

Assessing the Common Ownership Hypothesis in the US Banking Industry

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January 15, 2026

Abstract

The common ownership hypothesis (COH) states that firms with common shareholders compete less aggressively with each other. The U.S. banking industry is well suited to assess the common ownership hypothesis, because thousands of private banks without common ownership (CO) compete with hundreds of public banks with high and increasing levels of CO. This paper assesses the COH in the banking industry using more comprehensive ownership data than in previous studies. In simple comparisons of raw deposit rate averages we document that the deposit rates of public banks are similar in markets where they share common shareholders with their rivals, and in markets where they do not. Panel regressions of deposit rates on the profit weights implied by the COH are generally not consistent with the COH if bank-quarter FEs are included. These estimates are “precise zeros” with 95% CIs suggesting that the threefold rise in CO among public banks between 2005 and 2022 moved their deposit rates by less than a quarter of a basis point in either direction. To assess the COH along non-price dimensions we also estimate the effect of CO on deposit quantities, and find that the estimates are also not consistent with the COH.

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1 Introduction

The common ownership hypothesis (COH) states that firms with common shareholders, primarily large asset managers, compete less aggressively with each other. The U.S. banking industry is well suited to assess the COH, because, unlike in most other industries, there are many public and private banks (over 500 and 4,000, respectively) that compete with each other.¹ This creates substantial variation in common ownership (CO). While there is generally no CO among private banks, public banks have experienced a large increase in CO between 2005 and 2022. The COH predicts that the rise in CO among public banks changed their objective functions such that they should care more about competitors who are held by the same shareholders. The model by [O’Brien and Salop \(2000\)](#) implies that the average weight public banks place in their objective functions on rival profits increased roughly threefold between 2005 and 2022, which should have had a considerable effect on their pricing decisions. In contrast, the COH predicts that private banks should maximize only their own profits and that their objective functions have remained unchanged.

Importantly, the rise in CO among public banks creates not only variation in CO between banks (especially between private and public banks), but also within individual public banks across geographic markets. For instance, in banking markets with multiple public banks CO generally increased substantially, but in banking markets where a single public bank competes with private banks it did not.

Banking is not only a good laboratory to test the COH, but is also an industry in which CO is of particular policy relevance. Shareholders have to notify the Federal Reserve if their ownership share in a bank exceeds 10 percent (Change in Bank Control Act (CIBCA)), and the Federal Reserve can object to such a CIBCA notice on competitive grounds. The banking industry was also specifically mentioned in President Biden’s [executive order on competition](#).²

This paper assesses the COH in banking using more comprehensive ownership data than previous studies. Usually studies on the COH use data from SEC filing 13-F, which must be filed by institutional investment managers with \$100 million or more in assets under management. The holdings of large institutional investment managers tend to be diversified within industries so they often own shares of competing firms, which results in high measured CO. This paper uses not only ownership data from the 13F filings, but also from other filings such as SEC forms 3, 4 and 5 (“insider forms”), SEC form DEF 14A (“definitive proxy statement”), and SEC forms 13D and 13G (“beneficial ownership reports”). These

¹Throughout the paper we use the phrase “public” and “publicly traded” interchangeably. This refers to banks that are either listed on a stock exchange or traded OTC. It does not mean government-owned.

²This is not to say that CO is of no policy relevance in other industries. Guideline 11 of the [merger guidelines](#) by the Federal Trade Commission and the Department of Justice states that “[t]he Agencies ... assess if an acquisition of partial control or common ownership may substantially lessen competition.”

filings also capture ownership by smaller institutional shareholders and by non-institutional shareholders, both of whom tend to be less diversified and thus lessen the CO incentives predicted by the O’Brien and Salop (2000) model. While this effect is typically not important for large public banks, it tends to be more important for smaller public banks, especially those that are not listed on an exchange but traded over the counter.³

Description of Analysis and Findings We begin with a comparison of the average deposit rates offered by public and private banks. We find that private banks offer substantially more attractive deposit rates for all deposit products at all times from 2005 to 2022. This is not a surprising finding because it is well known that smaller banks tend to offer more attractive rates than large banks. This rate gap could be due to CO or due to other differences between public and private banks, such as public banks’ wider variety of products and services, larger branch and ATM networks, or better online banking. We also find that there is no widening of the interest rate gap between public and private banks over time, as would be predicted by the rise in CO among public banks. This latter finding is therefore inconsistent with the COH.

We then compare the deposit rates of public banks in geographic banking markets with multiple public banks (“CO markets”) to markets where a single public bank competes only with private rivals (“no CO markets”). The COH predicts that public firms should compete as aggressively as private firms in markets with no CO. We find, however, that the rates offered by public banks in “no CO markets” are far less attractive than the rates of private banks, and are very similar to the rates of public banks in “CO markets”. There is no substantial difference in the average level of public bank rates between “no CO markets” and “CO markets”. The rates also didn’t diverge as common ownership among public banks increased. These patterns are not consistent with the COH, and suggest that the rate gap between private and public banks is not due to CO, but due to other differences between public and private banks (e.g. greater product variety, larger branch and ATM network size, better online banking).

Next we turn to a regression analysis. In our main analysis we deviate from the approach in Azar, Schmalz, and Tecu (2018) and Azar, Raina, and Schmalz (2022), which relates prices to generalizations of the HHI that account for CO and cross ownership (Modified HHI (MHHI) and Generalized HHI (GHHI)).⁴ Instead, we propose to regress prices and

³These banks often have modest ownership by 13F filers, but because their market capitalization is fairly low other shareholders – often members of the family that used to own the entire bank before it went public – can hold sizable positions. In some cases such shareholders even play an important role for larger banks, such as in the case of the appropriately named Holding family that owns about 20% of First Citizens Bank.

⁴We run GHHI regressions in robustness checks.

quantities on weights describing how much firms care about the profits of their commonly owned rivals (according to the model by O’Brien and Salop (2000)). We argue that this approach has two important advantages. First, the approach does not inherit the problems of HHI regressions, which arise because HHI measures are functions of quantities that are in equilibrium simultaneously determined with prices (see O’Brien and Waehrer (2017) and Miller, Berry, Scott Morton, Baker, Bresnahan, Gaynor, Gilbert, Hay, Jin, Kobayashi, et al. (2022)). This does however not mean that the approach is free of potential endogeneity concerns due to endogenous ownership shares.⁵ Second, while generalizations of the HHI vary only at the market-time level, the profit weights also vary at the firm level, which allows us to control for a richer set of unobservables. One potential concern with our CO measure is that it does not capture some important market-quarter level determinants of prices and quantities that are captured by generalizations of the HHI. Due to the more granular variation of our CO measure, we can include market-time fixed effects to control for any effects that are captured by the MHHI or the GHHI to address this concern.⁶

In a simple specification — which is not our preferred specification — that only includes quarter fixed effects to account for changes in the level of interest rates but no bank fixed effects, we find that banks who care more about rival profits do, indeed, set less aggressive deposit interest rates. The largest point estimates imply that the rise in CO among public banks between 2005 and 2022 lowered their deposit rates by more than 6 basis points.⁷ Like the deposit rate gap between public and private banks, these estimates could be driven by CO or by other differences between banks (e.g. product variety, branch and ATM network size, online banking).

In our preferred specification, with bank-quarter fixed effects, however, we no longer find statistically significant effects in line with the COH. The large sample size and the fact that there is substantial variation within bank-quarter pairs across markets allows us to estimate “precise zeros”. The 95% confidence intervals imply that the threefold increase in CO among public banks between 2005 and 2022 moved their deposit rates by less than a quarter of a basis point in either direction. The crucial difference in this specification is that it uses only within-bank variation across banking markets. Overall our findings suggest that banks do

⁵We run IV regressions that try to isolate plausibly exogenous variation in ownership shares to address these concerns.

⁶Subsequent to earlier versions of this paper (Gramlich and Grundl (2017)) there has been extensive discussion of alternative measures of CO in the literature (e.g. Schmalz (2018), Backus, Conlon, and Sinkinson (2020), Schmalz (2021)). To the best of our knowledge Gramlich and Grundl (2017) was the first empirical paper to implement the profit weight approach, but the concurrent paper by O’Brien and Waehrer (2017) also pointed out the endogeneity problems with generalizations of the HHI.

⁷Total interest bearing deposits at public banks exceed \$10 trillion. Therefore a 1 basis point change for all deposit interest rates of public banks would result in annual harm for depositors of more than \$1 billion, or more than \$3 per American.

not adjust their deposit rates market by market in accordance with the COH.

One potential concern with our baseline estimates is that banks do generally not set interest rates at each branch separately, but instead designate a “rate setter” branch for a particular region and rates for other branches in the region follow. About 10-12% of all branches are rate setters. We explore whether our findings are driven by uniform pricing by running a robustness check where only rate-setter branches are used. As in the baseline estimates we find no effect of CO on deposit rates if bank-quarter FEs are included, but the confidence intervals are wider due to the smaller sample size.⁸

A potential endogeneity concern with these panel regressions is that at least some shareholders can choose which particular banks to invest in. Therefore we consider an identification strategy specification that isolates variation in profit weights driven by variation in the number of listed banks in a market and the general trend towards increased CO, but not by particular shareholder choices. To do this we use the number of listed banks in a market interacted with a time trend as an instrument for profit weights. The basic idea is that the number of public banks in a market is not a shareholder choice. The IV estimates are similar to the baseline findings as all estimates are negative and statistically significant without bank-quarter FEs, but no estimates remain statistically significant if bank-quarter FEs are added. In addition we also obtain estimates with a version of this instrument that freezes the number of public banks in a market at the beginning of the sample period to address endogeneity concerns stemming from entry, exit or M&A activity. We also consider the index fund instrument proposed by [Azar, Raina, and Schmalz \(2022\)](#). The estimates for both of these instruments show the same pattern as with the baseline instrument.

Next we examine the effect of CO on deposit quantities. Even if banks do not change their deposit interest rates in accordance with the COH, it is possible that banks adjust how fiercely they compete along other dimensions. For instance CO could lower service quality, reduce the variety of services a bank offers, or reduce the incentive to steal rival customers via advertising. If this were the case we would expect that it results in deposit losses in markets where banks have significant CO with their rivals. In panel regressions of deposit quantities on profit weights we find either a small positive effect of CO, which is not consistent with the COH, or obtain a precisely estimated zero effect (depending on the included fixed effects). These findings suggest that banks do not compete less aggressively in markets where they

⁸Uniform pricing is not exogenously imposed on banks, but is a choice. The prevalence of uniform pricing can therefore be viewed as evidence against the COH, because the COH predicts that bank objective functions differ substantially across markets and uniform pricing is therefore sub-optimal. However, even if one would view uniform pricing as exogenously imposed, notice that regressions using deposit quantities (see [Section 6](#)) are also inconsistent with the COH. Even if a uniform pricing constraint were imposed upon firms, firms can geographically vary the intensity of non-price competition (e.g. service, staffing, advertising, etc), so one would expect the COH to manifest in deposit quantities.

share significant common owners with their rivals, neither by lowering deposit rates nor along non-price dimensions.

Summary, Interpretation and Discussion of Findings Our main finding is that estimates that include only quarter fixed effects are generally consistent with the COH, but estimates that include bank-quarter fixed effects are not. Our interpretation of this finding is that the estimates without bank-quarter fixed effects suffer from omitted variable bias due to quality differences between banks with high levels of CO and banks without CO or with low levels of CO. For instance, public banks generally have larger branch and ATM networks and tend to offer better online banking services than private banks, and at the same time many public banks have high levels of CO whereas there is generally no CO among private banks. This interpretation is corroborated by the fact that controlling for the size of a bank’s branch network alone, which is arguably also an imperfect proxy for a variety of other quality differences, without including bank-quarter fixed effects, largely eliminates the negative association between profit weights and deposit rates. This interpretation is also consistent with the pattern of raw deposit rate averages that we have documented. There is a sizable persistent gap between the average deposit rates of private and public banks, but there is virtually no gap between the rates of public banks in markets where they compete only with private rivals (no CO markets) and markets where they also compete with other public banks (CO markets). Once bank-quarter fixed effects are included we only use variation across markets that is within bank-quarter. The COH predicts that banks should adjust their rates market by market depending on the degree of CO with their rivals in each market, but this is not the case in the data. This conclusion remains unchanged if we also include market-quarter fixed effects and bank-branch fixed effects. Market-quarter fixed effects can capture changes in local economic conditions and changes in local banking competition that affect all banks in the market and are not captured by our bank specific CO measure. Bank-branch fixed effects can capture persistent differences in branch location or quality of products and services offered in each branch. Lastly, we find no effect of CO on deposit quantities, which suggests that CO also did not result in diminished non-price competition.

Literature This paper is most closely related to [Azar, Raina, and Schmalz \(2022\)](#) (ARS) who also study the COH in the US banking industry. While our preferred estimates are not consistent with the COH, the estimates in ARS are. This raises the question of what accounts for the different conclusions in ARS and in this paper. To answer this question we obtain estimates using the ARS specification (fixed effects and controls) and CO measure (GHHI), and we transform deposit rates into percentile rankings. With these modeling

choices we obtain similar estimates as ARS. If we add bank-quarter fixed effects to their specification however the estimates are no longer consistent with the COH mirroring the pattern we described above. Moreover, without the transformation of deposit rates into percentile rankings the estimates are not consistent with the COH regardless of whether we include bank-quarter fixed effects or not.⁹

In addition this paper is related to the broader literature on the COH hypothesis, which was sparked by the seminal contribution of [Azar, Schmalz, and Tecu \(2018\)](#) who found anticompetitive effects of CO in the airline industry by relating airline prices to the MHHI.¹⁰ Other important contributions include [Backus, Conlon, and Sinkinson \(2021a\)](#) who propose a structural approach to testing the COH using data from the cereal industry, and [Antón, Ederer, Giné, and Schmalz \(2023\)](#) showing that CO is associated with less performance sensitive managerial incentives, and thereby suggesting a mechanism for the COH. Excellent surveys of the large and growing CO literature can be found in [Schmalz \(2018\)](#), [Schmalz \(2021\)](#) and [Gerardi, Lowry, and Schenone \(2024\)](#). [Backus, Conlon, and Sinkinson \(2019\)](#), [Backus, Conlon, and Sinkinson \(2020\)](#) and [Backus, Conlon, and Sinkinson \(2021b\)](#) provide some background on theory, measurement, the historical development of CO, and a discussion of different methodologies.

Roadmap The remainder of this paper is structured as follows. Section 2 briefly explains the common ownership model by [O’Brien and Salop \(2000\)](#). Section 3 goes over the data sources. Section 4 first compares the deposit rates of public and private banks, and then compares the rates of public banks in markets where they compete with other public banks (CO markets) and in markets where they compete only with private banks (no CO markets). Section 5 examines the effect of CO on deposit rates and Section 6 examines the effect of CO on deposit quantities. Section 7 concludes.

2 Common Ownership Model by O’Brien and Salop

This section briefly discusses the model by [O’Brien and Salop \(2000\)](#) in which the manager of firm j maximizes the objective function Π_j , which is a weighted sum of its own profits π_j and the profits of rivals π_k who have common shareholders:

⁹In other robustness checks we find that the CO measure (GHHI vs profit weights), the ownership data (13F data only vs more comprehensive ownership data), and the sample period play a less important role than the specification.

¹⁰See [Dennis, Gerardi, and Schenone \(2022\)](#) for a rebuttal.

$$\begin{aligned}\max \Pi_j &= \pi_j + \sum_{k \neq j} w_{jk} \pi_k \\ w_{jk} &= \frac{\sum_i \gamma_{ij} \beta_{ik}}{\sum_i \gamma_{ij} \beta_{ij}}\end{aligned}$$

Managers or banks are indexed by j and k , and shareholders by i . The “control share” of owner i in firm j is γ_{ij} . This is therefore the weight that manager j assigns to owner i ’s payoff in the objective function. For each firm j , the control shares add up to one $\sum_i \gamma_{ij} = 1$. The fraction of π_k that accrue to owner i is β_{ik} . For each firm k , the ownership shares add up to one $\sum_i \beta_{ik} = 1$ as well. It is natural to assume that the control share γ_{ij} is a non-decreasing function of the ownership share β_{ij} : as i ’s ownership of firm j increases, manager j should place more weight on i in its objective function. In this paper we follow the most common assumption in the literature in assuming that $\gamma_{ij} = \beta_{ij}$, which is called the proportional control assumption. As owner i increases their ownership of firm j , two terms in manager j ’s objective function increase: β_{ij} and γ_{ij} . As the objective function depends on the interaction between both terms, $\beta_{ij}\gamma_{ij}$, large shareholders can have a disproportionate impact on the objective functions.

The profit weights a bank places on the profits of its rivals vary across geographic banking markets m depending on which competitors are present in the market.¹¹ In the remainder of this paper we will focus on $w_{jm}^{total} = \sum_{k \neq j} w_{jkm}$, where the sum is taken over all $k \neq j$ who are also competing in market m . The basic idea is that w_{jm}^{total} is the total weight that bank j places on the profits of its rivals in market m . For instance if $w_{jm}^{total} = 1$ then the total weight that bank j places on the profits of its rivals in the same market is as large as the weight it places on its own profits. As w_{jm}^{total} increases bank j cares less about its own profits relative to the profits of its rivals and should therefore be competing less aggressively.

3 Data

The data comes from a number of sources and covers the sample window from 2005 to 2022. Ownership data and deposit rate data comes from S&P, quantity data comes from the FDIC’s Summary of Deposits (SOD), and data on the geographic market definitions comes from the Federal Reserve’s CASSIDI system.¹² These data sets are briefly described below.

¹¹The weights also vary over quarters q but we ignore this here to keep the notation simpler.

¹²Data from the National Information Center (NIC) is used to link subsidiaries of Bank Holding Companies to the parent institution.

Ownership Data Data on bank shareholders and the size of their holdings comes from S&P (formerly Capital IQ) ownership data set starting in 2005, which contains ownership information from several SEC filings. The literature has focused primarily on the information from SEC filing 13F, which must be filed by institutional investment managers with \$100 million or more in assets under management. Filers include stand-alone asset managers, banks, insurance companies, pension funds, and university endowments. The S&P Capital IQ data however also contains data from various other SEC filings such as the 3, 4 and 5, DEF 14A, 13D and 13G. The SEC forms 3, 4 and 5 must be filed by insiders such as officers or directors of the bank to report purchases, sales and holdings of shares. The SEC form DEF 14A, the definitive proxy statement, must be filed for shareholder votes and contains a section on beneficial ownership with information on insider holdings and the holdings of other large shareholders. The SEC forms 13D is a beneficial ownership report that must be filed by shareholders owning more than 5%. Some shareholders are eligible to file the shorter SEC form 13G instead of the 13D.¹³

These additional filings capture ownership by smaller and non-institutional shareholders than 13F filers who tend to be less diversified and sometimes hold sizable concentrated positions. Accounting for their ownership therefore typically lowers the measured level of CO. The reduction in the measured CO is often important for smaller public banks, in particular the approximately 100 public banks that are not listed but traded OTC. Small public banks often have low levels of 13F ownership, but because their market capitalization is fairly low other shareholders can hold sizable positions. One common case is that members of the family that used to own the entire bank before it went public continue to hold sizable positions. In some cases such shareholders even play an important role for larger banks. The most entertaining example is the appropriately named Holding family that owns approximately 20% of First Citizens Bank, which has more than \$100 billion in assets and 550 branches.¹⁴

Deposit Rate Data S&P (formerly RateWatch) conducts weekly surveys of branches for rates and fees for various financial products since 2003. S&P does not survey every branch in the country; they have identified what can be called rate-setter and rate-taker branches. Rate-setters are branches which set the rates for all branches in some region. S&P also provides a mapping of rate-takers to rate-setters. The distinction between rate-setter and rate-taker branches is potentially relevant for the interpretation of the findings and we show

¹³The S&P Capital IQ data also contains information from other forms such as the N-Q, N-Port and N-CSR that are filed by investment companies and therefore contain similar information as the 13F filings.

¹⁴First Citizen has recently acquired the commercial banking business of Silicon Valley Bank, which more than doubled its assets to more than \$200 billion, making it one of the 20 largest banks in the country. However, this acquisition occurred in 2023 after the sample window used in this paper.

robustness checks that only use data from rate-setter branches.

This paper uses rates on \$10,000 CDs with maturities of 3, 6, 12, 24, and 60 month, interest checking accounts starting at \$0 and interest checking accounts starting at \$2,500, and money market accounts with \$2,500, \$10,000 and \$25,000. While these data are available at a weekly frequency only the last week of each quarter is used to match the frequency of the ownership data. The coverage of bank branches is not constant during the sample window. It starts with about 15,000 branches in 2005, increases to more than 50,000 branches around 2010, and remains relatively steady thereafter.

Deposit Data Data on deposit quantities comes from the FDIC’s Summary of Deposits (SOD). The SOD is an annual census of insured depository institutions that is taken as of June 30 of each year, and tracks deposit information at the branch level. We also use the FDICs branch identifier in specifications with branch fixed effects.

Geographic Banking Market Definitions Data on geographic banking markets comes from the Federal Reserve’s CASSIDI system. These geographic market definitions are used by the Federal Reserve and the Department of Justice to assess the competitive effects of bank mergers. There are roughly 1,500 banking markets in the US. For each Federal Reserve district the banking markets in the district are defined by the regional Fed in collaboration with the Fed Board.

Summary Statistics Table 1 shows summary statistics for deposit rates (money market, interest checking and CD), CO measures (w_{jmq}^{total} and GHHI), and the number of banks in a market (overall and public banks only). Our preferred CO measure w_{jmq}^{total} (“Total Weight Placed on Rival Profits in Market”) varies at the bank-market-quarter level. Therefore we create a data set at the bank-market-quarter level to calculate the summary statistics. It should be noted however that most of the other variables do not vary at the bank-market-quarter level. The deposit rates can in addition also vary at the branch level, but rarely do. If deposit rates vary across branches of the same bank within a market for a given quarter, we use the average across branches for this table. We run regressions with the data at the branch level however, because we also want to report some specifications with branch fixed effects. The GHHI, the number of banks in a market, and the number of public banks in a market vary only at the market-quarter level so they are duplicated for all banks in the same market-quarter. The means and percentiles for the number of banks in a market are therefore higher than they would be if we would consider a data set at the market-quarter level.

Table 1: **Summary Statistics:** This table shows summary statistics from a data set at the bank-market-quarter level. This is the level at which our main explanatory variable “Total Weight Placed on Rival Profits in Market” (w_{jm}^{total}) varies. Deposit rates can in addition also vary at the branch level, but rarely do. If deposit rates vary across branches of the same bank within a market for a given quarter, we use the average across branches for this table. The GHHI, the number of banks in a market, and the number of public banks in a market varies only at the market-quarter level so they are duplicated for all banks in the same market-quarter. The means and percentiles for number of banks in a market are therefore higher than they would be if we would use a data set at the market-quarter level.

	N	Mean	SD	P25	Median	P75
Money Market Rates						
\$2.5K Money Market Rate	805907	0.29	0.45	0.05	0.10	0.26
\$10K Money Market Rate	828270	0.36	0.56	0.05	0.15	0.39
\$25K Money Market Rate	830817	0.43	0.65	0.10	0.20	0.50
Interest Checking Rates						
\$0 Interest Checking Rate	768951	0.15	0.24	0.03	0.05	0.15
\$2.5K Interest Checking Rate	830519	0.15	0.24	0.03	0.05	0.15
CD Rates						
\$10K 3 Months CD Rate	810380	0.61	0.95	0.05	0.15	0.60
\$10K 6 Months CD Rate	866869	0.79	1.13	0.10	0.25	0.90
\$10K 12 Months CD Rate	870465	0.99	1.23	0.20	0.41	1.24
\$10K 24 Months CD Rate	849236	1.18	1.23	0.30	0.65	1.55
\$10K 60 Months CD Rate	767740	1.64	1.25	0.75	1.25	2.23
Common Ownership Measures						
Total Weight Placed on Rival Profits in Market	872849	1.60	3.84	0.00	0.00	1.63
Generalized Herfindahl-Hirschman Index (GHHI)	872849	0.33	0.17	0.19	0.30	0.45
Number of Banks						
Number of Banks in Market	872849	31.09	42.12	9.00	16.00	32.00
Number of Public Banks in Market	872849	10.88	13.73	3.00	6.00	13.00
Observations	872849					

4 Raw Averages

4.1 Comparing Public and Private Banks

In this section we first show how the growth of common ownership among publicly traded banks increased the predicted weight that they place on rival profits between 2005 and 2022, whereas the weight that privately held banks place on rival profits remained constant at 0. Next we look at deposit interest rates of public and private banks during the same time window to see whether this divergence of objective functions between public and private banks also led to a divergence of prices.

First consider Figure 1, which shows the weight that public and private banks place on the profits of their rivals from 2005 to 2022.¹⁵ The profit weights are calculated using the common

¹⁵We treat bank holding companies with multiple bank subsidiaries as a single bank throughout the paper.

ownership model by [O'Brien and Salop \(2000\)](#) under the assumption of proportional control as described in section 2. Banks whose stock is publicly traded, either on an exchange or OTC, are shown in blue, and privately held banks are shown in red. The geographic market definition for this graph is a banking market as defined by the Federal Reserve to assess the competitive effects of bank mergers. For each bank j that operates in some banking market m we sum all the weights that j places on rivals k who operate in the same market: $w_{jm}^{total} = \sum_{k \neq j} w_{jk}$. Then we average w_{jm}^{total} for all public banks and for all private banks.

Privately held banks place no weight on rival profits, i.e. their objective function is to maximize their own profits. Public banks, however, place considerable weight on rival profits. In 2005 the average total rival weight w_{jm}^{total} was around 2, so the total weight placed on the profits of all rivals in the same market is on average twice as large as the weight it places on its own profits. This reflects the fact that there is already considerable common ownership among public banks in 2005. Between 2005 and 2022 the weight placed on rival profits rose steadily to about 6. Therefore the weight that banks place on rival profits increased threefold between 2005 and 2022.

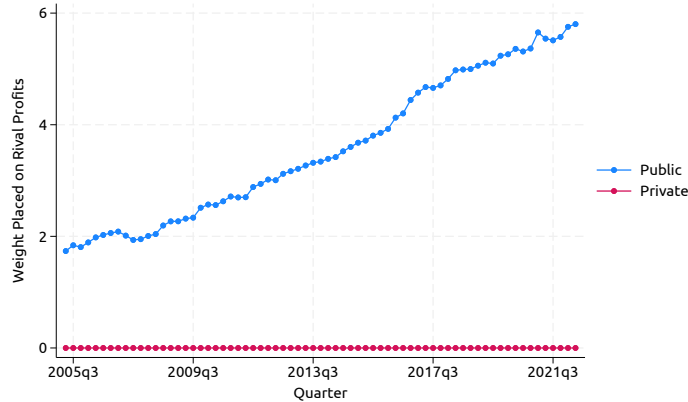


Figure 1: Weight on Rival Profits (Public vs Private Banks): This figure shows how much weight banks place on the profits of all their rivals in the same market from 2005 to 2022. The profit weights are calculated using the common ownership model by [O'Brien and Salop \(2000\)](#) under the assumption of proportional control. Banks whose stock is publicly traded, either on an exchange or OTC, are shown in blue, and privately held banks are shown in red.

Next, consider Figure 2, which shows four different deposit interest rates from 2005 to 2022 for public banks (blue) and private banks (red). For each bank j that operates in some banking market m we collect the deposit interest rate if it is covered in the S&P data and then average over public and private banks.¹⁶ Panel (a) shows 3 month CD rates, panel (b)

¹⁶Typically banks set the same interest rates at all branches in a market. If this is not the case we averaged rates over branches.

shows 60 month CD rates, panel (c) shows interest checking rates starting at a balance of \$0, and panel (d) shows interest rates for a money market account with a balance of \$25,000. Figure A1 in the Appendix shows CD rates for 6, 12 or 24 months, interest checking rates for higher balances and money market account rates for lower balances.

For all deposit interest rates and at almost all times during the sample window private banks pay higher rates than public banks. At times the gap exceeds 50 basis points. This is not a surprising finding because it is well known that smaller banks tend to offer more attractive rates than large banks. This rate gap could be due to CO or it could simply reflect differences in average product quality and variety between public and private banks. For example, public banks tend to have larger branch and ATM networks, better online banking options, more widely recognized brands, and offer a wider variety of products and services.

Note, importantly, that the gap in deposit interest rates between public and private banks does not widen as common ownership among public banks increases. For CD and money market rates the gap is roughly constant for most of the sample window, whereas the gap for interest checking rates narrows somewhat. The steadiness of the interest rate gap over time is inconsistent with the COH.

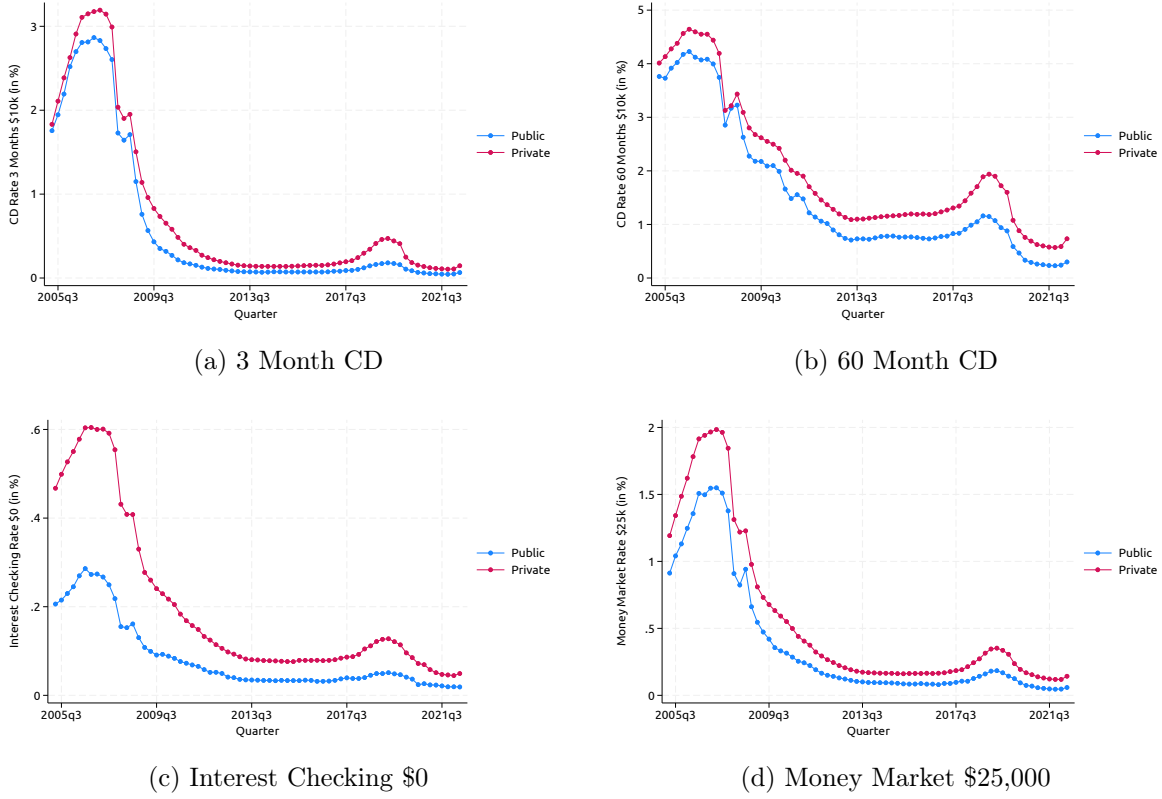


Figure 2: **Deposit Rates (Public vs Private Banks):** These graphs show deposit interest rates from 2005 to 2022. Banks whose stock is publicly traded, either on an exchange or OTC, are shown in blue, and privately held banks are shown in red. The geographic market definition for this graph is a banking market as defined by the Federal Reserve to assess the competitive effects of bank mergers. For each bank i that operates in some banking market m we collect the deposit interest rate if it is covered in the Ratewatch data and then average over all bank-market pairs.

4.2 Comparing Public Banks in Markets With and Without CO

The deposit rate gap between public and private banks could be due to CO, but the gap could also be due to other differences between public and private banks that are not controlled for or even unobserved. To tell these two possibilities apart we compare the deposit rates of public banks in two different kinds of markets. The first group of markets, the “CO markets”, are markets where multiple public banks compete. The second group of markets, the “no CO markets” are markets where only a single public bank competes with private rivals. Approximately 200 out of 1500 banking markets are “no CO markets” with exactly one public bank, and approximately 1150 markets have multiple public banks.

The COH predicts that the objective function of public banks in “no CO markets” is identical to the objective function of private banks. If the rate gap between public and

private banks is due to CO then we should observe a similar rate gap between the rates of public banks in “CO markets” and “no CO markets”. Figure 3 shows the average weight placed on rival profits in “CO markets” (blue) and “no CO markets” (red). In “no CO markets” public banks do not place any weight on the profits of their rivals, but in “CO markets” they do. Moreover the weight placed on rival profits tripled between 2005 and 2022.¹⁷

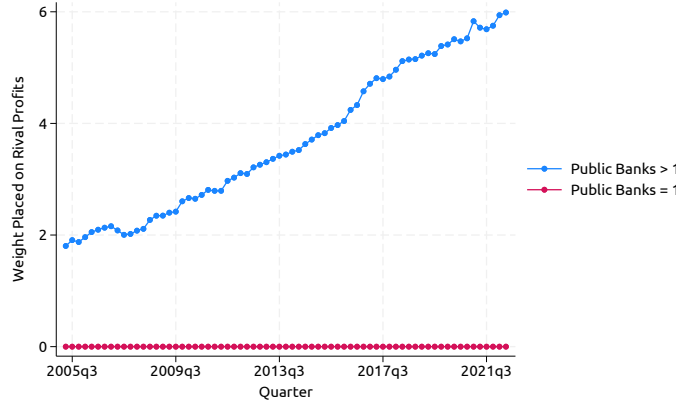


Figure 3: **Weight on Rival Profits (CO vs No CO Markets):** This figure shows how much weight banks place on the profits of their rivals from 2005 to 2022. Banking markets with at least two public banks are shown in blue (CO markets), whereas markets with a single public bank are shown in red (no CO markets).

Figure 4 compares the average deposit rates of public banks in “CO markets” (blue) and “no CO markets” (red). Panel (a) shows 3 month CD rates, panel (b) shows 60 month CD rates, panel (c) shows interest checking rates starting at a balance of \$0, and panel (d) shows interest rates for a money market account with a balance of \$25,000. Figure A2 in the Online Appendix shows CD rates for 6, 12 or 24 months, interest checking rates for higher balances and money market account rates for lower balances.

All ten deposit rate averages are very similar in CO and no CO markets at almost all times. All five CD rates are very similar at all times. There are gaps for interest checking rates and for money market rates with a \$25,000 minimum balance. Interest checking rates are very similar at most times except during times of rising rates (around 2007 and around 2018) when the rates in no CO markets are temporarily higher than in CO markets. Notice however that even during these times the gap reaches only about 10 basis points. For money market accounts with a minimum balance of \$25,000 CO markets tend to have higher rates especially during the years 2005-2009. Even during this period the gap reaches only about

¹⁷The average weight in CO markets shown in Figure 3 is only slightly higher than the average taken across all markets in Figure 1. The reason for the gap is that the rates of public banks in CO markets enters the average in Figure 1 but not in Figure 3. As most observations are from markets with many public banks however the observations from CO markets with a single public bank do not move the average much.

10 basis points. Overall, the rates in CO markets and no CO markets are strikingly similar in comparison to the large persistent gaps between private and public bank rates.

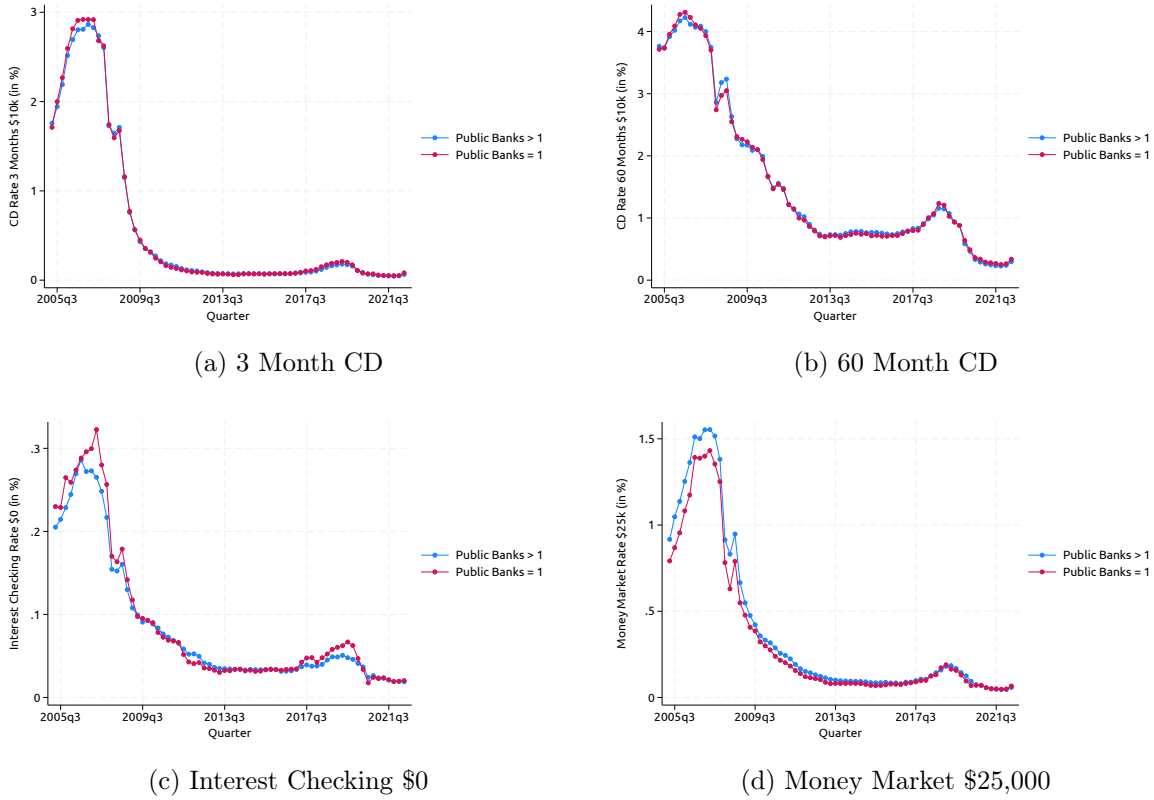


Figure 4: Deposit Rates of Public Banks (CO vs No CO Markets): These graphs show deposit interest rates of public banks from 2005 to 2022. Banking markets with at least two public banks are shown in blue (CO markets), whereas markets with a single public bank are shown in red (no CO markets).

Figures A3-A8 in the Online Appendix also compare deposit rates in “CO markets” and “no CO markets”, but instead of the average rates show the median, the 25th percentile, and the 75th percentile. For all three percentiles “CO markets” and “no CO markets” generally track each other closely with occasional exceptions during the early years of the sample period (2005-2009). This suggests that not only the mean but the distribution of deposit rates is largely not affected by CO, which is not consistent with the COH.

“CO markets” and “no CO markets” differ not only in the number of public banks but also in a number of other ways. “CO markets” are often large urban markets, whereas “no CO markets” are often smaller rural markets. Accordingly, “CO markets” tend to have larger populations, higher income, and not only more public banks but also more private banks. However, it is difficult to explain the observed pattern in Figure 4 with these persistent level differences in market characteristics. The COH predicts that as banks place greater weight on

the profits of their rivals in CO markets, but not in no CO markets, deposit rates in the two groups should diverge. Instead, we find that rates remain virtually identical throughout the sample period. For other market characteristics to explain this absence of divergence, these characteristics would have to change over time in a way that exactly offsets the increasing anti-competitive pressure predicted by the rise in CO.

5 Deposit Rates

5.1 Specification

We estimate panel regressions of the following form:

$$r_{jbm q} = \theta_0 + \theta_1 w_{jm q}^{total} + \xi_{jq} + \xi_{jb} + \xi_{mq} + \varepsilon_{jbm q} \quad (1)$$

Here, $r_{jbm q}$ is a deposit interest rate of bank j , at branch b , in market m and quarter q . Typically $r_{jbm q}$ does not vary across branches of the same bank for a given market and quarter. The variable $w_{jm q}^{total}$ (“Rival Weight”) is the total weight that bank j places on the profits of its rivals in market m in quarter q . Thus, formally $w_{jm q}^{total} = \sum_{k \neq j} w_{jk q}$, where the sum is taken over all rival banks $k \neq j$ that operate in market m in quarter q . In the main specification we include bank-quarter fixed effects ξ_{jq} that absorb variation across banks and use variation within bank across banking markets to estimate θ_1 . In robustness checks we also include bank-branch fixed effects ξ_{jb} and market-quarter fixed effects ξ_{mq} .

The null hypothesis is that managers maximize bank profits and therefore common ownership does not affect competition: $\theta_1 = 0$. Deposit interest rates are paid by banks to their customers so a finding of $\theta_1 < 0$ is consistent with anticompetitive effects of common ownership.

5.2 Baseline Findings

We estimate the regression in equation (1) for all ten deposit interest rates. The results are shown in Table 2. We start with a specification that only includes quarter fixed effects to account for the changing levels of interest rates at the top of Table 2. In the main specification in the middle of Table 2 we include bank-quarter fixed effects. Lastly, we also show a specification with bank-quarter, market-quarter and bank-branch fixed effects at the bottom of Table 2. The estimates are plotted with 95% confidence intervals in Figure 5.

The first specification, with quarter FEs but no bank FEs, results in negative estimates

for θ_1 for all ten deposit rates that are statistically significant at all conventional levels. The largest estimate for 60 Month CD rates implies that an increase of w_{jmq}^{total} by one lowers interest rates by approximately 1.6 basis points. The rise of CO raised the average w_{jmq}^{total} roughly from 2 to 6 between 2005 and 2022, which would result in an effect on 60 Month CD rates of about 6.4 basis points. Like the deposit rate gap between public and private banks, these estimates could be driven by CO or by other differences between banks (e.g. product variety, branch and ATM network size, online banking).

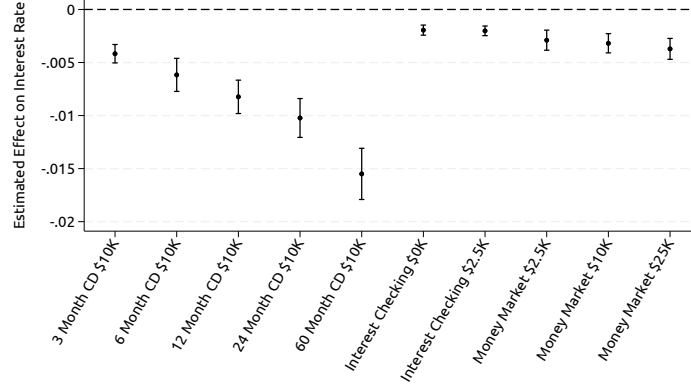
The second specification, with bank-quarter FEs, however, does not result in any statistically significant negative estimates for θ_1 . The only estimate that is statistically significant (for the \$25,000 money market rate) is positive and more than ten times smaller in magnitude than the corresponding negative estimate in the specification without bank-quarter FEs. The estimates are precise due to the large sample size and the substantial variation of w_{jmq}^{total} across markets within bank-quarter pairs. The 95% confidence intervals across all interest rates range roughly from -0.04 basis points to +0.05 basis points. Therefore the rise of the average w_{jmq}^{total} among public banks between 2005 and 2022 would have moved deposit rates by less than a quarter of basis point in either direction.¹⁸

The third specification with bank-quarter, market-quarter and bank-branch FEs also yields estimates that are centered around zero and not statistically significant for any of the ten interest rates. The estimates are substantially less precise than if only bank-quarter FEs are included however. The 95% confidence intervals range roughly from -0.4 to +0.3 basis points.

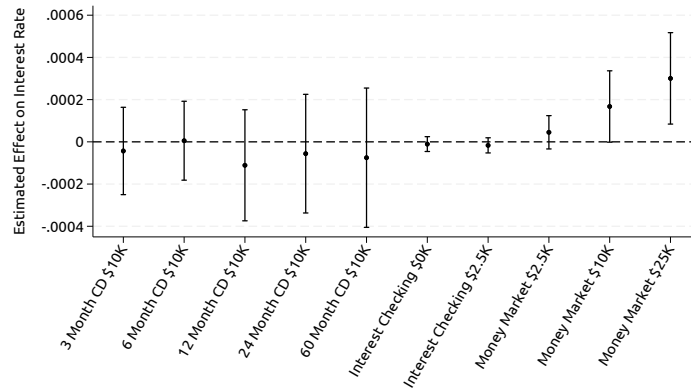
¹⁸Public banks hold more than \$10 trillion in interest bearing deposits. If this were applied to a deposit base of \$10 trillion it would translate in a total annual harm or benefit for depositors of less than \$250 million or less than a dollar per American.

Table 2: **Deposit Rate Panel Regressions (Baseline):** This table shows estimates for ten different deposit interest rates from left to right. The estimates on top include only quarter FEs, the estimates in the middle bank-quarter FEs, and the estimates at the bottom include bank-quarter, market-quarter and bank-branch FEs. Standard errors are clustered at the bank level. These estimates are also illustrated graphically in Figure 5.

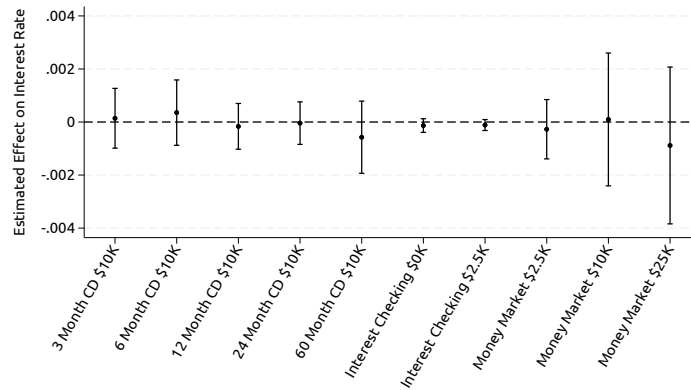
	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Weight on Rival Profits	-0.00417*** (0.000442)	-0.00617*** (0.000795)	-0.00824*** (0.000803)	-0.0102*** (0.000934)	-0.0155*** (0.00123)	-0.00195*** (0.000243)	-0.00201*** (0.000232)	-0.00289*** (0.000483)	-0.00319*** (0.000462)	-0.00371*** (0.000503)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Quarter FE	No	No	No	No	No	No	No	No	No	No
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	3876263	4028593	4038425	3981429	3797045	3624546	3869905	3650677	3731104	3744594
Weight on Rival Profits	-0.0000433 (0.000106)	0.00000532 (0.0000953)	-0.000111 (0.000134)	-0.0000560 (0.000143)	-0.0000752 (0.000168)	-0.0000106 (0.0000179)	-0.0000167 (0.0000183)	0.0000452 (0.0000403)	0.000167 (0.0000863)	0.000301** (0.000110)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	3801169	3943230	3952894	3902282	3736741	3546738	3788092	3573589	3652144	3665514
Weight on Rival Profits	0.000108 (0.000571)	0.000320 (0.000626)	-0.000206 (0.000440)	-0.0000760 (0.000408)	-0.000589 (0.000695)	-0.000141 (0.000129)	-0.000122 (0.000104)	-0.000260 (0.000576)	0.000123 (0.00129)	-0.000854 (0.00152)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Branch FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3794931	3937395	3947090	3896198	3729709	3538856	3781837	3566699	3645759	3659177



(a) Quarter FEs



(b) Bank-Quarter FEs



(c) Bank-Quarter, Market-Quarter and Bank-Branch FEs

Figure 5: Panel Regression Estimates (Baseline): These three figures plot the point estimates and 95% confidence intervals for findings in Table 2. Panel (a) shows estimates that only include quarter FEs, panel (b) includes bank-quarter FEs, and panel (c) includes bank-quarter, market-quarter and bank-branch FEs. Standard errors are clustered at the bank level.

5.3 Robustness Checks

Only Rate Setter Branches Banks generally do not set interest rates for each branch separately. Instead they designate “rate setter branches” for a particular region and then set interest at all other branches in the same region equal to the rate setter branch. This practice leads to geographically uniform pricing.

There are two basic interpretations of uniform pricing. One view is that uniform pricing is a choice by the banks. If a bank chooses the same interest rates at two different branches in different banking markets even though the COH predicts that the banks have different objective functions in both markets, then this is evidence against the COH. Another view is that uniform pricing is an exogenous constraint on bank pricing, which could explain why banks do not follow the predictions of the COH market by market.

To see whether the findings above are driven by uniform pricing we conduct a robustness check that uses only data from rate setter branches. The results are shown in Table A1 in and in Figure A9.¹⁹ Notice that the sample sizes for the specification with bank-quarter FEs are only about 10 percent of the sample sizes for the baseline estimates because on average one rate setter branch sets the interest rates for nine other branches as well. The estimates are therefore less precise than the baseline estimates.

The pattern of point estimates however follows the same pattern as the baseline findings. In the specification with quarter FEs we find sizable negative estimates, but in the specifications with bank-quarter FEs we do not.

Cross Ownership Azar, Raina, and Schmalz (2022) argue that shares held by the asset management arms of banks result in cross ownership rather than in common ownership. While common ownership refers to situations where a third party shareholder holds shares of two competing firms, cross ownership refers to situations where a firm owns shares of one of its competitors. In this paper we have so far assumed that holdings by the asset management arms of banks result in common ownership but not in cross ownership. The rationale for this choice is that the shares held by the asset management arms are ultimately not owned by the banks but by their clients and the banks have a fiduciary duty towards their clients. As a robustness check we also obtain estimates under the cross ownership assumption.

Table A2 and Figure A10 shows the findings. The estimates are very similar to the baseline estimates without cross ownership. One reason for this similarity is that the asset management arms of banks are fairly small in comparison to the large non-bank asset managers such as Blackrock, Vanguard or State Street.

¹⁹All figures and tables for the robustness checks can be found in A (Figures) and Online Appendix B (Tables).

GHHI Azar, Raina, and Schmalz (2022) find that deposit rates are strongly correlated with the GHHI – a generalized version of the HHI that accounts for common ownership and cross ownership. The GHHI is a function of the profit weights w_{jk} and of market shares. In this paper we relate prices and quantities directly to the profit weights rather than the GHHI, because GHHI regressions inherit the endogeneity problems of HHI regressions as they are both functions of market shares. An added benefit is that profit weights vary not just at the market-time level, but at the bank-market-time level. This creates additional variation and allows us to control for market-time fixed effects in some specifications.²⁰

However, as a robustness check we run GHHI regressions of the following form:

$$r_{jbm q} = \theta_0 + \theta_1 GHHI_{mq} + \xi_{jq} + \xi_{jb} + \varepsilon_{jbm q} \quad (2)$$

Table A3 and Figure A11 shows the findings. In the specification that only includes quarter fixed effects we find negative estimates for θ_1 for all ten deposit rates. The estimates are statistically significant at all conventional levels and economically substantial. Over the sample period the GHHI has increased by more than 2000 points. The estimates imply that a 2000 point increase in the GHHI is associated with a drop in deposit rates between 2 and 16 basis points, depending on the deposit product.²¹

The specification with bank-quarter fixed effects however does not result in estimates of θ_1 that are statistically significant. The point estimates imply that a 2000 point increase in the GHHI is associated with a change of deposit rates between 0 and -0.3 basis points. The 95% confidence interval for the most negative estimate (60 Month CDs) implies that a 2000 point increase of the GHHI leads to a change in the deposit rate between -0.8 basis and +0.2 basis points.

Including bank-branch fixed effects in addition to bank-quarter fixed effects turns the point estimates positive for seven of the ten deposit rates, and the confidence intervals become wider. None of the estimates are statistically significant.

IV Estimates A potential endogeneity concern with these panel regressions is that at least some shareholders can choose which particular banks to invest in. Therefore we consider an identification strategy specification that isolates variation in profit weights driven by variation in the number of listed banks in a market and the general trend towards increased CO, but

²⁰The profit weights actually even vary at an even more granular level: that of ordered firm pairs. However, the outcomes we observe - prices and quantities - vary only at the firm level.

²¹Notice that in the GHHI regressions, the GHHI is scaled from 0 to 1, not the 0 to 10,000 points scale typically used in discussion.

not by particular shareholder choices. To do this we use the number of listed banks in a market interacted with a time trend as an instrument for profit weights. The basic idea is that how many banks in a market are public is not a shareholder choice.

To illustrate the basic idea consider two banking markets – one with a single public bank (no CO market) and one market with multiple public banks (CO market). As CO among public banks increases the first stage regression will predict widening profit weight gap between CO and no CO markets, but the first stage only depends on the number of listed banks in a market and the quarter, neither of which is affected by any particular shareholder’s choices.

Notice that the number of public banks only varies at the market level. Therefore, we consider a specification of the following form:

$$r_{jbmq} = \theta_0 + \theta_1 \overline{w_{mq}^{total}} + \xi_{jq} + \xi_{jb} + \xi_{mq} + \varepsilon_{jbmq} \quad (3)$$

Here $\overline{w_{mq}^{total}}$ is the average of w_{jmq}^{total} across all banks in market m in quarter q . Figure A12 and Table A4 show the panel regression estimates for this specification. Figure A13 and Table A5 show the IV estimates for this specification if we use the number of public banks interacted with a time trend as an instrument for $\overline{w_{mq}^{total}}$. The first stage estimates are shown in Table A6. We interact the number of public banks in the market with a time trend to capture the growth of some large asset managers, most importantly Blackrock and Vanguard, over the sample period. Due to this growth the weights placed on rival profits tended to grow over time for any given number of public banks (above 2) in a market.

These estimates have a similar pattern to the baseline estimates. If only quarter FEs are included the estimates are consistent with the COH, but the effect disappears if bank-quarter FEs are included.

One potential concern with these IV estimates is that the number of public banks in a market may not be a valid instrument if entry and exit decisions are in part driven by common ownership. To address this concern we have obtained estimates with a version of the instrument that “freezes” the number of public banks in the market at the beginning of the sample period. This means that entry/exit and M&A behavior during the sample period does not affect the instrument. This yields similar estimates as in the baseline IV estimates (Tables A7 and A8 and Figure A14). Note however that this version of the instrument does not allow us to include branch fixed effects because now the “frozen” number of public banks no longer varies within market over time.

We also consider the instrument used in Azar, Raina, and Schmalz (2022) who use vari-

ation in index fund ownership. Specifically, index fund ownership in market m in quarter q is measured as $Index\ Fund\ Ownership_{mq} = \sum_j s_{jmq} \times Pct.\ Owned\ Top\ Index\ Funds_{jq}$, where s_{jmq} and we consider ownership index funds by Vanguard, Blackrock, State Street, Invesco and Fidelity. A potential concern with this instrument, however, is that like the GHHI it is a function of deposit shares s_{jmq} . Figure A15 and Tables A9 and A10 show the estimates. The general pattern is similar as for the baseline estimates. If only quarter FEs are included the estimates are consistent with the COH, but the effect disappears if bank-quarter FEs are included.²²

Time Period To explore whether the estimates vary by time period we obtained separate estimates for the first half of the sample window from 2005 to 2013 (Table A11 and Figure A16) and the second half from 2014 to 2022 (Table A12 and Figure A17). The first half of our sample period overlaps with the period studied in Azar, Raina, and Schmalz (2022) who used data from 2002 to 2013. For both time periods the estimates are similar as in the baseline specification that uses data from 2005 to 2022. The magnitudes of the estimates for specification that includes only quarter fixed effects however is somewhat larger for 2005-2013 than for 2014-2022.

Ownership Data In this paper we use not only ownership data from 13F filings that must be filed by institutional investment managers with \$100 million or more in assets under management, but also data from other filings such as SEC forms 3, 4 and 5 (“insider forms”), SEC form DEF 14A (“definitive proxy statement”), and SEC forms 13D and 13G (“beneficial ownership reports”). To understand how this more comprehensive data set affects our estimates we create a data set without the additional data sources and keep only ownership information from 13F filings. Estimates using only the 13F data are shown in Figure A18 and Table A13. The estimates have the same general pattern as the baseline estimates.²³

²²If we also include market-quarter and bank-branch fixed effects some of the estimates for the CD rates are positive and statistically significant, whereas the estimates for checking account rates and money market rates remain close to zero. While this is puzzling it is not consistent with the COH.

²³The magnitude of the estimates for the specification including only quarter fixed effects is substantially smaller and are not quite statistically significant at a 5% level. We believe this is because 13F filers tend to be much more diversified than shareholders we only observe through the other data sources. Therefore the weights placed on rival profits tend to be larger if we only use the 13F data. If w_{jmq}^{total} tends to be larger then the estimated θ_1 will be smaller to explain the same variation in rates. If we assume that in addition to the shareholders we observe in the 13F data for each bank there is an undiversified shareholder that holds 10 percent of the bank’s shares, then the estimated magnitudes are similar to the baseline specification that uses all data sources (Figure A19 and Table A14).

Controlling for Size of Branch Network We find consistently that specifications including only quarter FEs yield estimates that are broadly consistent with the COH, while specifications that include bank-quarter FEs do not. This pattern suggests that specifications without bank-quarter FEs fail to control for important time-varying bank characteristics that systematically affect deposit rates. A natural question, therefore, is which relevant bank characteristics are being absorbed by the bank-quarter fixed effects.

While it is not feasible to measure all relevant bank characteristics directly, because some are unobservable or difficult to quantify, we show that controlling solely for the size of a bank’s branch network goes a substantial way toward explaining the difference between the two specifications. Results are reported in Table A15 and Figure A20. For nine out of ten deposit products, adding branch network size as a control (along with quarter FEs) eliminates the negative association between profit weights and deposit rates. For 60-month CDs, the coefficient remains negative and statistically significant, but its magnitude is reduced by approximately 85 percent relative to the specification without controlling for branch network size. In several cases, particularly for checking accounts and money market rates, the estimated effect turns positive, though the magnitudes are small relative to the baseline estimates without controlling for branch network size.

How should one interpret these findings? We do not interpret branch network size as the only relevant bank characteristic. Rather, branch network size likely proxies for a broader set of bank attributes that matter for depositor demand and are difficult to measure, including ATM access, brand recognition, product variety, and the quality of online banking services. Banks with larger branch networks can rationally offer lower deposit rates because they compete in part on these non-price dimensions. Importantly, these same banks are also more likely to be publicly traded and held by large diversified asset managers. As a result, specifications without adequate controls confound CO with differences in non-price attributes that matter to depositors.

These estimates also rule out an alternative version of the COH in which the COH operates at the bank level, but banks do not adjust rates market by market in accordance with the COH. While this could explain why the CO effect disappears once bank-quarter FEs are included, it cannot explain why the CO effect disappears if we only control for the size of the branch network. If common ownership softened competition only at the bank level, so that banks with higher CO offered systematically lower rates on average, but could not adjust rates across markets, this effect should remain visible in specifications that compare banks to one another while controlling for branch network size but excluding bank-quarter FEs. The fact that the CO coefficient largely disappears even in these specifications indicates that bank-quarter FEs are not masking a bank-level CO effect. Instead, the disappearance of

the coefficient reflects that the negative association between CO and deposit rates in simpler specifications is driven by bank-level characteristics correlated with both CO and interest rates, rather than by CO itself.

Understanding the Differences to Azar et. al. (2022) Finally, this section attempts to explain the differences between our findings and [Azar, Raina, and Schmalz \(2022\)](#). We begin by trying to mimic their panel regressions in the upper panel of Table [A16](#) and Figure [A21](#). Here, CO is measured with the GHHI, we control for market cap, population and income, and include bank-branch and quarter fixed effects. The outcome variable is not measured by level of the interest rate but instead by the percentile of the interest rate in the cross-sectional distribution for each quarter. Using this specification the estimates are consistent with the COH as GHHI is associated with reductions of the deposit rates between 5.5 and 16.0 percentage points in the cross-sectional distribution, and eight out of ten estimates are statistically significant. Our estimates are however somewhat smaller in magnitude than the estimates in Table 3 of [Azar, Raina, and Schmalz \(2022\)](#) with effects between 19.5 and 23.5 percentage points.

Next we include bank-quarter fixed effects in the lower panel of Table [A16](#).²⁴ Doing that flips the sign of the GHHI coefficient for nine out of ten deposit rates. The only remaining negative estimate is small in magnitude and not statistically significant.

In Table [A17](#) and Figure [A22](#) we also obtained estimates using the same specification but without the transformation of interest rates into percentiles, because while this transformation maintains the cross-sectional ranking of interest rates it eliminates information about the size of interest rate differences. Without the percentile transformation nine out of ten GHHI coefficients are positive even without the inclusion of bank-quarter fixed effects (upper panel of Table [A17](#)). If bank-quarter fixed effects are included the coefficient signs are mixed but no estimate remains statistically significant (lower panel of Table [A17](#)).

This paper differs in a number of ways from [Azar, Raina, and Schmalz \(2022\)](#) such as the measurement of CO (profit weights vs. GHHI), ownership data (13F data only vs. more comprehensive data) and the time period (2002-2013 vs 2005-2022), but these differences do not appear to have a major effect on the conclusion regarding the validity of the COH. Instead the two most important differences are whether bank-quarter fixed effects are included and whether interest rates are transformed into percentiles or not. If bank-quarter fixed effects are included the estimates are not consistent with the COH regardless of the transformation of interest rates. If the interest rates are not transformed into percentiles then the estimates are

²⁴Market cap drops out if we include bank-quarter fixed effects, because it only varies at the bank-quarter level. Notice that we cannot include for market-quarter fixed effects, because the GHHI only varies at the market-quarter level.

not consistent with the COH regardless of whether bank-quarter fixed effects are included. If bank-quarter fixed effects are not included and the interest rates are transformed into percentiles the estimates are consistent with the COH.

6 Deposit Quantities

There are two main reasons to look not only at prices but also at quantities. First, even if banks do not change their deposit interest rates market by market in accordance with the COH, it is possible that banks adjust how fiercely they compete market by market along non-price dimensions. For instance CO could lower service quality, reduce the variety of services a bank offers, or reduce the incentive to steal rival customers via advertising. If this were the case we would expect that it results in slower deposit growth in markets where banks have lots of CO with their rivals. Second, the findings for the deposit rate regressions depend on whether bank-quarter fixed effects are included or not. This could be because CO affects bank pricing only at a bank wide level or because there are other differences between banks with high and low CO. Looking at quantity regressions with and without bank-quarter fixed effects can help us to distinguish these two possibilities.

Under what conditions should we expect deposit quantities to decrease via changes in non-price competition if firms care more about the profits of their rivals? Consider a model where interest rates are fixed, but each bank chooses a non-price variable a_j . For instance a_j could be the service quality provided in the branches or the amount of advertising. An increase in a_j is costly for bank j , and raises its demand at the expense of demand for the rival banks. If an increase in a_j lowers the demand for other banks, then an increase in w_{jk} will shift the best response function of bank j down. Intuitively, this is because bank j now cares more about π_k and therefore competes less aggressively by choosing - everything else equal - a lower level of a_j .²⁵ In isolation, a decrease of a_j would therefore always translate into a decrease of q_j , because we assume that a_j raises the demand for bank j . In equilibrium however we must also consider the best response functions of the other banks. If the best response functions are upward sloping (strategic complements) then the rivals will also decrease their levels of a_k , which will tend to increase q_j . In this case further restrictions are needed to

²⁵Formally, let $BR_j(a_1, \dots, a_J, w_{j1}, \dots, w_{jJ})$ be the best response function of bank j . Then by applying the implicit function theorem to the first order condition of bank j we obtain $\frac{\partial BR_j}{\partial w_{jk}} = -\frac{\frac{\partial^2 \Pi_j}{\partial w_{jk} \partial a_j}}{\frac{\partial^2 \Pi_j}{\partial a_j^2}}$. The denominator is negative due to the second order condition so the sign of $\frac{\partial BR_j}{\partial w_{jk}}$ is determined by $\frac{\partial^2 \Pi_j}{\partial w_{jk} \partial a_j}$. Notice that $\frac{\partial^2 \Pi_j}{\partial w_{jk} \partial a_j} = \frac{\partial \pi_k}{\partial a_j} = \frac{\partial q_k}{\partial a_j} m_k$, where q_k is the demand for bank k and m_k is its net interest margin. Therefore the best response function is shifted downwards if $\frac{\partial q_k}{\partial a_j} < 0$, i.e. if an increase in a_j lowers the demand for bank k .

limit the strength of the strategic complementarities and/or to limit the effect of $a_{k \neq j}$ on q_j , to guarantee that the direct effect dominates the strategic effect and q_j decreases with w_{jk} . If the best response functions are downward sloping (strategic substitutes) then the strategic effect reinforces the direct effect and leads to a further decrease of q_j . Therefore no additional restrictions are required in this case.

6.1 Specification

The specification for the quantity regressions is similar to the price regressions. However, while the price regressions were at the branch level we measure deposits at the bank-market level. Moreover, the frequency of the panel is yearly rather than quarterly, because the FDIC's Summary of Deposits is conducted only once a year. The specification has the following form:

$$\log(\text{deposits}_{jbmqt}) = \theta_0 + \theta_1 w_{jmt}^{total} + \xi_{jq} + \xi_{jb} + \xi_{mq} + \varepsilon_{jbmqt} \quad (4)$$

As before, w_{jmt}^{total} ("Rival Weight") is the total weight that bank j places on the profits of its rivals in market m in year t . An estimate of $\theta_1 < 0$ would be consistent with the COH as it would indicate that banks with higher CO compete less aggressively and therefore lose deposits.

6.2 Findings

The findings are shown in Table 3. The estimates of θ_1 in Table 3 are all positive and therefore not consistent with the COH. The specification with bank-quarter, market-quarter and bank-branch FEs in column (3) is however not statistically significant.

Table 3: log(Deposits)

	(1)	(2)	(3)
Weight on Rival Profits	0.0272*** (0.00270)	0.00944*** (0.00178)	0.00187 (0.00166)
Quarter FE	Yes	No	No
Bank-Quarter FE	No	Yes	Yes
Market-Quarter FE	No	No	Yes
Bank-Branch FE	No	No	Yes
N	1471423	1446535	1428458

7 Conclusion

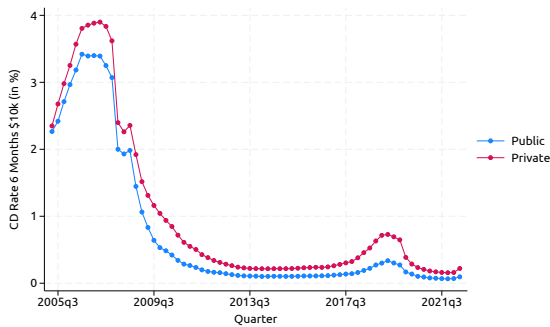
We assess whether common ownership has given rise to anticompetitive effects in the banking industry. We find that private banks offer more attractive deposit rates than public banks, but the rate gap did not widen as CO increased. Public banks offer similar rates in markets where they compete only with private rivals and in markets where they also compete with other public banks, which is not consistent with the COH. Regressions that only include quarter fixed effects suggest that CO is associated with lower deposit rates, but this is not the case if we control for bank-quarter fixed effects. Estimates for deposit quantities are also not consistent with the COH.

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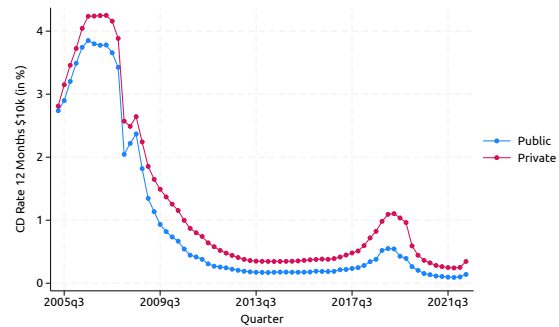
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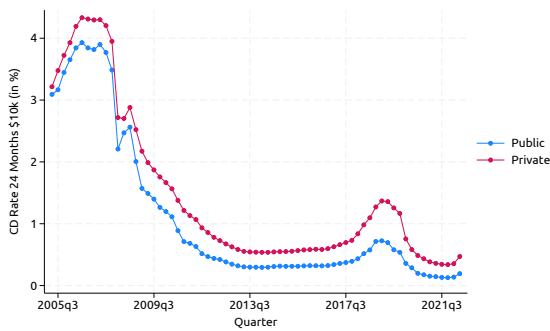
A Online Appendix: Figures



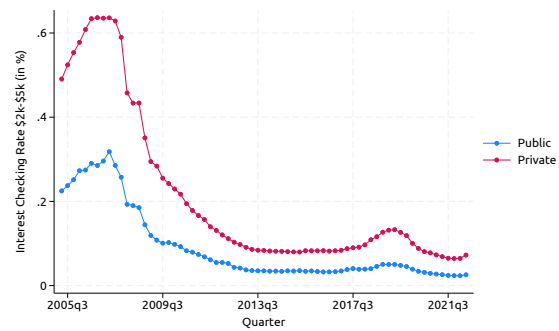
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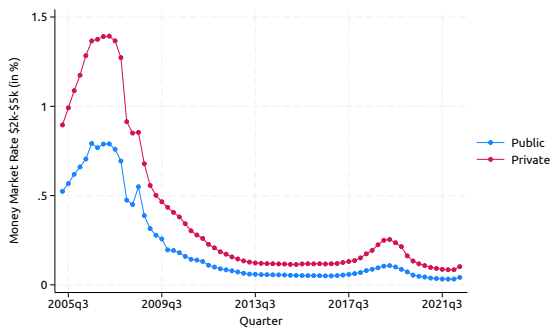
(b) 12 Month CD



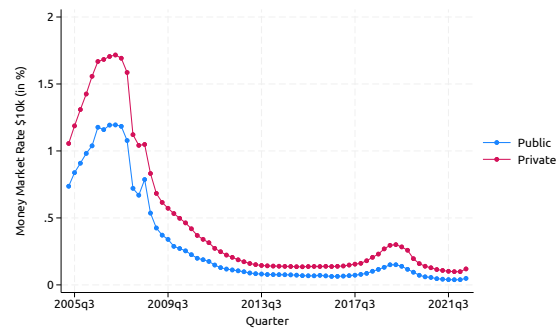
(c) 24 Month CD



(d) Interest Checking \$2500

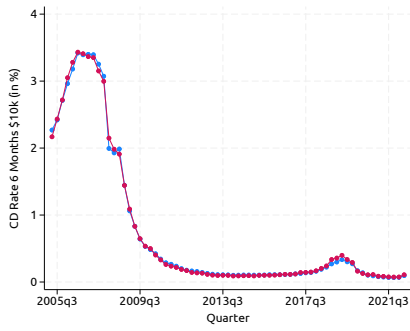


(e) Money Market \$2,500

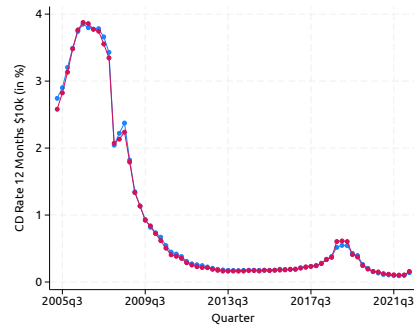


(f) Money Market \$10,000

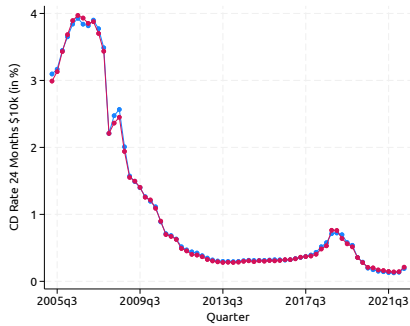
Figure A1: Deposit Rates (Public vs Private Banks): These graphs show deposit interest rates from 2005 to 2022. Banks whose stock is publicly traded, either on an exchange or OTC, are shown in blue, and privately held banks are shown in red.



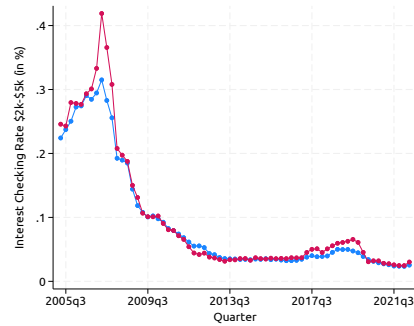
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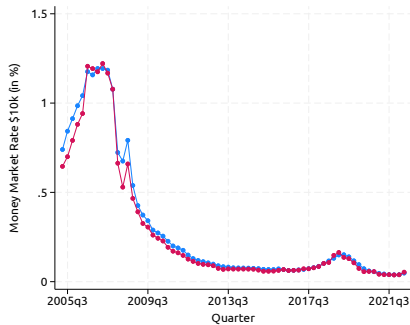
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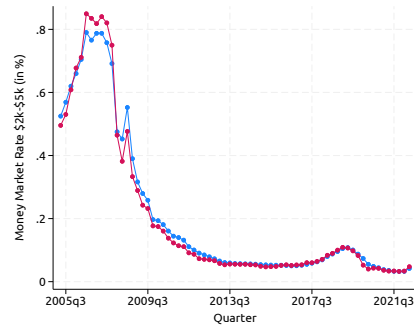
(c) 24 Month CD



(d) Interest Checking \$2,500

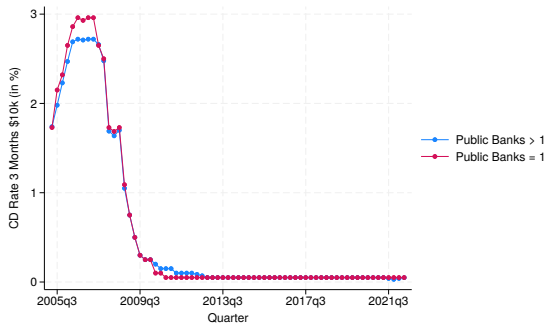


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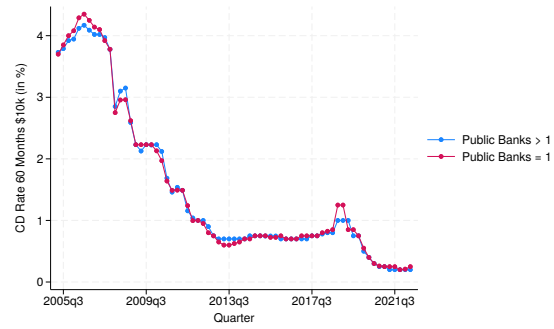


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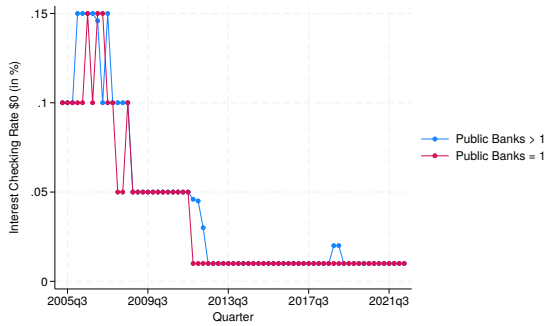
Figure A2: Average Deposit Rates of Public Banks (CO vs No CO Markets): These graphs show deposit interest rates of public banks from 2005 to 2022. Banking markets with at least two public banks are shown in blue (CO markets), whereas markets with a single public bank are shown in red (no CO markets).



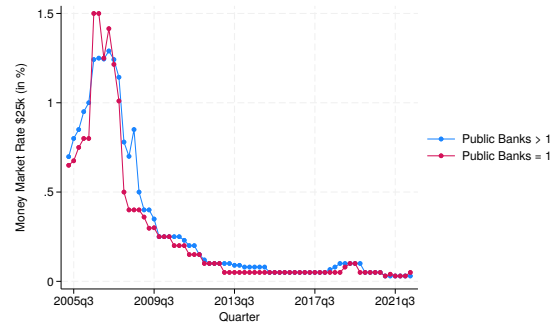
(a) 3 Month CD



(b) 60 Month CD

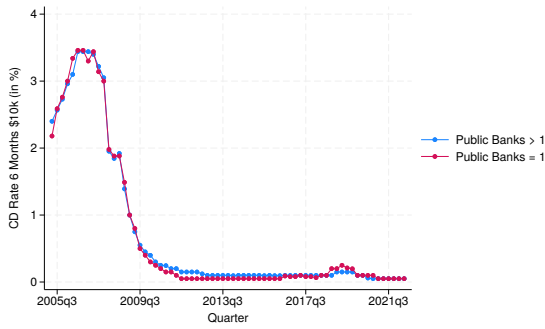


(c) Interest Checking \$0

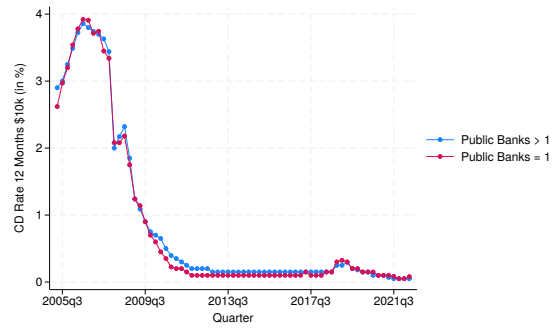


(d) Money Market \$25,000

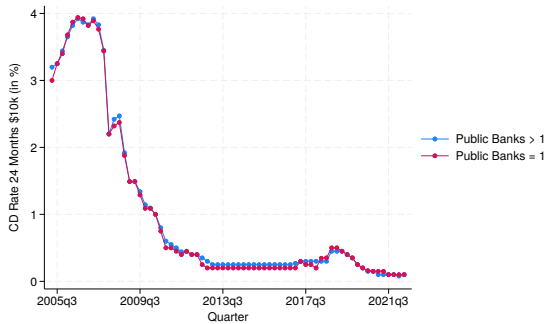
Figure A3: Deposit Rates of Public Banks (CO vs No CO Markets, Median): These graphs show deposit interest rates of public banks from 2005 to 2022. Banking markets with at least two public banks are shown in blue (CO markets), whereas markets with a single public bank are shown in red (no CO markets).



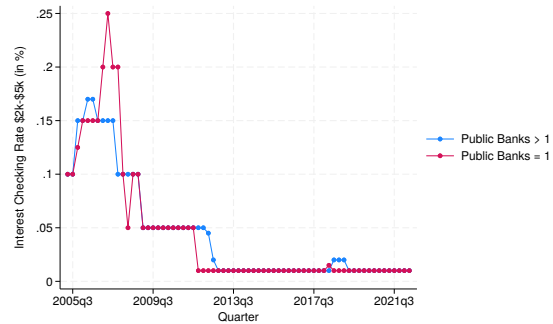
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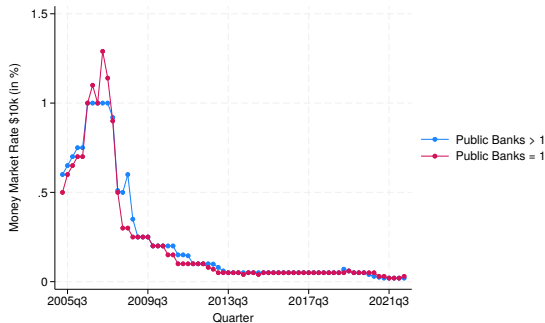
(b) 12 Month CD



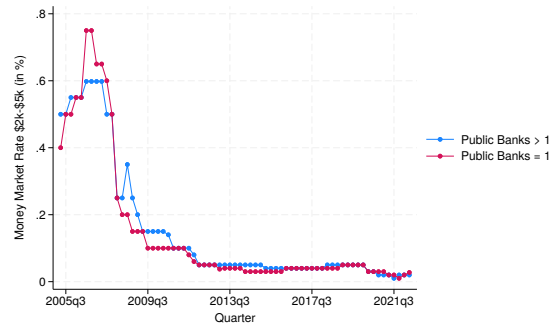
(c) 24 Month CD



(d) Interest Checking \$2,500

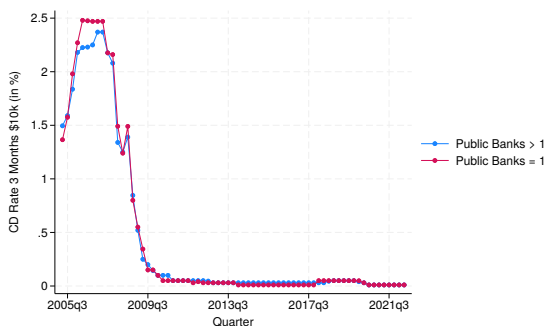


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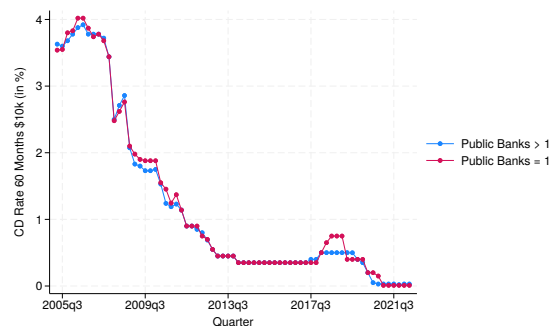


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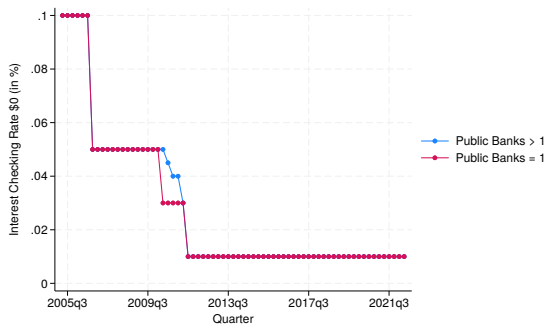
Figure A4: Deposit Rates of Public Banks (CO vs No CO Markets, Median): These graphs show deposit interest rates of public banks from 2005 to 2022. Banking markets with at least two public banks are shown in blue (CO markets), whereas markets with a single public bank are shown in red (no CO markets).



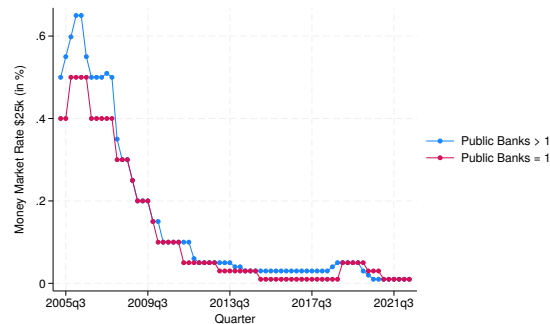
(a) 3 Month CD



(b) 60 Month CD

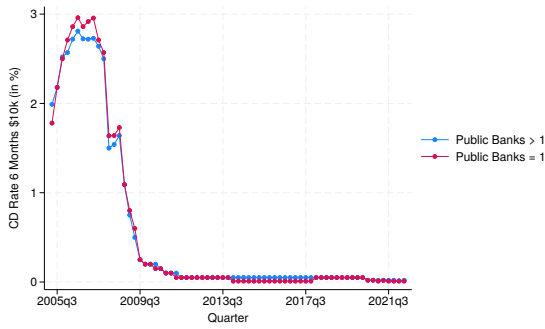


(c) Interest Checking \$0

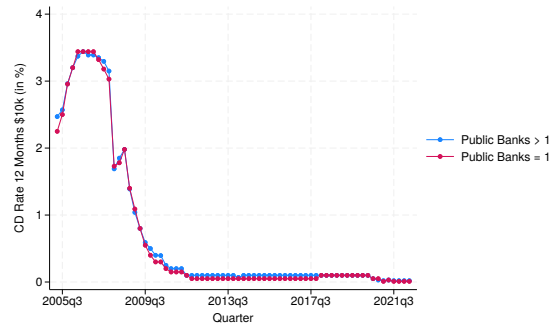


(d) Money Market \$25,000

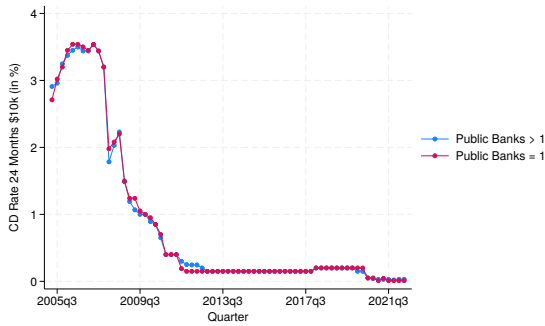
Figure A5: Deposit Rates of Public Banks (CO vs No CO Markets, 25th Percentile): These graphs show deposit interest rates of public banks from 2005 to 2022. Banking markets with at least two public banks are shown in blue (CO markets), whereas markets with a single public bank are shown in red (no CO markets).



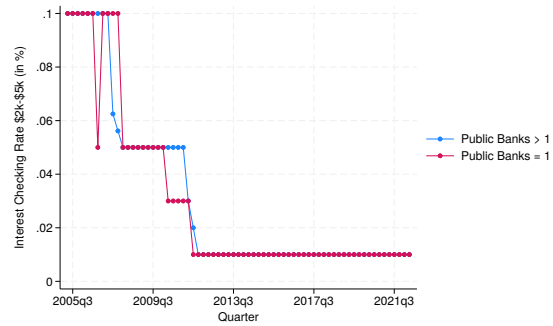
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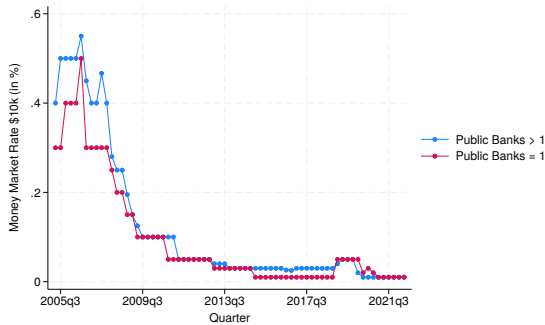
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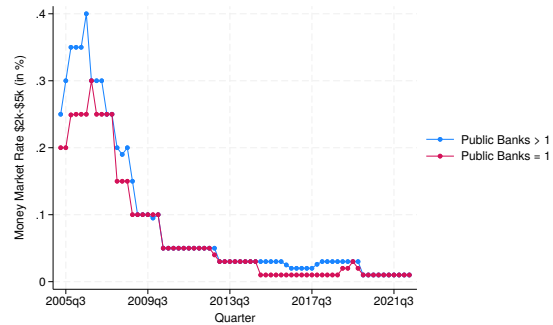
(c) 24 Month CD



(d) Interest Checking \$2,500

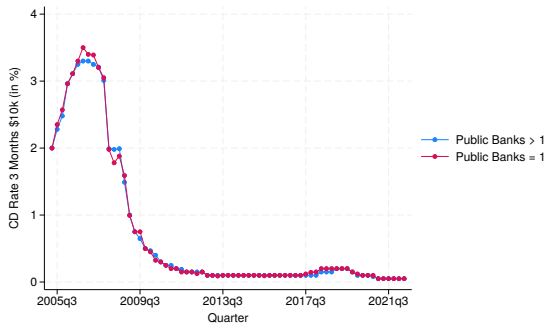


(e) Money Market \$10,000



(f) Money Market \$2,500

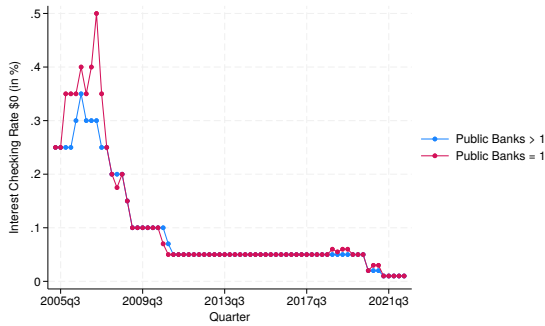
Figure A6: Deposit Rates of Public Banks (CO vs No CO Markets, 25th Percentile): These graphs show deposit interest rates of public banks from 2005 to 2022. Banking markets with at least two public banks are shown in blue (CO markets), whereas markets with a single public bank are shown in red (no CO markets).



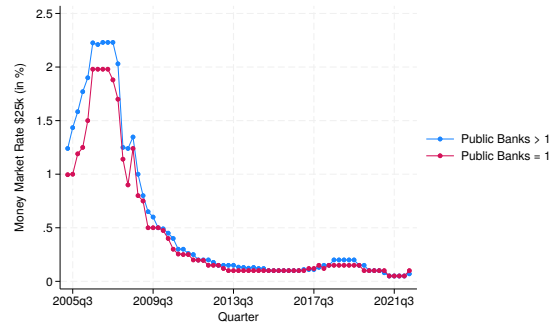
(a) 3 Month CD



(b) 60 Month CD

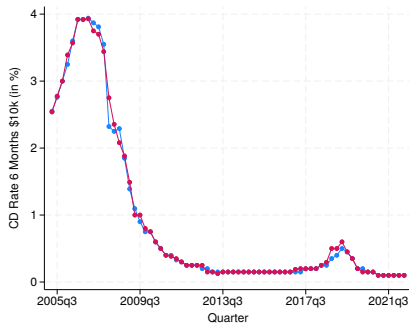


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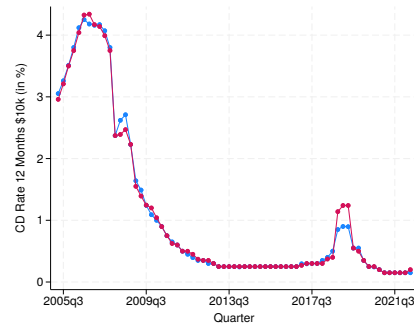


(d) Money Market \$25,000

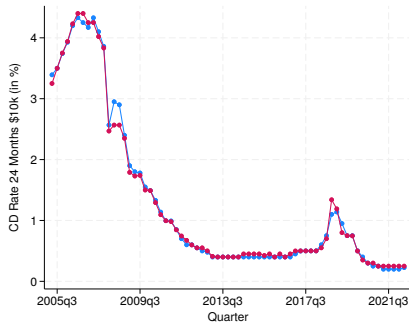
Figure A7: Deposit Rates of Public Banks (CO vs No CO Markets, 75th Percentile): These graphs show deposit interest rates of public banks from 2005 to 2022. Banking markets with at least two public banks are shown in blue (CO markets), whereas markets with a single public bank are shown in red (no CO markets).



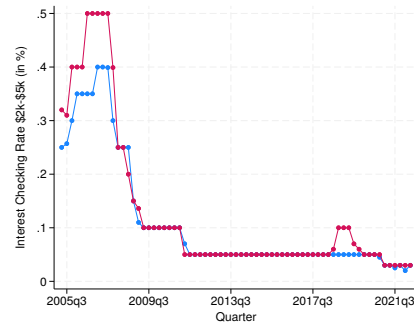
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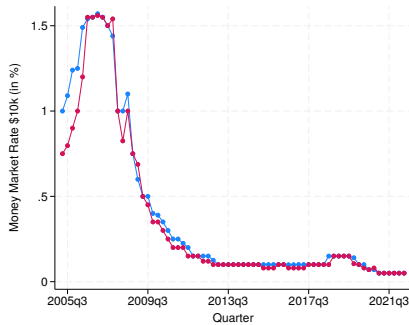
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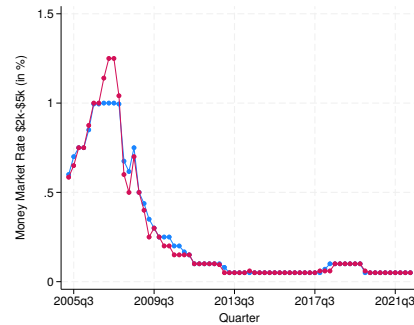
(c) 24 Month CD



(d) Interest Checking \$2,500

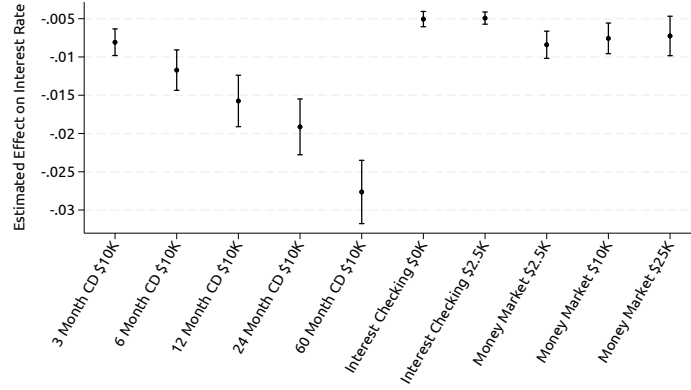


(e) Money Market \$10,000

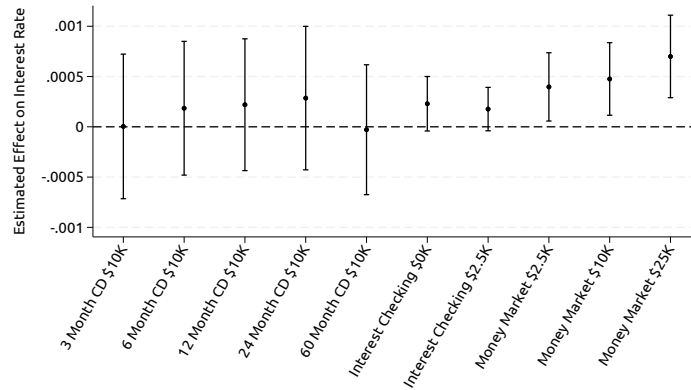


(f) Money Market \$2,500

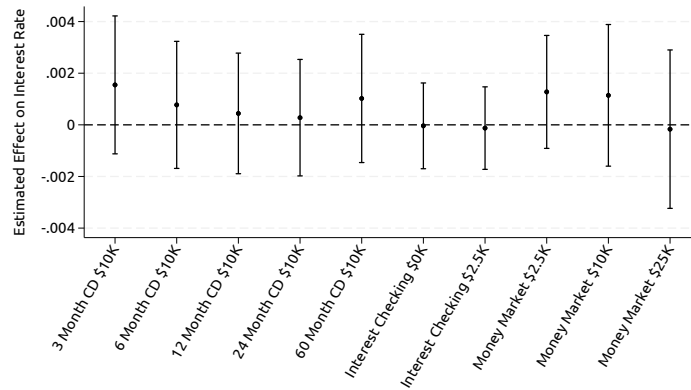
Figure A8: Deposit Rates of Public Banks (CO vs No CO Markets, 75th Percentile): These graphs show deposit interest rates of public banks from 2005 to 2022. Banking markets with at least two public banks are shown in blue (CO markets), whereas markets with a single public bank are shown in red (no CO markets).



(a) Quarter FEs

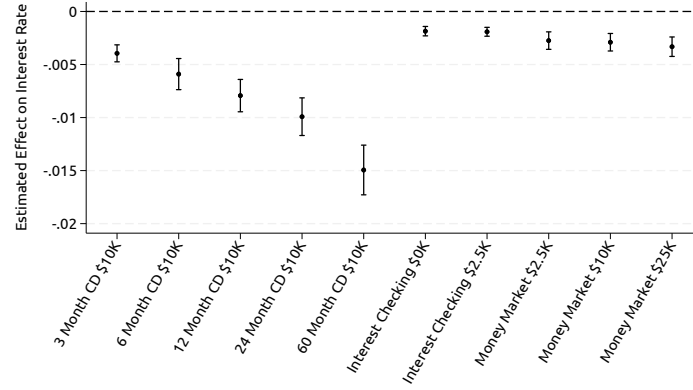


(b) Bank-Quarter FEs

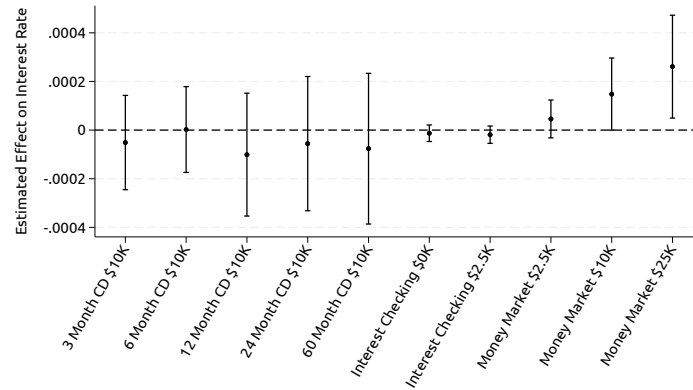


(c) Bank-Quarter, Market-Quarter and Bank-Branch FEs

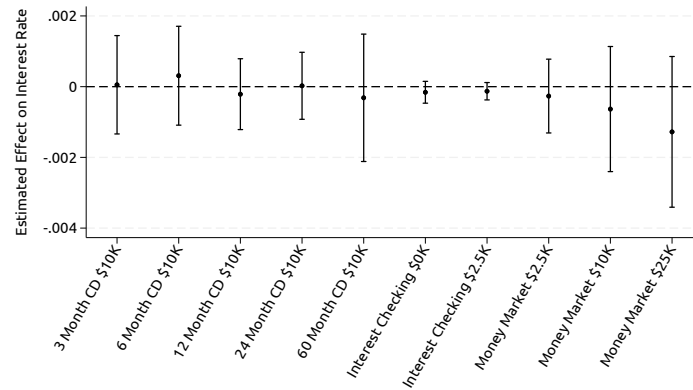
Figure A9: Panel Regression Estimates (Rate Setter Branches Only): These three figures plot the point estimates and 95% confidence intervals for findings in Table A1. Unlike the baseline estimates the sample includes only rate setter branches. Panel (a) shows estimates that only include quarter FEs, panel (b) includes bank-quarter FEs, and panel (c) includes bank-quarter, market-quarter and bank-branch FEs. Standard errors are clustered at the bank level.



(a) Quarter FEs

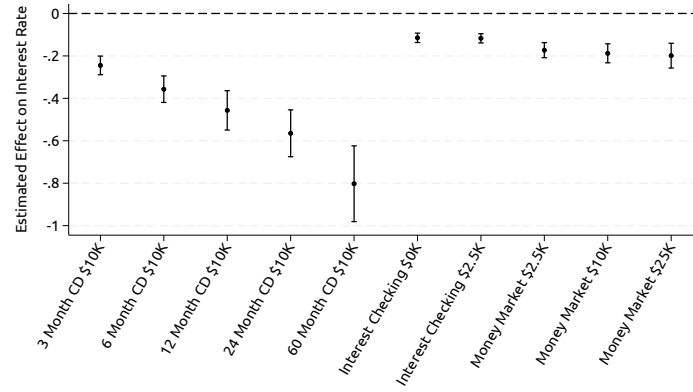


(b) Bank-Quarter FEs

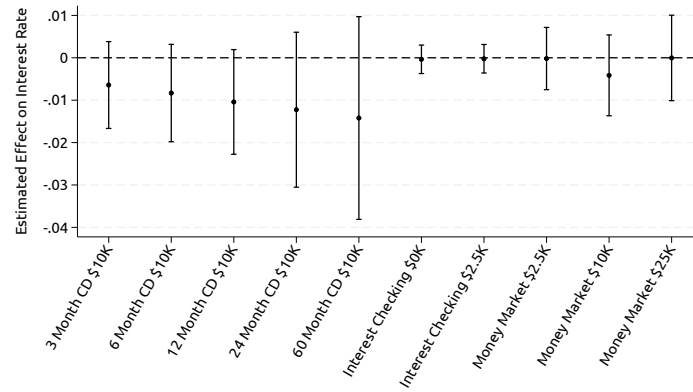


(c) Bank-Quarter, Market-Quarter and Bank-Branch FEs

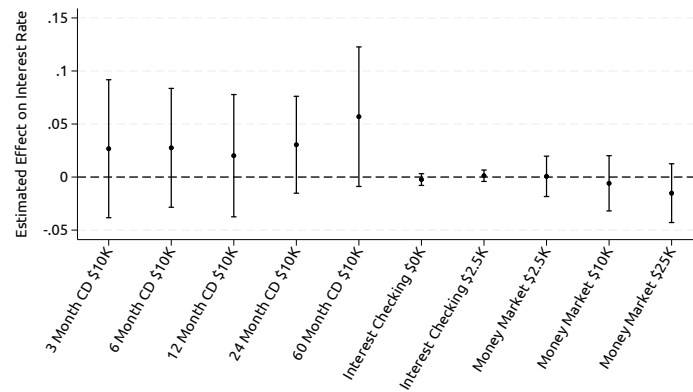
Figure A10: **Panel Regression Estimates (Cross Ownership)**: These three figures plot the point estimates and 95% confidence intervals for findings in Table A2. Unlike the baseline estimates these estimates assume that the holdings of banks' asset management arms result in cross ownership. Panel (a) shows estimates that only include quarter FEs, panel (b) includes bank-quarter FEs, and panel (c) includes bank-quarter, market-quarter and bank-branch FEs. Standard errors are clustered at the bank level.



(a) Quarter FEs

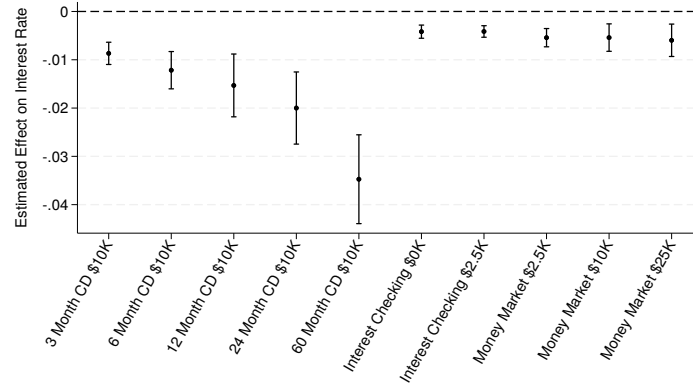


(b) Bank-Quarter FEs

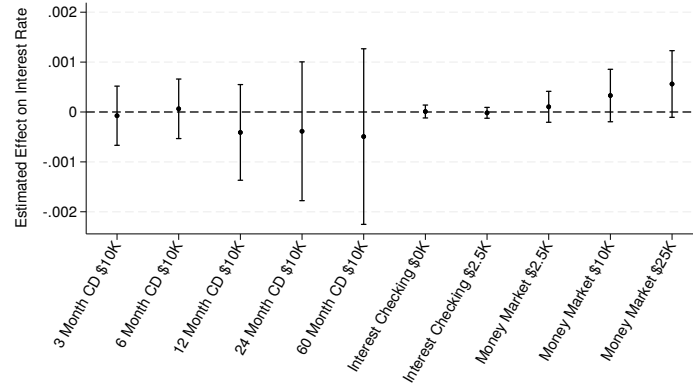


(c) Bank-Quarter and Bank-Branch FEs

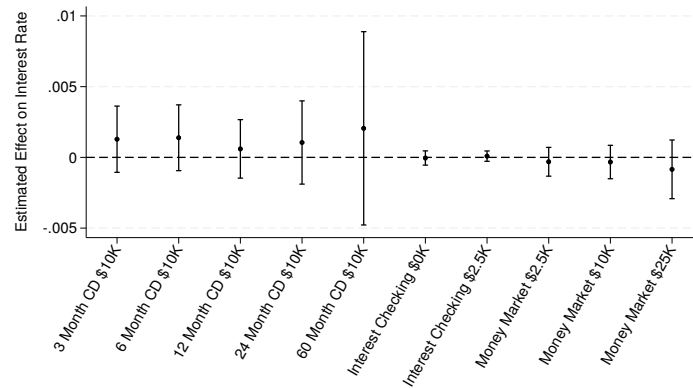
Figure A11: **Panel Regression Estimates (GHHI)**: These three figures plot the point estimates and 95% confidence intervals for in findings in Table A3. Panel (a) shows estimates that only include quarter FEs, panel (b) includes bank-quarter FEs, and panel (c) includes bank-quarter and bank-branch FEs. Standard errors are clustered at the bank level.



(a) Quarter FEs

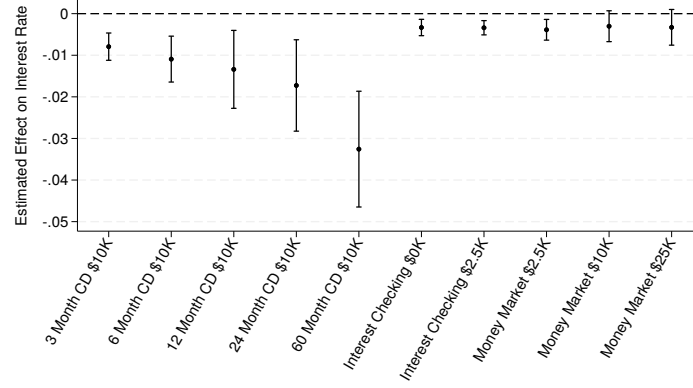


(b) Bank-Quarter FEs

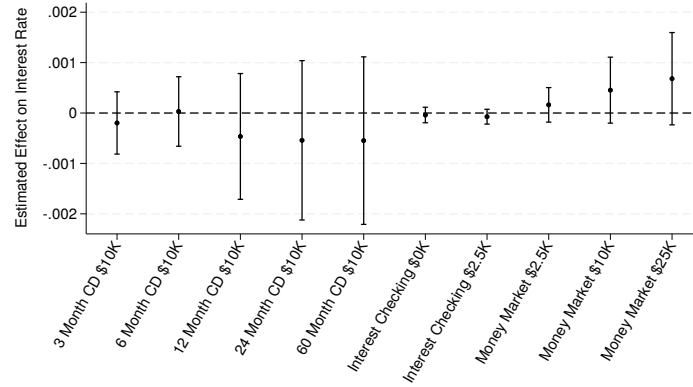


(c) Bank-Quarter and Bank-Branch FEs

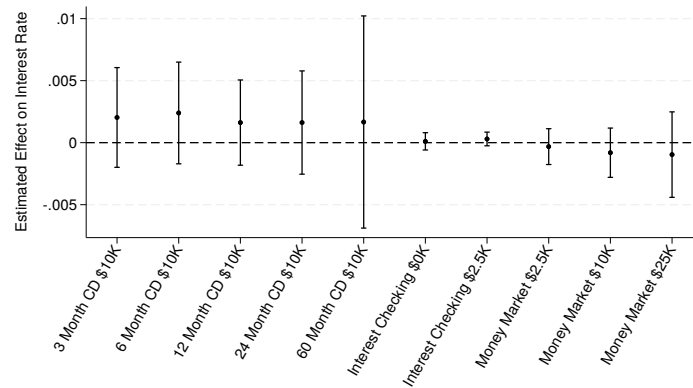
Figure A12: **Panel Regression Estimates (Average Market Weight):** These three figures plot the point estimates and 95% confidence intervals for findings in Table A4. Panel (a) shows estimates that only include quarter FEs, panel (b) includes bank-quarter FEs, and panel (c) includes bank-quarter and bank-branch FEs. Standard errors are clustered at the bank level.



(a) Quarter FEs

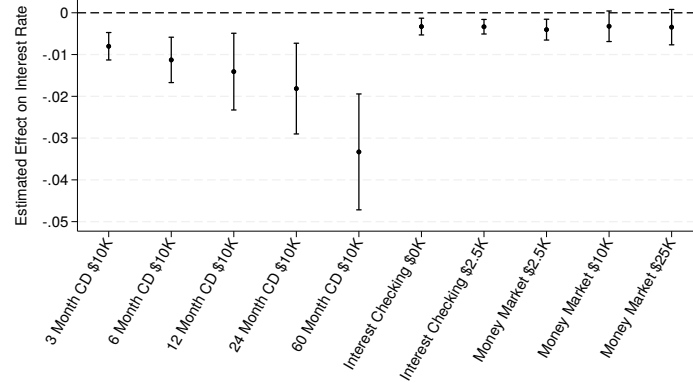


(b) Bank-Quarter FEs

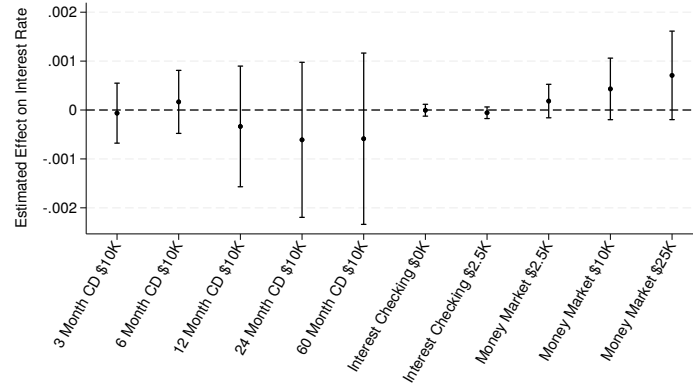


(c) Bank-Quarter and Bank-Branch FEs

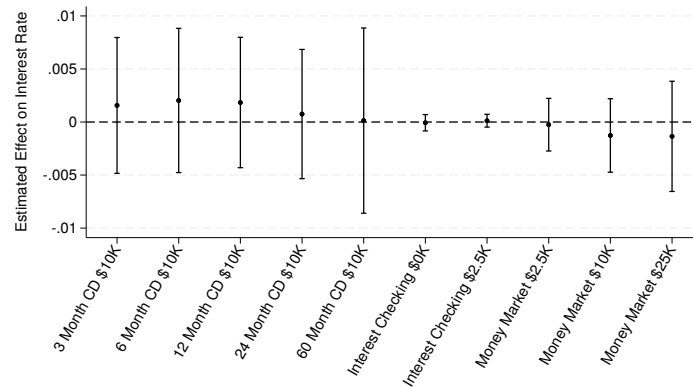
Figure A13: **IV Estimates (Number of Listed Banks):** These three figures plot the point estimates and 95% confidence intervals for findings in Table A5. Panel (a) shows estimates that only include quarter FEs, panel (b) includes bank-quarter FEs, and panel (c) includes bank-quarter and bank-branch FEs. Standard errors are clustered at the bank level.



(a) Quarter FEs

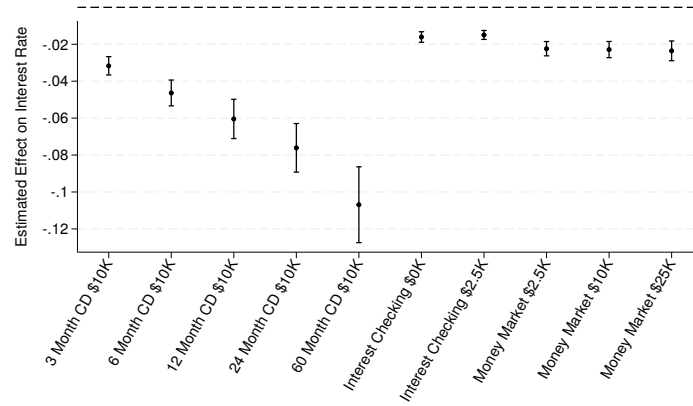


(b) Bank-Quarter FEs

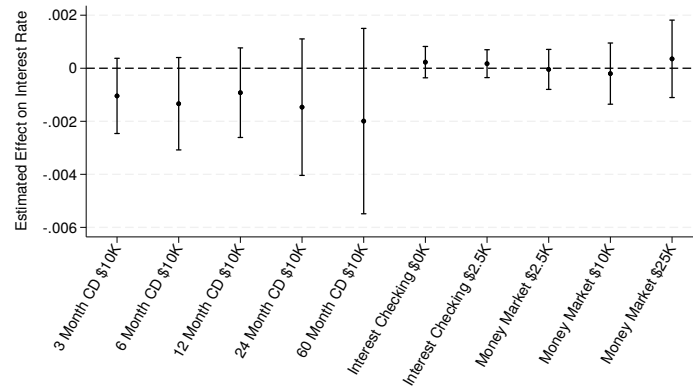


(c) Bank-Quarter and Bank-Branch FEs

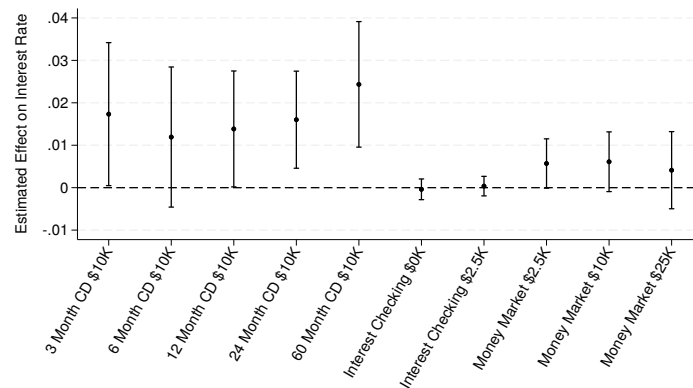
Figure A14: **IV Estimates (Number of Listed Banks 2005)**: These three figures plot the point estimates and 95% confidence intervals for findings in Table A5. Panel (a) shows estimates that only include quarter FEs, panel (b) includes bank-quarter FEs, and panel (c) includes bank-quarter and bank-branch FEs. Standard errors are clustered at the bank level.



(a) Quarter FEs

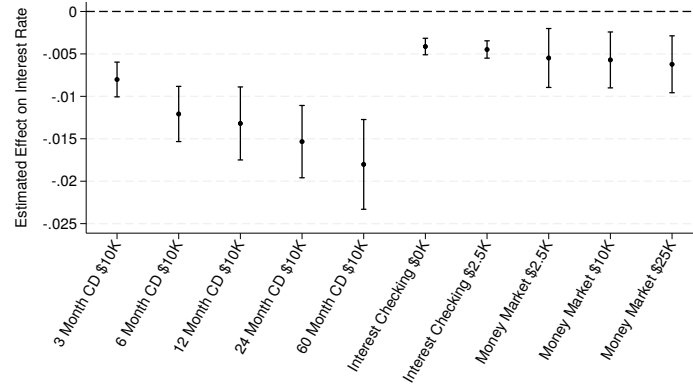


(b) Bank-Quarter FEs

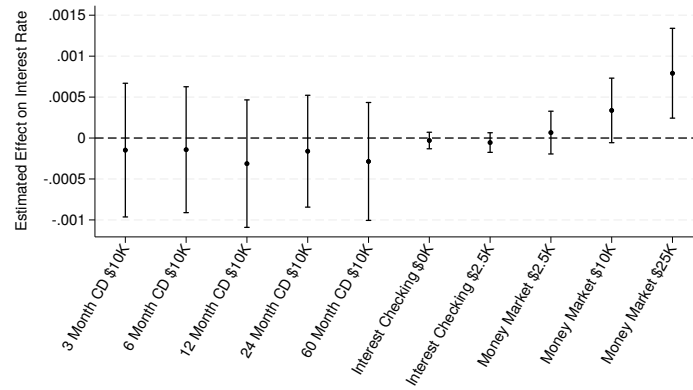


(c) Bank-Quarter and Bank-Branch FEs

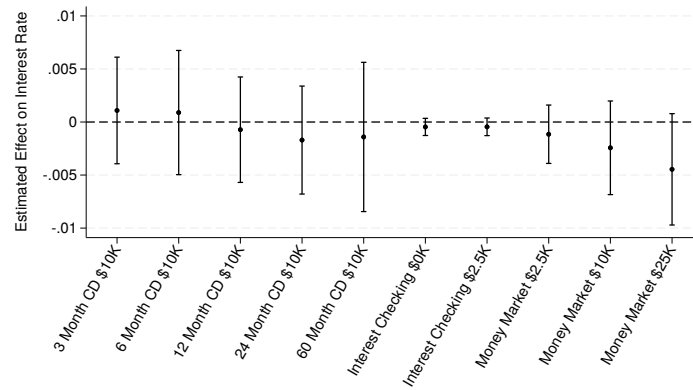
Figure A15: **IV Estimates (Index Fund Ownership)**: These three figures plot the point estimates and 95% confidence intervals for in findings in Table A9. Panel (a) shows estimates that only include quarter FEs, panel (b) includes bank-quarter FEs, and panel (c) includes bank-quarter and bank-branch FEs. Standard errors are clustered at the bank level.



(a) Quarter FEs

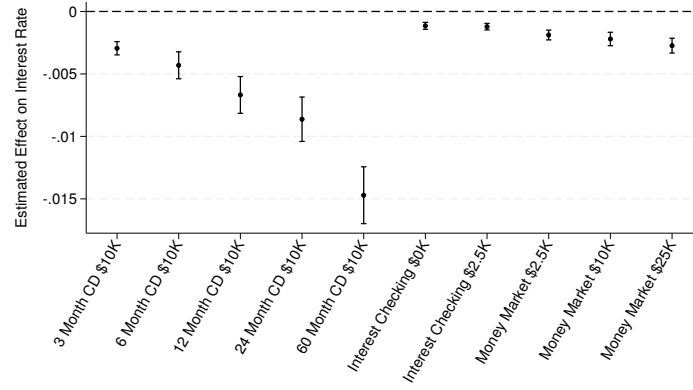


(b) Bank-Quarter FEs

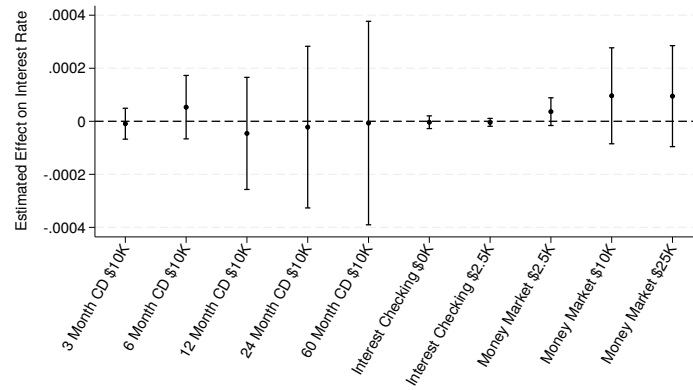


(c) Bank-Quarter, Market-Quarter and Bank-Branch FEs

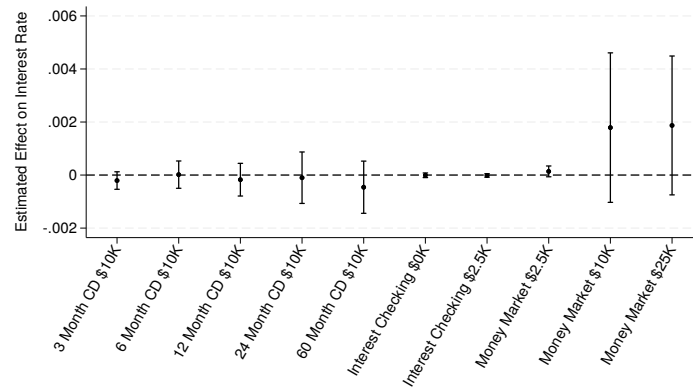
Figure A16: **Early Sample Period (2005-2013):** These three figures plot the point estimates and 95% confidence intervals for in findings in Table A11 using data from 2005 to 2013. Panel (a) shows estimates that only include quarter FEs, panel (b) includes bank-quarter FEs, and panel (c) includes bank-quarter, market-quarter and bank-branch FEs. Standard errors are clustered at the bank level.



(a) Quarter FEs

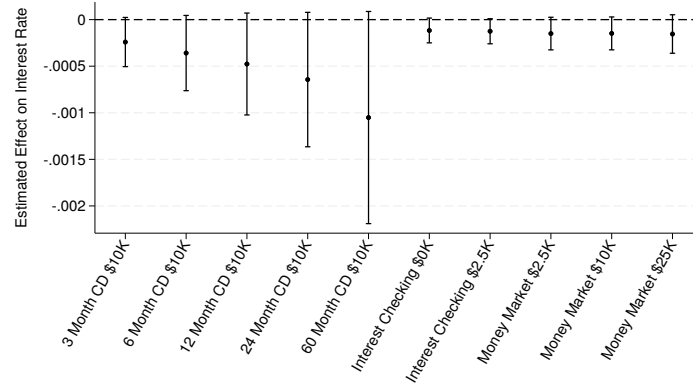


(b) Bank-Quarter FEs

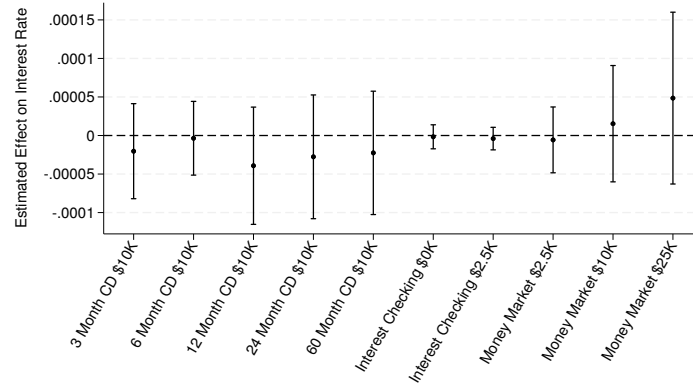


(c) Bank-Quarter, Market-Quarter and Bank-Branch FEs

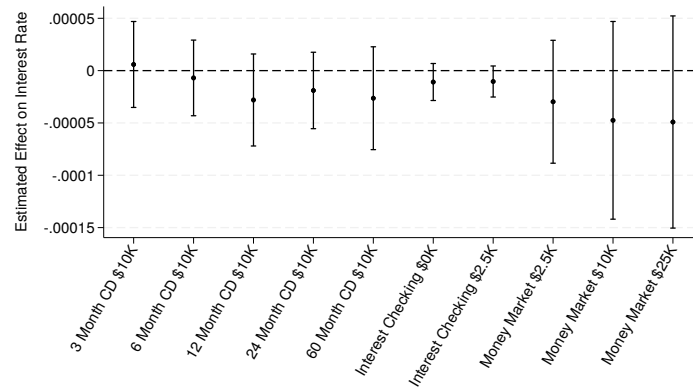
Figure A17: **Late Sample Period (2014-2022):** These three figures plot the point estimates and 95% confidence intervals for findings in Table A12 using data from 2014 to 2022. Panel (a) shows estimates that only include quarter FEs, panel (b) includes bank-quarter FEs, and panel (c) includes bank-quarter, market-quarter and bank-branch FEs. Standard errors are clustered at the bank level.



(a) Quarter FEs

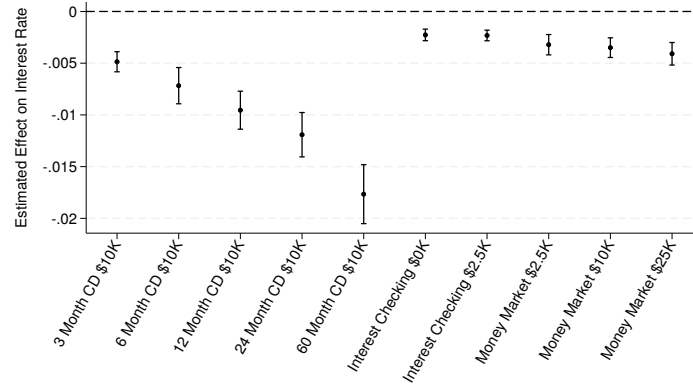


(b) Bank-Quarter FEs

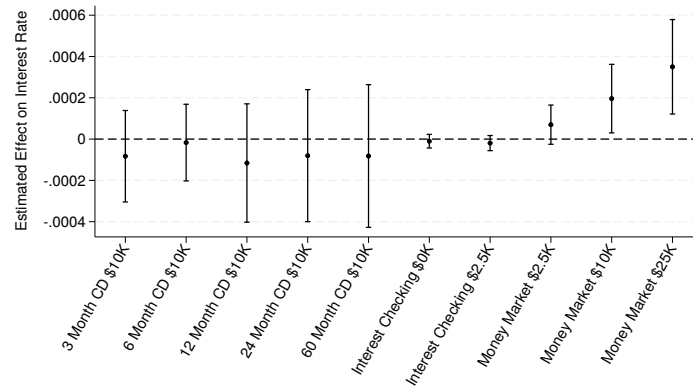


(c) Bank-Quarter, Market-Quarter and Bank-Branch FEs

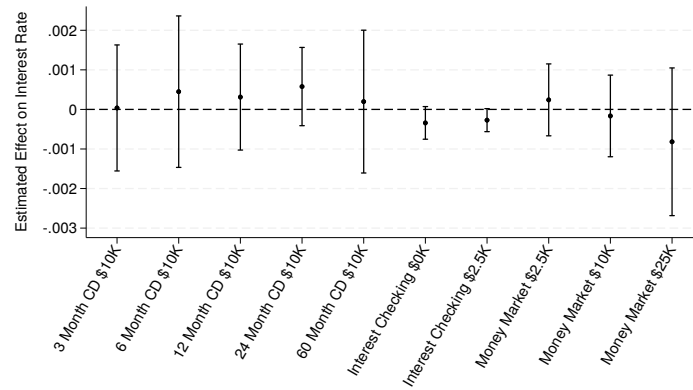
Figure A18: **13F Data Only:** These three figures plot the point estimates and 95% confidence intervals for in findings in Table A13 using using only ownership data from 13F filings. Panel (a) shows estimates that only include quarter FEs, panel (b) includes bank-quarter FEs, and panel (c) includes bank-quarter, market-quarter and bank-branch FEs. Standard errors are clustered at the bank level.



(a) Quarter FEs



(b) Bank-Quarter FEs



(c) Bank-Quarter, Market-Quarter and Bank-Branch FEs

Figure A19: 13F Data Only with Additional 10% Undiversified Shareholder: These three figures plot the point estimates and 95% confidence intervals for findings in Table A14 using only ownership data from 13F filings but adding a 10% undiversified shareholder. Panel (a) shows estimates that only include quarter FEs, panel (b) includes bank-quarter FEs, and panel (c) includes bank-quarter, market-quarter and bank-branch FEs. Standard errors are clustered at the bank level.

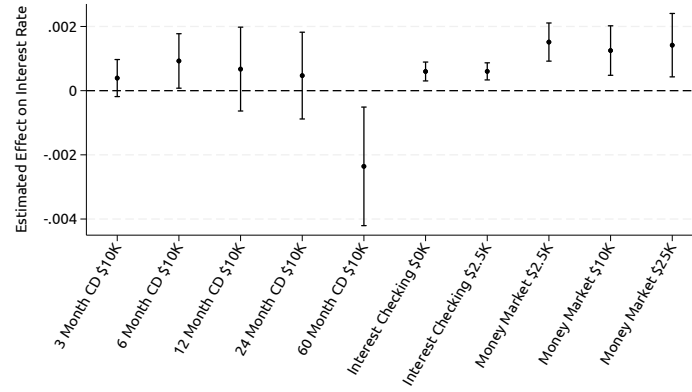
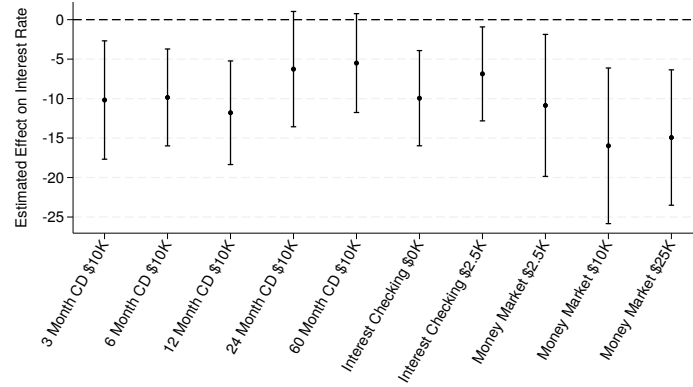
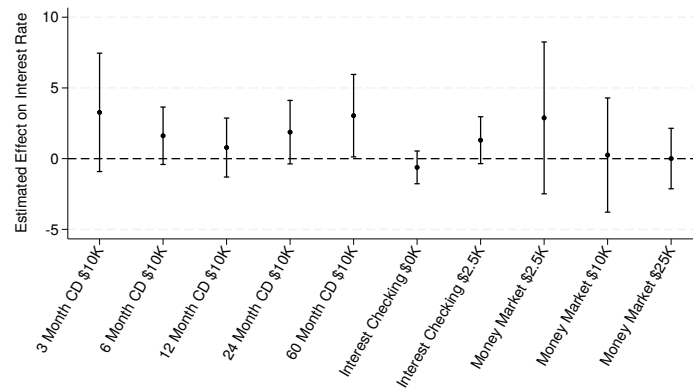


Figure A20: **Panel Regression Estimates (Controlling for Branch Counts):** These three figures plot the point estimates and 95% confidence intervals for in findings in Table A15. Unlike the baseline estimates these estimates control for the log of a bank's branch count. Only quarter fixed effects are included. Standard errors are clustered at the bank level.

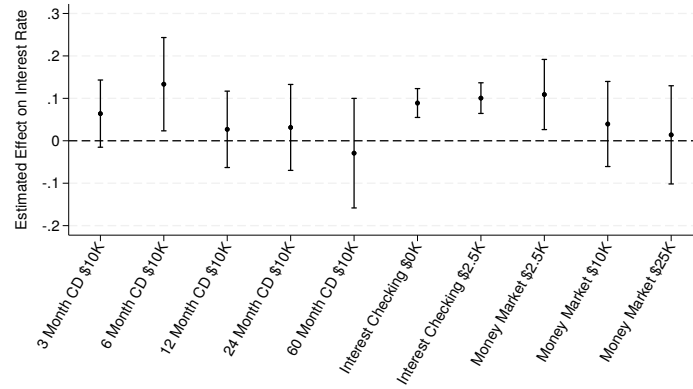


(a) Quarter & Bank-Branch FEs

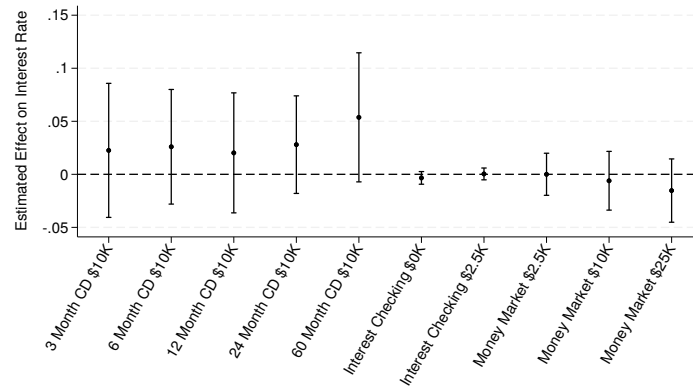


(b) Bank-Quarter & Bank-Branch FEs

Figure A21: **Azar et al. (2022) Specification with Percentile Transformation:** These three figures plot the point estimates and 95% confidence intervals for in findings in Table A16. Panel (a) shows estimates that include quarter and bank-branch FEs and panel (b) includes bank-quarter and bank-branch FEs. Standard errors are clustered at the bank level.



(a) Quarter & Bank-Branch FEs



(b) Bank-Quarter & Bank-Branch FEs

Figure A22: **Azar et al. (2022) Specification without Percentile Transformation:** These three figures plot the point estimates and 95% confidence intervals for in findings in Table A17. Panel (a) shows estimates that include quarter and bank-branch FEs and panel (b) includes bank-quarter and bank-branch FEs. Standard errors are clustered at the bank level.

B Online Appendix: Tables

Table A1: **Deposit Rate Panel Regressions (Rate Setter Branches Only)**: This table shows estimates for ten different deposit interest rates from left to right. Unlike the baseline estimates only rate setter branches are included in the sample. Standard errors are clustered at the bank level. These estimates are also illustrated graphically in Figure A9.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	3 Months CD	6 Months CD	12 Months CD	24 Months CD	60 Months CD	Checking \$0	Checking \$2.5K	MM \$2.5K	MM \$10K	MM \$25K
Weight on Rival Profits	-0.00807*** (0.0000887)	-0.0117*** (0.00135)	-0.0157*** (0.00171)	-0.0191*** (0.00186)	-0.0276*** (0.00211)	-0.00505*** (0.000508)	-0.00492*** (0.000407)	-0.00841*** (0.000906)	-0.00757*** (0.00102)	-0.00726*** (0.00132)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Quarter FE	No	No	No	No	No	No	No	No	No	No
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	373520	409952	411665	396217	340951	367862	392707	380091	390126	391319
A	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	3 Months CD	6 Months CD	12 Months CD	24 Months CD	60 Months CD	Checking \$0	Checking \$2.5K	MM \$2.5K	MM \$10K	MM \$25K
Weight on Rival Profits	0.00000382 (0.0000366)	0.000185 (0.000339)	0.000220 (0.000334)	0.000285 (0.000364)	-0.0000289 (0.0000329)	0.000229 (0.000138)	0.000176 (0.000110)	0.000397* (0.000173)	0.000476** (0.000184)	0.000700*** (0.000209)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	144972	153411	153861	150076	137338	139586	146797	142357	145369	146106
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	3 Months CD	6 Months CD	12 Months CD	24 Months CD	60 Months CD	Checking \$0	Checking \$2.5K	MM \$2.5K	MM \$10K	MM \$25K
Weight on Rival Profits	0.00132 (0.00129)	0.000465 (0.00122)	0.000199 (0.00113)	0.0000755 (0.00113)	0.00110 (0.00130)	-0.0000759 (0.000824)	-0.000117 (0.000795)	0.00159 (0.00107)	0.00156 (0.00135)	0.000333 (0.00154)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Branch FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	116742	124763	125133	121691	110118	112769	118631	113764	116748	117458

Table A2: Deposit Rate Panel Regressions (Cross Ownership): This table shows estimates for ten different deposit interest rates from left to right. Unlike the baseline estimates the calculation of profit weights assumes that the holdings of asset management arms of banks results in cross ownership. Standard errors are clustered at the bank level. These estimates are also illustrated graphically in Figure A10.

	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Weight on Rival Profits	-0.00395*** (0.000408)	-0.00590*** (0.000748)	-0.00793*** (0.000778)	-0.00992*** (0.000905)	-0.0149*** (0.00119)	-0.00186*** (0.000227)	-0.00191*** (0.000214)	-0.00275*** (0.000421)	-0.00290*** (0.000421)	-0.00332*** (0.000468)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Quarter FE	No	No	No	No	No	No	No	No	No	No
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	3876263	4028593	4038425	3981429	3797045	3624546	3869905	3650677	3731104	3744594
	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Weight on Rival Profits	-0.0000512 (0.0000989)	0.00000239 (0.0000900)	-0.000101 (0.000129)	-0.0000557 (0.000141)	-0.0000765 (0.000158)	-0.0000129 (0.0000173)	-0.0000190 (0.0000182)	0.0000458 (0.0000397)	0.000148 (0.0000757)	0.000261* (0.000108)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	3801169	3943230	3952894	3902282	3736741	3546738	3788092	3573589	3652144	3665514
	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Weight on Rival Profits	0.00000880 (0.000708)	0.000264 (0.000714)	-0.000263 (0.000519)	-0.0000162 (0.000485)	-0.000336 (0.000920)	-0.000164 (0.000156)	-0.000136 (0.000124)	-0.000257 (0.000538)	-0.000618 (0.000912)	-0.00125 (0.00110)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Branch FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3794931	3937395	3947090	3896198	3729709	3538856	3781837	3566699	3645759	3659177

Table A3: **Deposit Rate Panel Regressions (GHHI)**: This table shows estimates for ten different deposit interest rates from left to right. Standard errors are clustered at the bank level. These estimates are also illustrated graphically in Figure A11.

	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
GHHI	-0.245*** (0.0224)	-0.357*** (0.0319)	-0.457*** (0.0473)	-0.565*** (0.0563)	-0.802*** (0.0911)	-0.115*** (0.0113)	-0.117*** (0.0111)	-0.173*** (0.0182)	-0.188*** (0.0228)	-0.199*** (0.0298)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Quarter FE	No	No	No	No	No	No	No	No	No	No
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	3892284	4045402	4055236	3997837	3811632	3641242	3886541	3666951	3747587	3761085
	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
GHHI	-0.00642 (0.00523)	-0.00832 (0.00586)	-0.0104 (0.00630)	-0.0122 (0.00932)	-0.0142 (0.0122)	-0.000358 (0.00171)	-0.000229 (0.00172)	-0.000180 (0.00374)	-0.00414 (0.00486)	-0.0000343 (0.00514)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	3814683	3957278	3966947	3916116	3749361	3560719	3802021	3587305	3666022	3679398
	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
GHHI	0.0267 (0.0332)	0.0276 (0.0286)	0.0201 (0.0294)	0.0305 (0.0233)	0.0569 (0.0335)	-0.00236 (0.00282)	0.00125 (0.00274)	0.000673 (0.00971)	-0.00589 (0.0133)	-0.0152 (0.0141)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3813329	3955994	3965681	3914803	3747949	3558957	3800626	3585785	3664598	3678003

Table A4: **Average Market Weight:** This table shows estimates if the profit weights are averaged over all banks in a market. Standard errors are clustered at the bank level. These estimates are also illustrated graphically in Figure A12.

	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Average Weight on Rival Profits	-0.00867*** (0.00117)	-0.0122*** (0.00197)	-0.0153*** (0.00332)	-0.0200*** (0.00381)	-0.0347*** (0.00469)	-0.00418*** (0.000696)	-0.00414*** (0.000608)	-0.00543*** (0.000963)	-0.00541*** (0.00145)	-0.00597*** (0.00171)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Quarter FE	No	No	No	No	No	No	No	No	No	No
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	3830515	3978123	3987743	3933857	3759074	3580317	3820910	3604165	3683145	3696544
	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Average Weight on Rival Profits	-0.0000748 (0.000302)	0.0000638 (0.000304)	-0.000410 (0.000489)	-0.000386 (0.000710)	-0.000493 (0.000898)	0.00000966 (0.0000659)	-0.0000168 (0.0000555)	0.000104 (0.000158)	0.000330 (0.000268)	0.000561 (0.000341)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	3757904	3895532	3904955	3856728	3700004	3505193	3741808	3529314	3606440	3619723
	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Average Weight on Rival Profits	0.00128 (0.00119)	0.00139 (0.00119)	0.000599 (0.00105)	0.00105 (0.00150)	0.00205 (0.00349)	-0.0000438 (0.000257)	0.0000881 (0.000186)	-0.000311 (0.000519)	-0.000328 (0.000603)	-0.000846 (0.00106)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3756404	3894070	3903512	3855245	3698464	3503247	3740232	3527605	3604826	3618134

Table A5: **IV Estimates (Number of Listed Banks):** This table shows estimates if the number of banks in a market and the number of banks interacted with a time trend are used as an instrument for the profit weights. Standard errors are clustered at the bank level. These estimates are also illustrated graphically in Figure A13. The first stage estimates are shown in Table A6.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	3 Months CD	6 Months CD	12 Months CD	24 Months CD	60 Months CD	Checking \$0	Checking \$2.5K	MM \$2.5K	MM \$10K	MM \$25K
Average Weight on Rival Profits	-0.00793*** (0.00167)	-0.0109*** (0.00281)	-0.0134** (0.00478)	-0.0173** (0.00560)	-0.0326*** (0.00710)	-0.00333*** (0.00100)	-0.00339*** (0.000874)	-0.00388** (0.00127)	-0.00302 (0.00189)	-0.00329 (0.00219)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Quarter FE	No	No	No	No	No	No	No	No	No	No
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	3812260	3958349	3967891	3914242	3741370	3563118	3801835	3585598	3664042	3677422
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	3 Months CD	6 Months CD	12 Months CD	24 Months CD	60 Months CD	Checking \$0	Checking \$2.5K	MM \$2.5K	MM \$10K	MM \$25K
Average Weight on Rival Profits	-0.000197 (0.000315)	0.0000304 (0.000352)	-0.000465 (0.000637)	-0.000542 (0.000806)	-0.000548 (0.000848)	-0.0000393 (0.0000788)	-0.0000729 (0.0000752)	0.000162 (0.000175)	0.000454 (0.000334)	0.000681 (0.000467)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	3739813	3876016	3885359	3837277	3682264	3488254	3722990	3510868	3587546	3600802
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	3 Months CD	6 Months CD	12 Months CD	24 Months CD	60 Months CD	Checking \$0	Checking \$2.5K	MM \$2.5K	MM \$10K	MM \$25K
Average Weight on Rival Profits	0.00203 (0.00205)	0.00239 (0.00209)	0.00162 (0.00175)	0.00162 (0.00212)	0.00166 (0.00436)	0.000106 (0.000356)	0.000299 (0.000281)	-0.000318 (0.000736)	-0.000809 (0.00101)	-0.000962 (0.00176)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3738322	3874562	3883924	3835801	3680731	3486309	3721421	3509171	3585943	3599224

Table A6: **IV Estimates First Stage (Number of Listed Banks):** This table shows the first stage for the estimates in Table A5. Notice that the title of each column denotes the outcome variable for the second stage. Standard errors are clustered at the bank level.

	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Number of Public Banks	0.0162*** (0.00137)	0.0163*** (0.00133)	0.0163*** (0.00132)	0.0160*** (0.00136)	0.0156*** (0.00137)	0.0174*** (0.00199)	0.0163*** (0.00135)	0.0180*** (0.00168)	0.0178*** (0.00167)	0.0176*** (0.00167)
Number of Public Banks x Quarter	0.000477*** (0.0000556)	0.000477*** (0.0000539)	0.000476*** (0.0000539)	0.000498*** (0.0000615)	0.000484*** (0.0000561)	0.000394** (0.000126)	0.000483*** (0.0000580)	0.000357*** (0.000107)	0.000367*** (0.000106)	0.000378*** (0.000107)
Number of Public Banks x Quarter ²	0.0000209*** (0.000000743)	0.0000211*** (0.00000703)	0.0000211*** (0.00000704)	0.0000208*** (0.00000785)	0.0000210*** (0.00000738)	0.0000223*** (0.00000214)	0.0000209*** (0.00000773)	0.0000229*** (0.00000159)	0.0000228*** (0.00000157)	0.0000227*** (0.00000158)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Quarter FE	No	No	No	No	No	No	No	No	No	No
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
Kleibergen-Paap rk Wald F	1829.8	1915.3	1920.2	1909.2	1811.9	1808.4	1806.4	1543.6	1601.9	1608.5
N	3812260	3958349	3967891	3914242	3741370	3563118	3801835	3585598	3664042	3677422
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Number of Public Banks	0.0130*** (0.00208)	0.0130*** (0.00205)	0.0130*** (0.00204)	0.0129*** (0.00204)	0.0130*** (0.00206)	0.0152*** (0.00238)	0.0125*** (0.00195)	0.0162*** (0.00249)	0.0161*** (0.00249)	0.0159*** (0.00247)
Number of Public Banks x Quarter	0.000458*** (0.0000824)	0.000456*** (0.0000801)	0.000457*** (0.0000798)	0.000466*** (0.0000843)	0.000457*** (0.0000805)	0.000283* (0.000130)	0.000483*** (0.0000798)	0.000234 (0.000139)	0.000238 (0.000139)	0.000256 (0.000139)
Number of Public Banks x Quarter ²	0.0000196*** (0.00000106)	0.0000197*** (0.00000101)	0.0000197*** (0.00000101)	0.0000196*** (0.00000105)	0.0000197*** (0.00000101)	0.0000224*** (0.00000194)	0.0000193*** (0.00000103)	0.0000227*** (0.00000219)	0.0000227*** (0.00000219)	0.0000224*** (0.00000217)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
Kleibergen-Paap rk Wald F	985.3	968.8	965.4	962.6	977.2	949.4	1001.6	743.4	738.8	737.1
N	3739813	3876016	3885359	3837277	3682264	3488254	3722990	3510868	3587546	3600802
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Number of Public Banks	0.0512*** (0.00609)	0.0519*** (0.00600)	0.0519*** (0.00599)	0.0519*** (0.00608)	0.0514*** (0.00600)	0.0477*** (0.00556)	0.0519*** (0.00614)	0.0475*** (0.00571)	0.0486*** (0.00609)	0.0489*** (0.00614)
Number of Public Banks x Quarter	0.000206 (0.000109)	0.000210 (0.000109)	0.000210 (0.000109)	0.000226* (0.000114)	0.000210 (0.000110)	0.0000743 (0.000132)	0.000214 (0.000114)	0.000195 (0.000138)	0.000172 (0.000135)	0.000166 (0.000134)
Number of Public Banks x Quarter ²	0.0000215*** (0.00000109)	0.0000215*** (0.00000109)	0.0000215*** (0.00000109)	0.0000212*** (0.00000118)	0.0000215*** (0.00000110)	0.0000240*** (0.00000162)	0.0000214*** (0.00000116)	0.0000217*** (0.00000189)	0.0000220*** (0.00000184)	0.0000220*** (0.00000183)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Kleibergen-Paap rk Wald F	1009.2	1026.2	1027.1	974.9	1013.0	1067.7	990.7	869.3	855.8	855.7
N	3738322	3874562	3883924	3835801	3680731	3486309	3721421	3509171	3585943	3599224

Table A7: **IV Estimates (Number of Listed Banks 2005)**: This table shows estimates if the number of banks in a market and the number of banks interacted with a time trend are used as an instrument for the profit weights. Standard errors are clustered at the bank level. These estimates are also illustrated graphically in Figure A13. The first stage estimates are shown in Table A8.

	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Average Weight on Rival Profits	-0.00802*** (0.00168)	-0.0113*** (0.00277)	-0.0141** (0.00469)	-0.0181** (0.00554)	-0.0333*** (0.00708)	-0.00330** (0.00102)	-0.00334*** (0.000890)	-0.00404** (0.00127)	-0.00323 (0.00187)	-0.00344 (0.00216)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Quarter FE	No	No	No	No	No	No	No	No	No	No
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	3785773	3931593	3941095	3887615	3715548	3542194	3778285	3569346	3647357	3660727
	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Average Weight on Rival Profits	-0.0000642 (0.000313)	0.000166 (0.000329)	-0.000336 (0.000629)	-0.000610 (0.000809)	-0.000587 (0.000893)	-0.00000422 (0.0000619)	-0.0000561 (0.0000605)	0.000183 (0.000175)	0.000432 (0.000321)	0.000708 (0.000462)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	3713421	3849394	3858693	3810789	3656566	3467478	3699575	3494761	3571007	3584253

Table A8: **IV Estimates First Stage (Number of Listed Banks 2005)**: This table shows the first stage for the estimates in Table A7. Notice that the title of each column denotes the outcome variable for the second stage. Standard errors are clustered at the bank level.

	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Number of Public Banks 2005	0.00440* (0.00198)	0.00443* (0.00194)	0.00445* (0.00194)	0.00420* (0.00200)	0.00358 (0.00202)	0.00817* (0.00350)	0.00465* (0.00195)	0.00817* (0.00277)	0.00791** (0.00275)	0.00777** (0.00275)
Number of Public Banks 2005 x Quarter	0.00133*** (0.000109)	0.00134*** (0.000108)	0.00134*** (0.000108)	0.00135*** (0.000117)	0.00135*** (0.000114)	0.00103*** (0.000261)	0.00133*** (0.000110)	0.00105*** (0.000215)	0.00107*** (0.000215)	0.00108*** (0.000214)
Number of Public Banks 2005 x Quarter ²	0.0000155*** (0.00000139)	0.0000157*** (0.00000135)	0.0000157*** (0.00000135)	0.0000155*** (0.00000144)	0.0000155*** (0.00000142)	0.0000205*** (0.00000429)	0.0000157*** (0.00000140)	0.0000199*** (0.00000319)	0.0000198*** (0.00000315)	0.0000196*** (0.00000314)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Quarter FE	No	No	No	No	No	No	No	No	No	No
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
Kleibergen-Paap rk Wald F	919.4	955.9	960.2	935.1	901.8	937.3	910.6	944.9	975.5	981.0
N	3785773	3881593	3941095	3887615	3715548	3542194	3778285	3569346	3647357	3660727
	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Number of Public Banks 2005	0.00194 (0.00293)	0.00196 (0.00289)	0.00194 (0.00289)	0.00202 (0.00290)	0.00186 (0.00291)	0.00600 (0.00400)	0.00122 (0.00279)	0.00779* (0.00384)	0.00767* (0.00384)	0.00738 (0.00380)
Number of Public Banks 2005 x Quarter	0.00123*** (0.000158)	0.00123*** (0.000156)	0.00123*** (0.000155)	0.00122*** (0.000157)	0.00123*** (0.000157)	0.000894** (0.000280)	0.00127*** (0.000152)	0.000796** (0.000277)	0.000803** (0.000277)	0.000828** (0.000275)
Number of Public Banks 2005 x Quarter ²	0.0000136*** (0.00000187)	0.0000138*** (0.00000181)	0.0000138*** (0.00000181)	0.0000138*** (0.00000181)	0.0000137*** (0.00000181)	0.0000192*** (0.00000409)	0.0000132*** (0.00000176)	0.0000196*** (0.00000425)	0.0000196*** (0.00000424)	0.0000192*** (0.00000419)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
Kleibergen-Paap rk Wald F	621.2	604.8	603.8	591.6	610.2	641.8	627.6	594.0	588.7	590.0
N	3713421	3849394	3858693	3810789	3656566	3467478	3699575	3494761	3571007	3584253

Table A9: **IV Estimates (Index Fund Ownership)**: This table shows estimates if index fund ownership is used as an instrument for the profit weights. Standard errors are clustered at the bank level. These estimates are also illustrated graphically in Figure A15. The first stage estimates are shown in Table A10.

	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Average Weight on Rival Profits	-0.0317*** (0.00252)	-0.0464*** (0.00357)	-0.0604*** (0.00542)	-0.0761*** (0.00671)	-0.107*** (0.0105)	-0.0161*** (0.00146)	-0.0149*** (0.00123)	-0.0224*** (0.00198)	-0.0229*** (0.00223)	-0.0236*** (0.00273)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Quarter FE	No	No	No	No	No	No	No	No	No	No
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	3812260	3958349	3967891	3914242	3741370	3563118	3801835	3585598	3664042	3677422
	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Average Weight on Rival Profits	-0.00104 (0.000723)	-0.00134 (0.000888)	-0.000922 (0.000862)	-0.00147 (0.00131)	-0.00199 (0.00178)	0.000231 (0.000301)	0.000173 (0.000268)	-0.0000437 (0.000385)	-0.000202 (0.000589)	0.000355 (0.000745)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	3739813	3876016	3885359	3837277	3682264	3486254	3722990	3510868	3587546	3600802
	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Average Weight on Rival Profits	0.0173* (0.00859)	0.0119 (0.00842)	0.0138* (0.00697)	0.0160** (0.00584)	0.0243** (0.00755)	-0.000389 (0.00125)	0.000367 (0.00117)	0.00570 (0.00297)	0.00611 (0.00359)	0.00412 (0.00464)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3738322	3874562	3883924	3835801	3680731	3486309	3721421	3509171	3585943	3599224

Table A10: **IV Estimates First Stage (Index Fund Ownership)**: This table shows the first stage for the estimates in Table A9. Notice that the title of each column denotes the outcome variable for the second stage. Standard errors are clustered at the bank level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	3 Months CD	6 Months CD	12 Months CD	24 Months CD	60 Months CD	Checking \$0	Checking \$2.5K	MM \$2.5K	MM \$10K	MM \$25K
Index Fund Ownership	0.465*** (0.0208)	0.468*** (0.0205)	0.468*** (0.0205)	0.466*** (0.0204)	0.466*** (0.0208)	0.465*** (0.0207)	0.468*** (0.0210)	0.459*** (0.0189)	0.458*** (0.0187)	0.456*** (0.0186)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Quarter FE	No	No	No	No	No	No	No	No	No	No
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
Kleibergen-Paap rk Wald F	500.4	523.0	522.5	520.2	502.0	504.9	499.2	589.6	595.9	599.1
N	3812260	3958349	3967891	3914242	3741370	3563118	3801835	3585598	3664042	3677422
Index Fund Ownership	0.351*** (0.0291)	0.349*** (0.0285)	0.349*** (0.0285)	0.347*** (0.0287)	0.353*** (0.0291)	0.358*** (0.0300)	0.349*** (0.0296)	0.342*** (0.0273)	0.340*** (0.0270)	0.341*** (0.0268)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
Kleibergen-Paap rk Wald F	145.9	149.8	150.4	146.3	147.6	142.7	139.0	157.3	158.8	161.8
N	3739813	3876016	3885359	3837277	3682264	3488254	3722990	3510868	3587546	3600802
Index Fund Ownership	0.198*** (0.0268)	0.197*** (0.0262)	0.197*** (0.0262)	0.199*** (0.0258)	0.199*** (0.0270)	0.203*** (0.0281)	0.196*** (0.0272)	0.196*** (0.0245)	0.197*** (0.0241)	0.199*** (0.0238)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Kleibergen-Paap rk Wald F	54.46	56.43	56.65	59.46	54.42	52.46	51.76	64.13	66.95	70.00
N	3738322	3874562	3883924	3835801	3680731	3486309	3721421	3509171	3585943	3599224

Table A11: **Early Sample Period (2005-2013)**: This table shows estimates for ten different deposit interest rates from left to right. Unlike the baseline estimates these estimates only use data from the first half of the sample period from 2005 to 2013. Standard errors are clustered at the bank level. These estimates are also illustrated graphically in Figure A16.

	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Weight on Rival Profits	-0.00801*** (0.00104)	-0.0121*** (0.00166)	-0.0132*** (0.00219)	-0.0153*** (0.00217)	-0.0180*** (0.00270)	-0.00413*** (0.000496)	-0.00448*** (0.000521)	-0.00548** (0.00177)	-0.00571*** (0.00168)	-0.00622*** (0.00171)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Quarter FE	No	No	No	No	No	No	No	No	No	No
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	1692295	1744814	1745553	1715282	1621172	1724298	1702785	1634625	1677938	1680473
	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Weight on Rival Profits	-0.000147 (0.000416)	-0.000142 (0.000392)	-0.000313 (0.000397)	-0.000161 (0.000348)	-0.000286 (0.000367)	-0.0000302 (0.0000514)	-0.0000551 (0.0000611)	0.0000664 (0.000133)	0.000337 (0.000201)	0.000791** (0.000280)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	1639887	1686357	1687096	1660976	1579967	1667224	1645903	1580984	1623176	1625683
	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Weight on Rival Profits	0.00109 (0.00256)	0.000892 (0.00299)	-0.000724 (0.00254)	-0.00170 (0.00260)	-0.00141 (0.00359)	-0.000462 (0.000413)	-0.000453 (0.000423)	-0.00115 (0.00140)	-0.00243 (0.00225)	-0.00446 (0.00268)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Branch FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1634858	1681525	1682263	1655969	1574361	1662292	1640828	1575444	1618002	1620520

Table A12: **Late Sample Period (2014-2022)**: This table shows estimates for ten different deposit interest rates from left to right. Unlike the baseline estimates these estimates only use data from the second half of the sample period from 2014 to 2022. Standard errors are clustered at the bank level. These estimates are also illustrated graphically in Figure A17.

	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Weight on Rival Profits	-0.00294*** (0.000271)	-0.00431*** (0.000551)	-0.00668*** (0.000750)	-0.00862*** (0.000906)	-0.0147*** (0.00116)	-0.00115*** (0.000141)	-0.00121*** (0.000134)	-0.00188*** (0.000200)	-0.00220*** (0.000273)	-0.00273*** (0.000303)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Quarter FE	No	No	No	No	No	No	No	No	No	No
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	2183968	2283779	2292872	2266147	2175873	1900248	2167120	2016052	2053166	2064121
Weight on Rival Profits	-0.0000917 (0.0000297)	0.0000533 (0.0000610)	-0.0000457 (0.000108)	-0.0000220 (0.000155)	-0.00000666 (0.000196)	-0.00000349 (0.0000122)	-0.00000404 (0.00000757)	0.0000363 (0.0000267)	0.0000961 (0.0000923)	0.0000948 (0.0000971)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	2161282	2256873	2265798	2241306	2156774	1879514	2142189	1992605	2028968	2039831
Weight on Rival Profits	-0.000207 (0.000168)	0.0000162 (0.000263)	-0.000174 (0.000314)	-0.0000999 (0.000495)	-0.000458 (0.000502)	-0.00000802 (0.0000448)	-0.0000154 (0.0000340)	0.000138 (0.000104)	0.00179 (0.00144)	0.00187 (0.00134)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Branch FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2158863	2254711	2263664	2239046	2154128	1875289	2139737	1989759	2026254	2037164

Table A13: 13F Data Only: This table shows estimates for ten different deposit interest rates from left to right. Unlike the baseline estimates these estimates only use ownership data from 13F filings. Standard errors are clustered at the bank level. These estimates are also illustrated graphically in Figure A18.

	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Weight on Rival Profits	-0.000241 (0.000135)	-0.000359 (0.000206)	-0.000477 (0.000279)	-0.000643 (0.000368)	-0.00105 (0.000581)	-0.000117 (0.0000678)	-0.000125 (0.0000687)	-0.000150 (0.0000894)	-0.000148 (0.0000901)	-0.000154 (0.000105)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Quarter FE	No	No	No	No	No	No	No	No	No	No
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	3876263	4028593	4038425	3981429	3797045	3624546	3869905	3650677	3731104	3744594
	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Weight on Rival Profits	-0.000203 (0.0000315)	-0.0000358 (0.0000244)	-0.0000392 (0.0000388)	-0.0000277 (0.0000409)	-0.0000225 (0.0000408)	-0.00000170 (0.00000795)	-0.00000401 (0.00000747)	-0.00000569 (0.0000218)	0.0000153 (0.0000385)	0.0000485 (0.0000569)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	3801169	3943230	3952894	3902282	3736741	3546738	3788092	3573589	3652144	3665514
	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Weight on Rival Profits	0.00000587 (0.0000209)	-0.00000698 (0.0000184)	-0.0000281 (0.0000224)	-0.0000190 (0.0000186)	-0.0000264 (0.0000251)	-0.0000109 (0.00000902)	-0.0000104 (0.00000756)	-0.0000297 (0.0000299)	-0.0000475 (0.0000482)	-0.0000491 (0.0000517)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Branch FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3794931	3937395	3947090	3896198	3729709	3538856	3781837	3566699	3645759	3659177

Table A14: **13F Data Only with 10% Undiversified Shareholder:** This table shows estimates for ten different deposit interest rates from left to right. Unlike the baseline estimates these estimates only use ownership data from 13F filings. Standard errors are clustered at the bank level. These estimates are also illustrated graphically in Figure A19.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	3 Months CD	6 Months CD	12 Months CD	24 Months CD	60 Months CD	Checking \$0	Checking \$2.5K	MM \$2.5K	MM \$10K	MM \$25K
Weight on Rival Profits	-0.00486*** (0.000495)	-0.00717*** (0.000894)	-0.00954*** (0.000938)	-0.0119*** (0.00109)	-0.0177*** (0.00145)	-0.00227*** (0.000285)	-0.00232*** (0.000262)	-0.00321*** (0.000501)	-0.00350*** (0.000485)	-0.00409*** (0.000555)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Quarter FE	No	No	No	No	No	No	No	No	No	No
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	3876263	4028593	4038425	3981429	3797045	3624546	3869905	3650677	3731104	3744594
Weight on Rival Profits	-0.000830 (0.000113)	-0.000169 (0.0000947)	-0.000116 (0.000146)	-0.0000803 (0.000163)	-0.0000820 (0.000176)	-0.0000101 (0.0000169)	-0.0000193 (0.0000187)	0.0000698 (0.0000484)	0.000196* (0.0000847)	0.000350** (0.000117)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	3801169	3943230	3952894	3902282	3736741	3546738	3788092	3573589	3652144	3665514
Weight on Rival Profits	0.0000369 (0.000812)	0.000449 (0.000976)	0.000312 (0.000683)	0.000577 (0.000505)	0.000198 (0.000921)	-0.000341 (0.000210)	-0.000271 (0.000148)	0.000241 (0.000464)	-0.000165 (0.000526)	-0.000818 (0.000952)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Branch FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3794931	3937395	3947090	3896198	3729709	3538856	3781837	3566699	3645759	3659177

Table A15: **Deposit Rate Panel Regressions (Controlling for Branch Count)**: This table shows estimates for ten different deposit interest rates from left to right. Unlike the baseline estimates these estimates control for the log of a bank's branch count. Only quarter fixed effects are included. Standard errors are clustered at the bank level. These estimates are also illustrated graphically in Figure A20.

	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
Weight on Rival Profits	0.000393 (0.000295)	0.000926* (0.000433)	0.000672 (0.000667)	0.000470 (0.000690)	-0.00236* (0.000943)	0.000598*** (0.000150)	0.000601*** (0.000136)	0.00151*** (0.000303)	0.00125** (0.000393)	0.00142** (0.000504)
log(Branch Count)	-0.0394*** (0.00187)	-0.0591*** (0.00367)	-0.0741*** (0.00355)	-0.0896*** (0.00364)	-0.116*** (0.00748)	-0.0215*** (0.00109)	-0.0216*** (0.000974)	-0.0331*** (0.00247)	-0.0332*** (0.00242)	-0.0384*** (0.00354)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Quarter FE	No	No	No	No	No	No	No	No	No	No
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	No	No	No	No	No	No	No	No	No	No
N	3876263	4028593	4038425	3981429	3797045	3624546	3869905	3650677	3731104	3744594

Table A16: **Azar et al (2022) Specification with Percentile Transformation:** This table shows estimates for ten different deposit interest rates from left to right. Standard errors are clustered at the bank level. These estimates are also illustrated graphically in Figure A21.

	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
GHHI	-10.18** (3.824)	-9.851** (3.130)	-11.79*** (3.348)	-6.267 (3.725)	-5.499 (3.193)	-9.948** (3.075)	-6.870* (3.036)	-10.86* (4.587)	-15.98** (5.029)	-14.93*** (4.374)
log(1+ Market Cap)	0.415 (0.752)	0.346 (0.723)	0.448 (0.647)	0.308 (0.337)	0.580 (0.351)	0.774 (0.540)	0.554 (0.575)	-0.927** (0.340)	-1.084*** (0.326)	-1.154*** (0.326)
log(Population)	-17.25* (7.522)	-9.921 (7.955)	-20.26* (8.720)	-17.92*** (5.397)	-25.12*** (6.910)	0.819 (11.11)	1.945 (8.009)	-11.43 (9.318)	-19.02* (8.048)	-22.65** (7.952)
log(Income)	-8.830 (7.140)	-1.378 (8.177)	2.687 (6.220)	-3.127 (5.542)	-7.735 (6.068)	-10.09* (5.111)	-8.822 (5.736)	-11.99 (6.332)	-13.37 (8.471)	-16.45 (9.820)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Quarter FE	No	No	No	No	No	No	No	No	No	No
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3874627	4027005	4036852	3979812	3795378	3622471	3868199	3648831	3729361	3742878
	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
GHHI	3.271 (2.134)	1.619 (1.035)	0.785 (1.063)	1.873 (1.144)	3.039* (1.487)	-0.617 (0.590)	1.305 (0.846)	2.882 (2.738)	0.253 (2.059)	0.00651 (1.091)
log(Population)	7.731 (6.113)	6.386 (6.033)	1.310 (4.216)	4.214 (5.718)	0.0915 (3.905)	2.656 (2.551)	1.476 (2.744)	-3.763 (3.004)	0.104 (2.973)	-0.490 (3.599)
log(Income)	-13.62 (9.808)	-10.22 (8.789)	-6.068 (5.709)	-9.781 (6.829)	-12.70 (7.167)	-0.0759 (1.379)	1.263 (1.714)	-3.569 (2.714)	-0.658 (2.166)	-0.902 (1.296)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3799698	3941800	3951483	3900828	3735217	3544824	3786545	3571905	3650562	3663957

Table A17: Azar et al (2022) Specification without Percentile Transformation: This table shows estimates for ten different deposit interest rates from left to right. Standard errors are clustered at the bank level. These estimates are also illustrated graphically in Figure A22.

	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
GHHI	0.0640 (0.0404)	0.133* (0.0561)	0.0270 (0.0459)	0.0315 (0.0517)	-0.0292 (0.0659)	0.0890*** (0.0173)	0.101*** (0.0184)	0.109** (0.0422)	0.0395 (0.0511)	0.0139 (0.0590)
log(1+ Market Cap)	0.00930* (0.00460)	0.00975* (0.00480)	0.0102 (0.00564)	0.00747 (0.00530)	0.0120 (0.00788)	0.00156 (0.00151)	0.00147 (0.00136)	0.00109 (0.00256)	-0.000394 (0.00328)	-0.000632 (0.00460)
log(Population)	0.195 (0.103)	0.328* (0.154)	0.168 (0.144)	0.110 (0.124)	-0.196 (0.137)	0.349*** (0.0416)	0.352*** (0.0387)	0.315*** (0.0954)	0.327*** (0.0949)	0.426*** (0.126)
log(Income)	-0.180*** (0.0648)	-0.183 (0.103)	-0.110 (0.0836)	-0.171* (0.0773)	-0.264** (0.0993)	-0.0815** (0.0301)	-0.0774** (0.0272)	-0.245** (0.0763)	-0.218 (0.114)	-0.244 (0.150)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Quarter FE	No	No	No	No	No	No	No	No	No	No
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3874627	4027005	4036852	3979812	3795378	3622471	3868199	3648831	3729361	3742878
	(1) 3 Months CD	(2) 6 Months CD	(3) 12 Months CD	(4) 24 Months CD	(5) 60 Months CD	(6) Checking \$0	(7) Checking \$2.5K	(8) MM \$2.5K	(9) MM \$10K	(10) MM \$25K
GHHI	0.0226 (0.0322)	0.0260 (0.0276)	0.0202 (0.0289)	0.0280 (0.0235)	0.0537 (0.0310)	-0.00337 (0.00304)	0.000387 (0.00284)	0.0000463 (0.0101)	-0.00606 (0.0141)	-0.0153 (0.0152)
log(Population)	0.0472 (0.0555)	0.000672 (0.0689)	-0.0329 (0.0594)	0.0163 (0.0730)	-0.0223 (0.0608)	0.0112 (0.00959)	0.0105 (0.00896)	-0.0131 (0.0280)	-0.0152 (0.0357)	-0.0337 (0.0419)
log(Income)	-0.0739 (0.0506)	-0.0835 (0.0603)	-0.0580 (0.0482)	-0.106 (0.0667)	-0.226 (0.124)	0.00352 (0.00548)	0.00531 (0.00546)	-0.0376* (0.0156)	-0.0280 (0.0211)	-0.0235 (0.0270)
Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-Quarter FE	No	No	No	No	No	No	No	No	No	No
Bank-Branch FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3799698	3941800	3951483	3900828	3735217	3544824	3786545	3571905	3650562	3663957