Bank Fees, Aftermarkets, and Consumer Behavior

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Abstract

Fees for banking services have been a policy concern for over 20 years and the subject of several government agencies studies, which focused on the magnitude, incidence, or disclosure of such fees. Using a sample of single market banks, I study the relationship between market-level consumer characteristics and bank fee revenue, fees, and bank return on assets (ROA) to infer consumer and firm behavior. Of particular interest, I use county-level IRS tax records as a measure of the consumer income distribution, but my analysis also includes measures of age and education distributions. I find very little evidence that banks are systematically charging higher aftermarket fees in counties with greater proportions of younger, less educated, or poorer households. Standard measures of competition such as the Herfindahl-Hirschmann Index of deposit concentration are correlated with fees for base checking accounts, but not correlated with aftermarket product fees. Finally, state-wide restrictions on payday lending are correlated with higher bank fees, but not with increased bank revenue or ROA.

Key words: banking, aftermarkets, overdraft fees, competition

JEL Classification Code: G2, L1, L4

1. Introduction

Over the past decade, bank fees have been a consistent policy concern. Estimates of average per-person total bank fees are approximately $250 annually, which average to about $21 monthly. However, most fees result from a single incident rather than a monthly charge and are disproportionately paid by a small percent of bank account holders. Overdraft and nonsufficient funds (NSF) fees represent the largest percentage of fees. Fees tied to small, short term loans, can result in very large annual percent rates.[2] Overall sentiment is that bank fees are too high, are assessed in an unfair manner, and are growing too fast. Using market-level consumer characteristics, this study analyzes the determinants of bank service fee revenue, bank fees, and return on assets to gain some insight on fee-setting strategies, consumer behavior, and the competitive equilibrium in bank service provision. With an eye to theory on consumer behavior in banking aftermarkets, the main thrust of this analysis is to see what market-level characteristics lead to higher or lower bank fees.

Deposit related service fees consistently have been an important part of bank revenues. Over the past decade, total service fee revenues for banks increased from $32.6 billion in 2003 to a high of $41.6 billion in 2009.[3] Since 2010, industry revenue for service fees has fallen and then leveled off to approximately $34.6 billion in 2015.[4] These revenues represent approximately 15 percent of total banking non-interest revenue or approximately 5 percent of total bank revenue.

Most bank fees represent an example of add-on or aftermarket fees. Aftermarkets can be found in many industries such as printers (for toner), computers (software), razors (blades) and many others. Aftermarkets arise when a consumer has to purchase a base product, in order to make use of an additional product linked to the use of the base product.[5] In aftermarkets, consumers consider the price of the base good in their purchase decision, but whether they consider the aftermarket good price is focal to the analysis of aftermarkets. Consumers with full information

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[2] See Data Point: Checking account overdraft study by the CFPB.

[3] Other significant sources of noninterest income include fiduciary activities and trading account gains and fees.

[4] This paper does not test if the new disclosure requirements from Regulation DD and Regulation E were the causes of the decrease and leveling of service fee income. The sharp increase through 2009 and subsequent drop may have been the result of the financial crisis and subsequent recession rather than any structural change in banking.

[5] The Supreme Court decision in *Eastman Kodak Co. v. Image Technical Services, Inc.,* brought the antitrust economics and legal issues of aftermarkets foreground of public debate. See Shapiro (1995) for a discussion of this case.

would consider the entire cost (both prices) in their purchase decisions. The policy discussion on aftermarkets centers on whether consumers consider the cost of ownership, or simply the price of the base good (ignoring aftermarket prices).

In banking, an account like interest or non-interest checking account would be the base good. Overdraft and non-sufficient funds (NSF) services are aftermarket services, because consumers purchase these services after the consumer opens an account with a bank. Presumably, consumers consider the account maintenance fees as part of their banking decision. Consumers may or may not consider these aftermarket fees in their initial choice of a bank account.[6] Unlike traditional aftermarket examples, bank NSF or overdraft fees differ, because consumers only pay them in certain events (like overdrawing their account). In other words, consumers can avoid these fees, given sufficient effort.

Some consumers mistakenly incur fees, but others may purposefully use the bank product. For example, some consumers use overdraft as a short term credit line. The literature on bank fees has focused primarily on the former case, but less on the latter.[7] Mistakes seem to occur often. According to the CFPB study on overdrafts, the median dollar amount that leads to overdraft is $24 for debit card transactions and $50 for all types of transactions. A significant number of overdrafts occur for dollar transactions that are below the overdraft fee.[8]

In banking, a strong sense exists that banks do not readily divulge bank fee information. Regulations require banks to disclose fee schedules, but fee schedules can be "hidden" in thick documentation about accounts.[9] The important question is whether banks compete on after-market products. Consumer behavior is focal to this question. If consumers do not consider aftermarket prices in their bank account decisions, then banks do not have incentives to compete on these prices.

The purpose of this research is to shed light on bank fee-setting by analyzing bank service fee revenues, fee levels, and bank return on assets. Specifically, I consider the role of consumer

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[6] Switching costs exist in banking. So consumers may not switch banks if the fees change. See Kiser (2002) and Hannan and Adams (2011)

[7] The payday lending literature that considers bank substitution with payday loans is aimed at the purposeful use of overdraft facilities.

[8] See Romeo (2016) for more information on mistakes. See Chart 2. Average NSF fees at small banks is above $20.

[9] Anecdotally, bank advertising does not focus on fees. Nor do branches have signage about fee schedules.

characteristics such as income, age, race and education, among others. My primary focus is the role of income, since it is central to policy. But my analysis sheds light on other market and consumer characteristics, such as education, race, and market structure.

I consider which types of consumers are more sensitive to bank fees and are best able to avoid them. For example, high income consumers may not need to exert effort to avoid bank contingency fees and only incur them by accident. Hence, they may not consider such fees in their banking decisions. Low income consumers, on the other hand, may operate closer to their budget constraints and have fewer alternative options to make payment.[10] Hence, low income people have to exert greater effort to avoid overdraft fees. They may or may not consider overdraft fees in their bank account decisions, but their behavior may be more determinative of the market equilibrium. The analysis points to a picture of which consumers are best able to avoid aftermarket bank purchases and how do banks set fees to account for consumer behavior.

My analysis of banking fee income and bank fees includes a broader spectrum of market characteristics, all with a similar narrative as the high versus low income dichotomy. These characteristics include age, education, and race. Each characteristic represents groups that are more or less likely to incur overdraft fees and include them in their purchase decisions..

My results indicate that banks earn more in fee revenue and return on assets in markets with a greater proportion of young, and low income consumers. Overdraft fees do not vary significantly across these variables. I find some evidence of cross subsidization between base good and aftermarket good pricing. Greater competition is correlated with lower base good fees, but not with lower aftermarket fees. Restricting other forms of substitutable credit, such as payday lending, is correlated with higher fees, but not higher fee revenue or returns.

Section 2 discusses the regulation, literature and government studies on bank fees. Section 3 describes a conceptual framework. Section 4 describes the data and section 5 discusses descriptive statistics. Sections 6 details the empirical model and section 7 discusses the analysis. Section 8 concludes.

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[10] Many poor people do not have credit cards.

2. Background and Literature

Some regulation of bank fees exists. In 1991, the Truth in Savings Act (TiSA) required clear and uniform disclosure of bank fees and interest rates. The Federal Reserve's Regulation DD, which implements TiSA, laid out the rules for how, when, and what information banks are required to disclose. In 2006, Regulation DD was amended to ensure uniform and adequate disclosures on overdrafts and NSF fees. The most recent amendment to Regulation DD in 2010 focused on bank disclosures about overdraft and NSF on account statements. In 2010, an amendment to Regulation E was adopted, stipulating that institutions must obtain consumer consent before charging consumer fees for paying overdrafts on automated teller machine (ATM) and one-time debit card transactions, unless a consumer opts in to the overdraft service for those types of transactions.[11]

Increased public interest in fees led to numerous government studies. The Financial Institutions Reform, Recovery, and Enforcement Act of 1989 (FIRREA) resulted in annual congressional reports by the Federal Reserve on bank fees from 1997 through 2003. The Government Accountability Office (GAO) did a study in 2008 for the Congressional Subcommittee on Financial Institutions and Consumer Credit. The Federal Deposit Insurance Corporation (FDIC) and Consumer Financial Protection Bureau (CFPB) studied fees in 2008 and 2014, respectively.

Most studies focus on the magnitude and trends in bank fee setting. More recent studies focus on consumer usage and disclosure. These reports all make the same basic observations about bank fees. First, large banks charge higher fees than small banks. Second, bank fees have been increasing over time. Third, fee disclosures were inadequate. The GAO report observes that banks were not properly disclosing fee schedules when consumers opened accounts. Finally, the FDIC and CFPB studies analyze consumers who pay bank fees, the fees paid with the highest frequency, and the amount financial institutions charge. Both studies show that a small percentage of consumers are responsible for a large portion of fee income to banks. Overdraft fees represent by far the largest proportion of bank fee revenue.[12]

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[11] Technically, if a consumer opts out of overdraft protection, then the bank would either deny a debit transaction or charge a nsf fee instead.

[12] See CFPB Data Point: Checking Account overdraft.

A significant literature on bank fees exists. Gabaix and Laibson (2006) and Armstrong and Vickers (2012) provide theoretical models, where consumers are either sophisticated or naïve. Naïve consumers do not consider fees in their purchase decisions, but sophisticated consumers are aware of them and have to exert effort to avoid them. Firms may also hide fees, so called shrouding. Heidhues and Kosegi (2014) develop a model with naïve consumers. They find that firms are able to price discriminate and that under certain conditions, both naïve and sophisticated consumers suffer welfare losses. Grubb (2012) develops models where consumers are inattentive to past usage and uncertain of price. These theoretical models provide a theoretical basis for equilibria, when consumers are uninformed or must pay attention (exert effort).

Empirical studies are numerous. Examples include Stango and Zinman (2009) who calculate the actual cost of a bank account. They find the median household pays $43 in total bank and credit card account costs per month. Stango and Zinman (2014) consider which consumers incur overdraft fees and see if consumers learn from past experience. They find that consumers who recently incurred an overdraft or NSF charge are less likely to incur the charge again. Morgan, Strain, and Seblani (2012) find that bank fee income per capita increases after payday credit bans. Morgan and Meltzer (2015) consider overdraft fees when payday lending is prohibited. They find lower overdraft fees in areas with little or no competition from payday lenders. Romeo (2016) estimates the loss in consumer surplus when deposit-advance products are no longer offered and consumers use overdraft instead.

Williams (2016) tests the implications of Gabaix and Laibson on overdraft fees. Because direct measures of myopic consumers are not available, Williams uses market level measures of consumer characteristics as a proxy. He posits that high income individuals are myopic and finds evidence that banks shroud fees. He finds that banks in markets with higher median income charge higher overdraft fees. He observes higher fees for younger, less educated populations as well.

This paper improves on the existing literature by considering relationship between market level consumer characteristics, banks fees, and bank profitability. Most importantly, I use age, education and income distributions to see if groups of consumers have differing effects on bank pricing and profitability. Using an aftermarket framework, I also consider the interaction

between base product pricing and aftermarket pricing in an effort to determine consumer behavior.

3. Conceptual Framework

I present an abbreviated description of the Armstrong and Vickers (2012) version of the Gabaix and Laibson (2006) model and use it to discuss results. Armstrong and Vickers slightly modify the Gabaix and Laibson model to account for some of the characteristics of banking aftermarkets. They simplify the model by ignoring the shrouding decision to better focus on consumer behavior.[13] Their model is useful, because they describe equilibria in aftermarkets, where some consumers exert effort to avoid fees, others do not consider aftermarket fees, or, in the simple case, fully informed consumers consider the total cost of owning a bank account.[14]

Both models distinguish between sophisticated and naïve (or myopic) consumers. The distinction between sophisticated and naïve consumers can take on many forms and interpretations. For example, less educated or younger consumers can be interpreted as naïve, while more educated and older are seen as sophisticated. The effect of income on sophistication is ambiguous. Williams (2016) interprets high income consumers as naïve and low income as sophisticated, since the high income earners do not need to worry about banking aftermarkets. However, low income consumer could be either naïve or have high effort costs.

Sophisticated consumers (σ percent of the population) always take the aftermarket prices into consideration when choosing a bank. Sophisticated consumers exert effort to avoid aftermarket purchases. Naïve consumers ($1-\sigma$) do not consider the chance of consuming the aftermarket good and only base their purchase decisions on the price of the base good. On average, consumers can expect to purchase aftermarket goods α times.

Banks offer bank accounts with price, P, and marginal cost, C, and an add-on product (or overdraft facility) with price, p and marginal cost, c.

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[13] In a shrouding equilibrium, firms are able to hide the price of the aftermarket good to certain consumers.
[14] It is important to note that these theoretical models focus on consumer mistakes (i.e., behavior) or on bank behavior. It is difficult to interpret these models for individuals who purposefully use overdraft.

If enough consumers consider add-on market prices in their banking decisions, then banks will compete on both products.[15] Equilibrium prices would be equal to marginal costs. Total account expenditures are the same for both types of consumers:

$$P + \alpha p = C + \alpha c$$

Assume that costs and probability of incurring aftermarket costs are the same across markets. Assume that total account expenditures do not vary across markets, even though this is almost certainly not the case, since bank marginal costs do vary by bank and by county. Moreover, the probability that a consumer pays for overdraft services also varies by consumer type and by county.

In the case where a sufficient number of naïve consumers exist, prices for the base good would be:

$$P = C - \alpha(1 - \sigma)(p - c)$$

It is important to note that a shrouding equilibrium could exist. Firms could make it difficult for consumers to observe prices.

Armstrong and Vickers assume the equilibrium add-on price, p, will lie in the range $[c, \bar{p}]$ where $\bar{p}$ is an upper limit to pricing set exogenously by law or cultural norms. Avoiding paying for α uses of the aftermarket product involves ex ante effort cost e: $\alpha c < e < \alpha \bar{p}$. For $p > e/\alpha$, sophistacates will be diligent in avoiding use of the aftermarket product. Naives only take the base price into account. Prices paid by both consumers can be represented as :[16]

$$Naive: P + \alpha\bar{p} = C - \alpha(1 - \sigma)(\bar{p} - c) + \alpha\bar{p}$$

$$= C + \alpha c + \sigma\alpha(\bar{p} - c) > C + \alpha c$$

$$Sophisticated: P + e = C - \alpha(1 - \sigma)(\bar{p} - c) + e$$

$$= C + \alpha c - \alpha(\bar{p} + \sigma(\bar{p} - c)) + e < C + \alpha c$$

$Total: C + (1 - \sigma)\alpha c + \sigma e$

As the percentage of naïve consumers increases, so do total expenditures for a bank account. Hence, the incentive to compete only on the base product increases as the percent of naïve consumers increases.[17] Also, the base good price will be lower in these markets. This equilibrium also displays the result that the base good price is subsidized by the aftermarket price. So, naïve consumers subsidize sophisticated consumers.

I am using this model to simply illustrate how base good and aftermarket good prices relate, when firms are confronted with naïve and sophisticated consumers. The reduced form model that follows can only determine sophisticated consumers using negative correlation with prices and profits. If parameter estimates are positive, then it is unclear if consumers are naïve or have high effort costs (i.e., sophisticated but costly to avoid fees).

4. Data

The level of observation in our data is a bank in a county in a year. Bank balance sheet data come from the Bank Condition and Income Report (Call Report). Bank branch locations are from the Summary of Deposits (SOD) data. County characteristics such as per capita income, age, race, unemployment, and total population come from the Census Bureau and Bureau of Economic Analysis.

I use counties as the geographic level of observation. While banking has experienced significant technological changes that allow consumers to acquire some banking services at distant locations or online, the banking industry is still dominated by branch networks, where individuals and small businesses still predominantly chose banks with nearby branch locations. Banks still use branches to deliver many services or acquire new customers.[18]

The sample includes only depository institutions with less than $1 billion in assets. I also limit the sample to those institutions with 75 percent or more of their branches in a single county, so-

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[17]According to the Armstrong-Vickers model, if a large fraction of sophisticated consumers exists (or the maximum price is low enough), then both groups pay total marginal costs and total outlay is the same for both types of consumers.

[18] I use branch counts to avoid issues of central booking with deposits. Some banking products do not necessarily fit this mold. For example, mortgages are often obtained from banks with no local branch presence.

called single market banks.[19] I only consider single-market banks because bank revenues and other bank specific metrics can be more clearly tied to local market conditions.

My focus on single market banks mitigates other issues surrounding product quality and measurement.[20] The government-sponsored studies discussed in section 2 all show that large, multimarket institutions charge, on average, higher fees than small institutions. These multimarket institutions are not tied to any one geographic area, but numerous, sometimes thousands, of geographic areas. These institutions offer branch and ATM networks over a broad area. They also offer a greater array of products and services. One potential argument for the higher fees is the higher product quality compared to smaller institutions. Quantifying the difference between product quality and the other characteristics from multiple geographic areas is difficult.

I use Internal Revenue Service (IRS) Statistics on Income (SOI) data that aggregate individual tax returns by county. For the years 2010 through 2014, county-level data are provided. However, from 2005-2009, zip code-level data have to be aggregated to the county level.[21] I use the HUD zip code-to-county mapping and supplement this with Census zip code-to-ZCTA mapping to create county-level data for these years.[22]

The data are split into categories based on adjusted gross income (AGI).[23] AGI categories are not constant throughout the sample, and returns are aggregated to as many as 8 bins. Furthermore, if not enough returns populate a given bin, then bins are aggregated further. For consistency across the sample, I aggregated returns into 3 bins: under $25,000, $25,000 to $75,000, above $75,000. I will refer to AGIs below $25,000 as low income and above $75,000 as high income.[24]

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[19] I remove internet banks, because, while they fit the definition of a single market bank, they really only provide retail services via the internet. These institutions include Capital One/ING, USAA, E-trade, Emigrant, and State Farm.

[20] Deposit account and bank types likely differ more dramatically between large and small banks than among all small banks.

[21] IRS provides only aggregated (without AGI bins) county level data for these years.

[22] After matching, about 277 zip codes cannot be placed in a specific county. These zip codes tend to be for specific companies or PO boxes.

[23] One example of bin definitions is as follows: under $1, $1 to $10,000, $10,000 to $25,000, $25,000 to $50,000, $50,000 to $75,000, $75,000 to $100,000, $100,000 to $200,000, and $200,000 or more.

[24] AGI is an imperfect measure of income. These numbers serve as an approximation of the distribution of income.

Finally, I include a dummy variable for states that restrict payday lending. Payday lending has often been cited as a substitute for overdraft products.[25] Data on state payday loan restrictions come from Bhutta (2012). Meltzer and Morgan (2012) find that overdraft fees are lower in markets where payday lending is restricted. I test this hypothesis and determine the effect on overall fee revenue and returns as well.

In my initial analysis, I sort counties by increasing per capita income. Those counties in the highest quartile are designated "high income" counties, those in the lowest quartile "low income". The income disparity across counties is significant. The per capita income threshold for medium income counties is $36,655, about 30 percent above the threshold for low income counties, which is $27,914. Average income in high income counties is $43,957, over 70 percent greater than low income county average income of $25,662.[26] The majority of small banks in this sample are located in high income counties.[27]

The resulting data include information for the years 2005 through 2014 on an annual average of 4093 banks in 1740 counties, for a total 40,482 observations. Table 1 details the data.

For bank pricing information, I use RateWatch data.[28] RateWatch surveys fees, account minimums, and rates for various deposit accounts and loan services provided by banks. These data include information on account maintenance fees, minima to avoid such fees, other methods to avoid fees, and insufficient funds (so called NSF) fees.[29] In any given year, RateWatch surveys about 9,000 to 13,000 branches (about 6,000 individual institutions).[30] Since RateWatch is a marketing firm, banks are inconsistently surveyed. Most are only included in the RateWatch data for about 4 or fewer years out of the 10 years in this sample. Most fee data are only

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[25] Payday lending is potentially a substitute for people who deliberately use overdraft. It is not a substitute for mistake-driven overdrafts.

[26] Almost all high income counties are in metropolitan areas and low income counties are rural (or not in metropolitan areas).

[27] The distinction between high income and low income counties is used almost exclusively in the graphical analysis. Note the difference between characterization and the distribution of income characterization measured by the IRS AGI bins within a county.

[28] RateWatch, Deposit Loan, and Fee Data

[29] The data do not measure overdraft fees. However, for most banks, nsf fees are comparable to overdraft fees. See GAO study on Bank Fees (2006).

[30] RateWatch also seeds data to other branches in each surveyed bank branch networks according to RateWatch's knowledge on bank pricing behaviors. I do not use the seeded data in this study. I only use branches surveyed by RateWatch.

collected on an annual or semiannual basis. I calculate bank annual averages, when multiple observations occur for the same bank in the same year.

Unfortunately, overdraft fees are not collected by RateWatch. However, anecdotal evidence indicates that overdraft fees in most instances are virtually the same as NSF fees. I use the NSF fee to approximate overdraft fee levels.[31]

I censor obvious fee outliers and balance the data to ensure that data include only banks that report all three fees.[32] After matching the regulatory and census data for single market banks with RateWatch pricing data, the pricing data include information on an annual average 894 banks in 632 counties with 6830 observations.[33]

Table 1 displays data description for regulatory data. Table 2 shows summary statistics for the RateWatch data for entire sample and for high and low income county subsamples.

5. **Descriptive Statistics**

I start my analysis by considering simple graphs to see how bank service fee income, return on assets, and fee setting differ by average county income levels. I use service charge fee data from the Call Reports. Service fee income includes all fees directly associated with deposit accounts. These fees include monthly account fees, NSF, and overdraft fees. Return on assets is calculated as net income divided by total assets.

Chart 1 shows derived ratios from regulatory data as a measure of annual average bank fee revenue normalized by transaction deposits (in 00s) for only single-market banks.[34] Banks in low income counties earn more in service fee income than banks in high income counties.[35]

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[31] The GAO study shows that overdraft and nsf fees are on average virtually the same. See also Morgan and Meltzer (2012) footnote 3.

[32] I removed 4 observations with fees over $50. Some 1900 observations for banks not reporting nsf fees (but report other fees) and about 450 observations for banks not reporting checking monthly charges were censored.

[33] The number of observations vary depending on which fee is used to cut the data. These numbers are for banks reporting NSF fees.

[34] This ratio represents average fee revenue per dollar of deposits for the bank. I do not use the number of accounts from the Call Report, because the definition was changed mid-sample. These data show similar results.

[35] Banks in high income counties earn more in total non-interest revenue than banks in low income counties. A large part of the difference comes from fiduciary fees.

Banks in low income counties earned $1.85 per $100 of deposits in 2005, which eventually fell to $1.21 in 2014. Banks in high income counties earn $1.51 per $100 of deposits in 2005 and about 77 cents in 2014. These differences between low and high income counties are statistically significant at the 1 percent level.

Chart 2 shows bank return on assets (ROA) for single-market banks. Banks in low income counties earn greater returns than banks in high income counties. Small bank ROA in low income counties was 1.62 percent in 2005. ROA for these banks fell to 1.03 percent in 2014. Small bank ROA in high income counties was 1.48 percent in 2005. Small bank ROA in high income counties decreased significantly during the crisis where ROA was only 0.67 percent in 2009.[36] ROA returned only to about 0.93 in 2014.

I now turn to charts on bank fees using RateWatch data. I consider annual average NSF, non-interest checking, and interest checking for single-market banks in high income and low income counties. Charts 3-5 show average fees over time.

Chart 3 shows annual average NSF fees by county income quartile over time. In almost all years except 2014, average NSF is lower in poorer counties than in richer counties. NSF fees range from about $22.76 to a peak of approximately $28.45 in low income counties. In high income counties NSF fees ranged from $23.38 to approximately $27.69. In 2014, average NSF fees were $24.50 in low income counties and $22.88 in high income counties. NSF fees are significantly different in high income counties than in low income counties at the 1 percent level.

I find differing patterns for account maintenance fees for non-interest and interest checking accounts. Charts 4 and 5 show average account maintenance fees over time. Non-interest checking account fees are consistently higher in low income counties than in high income counties. Average non-interest account fees in low income counties range from $2.75 in 2003 to $5.50 in 2014. In high income counties, they range from $2.20 in 2003 to $2.62 in 2014 (with a peak of $3.42 in 2014).

Many banks offer free accounts with no maintenance fees. In my sample of only small banks, I find that banks in high income counties are more likely to offer free accounts. On average,

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[36] ROA for all banks went negative during the crisis and has since become positive again,

approximately 55 percent of single market banks offer free non-interest checking in high income counties, while an average 34 percent offer free non-interest checking in low income counties.[37]

Average interest account fees in low income counties are consistently lower than in high income counties. Average interest account fees for low income counties range from $7.12 in 2003 to $8.20 in 2014. In high income counties, they range from $8.14 in 2003 to $9.18 in 2014. Account maintenance fees are significantly different in high income counties than in low income counties at the 1 percent level.

6. Econometric Specification

I now turn to the econometric analysis of market characteristics and bank fee revenue. I start by simply considering deposit account service fees for banks. Service fees are a function of the market characteristics. I estimate the following reduced form model:

$$\ln(\frac{Revenue}{Deposits})_{bmt} = \beta_1 lnX_{bmt} + \beta_2 lnC_{bmt} + \sum \beta_i \, lnN_i + \varepsilon_{bmt}$$

where I normalize service fees by transaction deposits (in $00s). X represents market census data, including information on the proportion of people aged below 25 and above 65, the proportion of unemployed, the proportion of African Americans and Hispanics, the proportion with a up to high school diploma (or equivalents), and the proportion with some college. I include total population in the market as a control for market size.[38] I also include additional measures of product quality, bank costs, and market structure, denoted as C. These variables include a dummy for the presence of a mega bank (a bank with over $50 billion in assets), total number of branches in the county (for all banks), total of the bank's branches in the county, and the Herfindahl-Hirschman Index. Cost variables include salary costs per dollar of assets, premises costs per dollar of assets, and charge-offs per dollar of loans.[39] Finally, instead of using per capita income in the county, I use the proportion of households with adjusted gross

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[37] Federal Reserve Congressional Report to Congress notes that approximately 30 percent of banks offer free accounts in 2001 and 2002.
[38] One could argue that proportions should be used instead of the numbers, controlling for population. Proportions would normalize the data so that less populated counties look more similar to more populated counties.
[39] Charge-offs are defined as consumer loans excluding credit cards that are in nonaccrual status.

income in three specific ranges. The ranges include below $25k, $25k to $75k, and above $75k. In one specification, I remove the income bins and include per capita income as a continuous variable to show the distinction between models.

For estimation purposes, I omit the proportion of non-African American and non-Hispanic people, the proportion of people between 25 and 65, the proportion with a college degree or more, and the proportion of households earning more than $75,000. All parameter estimates of proportions are relative to these omitted groups.

The same specification is used to analyze the relationship between return on assets and market characteristics.

I estimate similar models for bank fees. As dependent variables, I use NSF, interest checking maintenance, and non-interest maintenance fees:

$$\ln(Fee)_{bmt} = \beta_1 lnX_{bmt} + \beta_2 lnC_{bmt} + \sum \beta_i \, lnN_i + \varepsilon_{bmt}$$

The independent variables are the same as above.

7. **Results**

I start the discussion of the results by describing coefficient estimates. I then give broader interpretation of the results in the next subsection.

I estimate equation 1 using OLS with fees per dollar of deposits as the dependent variable. Results are in table 3. Four columns represent my main model and three robustness checks. Column 2 removes the IRS income bins and replaces those variables with mean per-capita income. Column 3 estimates the same model as column 1, but restricts the sample to only high income counties. Column 4 shows coefficient estimates using ROA as a dependent rather than fee revenue.

All of the regressions include annual dummy variables (not reported). In all the fee revenue regressions, the annual dummy variable coefficient estimates are significantly positive through 2009 (increasing in magnitude through 2008). After 2009, the dummy variable coefficient

estimates are significantly negative and decreasing in magnitude.[40] In the ROA regression, the annual dummy variables are all negative increasing in magnitude to 2009. After 2009, the estimates are still significantly negative and do not change much in magnitude. These results clearly show the effect of the financial crisis on bank fee revenue and ROA. As economic conditions worsened for consumers, banks earned more fee income as consumers incurred additional fees.[41] Once economic conditions improved, bank fee revenue fell. ROA fell for most banks in the years up to the crisis.

First, I consider the results for fee revenue using the entire sample (column 1). I find that fee revenue increases as the proportion of households with income less than $25k increase. The coefficient estimates is positive and significant at 1.55. However, fee income falls as the proportion of households with income between $25k and $75k increases. The coefficient estimate is negative and significant at -0.53.

The cost and market structure control variables have expected signs with the exception of HHI. All cost coefficient estimates are significantly positive. Charge-offs, salary and fixed capital costs are also positive and significant. The presence of a megabank and increase in the total branches in a county are both correlated with lower bank fee revenue, but branches owned by the bank is correlated with higher fee revenue. The coefficient estimate on HHI is significantly negative. This result runs contrary to expectations about market concentration and revenue. However, HHI is a measure of concentration for the base good, a bank account measured by deposits, and less of a measure of competition for the aftermarkets. Since most bank fees stem from aftermarket good purchases, the standard relationship between concentration and overdraft or other aftermarket fees need not apply.

My results indicate that both age and education matter to bank fee income. The coefficient estimate for the proportion of people under 25 is positive and significant, while the estimate for the proportion of people over 65 is negative and significant. These results confirm that fee income is greater as the proportion of people under 25 increases and lower as proportion of

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[40] In the high income only regression, the decline in coefficient estimates begins in 2011.

[41] Presumably, a greater proportion of bank consumers experienced some sort of income shock during the crisis.

elderly increases. The coefficient estimates for the proportion with high school or less is positive and significant, while the estimate for some college is insignificant.

Several explanations exist for why younger consumers would incur greater bank fees. Learning, experience, inattention or consistent income flows are example explanations that would explain these results.[42] With learning or experience, younger, less educated consumers need to learn how to avoid bank fees or gain the necessary experience to avoid them. Younger consumers probably need to pay more attention to their bank accounts than older consumers. Older consumers have a more consistent income flow that makes it easier to avoid bank fees. It is unclear why education does not matter in the same way as age.

The coefficient estimate for the unemployment rate is negative and significant.

I find differences in fee revenues depending on the proportions of African Americans and Hispanics in a county. The coefficient on the proportion of African Americans is positive and significant, and the coefficient on the proportion of Hispanics is negative and significant. Counties with a greater proportion of African Americans are correlated with higher bank fee revenue and counties with a greater proportion of Hispanics are correlated with lower bank fee revenues. The underlying cause of this result is unclear. It could be that African Americans pay fees more often than others. The regressions may also not be accounting for all variation in other factors.[43]

This analysis has shown that total fee revenue at banks is correlated with income, age, and education. Total expenditures for bank accounts are higher in counties with poorer, younger or less educated populations. Using the Armstrong-Vickers model to interpret these estimates, these populations could be naïve. The proportion of middle income (those with annual $25k to $75k) households clearly have a strong negative effect on bank fee revenue. This result could stem from the notion that middle income people are financially sophisticated and are more able to avoid fees.

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[42] These explanations are all very similar with nuanced differences.

[43] For this explanation to hold, the unexplained variation should be highly correlated with the proportion of African Americans and Hispanics. In fact, charge-offs are more correlated with the proportion of African Americans in a county than either the proportion of Hispanics or All other races.

Restricting payday lending seems to have an effect on bank fee revenue. The coefficient estimate is significantly negative, but small in magnitude. One might posit that overdraft is a substitute for payday loans, but these results indicate that the effect is small, after accounting for other market characteristics.[44] The overdraft fee results adds more context to this result.

The results do change somewhat in the robustness regressions in columns 2 and 3. The regression in column 2 simply replaces the income variables in column 1 with log of per capita income. The regression in column 3 only uses the sample of banks from high income counties.

Most noteworthy is the coefficient estimate on average per capita income, which is significantly negative. Bank fee revenue declines as per capita income increases.

Other differences arise in education and the proportion of Hispanics. In column 2, the coefficient estimates on proportion of high school or less educated is insignificant and the estimate for proportion with some college education is negative and significant. The proportion of Hispanics is insignificant in column 2.

The results in column 3 using only high income counties mirror those in column 1. While magnitudes differ, sign and significance do not. The only exception is coefficient estimate for the logarithm of the total number of branches in the county.

Column 4 shows the ROA regression, which mirrors many of the results from the fee revenue regression for the most part.

Small banks experience higher ROA as the proportion of low income households increases and lower ROA as the proportion of middle income households increases. The coefficient estimate for the proportion of households below $25k is positive and significant at 0.98 and the coefficient estimate for the proportion of households between 25k and 75k is negative and significant at -0.53.

Age and education coefficient estimates are similar to those in the fee revenue regressions. Banks earn greater ROA in counties with a greater proportion of younger consumers, but not necessarily less in counties with a greater proportion of older consumers. In counties with more

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[44] Morgan, Strain, and Seblani (2012) find fee income percapita increases when payday lending is restricted.

consumers with high school education or less, bank ROA increase. As education level rises, small banks tend not to earn significantly different ROAs.

These results, especially on income, age and education, are similar to the results from Agarwal et al (2016) on credit card profitability. They show that credit cards are more profitable for low FICO score individuals. Profitability falls and becomes negative for a middle range of FICO scores and then is positive again for high FICO score individuals. If market characteristics are correlated with FICO scores such that low income, less educated, younger people have lower FICO scores, then banks earn more in counties with a greater proportion of low FICO score individuals.

Competition and cost variables are almost all significant and appropriately signed. Most noteworthy of these estimates is the coefficient estimate on HHI. This estimate is insignificant. So HHI does not seem to be correlated with greater (or lower) ROA.

The proportion of African Americans and Hispanics are both negative and very small. Both coefficient estimates are significant at the 1 percent level.

In order to get a better idea about consumer and bank behavior, I turn to the fee regressions. These regressions shed light on whether banks charge higher or lower fees for households in the different age, education, income, and race categories. I estimate 3 equations: one regression using NSF fees, one regression using interest checking fees and one regression using non-interest checking fees. Year dummy variables are included in all regressions. The main thrust of these regressions is to observe how banks set fees given various consumer characteristics.

The first column of table 4 shows the NSF regression results. The coefficient estimates for both the proportion of households with income less than $25k and of households with income between $25k and $75k are both insignificant. In other words, NSF fees are not significantly different across counties with varying proportions of low or middle income households. This result runs contrary to Williams (2016) who found a positive relationship between overdraft fees and market income.

The coefficient estimate for the proportion of the population under 25 is insignificant and the coefficient estimate for the proportion of the population over 65 is negative and significant, so that NSF fees are lower in counties with a greater proportion of older people.

The results for measures of the level of education indicates that bank fee setting and the level of education are not correlated. The coefficient estimates for the proportion of high school or less and some college. The coefficient estimate for proportion of people with high school education or less and some college are both insignificant.

The coefficient estimate for the unemployment rate is positive and significant.

Competition coefficient estimates vary from those in the fee revenue regressions. Megabank presence is correlated with greater NSF fees and increased total branches is correlated with slightly lower The HHI coefficient estimate is now insignificant. Since the HHI measure represents market structure primarily in the base good market (choosing a bank account), this estimate indicates that concentration in the base good market does not affect pricing in the aftermarket NSF market.

Cost coefficient estimates are all significant. The salary cost coefficient is negative and significant, but the estimate's magnitude is small. Capital costs coefficient estimate is positive and significant. Charge-off's coefficient estimate is negative and significant.

The coefficient estimate for the proportion of African Americans in a county is positive and significant. The coefficient on the proportion of Hispanics is negative and significant, but its magnitude is small. These results point to higher NSF fees charged by small banks in counties with a greater proportion of African Americans and slightly lower NSF fees in counties with a greater proportion of Hispanics.

NSF fees are slightly higher in states that restrict payday lending. The coefficient on such restrictions is positive and significant, but small in magnitude. These results point to a relationship between payday loans and overdraft, implying that they may be substitutes. This result contrasts with the result from Meltzer and Morgan (2012), who find a negative coefficient. Besides having a different set of control variables, their analysis almost certainly includes data from large banks. Large bank fees may be negatively correlated with payday lending

restrictions. Their sample could also include more large banks in states that do not restrict payday lending. Their analysis is done at state level rather than county level. Also, the increased overdraft fees may be one reason why bank fee income is lower in states that restrict payday lending.

The second column of table 4 shows the results for interest checking fees. The coefficient estimate for the proportion of households with income below $25k is insignificant. The coefficient estimate for proportion of households with income between $25k and $75k is significantly negative.

The coefficient estimates for age are both insignificant. The proportion of people under 25 and the proportion of people over 65 do not significantly differ from the proportion of people between 25 and 65.

The coefficient estimates for education are positive and significant. The one exception is the estimate for the proportion of consumers with college or more education, which is negative and significant. The coefficient estimate for the unemployment rate is insignificant.

Several of the cost and market structure coefficient estimates are insignificant. The total number of branches in a county is insignificant. The number of bank branches is positive, but only significant at the 10 percent level. The presence of a mega bank is insignificant. The coefficient estimate for HHI is now positive and significant, as expected. Capital costs is the only significant cost coefficient estimate.

The coefficient estimate for restricted payday lending is negative and significant.

The third column of table 4 shows the non-interest checking regression. The estimates for age proportions are both insignificant. The coefficient estimate for the proportion of high school or less educated is positive and significant. The coefficient estimate for some college education is insignificant.

The competition coefficient estimates are all significant. The coefficient estimate for the presence of a mega bank is positive and significant at the 10 percent level. This result is comparable to the results in Hannan and Prager (2004), who find that small banks charge higher prices in markets with mega bank presence. The coefficient estimate for the total number of

branches is negative and significant at the 5 percent levels. The coefficient estimate for HHI is again positive and significant. This is expected, since it measures concentration in the base good market. The estimate for the number of branches by the particular bank is negative and significant.

The coefficient estimate for states that restrict payday lending is negative and significant. Banks in states where payday lending is restricted seem to be offering cheaper accounts to attract new customers.[45] Presumably, consumers who might use payday loans are most likely to have a greater probability of incurring overdraft fees.

Non-interest checking would most likely be the general account type used by poorer consumers. The coefficient estimates for the proportion of households below $25k and for the proportion of households income between $25 and $75k are both negative and significant. Both coefficient estimates are indications of cross subsidization.

In both interest and noninterest checking account fee regressions, the coefficient estimate for the restricted payday lending dummy variable is negative and significant. While bank revenue is slightly lower in states that restrict payday loans, NSF fees are higher and account fees are lower.

The coefficient estimates for the proportion of African Americans and the proportion of Hispanics are almost always positive and significant. The magnitude in most cases is small, except the proportion of Hispanics in the non-interest checking regression. Single market banks in counties with more African Americans and more Hispanics tend to charge higher fees, NSF and account maintenance fees. Again, my reduced form model may not adequately control for all the other characteristics and unmeasured heterogeneity may still exist.

7.1 General Interpretations

Clearly, bank service fee revenue, fees, and ROA are correlated with market characteristics. Age, education and income distributions, competition and costs are correlated with fee revenue and ROA. However, I do not find similar correlation of these variables with the separate fees. For NSF fee, I find little correlation with these variables. Besides proportion over 65, which is small in magnitude, all other age, education and income proportions are insignificant. For

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[45] A bank account is needed to obtain a payday loan.

interest checking account maintenance fees, education and income matter. However, for noninterest checking account maintenance fees, I find strong negative correlation with proportion of low and middle income households, but little correlation with education and age (with the exception of high school or less education).   While my results on bank revenue and profitability follow what we would expect from the model and from previous research, my results indicate that for varying age, education, and income distributions, NSF levels do not significantly differ. None of these groupings seem to be more or less myopic about NSF fees than others.

These results indicate that banks do not differentially price based on the distributions of these county characteristics, but the results do not rule out a shrouding equilibrium. They could also indicate an equilibrium where everyone is sophisticated, but have varying effort costs to avoid bank fees. Low income households have less liquid assets, little discretionary income, and are more likely to be credit constrained. Banks offer higher account maintenance fees for interest-earning accounts in areas with more low income households, but do not charge higher fees for non-interest checking accounts. All else equal, NSF fees are virtually equal across counties with households in various income bins. The increase in revenues coupled with little difference in NSF fees in counties with more low income households point to considerable effort costs to avoid these fees.

The results for the ROA regressions confirm this interpretation and suggest that banks in counties with a greater proportion of low income consumers are able to earn more profits. Coupled with the fee regressions, I find that these banks do not necessarily charge higher fees. The higher return is more a result of greater usage rather than higher fees.

Furthermore, the results on the competition variables, number of banks and HHI, are mixed. A greater number of banks in a county is correlated with lower fees, but HHI is not correlated with NSF fees. However, higher HHI is correlated with higher account service fees (for both interest and noninterest accounts). Banks seem to be competing more on the base product and less so on the aftermarket good. Presumably, the NSF fees are not reflective of the marginal costs of providing the service and, hence, banks are most likely not competing on overdraft fees.[46]

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[46] Unless the risk of providing the product is considerable. In our sample, ex-post risk costs are low, since banks only charge off a small percent per dollar of assets. A high level of risk is unlikely, since banks earn considerably more as more people use overdraft.

I find some evidence of cross subsidization that models for aftermarkets predict (like the one presented in this paper). The cross subsidization is significant as the proportion of low and middle income households increase.

Cross subsidization seems to also work with regulation in other markets. The results on restricted payday lending indicate that banks offer cheaper bank accounts, but charge higher aftermarket fees. Banks do not necessarily earn more revenue or ROA with this strategy as indicated by the estimates from the fee revenue and ROA regressions.

Cross subsidization may not be clear in my results, because I do not observe if the banks give gifts for opening an account.[47] Many banks do not charge for a basic checking account and such gifts could give incentive to choose a particular bank. Such gifts would fit the model predictions and be a form of cross subsidization, if banks in counties with more low income people were more likely to give such gifts for opening an account.

I also do not include maximum daily fees in my analysis. These limitations can either be a maximum daily dollar amount or a maximum number of daily overdrafts. I omit these data because RateWatch only includes the data for about 1000 observations. Including these data would severely limit the overall interpretation.[48] Banks could charge low overdraft fees, but allow for a higher maximum daily.[49]

Other factors not considered in this analysis may be important. While banks in high income counties do not make as much in service-fee revenues as banks in low income counties, they do make significantly more in fiduciary fees (or fees related to wealth management). This analysis does not account for such channels of other fee revenue. However, the ROA regression indicates that these other sources of revenue do not offset the reduction in fee revenue. The model also ignores the interest-earning aspect to banking, where deposits are a low-cost funding source for banks and the relationship between deposit rates and fees is not considered.

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[47] Examples include cash gifts or the traditional small appliance (a toaster) for opening an account. Banks often give cash bonus for opening an account with direct deposit. Many banks offer up to $500 bonus for opening a checking account.

[48] My initial analysis using this variable led to all coefficient estimates being insignificant.

[49] I do not find this in my initial results on maximum daily.

More generally, I am pointing to a model of interrelated pricing, where the base good, a deposit account, is potentially used for in-roads into the provision of other, possibly more profitable, services. My results indicate that competition matters for the base good, but less so for the aftermarket services.

Such pricing models make basic antitrust regulation of deposit markets much more difficult, when behavioral or aftermarket relationships are present. Simple relationships between market concentration and prices may not be informative about potential anticompetitive behavior. In these cases, standard market concentration and price analyses result in nonsensical conclusions for the aftermarket good. However, the estimates on concentration measures have the correct sign and interpretation for both base-good products, interest and non-interest checking accounts, which indicates that local concentration for base products still matters.

My results also point to how regulation in other lending markets, such as payday lending, may have a direct effect on banking markets. My results indicate a modest price effect on overdraft loans from restricting payday loans, a potential competitor.

On a final note, my results on race are interesting and could potentially generate some concerns. Generally speaking, as the proportion of African Americans or Hispanics in a county increases, so do almost all fees and fee revenue. However, small bank ROA is not significantly higher. This result holds after taking age, education, competition, income, costs, and time trends into account. So small banks in areas with more minorities charge higher fees, all else equal, but they do not necessarily earn greater returns. It might be that the control variables are imperfect. It may also be that racial differences in the demand for banking products exist. African Americans and Hispanics may use these products more than others. Since fee revenue is significantly higher and ROA is lower, bank costs are most likely higher in these counties. For example, the correlation between charge-offs and the proportion of African Americans is positive and twice as large as the same correlations for the proportion of Hispanics, and the proportion of all other individuals.

8. Conclusion

This study focuses on bank fee revenue and fees in an effort to determine if they are correlated with consumer characteristics. My results allow us to make some inferences about consumer and

bank behavior. My sample only covers small banks, because their activities can be more easily tied to local market characteristics. Any inference regarding large banks would be difficult. Their activities cannot be tied to any single market and quality of the services provided would be more difficult accommodate in a reduced form regression.

While I cannot discount a shrouding equilibrium, my analysis indicates that consumer behavior across several categories has little effect on bank overdraft levels. Previous studies showed that low income consumers pay a considerable percentage of bank fees. My results support this observation and indicate banks are not charging higher fees in low income counties to increase profits. My results give support to the notion that low-income individuals face higher effort costs to avoid bank fees.

For consumers who purposefully use overdraft, then the payday lending results show that banks will charge slightly higher fees as a result of payday lending restrictions, but consumers do not necessarily turn to overdraft as a means of replacing payday loans.

My analysis supports a consumer-protection policy that either reduces effort costs to avoid fees or promotes the provision of cheaper credit products. Free bank accounts, required in several states, do not necessarily solve the problem of overdraft. Certainly, disclosure is an important aspect of consumer protection, but other remedies promoting financial management may be warranted. Products such as deposit advance, discontinued by almost all banks,[50] may be a better avenue to explore, as such products help consumers limit mistakes. With deposit advance, consumers are able to take out short term loans to avoid liquidity issues (and avoid overdrafts). Deposit advance can also be priced as a function of loan amount (fee per $100 dollars). Such pricing makes costs of such loans easier to compare to the costs of payday loans (which are often priced in a similar manner).

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[50] In a supervisory note in 2011, the OCC questioned the underwriting of advanced deposit insurance.

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Table 1

Summary Statistics: Single Market Banks Only 2005-2014

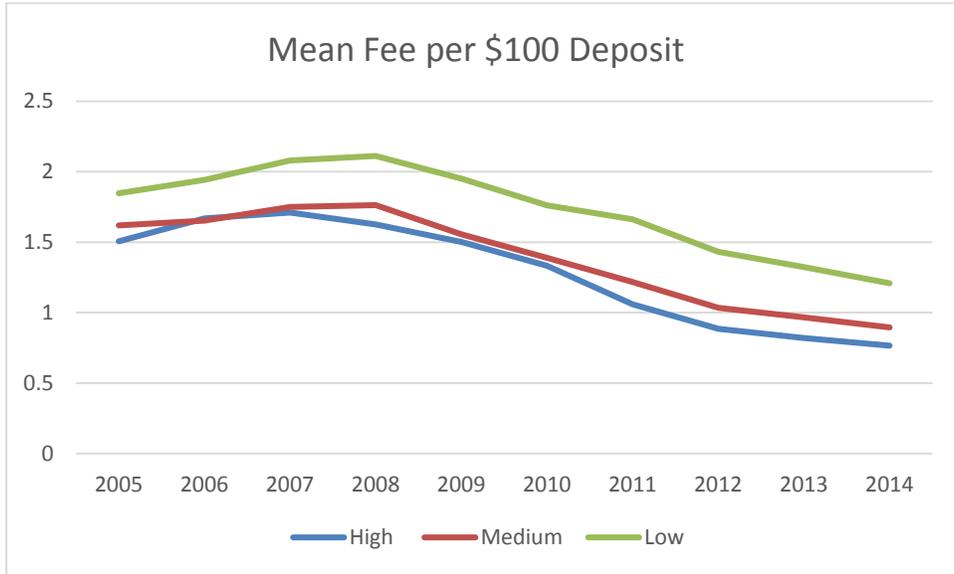| Variable Description	Mean	Std. Dev.
Bank Service Fees/ $100 Transaction Deposits	1.41	1.33
Return on Assets	1.12	0.99
Proportion of county returns with AGI less then $25k	0.43	0.07
Proportion of county returns with AGI between $25k and $75k	0.38	0.03
Bank Salary Cost per dollar asset	0.016	0.007
Bank fixed premises costs per dollar asset	0.0038	0.0019
Mean Nonaccural Other Conusmer Loans per dollar loan	0.005	0.017
County Population	494,476	1,275,979
Unemployment rate	0.07	0.03
Proportion of African Americans	0.09	0.11
Proportion of Hispanics	0.10	0.13
Proportion or people younger than 25	0.33	0.04
Proportion of people alder than 65	0.15	0.04
Proportion of people with up to high school or equilvalency education	0.48	0.11
Proportion of people with some college	0.29	0.05
Ln(Number of mega banks in County)	1.04	0.78
Ln(Total number of all bank branches in County)	3.53	1.54
Ln(Number of bank branches in County)	0.811	0.77
Herfindahl Hirschman Index	0.20	0.13
Dummy: State retricts payday lending	0.15	0.36
County percapita income '000s	3.59	0.26

Total number of observations: 40,482

Source: FFIEC, *Call Reports*; FDIC *Summary of Deposits*; IRS *Statistics on Income*; Bureau of Economic Analysis *Regional Economic Account*s; Census *American FactFinder*

Table 2: Single market Summary Statistics: RateWatch High income versus Low income

Variables	Obs	Mean	Std. Dev.	Min	Max
Entire Sample					
NSF	6830	25.37	5.28	0	50
Int_month	6830	7.86	3.52	0	30
Non_int_month	6830	2.73	3.37	0	25
int minimum	6549	1212	1869	4	50000
Non Int Minimum	3007	489	587	0	20000
Max daily nsf	1395	119	66	0	1000
High income Counties					
NSF	2875	26.03	5.15	0	45
Int_month	2875	8.32	3.88	0	30
Non_int_month	2875	2.70	3.68	0	25
int minimum	2732	1386	2517	5	50000
Non Int Minimum	1116	517	731	0	20000
No fee - noninterest	2875	0.56	0.50	0	1
Max daily nsf	613	121	61	0	640
Low income Counties					
NSF	805	24.81	5.08	0	36
Int_month	805	7.56	2.93	0	17.35
Non_int_month	805	3.34	2.98	0	15
int minimum	775	1126	719	100	10000
Non Int Minimum	448	494	391	50	5000
No fee - noninterest	805	0.34	0.47	0	1
Max daily nsf	105	124	66	15	300

Source: Ratewatch, Deposit, Loan, and Fee Data

Chart 1

Mean Fee per $100 Deposit

High · Medium · Low

Chart 2

Mean ROA

High · Medium · Low

Chart 3

Mean NSF

Source: Ratewatch Deposit, Loan, and Fee Data

Chart 4

Mean Non-Interest Checking Fee
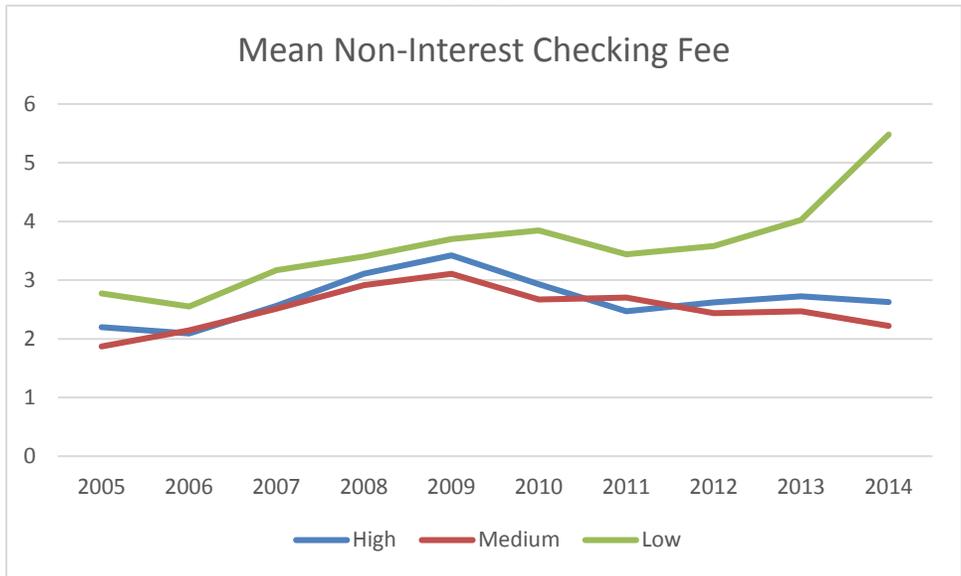
Source: Ratewatch, Deposit, Loan, and Fee Data

Chart 5

Mean Interest Checking Fee
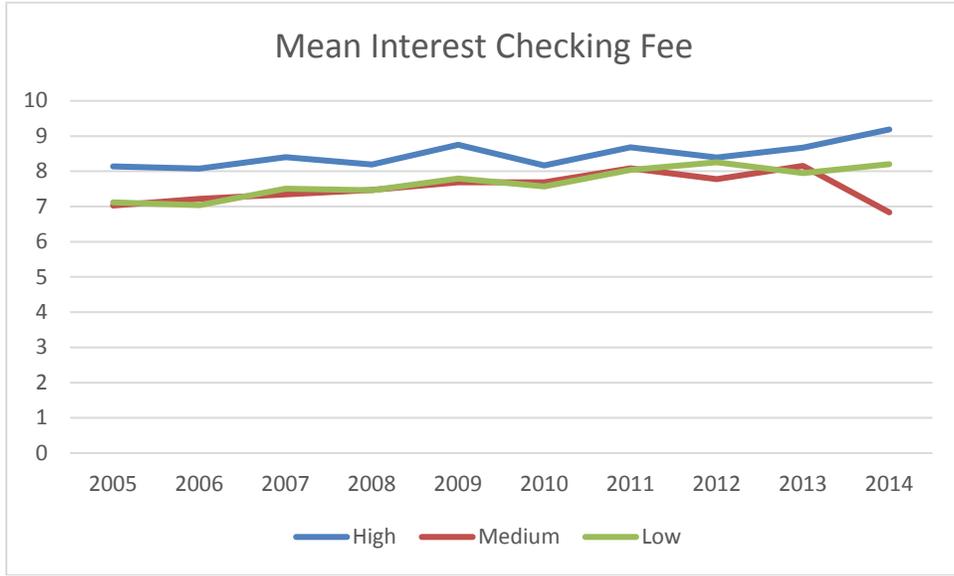
Source: Ratewatch, Deposit, Loan, and Fee Data

Table 3: Fee per $100 Deposit Regressions

Specification:			Bank-County-Yr (High income Counties Only)	
Observation Type	Bank-County-Yr	Bank-County-Yr		Bank-County-Year
Dep Var	Ln(Fee/Deps)	Ln(Fee/Deps)	Ln(Fee/Deps)	Return on Assets
Sample Start	2005	2005	2005	2005
Sample End	2014	2014	2014	2014
Observations	40582	40582	17071	40582
r2_p	0.29	0.30	0.28	0.20
Variables	Coefficient Estimates			
Prop_African_Am	0.12***	0.43***	-0.15	-0.20***
Prop_Hispanic	-0.20***	0.012	-0.66**	-0.16***
Prop_under25	0.50***	0.44**	-0.13	0.82***
Prop_over65	-2.20***	-1.23***	-4.13***	-0.36
Prop_High_School	0.41***	-0.037	0.30**	0.35***
Prop_Some_College	-0.21	-0.88***	-0.63***	0.07
Unemployment rate	-0.98***	-1.01***	1.01*	-4.69***
Ln_megabk_cnty	-0.12***	-0.12***	-0.16***	-0.03***
Ln_Br_cnty	-0.18***	-0.13***	0.009	-0.26***
HHI	-0.28***	-0.20***	-0.33***	0.041
Ln_Num_Branches	0.39***	0.40***	0.46***	0.25***
Prop Below $25,000	1.55***		2.06***	0.98***
Prop $25k to $75k	-0.53***		-0.053***	-0.53***
Ln salary costs per asset	0.24***	0.24***	0.23***	-0.12***
Ln capital costs per asset	0.15***	0.15***	0.14***	-0.50***
Charge offs per $ loan	2.02***	2.21***	2.13***	-2.25***
Restrict PayDay	-0.03**	-0.032**	-0.09***	-0.29***
Ln Population	-0.09***	0.05***	-0.05**	0.17***
Ln percapita Income		-0.52***		
Year Dummy Variables	Y	Y	Y	Y

*0.1 **0.05 ***0.01

Table 4: RateWatch - Single market only

Specification:			
Observation Type	Bank-County-Yr	Bank-County-Yr	Bank-County-Yr
Dep Var	Ln(NSF)	Ln(IntCheck)	Ln(NonIntCheck)
Sample Start	2005	2005	2005
Sample End	2014	2014	2014
Observations	6830	6830	6830
r2_p	0.33	0.08	0.07
Variables	Coefficient Estimates		
Prop_African_Am	0.21***	0.41***	0.84***
Prop_Hispanic	-0.07***	0.27***	1.14***
Prop_under25	-0.08	-0.08	-0.11
Prop_over65	-0.27***	0.24	0.59
Prop_High_School	0.004	0.33***	1.16***
Prop_Some_College	-0.11	0.50***	-0.22
Unemployment rate	0.70***	-0.43	0.92
Ln_megabk_cnty	0.088***	0.06***	0.037*
Ln_Br_cnty	-0.07**	0.006	-0.029**
HHI	0.003	0.39***	0.61***
Ln_Num_Branches	0.051***	0.014*	-0.051***
Prop Below $25,000	0.003	0.12	-1.06***
Prop $25k to $75k	-0.25	-0.70***	-1.87***
Ln salary costs per asset	-0.051***	-0.001	0.11***
Ln capital costs per asset	0.082***	0.046***	-0.07**
Charge offs per $ loan	-0.41**	-0.54	-1.55*
Restrict PayDay	0.04***	-0.18***	-0.15***
Ln Population	0.06***	0.046***	-0.03***
Year Dummy Variables	Y	Y	Y

*0.1 **0.05 ***0.01