window of $20. Here, our identification strategy depends on any unobserved characteristics being inconsequential for those making transactions just above and below the $1000 threshold; rather, it is the large discrepancy around the price that drives check-cashing choices. In both robustness checks, the price elasticities are in the

same range as in Specification (2), though the impact of distance is imprecisely estimated, likely owing to the much smaller sample size.

Because the preceding price elasticity estimates are so large, they suggest that the optimal fee for check cashing, all else equal, is below the state cap of 2.01%. Focusing on Specification (2) which considers those without a deposit account (and is perhaps the sample that best represents the type of check-cashing customer that policymakers aim to protect with AFS regulations), we can derive the optimal price for check cashing using the identity $P^* = MC\frac{|E_p|}{|E_p|-1}$. Under various assumptions about costs, the optimal price ranges from 1.56% for no marginal costs and up to 1.70% for a marginal cost that includes a $2 per check processing cost and a 0.3% bounced check rate. We estimate that the marginal cost would need to be a comparatively large $8.68 on a $523 check to justify charging the state cap of 2.01%. That the optimal fee lies well below the state cap while all surveyed check cashers charge at the cap is suggestive of collusion (implicit or otherwise), a topic beyond our current paper but which we consider in a separate paper.

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 and purchase money orders to make 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 to deposit them and wait until they clear through the banking system before accessing their cash at no additional charge.

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 for other checks. To be conservative in our estimates below, we will assume that all funds are made

available on the next business day and only consider checks with face values of $5000 or below.

Summary statistics for those with deposit accounts appear in Table 7. The data include 47,191 transactions from 2,484 unique customers. Among these checks, the vast majority, 82.2%, were deposited, while the remainder were cashed for a fee. The average implicit fee is $8.13, 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 $5.03. The average check in this sample has a face value of $861.74, which is well above the average of $523 from a typical check-cashing transaction in the previous section; this is consistent with previous findings that those with deposit account have higher incomes. Checks on average would take 1.8 days to clear, with most — 63.8% — needing only one day. Much of the variation in check-hold times comes from deposits made on Fridays that require a three-day hold, as approximately 30.8% of checks would take three days to clear if deposited. A small portion, 4.2%, would take four days to clear because they were deposited the day before a three-day holiday (e.g., on the Friday before Memorial Day).

Panel A of Table 8 shows that the likelihood of cashing a check instead of depositing it increased more than eight percentage points following the price cut, rising from 13.4% to 22.1% overall. Notably, this propensity varies over check-hold times, ranging in the pre-cut period from 9.8% for one day to 20.2% for four days, but then from 16.8% to 32.4% post cut. That is, nearly one-third of checks that would take 4 days to clear in the post-cut period are cashed rather than deposited.

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 (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 slightly under 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 barely two percentage points for longer holds, whereas it increases by over thirteen percentage points for those with low incomes.

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 as

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

where the key new variable is the number of days it will take the check to clear. Here, a longer check-hold time should prompt more customers to favor cashing a check over depositing it, making our expected estimate of λ positive. Note that some may use direct deposit and do not actually face a choice between depositing and cashing a check. In that case, we will understate the elasticity of substitution because that customer's choice is 0 by default, making our estimate conservative. Furthermore, some customers have balances that exceed the face value of their checks and would not incur check-cashing fees if they withdrew the full amount of the check immediately; ignoring such cases would again result in conservative estimates.

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. After controlling for the day of the week and the month, we find that higher check-cashing fees make customers more likely to deposit their checks, while longer check-hold times make customers more likely to cash them. In Specification (1), an extra day of holding time increases the likelihood of cashing a check by 14.3%. Fees affect this decision in the expected way, though they are small in magnitude: an additional $1 fee reduces demand for check cashing by only 2.1%. As a benchmark, the estimated parameters suggest that an extra day of waiting is equivalent to a fee increase of nearly $5.94. On an average check of $861.74, that represents a daily discount rate of 0.69% — or an effective APR of 1127.3%.[6] Specification (2) shows that the effects are broadly similar among a sample restricted to only those who have cashed at least one check (i.e., excludes deposit account holders who never cash checks).

Specification (3) shows that, controlling for fees, distance, check-hold times, and month and day fixed effects, the likelihood of cashing a check increased 45.4% in the post-cut period, while Specification (4) shows that those with low incomes are 2.9 times more likely to cash a check than those with incomes above $20,000. Further, Specification (5) that includes only low-income account holders stands in stark contrast to Specification (6) that includes only those with high incomes: the poor alone are influenced by check-cashing fees and check-hold times in a statistically significant way.

Because this group of customers exhibits a strong preference for immediate access to cash, 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 ease this population's

[6] Calculation based on $(1.0069)^{365} - 1$.

urgent needs for cash, 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 also expanding exclusive territories would affect consumer welfare. Second, federal regulations specify check-hold 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 shorter check-holding times, 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. As such, we measure the benefits of a policy change that decreases New York's rate cap while 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 of the state. 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 3 — will lead to more transactions for any given check casher. To the extent that the marginal cost per transaction stays constant along with fixed costs, a check casher should be indifferent between breaking even at a level with more volume but lower fees or less volume but higher fees. In this case, expanding r will allow regulators to reduce p 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).

Because 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 but increased check cashers' exclusive territories. Table 10 presents these welfare calculations for an average customer. The top panel shows the benefits consumers will receive (in dollars) from expanding the territory by a given amount while reducing the fee cap so that the break-even threshold in (4) continues to hold. With an expanded territory, however, 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 the model we estimate to be \$1.92 per mile) is \$12.04 for the average customer with a check of \$523. For a customer who has to travel an additional mile to cash a check, that cost increases to \$13.96.

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

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 $8.13. 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 cost will climb to $8.32. At a full mile, it increases to $10.05. Even within this full mile range, however, all transaction costs are below the benchmark of $12.04, meaning that consumers are unambiguously better off — by between 16.6% and 32.5%. 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 simply relocate to satisfy the new restrictions. To the extent that the market is 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 our 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 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. From our experience with Spring Bank that saw a

more than twofold increase in volume following its price cut, however, any impact on operations will likely be modest (i.e., no extra staff needed to be hired).

6.2 Promoting Deposit Accounts Over Check Cashing

As we show in Section 5, lower check-cashing fees lead more customers to cash their checks instead of depositing 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 may be delaying a transition to mainstream deposit accounts because check cashing is seen as a better overall value compared to waiting several days to access funds. To encourage greater take-up of mainstream accounts, an effective policy, given our analysis, 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, and accelerating check-clearing has been the focus of recent proposals to improve the banking system (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 four 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 17.8% of transactions to 15.8% among deposit-account holders, an 11.4% reduction. To provide a sense of scale, we can extrapolate the findings from Spring Bank to the national level, where a 2.0% decline in check cashing among deposit-account holders would amount to a savings of $10.6 million in check-cashing fees for this population each year based on estimates from Schneider & Longjohn (2014).[7] In addition, based on our estimated willingness to pay of $7.71 per day to accelerate check clearing among the underbanked in Specification (2) of Table 9, a maximum hold of one day would generate $3.2 billion in additional consumer surplus each year.[8]

[7] 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 2% of that each year is worth $10.6 million.

[8] 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 0.197 checks with two-day holds, 5.231 with three-day holds, and 0.554 with four-day holds in the latest twelve-month period.

Another policy lever to promote deposit accounts is 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 have the effect of moving more customers towards mainstream accounts. Increasing the rate cap to 3.0%, for instance, would reduce the number of checks cashed instead of deposited to just under 13.6%, a 23.6% decline. Using both levers simultaneously would have an even larger effect, bringing the number of checks cashed by deposit-account holders down to 12.0%, a 33.0% drop.

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, and our results offer new insights about the economics of AFS. We have two main findings, each with important implications for regulators.

First, check-cashing customers are much more sensitive to service fees than travel costs. Namely, demand for check-cashing services is nearly six 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 guidance about how 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. Absent pro-competitive reforms in check cashing, such a regulatory change represents the next best alternative for improving consumer welfare.

Second, consumers have a high willingness to pay 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 a 1127% effective APR to avoid waiting an extra day for their checks to clear. Low-income customers have an even higher willingness to pay to receive their cash immediately, which could stem from time preferences in the form of either a high discount rate or present-bias (Laibson 1997). Alternatively, many of these low-income account holders are likely credit-constrained and may urgently need access to their funds so as to avoid even larger late fees or penalties in other parts of their financial lives. These customers would highly value shorter hold times, and a reduction in hold times would make deposit accounts much more

attractive to low-income consumers. Recent efforts to accelerate the payment-clearing system 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 higher AFS fees and shorter hold times remains an open question subject to considerable debate. 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 despite the many efforts aimed at transitioning users of AFS to the mainstream banking system. These potentially conflicting goals notwithstanding, our results provide novel evidence on the likely impact of such reforms and can serve as a guide to financial regulators who have previously relied exclusively on surveys as a basis for setting their policies.

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Tables & Figures

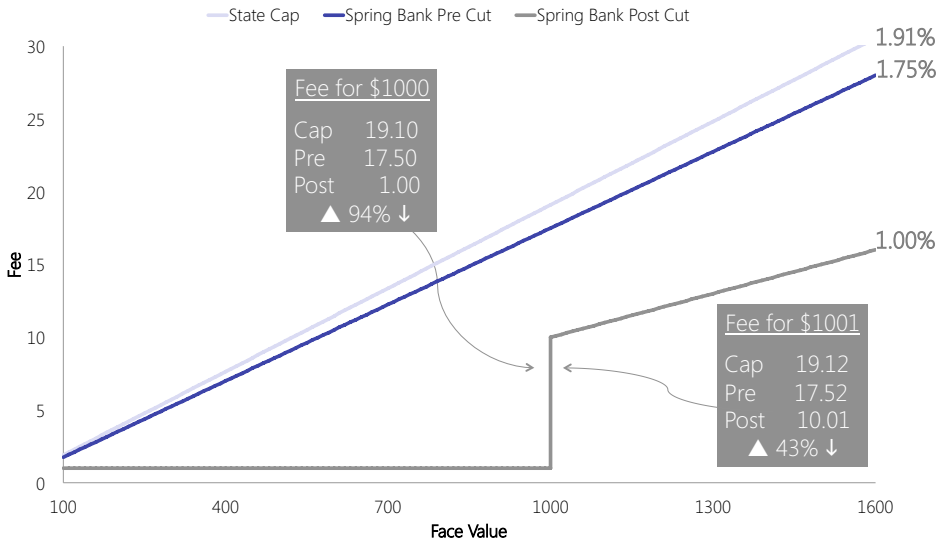

Figure 1: Spring Bank's price schedule before and after the price cut in March 2012.

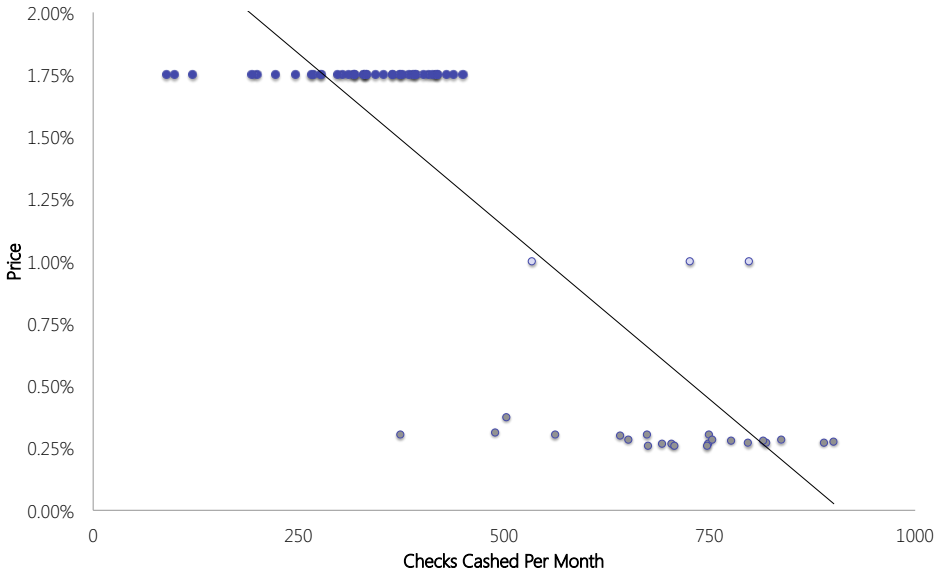

Figure 2: Demand curve estimated from Spring Bank's monthly transaction volume.

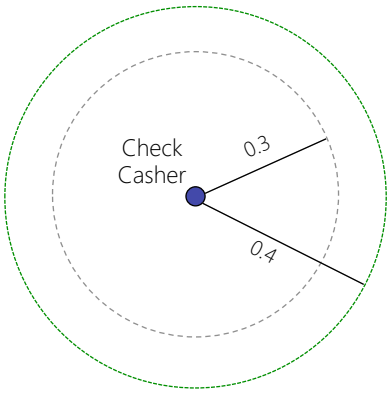

Figure 3: Example of how a regulatory change would affect a check casher's protected territory.

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

Variable	Mean	Std. Dev.	Min.	Max.
Transactions	468.318	212.419	89	901
Total Face Value	252599.148	120960.582	38420.571	594566.8
Average Face Value	548.865	157.073	412.208	1163.989
Total Fees	2671.21	1615.153	672.36	8500.639
Average Fee	7.086	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	238.773	68.116	75	351
Unique New CC Customers	41.682	23.195	11	150
Unique CC Customers with DA	69.5	28.912	20	123
Unique CC Customers with New DA	0.894	0.93	0	3
Distance to Spring Bank	0.692	0.065	0.567	0.829
Distance to Competitor	0.601	0.046	0.513	0.693
N		66		

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

Table 2: Monthly summary statistics for check-cashing transactions before and after March 2012 price cut.

Variable	Pre-Cut Mean	Post-Cut Mean	t-stat
Transactions	325.561	702.440	12.84
Total Face Value	186234.728	361436.797	8.70
Average Face Value	562.149	527.078	-0.97
Total Fees	3259.1078	1707.057	-4.85
Average Fee	9.838	2.573	-12.60
Average Rate	0.018	0.004	-29.10
Average Rate Cap	0.018	0.019	15.95
Unique CC Customers	196.829	307.56	11.95
Unique New CC Customers	47.707	31.8	-3.15
Unique CC Customers with DA	49.293	102.64	17.60
Unique CC Customers with New DA	0.829	1	0.70
Distance to Spring Bank	0.66	0.746	6.46
Distance to Competitor	0.58	0.636	5.63
N	41	25	

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

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

Variable	Mean	Std. Dev.	Min.	Max.
Transactions	9.361	19.698	1	257
Total Face Value	5048.923	10703.058	100	199217.656
Average Face Value	717.113	916.692	100	8911.050
Average Fee	9.640	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	38.574	18.902	1	66
N		3302		

Table 4: Conditional summary statistics for those with and without deposit accounts at Spring Bank.

Variable	No Deposit Account	Has Deposit Account	t-stat
Transactions	8.229	12.669	4.97
Total Face Value	4341.027	7117.123	5.24
Average Face Value	705.917	749.607	1.22
Average Fee	9.799	9.177	-1.08
Distance to Spring Bank	0.874	0.663	-7.01
Distance to Competitor	0.719	0.559	-6.33
Account Length	39.011	37.296	-2.18
N	2460	842	

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

Variable	Mean	Std. Dev.	Min.	Max.
Cash Check at Spring Bank	0.614	0.487	0	1
Fee at Spring Bank	6.863	10.01	1	155.943
Fee at State Cap	9.746	11.395	1.75	173.648
Fee Difference	-2.883	5.145	-172.648	0
Distance to Spring Bank	0.795	0.804	0.024	2.996
Distance to Competitor	0.667	0.678	0.002	2.803
Distance Difference	0.128	0.206	-0.588	2.183
Face Value	523.146	610.724	100	8911.050
Has Deposit Account	0.201	0.4	0	1
N		50379		

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

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Fee Difference	-1.105***	-1.110***	-1.070***	-1.381***	-1.205***	-1.364***	-1.137***	-0.858***	-1.369*
	(0.0568)	(0.0591)	(0.145)	(0.0913)	(0.0907)	(0.366)	(0.0708)	(0.319)	(0.743)
	-5.801	*-7.399*	*-2.529*	*-9.772*	*-7.484*	*-2.641*	*-7.826*	*-6.089*	*-8.886*
Distance Difference	-2.243***	-2.132***	-3.073***	-2.660***	-2.884***	-11.66	-2.621***	1.968	1.633
	(0.388)	(0.400)	(1.083)	(0.541)	(0.472)	(10.95)	(0.490)	(1.347)	(1.960)
	-0.898	*-1.092*	*-0.537*	*-1.460*	*-1.371*	*-1.691*	*-1.390*	*1.080*	*0.825*
Has Deposit Account	1.747***								
	(0.229)								
Constant	-0.425***	-0.434***	1.442***	-0.855***	-0.592***	-0.830	-0.828***	-1.778**	0.922
	(0.146)	(0.154)	(0.337)	(0.215)	(0.198)	(2.761)	(0.220)	(0.861)	(1.220)
Observations	50379	40270	10109	31233	16976	340	12742	309	137
Pseudo R^2	0.371	0.324	0.296	0.400	0.314	0.538	0.418	0.311	0.297

(Robust standard errors clustered by customer)

Elasticity calculated for 1% change at mean values

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

Notes: Logit regressions in which the dependent variable is equal to 0 if the customer cashes a check at a check casher other than Spring Bank and 1 if he cashes it at Spring Bank. All specifications include day and month fixed effects. Specification (1) includes the entire sample of transactions as described in Section 3. Specification (2) uses a sample restricted to customers who do not have a deposit account at Spring Bank. Specification (3) uses a sample restricted to customers with a deposit account at Spring Bank. Specification (4) uses a sample restricted to customers who do not have a deposit account at Spring Bank and who make at least six transactions in a calendar year. Specification (5) uses a sample restricted to customers who do not have a deposit account at Spring Bank and 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 do not have a deposit account at Spring Bank and 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 for customers who do not have a deposit account at Spring Bank. Specification (8) uses a sample restricted to checks with face values between $975-1025 from customers who do not have a deposit account at Spring Bank. Specification (9) uses a sample restricted to checks with face values between $990-1010 from customers who do not have a deposit account at Spring Bank. Price elasticities are calculated based on the state rate cap of 2.01%.

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

Variable	Mean	Std. Dev.	Min.	Max.
Cash Check	0.178	0.383	0	1
Check Cashing Fee	8.125	14.23	1	87.5
Face Value	861.737	986.11	100.01	5000
Distance Difference	0.111	0.201	-0.588	2.842
Days Until Check Clears	1.754	1.027	1	4
Days Until Check Clears – 1	0.638	0.481	0	1
Days Until Check Clears – 2	0.012	0.109	0	1
Days Until Check Clears – 3	0.308	0.462	0	1
Days Until Check Clears – 4	0.042	0.201	0	1
Post Check Cashing Price Cut	0.51	0.5	0	1
N		47191		

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

	Days Until Check Clears				
	1	2	3	4	Total
		A. By Period			
Overall	13.31	23.63	25.95	25.40	17.84
Pre Price-Cut	9.76	21.43	19.89	20.16	13.38
Post Price-Cut	16.81	25.07	31.32	32.36	22.13
		B. By Income			
Low Income	16.43	25.00	28.15	30.11	20.94
High Income	4.40	6.67	5.00	5.56	4.60

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

	(1) Cash Check	(2) Cash Check	(3) Cash Check	(4) Cash Check	(5) Cash Check	(6) Cash Check
Check Cashing Fee	-0.0266***	-0.0124**	-0.0139***	-0.0118**	-0.0143**	0.00191
	(0.00559)	(0.00511)	(0.00505)	(0.00549)	(0.00598)	(0.00942)
Days Until Check Clears	0.158***	0.0954*	0.181***	0.192***	0.194***	0.0891
	(0.0474)	(0.0507)	(0.0468)	(0.0707)	(0.0718)	(0.343)
Distance Difference	-1.077**	-0.495	-1.152**	-0.507	-0.517	-0.105
	(0.520)	(0.356)	(0.535)	(0.362)	(0.369)	(1.310)
Post Cut			0.476***			
			(0.136)			
Low Income				1.514***		
				(0.358)		
Constant	-2.032***	-0.912***	-2.392***	-3.364***	-1.847***	-3.379***
	(0.142)	(0.123)	(0.147)	(0.387)	(0.158)	(1.182)
Observations	47191	21951	47191	16733	15451	1282
Pseudo R^2	0.058	0.027	0.064	0.047	0.033	0.030

(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. 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) & (3) include the entire sample of transactions among deposit-account holders. Specification (2) uses a sample restricted to those customers who have cashed at least one check at Spring Bank. Specification (4) uses a sample restricted to those customers making between between 6-24 transactions in a calendar year. Specification (5) uses a sample restricted to low-income customers based on the definition above, while Specification (6) uses a sample restricted to high-income customers.

Table 10: Counterfactual consumer welfare analysis.

	Equivalent	Additional Travel by Average Consumer										
Δ r	Rate Cap	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
		A. Total Cost Per Transaction for Consumers ($)										
0.0	2.01%	12.04	12.23	12.42	12.62	12.81	13.00	13.19	13.38	13.58	13.77	13.96
0.1	1.26%	8.13	8.32	8.51	8.70	8.89	9.09	9.28	9.47	9.66	9.86	10.05
0.2	0.92%	6.32	6.51	6.70	6.89	7.08	7.28	7.47	7.66	7.85	8.04	8.24
0.3	0.73%	5.33	5.52	5.72	5.91	6.10	6.29	6.48	6.68	6.87	7.06	7.25
0.4	0.61%	4.74	4.93	5.12	5.31	5.51	5.70	5.89	6.08	6.28	6.47	6.66
0.5	0.54%	4.35	4.55	4.74	4.93	5.12	5.31	5.51	5.70	5.89	6.08	6.27
0.6	0.49%	4.09	4.28	4.47	4.67	4.86	5.05	5.24	5.43	5.63	5.82	6.01
0.7	0.45%	3.90	4.09	4.29	4.48	4.67	4.86	5.05	5.25	5.44	5.63	5.82
0.8	0.43%	3.76	3.95	4.15	4.34	4.53	4.72	4.91	5.11	5.30	5.49	5.68
0.9	0.41%	3.65	3.85	4.04	4.23	4.42	4.62	4.81	5.00	5.19	5.38	5.58
1.0	0.39%	3.57	3.76	3.96	4.15	4.34	4.53	4.72	4.92	5.11	5.30	5.49
		B. Change in Consumer Welfare										
0.0	2.01%	0.00%	-1.60%	-3.19%	-4.79%	-6.38%	-7.98%	-9.57%	-11.17%	-12.76%	-14.36%	-15.95%
0.1	1.26%	32.50%	30.90%	29.31%	27.71%	26.12%	24.52%	22.93%	21.33%	19.74%	18.14%	16.55%
0.2	0.92%	47.54%	45.95%	44.35%	42.76%	41.16%	39.57%	37.97%	36.37%	34.78%	33.18%	31.59%
0.3	0.73%	55.71%	54.12%	52.52%	50.93%	49.33%	47.74%	46.14%	44.55%	42.95%	41.35%	39.76%
0.4	0.61%	60.64%	59.04%	57.45%	55.85%	54.26%	52.66%	51.07%	49.47%	47.88%	46.28%	44.69%
0.5	0.54%	63.84%	62.24%	60.65%	59.05%	57.46%	55.86%	54.27%	52.67%	51.08%	49.48%	47.88%
0.6	0.49%	66.03%	64.44%	62.84%	61.24%	59.65%	58.05%	56.46%	54.86%	53.27%	51.67%	50.08%
0.7	0.45%	67.60%	66.00%	64.41%	62.81%	61.22%	59.62%	58.03%	56.43%	54.84%	53.24%	51.64%
0.8	0.43%	68.76%	67.16%	65.57%	63.97%	62.38%	60.78%	59.19%	57.59%	56.00%	54.40%	52.81%
0.9	0.41%	69.64%	68.05%	66.45%	64.86%	63.26%	61.66%	60.07%	58.47%	56.88%	55.28%	53.69%
1.0	0.39%	70.33%	68.73%	67.14%	65.54%	63.95%	62.35%	60.76%	59.16%	57.57%	55.97%	54.37%

Appendix

As discussed in Section 4, we consider a microlevel discrete choice model to be the most natural way to estimate check-cashing demand. Doing so, however, requires us to simulate checks for those customers whom we do not observe prior to Spring Bank's price cut. For these customers, we assume that they received the same stream of checks prior to entering the Spring Bank sample that we observe them receiving after entering the sample. This assumption is similar to having the outside good in a discrete choice model be "no purchase" even if a full record of transactions is not actually observed. In our case, cashing a check at Spring Bank is the inside good, while cashing a simulated check at the nearest competing check casher is the outside good.

As an alternative demand model, we could aggregate transactions over a specified period (e.g., a month), as in Table 1 and Figure 2. For instance, Table 11 below shows a series of OLS regressions in which the number of checks cashed each month is the dependent variable. Specification (1) uses the full sample of transactions and the prevailing check-cashing rate at Spring Bank as the measure of price. Recall that before the rate cut, this was 1.75% of face value, while after it was $1 for checks with face values under $1000 and 1% of face value for checks above $1000 (so the monthly rate is a weighted average between 0.1-1% post cut, depending on the checks cashed by customers). Here, the price elasticity of demand is estimated to be -2.02 at the rate cap of 2.01%. In Specification (3), we consider the same regression but with the average fee paid by customers that month as our measure of price — the elasticity falls to -0.91. Both of these price elasticities are considerably lower than the ones we estimated in Section 4 from a microlevel analysis, likely due to the considerable heterogeneity associated with check-cashing transactions that range between $100-10,000. Using the difference in fees between Spring Bank and the state cap in our microlevel estimation mitigates the issue of heterogeneous face values because the face values themselves are differenced out (including the check's face value as a control in these regressions yields nearly identical results but lacks a structural interpretation). Furthermore, adding a control for the distance the average customer travels to Spring Bank in Specifications (2) & (4) results in a nonsensical positive coefficient because the price cut drew in more customers to Spring Bank who travel from farther away.

In Specifications (5)-(8), we partially correct for the heterogeneity across transactions with different face values by restricting the sample to checks with face values between $450-550, a range that includes the sample mean. Within this tighter range, the unobservable characteristics of each transaction are likely to be more similar. In Specification (5) that uses the rate as the price measure, the elasticity is -4.14, while in Specification (7) that uses the fee, it is -4.28. As shown in Specifications (6) & (8), however, we still do not get reasonable estimates for the disutility of travel from these aggregate models, as both parameters are again positive.

Based on these results, we view the aggregate demand analysis in Table 11 as informative but not satisfactory for our purposes. Although we find it reassuring that, after correcting somewhat for unobserved heterogeneity in Specifications (5)-(8), we obtained price elasticity estimates broadly similar to our microlevel estimates in Section 4, in no specification could we suitably pin down an estimate of travel costs, a primary aim of our research. In short, we consider the small tradeoffs associated with a logit specification to be well justified given the major limitations of an aggregate demand estimation in this case.

Table 11: Aggregate demand analysis.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rate	-26393.9***	-22302.4***			-3769.2***	-2995.2***		
	(1991.1)	(2501.5)			(278.3)	(336.0)		
Mean Fee			-33.83***	-22.63***			-7.799***	-6.152***
			(4.291)	(4.735)			(0.586)	(0.701)
Mean Distance		669.3**		1297.8***		138.6***		142.8***
		(263.9)		(319.6)		(38.98)		(39.15)
Constant	792.4***	278.8	708.0***	-269.9	94.06***	-10.93	96.20***	-12.40
	(27.99)	(204.3)	(35.73)	(242.9)	(3.854)	(29.73)	(4.055)	(29.99)
Observations	66	66	66	66	66	66	66	66
R^2	0.733	0.758	0.493	0.598	0.741	0.785	0.734	0.781

(Standard errors in parentheses)

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

Notes: OLS regressions with the number of monthly transactions as the dependent variable. Specifications (1)-(4) include the entire sample. Specifications (5)-(8) use a sample restricted to checks with face values between \$450-550. The variable *Rate* is the percentage rate charged to cash a check at Spring Bank, which is 1.75% before Spring Bank's price cut and a weighted average of \$1 and 1% following the price cut. The variable *Mean Fee* is the average fee across all transactions during the month. The variable *Mean Distance* is the average walking distance of customers making transactions during the month.