

Interest Rate Hedging & Current Market



PNC



Interest Rate Hedging

Interest Rate Swaps

Product Definition

■ Interest rate swap:

- A contractual agreement between two counterparties to exchange cash flows based on predetermined terms.

■ Key terms include:

- ✓ Effective Date: Date on which swap calculations begin;
- ✓ Maturity Date: Date on which swap calculations end (typically last payment date);
- ✓ Notional Principal Amount: Akin to loan or bond principal but not exchanged, can be constant, increase or decrease;
- ✓ Fixed Rate: Typically the term that is “traded”, fluctuates until swap is executed;
- ✓ Floating Rate: Widely publicized floating interest rate, now SOFR, previously LIBOR;
- ✓ Floating Rate adjustments: Spread added to floating rate or multiplier/fraction applied to floating rate;
- ✓ Payment Dates: Periodic date on which cash flow calculations are exchanged, typically monthly, quarterly, semiannually or annually;
- ✓ Calculation Period: With SOFR, some lookback to payment dates;
- ✓ Day Count Basis: Method to count days – Act/360 or 30/360 typical, Act/Act and others possible.

- Fixed Amount = Fixed Rate * Notional * DayCount

- Floating Amount = Floating Rate (w/adjustments) * Notional * DayCount

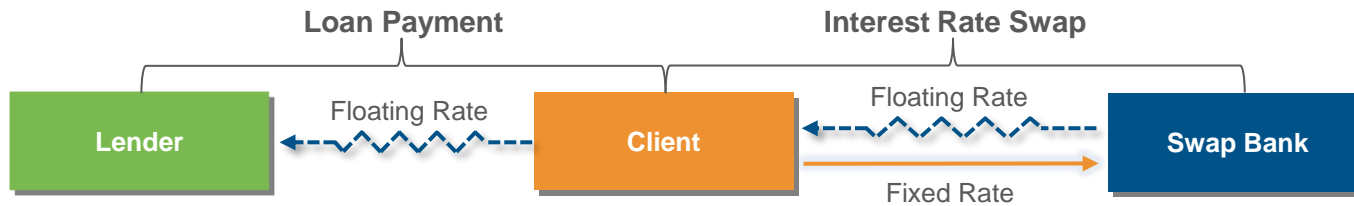
- Net Swap Payment = Fixed Amount less Floating Amount (whichever party owes the larger amount pays the net difference)

- Alternatives to swaps include interest rate caps, collars, swaptions, cancellable swaps, limit swaps, ++.

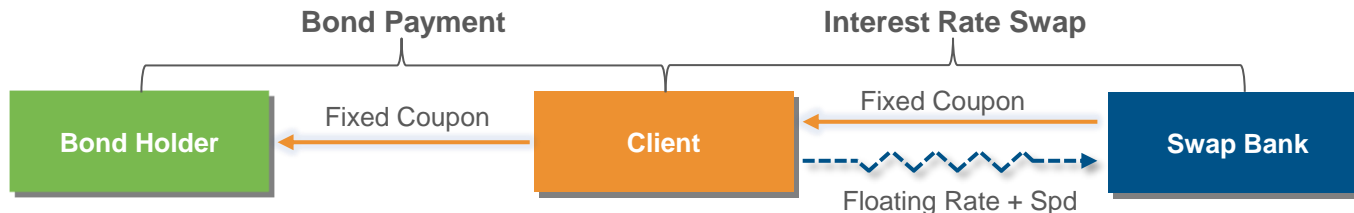
Interest Rate Swaps

Example of swap uses

- Interest rate swaps and other interest rate hedging products are used by financial managers to change the interest rate characteristics of existing assets or liabilities or anticipated future assets or liabilities.
- Example 1** – hedging a floating rate loan (cash flow hedge):
 - ✓ Banks prefer to make loans on a floating rate basis to better match assets with liabilities;
 - ✓ Borrowers typically prefer fixed rate loans for interest expense/budgeting certainty.
 - ✓ Client borrows on a floating rate and enters into a swap to pay fixed and receive floating:



- Example 2** – hedging a fixed rate bond upon issuance (market value hedge):
 - ✓ Companies that fund primarily in the bond market typically issue fixed-rate bonds and sometimes have little or no floating rate borrowings;
 - ✓ Historically floating rates have been less expensive than fixed;
 - ✓ Client issues fixed rate bonds and enters into a swap to receive fixed and pay floating.



Interest Rate Swaps

Advantages and Considerations

Advantages

- Mitigate against uncertainty of variable interest costs (cash flow hedge) to provide expense/budget certainty.
- Mitigate against variability of market value (market value hedge).
- Interest rate decision can be separated from funding decision:
 - ✓ Fund in best available market; swap to create desired interest rate exposure.
- Swap structure flexible and independent of financing structure:
 - ✓ Hedge can be smaller size or for shorter period;
 - ✓ Hedge can be executed at different time or in parts over time.
- Hedge can be terminated early without impacting financing transaction in order to take advantage of market gains or change in outlook.
- Swaps typically structured without out-of-pocket fees (client's costs are built into the swap rate).

Considerations

- Swap may prove to be more expensive than unhedged financing over time.
- Termination of the swap prior to maturity may result in a termination payment.
- Client bears risk of any mismatch between the terms of the hedged item and the swap.
- Client bears risk of mismatch between the hedged item's principal and the swap's notional – if debt prepaid client may become overhedged.

Interest Rate Swap

Cash Flow Hedge Terms and Indicative Pricing

- The table below provides example pricing for a 3 year and a 5 year swap;
- Pricing is purely for example purposes and does not represent terms at which a client might enter a transaction;
- Pricing fluctuates day-to-day and intraday.



Indicative Swap Terms	
Effective Date	11-May-23
Maturity Date	(See table)
Notional Principal	\$10,000,000
Amortization	None
Fixed Rate:	(See table)
Floating Rate:	Daily SOFR
Floating Spread:	None
Floating Rate Factor:	1.0 x
Payment Dates:	Monthly
Calculation Period:	2 day lookback
Day Count:	Act/360

Indicative Swap Pricing		
	Maturity Date	Fixed Rate
3 Yr Swap	May-26	3.650%
5 Yr Swap	May-28	3.350%

Pricing as of 5/17/23, indicative and subject to change.

Interest Rate Swaps

Swap Cash Flow Example

Detailed Loan and Swap Cash Flow Calculations

- The tables below give examples of how loan interest and swap fixed and floating leg calculations work together to effectively fix the rate on a floating-rate loan. The table is for example purposes only. Full floating rate loan offset depends on Loan Principal and Swap Notional matching in each period.

Shared Assumptions for Cash Flow examples (*)

Period Start	Period End	Days	Loan Principal	Swap Notional
5/1/2023	6/1/2023	31	5,000,000.00	5,000,000.00

(*) Dates chosen for illustrative purposes

5yr Interest Rate Swap @ 3.35% vs SOFR Flat

Loan Interest Calculations (1)					Swap Cash Flow Calculations (1)						Loan + Swap CF	
Loan Principal	SOFR	Spread	All-in Rate	Loan CF	Swap Notional	Fixed Rate	Fixed CF	SOFR	Float CF	Net Cash Flow	Loan + Swap CF	Effective Rate
5,000,000	3.06%	2.00%	5.06%	(21,786)	5,000,000	3.35%	-14,424	3.06%	13,175	(1,249)	(23,035)	5.35%
5,000,000	5.06%	2.00%	7.06%	(30,397)	5,000,000	3.35%	-14,424	5.06%	21,786	7,363	(23,035)	5.35%
5,000,000	7.06%	2.00%	9.06%	(39,008)	5,000,000	3.35%	-14,424	7.06%	30,397	15,974	(23,035)	5.35%

5yr Interest Rate Swap @ 5.35% vs SOFR + 2.00%

Loan Interest Calculations (1)					Swap Cash Flow Calculations (1)						Loan + Swap CF	
Loan Principal	SOFR	Spread	All-in Rate	Loan CF	Swap Notional	Fixed Rate	Fixed CF	SOFR + Spd	Float CF	Net Cash Flow	Loan + Swap CF	Effective Rate
5,000,000	3.06%	2.00%	5.06%	(21,786)	5,000,000	5.35%	-23,035	5.06%	21,786	(1,249)	(23,035)	5.35%
5,000,000	5.06%	2.00%	7.06%	(30,397)	5,000,000	5.35%	-23,035	7.06%	30,397	7,363	(23,035)	5.35%
5,000,000	7.06%	2.00%	9.06%	(39,008)	5,000,000	5.35%	-23,035	9.06%	39,008	15,974	(23,035)	5.35%

(1) All calculations assume a 31 day interest period. Loan interest = Loan Principal * All-in Rate * 31/360. Fixed CF = Swap Notional * Fixed Rate * 31/360. Float CF = Swap Notional * Daily Avg. SOFR * 31/360. Effective Rate = Loan + Swap CF / (Loan Principal * 31/360).

Interest Rate Swaps

Early Termination Cost or Benefit

Mark-to-Market Value

- The Mark-to-Market value represents the present value of the difference between the original swap rate and the prevailing replacement market swap rate for a swap with a maturity equal to the remaining term of the original swap at time of unwind. This value will either be positive or negative to the Company. If the swap is held to maturity, the market value of the swap will erode to \$0 at maturity.

Rate Scenario Analysis

- The table below provides an estimate of the potential market value of a swap (cash flow hedge) at various replacement market rates and at various points in the future. Positive values represent payments made to the company in the event of an early termination. Negative values represent payments the Company would be required to make in the event of an early termination.

\$5,000,000, Spot Start, 5 Year Swap: Current Indicative Swap Rate = 3.35%					
Delta Between Coupon and Replacement Rate	-1.00%	-0.50%	0.00%	0.50%	1.00%
Replacement Market Rate	2.35%	2.85%	3.35%	3.85%	4.35%
5 Years Remaining	(\$244,260)	(\$121,536)	\$0	\$120,366	\$239,578
4 Years Remaining	(\$195,408)	(\$97,229)	\$0	\$96,293	\$191,663
3 Years Remaining	(\$146,556)	(\$72,922)	\$0	\$72,220	\$143,747
2 Years Remaining	(\$97,704)	(\$48,614)	\$0	\$48,146	\$95,831
1 Years Remaining	(\$48,852)	(\$24,307)	\$0	\$24,073	\$47,916
Maturity	\$0	\$0	\$0	\$0	\$0

Actual results will vary. Market Values quoted herein are for informational purposes only, are not intended to represent bids or offers regarding the referenced transactions, and are not intended as an offer or solicitation with respect to the purchase or sale of any security. No representation is made that the reports are accurate or complete, or that any returns will be achieved. Past performance is not indicative of future results. Changes to pricing assumptions may have a material impact on returns.

Eligible Contract Participant

Corporate and Individual Entities

- All parties entering into an interest rate hedging contract must qualify as an Eligible Contract Participant (“ECP”) as defined in the Dodd Frank regulations.
- Methods to qualify as a corporate entity ECP include (US based clients):
 - Entity has Total Assets Greater than \$10MM.
 - Net Worth Greater than \$ 1MM and the entity is entering into swap in connection with the conduct of its business or to manage the risk associated with an asset or liability owned or reasonably likely to be owned or incurred by it in the conduct of its business.
 - Swap obligations are guaranteed by a corporation, partnership, organization, trust, or other entity with total assets greater than \$10 MM. Individuals may be a guarantor on the swap, but a guarantee from an individual cannot be used to make the counterparty an ECP
 - Each of the entity’s owners is an ECP and customer's net worth (when combined with the net worth of its owners) is greater than \$ 1 MM and it enters into swap in connection with the conduct of its business or to manage the risk associated with an asset or liability owned or reasonably likely to be owned or incurred by it in the conduct of its business.
- Methods to qualify as an individual ECP:
 - Amounts invested on a discretionary basis are greater than \$5MM and the individual enters into the swap to manage the risk associated with an asset owned or liability incurred, or reasonably likely to be owned or incurred by customer.
 - Amounts invested on a discretionary basis are greater than \$10 MM

Documentation Requirements

- ISDA Master Agreement and Schedule
 - ✓ The ISDA Master Agreement is an industry standard document that outlines the general terms of any derivative contract between two parties including provisions dealing with events of default and/or early termination and each party's rights and remedies. The ISDA Schedule amends the Master to fill-in certain details.
- Eligible Contract Participant Certificates for Counterparty and Guarantors
 - ✓ Certificates denote that the counterparty and any guarantors to any derivatives transaction is eligible under Dodd Frank Regulations (or ISDA Protocol);
- End-User Exemption Certificate
 - ✓ Allows a non-financial entity to exempt itself from clearing requirements under Dodd Frank Regulations (or ISDA Protocol);
- Resolution
 - ✓ Authorizes a company to enter into the ISDA and hedging agreements and identifies authorized signers.
- Legal Entity Identifier (LEI) or Global Markets Entity Identifier (GMEI) Registration
 - ✓ Unique identifier required of each party to a swap for regulatory reporting purposes. Client must register with a third-party LEI/GMEI provider and provide its identifier to PNC (usually on the ECP form).
- IRS Form W-9
- Trade Confirmation Letter
 - ✓ Provided after swap execution, the trade confirmation includes specific terms including the notional amount, start and maturity dates, payment dates, floating rate index, day count basis, and any amortization.



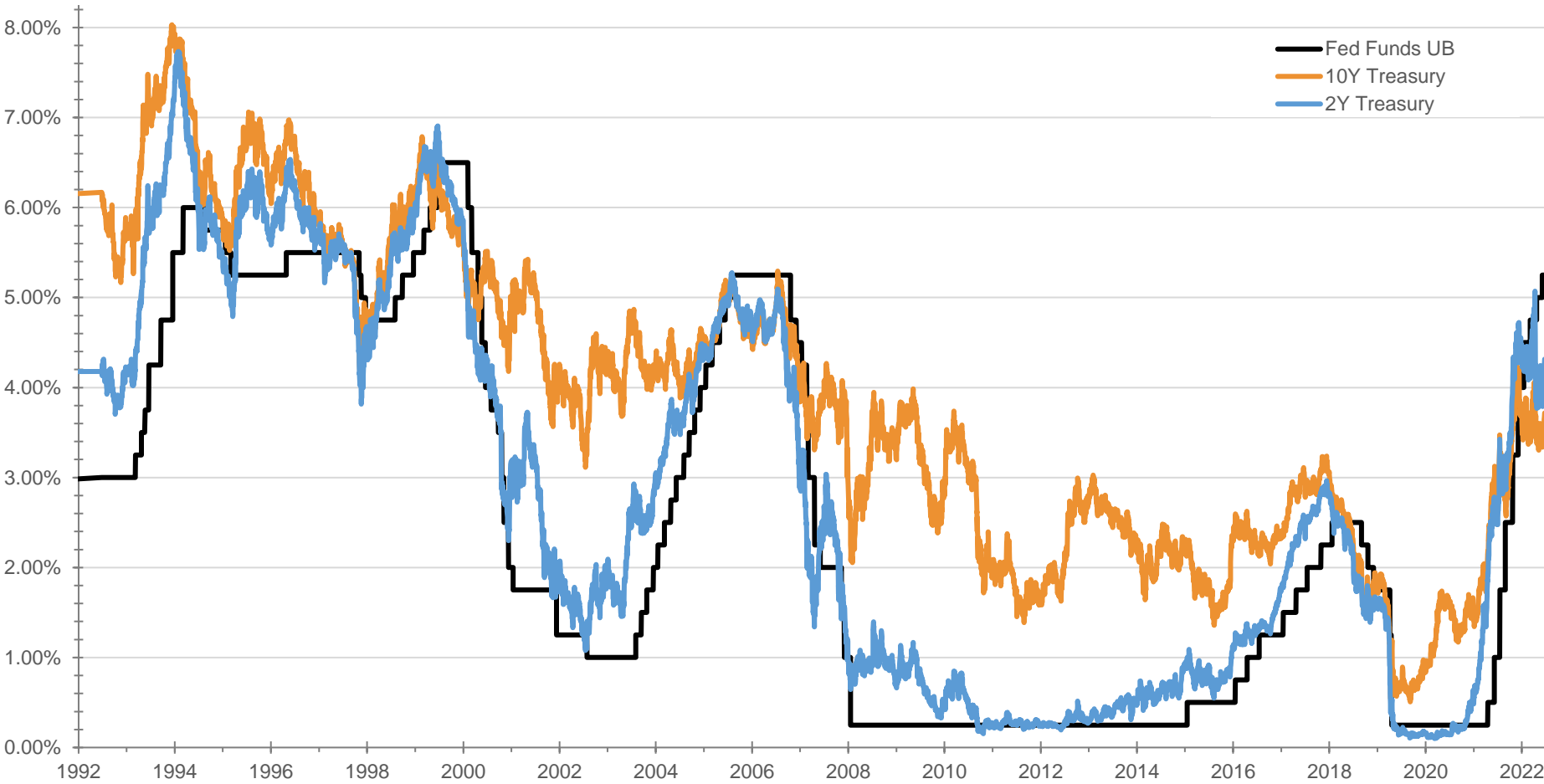
Economic & Interest Rate Market Update

Current Interest Rates

Yields Substantially Higher YTD



Fed Funds UB, 2Y and 10Y UST since 1992



Sources: Bloomberg, CME

Employment

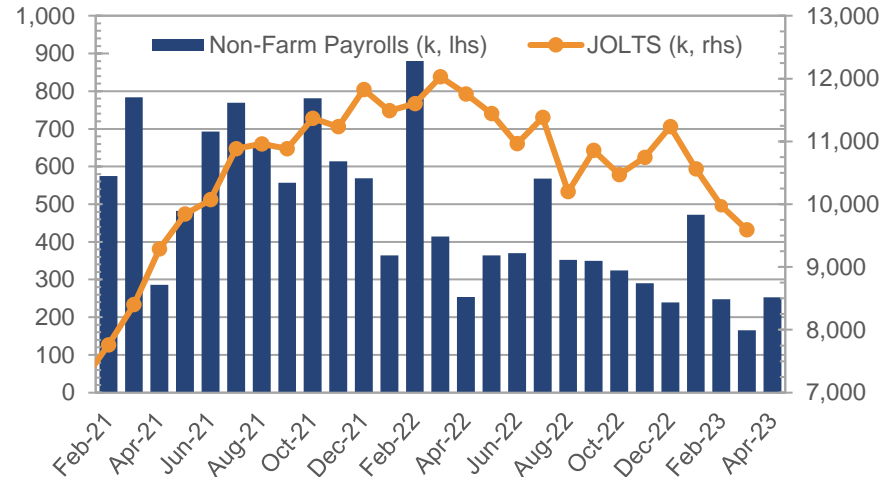
Labor Demand Shows Signs of Moderating



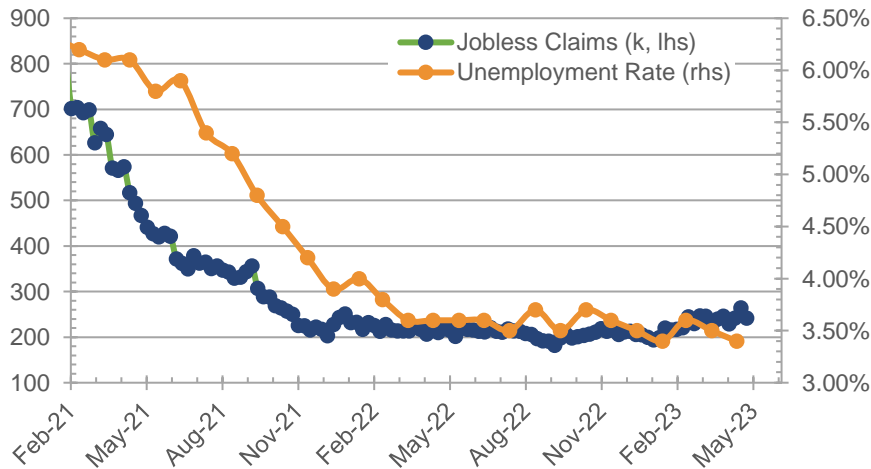
Commentary

- April's Nonfarm Payrolls report showed 253k jobs were added last month, higher than the forecast of 185k. The unemployment rate decreased from 3.5% to 3.4%.
- March JOLTS job openings decreased from 9,974K to 9,590K illustrating that demand for labor is moderating. There are 1.62 job openings for every person looking for a job.
- Wage gains have begun to moderate in the past couple of months.
- Many industries continue to add workers in contrast to the announced layoffs at tech, financial and consulting companies.

Payrolls & Job Openings



Jobless Claims Unemployment Rate



Forecasts

	Apr '23 a	3Q '23 f	4Q '23 f	1Q '24 f	2Q '24 f
Non-Farm Payrolls					
Bloomberg Consensus	253	-33	-57	-20	50
PNC Forecast		58	-64	-108	-159
Unemployment Rate					
Bloomberg Consensus	3.4	3.9	4.3	4.6	4.7
PNC Forecast		3.9	4.1	4.4	4.7

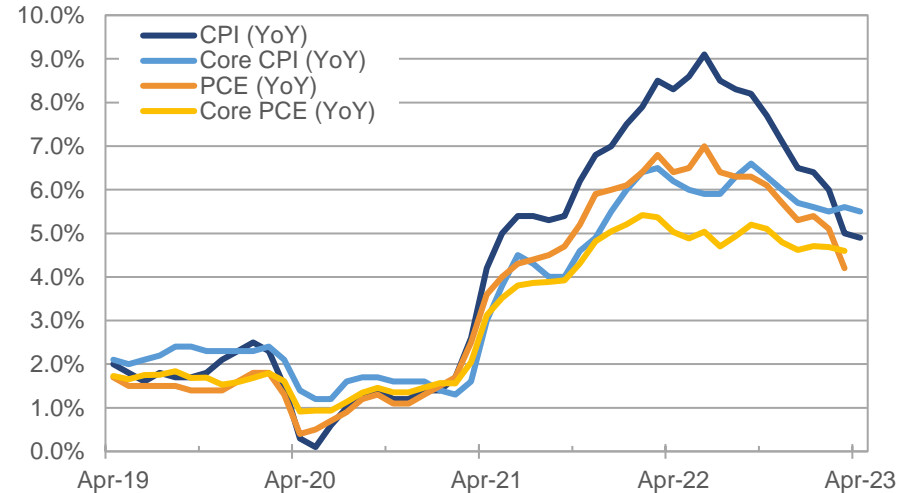
Inflation

Continues to Run Well Above Fed Target

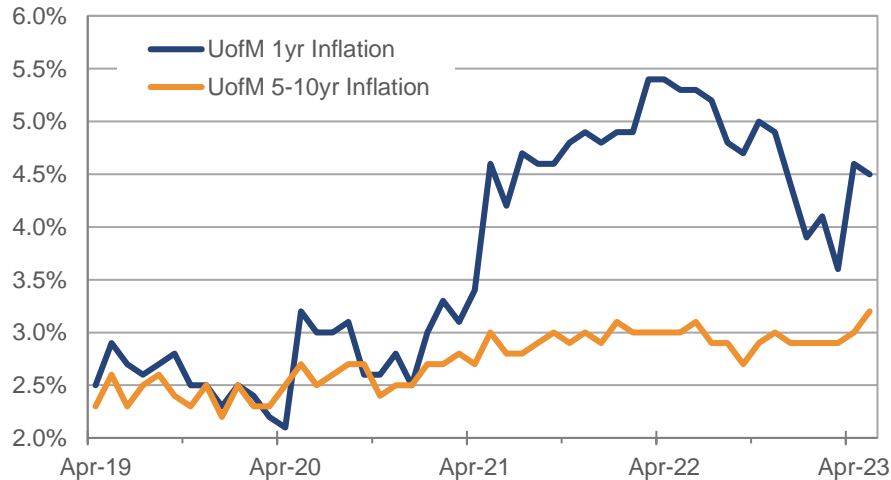
Commentary

- CPI for April was +4.9% y/y, cooling from +5.0% in March and slightly below the +5.0% the consensus estimate. Core CPI for Apr. ticked lower from the +5.6% Mar. value to +5.5% y/y.
- March PCE was +4.2% y/y, lower than February's value of +5.0% y/y and in line with estimates. February Core PCE came in at +4.6% y/y, also in line with the median estimate and same as the previous month.
- Inflation expectations have increased, with the UofM consumer survey 1yr inflation expectation at 4.6%, up from 3.8% the previous month.
- Forecasts continue to call for inflation readings to fall over 2023, but core PCE not expected to reach Fed's 2.0% target by YE.

Inflation Headlines



Inflation Expectations



Forecasts

	Apr '23 a	3Q '23 f	4Q '23 f	1Q '24f	2Q '24 f
CPI (YoY%)					
Bloomberg Consensus	4.9	3.5	3.2	2.8	2.7
PNC Forecast		3.7	3.2	2.5	1.8
PCE (YoY%)	Mar '23 a	3Q '23 f	4Q '23 f	1Q '24f	2Q '24 f
Bloomberg Consensus	4.2	3.5	3.3	2.8	2.5
PNC Forecast		3.0	2.6	2.1	1.6
Core PCE (YoY%)	Mar '23 a	3Q '23 f	4Q '23 f	1Q '24f	2Q '24 f
Bloomberg Consensus	4.6	4.0	3.5	3.0	2.6
PNC Forecast		3.3	2.7	2.2	1.8

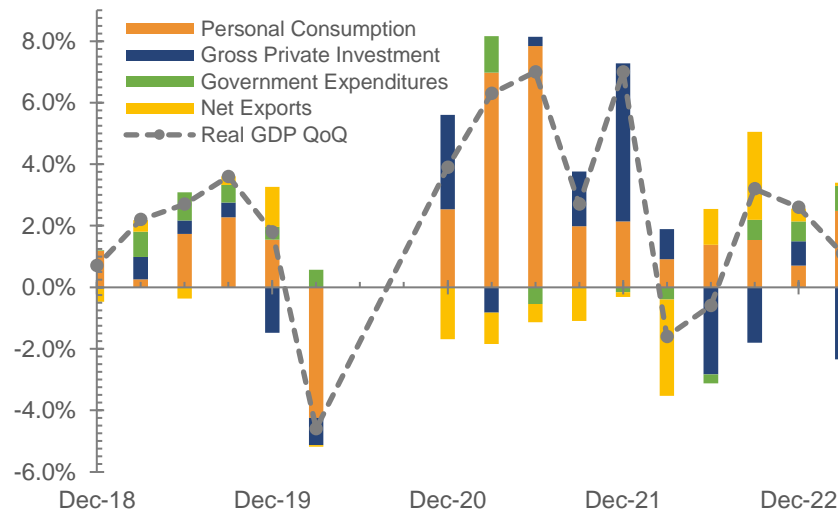
Growth

GDP Slowed In Q1

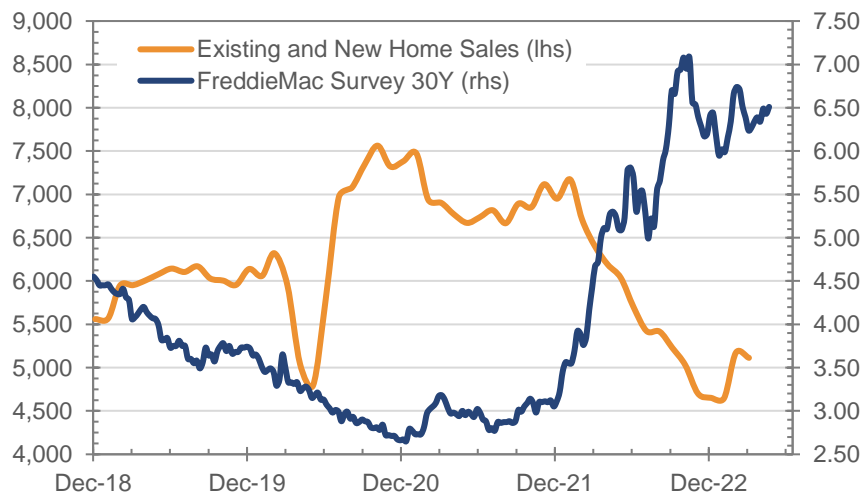
Commentary

- GDP growth slowed to 1.1% in Q1 of 2023 lower than the expectations of 1.9% and down from 2.6% in Q4 of 2022. While goods spending was positive for the first time in 3 quarters, private inventories subtracted 2.3% from the bottom line GDP print.
- NBER's Business Cycle Dating Committee did not officially announce a recession despite negative GDP in Q1 and Q2 of 2022, citing the strength of the labor market as evidence that the economy has not reached a recession yet.
- Rate sensitive sectors of the economy, like housing, are showing signs of slowing as higher longer-term yields compared to a year ago and recent Fed hikes impact consumer decisions.

US Real GDP (q/q ann.)



Housing Market



Forecasts

	1Q '23 a	2Q '23 f	3Q '23 f	4Q '23 f	1Q '24f	2Q '24 f
Real GDP (YoY)						
Bloomberg Consensus	1.1	0.5	-0.5	-0.5	0.8	1.6
PNC Forecast		0.5	0.2	-0.5	-1.0	-0.8
New + Exist Home Sales	Mar '23 a	2Q '23 f	3Q '23 f	4Q '23 f	1Q '24f	2Q '24 f
Bloomberg Consensus	5,113	4,825	4,673	4,673	4,784	4,895
PNC Forecast		4,527	4,468	4,422	4,392	4,447

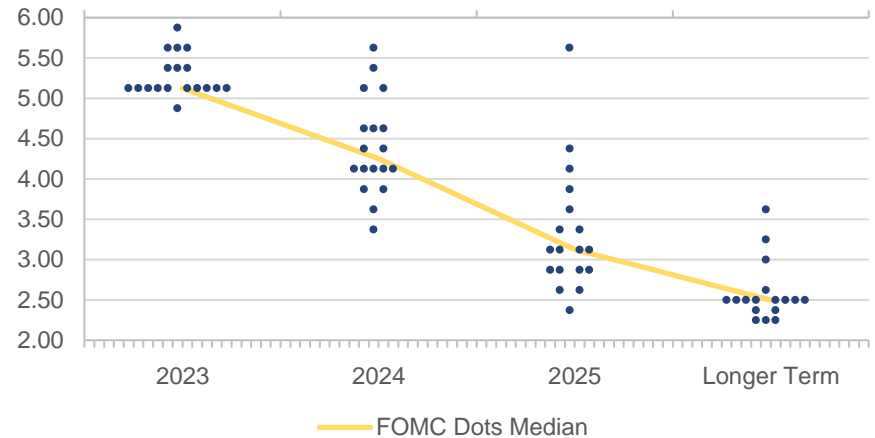
Fed Pause In Sight

Market Preparing For Possible Rate Cuts

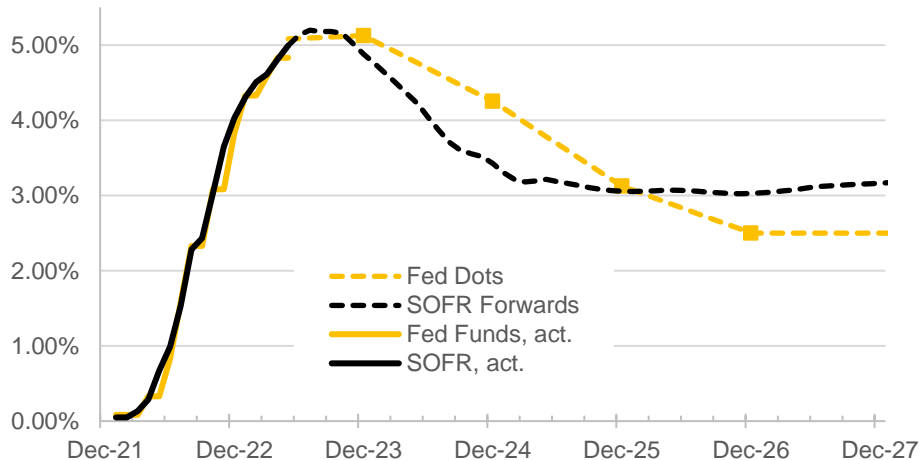
Commentary

- At the March meeting, the FOMC raised Fed funds target rate by 0.25% to range of 4.75% / 5.00%
- At the post meeting press conference, Fed Chair Powell signaled the Fed may continue to hike, as he “anticipates that some additional policy firming may be appropriate in order to attain a stance of monetary policy that is sufficiently restrictive to return inflation to 2% over time.”
- Amid bank sector concerns, Powell reiterated that the Fed is “committed to restoring price stability, and all of the evidence says that the public has confidence that we will do so.”
- Fed Funds futures are pricing in a ~20% chance of one 25 bps hike in June. FF futures have multiple cuts by YE 2023, but Fed dots do not show cuts until 2024.

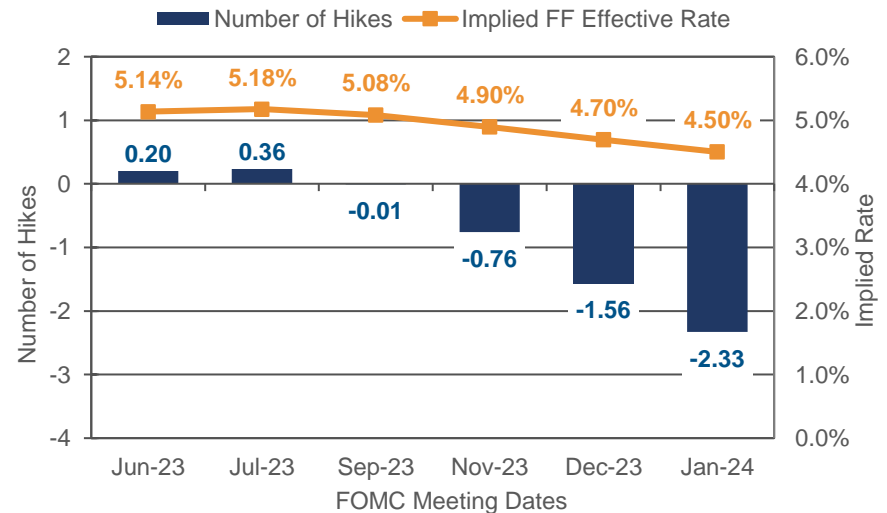
Fed Dots



Daily SOFR Forward Curve vs Fed Dots



Implied Additional Rate Hikes



Historical Tightening Cycles

Cycles Vary In Steepness And Duration

Commentary

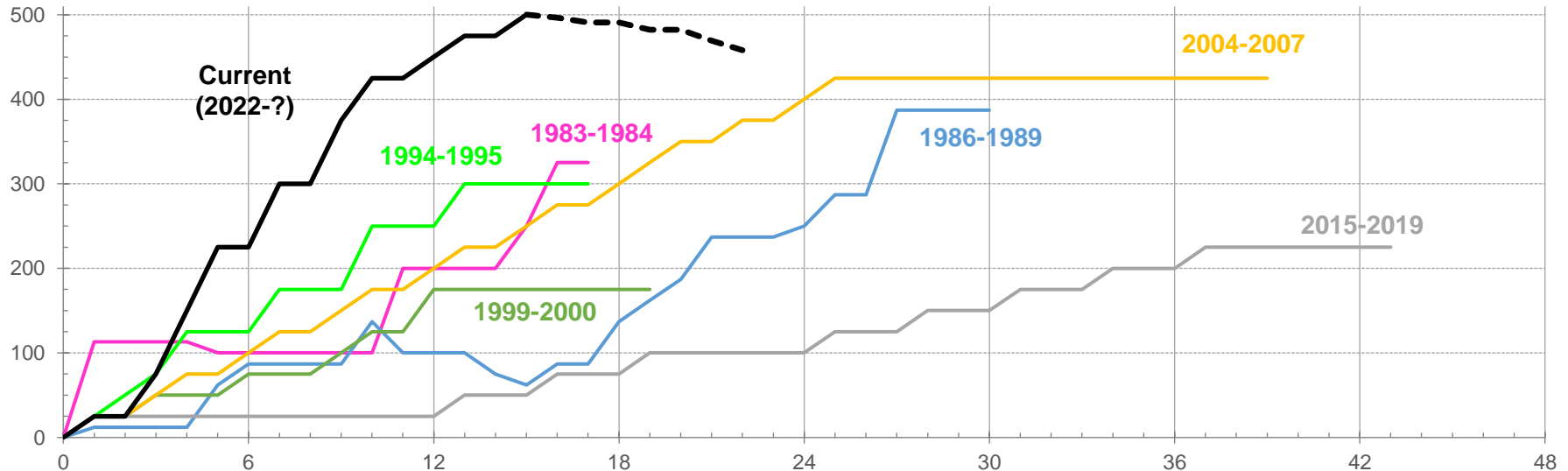
- Current fed funds futures imply a ~3% chance of a 25 bp cut in June 2023.
- Average increase in rates over the past six hiking cycles is 3.75% over 22 months at an average pace of 0.17% per month. Pause before cuts varies significantly but typically within 6 to 7 months. Only the 2004-2007 cycle resulted in a pause longer than one year.
- Current market expectations reflect one of the steepest tightening cycles in recent history.

Overview Of Previous Rate Hikes

Tightening Cycle (*)	Starting Rate	Ending Rate	Total Increase	Pace of Hikes	Months Hiking	Months Paused
May 83 Sep 84	8.50%	11.75%	3.25%	0.20%	16	1
Dec 86 May 89	5.88%	9.75%	3.87%	0.14%	27	3
Feb 94 Jun 95	3.00%	6.00%	3.00%	0.23%	13	4
Jun 99 Dec 00	4.75%	6.50%	1.75%	0.15%	12	7
Jun 04 Aug 07	1.00%	5.25%	4.25%	0.17%	25	14
Dec 15 Jun 19	0.25%	2.50%	2.25%	0.06%	37	6
Mar 22 May 23	0.25%	5.25%	5.00%	0.33%	15	0

(*) From month of 1st hike to month before 1st cut.

Basis Points Change In Fed Funds Target Rate – Tightening Cycles Since 1983

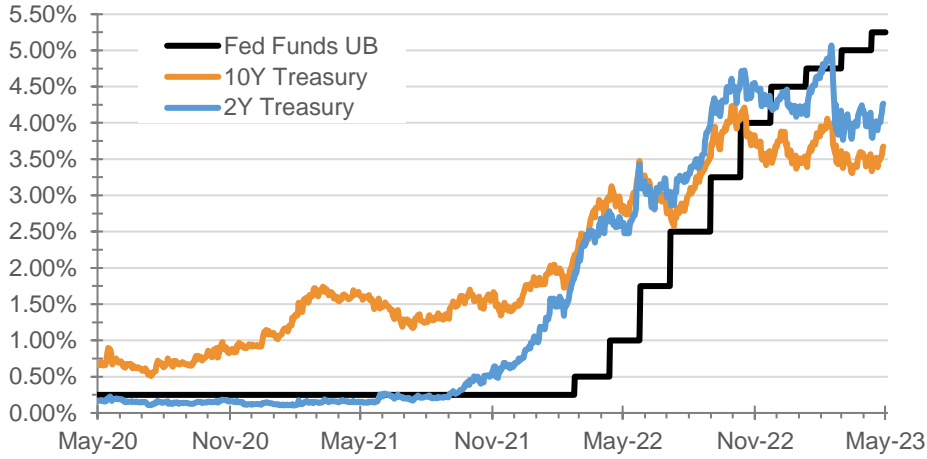


Current Interest Rates

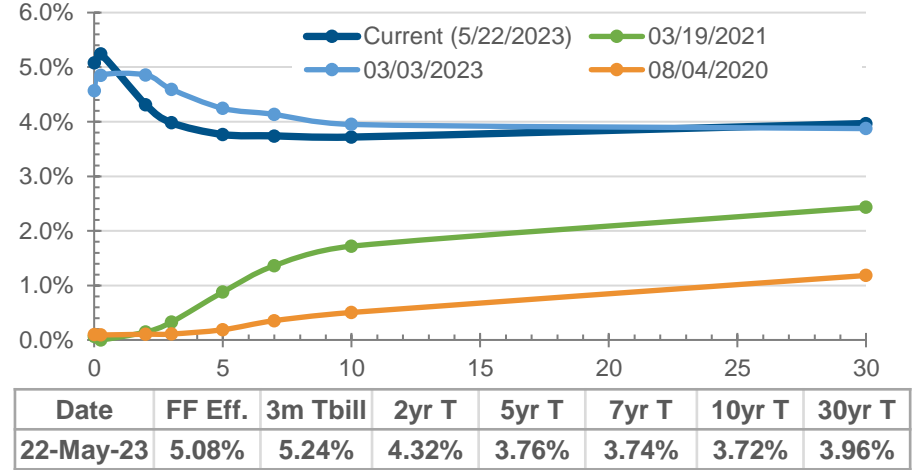
Yields Substantially Higher YTD



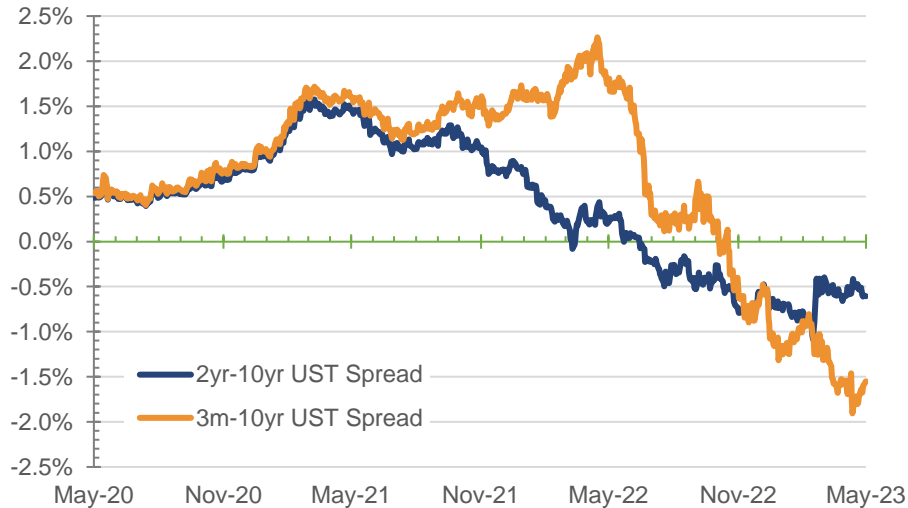
Fed Funds UB, 2Y and 10Y UST



UST Yield Comparison



UST Yield Spreads



FF + 2y and 10y UST Forecasts

	5/22/23	2Q '23f	3Q '23f	4Q '23f	1Q '24f	4Q '24f
Fed Funds UB						
Bloomberg Consensus	5.25	5.25	5.25	5.25	4.75	3.50
PNC Forecast		5.25	5.25	5.25	4.50	3.00
Implied Forward Yield		5.13	5.08	4.69	4.50	3.45
2-year Treasury Yield						
Bloomberg Consensus	4.32	4.05	3.90	3.67	3.40	2.95
PNC Forecast		3.97	3.92	3.67	3.44	2.88
Implied Forward Yield		4.20	3.98	3.76	3.57	3.37
10-Year Treasury Yield						
Bloomberg Consensus	3.72	3.50	3.42	3.36	3.30	3.15
PNC Forecast		3.45	3.41	3.37	3.34	3.31
Implied Forward Yield		3.71	3.67	3.64	3.62	3.63

Sources: Bloomberg, Forecasts as of 5.22.23.



LIBOR Cessation and Replacement

The IBA¹ & FCA² formally announced dates after which LIBOR rates will no longer be available, with most USD LIBOR tenors extended until June 30, 2023

Per regulatory guidance, banks cannot issue new LIBOR contracts after January 1, 2022

Key Points

1 week and 2 month USD LIBOR ceased to be available as of January 1, 2022

All foreign currency IBOR rates ceased to be available as of January 1, 2022

All other USD LIBOR tenors will no longer be available after June 30, 2023

- The announcements constituted a trigger³ event under LIBOR replacement provisions, but did not result in an immediate transition to a new reference rate
- The ISDA fallback spread adjustments published by Bloomberg were fixed as of March 5, 2021

1. IBA, ICE Benchmark Administration, the administrator of LIBOR: https://www.theice.com/publicdocs/ICE_LIBOR_feedback_statement_on_consultation_on_potential_cessation.pdf

2. FCA, Financial Conduct Authority, the regulatory supervisor of the IBA: <https://www.fca.org.uk/news/press-releases/announcements-end-libor>

3. Trigger events include, among other things, public statements issued by the administrator of LIBOR (or other applicable regulatory authorities) announcing that the administrator of LIBOR will cease to provide LIBOR permanently or that LIBOR is no longer representative.

Foundational differences exist between risk free rates and credit sensitive rates

Risk Free Rate
Rate of return for an investment with **no risk**. Government bond yields are commonly used.

Treasury Bills

Repos backed by Treasury Securities

Treasury Notes and Bonds

SOFR (Secured Overnight Financing Rate)

Less reflective of bank market funding costs

Credit Sensitive Rate
Rate of return for an investment with **default risk**. The degree of risk will generally be measured as a spread to a risk free rate.

Short Term Money Market Instruments (commercial paper)

Indices reflecting unsecured funding costs for a group of banks

Unsecured Corporate Bonds

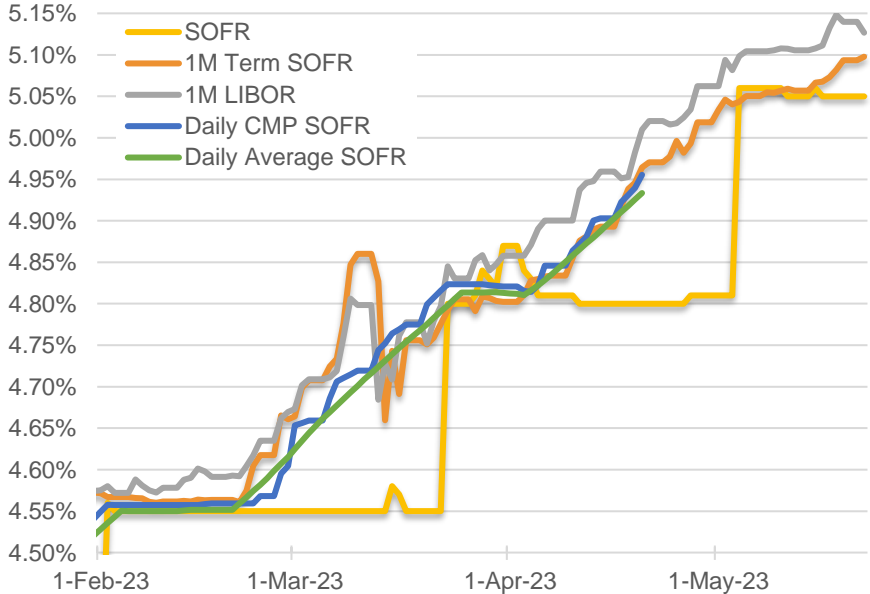
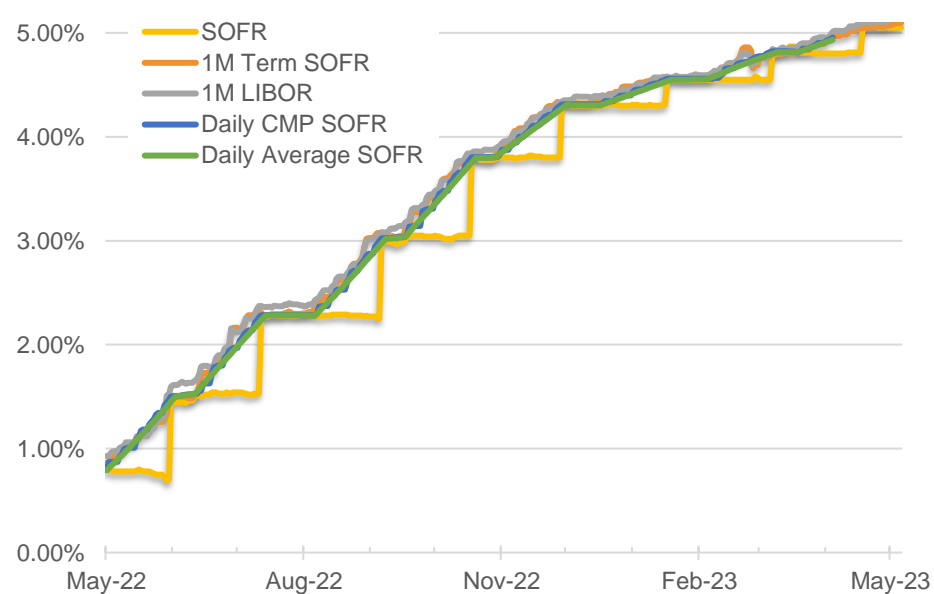
LIBOR (London Interbank Borrowing Rate)
BSBY (Bloomberg Short-Term Bank Yield Index)

More reflective of bank market funding costs

Several replacement rates for LIBOR have been developed and are in use for both loans and swaps

Alternative Reference Rate Committee has developed SOFR, and other rate producers have developed replacement rates, including Bloomberg's Short-Term Bank Yield Index (BSBY). Historically, various replacement rates have behaved differently from LIBOR and may react distinctly to changing economic conditions in the future.

Rate Components¹



Data as of May 2022
1-month adjustment = 11.448bps

1. Source: Federal Reserve
2. Spread adjustments for various tenors are published by Bloomberg and have been fixed, effective March 5, 2021

Alternative Reference Rates Disclosure for PNC Derivatives Counterparties

As part of the transition away from U.S. Dollar (“USD”) London Interbank Offered Rate (“LIBOR”), various alternative reference rates may be used as the reference rate for various financial instruments, including derivatives, loans and other products that you may be considering entering into with PNC Bank, National Association (“PNC”).

The Alternative Reference Rates Committee (“ARRC”), a group of private market participants convened by the Board of Governors of the Federal Reserve System and the Federal Reserve Bank of New York to help ensure a successful transition away from USD LIBOR, has recommended the Secured Overnight Financing Rate (“SOFR”) as the alternative reference rate for USD LIBOR. Separately, the Bloomberg Short-Term Bank Yield Index (“BSBY”), which incorporates bank credit spreads and defines a forward looking term structure, has also emerged as a potential alternative reference rate for USD LIBOR.

Notwithstanding the ARRC’s recommendation for SOFR to be the alternative reference rate for USD LIBOR or BSBY’s recent market traction, at present, it is not possible to state with certainty which alternative reference rate(s) will be widely adopted. As a result, a liquid market for your derivatives contracts which use an alternative reference rate may not develop quickly or at all.

An alternative reference rate may behave differently to other alternative reference rates, which could be material, based on the number of transactions underlying such rate, whether such rate is credit sensitive and whether such rate defines a forward-looking term structure. It is important that you understand the composition and characteristics of a particular alternative reference rate to determine whether such rate is appropriate for your hedging needs.

The contractual terms of any derivatives instruments with PNC will provide a process for determining a fallback rate if an alternative reference rate (including, but not limited to, SOFR and BSBY) is not published on a given day. The contractual provisions of other financial instruments, though, may (i) utilize a different method by which a fallback rate is determined and implemented, (ii) calculate the same fallback rate differently or otherwise use different conventions with respect to the same fallback rate and/or (iii) make inconsistent changes to other economic terms. Any of these differences could result in a mismatch between the reference rate or other economics in your derivatives instruments and your other financial instruments, such as loans for which a derivatives instrument is intended as a hedge. In this regard, it is important for you to determine any such potential mismatches between fallback provisions in derivatives contracts and other financial products.

Prior to entering into any derivatives transaction on an alternative reference rate (such as SOFR or BSBY), we strongly urge you to ensure that you:

- Understand the composition and characteristics of the applicable alternative reference rate;
- Understand that, during the lifetime of the derivatives transaction, a liquid market for your derivatives contracts may not develop;
- Understand that, during the lifetime of the derivatives transaction, the applicable alternative reference rate may cease to be published or may not be a representative benchmark, and therefore may not be appropriate in a number of different ways and/or for a variety of reasons;
- Recognize that amendments to the product or other actions may be required or become desirable as the market for alternative reference rates continues to evolve; and
- Understand how the current fallback provisions of the derivatives transaction would operate, and review the terms of your other financial products, such as loan agreements, and consider whether the contractual fallbacks for alternative reference rates could directly or indirectly result in a mismatch of the reference rates or other economic terms that apply across your portfolio.

We are providing you this information to ensure that you are aware of the potential risks and other considerations with executing a derivatives transaction on an alternative reference rate. We note that PNC does not owe you any duties, nor have any liability to you, in relation to any alternative reference rate developments. Nothing contained herein should be construed as legal, accounting, tax, trading or other professional advice.

We strongly encourage you to review the contractual terms of any proposed derivatives contracts and other financial instruments linked to an alternative reference rate, and consult with your own independent advisors, to determine whether an applicable alternative reference rate and such contractual terms are appropriate for you and will meet your hedging, tax and accounting objectives.

For more information on benchmark reform related to LIBOR and other IBORs, as well as information specific about the relevant rates, please see:

- The accompanying ISDA IBOR Alternative Reference Rates Disclosure (October 2020): <https://www.isda.org/a/aorTE/IBOR-Alternative-Reference-Rates-Disclosure-October-2020.pdf>
- PNC LIBOR Transition Center: <https://www.pnc.com/en/corporate-and-institutional/libor-transition.html>

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