Interest Rates, Yield Curves, and Bank Profitability: Evidence from the United States Banking Sector

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Abstract

This paper investigates the effect of monetary policy on the profitability of US banks from 2004 to 2023, a period that includes the Financial Crisis, a prolonged low-rate environment, and the rate hikes following the COVID-19 pandemic. Using annual data for all US banks, we analyse how the Federal Funds Rate and the yield curve impact net interest income, non-interest income, loan loss provisions, and return on assets with a focus on differences across bank sizes and rate environments. We find that in normal rate environments, increases in the federal funds rate and the yield curve benefit smaller banks but reduce profitability for larger institutions. In low-rate environments, large banks show stronger gains in net interest income, likely due to more diversified funding and asset strategies. The results highlight the importance of accounting for both interest rate regimes and bank size in making and assessing monetary policy.

Keywords: bank profitability; interest rate; yield curve; federal funds rate; monetary policy.

JEL Codes: E43; E52; G21.

Introduction

The Federal Reserve, established in 1913, conducts monetary policy primarily through open market operations to adjust the money supply and influence interest rates. The key rate in focus is the Effective Federal Funds Rate, or the overnight rate between banks, which also impacts banks' lending rates to consumers (Open Market Operations, 2024). While much of

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the discussion surrounding interest rates is focused on its impact on factors like the job market and GDP, there is also interest about its effect on banks. Given the size and influence of the financial sector, the health of financial institutions is an important consideration in monetary policy decisions. In this paper, we examine the effect of interest rates on bank performance for all banks in the US from 2004-2023.

An empirical literature highlights that bank performance is shaped by monetary policy as well as broader macroeconomic and institutional conditions. Research shows that financial system deposits and macroeconomic conditions play an important role in determining bank profitability (Ozili & Ndah 2024; Moyo & Tursoy 2020). External conditions such as economic globalization and political stability can influence bank profitability through changes in competition, funding environments, and financial development (Yakubu & Bunyaminu 2022; Lompo 2024). Molla et al. (2021) show that corporate governance structures affect bank performance. In related work, Al-Harbi (2017) highlights how bank performance indicators respond to macroeconomic and financial conditions that are related to monetary policy. Building on this literature the present study focuses on how monetary policy and the yield curve affect US bank profitability, emphasizing heterogeneity across bank sizes and interest rate regimes.

Banks often borrow money short term and lend it out long term via maturity transformation. When interest rates go up, the cost of borrowing short-term money increases faster than fixed rate assets. Studies show that loan rates are often more elastic than deposit rates, leading to higher profits as interest rates rise (Hancock, 1985). However, assets generally have longer maturities than deposits, leaving deposits to reprice at new rates quicker than loans. This timing mismatch can compress the bank's profit margins in the short run when assets and liabilities don't reprice at the same pace (Alessandri & Nelson, 2015; Altavilla et al., 2018; Drechsler et al., 2021). Over time, if the yield curve remains steep, banks can earn more as they gradually adjust loan rates, but only if they don't lose too many low-cost deposits or hold onto lower-rate loans.

Option risk can also diminish expected returns from higher rate, long term assets in a falling rate environment when option holders choose to prepay a loan or call a bond to issue new debt (Federal Deposit Insurance Corporation, 2018). Along with risks from customer behaviour, banks are also subject to price risk, where the fair value of a bank's assets changes with interest rate changes (Federal Deposit Insurance Corporation, 2018). These value changes can significantly impact a bank's ability to manage liquidity levels, threatening the solvency of banks by increasing firm risk and elevating funding costs (Marsh & Laliberte, 2023). This complex relationship between interest rates and bank earnings brought by maturity mismatches, funding structures, and asset repricing highlights the importance of understanding how monetary policy affects profitability across the board.

Economists have studied the effect of interest rates on profitability, and the consensus has been mixed. Some claim that low interest rates compress net interest income, especially for an extended period of time (Borio et al., 2017; Windsor et al., 2023; Claessens et al., 2017, Wang, 2025). Windsor (2023) measures this impact from a global perspective, considering banking environments from many countries, with both negative and low rates. While they find no impact of a low rate, *extended* low rates negatively impact profitability.

Similarly, in 2008-crisis-specific research, Borio et al. (2017) find that low rates and a steep yield curve benefit institutions for about two years after the crisis. As rates decrease further and the yield curve flattens for extended periods, profitability suffers. Flannery (1981) finds that the effect of monetary policy changes on costs and revenues are equal and result in minimal changes to bank profits.

Altavilla et al. (2018) find that the impact on provisions for credit losses offsets the impact on net interest income, ultimately suppressing the monetary policy effects. The paper also finds that different bank strategies affect how rate changes are handled within an institution. Bordeleau & Graham (2010) supports this finding when studying the effects of liquid assets on profitability. Banks that held some liquid assets were more profitable, but there was a point when additional liquidity stifled earnings. More traditional banks with deposit and loan-based business models can also be profitable with a lower level of liquid assets compared to others (Bordeleau and Graham, 2010), however small banks with less liquidity are the most affected by monetary policy changes (Kashyap & Stein, 2000). Deposit composition also influences bank earnings. Highlighting the importance of considering bank size, d'Avernas et al. (2024) found that large banks give lower deposit rates and have lower rate elasticities.

While prolonged low interest rates can compress net interest income, a high interest rate environment presents its own challenges. The Federal Reserve raised rates much faster post-Covid than it typically had, with a 525-basis point increase in a matter of just a year and a half (Federal Funds Effective Rate, 2024).

Koch & Islam (2023) find that an increase in the Federal Funds Rate post-covid resulted in a decrease in non-performing and impaired loans, ultimately lowering credit risk but increasing regulatory capital risk, leverage risk, and insolvency risk. There is limited research on how bank profits are affected during these unprecedented rate hikes. This paper adds to research on how bank profitability responded to COVID-19 and the following period of historic rate increases. The research aims to determine the effect of rate changes, measured via Federal Funds Rate and the yield curve, on profits from 2004 to 2023 for all US banks. It also examines the impact of these variables in low interest rate environments.

Previous literature focuses on the impact of rate changes on bank profits across countries for larger banks (Borio et al., 2017; Bourke, 1989; Altunbas et al., 2014). Buch et al. (2014) find that smaller US banks are more vulnerable to macroeconomic risks. Flannery (1981) also recognizes small banks have access to fewer financial instruments and may differ from large banks. We focus on these differences across asset sizes in one country by observing all US banks in six asset-size groups.

Specifically, this paper makes three main contributions: we examine how interest rate effects differ across all banks in the US instead of focusing on large banks or aggregate measures, we distinguish between low and non-low-rate environments, and we examine new data from 2004 to 2023 that includes Covid-19 effects and the extreme rate hikes that followed.

1. Econometric Model

To assess the effect of interest rates and their corresponding structure on financial institution profits, we use the following econometric model (1).

$$Y_{i,t} = \beta_0 + \beta_1 Y_{i,t-1} + \beta_2 FFR_{i,t} + \beta_3 FFR_{i,t} xLow_{i,t} + \beta_4 Slope_{i,t} + \beta_5 Slope_{i,t} xLow_{i,t} + \beta_6 Low_{i,t} +$$
$$\beta_7 \log(Total\_Assets_{i,t-1}) + \beta_8 Liquidity_{i,t-1} + \beta_9 Total\ Capital_{i,t-1} + \beta_{10} ST\ Funding_{i,t-1} +$$
$$\beta_{11} Total\ Deposits_{i,t-1} + \beta_{12} Asset\ Volatility_{i,t-1} + \beta_{13} Efficiency_{i,t-1} + \beta_{14} GDP_{i,t} +$$
$$\beta_{15} CPI_{i,t} + \beta_{16} ASPUS_{i,t} + \beta_{17} SPY_{i,t} + \beta_{18} Crisis_{i,t} + \beta_{19} Covid_{i,t} + \beta_{20} Time_{i,t} + \mu_i + \varepsilon_{i,t}$$

(1)

Following Altavilla et al. (2018) and Borio et al. (2017), we use net interest income (NII), non-interest income, provisions, and return on assets (ROA) as the dependent variables (Y) to encompass bank profit measures. All dependent variables are represented as a percentage of total assets for each financial institution. The lagged profit measure is used as a regressor to account for the persistence of bank earnings over time. The key explanatory variables of interest are the Federal Funds Rate (FFR) and the slope of the yield curve (Slope) to measure monetary policy effects. The Slope is calculated by subtracting the Federal Funds Rate from the 10-year bond rate (Borio et al., 2017; Alessandri & Nelson, 2015). This variable aims to capture any unconventional monetary policy like quantitative easing and periods with an inverted yield curve. Following Claessens et al. (2018) and Windsor et al. (2023), we include an interaction between the interest rate proxies and a low-rate dummy variable. The low-rate dummy equals 1 for years when the Federal Funds Rate was below 1.25%, which in this dataset includes years from 2008 through 2016. Bank-level control variables include the natural log of a bank's total assets (Altunbus, 2014; Borio et al., 2017; Buch, 2014; Koch and Islam, 2023); liquidity levels measured by the sum of cash and due from banks and available for sale securities as a percentage of total assets (Borio et al., 2017; Bourke, 1989); Total Capital ratio, defined as total risk-based capital as a percentage of risk-weighted assets; share of short term funding (ST Funding) as a percentage of total liabilities (Borio et al., 2017); total deposits as a percentage of total liabilities (Claessens et al., 2018); asset volatility measured as the percent change in total assets year over year (Alessandri, 2015); and efficiency measured as non-interest expense divided by the sum of net interest income and non-interest income subtract provision for credit losses (Borio et al., 2017). Macroeconomic variables consist of year-over-year growth of GDP, inflation (CPI), growth of average sales price of houses (ASPUS), growth of the S&P 500 (SPY), a time index increasing with every year, a dummy variable indicating the Great Financial Crisis (years 2008 - 2012), and a dummy variable indicating the Covid-19 pandemic (years 2020 and 2021). Inflation, the growth of GDP, S&P 500, and housing prices, along with the Crisis and Covid dummy variables attempt to capture the market's effects on bank earnings. The bank level variables account for each bank's ability to adjust to monetary policy changes. Banks with fewer assets, capital, and liquidity are generally less capable of adjustments, requiring higher costs to secure funding and access to less resources to tap into in times of distress. We use bank fixed effects to control for time-invariant characteristics of each bank that could influence earnings. We also cluster standard errors for each bank to account for serial correlation within individual banks. Fixed effects with large *n* and small *t* suffer from Nickell Bias, however, a longer panel as described in our data description can help mitigate this bias. Other papers using fixed effect analysis include Alessandri & Nelson (2015); Altavilla et al. (2018); Borio et al. (2017); and Claessens et al. (2018).

2. Data

Bank specific data is from annual call report information, compiled by the Federal Financial Institutions Examination Council (FFIEC) in the Uniform Bank Performance Report (UBPR). The Effective Federal Funds Rate is gathered from the New York Federal Reserve. Gross Domestic Product (GDP) is from the US Bureau of Economic Analysis (2025), retrieved from the Federal Reserve Bank of St. Lewis (FRED). Inflation, measured as year over year growth in Consumer Price Index (CPI) is from the US Bureau of Labor Statistics (2025), also retrieved from FRED. The housing growth variable is also retrieved from FRED (US Census Bureau & US Department of Housing and Urban Development, 2025). S&P 500 prices are from investing.com. All macroeconomic variables are displayed as a year-over-year percent change. Year-end call report data is gathered from December 2004 to December 2023, for all US banks in the time period. Following Kashyap and Stein (2000) and Claessens et al. (2018), we drop outliers that are more than 5 standard deviations away from the average of the selected dependent variable. To uncover potential differences in bank behaviour by size, we also divide the data into six groups based on the following asset-size percentiles in order to assess the size-related differences between banks at a more granular level: 0–5%, 5–25%, 25–50%, 50–75%, 75–95%, and above 95% (Kashyap & Stein, 2000). We do not adjust for mergers, as prior studies have found that using merger-adjusted and non–merger-adjusted samples return similar results (Kishan & Opiela, 2000).

Table 1 contains the descriptive statistics for all variables in the sample used in the econometric model. Outliers in each of the four regressions are dropped based on each dependent variable's unique standard deviations, so the sample size varies slightly across each model. For consistency, descriptive statistics are summarized using the sample for ROA as it has the largest number of observations in each asset-size group. Descriptive statistics for the dependent variables look similar across asset-size classes. A notable exception is that banks below the 5th percentile have much higher non-interest income than all other asset-size classes. In general, bank liquidity levels and capital ratios also decrease as asset size increases. Higher holdings of liquid assets for small banks are ideal because they serve as buffer stocks, protecting small banks in contractionary monetary policy while larger banks have better access to financing if necessary (Kashyap & Stein, 2000). Provisioning also increases as asset size increases. As banks get larger, they rely more on short term funding as well. Banks above the 95th percentile see a significantly higher asset volatility, likely due to larger banks acquiring other institutions.

3. Research Results

The regression results illustrate significant differences in how banks of different sizes respond to monetary policy changes. We review the effects of interest rate changes on all profit metrics in Table 2. Full regression results are available in the Appendix.

Table 1: Descriptive Statistics

| Bank Size	<5%		5-25%		25-50%		50-75%		75-95%		>95%	
Variable	Mean	Standard Dev.	Mean	Standard Dev.	Mean	Standard Dev.	Mean	Standard Dev.	Mean	Standard Dev.	Mean	Standard Dev.
ROA	2.00	7.31	0.73	2.54	0.71	1.70	0.76	1.47	0.82	1.57	0.95	1.79
NII	3.29	1.81	3.58	0.88	3.56	0.80	3.49	0.82	3.38	1.13	3.23	1.82
Provisions	0.16	0.75	0.23	0.61	0.28	0.63	0.31	0.67	0.34	0.83	0.47	1.72
NonIntInc	15.77	45.93	1.68	11.96	1.34	11.68	1.02	6.10	1.13	3.90	1.36	2.58
FFR	1.75	1.96	1.49	1.85	1.34	1.76	1.31	1.73	1.43	1.81	1.60	1.91
Slope	1.43	1.27	1.53	1.24	1.55	1.22	1.49	1.23	1.32	1.28	1.14	1.31
Low	0.51	0.50	0.56	0.50	0.57	0.50	0.55	0.50	0.48	0.50	0.42	0.49
Log Total Assets	9.58	0.53	10.79	0.29	11.65	0.21	12.44	0.24	13.56	0.46	16.12	1.31
Liquidity	25.78	24.37	23.54	17.38	22.64	15.69	21.18	14.55	19.30	12.94	18.09	13.18
STFunding	9.10	13.18	10.68	9.66	11.66	10.23	11.97	10.24	13.20	10.96	17.43	16.03
Total Capital	95.66	346.28	32.71	482.77	19.34	23.51	17.66	19.01	16.79	22.21	15.78	10.44
Total Deposits	0.82	0.35	0.95	0.11	0.94	0.09	0.93	0.08	0.91	0.10	0.86	0.16
Asset Volatility	5.20	24.62	5.07	13.09	5.04	10.10	5.87	10.46	8.06	14.31	10.48	24.08
Efficiency	-4,656	329,140	0.85	3.11	1,466	477,201	2,767	363,520	539	78,372	-7,284	542,330
ASPUS	1.95	6.63	2.28	6.89	2.62	7.13	2.84	7.37	3.23	7.85	3.62	8.30
CPI	2.32	1.34	2.22	1.33	2.19	1.37	2.25	1.48	2.47	1.72	2.71	1.90
GDP	3.96	2.32	3.89	2.24	3.92	2.24	4.02	2.35	4.31	2.67	4.68	2.88
SPY	6.50	16.20	7.04	16.42	7.73	16.17	8.17	15.87	8.42	15.51	8.73	14.86
Time	7.58	4.71	8.39	4.74	9.27	4.84	10.11	4.99	11.23	5.30	12.20	5.44
Covid	0.03	0.18	0.04	0.19	0.05	0.22	0.07	0.25	0.11	0.31	0.13	0.34
Crisis	0.34	0.47	0.35	0.48	0.33	0.47	0.30	0.46	0.25	0.44	0.20	0.40
Observations	4,996		20,959		25,712		25,664		21,190		5,543	

Source: Authors' calculations

3.1. Net Interest Income

The Federal Funds Rate shows a size-dependent relationship with net interest income in low and non-low-rate environments (see Figure 1). In non-low-rate environments, an increase in the Federal Funds Rate significantly increases net interest income for banks below the 50th percentile. For example, a one percentage point increase in the Federal Funds Rate is associated with a 0.3359% - point increase in net interest income as a percent of total assets. As asset size increases, the magnitude of the effect decreases. For banks above the 75th percentile, the relationship between the Federal Funds Rate and net interest income becomes negative and significant. By combining the estimates on the Federal Funds Rate level term and its interaction with Low (FFR + FFR*Low), we see the opposite effect in a low interest rate environment. Specifically, the effect is negative for banks below the 25th percentile and positive and significant for banks above the 25th percentile, increasing in magnitude as asset size increases. This is likely because small banks engage in more traditional banking activities funded by deposits with stickier rates (Claessens et al., 2017).

Large banks also have more access to different funding options like commercial paper and long-term bonds with different asset composition, using trading assets instead of traditional lending strategies more frequently than smaller institutions (d'Avernas et al., 2024). The results suggest that in a low-rate environment, non-traditional banking strategies less reliant on lending improve profits, as seen with the larger increase in net interest income for large banks during low-rate times.

Figure 1: Federal Funds Rate Effect on Net Interest Income (95% Confidence Interval)
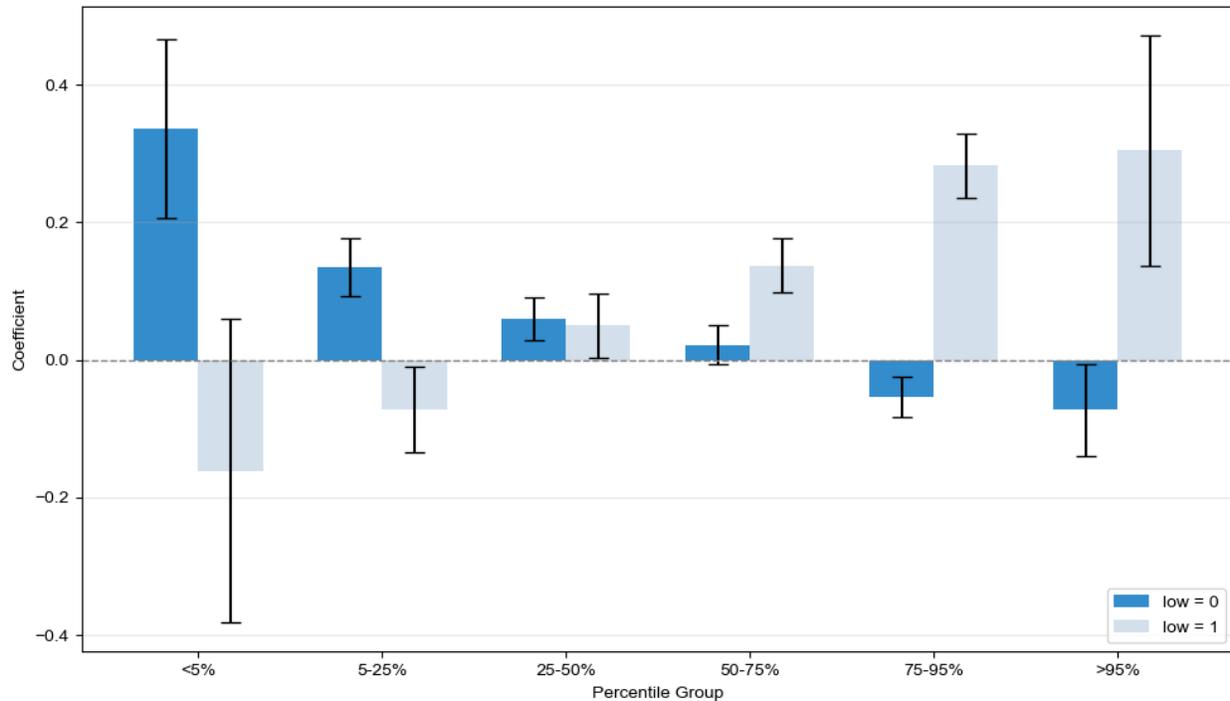
Source: Authors' calculations

The effect of the yield curve (Slope) in a non-low-rate environment has similar effects as the Federal Funds Rate in a non-low environment (see Figure 2). Across asset sizes, the yield curve initially has a significant positive effect on net interest income and slowly decreases until it reaches a negative and significant effect after the 75th percentile. This is also likely due to large bank's additional funding and interest rate hedging activities (Claessens et al., 2017). Once again combining estimates of the level term and the interaction with low (Slope + Slope*Low), we find that in a low-rate environment, the effect of the yield curve remains positive across all asset sizes, but with smaller magnitude. Small banks are more reactive to changes in the yield curve slope while large banks have more derivatives and other contracts to mitigate interest rate sensitivities. The full regression results show the effect of Covid-19 to be negative and significant for banks above the 25th percentile with the magnitude of the impact increasing with bank size. Hassan et al. (2022) also found smaller community banks did better than larger noncommunity banks, through stronger customer relationships and familiarity with local business environments.

Figure 1: Yield Curve Slope Effect on Net Interest Income (95% Confidence Interval)
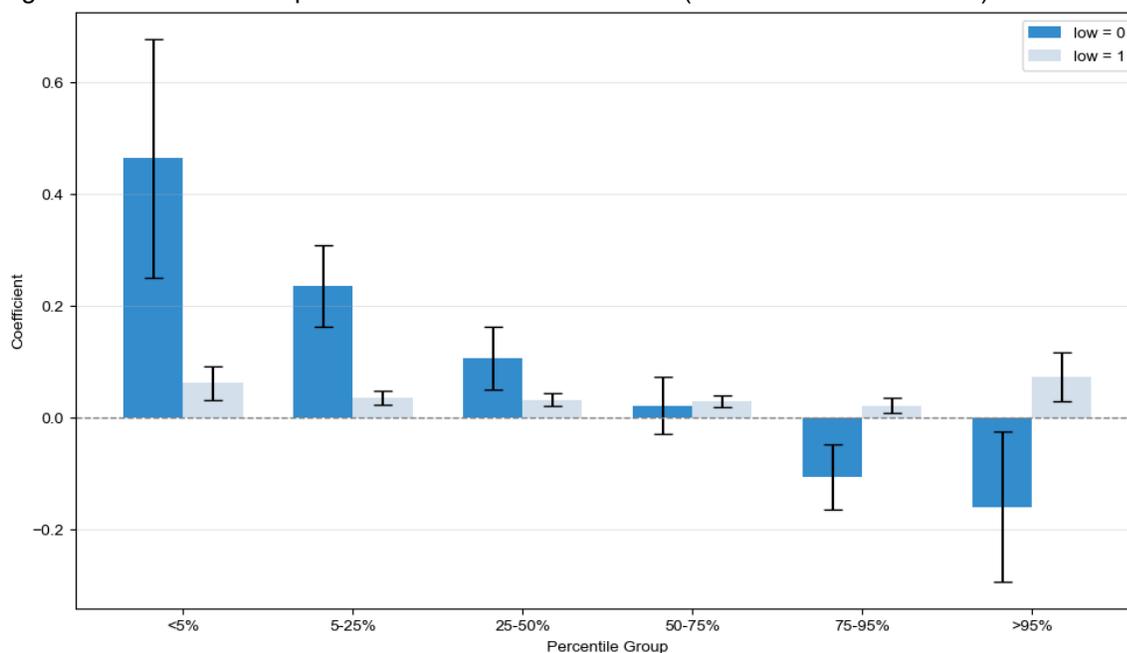
Source: Authors' calculations

3.2. Non-interest Income

In a non-low-rate environment, the effect of the Federal Funds Rate is positive and significant at the ten percent level for banks below the 25th percentile but insignificant for larger institutions. The slope of the yield curve is also positively associated with non-interest income in a non-low-rate environment for banks below the 25th percentile and insignificant for other bank sizes. In a low-rate environment, there is a negative relationship with the Federal Funds Rate for banks below the 5th percentile in size. However, as asset size increases, the effect of the Federal Funds Rate becomes positive. Abedifar et al. (2017) explains that larger banks are found to charge lower rates when they earn more investment income, also known as cross subsidization.

In non-low-rate environments, rate hikes are intended to slow economic activity, which slows fee income through fewer originations. This could explain why the effect on the Federal

Funds Rate is negative for small banks as they are more reliant on non-interest income. Non-interest income for larger banks is less rate sensitive and therefore not significant because these banks often take on more non-traditional bank strategies, like trading and investment activities that offset declines in traditional fee income.

Non-interest income is significantly higher during Covid-19, particularly for banks less than the 25th percentile. The results suggest no impact on non-interest income during the Great Financial Crisis. Smaller banks and community banks issued a larger share of loans under the federal Pay-check Protection Program than larger banks (Granja et al., 2022; Marsh & Sharma, 2020). Additional fees generated from this new lending strategy likely contributed to this increase in non-interest income.

Table 2: Impact of Interest Rates on Bank Profitability

Size	<5%	5-25%	25-50%	50-75%	75-95%	>95%
Dependent Variable	Net Interest Income					
FFR	0.3359***	0.1347***	0.0600***	0.0222	-0.0541***	-0.0726**
	(0.0663)	(0.0214)	(0.0159)	(0.0146)	(0.0147)	(0.0339)
FFR*Low	-0.4972***	-0.2072***	-0.0099	0.1153***	0.3364***	0.3770***
	(0.1642)	(0.0490)	(0.0347)	(0.0307)	(0.0328)	(0.0965)
Slope	0.4643***	0.2366***	0.1073***	0.0218	-0.1058***	-0.1588**
	(0.1087)	(0.0373)	(0.0285)	(0.0259)	(0.0294)	(0.0685)
Slope*Low	-0.4020***	-0.2005***	-0.0746***	0.0086	0.1278***	0.2322***
	(0.1019)	(0.0352)	(0.0272)	(0.0233)	(0.0273)	(0.0684)
FFR + FFR*Low	-0.1613	-0.0725**	0.0500**	0.1375***	0.2822***	0.3045***
	(0.1124)	(0.0320)	(0.0238)	(0.0205)	(0.0239)	(0.0853)
Slope + Slope*Low	0.0622***	0.0361***	0.0327***	0.0304***	0.0221***	0.0735***
	(0.0152)	(0.0059)	(0.0054)	(0.0054)	(0.0067)	(0.0223)
Observations	4,985	20,958	25,712	25,660	21,147	5,515
No of Banks	780	2,972	3,967	3,860	2,795	678
Dependent Variable	Non-interest Income					
FFR	0.6760*	0.1440*	-0.0218	-0.0104	-0.0222	-0.0564
	(0.3746)	(0.0811)	(0.0451)	(0.0188)	(0.0341)	(0.0634)
FFR*Low	-2.0497**	-0.0709	0.1684	0.1713***	0.1724	0.0859
	(1.0040)	(0.1863)	(0.1094)	(0.0541)	(0.1116)	(0.1493)
Slope	1.7249***	0.3219**	-0.0123	-0.0251	-0.0782	-0.1261
	(0.6589)	(0.1561)	(0.0798)	(0.0376)	(0.0594)	(0.1352)
Slope*Low	-1.7691***	-0.3342**	0.0072	0.0019	0.0255	0.1059
	(0.6300)	(0.1447)	(0.0742)	(0.0336)	(0.0529)	(0.1436)
FFR + FFR*Low	-1.3737*	0.0731	0.1455*	0.1609***	0.1503	0.0295
	(0.7543)	(0.1710)	(0.0763)	(0.0437)	(0.1035)	(0.1139)

Size	<5%	5-25%	25-50%	50-75%	75-95%	>95%
Slope + Slope*Low	-0.0441	-0.0123	-0.0051	-0.0232**	-0.0527*	-0.0202
	(0.0907)	(0.0290)	(0.0094)	(0.0100)	(0.0281)	(0.0436)
Observations	4,744	20,879	25,650	25,639	21,184	5,543
No of Banks	760	2,964	3,956	3,857	2,798	681
Dependent Variable	Provisions					
FFR	0.0158	0.0310*	-0.0054	0.0022	0.0548***	0.2421***
	(0.0283)	(0.0171)	(0.0136)	(0.0123)	(0.0132)	(0.0282)
FFR*Low	-0.0136	0.0221	0.1006***	0.0635**	-0.0125	-0.1654**
	(0.0706)	(0.0402)	(0.0345)	(0.0317)	(0.0368)	(0.0765)
Slope	0.0519	0.0824***	0.0216	0.0451*	0.1586***	0.4787***
	(0.0542)	(0.0320)	(0.0263)	(0.0239)	(0.0270)	(0.0606)
Slope*Low	-0.0100	0.0026	0.0962***	0.0832***	0.0218	-0.2066***
	(0.0503)	(0.0305)	(0.0244)	(0.0226)	(0.0258)	(0.0555)
FFR + FFR*Low	0.0022	0.0532*	0.0951***	0.0657**	0.0423	0.0767
	(0.0562)	(0.0319)	(0.0301)	(0.0282)	(0.0333)	(0.0689)
Slope + Slope*Low	0.0419***	0.0850***	0.1178***	0.1283***	0.1804***	0.2721***
	(0.0137)	(0.0076)	(0.0084)	(0.0085)	(0.0109)	(0.0269)
Observations	4,971	20,886	25,619	25,581	21,052	5,458
No of Banks	773	2,970	3,958	3,861	2,791	678
Dependent Variable	Return on Assets					
FFR	-0.0550	-0.0818	-0.0440	-0.0647**	-0.2146***	-0.7021***
	(0.3620)	(0.0592)	(0.0437)	(0.0258)	(0.0333)	(0.1050)
FFR*Low	-0.0413	0.0937	0.0041	0.1275*	0.4557***	0.9934***
	(0.8296)	(0.1449)	(0.0949)	(0.0689)	(0.0898)	(0.2774)
Slope	-0.1039	-0.1390	-0.1266*	-0.1888***	-0.5212***	-1.4857***
	(0.6548)	(0.1019)	(0.0721)	(0.0488)	(0.0712)	(0.2403)
Slope*Low	0.0363	0.0293	0.0127	0.0590	0.3232***	1.1509***
	(0.6600)	(0.0965)	(0.0679)	(0.0498)	(0.0677)	(0.2427)
FFR + FFR*Low	-0.0962	0.0119	-0.0399	0.0627	0.2411***	0.2913
	(0.5426)	(0.1110)	(0.0643)	(0.0549)	(0.0732)	(0.2033)
Slope + Slope*Low	-0.0676	-0.1097***	-0.1139***	-0.1298***	-0.1980***	-0.3348***
	(0.0922)	(0.0243)	(0.0178)	(0.0160)	(0.0380)	(0.0627)
Observations	4,996	20,959	25,712	25,664	21,190	5,543
No of Banks	779	2,973	3,966	3,864	2,799	681

Note: FFR + FFR*Low and Slope + Slope*Low is the linear combination of the respective coefficients.
Source: Authors' calculations. Cluster robust standard errors in parentheses. ***p<0.01, **<0.05, *p<0.1.

3.3. Provisions

Regarding provisions, the Federal Funds Rate has an insignificant effect for smaller banks, but is increasingly positive for banks above the 75th percentile with a much larger increase for banks above the 95th percentile. In low-rate environments, the Federal Funds Rate has a significant positive effect on only mid-sized banks (5-75th percentile). This suggests that small, mid-sized, and large banks have different provisioning practices, with mid-sized banks being most sensitive to interest rates in a low-rate environment. With respect to the yield curve, provisioning practices are positive across all asset-size classes with the size of the effect increasing with the size of the bank. In a low-rate environment, the yield curve has a positive and significant effect on provisions for all bank sizes. The size of the effect increases with bank size, the same size-based pattern as seen in a normal rate environment. This pattern is likely due to rules and regulations impacting asset quality monitoring, general risk modelling, and capital and provisioning requirements based on the size, complexity, and risk profile of a bank (for example, see rules in BASEL III, Title 12 CFR Part 324, and Dodd-Frank)

3.4. Return on Assets

In a non-low-rate environment, the effect of the Federal Funds Rate on a bank's return on assets is insignificant for banks below the 50th percentile. For banks above the 50th percentile, the effect is negative, significant, and increasing in magnitude as asset size increases. The yield curve in a non-low-rate environment is negatively associated with return on assets, increasing in magnitude as bank size increases. These findings align with Claessens et. al (2017), with a high yield curve potentially associated with adverse economic conditions. In a low-rate environment, the effect of the yield curve is not as strong, but is still significant and increasingly negative as bank size increases.

It is important to note large differences between the effects of rate changes on banks above the 95th percentile and all other banks. For banks in the 95th percentile and above, the magnitude of interest rate effects is much larger. This can likely be attributed to the more extreme provisioning that is associated with increasing rates, which ultimately impacts ROA through the income statement.

Discussion and Conclusion

This study contributes to the literature by focusing on how the Federal Funds Rate and the slope of the yield curve impacts bank profitability, disaggregating the effects by both bank size and interest rate regime, using a US dataset from 2004 to 2023. Our results reveal a size-dependent relationship that speaks to other findings in the literature.

Our primary finding is that the impact of monetary policy on net interest income is not uniform. In normal rate environments, rising rates and a steeper yield curve benefits smaller banks, but harms larger institutions. During low-rate environments, however, we find that larger banks show strong net interest income gains. Our findings add to the work of Borio et al. (2017) and Claessens et al (2017), demonstrating that while extended low rates can be detrimental, this effect may be mediated by bank size and business model.

One explanation for this divergence lies in differences in funding composition and deposit rate sensitivity across bank sizes documented in prior literature (Claessens et al. 2017; Kashyap & Stein 2000). Smaller banks often rely more heavily on core retail deposits that adjust to rate changes more gradually. On the other hand, larger institutions tend to have broader access to diversified market-based funding sources. In periods of tightening, this difference in repricing speed can contribute to margin compression for institutions whose liabilities adjust more quickly than the yields on longer-maturity assets. Our findings of heterogeneous net interest income responses by bank size are consistent with this channel rather than implying a uniform transmission of policy rates across institutions.

Asset-side diversification also plays a complementary role. Larger banks more frequently engage in trading activities, derivatives use, and non-traditional lending, which can offset margin compression during tightening cycles (Alessandri & Nelson 2015; d'Avernas et al. 2024). Smaller banks, by contrast, are more concentrated in relationship-based lending and fixed-rate loan portfolios, making their profitability more directly tied to the timing mismatch between asset and liability repricing. These structural balance sheet differences help explain why rate hikes can generate a disparate impact on profitability across bank sizes rather than a uniform sector-wide response.

In line with the results in Altavilla et al. (2018), we find that other factors can offset NII gains. In a normal rate environment, an increase in the Federal Funds rate is associated with increased provisioning for larger institutions. This effect, combined with net interest income compression, leads to our finding that return on assets is negatively associated with rate hikes only for these larger institutions.

The paper's main contribution is to empirically explore the effect of monetary policy by bank size and in different interest rate environments. Our results suggest that small banks are different especially with respect to the yield curve slope, while the profitability of larger banks is more tied to the Federal Funds Rate and its relationship to provisions. By incorporating the rate hikes post-COVID, this research echoes Koch & Islam (2023) and suggests it is important to understand the heterogeneous impacts of interest rate increase across institution size. For policy makers, the findings suggest that monetary policy is not an instrument with homogeneous effects, rather its impact depends on which institutions are most affected.

Credit Authorship Contribution Statement

Brown, O. was primarily responsible for the conceptualization, data curation, and writing the original draft. Other elements of the Contributor Role Taxonomy were shared between Brown, O. and Koford, B.

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Conflict of Interest Statement

The authors declare that there were no conflicts of interest in preparing this research

Data Availability Statement

Data used in this study are available from publicly accessible sources.

Ethical Approval Statement

This study uses only publicly available secondary data obtained from official databases, including the Federal Financial Institutions Examination Council (FFIEC), the Federal Reserve Economic Data (FRED), the US Bureau of Economic Analysis, and the US Bureau of Labor Statistics. The research does not involve human participants, personal data, or confidential institutional information. Therefore, according to standard research ethics guidelines, formal ethical approval from an institutional review board or ethics committee was not required.

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APPENDIX

Table A1: Fixed Effects Regression of Net Interest Income

Size	<5%	5-25%	25-50%	50-75%	75-95%	>95%
Lagged NII	0.5310***	0.5830***	0.5313***	0.5582***	0.5234***	0.6585***
	(0.0356)	(0.0214)	(0.0268)	(0.0258)	(0.0222)	(0.0502)
FFR	0.3359***	0.1347***	0.0600***	0.0222	-0.0541***	-0.0726**
	(0.0663)	(0.0214)	(0.0159)	(0.0146)	(0.0147)	(0.0339)
Low	0.6244***	0.2744***	0.0104	-0.1333***	-0.3777***	-0.5199***
	(0.2090)	(0.0712)	(0.0516)	(0.0442)	(0.0483)	(0.1246)
FFR*Low	-0.4972***	-0.2072***	-0.0099	0.1153***	0.3364***	0.3770***
	(0.1642)	(0.0490)	(0.0347)	(0.0307)	(0.0328)	(0.0965)
Slope	0.4643***	0.2366***	0.1073***	0.0218	-0.1058***	-0.1588**
	(0.1087)	(0.0373)	(0.0285)	(0.0259)	(0.0294)	(0.0685)
Slope*Low	-0.4020***	-0.2005***	-0.0746***	0.0086	0.1278***	0.2322***
	(0.1019)	(0.0352)	(0.0272)	(0.0233)	(0.0273)	(0.0684)
Log Total Assets	0.0865	-0.0584	-0.1571***	-0.1323***	-0.0882***	-0.0225
	(0.0899)	(0.0415)	(0.0340)	(0.0294)	(0.0225)	(0.0542)
Liquidity	-0.0001	-0.0030***	-0.0036***	-0.0032***	-0.0036***	-0.0049***
	(0.0009)	(0.0006)	(0.0006)	(0.0006)	(0.0007)	(0.0018)
ST Funding	-0.0038*	-0.0002	-0.0017***	-0.0031***	-0.0030***	-0.0022
	(0.0023)	(0.0009)	(0.0006)	(0.0008)	(0.0010)	(0.0024)
Total Capital	0.0002***	-0.0000***	-0.0013	-0.0033**	-0.0002	-0.0049***
	(0.0000)	(0.0000)	(0.0014)	(0.0014)	(0.0006)	(0.0017)
Total Deposits	-0.1809	0.2397	0.2088*	-0.0303	-0.0858	-0.7370
	(0.3113)	(0.2332)	(0.1157)	(0.1088)	(0.1655)	(0.4493)
Asset Volatility	-0.0055***	-0.0135***	-0.0140***	-0.0124***	-0.0090***	-0.0048***
	(0.0019)	(0.0006)	(0.0005)	(0.0005)	(0.0005)	(0.0012)
Efficiency	0.0000***	0.0009	0.0000***	0.0000	-0.0000***	-0.0000***
	(0.0000)	(0.0021)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
ASPUS	-0.0138***	-0.0103***	-0.0076***	-0.0044***	-0.0001	0.0015
	(0.0023)	(0.0008)	(0.0007)	(0.0005)	(0.0007)	(0.0018)
CPI	-0.0759***	-0.0538***	-0.0423***	-0.0228***	0.0127***	0.0385***
	(0.0184)	(0.0066)	(0.0053)	(0.0041)	(0.0043)	(0.0111)
GDP	0.0451***	0.0511***	0.0449***	0.0275***	0.0081***	-0.0006
	(0.0120)	(0.0048)	(0.0042)	(0.0024)	(0.0024)	(0.0060)
SPY	-0.0031***	-0.0033***	-0.0015***	-0.0000	0.0027***	0.0050***
	(0.0011)	(0.0004)	(0.0004)	(0.0002)	(0.0003)	(0.0009)

Size	<5%	5-25%	25-50%	50-75%	75-95%	>95%
Time	0.0244**	0.0080**	-0.0014	-0.0084***	-0.0189***	-0.0084
	(0.0111)	(0.0037)	(0.0030)	(0.0029)	(0.0029)	(0.0091)
Covid	-0.0464	-0.0406	-0.0686**	-0.1117***	-0.2606***	-0.4121***
	(0.0765)	(0.0360)	(0.0270)	(0.0195)	(0.0188)	(0.0457)
Crisis	0.1785***	0.0981***	0.0848***	0.0643***	0.0173	0.0951**
	(0.0410)	(0.0140)	(0.0112)	(0.0113)	(0.0125)	(0.0404)
Constant	-0.3583	1.4665**	3.2806***	3.4577***	3.4164***	2.5718***
	(0.9787)	(0.6244)	(0.4430)	(0.3951)	(0.4076)	(0.9324)
Observations	4,985	20,958	25,712	25,660	21,147	5,515
No of Banks	780	2,972	3,967	3,860	2,795	678

Note: Cluster robust standard errors in parentheses. ***p<0.01, **<0.05, *p<0.1
Source: Authors' calculations.

Table A2: Fixed Effects Regression of Non-interest Income

Size	<5%	5-25%	25-50%	50-75%	75-95%	>95%
Lagged Non-interest	0.6876***	0.6419***	0.5668***	0.5518***	0.4834***	0.6011***
	(0.0424)	(0.0751)	(0.2040)	(0.0701)	(0.1744)	(0.0658)
FFR	0.6760*	0.1440*	-0.0218	-0.0104	-0.0222	-0.0564
	(0.3746)	(0.0811)	(0.0451)	(0.0188)	(0.0341)	(0.0634)
Low	2.7597**	0.5750**	-0.0783	-0.0253	-0.0523	-0.1969
	(1.2117)	(0.2725)	(0.1519)	(0.0560)	(0.1033)	(0.2326)
FFR*Low	-2.0497**	-0.0709	0.1684	0.1713***	0.1724	0.0859
	(1.0040)	(0.1863)	(0.1094)	(0.0541)	(0.1116)	(0.1493)
Slope	1.7249***	0.3219**	-0.0123	-0.0251	-0.0782	-0.1261
	(0.6589)	(0.1561)	(0.0798)	(0.0376)	(0.0594)	(0.1352)
Slope*Low	-1.7691***	-0.3342**	0.0072	0.0019	0.0255	0.1059
	(0.6300)	(0.1447)	(0.0742)	(0.0336)	(0.0529)	(0.1436)
Log Total Assets	-1.1676	-0.3105*	-0.3305**	-0.1661**	-0.2757***	-0.1455***
	(1.2681)	(0.1592)	(0.1397)	(0.0831)	(0.0819)	(0.0495)
Liquidity	-0.0191*	0.0003	0.0050	0.0005	-0.0082	0.0009
	(0.0109)	(0.0024)	(0.0032)	(0.0014)	(0.0077)	(0.0029)
ST Funding	0.0214	-0.0017	0.0002	-0.0006	-0.0009	0.0016
	(0.0159)	(0.0024)	(0.0019)	(0.0018)	(0.0041)	(0.0036)
Total Capital	-0.0001	-0.0002***	0.0049	-0.0191	0.0118	-0.0055
	(0.0001)	(0.0000)	(0.0069)	(0.0127)	(0.0119)	(0.0034)
Total Deposits	-2.2862	-1.0038*	0.0664	-0.6217	-1.5194	-0.2777
	(3.1930)	(0.5810)	(0.5159)	(0.4667)	(1.0071)	(0.4100)

Size	<5%	5-25%	25-50%	50-75%	75-95%	>95%
Asset Volatility	-0.0320**	-0.0035	0.0014	-0.0021**	-0.0053***	-0.0046***
	(0.0129)	(0.0028)	(0.0016)	(0.0011)	(0.0016)	(0.0013)
Efficiency	0.0000	0.0027**	0.0000***	0.0000	-0.0000	0.0000***
	(0.0000)	(0.0012)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
ASPUS	-0.0125	-0.0045	0.0007	0.0036***	0.0081	0.0095**
	(0.0169)	(0.0031)	(0.0013)	(0.0011)	(0.0051)	(0.0046)
CPI	-0.3144***	-0.0532**	0.0043	-0.0071	0.0004	0.0223
	(0.1077)	(0.0262)	(0.0125)	(0.0066)	(0.0102)	(0.0173)
GDP	0.1758***	0.0348*	0.0050	0.0005	-0.0182**	-0.0211*
	(0.0672)	(0.0186)	(0.0071)	(0.0047)	(0.0075)	(0.0120)
SPY	-0.0120*	-0.0013	-0.0001	-0.0002	-0.0009	-0.0026**
	(0.0062)	(0.0015)	(0.0006)	(0.0004)	(0.0007)	(0.0011)
Time	0.0967	0.0199**	0.0071	0.0075	0.0058	-0.0132
	(0.0717)	(0.0096)	(0.0055)	(0.0049)	(0.0101)	(0.0094)
Covid	1.6481***	0.3331**	-0.0039	0.0902***	0.1055**	0.0189
	(0.6155)	(0.1411)	(0.0517)	(0.0329)	(0.0484)	(0.0699)
Crisis	0.4025	0.0835	-0.0070	0.0074	-0.0247	-0.0984
	(0.2567)	(0.0691)	(0.0290)	(0.0220)	(0.0401)	(0.0797)
Constant	12.3338	3.9498**	3.9011***	3.3353**	5.8065***	3.6000***
	(12.8425)	(1.6527)	(1.4792)	(1.3173)	(1.6791)	(0.9154)
Observations	4,744	20,879	25,650	25,639	21,184	5,543
Number of Banks	760	2,964	3,956	3,857	2,798	681

Note: Cluster robust standard errors in parentheses. ***p<0.01, **<0.05, *p<0.1
Source: Authors' calculations.

Table A3: Fixed Effects Regression of Provisions for Credit Losses

Size	<5%	5-25%	25-50%	50-75%	75-95%	>95%
Lagged Provisions	0.0933**	0.1589***	0.1948***	0.2785***	0.3239***	0.2906***
	(0.0371)	(0.0171)	(0.0149)	(0.0142)	(0.0158)	(0.0303)
FFR	0.0158	0.0310*	-0.0054	0.0022	0.0548***	0.2421***
	(0.0283)	(0.0171)	(0.0136)	(0.0123)	(0.0132)	(0.0282)
Low	-0.0634	-0.1225**	-0.2995***	-0.2719***	-0.1952***	0.1193
	(0.0899)	(0.0557)	(0.0438)	(0.0398)	(0.0453)	(0.0947)
FFR*Low	-0.0136	0.0221	0.1006***	0.0635**	-0.0125	-0.1654**
	(0.0706)	(0.0402)	(0.0345)	(0.0317)	(0.0368)	(0.0765)
Slope	0.0519	0.0824***	0.0216	0.0451*	0.1586***	0.4787***
	(0.0542)	(0.0320)	(0.0263)	(0.0239)	(0.0270)	(0.0606)

Size	<5%	5-25%	25-50%	50-75%	75-95%	>95%
Slope*Low	-0.0100	0.0026	0.0962***	0.0832***	0.0218	-0.2066***
	(0.0503)	(0.0305)	(0.0244)	(0.0226)	(0.0258)	(0.0555)
Log Total Assets	0.1679***	0.3063***	0.4545***	0.4342***	0.2768***	0.0960***
	(0.0458)	(0.0379)	(0.0395)	(0.0320)	(0.0245)	(0.0300)
Liquidity	-0.0002	-0.0029***	-0.0044***	-0.0045***	-0.0040***	-0.0067***
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0006)	(0.0014)
ST Funding	0.0035**	0.0053***	0.0065***	0.0058***	0.0055***	0.0046***
	(0.0014)	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0012)
Total Capital	0.0000*	0.0000***	0.0017**	0.0033***	0.0004*	-0.0015
	(0.0000)	(0.0000)	(0.0008)	(0.0009)	(0.0002)	(0.0014)
Total Deposits	-0.1069	-0.1382	-0.2875**	0.1133	0.0638	-0.0836
	(0.1955)	(0.1230)	(0.1217)	(0.1238)	(0.1014)	(0.1851)
Asset Volatility	0.0001	-0.0020***	-0.0050***	-0.0041***	-0.0010***	0.0003
	(0.0003)	(0.0005)	(0.0005)	(0.0005)	(0.0003)	(0.0004)
Efficiency	0.0000***	0.0036	0.0000	-0.0000***	0.0011	-0.0000***
	(0.0000)	(0.0023)	(0.0000)	(0.0000)	(0.0018)	(0.0000)
ASPUS	-0.0011	-0.0028***	-0.0019***	-0.0031***	-0.0044***	-0.0032**
	(0.0012)	(0.0007)	(0.0007)	(0.0006)	(0.0007)	(0.0015)
CPI	-0.0059	-0.0253***	-0.0085	-0.0062	-0.0024	-0.0175
	(0.0098)	(0.0062)	(0.0057)	(0.0052)	(0.0052)	(0.0107)
GDP	-0.0022	0.0068**	-0.0032	-0.0102***	-0.0242***	-0.0634***
	(0.0057)	(0.0031)	(0.0030)	(0.0024)	(0.0026)	(0.0058)
SPY	-0.0011*	-0.0017***	-0.0015***	-0.0012***	-0.0015***	-0.0032***
	(0.0006)	(0.0003)	(0.0003)	(0.0003)	(0.0004)	(0.0007)
Time	0.0003	-0.0034	-0.0121***	-0.0136***	-0.0018	0.0300***
	(0.0043)	(0.0025)	(0.0023)	(0.0022)	(0.0023)	(0.0047)
Covid	0.0123	0.0589**	0.0465**	0.0628***	0.0737***	0.2346***
	(0.0381)	(0.0234)	(0.0188)	(0.0166)	(0.0165)	(0.0331)
Crisis	0.0560**	0.1293***	0.1822***	0.2116***	0.2756***	0.4040***
	(0.0224)	(0.0138)	(0.0141)	(0.0138)	(0.0172)	(0.0418)
Constant	-1.4772***	-3.0564***	-4.6925***	-5.1988***	-3.7331***	-2.0152***
	(0.5032)	(0.4460)	(0.4861)	(0.4104)	(0.3335)	(0.5490)
Observations	4,971	20,886	25,619	25,581	21,052	5,458
No of Banks	773	2,970	3,958	3,861	2,791	678

Note: Cluster robust standard errors in parentheses. ***p<0.01, **<0.05, *p<0.1
Source: Authors' calculations.

Table A4: Fixed Effects Regression of Return on Assets

Size	<5%	5-25%	25-50%	50-75%	75-95%	>95%
Lagged ROA	0.4735***	0.4030***	0.2815***	0.2840***	0.2514***	0.1311
	(0.0558)	(0.1024)	(0.0702)	(0.0590)	(0.0569)	(0.0796)
FFR	-0.0550	-0.0818	-0.0440	-0.0647**	-0.2146***	-0.7021***
	(0.3620)	(0.0592)	(0.0437)	(0.0258)	(0.0333)	(0.1050)
Low	-0.1671	-0.0603	-0.0206	-0.0971	-0.5421***	-1.8399***
	(1.3045)	(0.1918)	(0.1371)	(0.0899)	(0.1244)	(0.4208)
FFR*Low	-0.0413	0.0937	0.0041	0.1275*	0.4557***	0.9934***
	(0.8296)	(0.1449)	(0.0949)	(0.0689)	(0.0898)	(0.2774)
Slope	-0.1039	-0.1390	-0.1266*	-0.1888***	-0.5212***	-1.4857***
	(0.6548)	(0.1019)	(0.0721)	(0.0488)	(0.0712)	(0.2403)
Slope*Low	0.0363	0.0293	0.0127	0.0590	0.3232***	1.1509***
	(0.6600)	(0.0965)	(0.0679)	(0.0498)	(0.0677)	(0.2427)
Log Total Assets	-0.7415	0.1331	-0.0929	-0.1812**	-0.3993***	-0.3404***
	(0.9194)	(0.1229)	(0.1006)	(0.0755)	(0.0737)	(0.1076)
Liquidity	-0.0101	0.0042	0.0039**	0.0017	-0.0020	0.0056
	(0.0080)	(0.0034)	(0.0017)	(0.0013)	(0.0045)	(0.0037)
ST Funding	-0.0462**	-0.0045	-0.0107***	-0.0114***	-0.0087***	-0.0039
	(0.0222)	(0.0029)	(0.0024)	(0.0022)	(0.0033)	(0.0041)
Total Capital	0.0002	-0.0001***	0.0026	-0.0116	0.0093	-0.0025
	(0.0002)	(0.0000)	(0.0048)	(0.0072)	(0.0080)	(0.0041)
Total Deposits	-8.9136**	-0.0594	-0.0820	-0.7840*	-1.2226**	-0.5626
	(4.1037)	(0.5116)	(0.4196)	(0.4071)	(0.6022)	(0.6852)
Asset Volatility	0.0031	0.0095***	0.0119***	0.0106***	0.0028*	0.0002
	(0.0080)	(0.0015)	(0.0020)	(0.0016)	(0.0015)	(0.0013)
Efficiency	-0.0000***	-0.0040	-0.0000*	0.0000***	-0.0000***	0.0000***
	(0.0000)	(0.0064)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
ASPUS	-0.0130	-0.0059***	-0.0041**	-0.0001	0.0083**	0.0163**
	(0.0147)	(0.0021)	(0.0016)	(0.0014)	(0.0035)	(0.0063)
CPI	0.0840	0.0104	-0.0056	0.0184*	0.0593***	0.1466***
	(0.1490)	(0.0182)	(0.0114)	(0.0101)	(0.0126)	(0.0427)
GDP	0.0445	0.0536***	0.0370***	0.0237***	0.0092	0.0421**
	(0.0903)	(0.0122)	(0.0065)	(0.0055)	(0.0092)	(0.0195)
SPY	0.0076	0.0004	0.0013	0.0016**	0.0052***	0.0102***
	(0.0085)	(0.0011)	(0.0008)	(0.0007)	(0.0007)	(0.0023)
Time	-0.0103	-0.0161**	-0.0129	-0.0147***	-0.0246***	-0.0886***

Size	<5%	5-25%	25-50%	50-75%	75-95%	>95%
	(0.0645)	(0.0081)	(0.0084)	(0.0053)	(0.0087)	(0.0175)
Covid	0.3782	-0.0693	-0.0970	-0.0789**	-0.2074***	-0.7328***
	(0.6176)	(0.1101)	(0.0652)	(0.0389)	(0.0457)	(0.1412)
Crisis	-0.0786	-0.0669	-0.1395***	-0.1962***	-0.3656***	-0.7568***
	(0.2265)	(0.0455)	(0.0439)	(0.0318)	(0.0492)	(0.1599)
Constant	16.2089*	-0.7565	1.8868	4.1574***	8.0956***	9.7660***
	(8.9564)	(1.5120)	(1.2313)	(0.9258)	(1.3032)	(2.3728)
Observations	4,996	20,959	25,712	25,664	21,190	5,543
No of Banks	779	2,973	3,966	3,864	2,799	681

Note: Cluster robust standard errors in parentheses. ***p<0.01, **<0.05, *p<0.1

Source: Authors' calculations.