Special Report

Big Four US Banks: Who Has Better Deposit Beta and NIM?

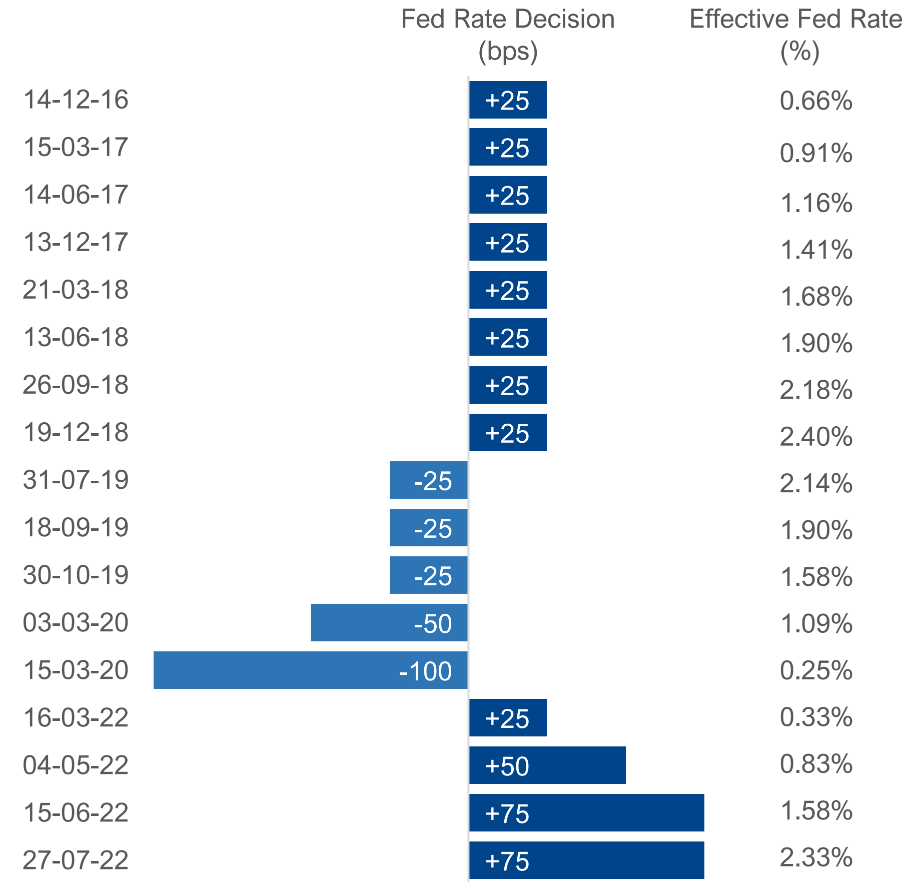
September 2022

Contents

Magnitude of the current US rate hike is much higher compared to the previous rate hike cycle which was more systematic and evenly spread

Objective of the report:

- Decode net interest margin (NIM) of big four banks in the US – J.P. Morgan (JPM), Bank of America (BofA), Wells Fargo (WF), and Citigroup (Citi) – using deposit beta and composition of and yield on interest earning assets
  - $\text{NIM} = \dfrac{\text{Interest Income} - \text{Interest Expense}}{\text{Average Interest Earning Assets}}$
  - Customer deposits constitute more than 75% of the funding of the big four banks in the US. **Thus, deposit beta is the main driver of interest expense of these banks.**
  - Interest income is driven by the composition of and yield on interest earnings assets, which include loans, deposits with other banks and the Federal Reserve, and trading asset and investments.
- Analyze whether strong deposit beta can lead to better NIM
- Interpret likely trend of NIM and deposit beta in the current rate hike cycle to determine which bank would benefit the most



- The Fed's decision to raise interest rates over 2016–18 and 2022 portray a similar economic backdrop characterized by high inflation, rising housing cost, and soaring energy prices.
- **However, rate hikes over 2016–18 were more systematic and uniform, while in 2022, it was more aggressive and of a greater magnitude.**

Source: Federal Reserve

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What is Deposit Beta?

Deposit beta analyzes sensitivity of banks' cost of deposit to rising interest rate

- **Deposit beta measures the change in the cost of interest-bearing deposit (IBD) relative to the change in the benchmark interest rate.** For example, the central bank increased the benchmark interest rate by 100 bps, while the bank increase interest rate on its deposits by only 60 bps. The deposit beta then equals 0.6 or 60% (60/100). This can be interpreted as a 60 bps rise in the cost of deposit for every 100 bps increase in the benchmark rate.
- Deposits are a major source of funding for banks. Hence, a lower deposit beta is beneficial in a rising interest rate scenario as the bank would have passed a lower interest rate hike to depositors.

Factors Driving Deposit Beta

Market liquidity

- When there is excess liquidity in the market, banks tend to delay passing on the rate hike to depositors.
- On the contrary, when liquidity is scarce, banks may be forced to pass on a higher portion of interest rate hikes to depositors in order to attract deposits for supporting loan book growth.

Pace of interest rate hikes

- The faster the pace of interest rate hikes, the more pressure banks face to increase rates to retain deposits.
- With a faster pace of interest rate hikes, depositors become more sensitive to rate increases and expect banks to pass on a higher proportion of cumulative rate hikes on deposits.

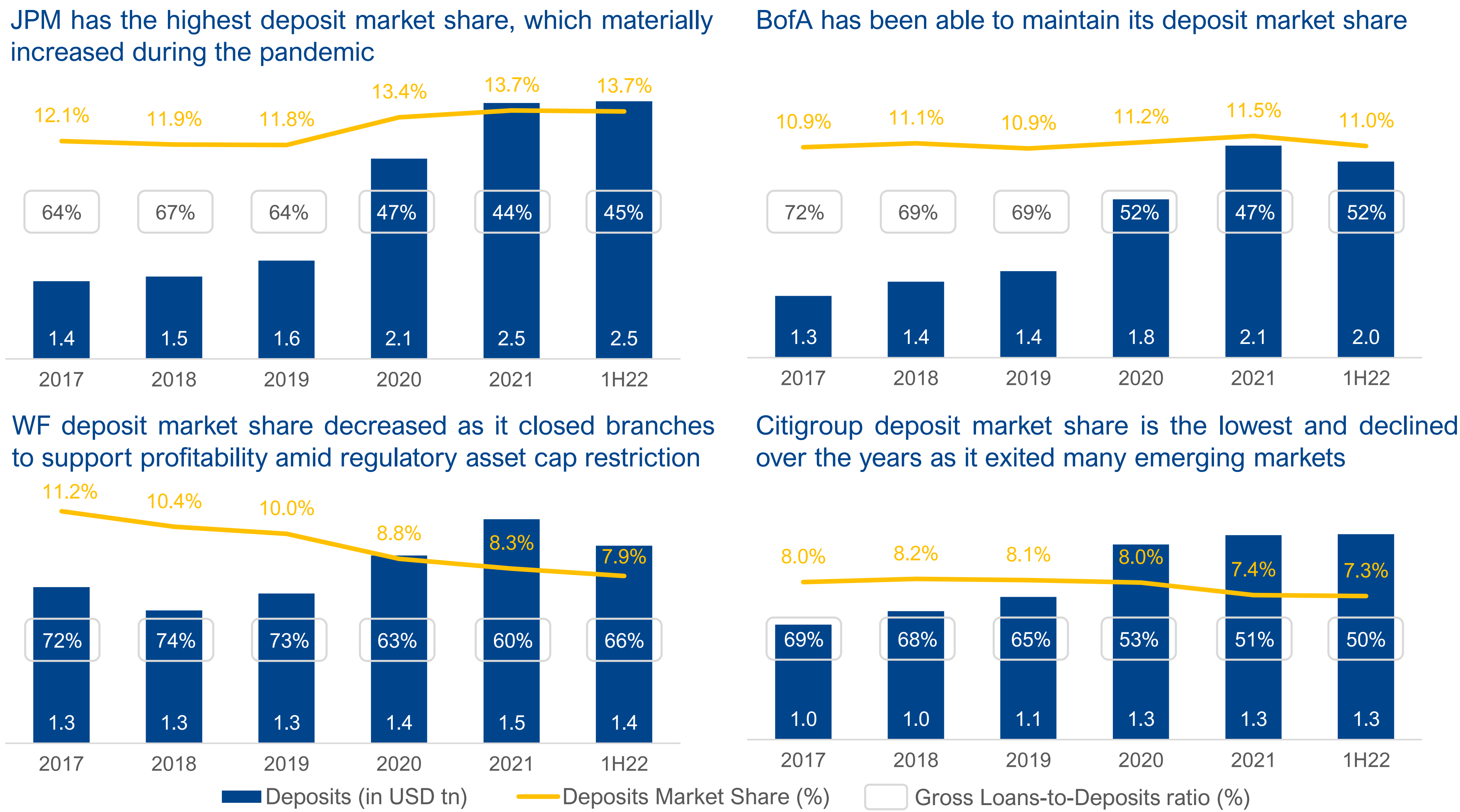
Deposit composition

- Generally, banks with a higher base of non-IBD tend to have a lower (or best) deposit beta.
- Factors contributing to the higher non-IBD include a strong deposit franchise and market position, superior customer service and banking experience, and allied services and benefits linked with holding a deposit account.

Loan-to-deposit ratio

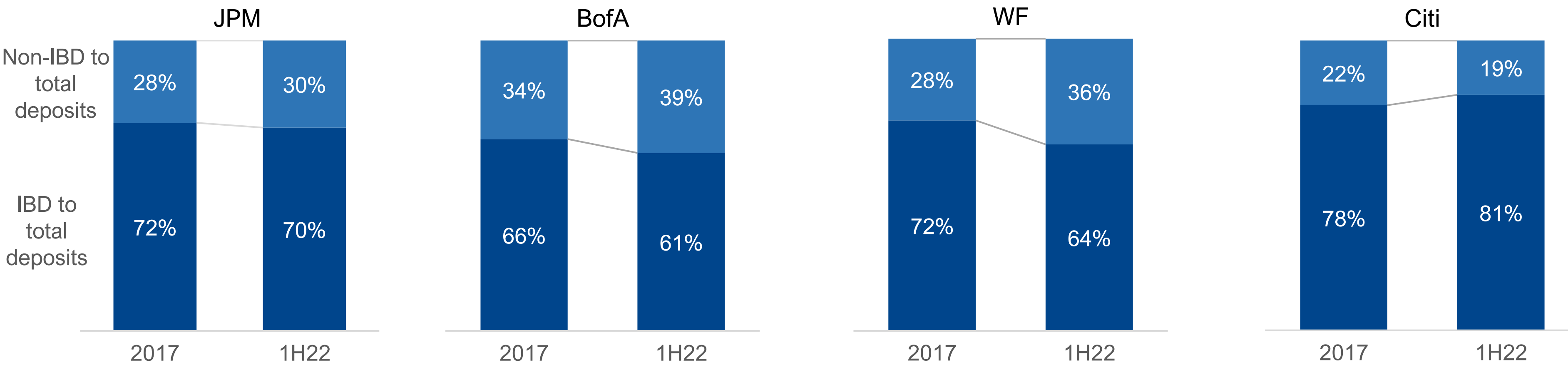
- Banks with a high loan-to-deposit ratio would be obliged to pass on a larger portion of the interest rate hike to depositors in order to retain deposits.
- While those with a low loan-to-deposit ratio have a greater capacity to pass on the lower interest rate hike to depositors.

JPM continues to have the highest customer deposit market share*; Gross loans-to-deposits ratio remains comfortable for all banks



Source: Company filings, Federal Reserve (H.8 Assets and Liabilities of Commercial Banks in the United States - Monthly basis seasonally adjusted)
**Market share derived by dividing bank deposit by total industry deposits*

BofA has the highest composition of non-IBD to total deposits attributable to better digitalization, add-on services to depositors; Citi has lowest composition of non-IBD



- Branches: 4,790
- JPM ranks first in terms of retail deposits and credit card issuances.
- The bank has exceptionally strong investment banking operations that helped it capture the largest share of deposits.
- However, **due to a low share of deposits from the consumer and community segments, JPM has not been able to increase its share of non-IBD deposits.**

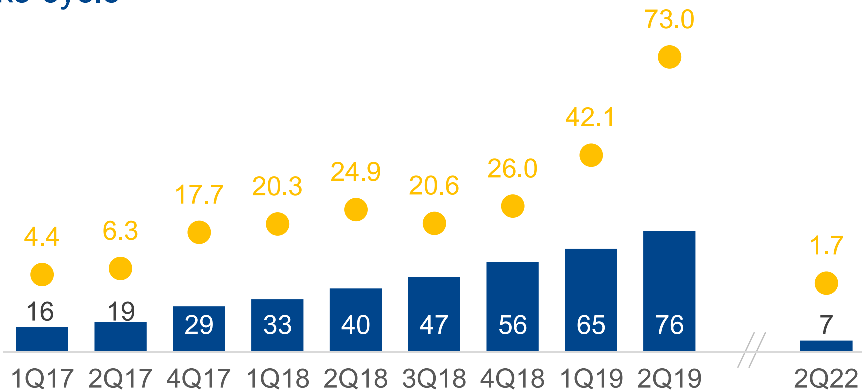
- Branches: 4,200
- **BofA has the biggest share of non-IBD attributable to better digitalization and loyalty programs.**
- BofA's mission is to get customers to open checking accounts and to provide various services/programs to keep them engaged.
- In 2021, BofA's flagship loyalty program Preferred Rewards, which recognizes and rewards clients for doing business across all products, grew to 9.4 million (+11% y/y) with a retention rate of 99%.

- Branches: 4,800
- **WF non-IBD composition grew strongly as the bank remained focused on reducing expensive time deposits.**
- WF also has a strong consumer banking segment that accounts for 60% of total deposits.
- WF deposit growth has lagged peers due to regulatory asset cap and implementation of strategic decisions to optimize its commercial-oriented deposits, according to Fitch.

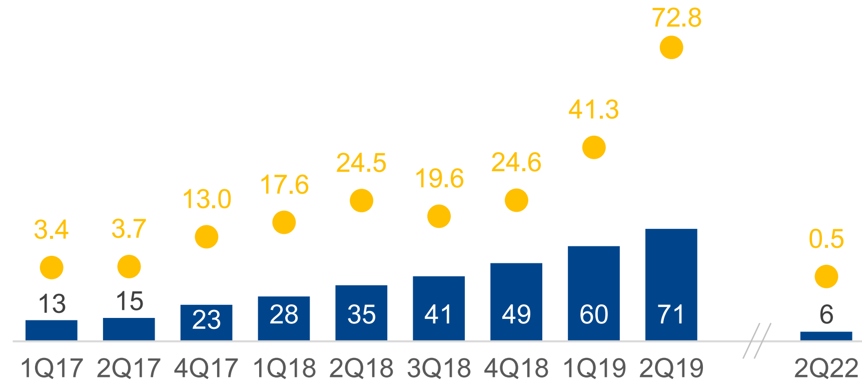
- Branches: 2,154 – Global consumer banking segment; 658 – US Personal Banking segment
- Citi has the lowest share of deposits and non-IBD.
- **Citi has been shifting its focus to the wealth management business and intends to exit from markets where the group has not achieved meaningful scale.**
- In 2021, Citi announced plans to exit consumer banking business in 13 markets.

BofA records best deposit beta* in previous rate hike cycle, WF has best deposit beta in current cycle due to lowest cost of deposit; deposit beta rise more when rate hike ends#

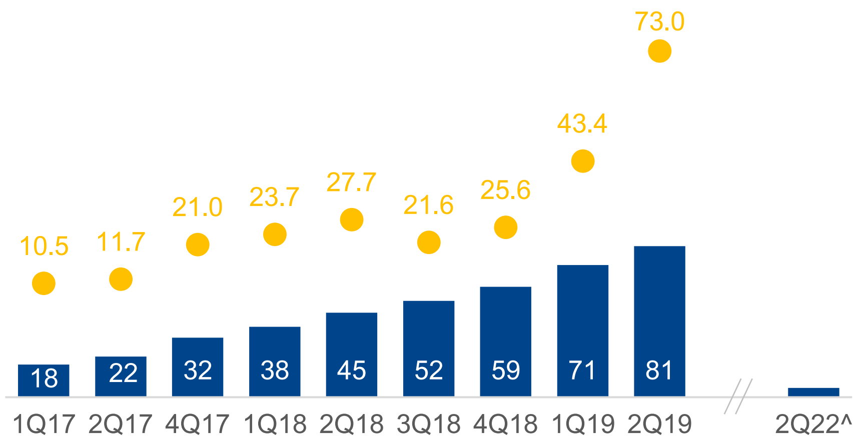
JPM had the second lowest deposit beta in the previous rate hike cycle



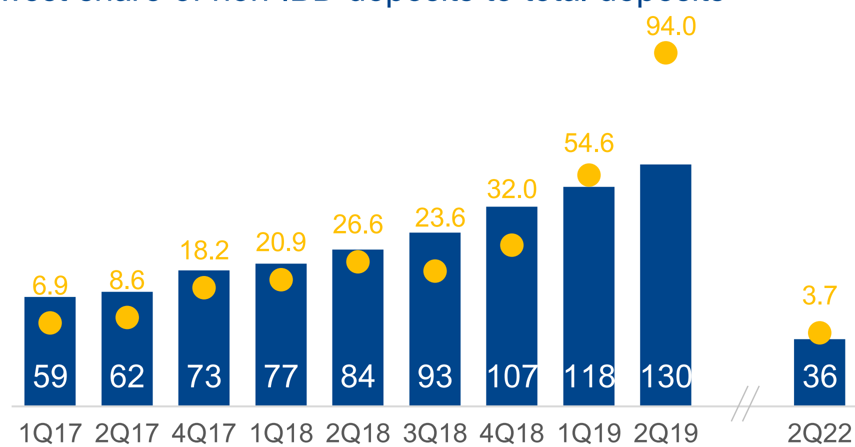
BofA's highest non-IBD deposits to total deposits led to the lowest (or best) deposit beta in the previous rate hike cycle



WF has the lowest (or best) deposit beta in the current rate cycle as its cost of deposit was the lowest in LTM 2Q22



Citigroup deposit beta was the highest (or worst) due to its lowest share of non-IBD deposits to total deposits



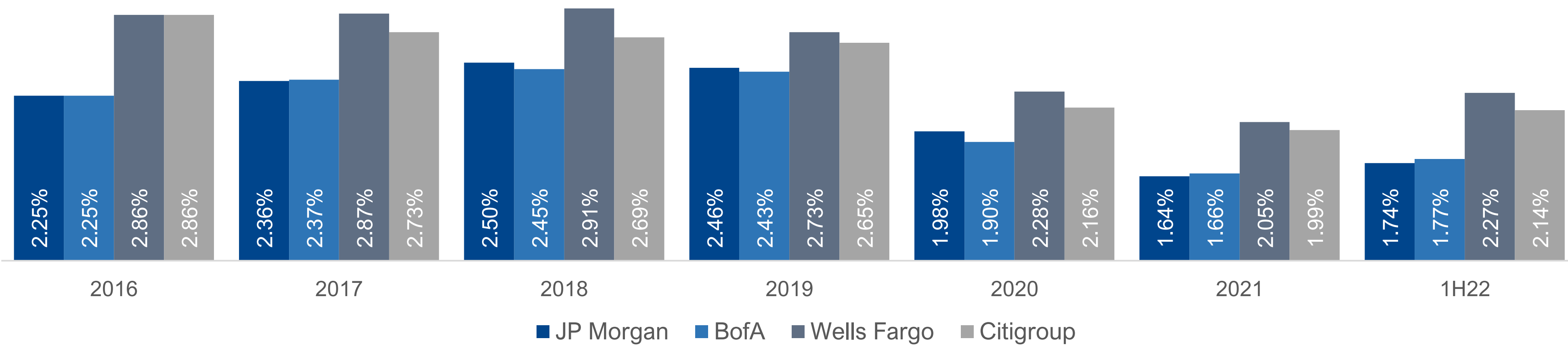
■ Cost of interest bearing deposits ● Deposit beta (%) - RHS

**Deposit beta calculated as (current year LTM cost of deposit – previous year LTM cost of deposit) / (current year Effective Fed rate – previous year Effective Fed rate)*
^Wells Fargo had negative deposit beta in 2Q22 as cost of deposit in LTM 2Q22 was lower than that in LTM 2Q21
#Rate hikes ended in 4Q18 in the previous rate hike cycle

Does Strong Deposit Beta Lead to Better NIM?

NIM of Big Four US Banks

Strong deposit beta does not necessarily translate to better NIM; WF has highest NIM, while BofA's NIM was lowest despite having best deposit beta



- **WF** consistently posted the highest NIM among the four banks, despite having the third lowest deposit beta in the previous rate hike cycle. Its strong NIM can be attributed to the highest composition of loans and lowest composition of low yielding interbank deposits in interest earning assets. Another strong contributor to NIM is WF's largest share of mortgages, which by nature are long tenured loans, generating strong regular interest income **(see Exhibits for loan book details, and composition of and yield on interest earning assets).**
- **Citi** had the second highest NIM, despite having the weakest deposit beta owing to a larger share of high yielding credit card loans.
- **JPM** had the second highest yield on loans, but NIM was the third highest due to a lower composition of loans in the interest earning assets. Another drag on JPM's NIM is the largest composition of low yielding interbank deposits in the interest earning assets. Although JPM had the best yields on trading assets and investment, it constituted a relatively small portion of interest earning assets.
- **BofA** had the best deposit beta, but the lowest NIM. BofA's yield on all interest earning assets was the lowest.
- **Notably, there was no material increase in NIM during 2016–18, although interest rate climbed by 200 bps.** The Fed increased the interest rate to curb inflation and drive down demand. However, banks did not pass on much of the rate hikes on loans to support loan growth.

Source: Company filings

Outlook on Deposit Beta and NIM

Deposit Beta

- S&P Global Ratings predict the Fed would push its target range for its funds rate to 3.00–3.25% by the end of 2022 (vs 2.25–2.5% in August 2022) and increase further to 3.50–3.75% by mid-2023.
- Accordingly, **deposit betas would rise more rapidly in 2H22 and 1H23** when banks would be inclined to pass on most of the cumulative rate hikes to depositors.
- Another driver that will increase deposit beta is the **accelerating deposit withdrawals** due to easing fiscal stimulus, erosion of savings due to inflation, and rising yield on other assets. Banks did not feel much pressure to pass on rate hikes to depositors in 1H22 as they entered 2022 flushed with the high deposit infused during the pandemic.

NIM

- Net interest income rose materially in 1H22 for all the banks. Moreover, NIM expansion in 1H22 was higher compared to the previous rate hike cycle. **NIM would increase further in 2H22 as the benefit of the recent two 75 bps rate hikes materializes.**
- However, **the pace of NIM expansion would slow, going forward.** Bank liabilities have shorter maturities compared to assets and short-term rates respond more to rate changes than long-term rates.
- **Another major headwind to NIM expansion is declining volumes in the mortgage business,** which was already visible in 1H22 amid rising interest rates. **Home loan interest rates surged to a 14-year high** in July, following the 0.75% rate hike. According to Freddie Mac, the average rate on a 30-year fixed-rate mortgage (the most common US home loan) was 5.66% as of September 1, 2022, up from 2.87% a year ago.
- As per Fannie Mae economists, **total home sales would fall 13.5% and mortgage originations would decrease by nearly 42% in 2022.** The big four US banks have already started laying off staff in the mortgage business.

Conclusion

BofA had the lowest (or best) deposit in the previous cycle, supported by its highest composition of non-IBD to total deposits. However, WF non-IBD grew materially after the pandemic as the bank focused on reducing expensive time deposits to boost profitability amid regulatory asset cap restrictions. **Thus, WF had the best deposit beta in the current rate hike cycle as its cost of deposit was lowest in LTM 1H22.** Moreover, WF's cost of deposit in LTM 1H22 was lower than that in LTM 1H21, whereas for other the banks, it was higher.

A strong deposit beta does not necessarily lead to better NIM, as BofA has the lowest NIM despite having the best deposit beta. While WF consistently recorded the highest NIM in spite of having a higher deposit beta, attributable to its greater share of mortgages and better mix of interest earning assets.

WF could deliver the best deposit beta and NIM in the current rate hike cycle, given its expanding share of non-IBD and its highest proportion of mortgages to total loans among the four banks.

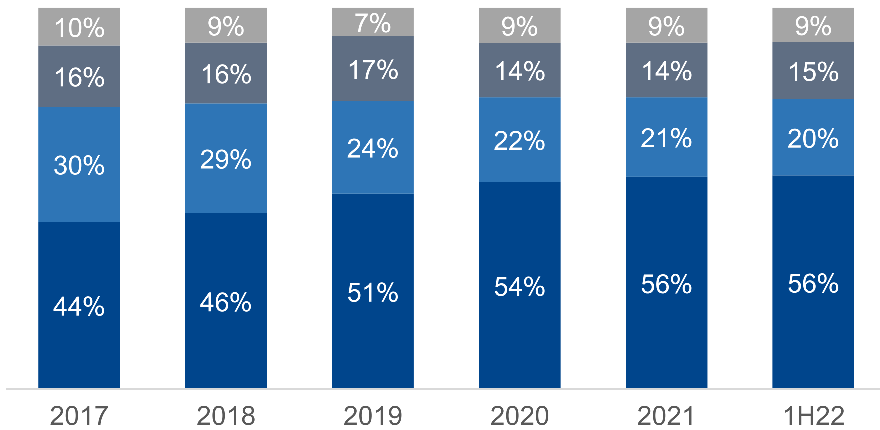
Deposit beta would rise rapidly in 2H22 and 1H23 as the banks would be inclined to pass on a higher portion of cumulative rate hikes. The pace of NIM expansion will slow on account of decreasing mortgage volumes, accelerated deposit withdrawals, and increasing cost of the bank's highly rate-sensitive short-term liabilities.

Exhibits

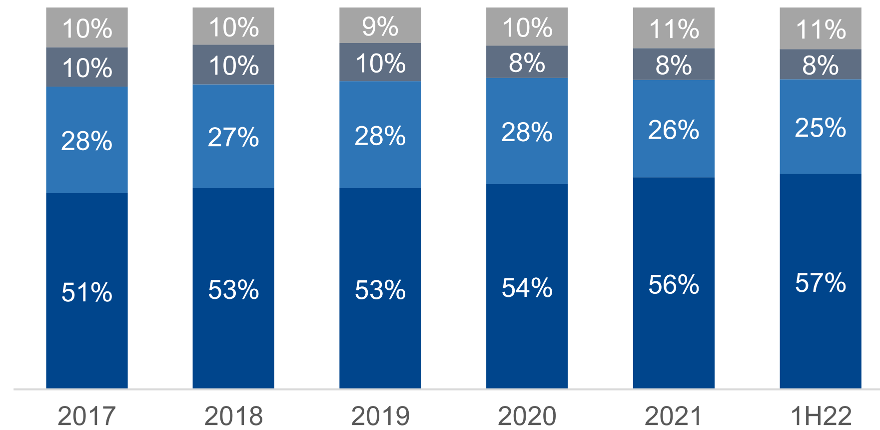
Decoding NIM: Loan Composition

Loan book of big four banks is skewed toward mortgages and corporate loans, except for Citigroup

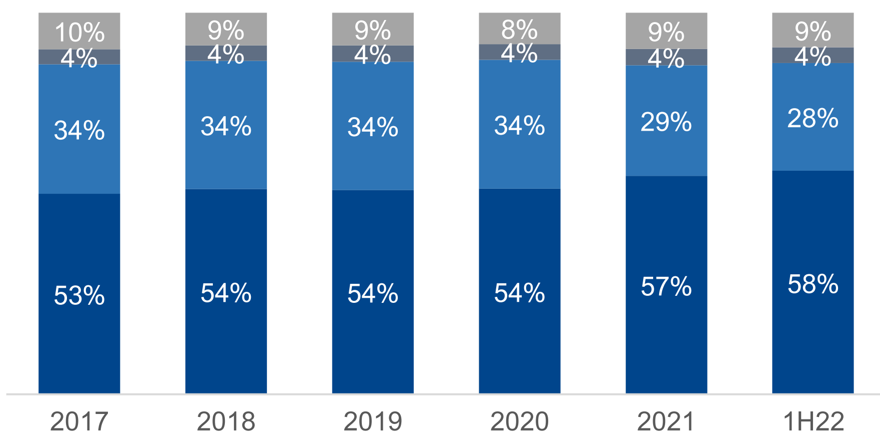
JPM has the second highest composition of credit card loans



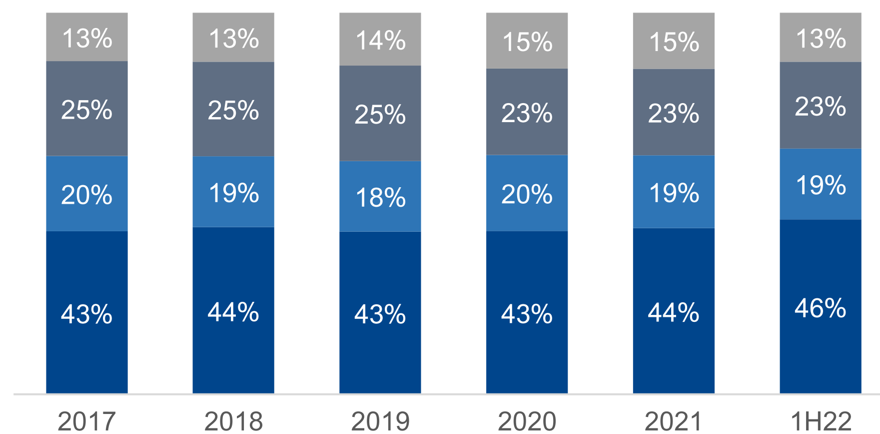
BofA has a particularly strong small business lending franchise, mortgages composition is second highest



WF has the highest composition of mortgages and lowest credit card loans



Citigroup has the highest composition of credit cards and lowest mortgages



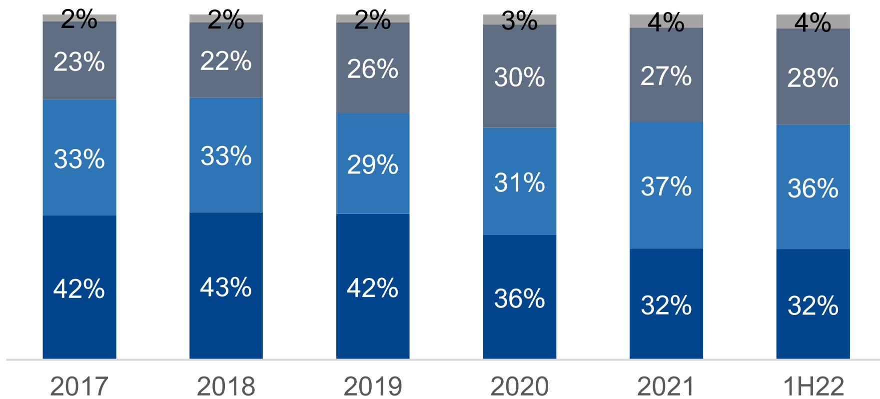
■ Corporate loan ■ Mortgages ■ Credit cards ■ Small business and others

Source: Company filings

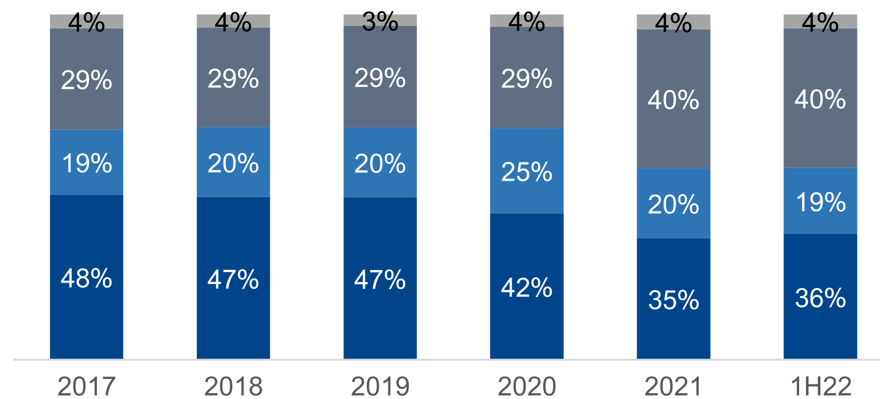
Decoding NIM: Interest Earning Assets Composition

Wells Fargo has highest share of loans, lowest share of low yielding deposits with other banks in asset mix

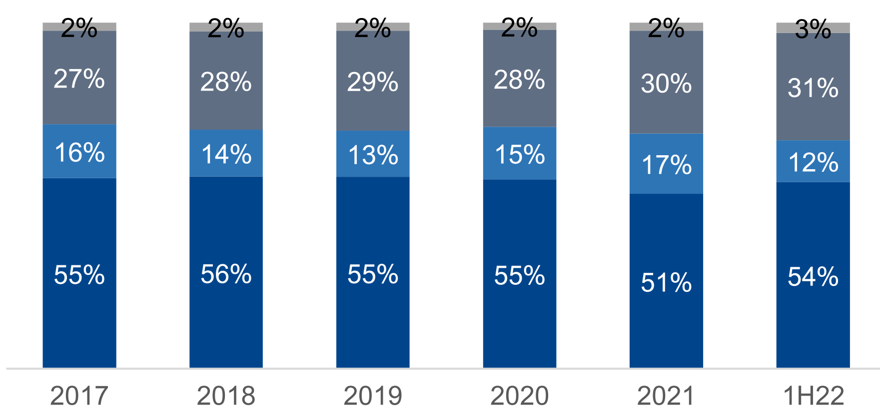
JPM has the highest share of low yielding deposit with other banks, Fed, and repos



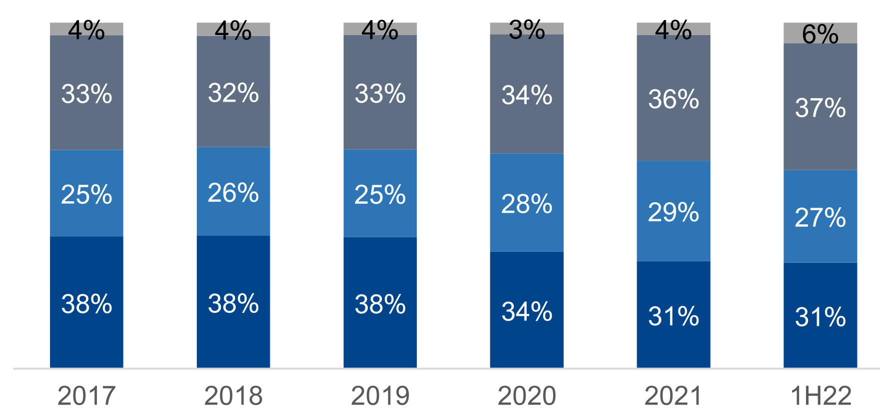
BofA has the second highest composition of loans, while investment composition grew materially in 2021



WF interest earnings assets are geared toward loans, while share of deposits with other banks, Fed and repos is lowest



Citi has the lowest share of loans and second highest share of low yielding deposits with other banks



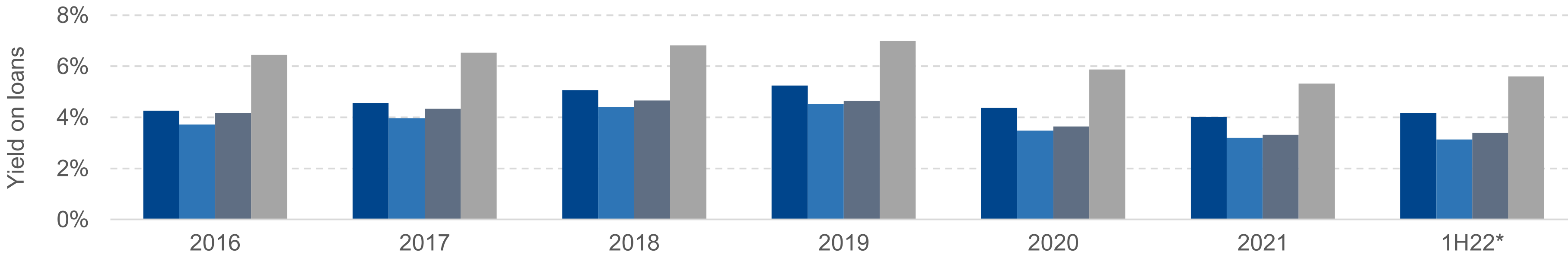
■ Loans ■ Deposits with other banks, Fed and repos ■ Trading assets and investments ■ Others

Source: Company filings

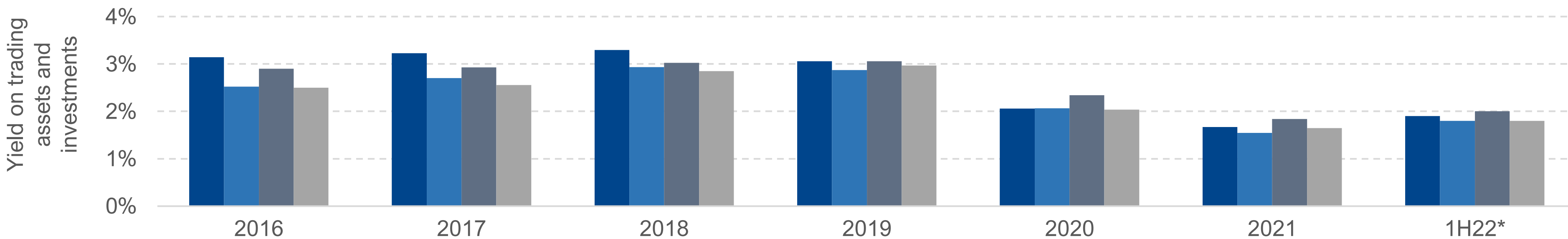
Decoding NIM: Yields on Interest Earning Assets

Citibank has the highest yields on loans, while BofA has lowest yield on interest earning assets

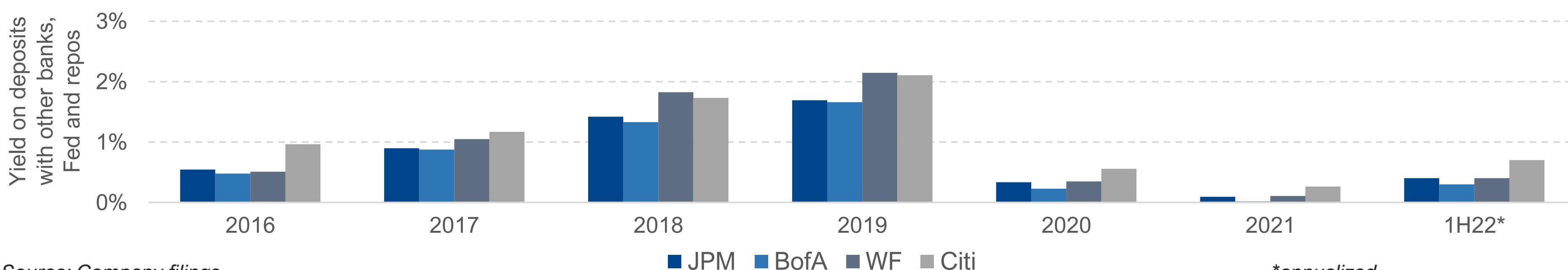
Citi and JPM earns higher yield on loans owing to higher exposure to credit cards loans



JPM and WF earn higher yield on trading assets and investments



Yield on deposits with other banks, Fed, and repos of all the banks moved in tandem with each other; however, WF and Citi earned higher yield than others



Source: Company filings

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