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An Analysis of Bank Willingness to Decrease Deposit Fees

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by

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Introduction

For decades, banks have assessed numerous fees on their customers in many different facets of banking services. With regards to individuals' deposits, there are three main fees that are commonly assessed. These are overdraft and non-sufficient fund (NSF) fees, account maintenance fees, and automated teller machine (ATM) service charges. In addition to these main fees, banks also impose a few other service charge fees on deposit accounts that are collectively referred to as other service charges.

These fees levied on deposit accounts have often been criticized by many as being too severe and having a disproportionate effect on low-income customers. Individuals receiving many of these fees are often those who are financially challenged and struggle to endure such penalties. Additionally, a small portion of depositors bear the majority of the burden of these fees. Indeed, 80 percent of the revenue generated from overdraft and NSF fees comes from just 9 percent of depositors (Neely, 2023).

In recent years there has been a strong push for banks to decrease these seemingly aggressive and steep fees. A 2023 survey conducted by Bankrate found that overdraft and NSF fees as well as account maintenance fees are already on the decline, while ATM fees recently hit an all-time high (Bennett & Goldberg, 2023). Furthering the push for decreased banking fees, the Biden administration in conjunction with the Consumer Financial Protection Bureau (CFPB) recently proposed new legislation that would force banks to significantly lower their 'junk' fees (Sweet & Lewis, 2024). If passed, banks would have to lower overdraft fees to the break-even point. This would remove these fees as a profit center for banks.

While it seems as if the wheels are already in motion to continue lowering fees in the future, banks are still free to dictate their fees as they deem fit. Banks may choose to decrease or not to decrease fees for an array of reasons that are unique to each individual bank.

In this paper, I examine bank willingness to decrease deposit fees. I analyze current banks' fees and the factors that lead to changes in these fees. Using linear regression and subsequent analysis, I explore key factors in determining bank fees. I find that various factors such as 2017 deposit fee level, ROA, (log) total assets, (log) average personal deposits, population, median income, and poverty rates are significant in determining bank fee levels and changes. Additionally, I find that these factors vary by bank size. By breaking the sample banks into different size and fee classifications, interesting trends emerge in the clientele base of the banks.

Literature Review

Overdraft and non-sufficient fund (NSF) fees are utilized by banks to penalize individuals who overdraw their checking account balances. Virtually all banks have some form of overdraft and NSF fees. Often, overdraft and NSF fees are thought of as the same thing and thus have become synonymous with one another. However, these two fees are very different. Overdraft fees are fees levied when an individual spends more money than what is present in their account, and the bank allows the transaction to go through, thus over-drafting the account. When this happens, the bank essentially gives the individual a short-term loan and allows the charge to go through. The fee assessed for this service is known as an overdraft fee. When over-drafted, an individual must pay back the amount they over-drafted by as well as the fee the bank charges for the overdraft. Some banks assess fees each day the account remains in the overdrawn status.

Individuals have the ability to opt-in for overdraft protection, which guarantees (for a fee) that banks will process most overdrawn transactions. However, by not opting into this service,

banks may refuse to cover the transaction when an account becomes overdrawn. In this case, NSF fees are levied, and the bank does not allow the transaction to go through. This commonly happens when a check is written for more than what is available in the account, causing the check to 'bounce.' Unlike overdraft protection, there is no ability for depositors to opt-in or out of NSF fees. The bottom line is that overdraft and NSF fees are assessed when similar circumstances arise within an account, but each fee is associated with a different fee and outcome for the account holder (FDIC, 2021).

Account maintenance fees are fees charged to individuals by banks for having an account open. They are often charged to consumers on a monthly basis and are a way for banks to cover the cost of maintaining the accounts. Not all banks charge maintenance fees, and the fee amount varies across banks. Often, banks require a minimum balance threshold, and depositors above the threshold avoid maintenance fees (Porter, 2024).

Automated teller machine (ATM) service charges are fees charged to individuals using out-of-network ATMs. ATMs are often specific from bank to bank, but they allow customers from various banks access to funds for a fee. When using an in-network ATM, customers will often have access to their funds without fees because this is an ATM operated by their home bank. However, when using an out-of-network ATM customers will often run into ATM operator fees and out-of-network fees. ATM operator fees are charged by the bank owning the ATM to the non-customer. Out-of-network fees are charged to the customer from their own bank for using an ATM not operated by the bank (Bennett, 2024). While out-of-network fees can sometimes be waived depending on the bank, these fees are generally standard across all ATMs and serve as a way for banks to profit.

In addition to the three specific fees outlined above, banks charge a plethora of different service charge fees on deposit accounts. These fees vary from account to account and bank to bank. For reporting purposes, the remaining various fees are lumped together as 'all other service charges on deposit accounts' (FFIEC, 2024). In my analysis, I use the sum of all personal deposit fees to analyze trends of bank willingness to decrease deposit fees.

Hypotheses

I test the following hypotheses regarding the relationship between bank willingness to decrease deposit fees and bank and market characteristics. These characteristics include: 2017 deposit fee level, T1 leverage ratio, ROA, total assets, average personal deposits, bank age, bank headquarter state political affiliation, population, median income, poverty rate, and urban asset share.

Hypothesis I:

H_O: There is no relationship between bank/market characteristics and deposit service fee levels for 2018

H_A: There is a relationship between bank/market characteristics and deposit service fee levels for 2018

Hypothesis II:

H_O: There is no relationship between bank/market characteristics and deposit service fee levels for 2023

H_A: There is a relationship between bank/market characteristics and deposit service fee levels for 2023

Hypothesis III:

H_O: There is no relationship between bank/market characteristics and change in deposit fees from 2018 to 2023

H_A: There is a relationship between bank/market characteristics and change in deposit fees from 2018 to 2023

Data Description

With assistance from my research advisor, I gathered, cleaned, and synthesized data from various sources to find the appropriate variables needed for my analysis. The first main data set I retrieved was pulled from the Federal Financial Institutions Examination Council's (FFIEC) "Consolidated Reports of Condition and Income for a Bank with Domestic Offices Only". These reports are commonly referred to as bank call reports. The FFIEC is an interagency hub tasked with prescribing "uniform principles, standards, and report forms for the federal examination of financial institutions" (FFIEC, 2024). Each quarter, all national banks, state member banks, insured state nonmember banks, and savings institutions are required to complete and file with the FFIEC a truthful call report. In these reports, banks with $1billion or more in total assets are required to report their "components of service charges on deposit accounts." Within this reporting, banks break down their deposit service charges into the four categories expanded upon in the literature review. Formally, as listed in the call reports, these fees are: consumer over-draft related charges, consumer account periodic maintenance charges, consumer customer automated teller machine fees, and all other service charges on deposit accounts (FFIEC, 2023). For my analysis, I gathered and utilized call report data over the period from quarter one of 2018 to quarter two of 2023 for banks with over one-billion dollars in assets. This time period was chosen because many banks began to lower or eliminate deposit service charge fees in 2020 and 2021. This time period provides an opportunity to measure the changes in fees across banks.

The bank sample started with 863 banks that held over $1 billion in total assets and reported deposit service charges. I removed banks that did not exist the entire period from quarter one of 2017 through quarter two of 2023 to maintain analysis integrity. The 391 banks that remained make up the research sample population. Key factors related to each of the banks such as total assets, average personal deposits, and deposit service charges as well as the generated variables described above are included in this data set.

I classified the sample banks into three categories based on bank size to provide better peer comparisons. The classifications are: community, regional, and large. Community banks are those that hold less than $10 billion in total assets, regional banks are those that hold between $10 billion and $50 billion in total assets, and large banks hold over $50 billion in total assets. Within each group there are 261, 91, and 39 banks, respectively. These three bank classifications are used throughout my analysis.

Three dependent variables are used throughout the analysis. The first variable measures deposit service fee levels for 2018. The second variable measures deposit service fee levels for 2023. These two variables were generated by taking all personal deposit service charges for the given year and dividing by average personal deposits for the corresponding year. The third variable measures the change in deposit fees from 2018 to 2023. This was computed by taking the change in all personal deposit service charges from 2018 to 2023 divided by the average of personal deposits for 2018 and 2023.

Control variables that account for bank characteristics that may affect deposit service fees include bank age, return on assets (ROA), and the tier one leverage ratio (tier one capital divided

by total assets). These variables were gathered from the 2017 bank call reports for each bank (FFIEC, 2024). I also include deposit service fee level for 2017. All else equal, banks with higher fees in 2017 have more room to lower fees during the sample period. Lagged variables are included to avoid endogeneity in the analysis.

A bank's market characteristics also could influence a bank's deposit fees. I gathered data on political affiliation on a state-wide basis for each bank in the sample. I used 2020 presidential election results by state in conjunction with bank headquarter state location to determine the political affiliation (Woolley & Peters, 2020). This is a binary variable with 1 indicating a bank with headquarters in a red (Republican) state, and 0 indicating a bank with headquarters in a blue (Democratic) state.

Additionally, using the United States Census Bureau files, I collected population, median household income, and poverty rate by state for 2017 (United States Census Bureau, 2024). Because many banks operate across state lines, I weighted these variables by the share of deposits that each bank held in each state. The deposit data come from the FDIC Summary of Deposits database. For each bank, the deposit share in each state was multiplied by respective state population, median household income, and poverty rate, and then summed across the bank. This resulted in variables indicating weighted population, weighted median household income, and weighted poverty level for each bank. Additionally, urban deposit share data was gathered. This variable indicates that the bank operates in urban or rural areas. These weighted variables more accurately portray the market area each bank serves because different markets have different factors that play a role in influencing the level of deposit service fees. Combining all the data sources described above, we have the full data set that is used throughout the analysis.

Descriptive Statistics

Summary Statistics

Table 1 shows the mean values for the three dependent variables across all bank size categories. The first column of values portrays the averages for all 391 banks in the sample. The subsequent columns show the average values broken down into the three bank sizes. All bank size categories show a decrease in deposit fee levels from 2018 to 2023. Additionally, large banks started with the lowest average initial fee level at 0.325 percent compared to community and regional banks. Large banks also ended with the lowest final fee level at 0.142 percent. Finally, community banks had the largest decrease in fees during the sample period.

Table 1. Descriptive Statistics for Dependent Variables

Dependent Variable Summary Statistics

	All Banks	Community	Regional	Large
Deposit Fees 2018	0.418%	0.442%	0.386%	0.325%
Deposit Fees 2023	0.237%	0.255%	0.226%	0.142%
Fee Change	-0.180%	-0.187%	-0.160%	-0.183%

Table 2 portrays the mean value of each independent variable used in the analysis. The mean value for the entire sample and for each bank size category is reported. Large banks had the lowest 2017 deposit fees at 0.338 percent followed by regional and community banks. The tier one leverage ratio for all three bank categories was very similar. Large banks had the highest ROA, (log) total assets, and (log) average personal deposits, followed by regional and

community banks. Additionally, large banks had an average age of 101 years while regional banks averaged 84 years and community banks 81 years. All the banks had roughly the same percentage of headquarters in red states with regional banks having the greatest percentage. Large banks served the largest weighted population, followed by regional and community banks. Interestingly, community banks served the highest median income areas with large and regional banks following. Large bank markets also had the highest weighted poverty rate and weighted urban share, followed by regional and community banks.

Table 2. Descriptive Statistics for Independent Variables

Independent Variable Summary Statistics

	All Banks	Community	Regional	Large
Deposit Fees 2017	0.425%	0.438%	0.425%	0.338%
T1 Leverage Ratio	0.103	0.104	0.099	0.099
ROA	1.04%	1.02%	1.05%	1.10%
Log Total Assets	15.40	14.66	16.18	18.56
Log Average Personal Deposits	13.96	13.23	14.70	17.20
Bank Age	84	81	84	101
Red State	0.453	0.437	0.495	0.462
Weighted Population	12,200,000	11,800,000	12,900,000	13,000,000
Weighted Median Income	61,304	61,685	60,078	61,547
Weighted Poverty	13.3%	13.1%	13.7%	13.9%
Weighted Urban Share	0.843	0.812	0.878	0.960

Quartile Analysis

In this section, I separate banks into quartiles based on their 2018 fee levels and the change in fees between 2018 and 2023. Figures 1 through 4 show a matrix quartile breakdown of the 391 banks in the data set by bank size classification. For these figures, bank quartile for initial deposit fees in 2018 is shown on the horizontal axis. Quartile 1 indicates banks with the lowest initial fees in 2018, while quartile 4 indicates banks with the highest initial fees. Quartiles for changes in deposit fees from 2018 to 2023 are displayed on the vertical axis. Banks in quartile 1 had the biggest reduction in fees over the 2018 to 2023 time period, while banks in quartile 4 had the smallest reduction of fees.

Figure 1 is the matrix showing a breakdown of fee quartile classifications for all the 391 banks within the sample. As expected, banks with the highest initial fees (quartiles 3 and 4) had the biggest reduction in fees (quartiles 1 and 2), while banks with the lowest initial fees had the smallest reduction in fees. Banks in the shaded cells, however, do not follow the expected pattern. These cells encompass banks who started with low fees and had bigger reductions (31 banks in the top-left quadrants), as well as those that started with high fees and had small reductions (32 banks in the bottom-right quadrants). These outlier banks make up 16.1 percent of the banks in the sample. Analyzing the characteristics of these 63 outlier banks may give us an understanding of their willingness or unwillingness to decrease deposit fees.

Figure 1. Matrix of Fee Quartiles – All Banks

Fee Quartile Bank Breakdown - All Banks

2018 Initial Fee Quartiles

Lowest Fees → Highest Fees

2018 to 2023 Changes in Fee Quartiles: Biggest Reduction ↓ Smallest Reduction

Quartiles	1	2	3	4
1	0	1	18	77
2	1	29	56	13
3	30	48	15	5
4	65	21	9	3

Figure 2 is the matrix showing a breakdown of fee quartile classifications for the 261 community banks. Similar to figure 1, a majority of the banks fall within expected classifications. Looking at the outlier (shaded) banks, 23 of them started with low fees and had bigger reductions, while 22 started with high fees and had small reductions. These banks are outliers from the others and make up 17.2 percent of the total community banks in the sample. Much like Figure 1, there is a symmetry to the outlier banks as well as a similar percentage of total banks as outliers.

Figure 2. Matrix of Fee Quartiles – Community Banks

Fee Quartile Bank Breakdown - Community Banks

2018 Initial Fee Quartiles

Lowest Fees → Highest Fees

2018 to 2023 Changes in Fee Quartiles: Biggest Reduction ↓ Smallest Reduction

Quartiles	1	2	3	4
1	0	0	12	53
2	1	22	36	7
3	23	30	10	2
4	41	14	7	3

Figure 3 is the matrix showing a breakdown of fee quartile classifications for the 91 regional banks. Much like figures 1 and 2, a majority of the banks fall where expected. With regards to outliers, 8 regional banks started with low fees and had bigger reductions, while 9 started with high fees and had small reductions. These outlier banks comprise 18.7 percent of the regional banks in the sample.

Figure 3. Matrix of Fee Quartiles – Regional Banks

Fee Quartile Bank Breakdown - Regional Banks

2018 Initial Fee Quartiles

Lowest Fees → Highest Fees

2018 to 2023 Changes in Fee Quartiles: Biggest Reduction ↓ Smallest Reduction

Quartiles	1	2	3	4
1	0	1	5	16
2	0	7	12	4
3	6	10	4	3
4	16	5	2	0

Figure 4 is the matrix showing a breakdown of fee quartile classifications for the 39 large banks only. In contrast to figures 1, 2 and 3, almost all the large banks fall within the expected classifications, with one outlier. The outlier bank started with high fees and had a small reduction. The outlier makes up 2.7 percent of the large banks in the sample.

Figure 4. Matrix of Fee Quartiles – Large Banks

Fee Quartile Bank Breakdown - Large Banks

2018 Initial Fee Quartiles

Lowest Fees → Highest Fees

2018 to 2023 Changes in Fee Quartiles

Biggest Reduction ↓ Smallest Reduction

Quartiles	1	2	3	4
1	0	0	1	8
2	0	0	8	2
3	1	8	1	0
4	8	2	0	0

Table 3 provides a summary of descriptive statistics for the outlier banks compared to the expected banks, as determined via the quartile analysis above. The top three variables are the dependent variables used in the analysis, while the remainder of the variables are the independent variables. Expected banks are comprised of the banks in the white cells of the matrices above, which have initial fee quartile and changes in fee quartile that were to be expected. Outlier low banks are those banks in the top-left shaded cells that started with low fees and had a big reduction in fees, while outlier high banks are those found in the bottom-right shaded cells that started with high fees and had small fee reductions.

When comparing the three classification columns, differences emerge that help give a better understanding of the market that these outlier banks serve compared to expected banks. Banks in the outlier low classification had both an average initial fee level and ending fee level that was much lower than the outlier high group. Additionally, the average fee change in the outlier low group is over 0.10 percentage points greater than the outlier high group that saw a decrease in rates, on average, of just 0.034 percent.

Looking at the dependent variables, there are many interesting trends seen between the outlier groups. Average ROA for banks in the outlier high group is 14 basis points lower than those in the outlier low group. Additionally, both outlier groups have a lower average ROA compared to the expected banks. Banks in the outlier high group had, on average, greater (log) total assets and (log) average personal deposits, when compared to the outlier low group. However, both outlier groups had lower (log) total assets and (log) average personal deposits than the expected group. Interestingly, outlier low banks had a greater percent of banks headquartered in states that voted for the Democratic presidential candidate in 2020 compared to outlier high banks. Banks with headquarters in states that voted for the Republican candidate were more likely to have higher fees and less of a fee reduction. Outlier low banks served over two million more of the weighted population than outlier high banks. Additionally, average weighted median income for outlier low banks was 7,064 dollars higher than that for outlier high banks, indicating that the banks that began with higher rates and decreased them the least serviced a lower income population base. On top of that, outlier low banks had a lower weighted poverty rate and higher weighted urban share than outlier high banks. It is interesting that the banks in the outlier high group that service a poorer and more rural population had higher initial fees and maintained these high fees.

Table 3. Descriptive Statistics for Outlier Banks

Outlier Bank Summary Statistics

	Expected Banks	Outlier Low Banks	Outlier High Banks
Deposit Fees 2018	0.433%	0.229%	0.446%
Deposit Fees 2023	0.234%	0.093%	0.412%
Fee Change	-0.199%	-0.137%	-0.034%
Deposit Fees 2017	0.442%	0.238%	0.435%
T1 Leverage Ratio	0.103	0.098	0.102
ROA	1.05%	1.02%	0.88%
Log Total Assets	15.47	14.92	15.25
Log Average Personal Deposits	14.01	13.63	13.82
Bank Age	84	89	84
Red State	0.448	0.323	0.625
Weighted Population	12,400,000	11,800,000	9,550,000
Weighted Median Income	61,536	63,664	56,600
Weighted Poverty	13.3%	12.4%	14.6%
Weighted Urban Share	0.851	0.836	0.770

The above matrices coupled with the outlier descriptive statistics give a good idea as to the fee classification of the banks in the sample, both in total and broken down by size. In the appendix, further evaluation of these breakdowns is found. Key trends apparent in each category based on average 2018 fee level, average fee level change from 2018 to 2023, and the ratio of average personal deposits to total assets are discussed in detail there. Having a firm grasp of the composition of the data and key variables within each quartile, provides a solid foundation to build upon in my subsequent analysis.

Regression Results and Discussion

To analyze factors impacting bank willingness to decrease deposit fees, I ran multiple linear regressions using ordinary least squares (OLS) on all the banks in my sample combined, as well as each bank size category individually. For each of these four classifications I ran three regressions each to explain deposit fees in 2018, deposit fees in 2023, and change in deposit fees from 2018 to 2023 as a function of 2017 bank and market characteristics. A ten percent significance level is used throughout my analysis.

All Banks

Table 4 shows the results for deposit fees levels in 2018 for all banks combined. The coefficient on deposit fees in 2017 is positive and statistically significant. The coefficients on ROA and weighted population are both negative and statistically significant. Thus, as ROA and weighted population increase, 2018 fee levels decrease. In predicting 2018 fee levels, deposit fees from the prior year as well as ROA and weighted population are significant factors.

Table 4. Regression Results – All Banks Initial Fee Level

Overall Fee Level in 2018

Dependent Variable: Personal Deposit Service Charges to Average Personal Deposits in 2018 (Deposit Fees 2018)

Probablitly > F: 0.000 R-Squared: 0.8476

	Coefficient	Std. Error	t-Statistic	P-Value
Deposit Fees 2017	0.9501	0.023	41.55	0
T1 Leverage Ratio	-0.3519	0.584	-0.6	0.547
ROA	-0.0377	0.021	-1.76	0.08
Log Total Assets	0.0232	0.020	1.18	0.237
Log Avergage Personal Deposits	-0.0228	0.017	-1.35	0.178
Bank Age	-0.0001	0.000	-0.58	0.566
Red State	0.0019	0.035	0.05	0.956
Weighted Population	-2.64E-09	0.000	-1.88	0.061
Weighted Median Income	0.0000	0.000	-0.35	0.729
Weighted Poverty	-0.0025	0.007	-0.37	0.709
Weighted Urban Stare	0.0373	0.061	0.61	0.544
Constant	0.1612	0.277	0.58	0.561

Table 5 provides the regression results for deposit fee levels in 2023 for all the banks combined. The coefficient on deposit fees in 2017 is positive and statistically significant, but the coefficient value of 0.43 is much less than the value of 0.95 shown in Table 4. As banks move further from 2017, deposit fees in 2017 become less important in predicting deposit fees. Additionally, ROA is negative and statistically significant, indicating that as ROA increases, 2023 deposit fees decreased.

Table 5. Regression Results – All Banks Final Fee Level

Overall Fee Level in 2023

Dependent Variable: Personal Deposit Service Charges to Average Personal Deposits in 2023 (Deposit Fees 2023)

Probablitly > F: 0.000 R-Squared: 0.6874

	Coefficient	Std. Error	t-Statistic	P-Value
Deposit Fees 2017	0.4330	0.017	25.1	0
T1 Leverage Ratio	0.2083	0.440	0.47	0.636
ROA	-0.0643	0.016	-3.98	0
Log Total Assets	0.0083	0.015	0.56	0.577
Log Avergage Personal Deposits	-0.0172	0.013	-1.35	0.179
Bank Age	-0.0001	0.000	-0.73	0.468
Red State	0.0323	0.027	1.22	0.225
Weighted Population	0.0000	0.000	-0.69	0.49
Weighted Median Income	0.0000	0.000	-0.19	0.846
Weighted Poverty	0.0013	0.005	0.26	0.797
Weighted Urban Stare	-0.0090	0.046	-0.19	0.846
Constant	0.2329	0.209	1.12	0.265

Table 6 provides the regression results for change in personal deposit service charges from 2018 to 2023 for all the banks combined. Deposit fees in 2017 is negative and statistically significant, showing that, on average, banks with higher fees in 2017 had higher reductions in fees. Additionally, ROA is negative and statistically significant, while weighted population is

positive and statistically significant. Banks with higher ROA had a bigger decrease in fees and banks with a greater weighted population saw less of a decrease in fees.

Table 6. Regression Results – All Banks Change in Fee Level

Overall Change in Deposit Fees 2018 to 2023

Dependent Variable: Change in Personal Deposit Service Charges to Average Personal Deposits from 2018 to 2023 (Fee Change)

Probablitly > F: 0.000 R-Squared: 0.7685

	Coefficient	Std. Error	t-Statistic	P-Value
Deposit Fees 2017	-0.5171	0.016	-32.73	0
T1 Leverage Ratio	0.5601	0.403	1.39	0.166
ROA	-0.0266	0.015	-1.8	0.073
Log Total Assets	-0.0150	0.014	-1.1	0.27
Log Avergage Personal Deposits	0.0056	0.012	0.48	0.63
Bank Age	0.0000	0.000	0.04	0.969
Red State	0.0303	0.024	1.25	0.213
Weighted Population	1.91E-09	0.000	1.97	0.05
Weighted Median Income	0.0000	0.000	0.29	0.772
Weighted Poverty	0.0038	0.005	0.82	0.412
Weighted Urban Stare	-0.0463	0.042	-1.09	0.276
Constant	0.0717	0.191	0.37	0.708

Community Banks

Table 7 shows the results for deposit fees in 2018 for community banks. Deposit fees in 2017 is positive and statistically significant. Additionally, unlike the full-sample results, ROA is insignificant, however (log) total assets is positive and significant and (log) average personal deposits is negative and significant. This indicates that fees at community banks are higher for banks with greater total assets and lower for banks with greater average personal deposits.

Table 7. Regression Results – Community Banks Initial Fee Level

Community Banks Fee Level in 2018

Dependent Variable: Personal Deposit Service Charges to Average Personal Deposits in 2018 (Deposit Fees 2018)

Probablitly > F: 0.000 R-Squared: 0.8972

	Coefficient	Std. Error	t-Statistic	P-Value
Deposit Fees 2017	0.9899	0.023	42.17	0
T1 Leverage Ratio	-0.3801	0.589	-0.65	0.519
ROA	-0.0299	0.023	-1.29	0.2
Log Total Assets	0.0986	0.033	3.02	0.003
Log Avergage Personal Deposits	-0.0532	0.018	-2.96	0.003
Bank Age	-0.0001	0.000	-0.44	0.658
Red State	0.0188	0.040	0.46	0.643
Weighted Population	0.0000	0.000	-1.55	0.122
Weighted Median Income	0.0000	0.000	-0.09	0.93
Weighted Poverty	-0.0013	0.008	-0.17	0.867
Weighted Urban Stare	0.0717	0.061	1.18	0.237
Constant	-0.6545	0.457	-1.43	0.153

Table 8 illustrates the regression results for deposit fees in 2023 for community banks. The coefficient on deposit fees in 2017 is positive and statistically significant with a smaller t-statistic than in table 7. ROA is negative and statistically significant. These are consistent with the findings for overall banks. Additionally, red state is positive and statistically significant. This indicates that banks that are headquartered in states that voted Republican in 2020 have a higher 2023 fee level.

Table 8. Regression Results – Community Banks Final Fee Level

Community Banks Fee Level in 2023

Dependent Variable: Personal Deposit Service Charges to Average Personal Deposits in 2023 (Deposit Fees 2023)

Probablitly > F: 0.000 R-Squared: 0.7549

	Coefficient	Std. Error	t-Statistic	P-Value
Deposit Fees 2017	0.4252	0.018	24.05	0
T1 Leverage Ratio	0.0030	0.444	0.01	0.995
ROA	-0.0373	0.017	-2.13	0.034
Log Total Assets	0.0368	0.025	1.5	0.136
Log Avergage Personal Deposits	-0.0178	0.014	-1.32	0.19
Bank Age	-0.0001	0.000	-0.55	0.58
Red State	0.0570	0.030	1.87	0.062
Weighted Population	0.0000	0.000	-0.65	0.517
Weighted Median Income	0.0000	0.000	0.26	0.797
Weighted Poverty	0.0045	0.006	0.77	0.444
Weighted Urban Stare	0.0015	0.046	0.03	0.975
Constant	-0.3035	0.344	-0.88	0.379

Table 9 provides the regression output for change in personal deposit service charges from 2018 to 2023 for community banks. The coefficient on deposit fees in 2017 is negative and statistically significant, again showing that higher fees in 2017 lead to smaller changes in fees. Additionally, (log) total assets is negative and significant, while (log) average personal deposits is positive and significant. This is consistent with the findings for 2018 fee level in community banks.

Table 9. Regression Results – Community Banks Change in Fee Level

Community Banks Change in Deposit Fees 2018 to 2023

Dependent Variable: Change in Personal Deposit Service Charges to Average Personal Deposits from 2018 to 2023 (Fee Change)

Probablitly > F: 0.000 R-Squared: 0.8242

	Coefficient	Std. Error	t-Statistic	P-Value
Deposit Fees 2017	-0.5648	0.018	-31.63	0
T1 Leverage Ratio	0.3831	0.448	0.85	0.393
ROA	-0.0074	0.018	-0.42	0.675
Log Total Assets	-0.0618	0.025	-2.49	0.014
Log Avergage Personal Deposits	0.0354	0.014	2.59	0.01
Bank Age	0.0000	0.000	0.03	0.972
Red State	0.0382	0.031	1.24	0.215
Weighted Population	0.0000	0.000	1.39	0.164
Weighted Median Income	0.0000	0.000	0.37	0.711
Weighted Poverty	0.0058	0.006	0.98	0.328
Weighted Urban Stare	-0.0703	0.046	-1.53	0.128
Constant	0.3510	0.347	1.01	0.313

Regional Banks

Table 10 shows the results for deposit fees in 2018 for regional banks. The coefficients on deposit fees in 2017 is positive and statistically significant. Additionally, much like the entire sample regression, ROA is negative and significant.

Table 10. Regression Results – Regional Banks Initial Fee Level

Regional Banks Fee Level in 2018

Dependent Variable: Personal Deposit Service Charges to Average Personal Deposits in 2018 (Deposit Fees 2018)

Probablitly > F: 0.000 R-Squared: 0.7051

	Coefficient	Std. Error	t-Statistic	P-Value
Deposit Fees 2017	0.6948	0.078	8.93	0
T1 Leverage Ratio	0.1774	2.454	0.07	0.943
ROA	-0.3324	0.077	-4.3	0
Log Total Assets	-0.0551	0.082	-0.67	0.506
Log Avergage Personal Deposits	0.0797	0.059	1.35	0.18
Bank Age	-0.0002	0.001	-0.28	0.781
Red State	0.0010	0.093	0.01	0.991
Weighted Population	0.0000	0.000	-0.5	0.618
Weighted Median Income	0.0000	0.000	-0.53	0.599
Weighted Poverty	-0.0097	0.021	-0.47	0.643
Weighted Urban Stare	-0.2574	0.240	-1.07	0.287
Constant	0.7818	1.142	0.68	0.496

Table 11 contains the regression results for deposit fees in 2023 for regional banks. The coefficient on deposit fees in 2017 is positive and statistically significant, while that of ROA is negative and significant. These findings are consistent with the entire sample as well as community banks.

Table 11. Regression Results – Regional Banks Final Fee Level

Regional Banks Fee Level in 2023

Dependent Variable: Personal Deposit Service Charges to Average Personal Deposits in 2023 (Deposit Fees 2023)

Probablitly > F: 0.000 R-Squared: 0.6309

	Coefficient	Std. Error	t-Statistic	P-Value
Deposit Fees 2017	0.4029	0.062	6.45	0
T1 Leverage Ratio	1.5506	1.970	0.79	0.434
ROA	-0.3498	0.062	-5.63	0
Log Total Assets	-0.0192	0.066	-0.29	0.773
Log Avergage Personal Deposits	0.0464	0.047	0.98	0.33
Bank Age	-0.0004	0.001	-0.66	0.512
Red State	0.0620	0.075	0.83	0.409
Weighted Population	0.0000	0.000	-0.04	0.97
Weighted Median Income	0.0000	0.000	0.23	0.82
Weighted Poverty	-0.0001	0.017	-0.01	0.993
Weighted Urban Stare	-0.2024	0.193	-1.05	0.297
Constant	-0.0286	0.917	-0.03	0.975

Table 12 shows the regression results for change in personal deposit service charges from 2018 to 2023 for regional banks. Deposit fees in 2017 is positive and statistically significant.

Table 12. Regression Results – Regional Banks Change in Fee Level

Regional Banks Change in Deposit Fees 2018 to 2023

Dependent Variable: Change in Personal Deposit Service Charges to Average Personal Deposits from 2018 to 2023 (Fee Change)

Probablitly > F: 0.000 R-Squared: 0.5969

	Coefficient	Std. Error	t-Statistic	P-Value
Deposit Fees 2017	-0.2920	0.037	-7.82	0
T1 Leverage Ratio	1.3731	1.178	1.17	0.248
ROA	-0.0173	0.037	-0.47	0.642
Log Total Assets	0.0359	0.040	0.91	0.367
Log Avergage Personal Deposits	-0.0333	0.028	-1.18	0.242
Bank Age	-0.0002	0.000	-0.52	0.604
Red State	0.0610	0.045	1.37	0.176
Weighted Population	0.0000	0.000	0.98	0.33
Weighted Median Income	0.0000	0.000	1.48	0.143
Weighted Poverty	0.0096	0.010	0.96	0.342
Weighted Urban Stare	0.0550	0.115	0.48	0.634
Constant	-0.8105	0.548	-1.48	0.144

Large Banks

Table 13 contains the regression results for deposit fees in 2018 for large banks. The coefficient on deposit fees in 2017 is positive and statistically significant. Coefficients on weighted median income as well as weighted poverty are both negative and significant. This indicates that large banks with higher median income and/or poverty levels have lower 2018 fee levels.

Table 13. Regression Results – Large Banks Initial Fee Level

Large Banks Fee Level in 2018

Dependent Variable: Personal Deposit Service Charges to Average Personal Deposits in 2018 (Deposit Fees 2018)

Probablitly > F: 0.000 R-Squared: 0.9968

	Coefficient	Std. Error	t-Statistic	P-Value
Deposit Fees 2017	1.0089	0.016	63.28	0
T1 Leverage Ratio	0.1484	0.213	0.70	0.493
ROA	0.0037	0.006	0.63	0.536
Log Total Assets	-0.0001	0.008	-0.01	0.991
Log Avergage Personal Deposits	-0.0003	0.007	-0.04	0.968
Bank Age	0.0000	0.000	0.14	0.89
Red State	-0.0073	0.010	-0.75	0.46
Weighted Population	0.0000	0.000	1.58	0.127
Weighted Median Income	-2.91E-06	0.000	-3.14	0.004
Weighted Poverty	-0.0064	0.002	-4.00	0.000
Weighted Urban Stare	0.0052	0.062	0.08	0.934
Constant	0.2340	0.088	2.66	0.013

Table 14 reports the regression results for deposit fees in 2023 for large banks. Deposit fees in 2017 is positive and statistically significant. Additionally, weighted median income is negative and significant, indicating that large banks with higher median income depositors have lower 2023 fees.

Table 14. Regression Results – Large Banks Final Fee Level

Large Banks Fee Level in 2023

Dependent Variable: Personal Deposit Service Charges to Average Personal Deposits in 2023 (Deposit Fees 2023)

Probablitly > F: 0.000 R-Squared: 0.9017

	Coefficient	Std. Error	t-Statistic	P-Value
Deposit Fees 2017	0.4383	0.042	10.39	0
T1 Leverage Ratio	0.7392	0.564	1.31	0.202
ROA	0.0137	0.016	0.87	0.391
Log Total Assets	0.0225	0.020	1.11	0.278
Log Avergage Personal Deposits	-0.0154	0.019	-0.81	0.423
Bank Age	0.0003	0.000	1.4	0.172
Red State	-0.0400	0.026	-1.55	0.134
Weighted Population	0.0000	0.000	0.9	0.378
Weighted Median Income	-4.50E-06	0.000	-1.84	0.078
Weighted Poverty	-0.0061	0.004	-1.44	0.162
Weighted Urban Stare	0.0440	0.163	0.27	0.79
Constant	0.0521	0.233	0.22	0.825

Table 15 shows the regression results for change in personal deposit service charges from 2018 to 2023 for large banks. Deposit fees in 2017 is positive and statistically significant.

Table 15. Regression Results – Large Banks Change in Fee Level

Large Banks Change in Deposit Fees 2018 to 2023

Dependent Variable: Change in Personal Deposit Service Charges to Average Personal Deposits from 2018 to 2023 (Fee Change)

Probablitly > F: 0.000 R-Squared: 0.9239

	Coefficient	Std. Error	t-Statistic	P-Value
Deposit Fees 2017	-0.5706	0.045	-12.58	0
T1 Leverage Ratio	0.5908	0.606	0.98	0.339
ROA	0.0100	0.017	0.59	0.560
Log Total Assets	0.0226	0.022	1.03	0.311
Log Avergage Personal Deposits	-0.0152	0.020	-0.74	0.464
Bank Age	0.0003	0.000	1.26	0.220
Red State	-0.0326	0.028	-1.18	0.250
Weighted Population	0.0000	0.000	0.28	0.783
Weighted Median Income	0.0000	0.000	-0.6	0.552
Weighted Poverty	0.0003	0.005	0.07	0.948
Weighted Urban Stare	0.0388	0.175	0.22	0.827
Constant	-0.1820	0.250	-0.73	0.474

Given these regression results, I find that I can reject all three of my null hypotheses in favor of the alternative hypotheses at the ten percent level. Thus, I conclude that:

1. There is a relationship between bank/market characteristics and deposit service fee levels for 2018 (hypothesis I)
2. There is a relationship between bank/market characteristics and deposit service fee levels for 2023 (hypothesis II), and
3. There is a relationship between bank/market characteristics and change in deposit fees from 2018 to 2023 (hypothesis III).

Conclusions

In this paper, I examined the relationship between deposit service fee levels in 2018, deposit service fee levels in 2023, and the change in deposit service fee levels from 2018 to 2023 in community, regional, and large banks as it relates to bank characteristics and deposit share make up. I found that within each bank size classification, different variables are significant in determining deposit service fee levels.

When looking at the market composition of the expected sample banks as well as the outliers with lower fees and high reductions, and the outliers with higher fees and little reductions, many interesting trends are apparent. Notably, 2017 deposit fees, T1 leverage ratio, (log) total assets, (log) average personal deposits, red state, and weighted poverty level are all higher for banks in the outlier high group as opposed to the outlier low group. Additionally, ROA, bank age, weighted population, weighted median income, and weighted urban share are all lower for banks in the outlier high group compared to the outlier low group. It is interesting that banks with a market composition in places with higher poverty, lower median income, and lower urban share are those that began with the highest fees and saw the lowest reduction in fees.

Looking at the regression analysis, with regards to 2018 fee levels, 2017 deposit fees were positive and statistically significant across all bank sizes. For the sample with all banks as well as regional banks, ROA was negative and significant. Weighted population was negative and statistically significant in the overall bank regression. Within community banks, (log) total assets was positive and significant, while (log) average personal deposits was negative and significant. Looking at large banks, weighted median income and weighted poverty level were both negative and statistically significant. Across all banks, the main variable in determining 2018 fee level appears to be 2017 fee level.

Looking at 2023 fee levels, once again 2017 deposit fees were positive and statistically significant for all bank sizes. ROA was negative and significant for the overall bank sample as well as community and regional banks. Interestingly, red state was positive and significant in community banks. For large banks, weighted median income was negative and statistically significant. In sum, much like 2018 fee levels, the main variable used in determining 2023 fee levels is 2017 fee level.

For the change in deposit fees from 2018 to 2023, deposit fee levels in 2017 was negative and statistically significant across all groups and was the only significant variable for regional and large banks. In the overall bank sample, ROA was negative and significant, while weighted population was positive and significant. For community banks, (log) total assets was negative and significant while (log) average personal deposits was positive and significant. Overall, 2017 deposit fees is the main variable in determining change in deposit fees.

As seen throughout my analysis, banks use a wide array of factors when determining the levels of fees to charge on personal deposits. From prior fee levels to key factors concerning bank size, banks rely on many different variables to determine optimal fee level. Banks also tailor their fees to their given markets based on the characteristics and make-up of their clientele. All in all, the future of bank personal deposit fees is uncertain and will be an interesting area to keep focus on in the coming years.

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Appendix

Breakdown of Key Quartile Trends

Figure 5 represents the average fee level in 2018 of the banks that fall within each quartile classification for community banks. This is the beginning fee level used in my analysis. Examining the average fee level for each of the matrix blocks reveals a great deal about the banks classified in each group. It is interesting to note the average starting fees in the shaded outlier groups as opposed to their counterparts.

Figure 5. Matrix of Average 2018 Fee Level with Respect to Quartiles – Community Banks

2018 Average Fee Level (in percent) - Community Banks

2018 to 2023 Changes in Fee Quartiles	2018 Initial Fee Quartiles: Lowest Fees → Highest Fees			
Quartiles	1	2	3	4
1 (Biggest Reduction)	-	-	0.46	1.23
2	0.11	0.22	0.39	0.59
3	0.08	0.18	0.36	0.81
4 (Smallest Reduction)	0.04	0.18	0.35	0.80

Figure 6 represents the average fee level change, in percentage points, for community banks from 2018 to 2023. This matrix represents what you would expect to see with the magnitude of the level of change mostly increasing as you go across the rows to the right and decreasing as you go down the columns. It is interesting to note that in row four, banks with the smallest fee reduction actually increased their fees slightly. This is especially surprising for banks in columns three and four for this row, as these banks started with the highest fees and ended up increasing their fees even higher.

Figure 6. Matrix of Average Fee Level Change with Respect to Quartiles – Community Banks

Average Fee Level Change from 2018 to 2023 (in percentage points) - Community Banks

2018 to 2023 Changes in Fee Quartiles	2018 Initial Fee Quartiles: Lowest Fees → Highest Fees			
Quartiles	1	2	3	4
1 (Biggest Reduction)	-	-	-0.28	-0.63
2	-0.10	-0.13	-0.16	-0.16
3	-0.05	-0.07	-0.07	-0.06
4 (Smallest Reduction)	0.02	0.03	0.03	0.09

Figure 7 shows the ratio of average personal deposits to total assets for community banks within each quartile classification. These averages are relatively equally dispersed across all quartiles and range from 0.38 to 0.23. This dispersion may be indicative that banks are not weighing average personal deposits heavily when making decisions regarding deposit fees.

Figure 7. Matrix of Average Personal Deposits Over Total Assets with Respect to Quartiles – Community Banks

Ratio of Average Personal Deposits Over Total Assets - Community Banks

2018 to 2023 Changes in Fee Quartiles	2018 Initial Fee Quartiles: Lowest Fees → Highest Fees			
Quartiles	1	2	3	4
1 (Biggest Reduction)	-	-	0.38	0.31
2	0.32	0.28	0.31	0.29
3	0.23	0.32	0.31	0.28
4 (Smallest Reduction)	0.24	0.26	0.21	0.29

Figure 8 represents the average fee level in 2018 of the banks that fall within each quartile classification for regional banks. This matrix appears to be similar to figure 5 in the sense that banks contained on the upper left side had a higher average starting fee than their counterparts in the lower left side and banks on the lower right side had lower initial starting fees than their counterparts in the upper right side.

Figure 8. Matrix of Average 2018 Fee Level with Respect to Quartiles – Regional Banks

2018 Average Fee Level (in percent) - Regional Banks

2018 to 2023 Changes in Fee Quartiles	2018 Initial Fee Quartiles: Lowest Fees → Highest Fees			
Quartiles	1	2	3	4
1 (Biggest Reduction)	-	0.22	0.42	1.02
2	-	0.27	0.38	0.61
3	0.08	0.19	0.35	0.57
4 (Smallest Reduction)	0.03	0.18	0.38	-

Figure 9 represents the average fee level change, in percentage points, for regional banks from 2018 to 2023. Much like figure 6, this matrix represents what you would expect to see. For the most part, the magnitude of the level of change increases as you go across the rows to the right and decreases as you go down the columns. Once again, the banks in the final row had no fee change or a positive fee increase. In general, the spread of fee change is much less for regional banks than it was for community banks.

Figure 9. Matrix of Average Fee Level Change with Respect to Quartiles – Regional Banks

Average Fee Level Change from 2018 to 2023 (in percentage points) - Regional Banks

2018 to 2023 Changes in Fee Quartiles	2018 Initial Fee Quartiles: Lowest Fees → Highest Fees			
Quartiles	1	2	3	4
1 (Biggest Reduction)	-	-0.21	-0.28	-0.49
2	-	-0.15	-0.16	-0.18
3	-0.04	-0.08	-0.08	-0.09
4 (Smallest Reduction)	0.00	0.04	0.00	-

Figure 10 shows the ratio of average personal deposits to total assets for regional banks within each quartile classification. Much like community banks, the averages are relatively equally dispersed across all quartiles. These ratios range from 0.35 to 0.22.

Figure 10. Matrix of Average Personal Deposits Over Total Assets with Respect to Quartiles – Regional Banks

Ratio of Average Personal Deposits Over Total Assets - Regional Banks

2018 to 2023 Changes in Fee Quartiles	2018 Initial Fee Quartiles: Lowest Fees → Highest Fees			
	1	2	3	4
Biggest Reduction ↓ Smallest Reduction				
1	-	0.31	0.26	0.27
2	-	0.28	0.33	0.35
3	0.22	0.29	0.26	0.22
4	0.26	0.23	0.29	-

Figure 11 represents the average fee level in 2018 of the banks that fall within each quartile classification for large banks. The matrix of average initial fee level is what you would expect to see with initial fees decreasing as you go down columns and increasing as you go across.

Figure 11. Matrix of Average 2018 Fee Level with Respect to Quartiles – Large Banks

2018 Average Fee Level (in percent) - Large Banks

2018 to 2023 Changes in Fee Quartiles	2018 Initial Fee Quartiles: Lowest Fees → Highest Fees			
	1	2	3	4
Biggest Reduction ↓ Smallest Reduction				
1	-	-	0.49	0.72
2	-	-	0.40	0.52
3	0.06	0.18	0.39	-
4	0.01	0.11	-	-

Figure 12 represents the average fee level change, in percentage points, for large banks from 2018 to 2023. In similar fashion to figures 6 and 9, this matrix appears as one would expect, with the magnitude of the level of change mostly increasing as you go across the rows to the right and decreases as you go down the columns.

Figure 12. Matrix of Average Fee Level Change with Respect to Quartiles – Large Banks

Average Fee Level Change from 2018 to 2023 (in percentage points) - Large Banks

2018 to 2023 Changes in Fee Quartiles	2018 Initial Fee Quartiles: Lowest Fees → Highest Fees			
	1	2	3	4
Biggest Reduction ↓ Smallest Reduction				
1	-	-	-0.42	-0.41
2	-	-	-0.24	-0.24
3	-0.04	-0.09	-0.18	-
4	0.00	-0.02	-	-

Figure 13 shows the ratio of average personal deposits to total assets for large banks within each quartile classification. Similar to figures 7 and 10 for community and regional banks, the averages are relatively equally dispersed across all quartiles with the ratios ranging from 0.40 to 0.17.

Figure 13. Matrix of Average Personal Deposits Over Total Assets with Respect to Quartiles – Large Banks

Ratio of Average Personal Deposits Over Total Assets - Regional Banks

2018 Initial Fee Quartiles

Lowest Fees → Highest Fees

2018 to 2023 Changes in Fee Quartiles

Biggest Reduction ↓ Smallest Reduction

Quartiles	1	2	3	4
1	-	-	0.20	0.33
2	-	-	0.40	0.27
3	0.22	0.23	0.36	-
4	0.29	0.17	-	-

Taking the analysis of the matrixes above as a whole, it is evident that many of the trends seen are to be expected and each bank in their respective cell acted as you would anticipate, on average. When diving deeper into the underlying summary statistics for each cell in the above matrices, it becomes clearer as to why there are some outliers and how, for the most part, each bank performed similar to what would be expected for banks in their position. In regards to banks within each quartile, it is apparent that community banks have the highest variability in quartile classification, followed by regional banks, and lastly large banks. Additionally, average initial fee level and average fee percent change are dispersed as one would expect throughout the three different bank classifications. Finally, when examining the ratios of average personal deposits to total assets for the three classifications, it seems as if there is no trend associated with these values.