Treasury Presentation to TBAC

Office of Debt Management

Fiscal Year 2024 Q4 Report

Table of Contents*

*All sources are from Treasury unless otherwise specified

Section I:
Executive Summary

Highlights of Treasury's November 2024 Quarterly Refunding Presentation to the Treasury Borrowing Advisory Committee (TBAC)

Receipts and Outlays through Q4 FY2024

	$ billion	Change from same period last year ($ billion)	Change from same period last year (%)	As % of GDP	Change from same period last year (% GDP)
Total Receipts thru Q4 FY2024	$4,919	$479	11%	17.1%	0.9%
Total Outlays thru Q4 FY2024	$6,752	$617	10%	23.4%	1.0%

*Treasury's Projected Privately-held Net Marketable Borrowing for the Current and Next Fiscal Quarters**

Treasury OFP Near Term Fiscal Projections	Privately Held Net Marketable Borrowing ($ billion)	Assumed End-of-Quarter Cash Balance ($ billion)
Q1 FY2025	546	700 (Dec)
Q2 FY2025	823	850 (Mar)

*Treasury's assumed end-of-December cash balance of $700 billion is also its assumed cash balance upon the expiration of the debt limit suspension on January 1, 2025. This assumption is based on expected cash flows under Treasury's cash management policies and is consistent with its authorities and obligations, including those under the Fiscal Responsibility Act of 2023. The actual cash balance on January 1, 2025, may vary from this assumption based on changes to cash flows near the end of 2024. The end-of-March cash balance assumes enactment of a debt limit suspension or increase. While the debt limit is not currently binding, Treasury's cash balance may be lower than assumed depending on several factors, including constraints related to the debt limit.

*Projected Privately-held Net Marketable Borrowing for the Next Three Fiscal Years from Various Sources***

Fiscal Year	Primary Dealers, Median October 2024 ($ billion)	OMB Estimates, July 2024 ($ billion)	CBO Estimates, June 2024 ($ billion)
2025	2,169	2,051	2,160
2026	2,000	1,695	1,930
2027	2,025	1,648	1,831

**All privately-held net marketable borrowing estimates are "normalized" with details from page 18.

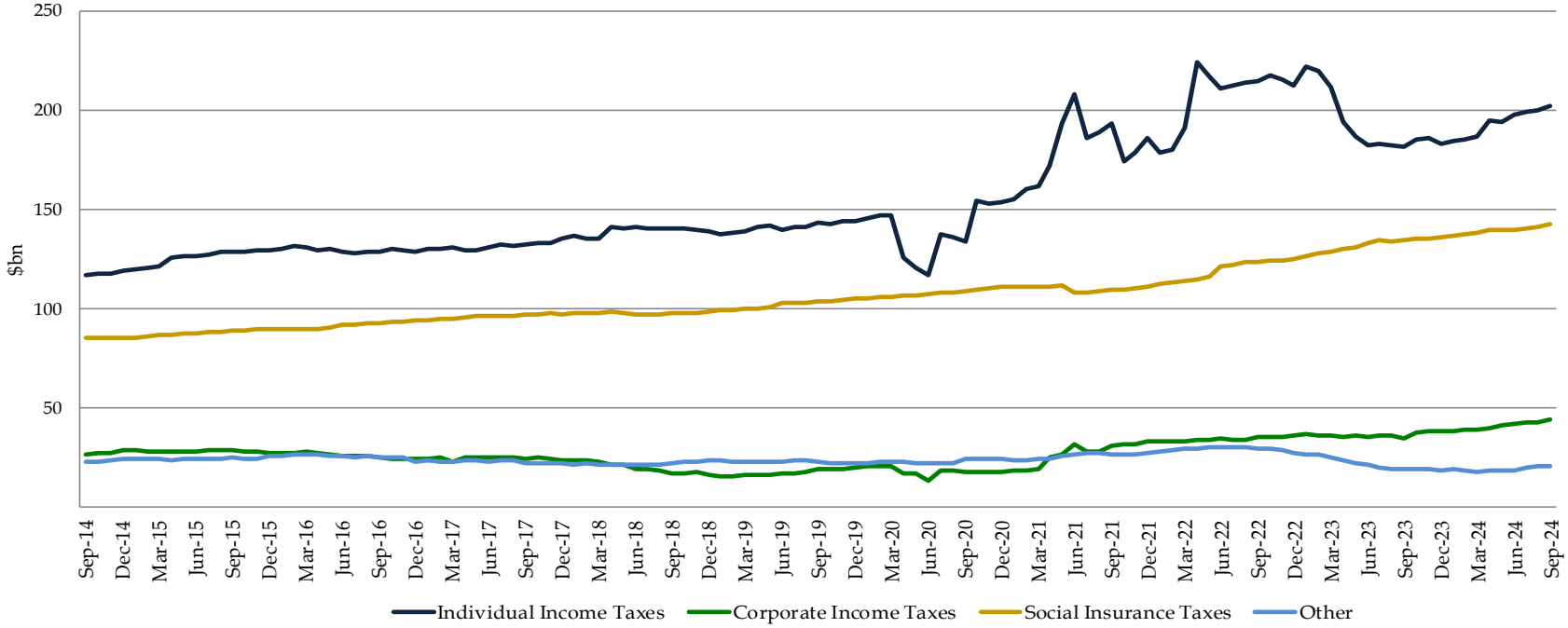
Uncertainty regarding future funding needs remains relatively high, reflecting a variety of views on the path of monetary policy, the duration of SOMA redemptions, and the outlook for the economy.

Latest Market Expectations for Treasury Financing in October 2024:

- Primary dealers expected no changes to nominal coupon issuance sizes at the November refunding.
- With respect to TIPS, a majority of dealers expect Treasury to announce a $1 billion increase (to $20 billion) to the 10-year new issue in January 2025.

Section II:
Recent Fiscal Results
Receipts, Outlays, and Deficits

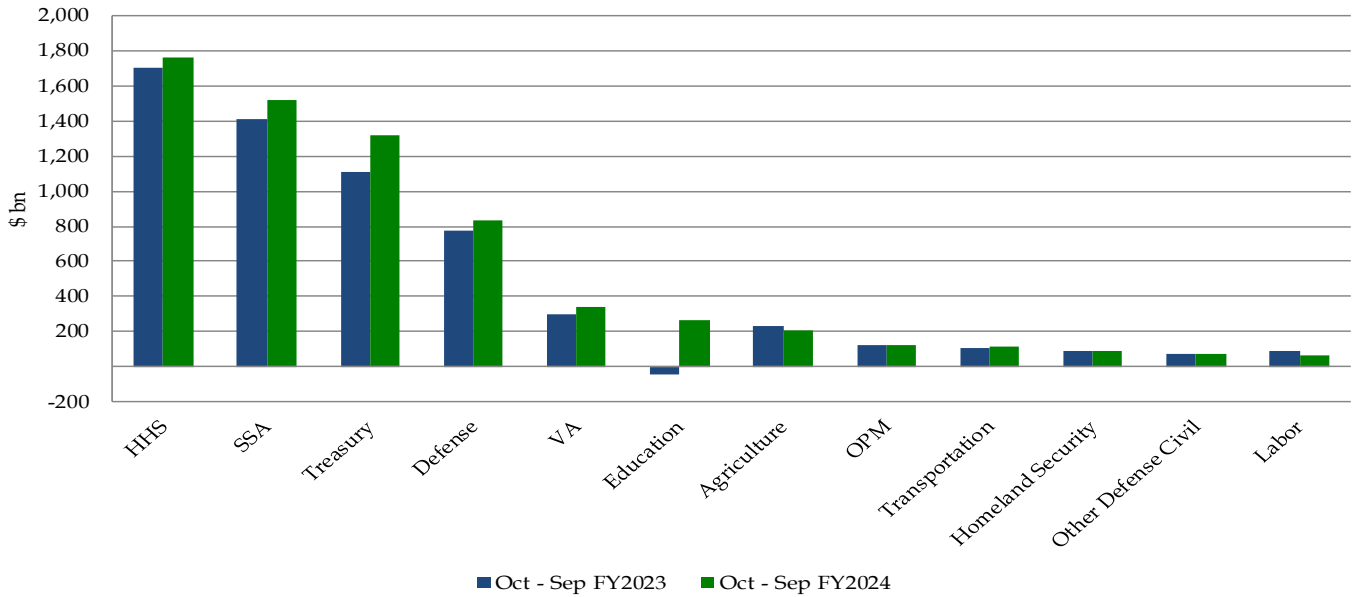
Monthly Receipt Levels
(12-Month Moving Average)



Notable Receipt Category	YoY change thru Q4 FY24 ($ billion)	YoY change thru Q4 FY24 (%)	Comments
Non-withheld and SECA Taxes	+$123	+13%	Increased due to IRS extension of several major deadlines for some taxpayers, including those in California, from FY 2023 into FY 2024.
Gross Corporate Taxes	+$108	+24%	Mainly due to deferred taxes from FY 2023 to FY 2024, growth and the new Corporate Alternative Minimum Tax (CAMT).
Withheld & FICA Taxes (calendar adjusted)	+$120	+4%	Increased due to wage and employment growth, partially offset by the nonrecurrence of the CARES deferral repayment.
Individual Refunds	-$74	-20%	Decreased (a plus to cash) due to IRS paring of backlog in January 2023 at a non-recurring rate.
Miscellaneous (including other Social Insurance)	$24	23%	Due to IRS correction of prior year accounting of Excise Refunds.

Individual Income Taxes include withheld and non-withheld. Social Insurance Taxes include FICA, SECA, RRTA, UTF deposits, FUTA and RUIA. Other includes excise taxes, estate and gift taxes, customs duties and miscellaneous receipts.

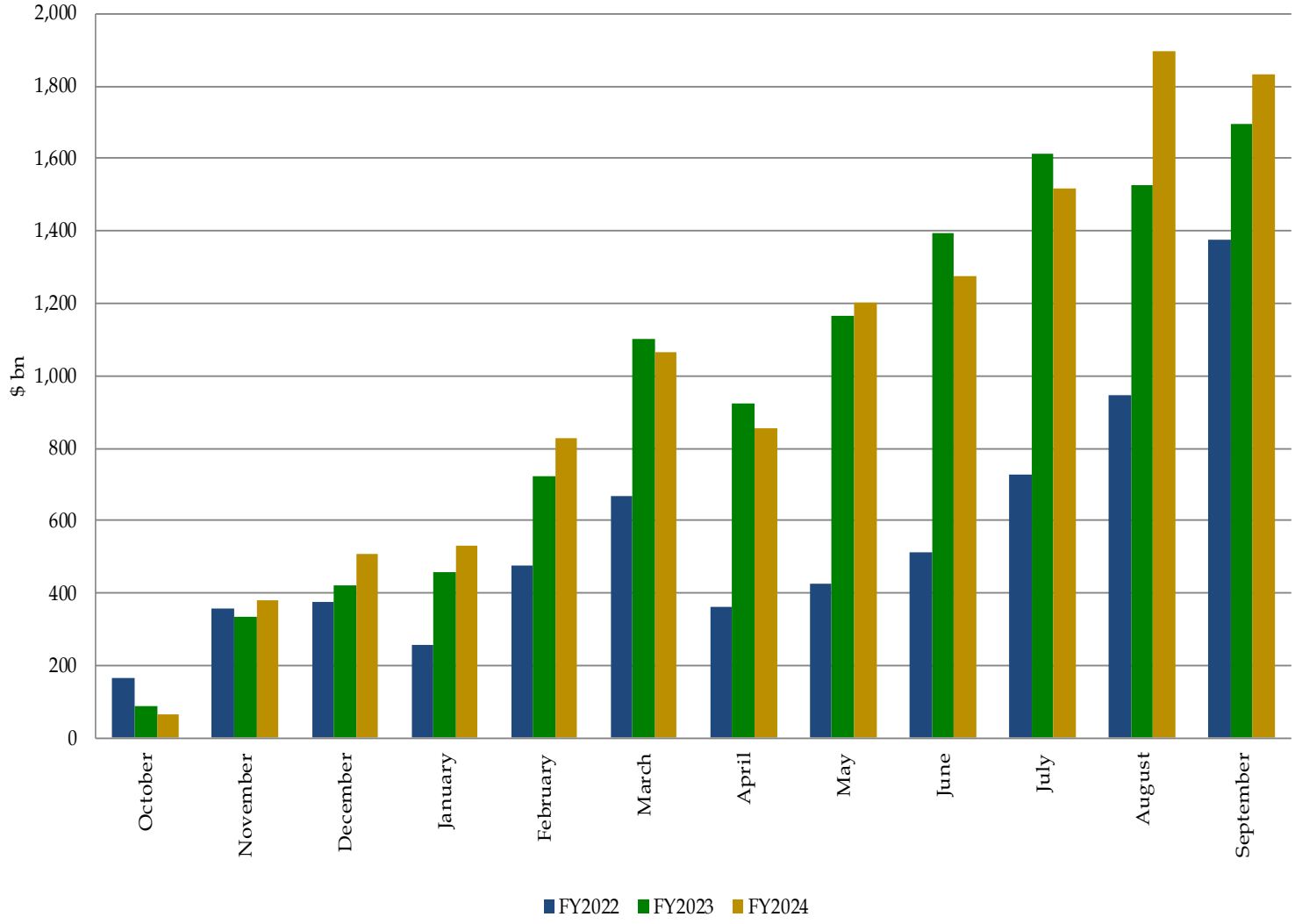
Largest Outlays



Notable Outlay Category	YoY change thru Q4 FY24 ($ billion)	YoY change thru Q4 FY24 (%)	Comments
Social Security Administration (calendar adjusted)	+$109	+8%	Due to benefit increases from cost-of-living adjustments (COLA) and increased beneficiaries. The COLA decreased from 8.7% in calendar year 2023 to 3.2% in calendar year 2024.
Health and Human Services (calendar adjusted)	+$65	+4%	Due to increases in Medicare spending.
Department of Defense (calendar adjusted)	+$55	+7%	Due to higher outlays for operation, maintenance, procurement, research, development, test, and evaluation.
Department of Treasury	+$210	+19%	Primarily due to a $254 billion (29%) increase in Gross Interest on the Public Debt, somewhat offset by lower tax credits (-$25 billion).
Department of Veterans Affairs (calendar adjusted)	+$38	+13%	Due to increased spending per person and veterans' increased use of health care facilities. The Promise to Address Comprehensive Toxics Act of 2022 (PACT Act) and the Fiscal Responsibility Act of 2023 are contributing to the increase in outlays.
Other (calendar adjusted, not in the chart above)	-$61	-8%	Mainly due to Federal Deposit Insurance Corporation ($55 billion) outlays booked in September 2023 related to bank failures, but didn't reoccur in FY2024.

Outlays in the chart above are on a calendar adjusted basis

Cumulative Budget Deficits by Fiscal Year



Section III:
Various Fiscal Forecasts

Primary Dealers, OMB, CBO

Recent Economic Forecasts

Primary Dealer Median Estimates October 2024

	CY2024	CY2025	CY2026
	% Change from Q4 to Q4		
GDP			
Real	2.3	1.9	2.1
Nominal	4.8	4.2	4.2
Inflation			
CPI Headline	2.6	2.3	2.3
CPI Core	3.2	2.5	2.4
	Fourth Quarter Levels		
Unemployment Rate (%)	4.2	4.4	4.3
	FY2025	**FY2026**	**FY2027**
Deficits ($bil)	$1,900	$1,910	$1,975

CBO Estimates June 2024

	CY2024	CY2025	CY2026
	% Change from Q4 to Q4		
GDP			
Real	2.0	2.0	1.8
Nominal	4.6	4.0	3.6
Inflation			
CPI Headline	3.0	2.3	2.2
	Fourth Quarter Levels		
Unemployment Rate (%)	3.9	4.0	4.2
	FY2025	**FY2026**	**FY2027**
Deficits ($bil)	$1,938	$1,851	$1,756

OMB Estimates July 2024

	CY2024	CY2025	CY2026
	% Change from Q4 to Q4		
GDP			
Real	1.9	2.1	2.0
Nominal	4.6	4.4	4.1
Inflation			
CPI Headline	3.1	2.3	2.3
	Fourth Quarter Levels		
Unemployment Rate (%)	3.8	3.8	3.8
	FY2025	**FY2026**	**FY2027**
Deficits ($bil)	$1,878	$1,601	$1,535

Note: OMB's Economic assumptions are from "Mid-Session Review Budget of The U.S. Government, Fiscal Year 2025," July 2024. Their forecast is based on information available as of May 28, 2024.
CBO's economic assumptions are from "An Update to the Budget and Economic Outlook: 2024 to 2034," June 2024. They reflect developments in the economy as of May 2, 2024.

Recent Deficit Forecasts

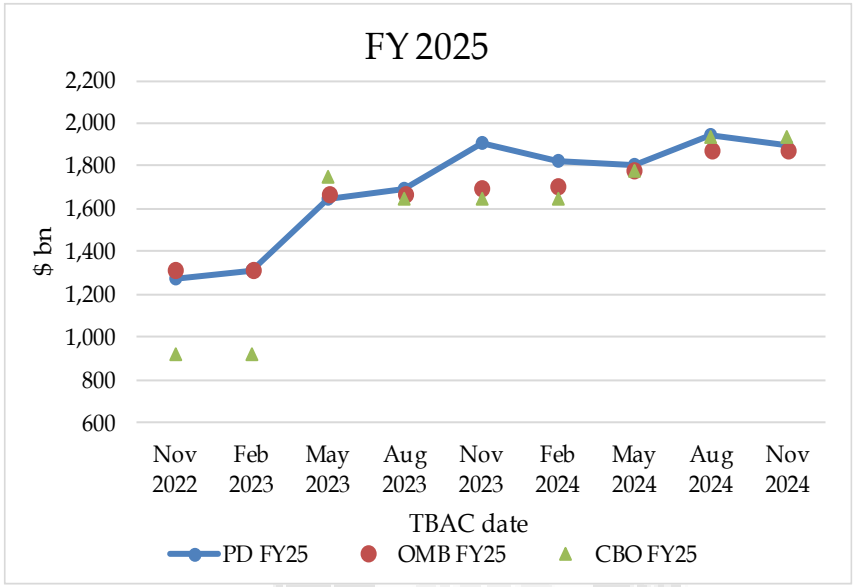
Primary dealers slightly decreased their median deficit estimates in October 2024 relative to estimates they provided in July 2024; in aggregate over FY25-FY26, dealers decreased their estimates by about $30 billion.

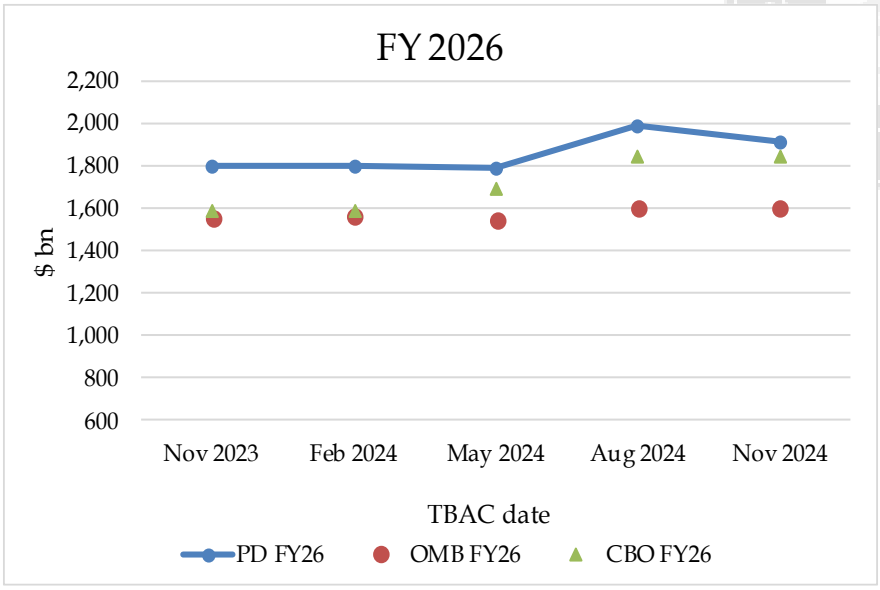
- The latest OMB and CBO estimates in the table below are provided for reference.

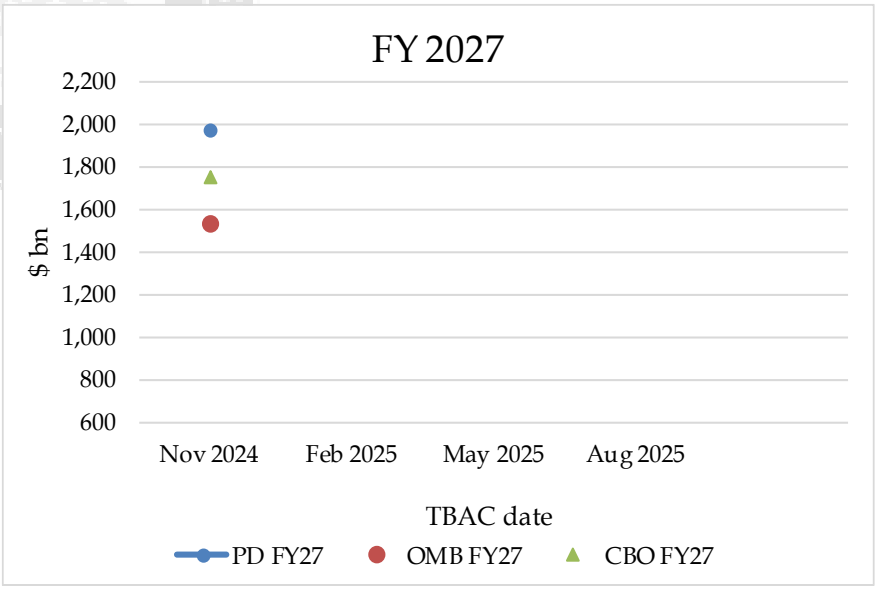
Deficit Estimates ($ billion)	PD 25th Percentile	Primary Dealers (Median)	PD 75th Percentile	Change from Prior Quarter (Median)	OMB	CBO
FY 2025	1,875	1,900	1,950	-42	1,878	1,938
FY 2026	1,850	1,910	2,013	10	1,601	1,851
FY 2027	1,838	1,975	2,100	N/A	1,535	1,756
As of date	Oct-24	Oct-24	Oct-24		Jul-24	Jun-24

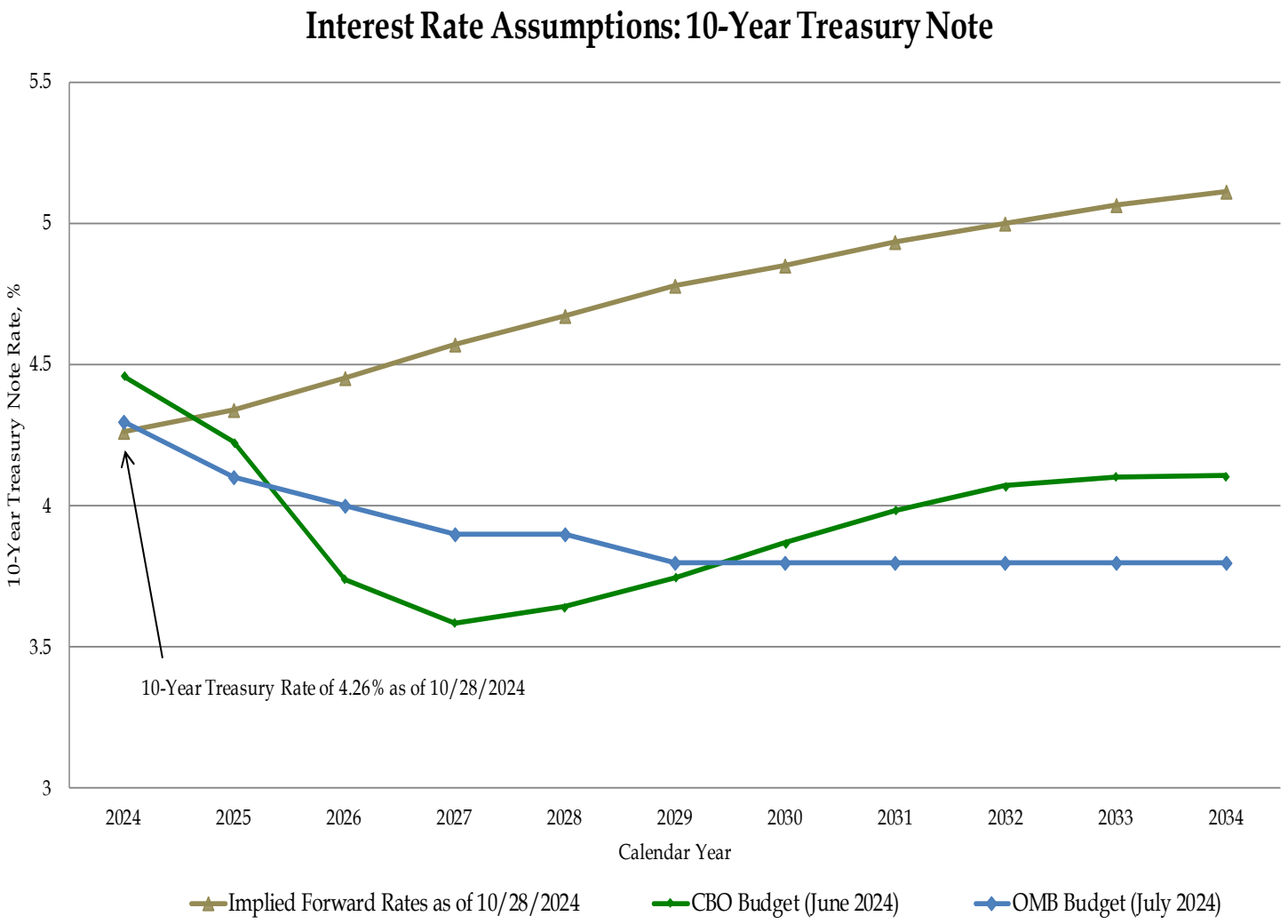
- OMB projections are using estimates are from Table S-3 of "Mid-Session Review Budget of The U.S. Government, Fiscal Year 2025," July 2024. CBO projections are using estimates are from "An Update to the Budget and Economic Outlook: 2024 to 2034," June 2024.

Evolution of Median Primary Dealer, OMB, and CBO Deficit Estimates







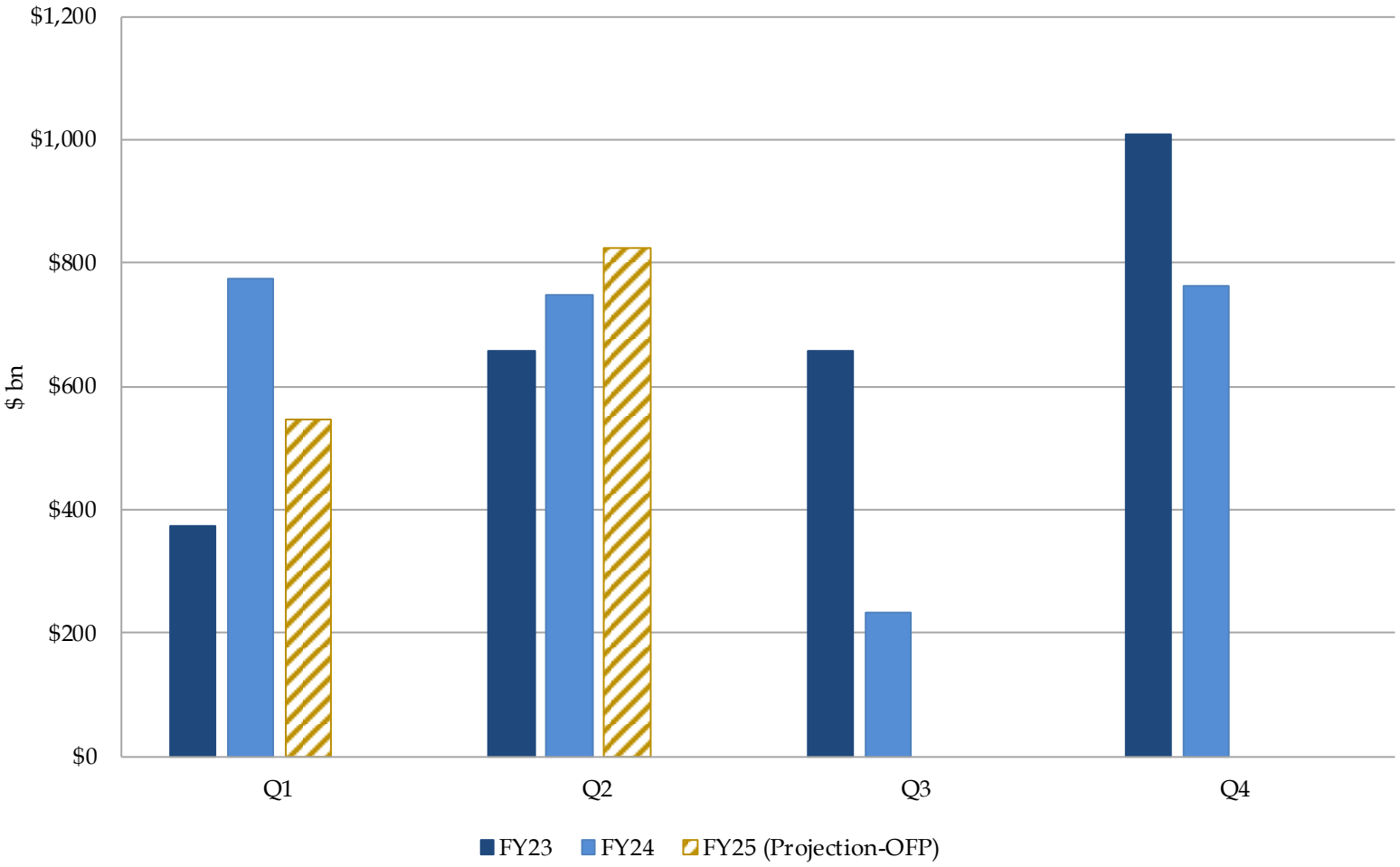

Interest Rate Assumptions: 10-Year Treasury Note
10-Year Treasury Note Rate, %
5.5
5
4.5
4
3.5
3
10-Year Treasury Rate of 4.26% as of 10/28/2024
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
Calendar Year
Implied Forward Rates as of 10/28/2024
CBO Budget (June 2024)
OMB Budget (July 2024)

Section IV:
Estimated Borrowing Needs and Financing Implications

Assumptions for Financing Section (pages 16 to 20)

- Portfolio and SOMA holdings as of 09/30/2024, unless otherwise noted (see slide 20).
- Estimates assume privately announced issuance sizes and patterns remain constant for nominal coupons, TIPS, and FRNs given the issuance sizes in effect in October 2024, while using total bills outstanding of ~$6.0 trillion as of 9/30/2024, unless otherwise noted (see slide 20).
- The principal on the TIPS securities was accreted to each projection date based on market ZCIS levels as of 09/30/2024, unless otherwise noted (see slide 20).
- No attempt was made to account for future financing needs.
- **Privately-held marketable borrowing** excludes rollovers (auction "add-ons") of Treasury securities held in the Federal Reserve System Open Market Account (SOMA) but includes financing required due to SOMA redemptions. Secondary market purchases of Treasury securities by SOMA do not directly change privately-held net marketable borrowing but, all else equal, when the securities mature and assuming the Fed does not redeem any maturing securities, this would increase the amount of cash raised for a given privately-held auction size by increasing the SOMA "add-on" amount. These borrowing estimates are based upon current law and do not include any assumptions for the impact of additional legislation that may be passed. Additionally, buybacks are not expected to significantly affect privately-held net marketable borrowing as new issuance replaces securities that are bought back.

Privately-Held Net Marketable Borrowing Outlook



Implied Bill Funding for the Current and Next Quarters Based on Recent Borrowing Estimates

Sources of Privately-Held Financing in FY25 Q1

October - December 2024	
Assuming Constant Coupon Issuance Sizes[1]	
Treasury Announced Net Marketable Borrowing[2]	546
Net Coupon Issuance	477
Implied Change in Bills[3]	69

Sources of Privately-Held Financing in FY25 Q2

January - March 2025	
Assuming Constant Coupon Issuance Sizes[1]	
Treasury Announced Net Marketable Borrowing[2]	823
Net Coupon Issuance	449
Implied Change in Bills[3]	374

	October - December 2024 Coupon Issuance			Fiscal Year-to-Date Coupon Issuance				January - March 2025 Coupon Issuance			Fiscal Year-to-Date Coupon Issuance		
Security	Gross	Maturing	Net	Gross	Maturing	Net	Security	Gross	Maturing	Net	Gross	Maturing	Net
2-Year FRN	86	68	18	86	68	18	2-Year FRN	86	68	18	172	136	36
2-Year	207	125	82	207	125	82	2-Year	207	126	81	414	251	163
3-Year	174	166	8	174	166	8	3-Year	174	150	24	348	316	32
5-Year	210	96	114	210	96	114	5-Year	210	100	110	420	196	224
7-Year	132	70	62	132	70	62	7-Year	132	68	64	264	138	126
10-Year	120	59	61	120	59	61	10-Year	120	53	67	240	112	128
20-Year	42	0	42	42	0	42	20-Year	42	0	42	84	0	84
30-Year	69	3	66	69	3	66	30-Year	69	3	66	138	7	131
5-Year TIPS	46	39	7	46	39	7	5-Year TIPS	0	0	0	46	39	7
10-Year TIPS	17	0	17	17	0	17	10-Year TIPS	36	40	(4)	53	40	13
20-Year TIPS[4]	0	0	0	0	0	0	20-Year TIPS[4]	0	27	(27)	0	27	(27)
30-Year TIPS	0	0	0	0	0	0	30-Year TIPS	9	0	9	9	0	9
Coupon Subtotal	1,103	626	477	1,103	626	477	Coupon Subtotal	1,085	636	449	2,188	1,262	926

[1] Keeping announced issuance sizes and patterns constant for nominal coupons, TIPS, and FRNs.
[2] Assumes end-of-December 2024 and end-of-March 2025 cash balances of $700 billion and $850 billion respectively versus end-of-September 2024 cash balance of $886 billion. Financing Estimates released by the Treasury can be found here: http://www.treasury.gov/resource-center/data-chart-center/quarterly-refunding/Pages/Latest.aspx
[3] Implied change in bills doesn't incorporate the effects of any buyback operations conducted during the specified periods.
[4] Treasury is currently not issuing 20-year TIPS.

Longer-Term Privately-Held Net Marketable Borrowing Estimates and SOMA Redemption Assumptions

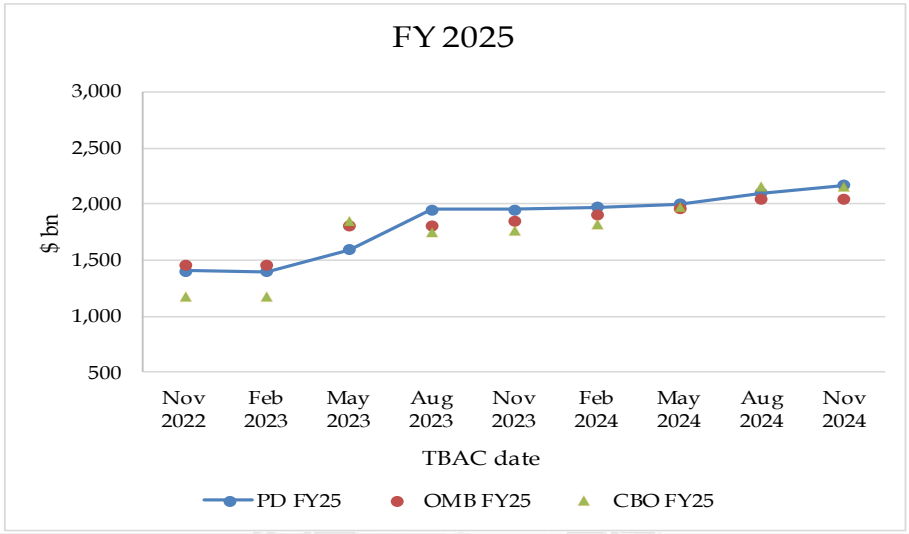
FY 2025-2027 Deficits and Privately-Held Net Marketable Borrowing Estimates, in $ billions

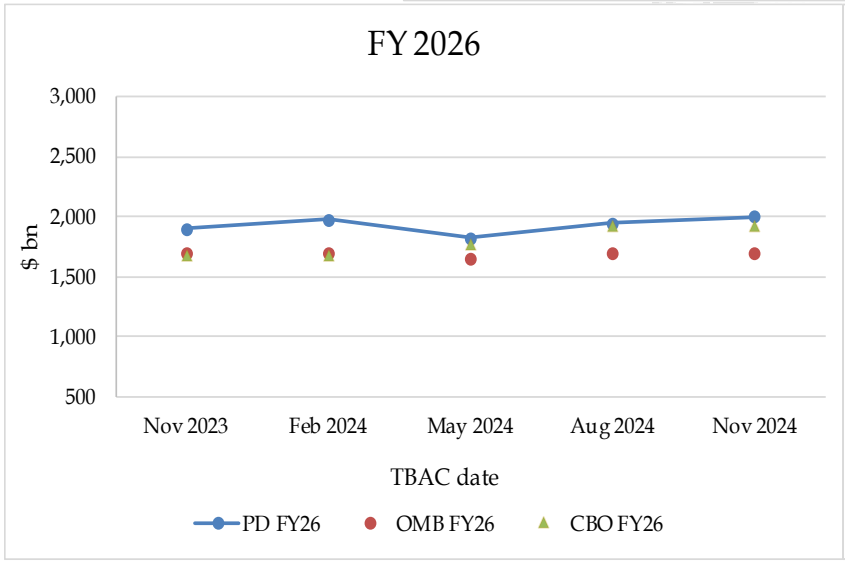
	Primary Dealer			OMB	CBO
	25th	Median	75th		
FY 2025 Deficit	1,875	1,900	1,950	1,878	1,938
FY 2026 Deficit	1,850	1,910	2,013	1,601	1,851
FY 2027 Deficit	1,838	1,975	2,100	1,535	1,756
FY 2025 SOMA Redemption	75	150	225		
FY 2026 SOMA Redemption	0	0	0		
FY 2027 SOMA Redemption	0	0	0		
FY 2025 Privately-Held Net Marketable Borrowing*	2,067	2,169	2,220	2,051	2,160
FY 2026 Privately-Held Net Marketable Borrowing*	1,895	2,000	2,094	1,695	1,930
FY 2027 Privately-Held Net Marketable Borrowing*	1,900	2,025	2,198	1,648	1,831
Estimates as of:		Oct-24		Jul-24	Jun-24

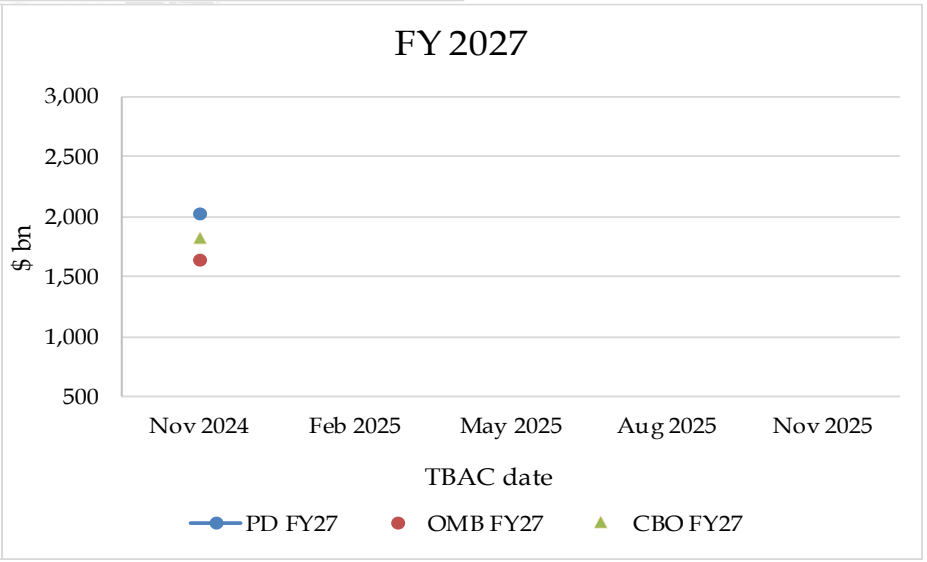
* All privately-held net marketable borrowing estimates are "normalized" using:
- 1) the median Primary Dealer's estimates for SOMA redemptions, and
- 2) assumed Fiscal Year 2025 cash balance of $850 billion, held constant in out years.

- OMB projections are using estimates are from Table S-3 of "Mid-Session Review Budget of The U.S. Government, Fiscal Year 2025," July 2024.
- CBO projections are using estimates are from "An Update to the Budget and Economic Outlook: 2024 to 2034," June 2024.

Evolution of Median Primary Dealer, OMB, and CBO Privately-Held Net Marketable Borrowing Estimates*



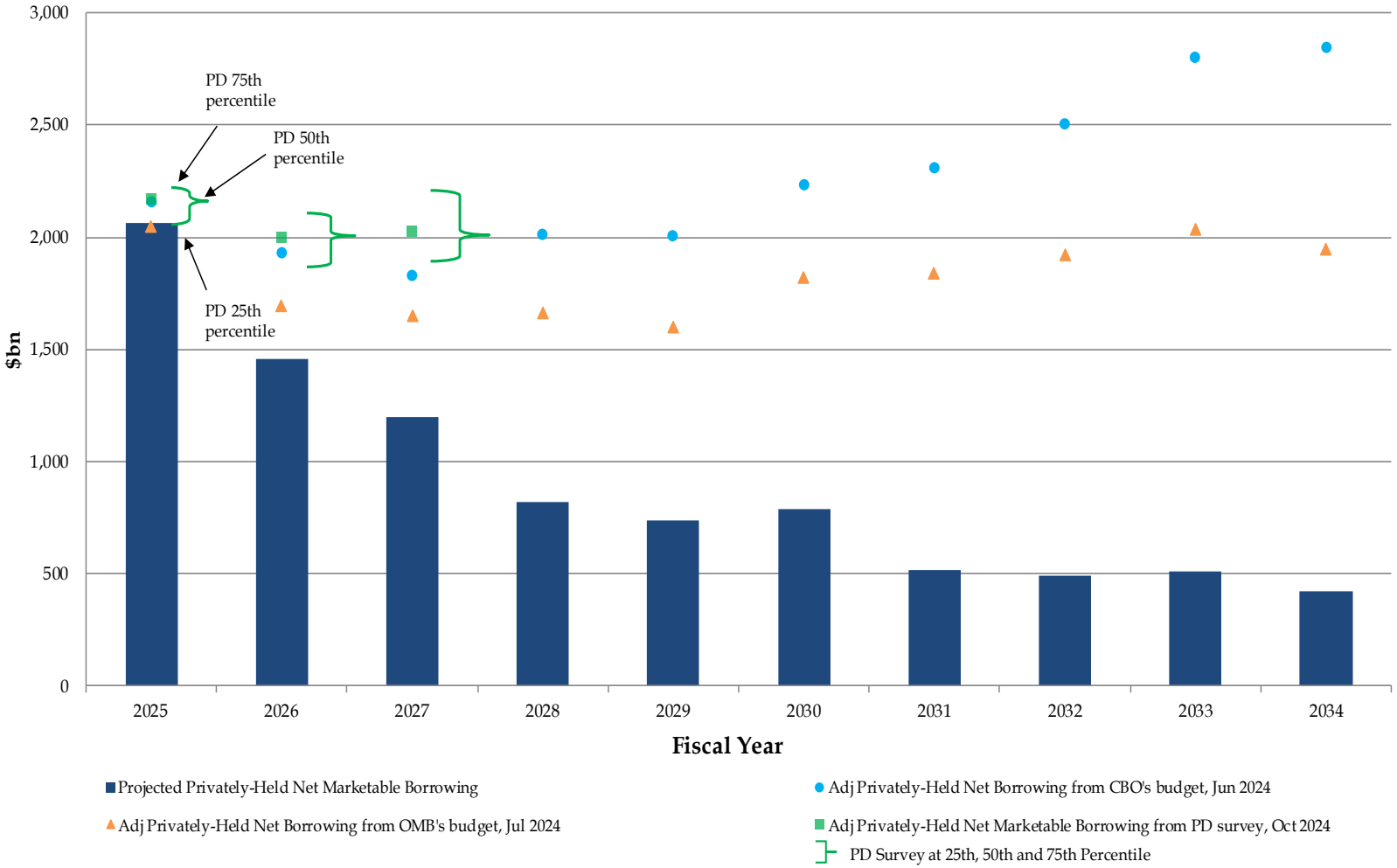




* Note that both the OMB and CBO privately-held net marketable borrowing estimates are calculated by adjusting their respective deficit estimates using dealer's median SOMA redemption estimates. In addition, all the PD, OMB and CBO privately-held borrowing estimates are normalized with the same cash balance changes. See slide 18 for details.

Projected Privately-Held Net Marketable Borrowing

Assuming Private Coupon Issuance & Total Bills Outstanding Remain Constant as of 10/31/2024*



*Treasury's latest primary dealer survey median/interquartile range estimates can be found on page 18. OMB projections are using estimates are from Table S-3 of "Mid-Session Review Budget of The U.S. Government, Fiscal Year 2025," July 2024. CBO projections are using estimates are from "An Update to the Budget and Economic Outlook: 2024 to 2034," June 2024. OMB and CBO borrowing estimates from FY25 to FY27 are normalized to privately-held net marketable borrowing after adding PD survey median SOMA redemption assumptions for FY25/26/27. In addition, all privately-held net marketable borrowing estimates are normalized with a cash balance assumption of $850 billion.

Section V:
Select Portfolio Metrics

Note: Several of the portfolio metric charts that follow include three years of projected metrics.

These projections are hypothetical and <u>are meant for illustrative purposes only</u>. The projections contained in these charts <u>should not</u> be interpreted as representing any future policy decisions regarding Treasury financing.

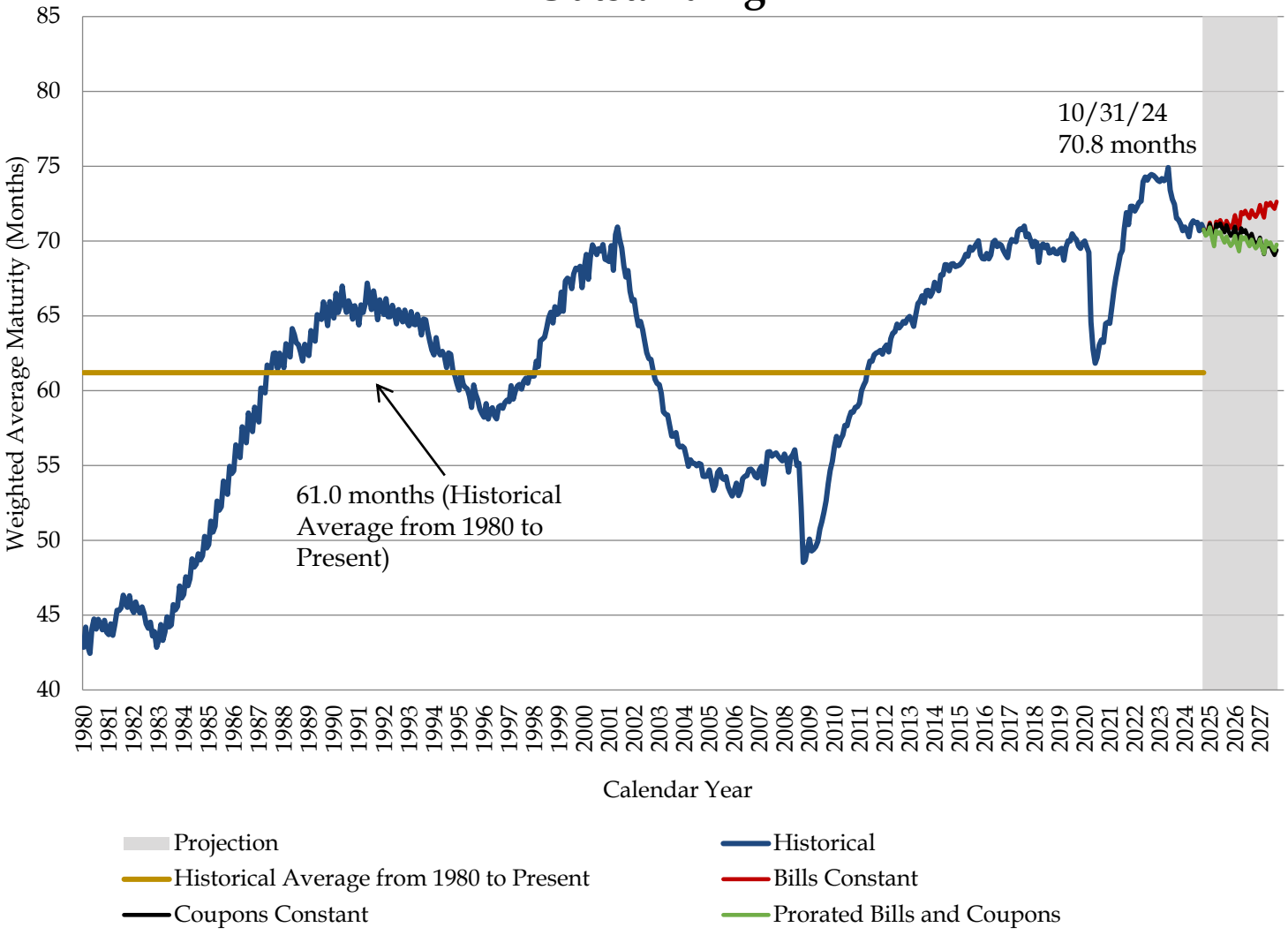
Projections illustrate how various portfolio metrics could evolve under three hypothetical financing scenarios. The scenarios were chosen to illustrate a potential range of portfolio metric outcomes based on hypothetical issuance choices.

The scenarios are:

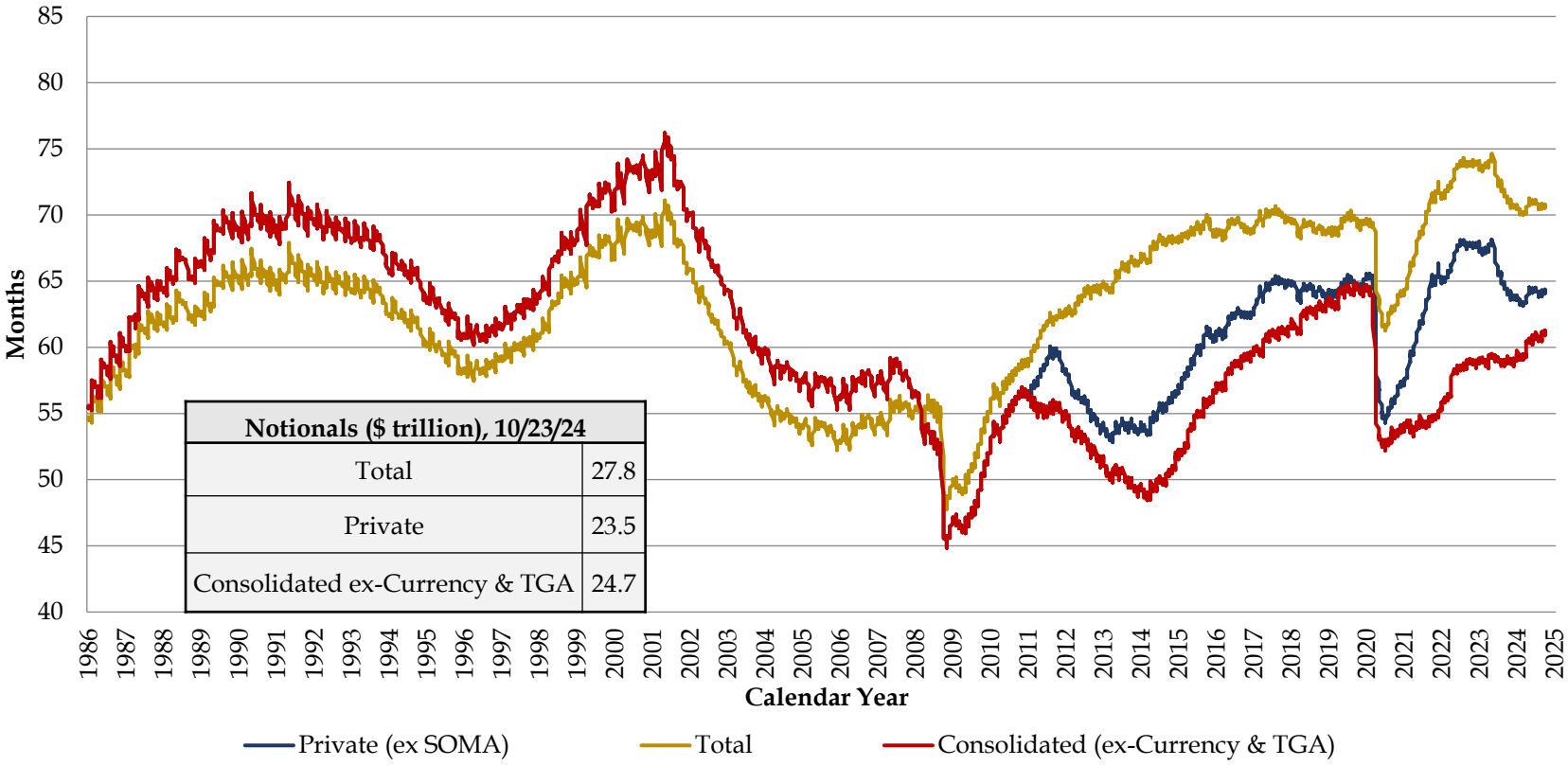
1) ***"Coupons Constant":*** Treasury maintains **coupon, FRN, and TIPS auction sizes constant** as of October 2024 and addresses any changes in financing needs by only increasing or decreasing T-bill auction sizes;
2) ***"Bills Constant":*** Treasury maintains **T-bills aggregate supply constant** at $6.2 trillion as of 10/31/2024 and increases or decreases coupon, FRN, and TIPS auction sizes in response to financing needs in a manner that maintains current issuance proportions going forward;
3) ***"Prorated Bills and Coupons":*** Treasury maintains **T-bills share constant** at 22.1% as of 10/31/2024 and addresses any changes in financing needs by pro rata increasing or decreasing coupon, FRN, and TIPS auction sizes.

Privately-held net marketable borrowing needs used in the projections section of these charts are proxied using median primary dealer estimates for FY25, FY26 & FY27 (see page 18).

Weighted Average Maturity of Marketable Debt Outstanding



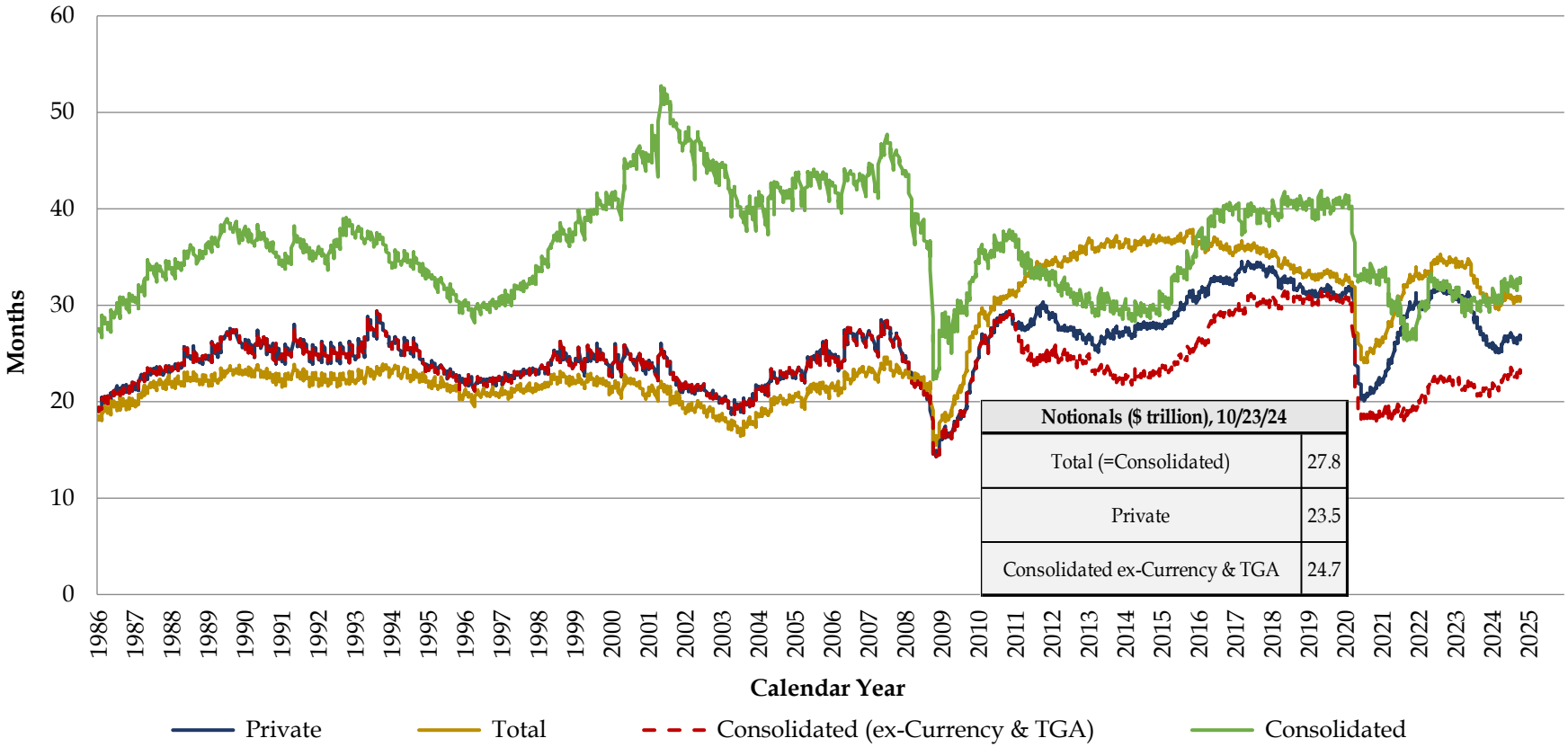
Consolidated **WANRR** Calculation*



Notionals ($ trillion), 10/23/24	
Total	27.8
Private	23.5
Consolidated ex-Currency & TGA	24.7

* Weighted Average Next Rate Reset (WANRR) is a "Weighted Average Maturity" metric that attempts to adjust for the floating rate aspect of some Treasury debt. The WANRR is the average time until the outstanding debt's interest rate is set to a new interest rate. For bills and fixed rate notes and bonds, the next rate reset is equal to the maturity date.
In contrast, for floating rate obligations, the time between the next rate reset date or maturity date is examined and the shorter period is used in the calculation.
The consolidated outstanding debt is defined as the private amount plus SOMA Treasury securities holdings less currency amount and Treasury General Account (TGA). In this calculation, SOMA Treasury holdings greater than the sum of the level of currency outstanding and TGA is treated as if it is a daily rate reset.

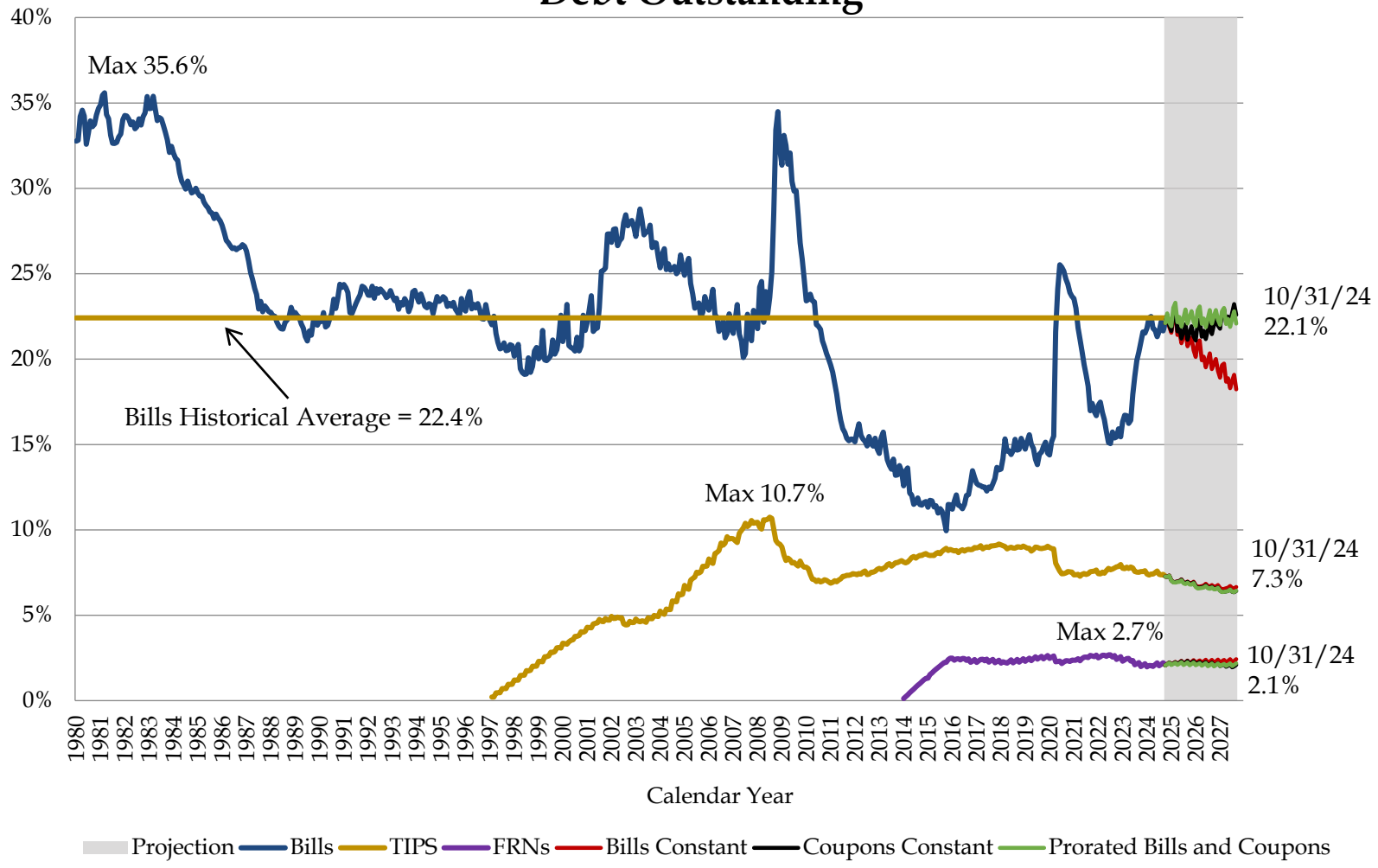
Weighted Median Next Rate Reset (WMNRR)*

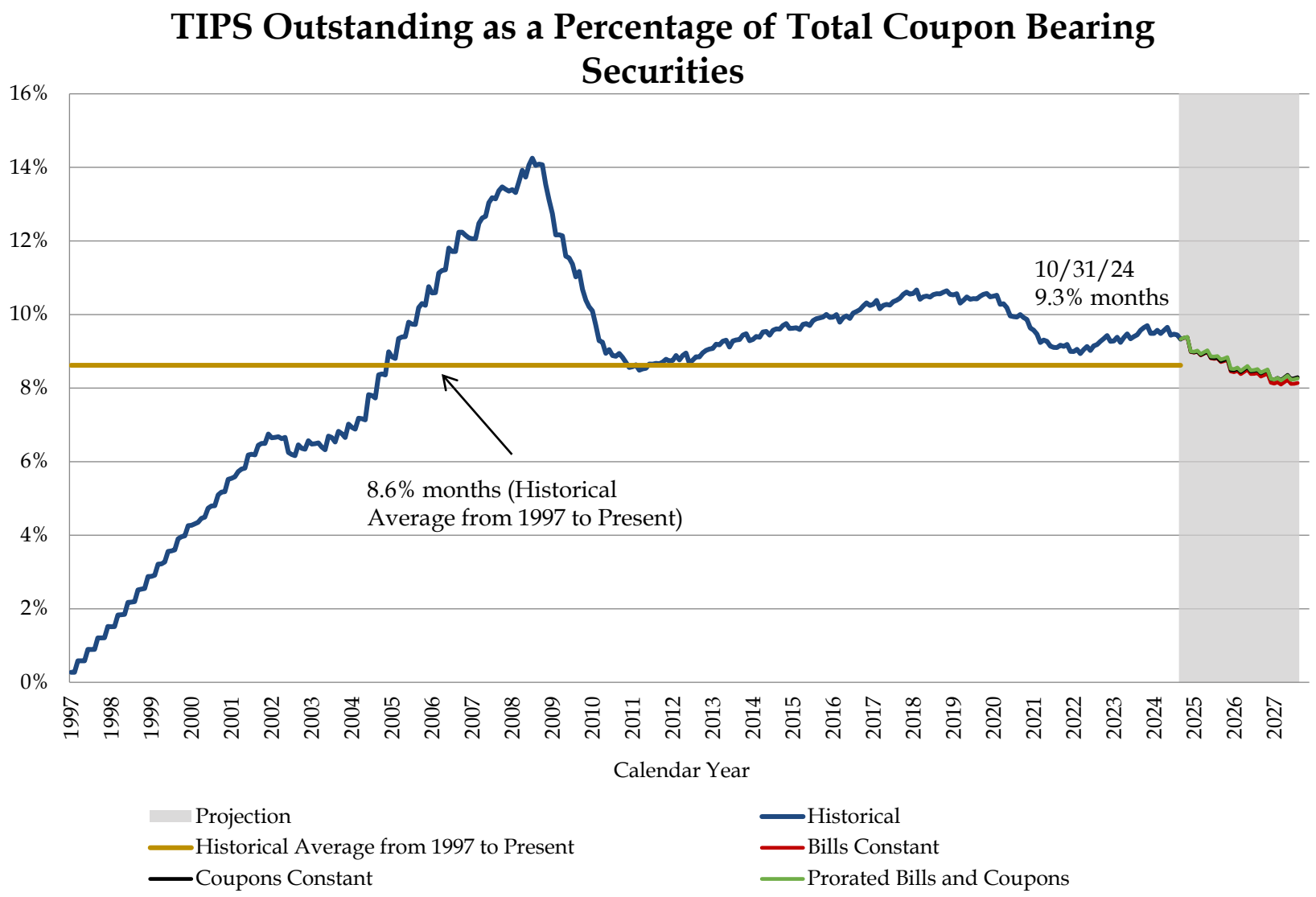


* Weighted Median Next Rate Reset (WMNRR) of the Treasury portfolio (Total or Private) is the time, in months, by which half the portfolio by current-face is scheduled to mature (or be subject to rate-reset for FRNs). In most cases no existing tenor/coupon-date will demarcate exactly 50% of cumulative-notional; as such, linear interpolation between two nearest tenors is used.

WMNRR of the Consolidated portfolio is calculated in the same manner, but with SOMA Treasury holdings netted-out, against combined non-interest-bearing liabilities of currency & TGA (treated as having a de facto infinite next-reset date) and the remainder, as applicable, against reserve balances and RRP (considered to have a one-day next-reset). WMNRR Consolidated (ex-Currency & TGA) reflects the WMNRR of the consolidated portfolio but excluding that portion of SOMA Treasury holdings implicitly financed by the currency in circulation and TGA; this is equivalent to Privately-held Treasuries outstanding + SOMA Treasury holdings, less Currency & TGA balance.

Bills, TIPS & FRNs Outstanding as a Percent of Marketable Debt Outstanding




TIPS Outstanding as a Percentage of Total Coupon Bearing Securities
16%
14%
12%
10%
8%
6%
4%
2%
0%
10/31/24
9.3% months
8.6% months (Historical Average from 1997 to Present)
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
Calendar Year
Projection
Historical
Historical Average from 1997 to Present
Bills Constant
Coupons Constant
Prorated Bills and Coupons

Measures of Treasury Bill Supply

Total Bills Outstanding/Nominal GDP

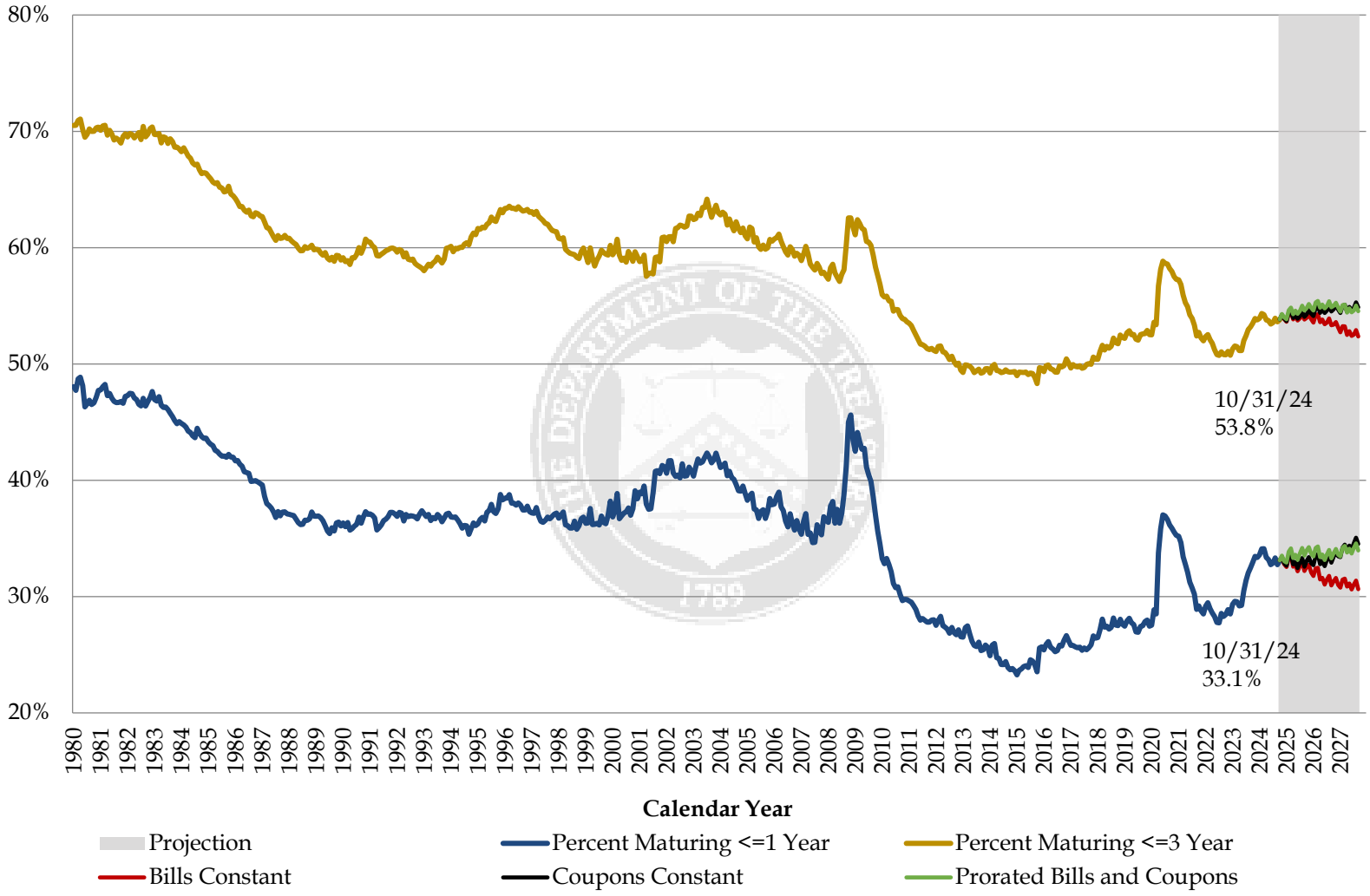
Total Bills Outstanding/Commercial Bank Deposits

Total Bills Outstanding/Total MMF AUM

Total Bills Outstanding/Federal Reserve Liabilities ex. TGA

Source: Bloomberg and Treasury

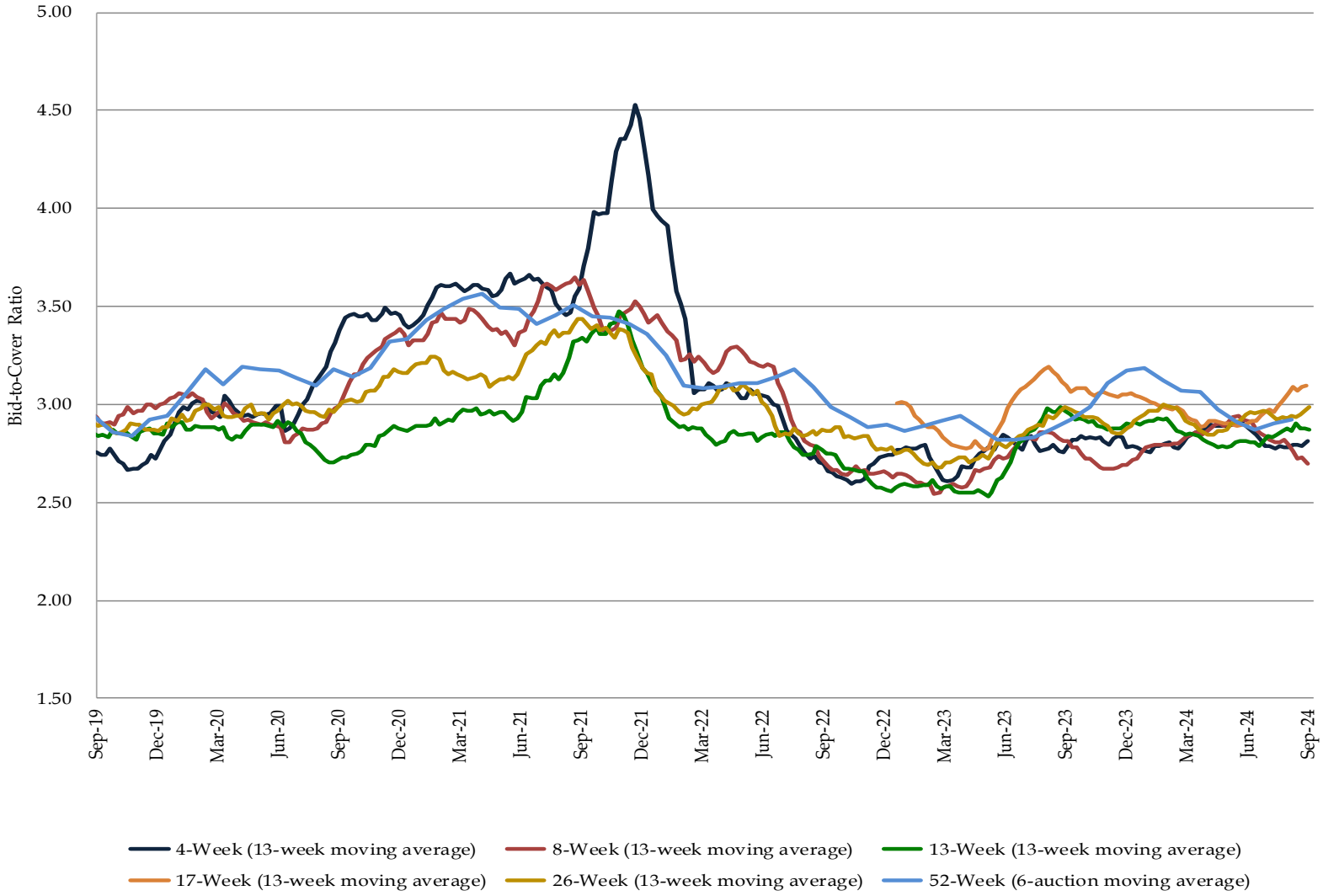
Treasury Maturity Profile



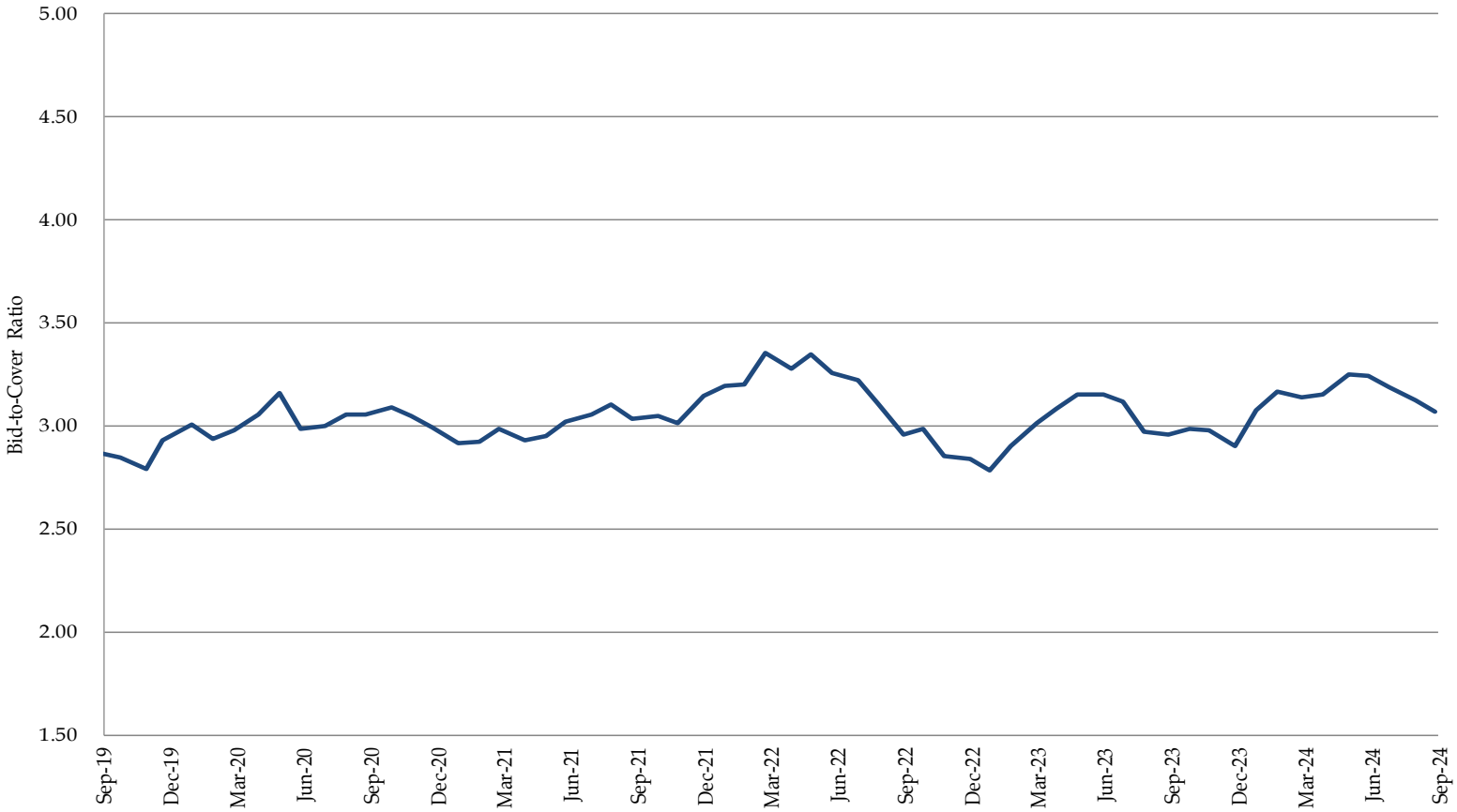
Section VI:
Select Demand Metrics

Bid-to-Cover Data, Investor Class Data,
Direct & Primary Dealer Awards, and Foreign Demand

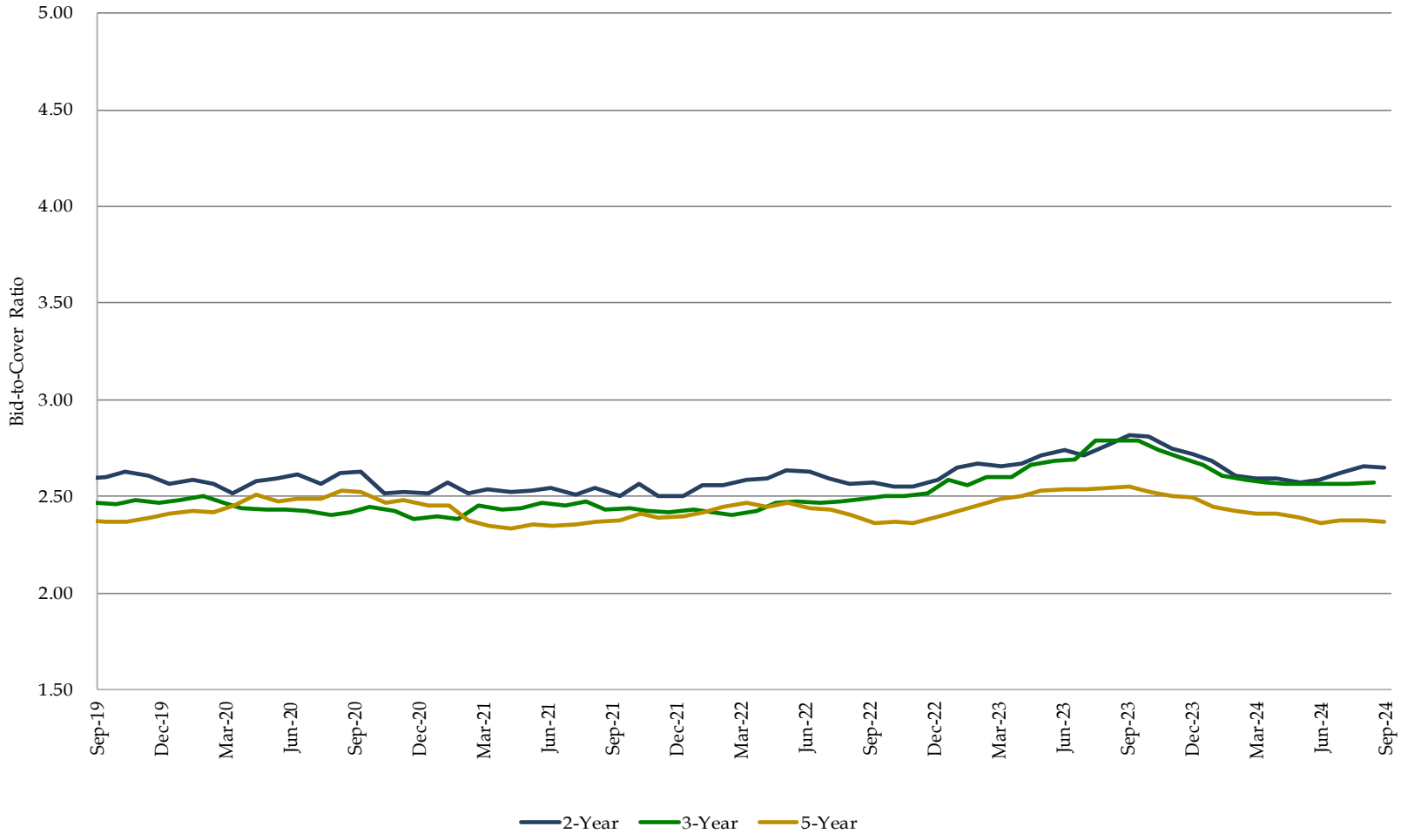
Bid-to-Cover Ratios for Treasury Bills



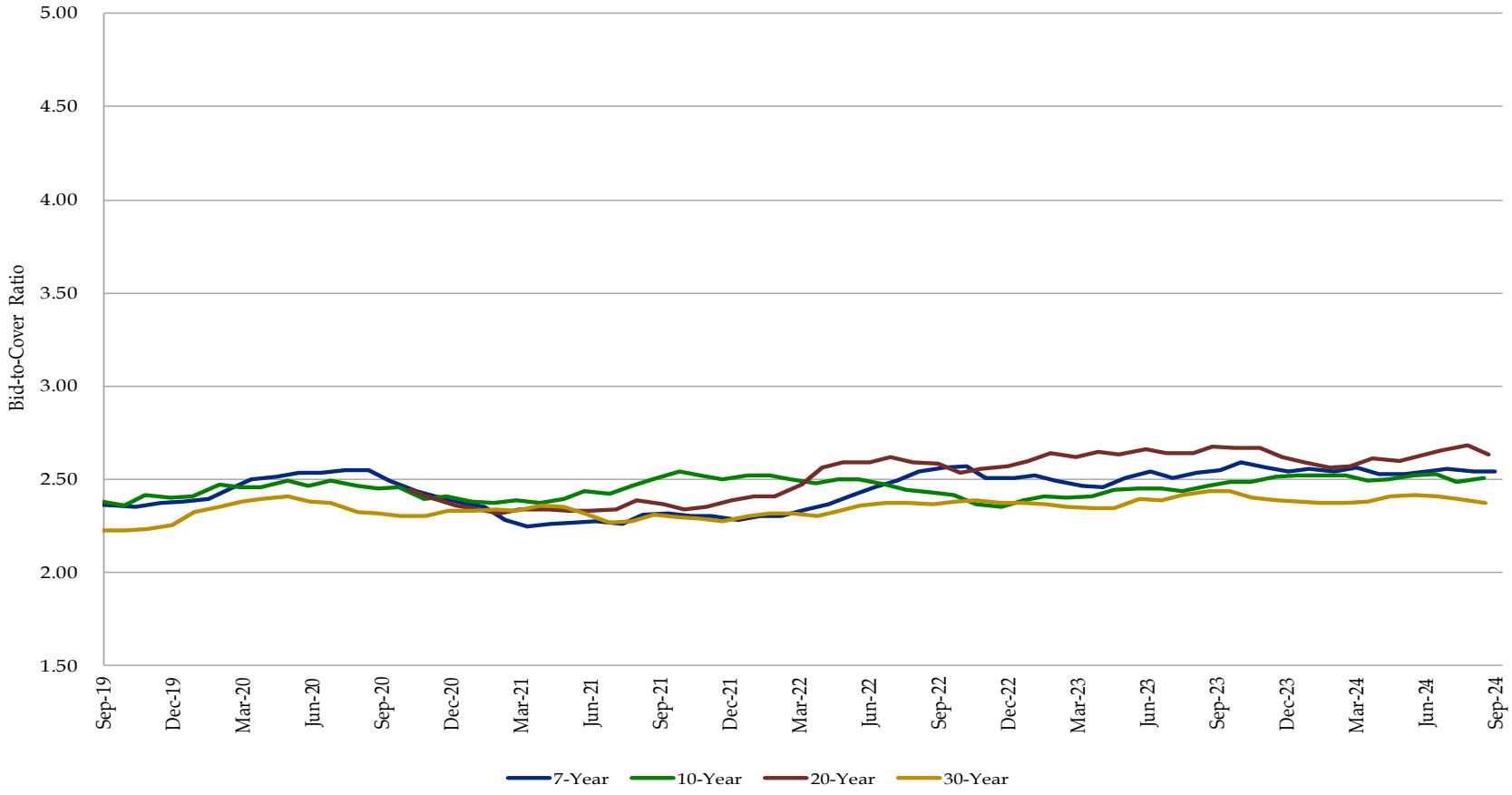
Bid-to-Cover Ratios for FRNs
(6-Month Moving Average)



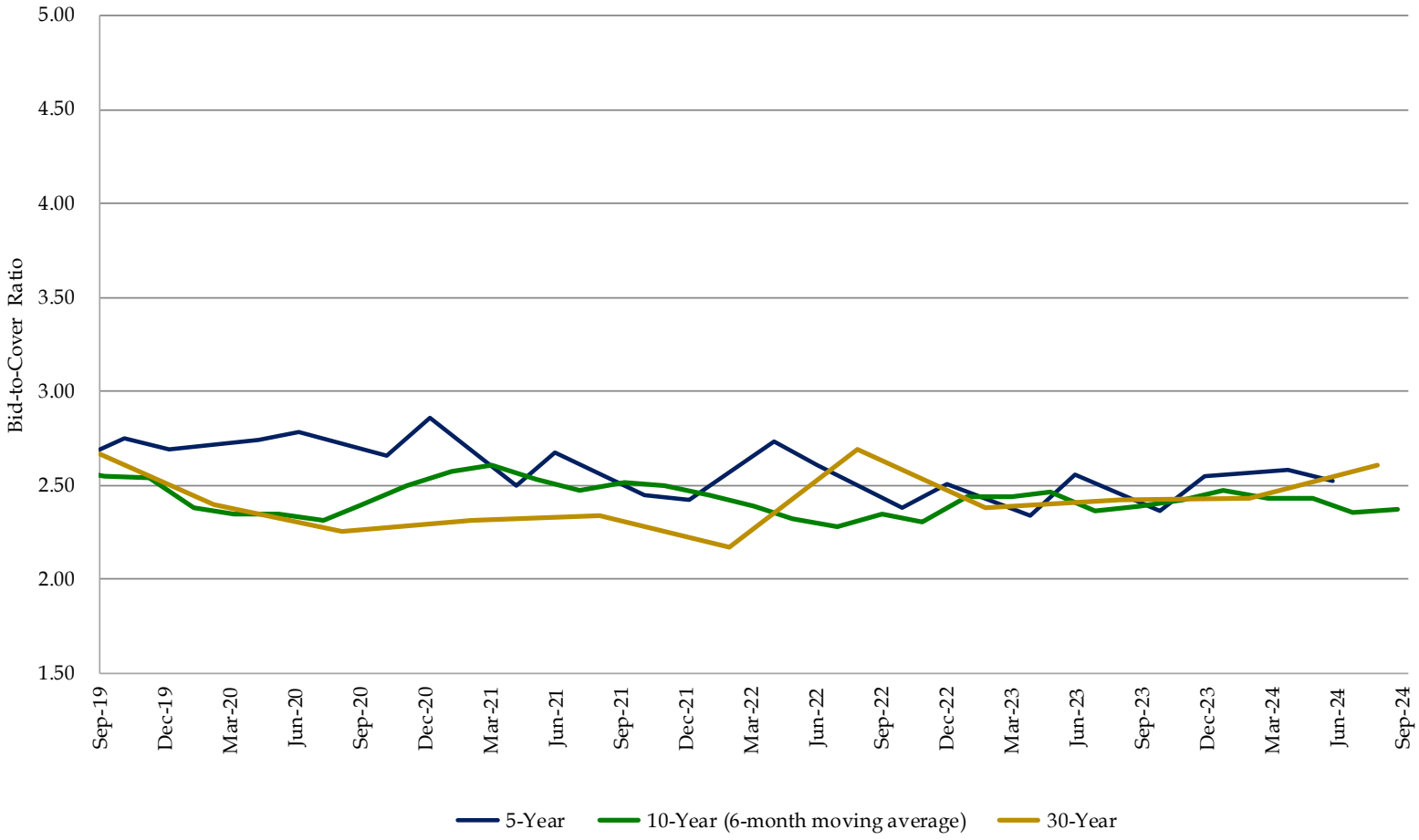
Bid-to-Cover Ratios for 2-, 3-, and 5-Year Nominal Securities (6-Month Moving Average)



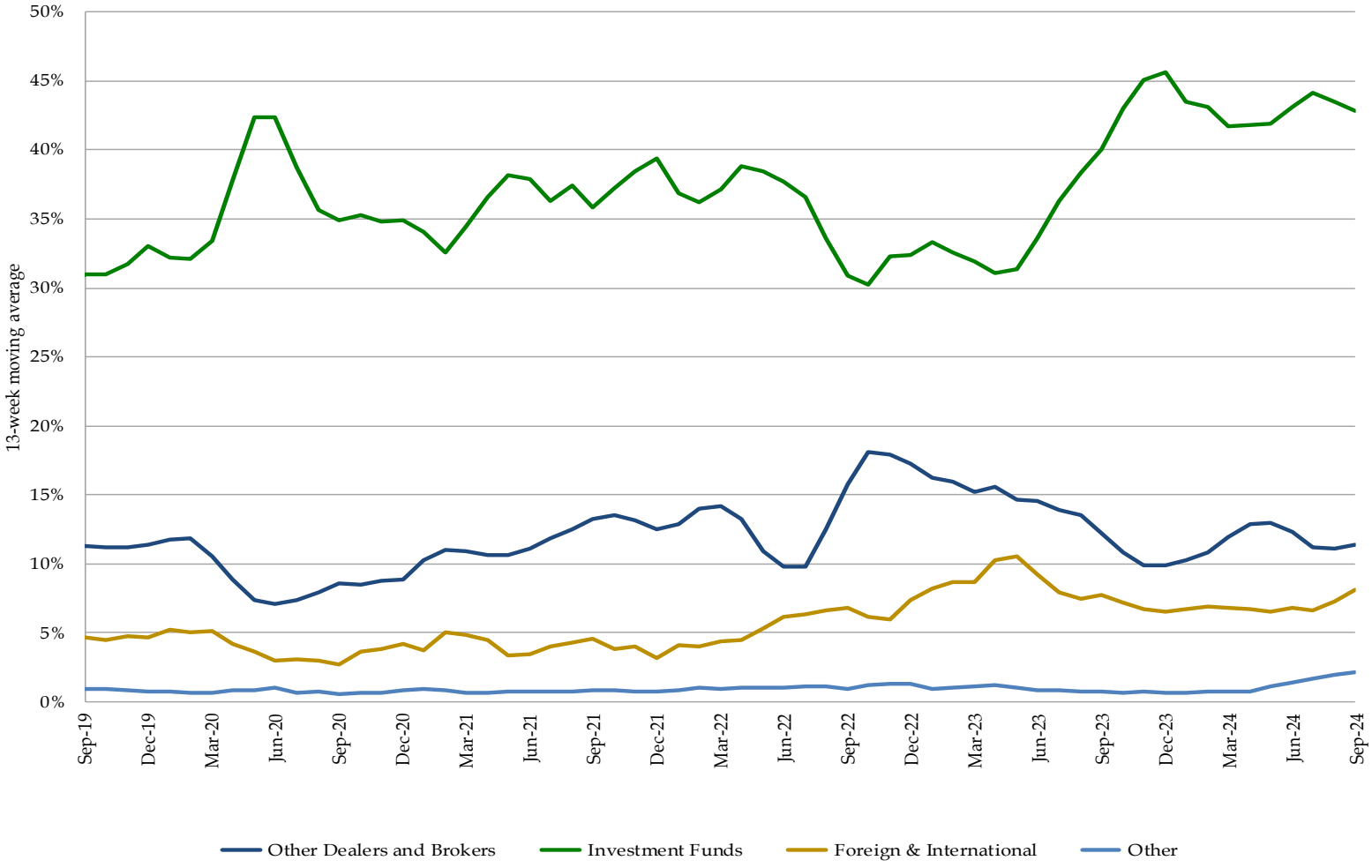
Bid-to-Cover Ratios for 7-, 10-, 20-, and 30-Year Nominal Securities (6-Month Moving Average)



Bid-to-Cover Ratios for TIPS

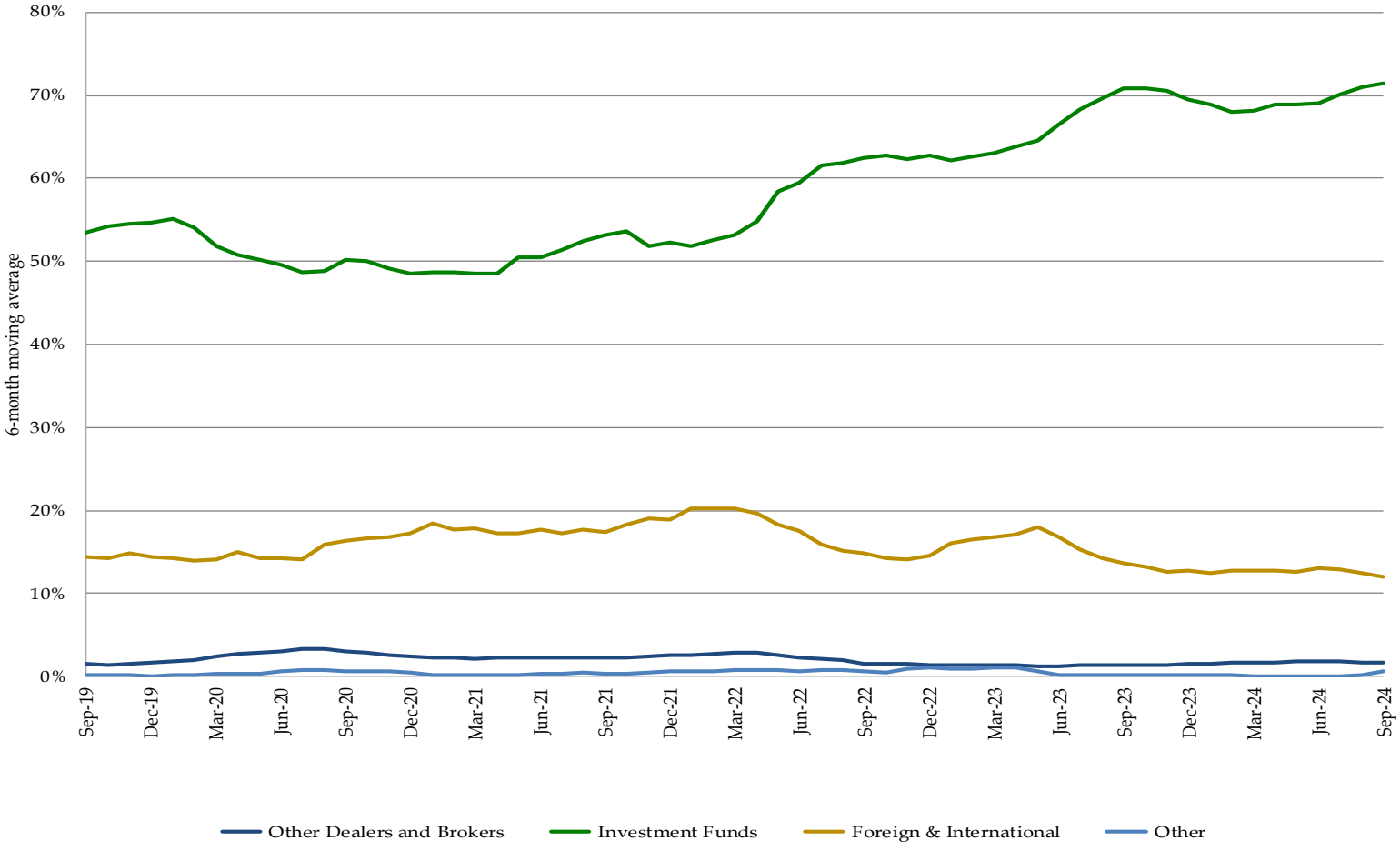


Percent Awarded in Bill Auctions by Investor Class (13-Week Moving Average)



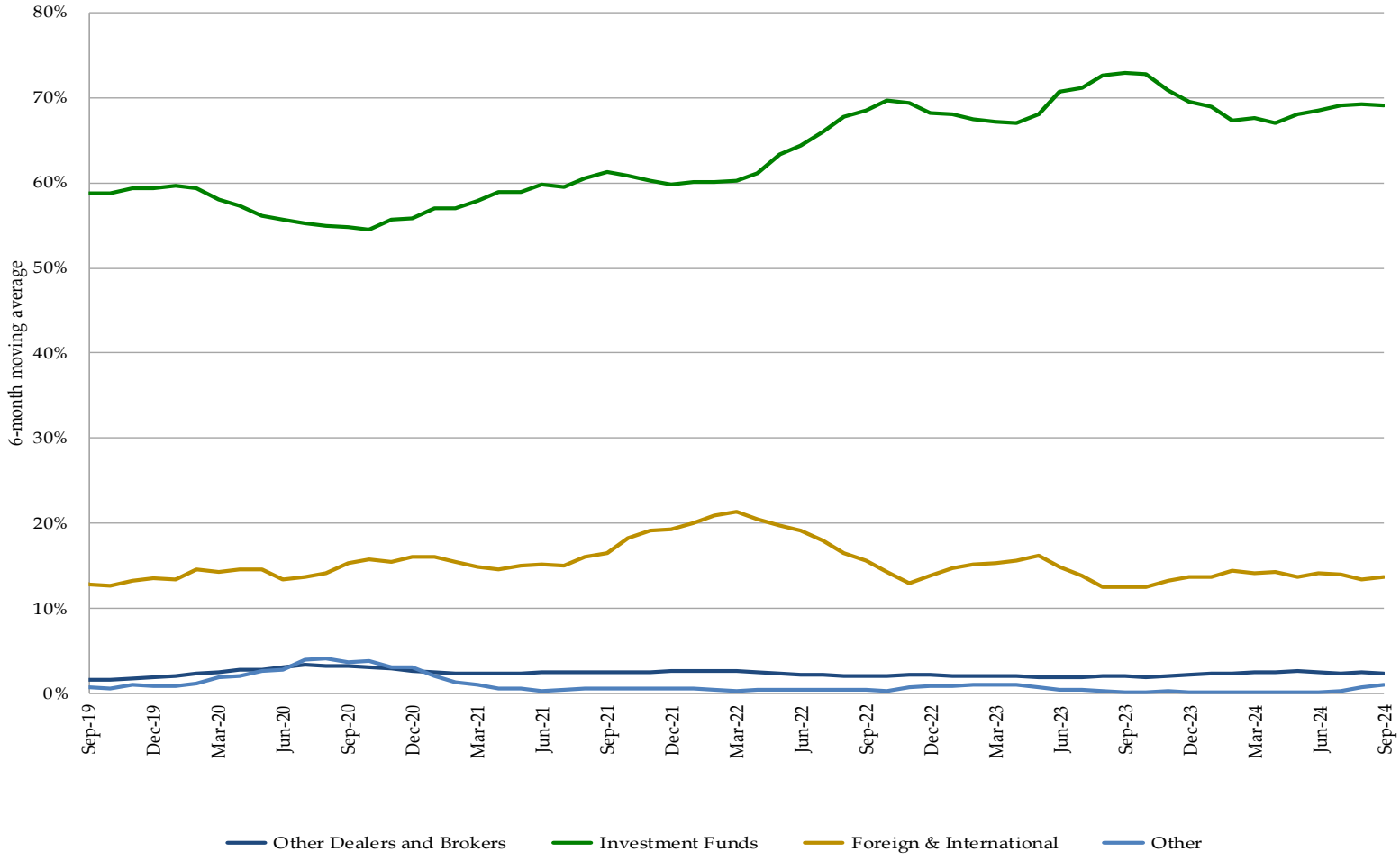
Excludes SOMA add-ons. The "Other" category includes categories that are each less than 5%, which include Depository Institutions, Individuals, Pension and Insurance.

Percent Awarded in 2-, 3-, and 5-Year Nominal Security Auctions by Investor Class (6-Month Moving Average)



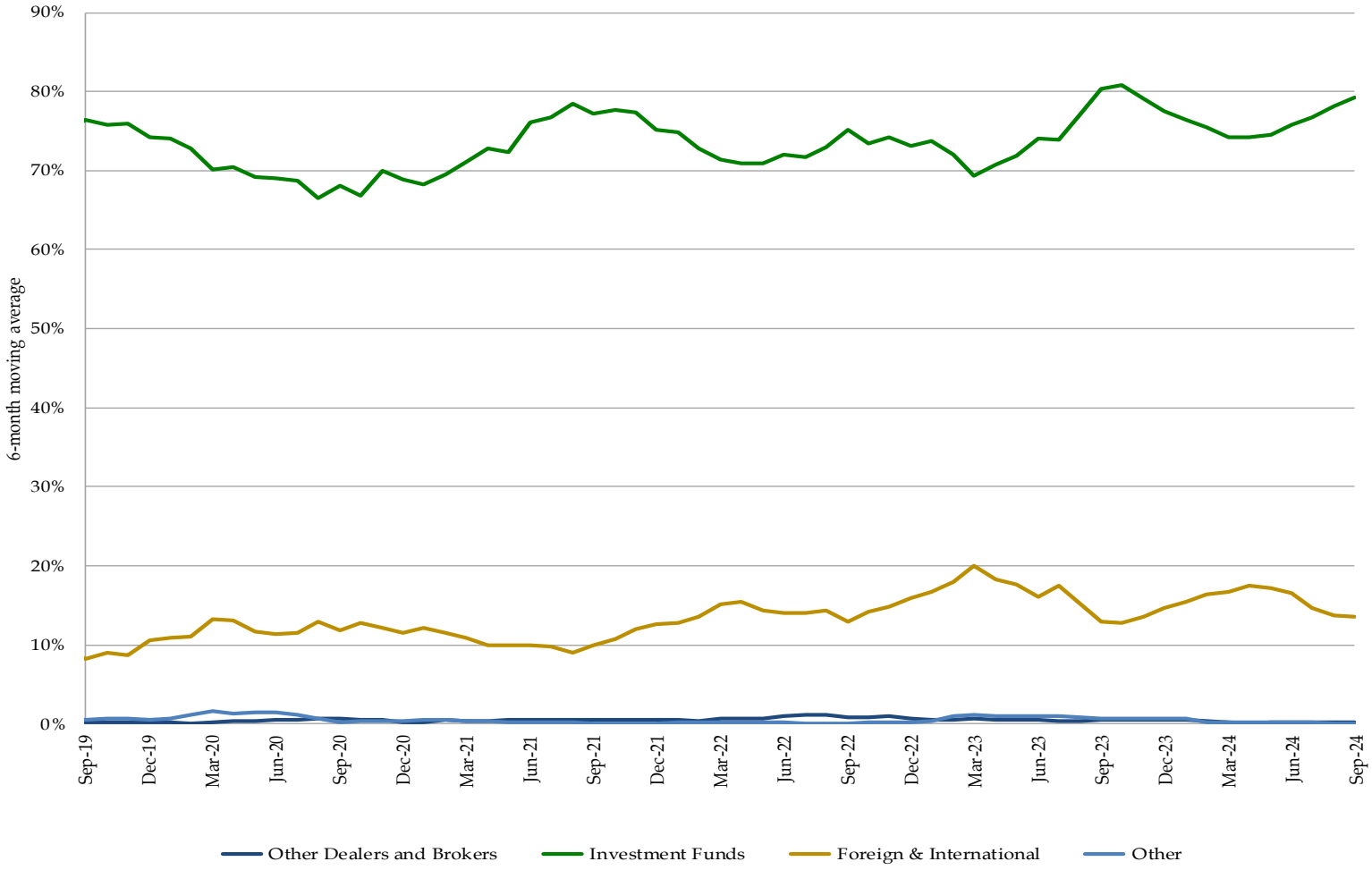
Excludes SOMA add-ons. The "Other" category includes categories that are each less than 5%, which include Depository Institutions, Individuals, Pension and Insurance.

Percent Awarded in 7-, 10-, 20-, 30-Year Nominal Security Auctions by Investor Class (6-Month Moving Average)



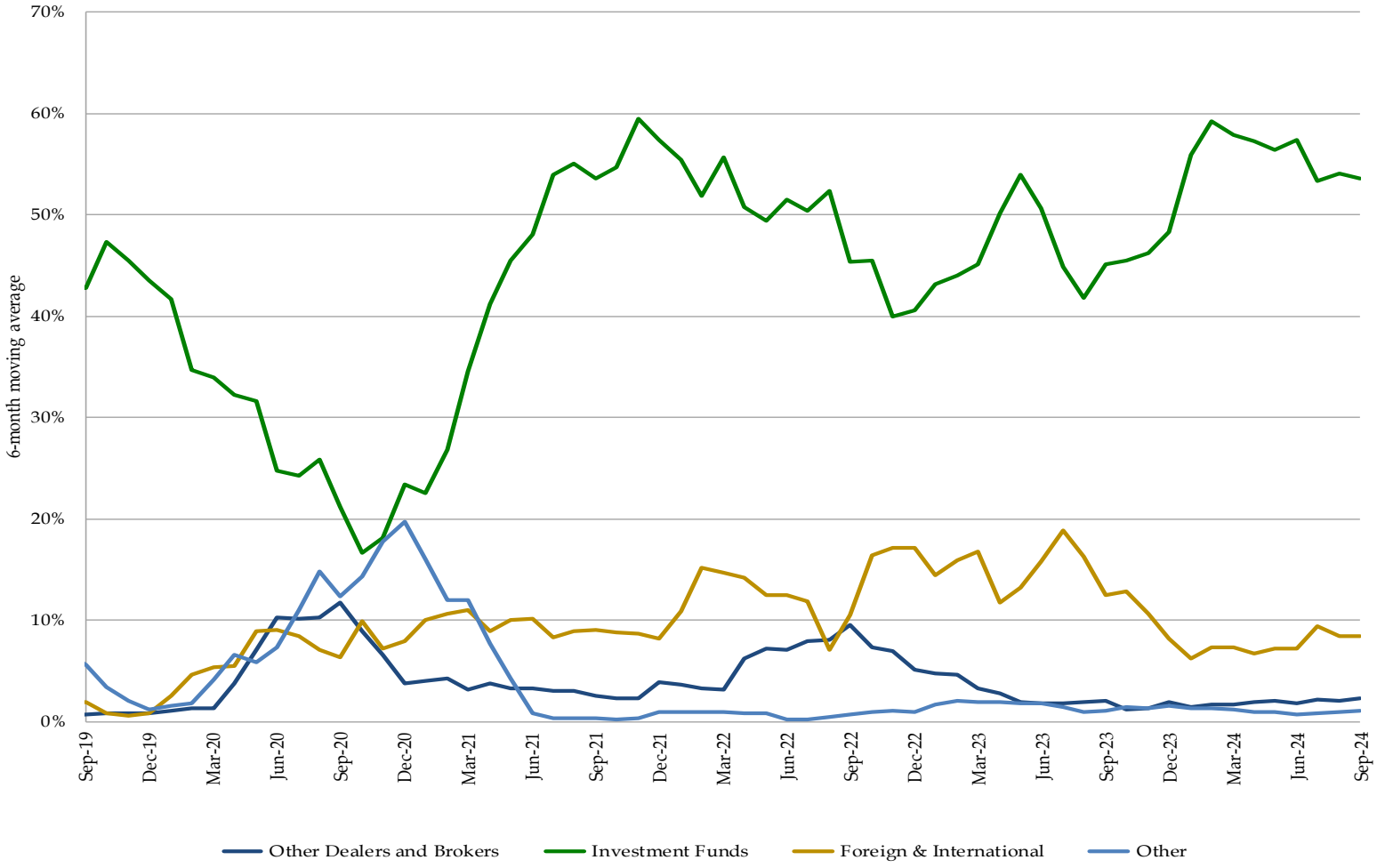
Excludes SOMA add-ons. The "Other" category includes categories that are each less than 5%, which include Depository Institutions, Individuals, Pension and Insurance.

Percent Awarded in TIPS Auctions by Investor Class (6-Month Moving Average)



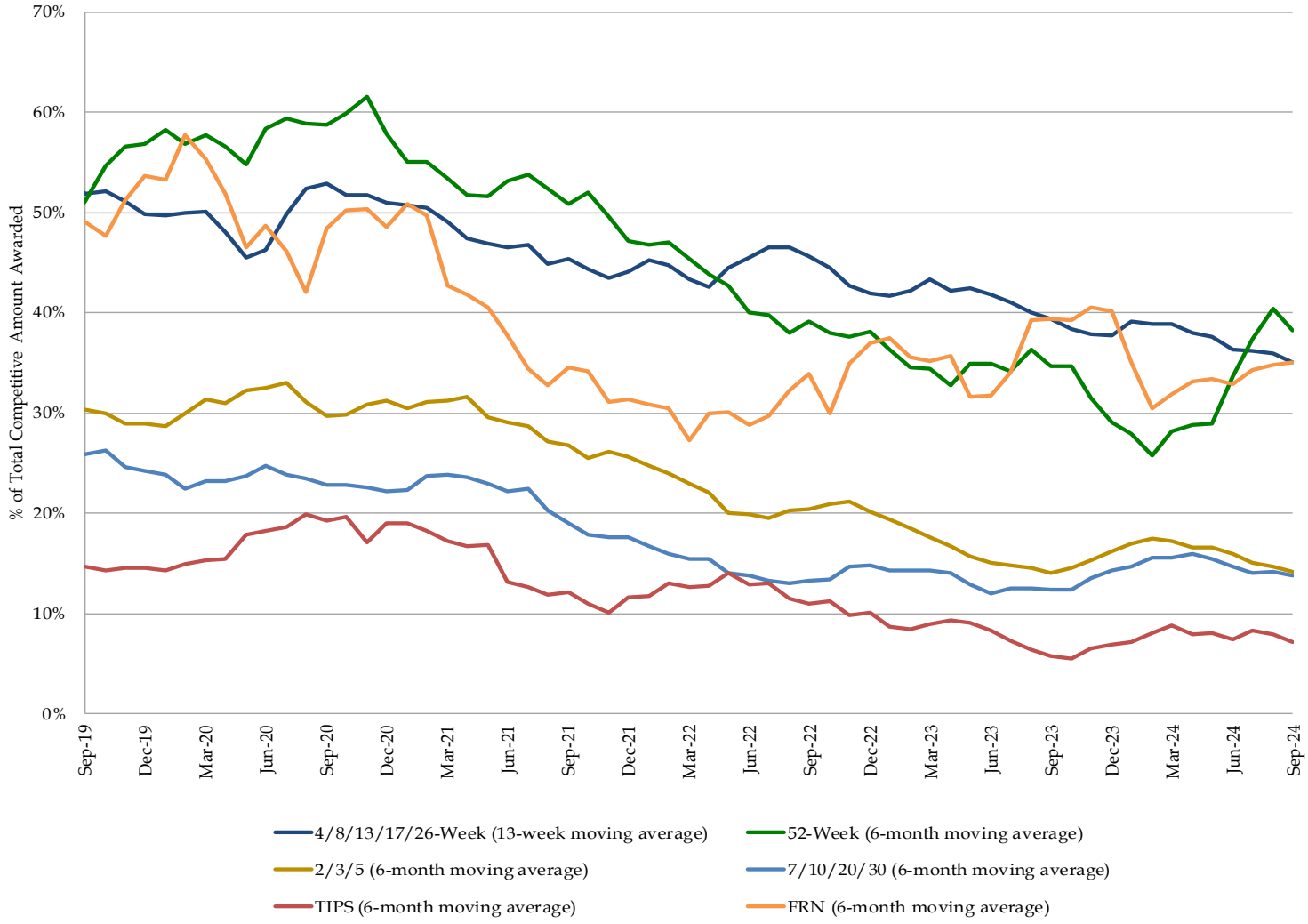
Excludes SOMA add-ons. The "Other" category includes categories that are each less than 5%, which include Depository Institutions, Individuals, Pension and Insurance.

Percent Awarded in FRN Auctions by Investor Class (6-Month Moving Average)



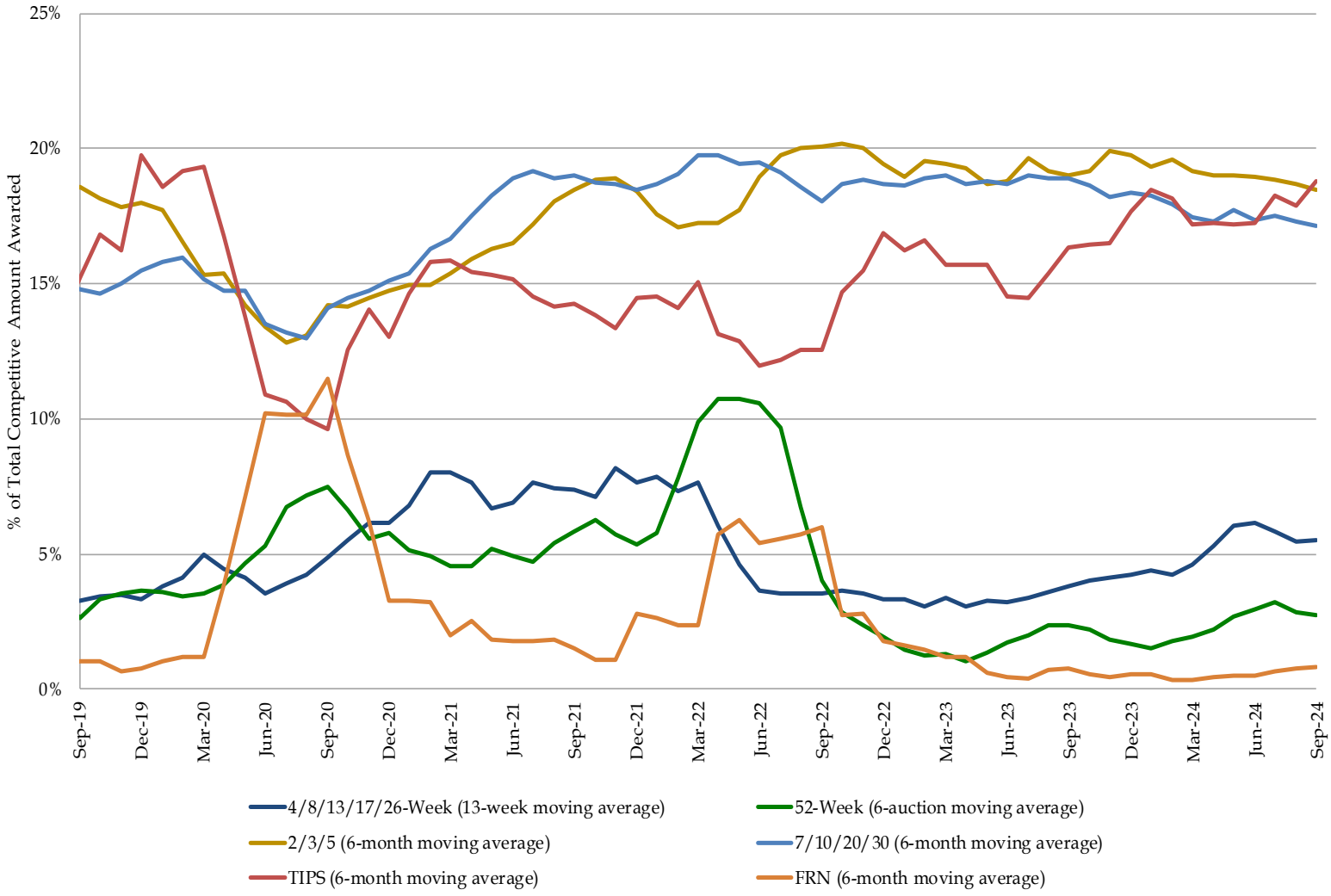
Excludes SOMA add-ons. The "Other" category includes categories that are each less than 5%, which include Depository Institutions, Individuals, Pension and Insurance.

Primary Dealer Awards at Auction



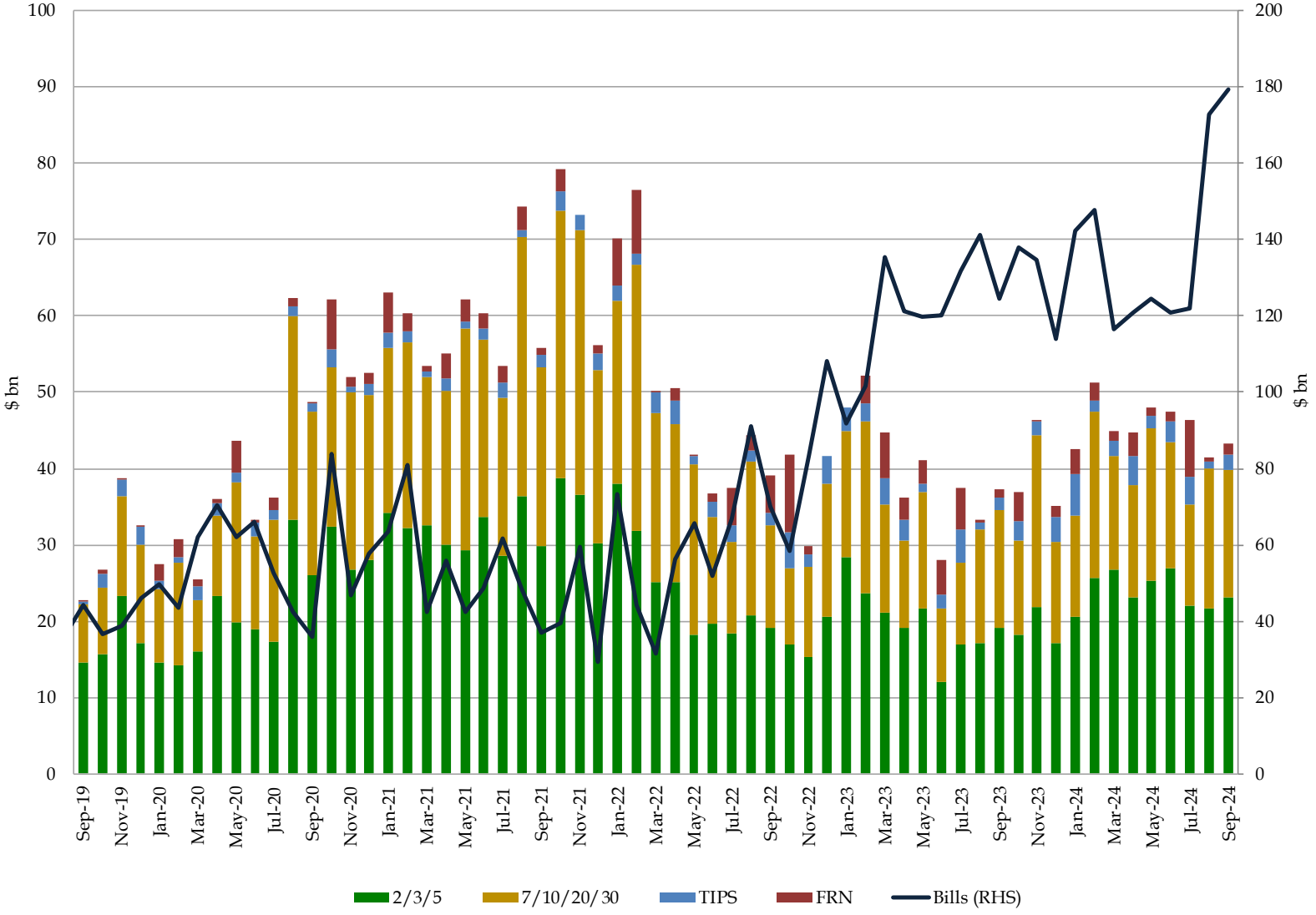
Competitive Amount Awarded excludes SOMA add-ons.

Direct Bidder Awards at Auction



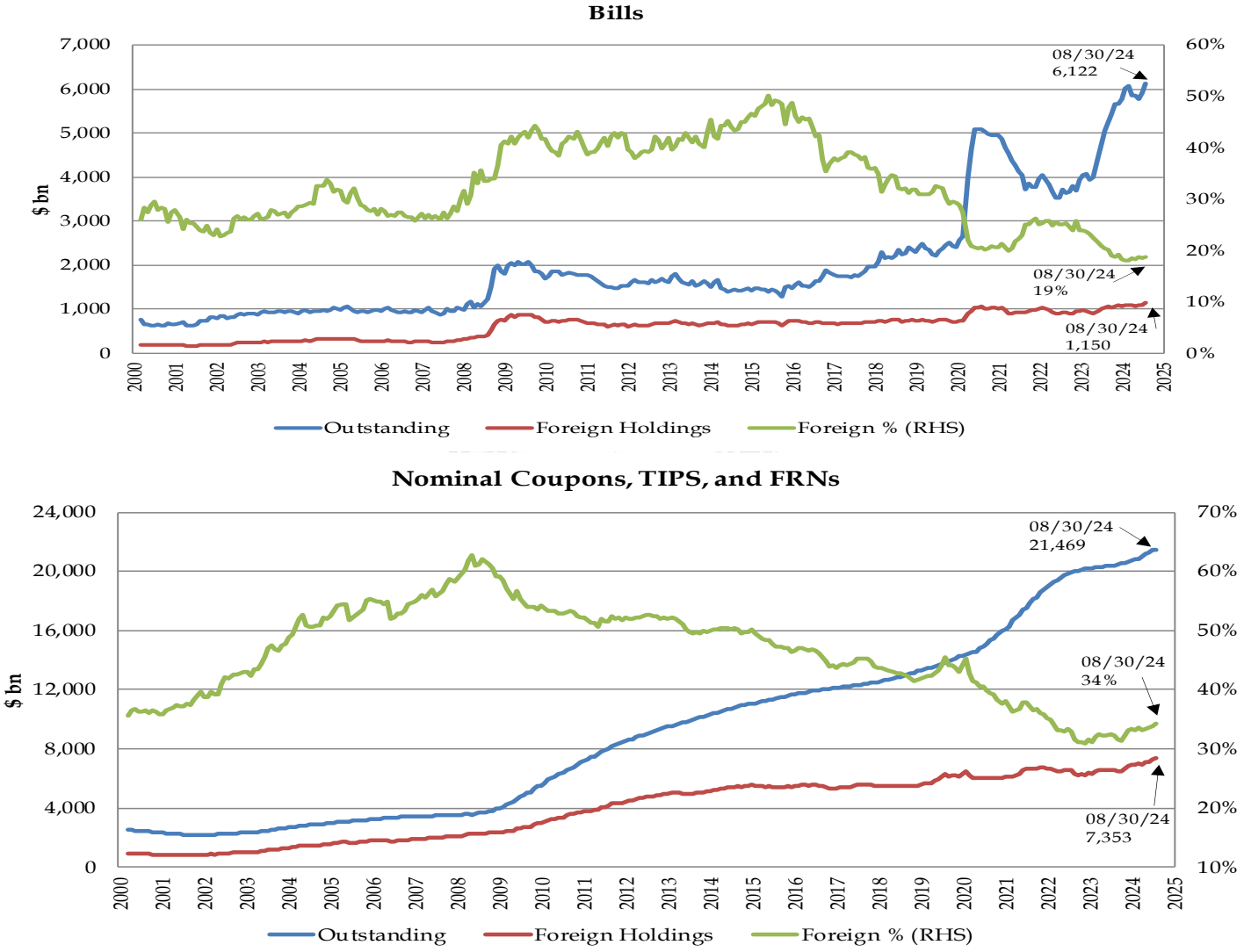
Competitive Amount Awarded excludes SOMA add-ons.

Total Foreign Awards of Treasuries at Auction, $ billions



Foreign includes both private sector and official institutions.

Total Foreign Holdings

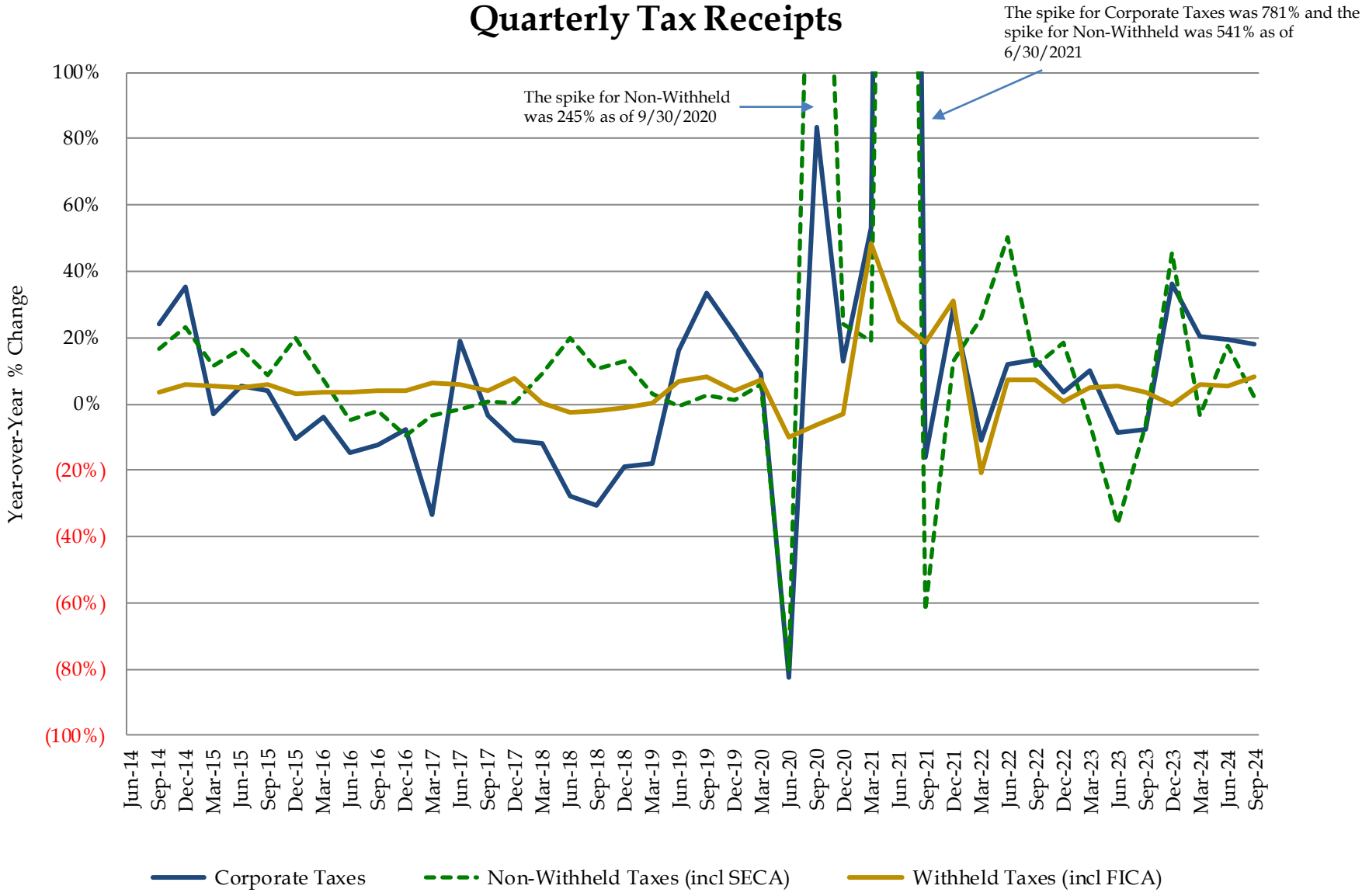


Source: Treasury International Capital (TIC) System as of August 2024.
For more information on foreign participation data, including more details about the TIC data shown here, please refer to Treasury Presentation to TBAC "Brief Overview of Key Data Sources on Foreign Participation in the U.S. Treasury Securities Market" at the Treasury February 2019 Refunding.

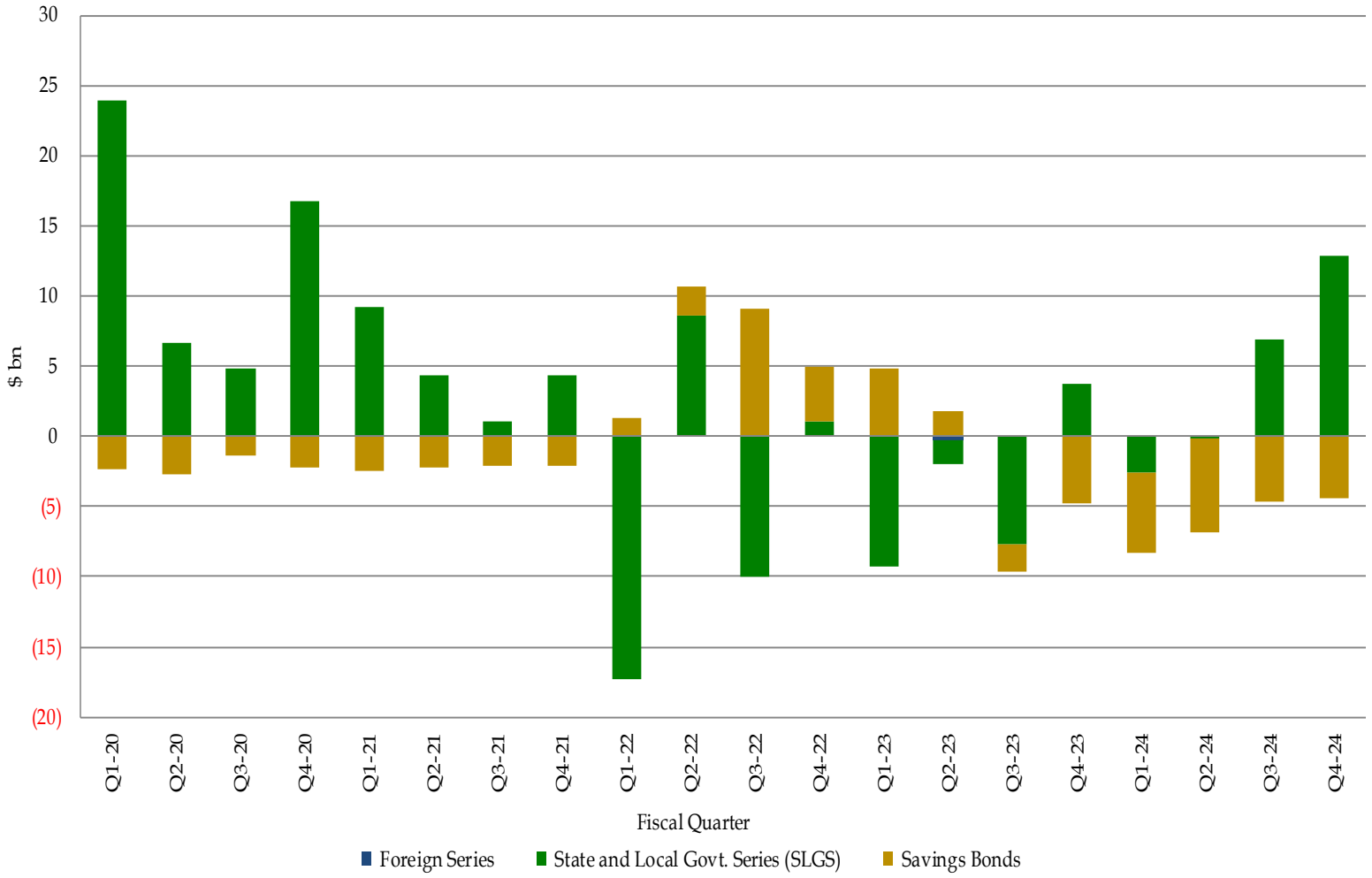
VII. Appendix

Contents

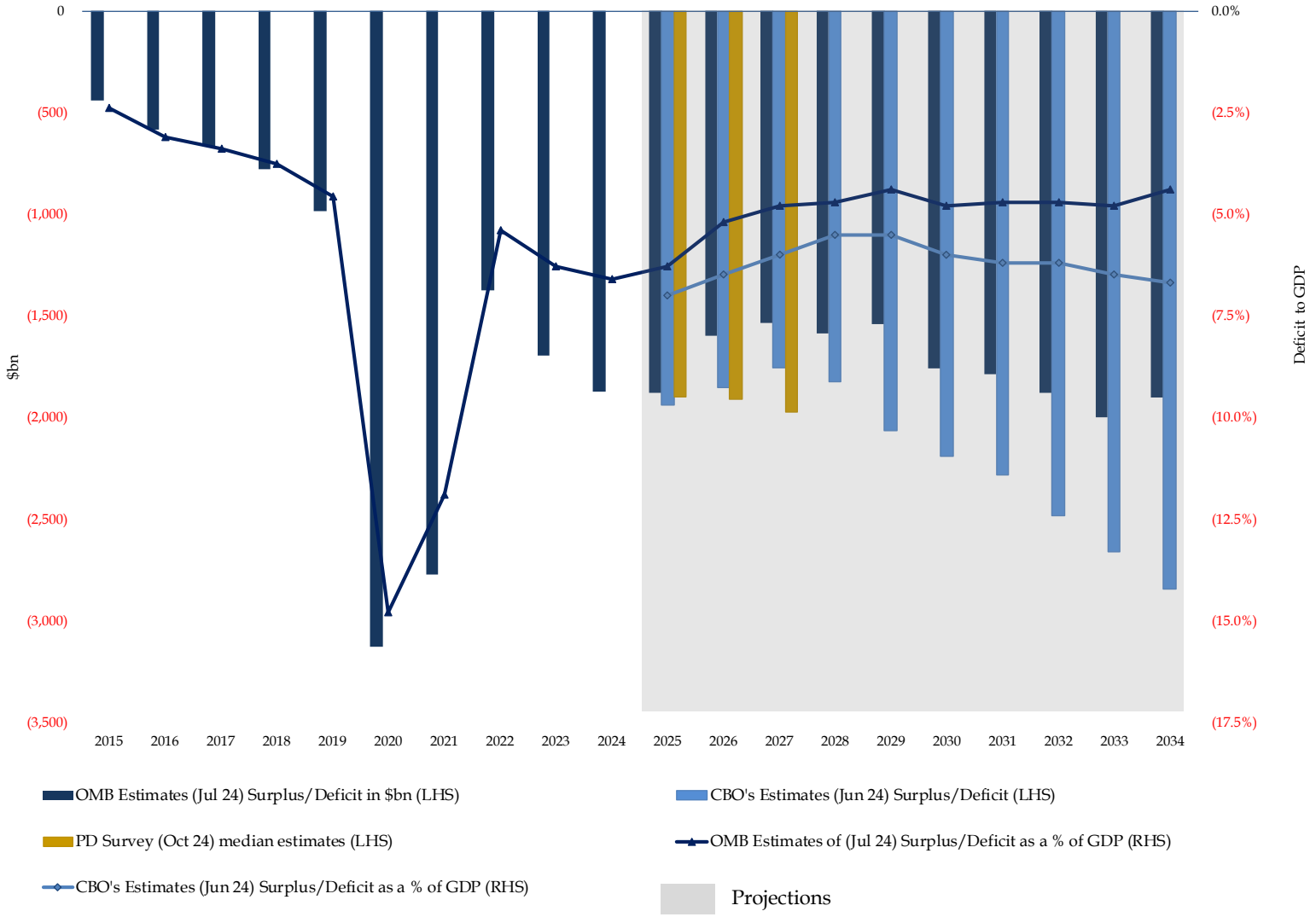
Quarterly Tax Receipts



Treasury Net Nonmarketable Borrowing



Budget Surplus/Deficit*



* OMB projections are using estimates are from Table S-3 of "Mid-Session Review Budget of The U.S. Government, Fiscal Year 2025," July 2024. CBO projections are using estimates are from "An Update to the Budget and Economic Outlook: 2024 to 2034," June 2024.

Sources of Privately-Held Financing in FY24 Q4

July - September 2024	
Net Bill Issuance	239
Net Coupon Issuance	559
Subtotal: Net Marketable Borrowing	798
Buyback	36
Ending Cash Balance	886
Beginning Cash Balance	778
Subtotal: Change in Cash Balance	108
Net Implied Funding for FY24 Q4*	654

Security	July - September 2024 Bill Issuance			Fiscal Year-to-Date Bill Issuance		
	Gross	Maturing	Net	Gross	Maturing	Net
4-Week	1,135	1,090	45	4,394	4,389	5
8-Week	1,085	1,005	80	4,255	4,125	130
13-Week	985	910	75	3,868	3,758	110
17-Week	780	780	(0)	3,048	2,834	214
26-Week	910	904	6	3,602	3,247	355
52-Week	138	120	18	590	466	124
CMBs						
6-Week	855	940	(85)	2,780	2,760	20
CMBs	70	(30)	100	925	1,095	(170)
Bill Subtotal	5,958	5,719	239	23,462	22,674	788

Security	July - September 2024 Coupon Issuance			Fiscal Year-to-Date Coupon Issuance		
	Gross	Maturing	Net	Gross	Maturing	Net
2-Year FRN	86	68	18	334	282	52
2-Year	276	178	98	813	659	154
3-Year	174	153	21	654	584	70
5-Year	280	127	153	826	314	512
7-Year	176	91	85	544	343	201
10-Year	120	60	60	470	221	249
20-Year	55	0	55	181	0	181
30-Year	69	0	69	271	0	271
5-Year TIPS	0	0	0	86	27	59
10-Year TIPS	36	43	(8)	101	90	11
30-Year TIPS	8	0	8	17	0	17
Coupon Subtotal	1,280	721	559	4,297	2,519	1,777

Buyback		36			45	
Total	7,237	6,475	762	27,758	25,238	2,520

*By adjusting the change in cash balance, Treasury arrives at the net implied funding number.

Privately-Held Net Marketable Borrowing Definition and Calculation Example

FY 2022 Actual Deficits and Privately-Held Net Marketable Borrowing, in $ billions

	FY 2022 Actual
FY 2022 Deficit	1,375
FY 2022 + Change in Cash Balance	421
FY 2022 + Other Means of Financing (e.g. Direct Loans)	-125
FY 2022 **= Total Net Marketable Borrowing**	1,671
FY 2022 + SOMA Redemption	150
FY 2022 **= Privately-Held Net Marketable Borrowing**	1,821

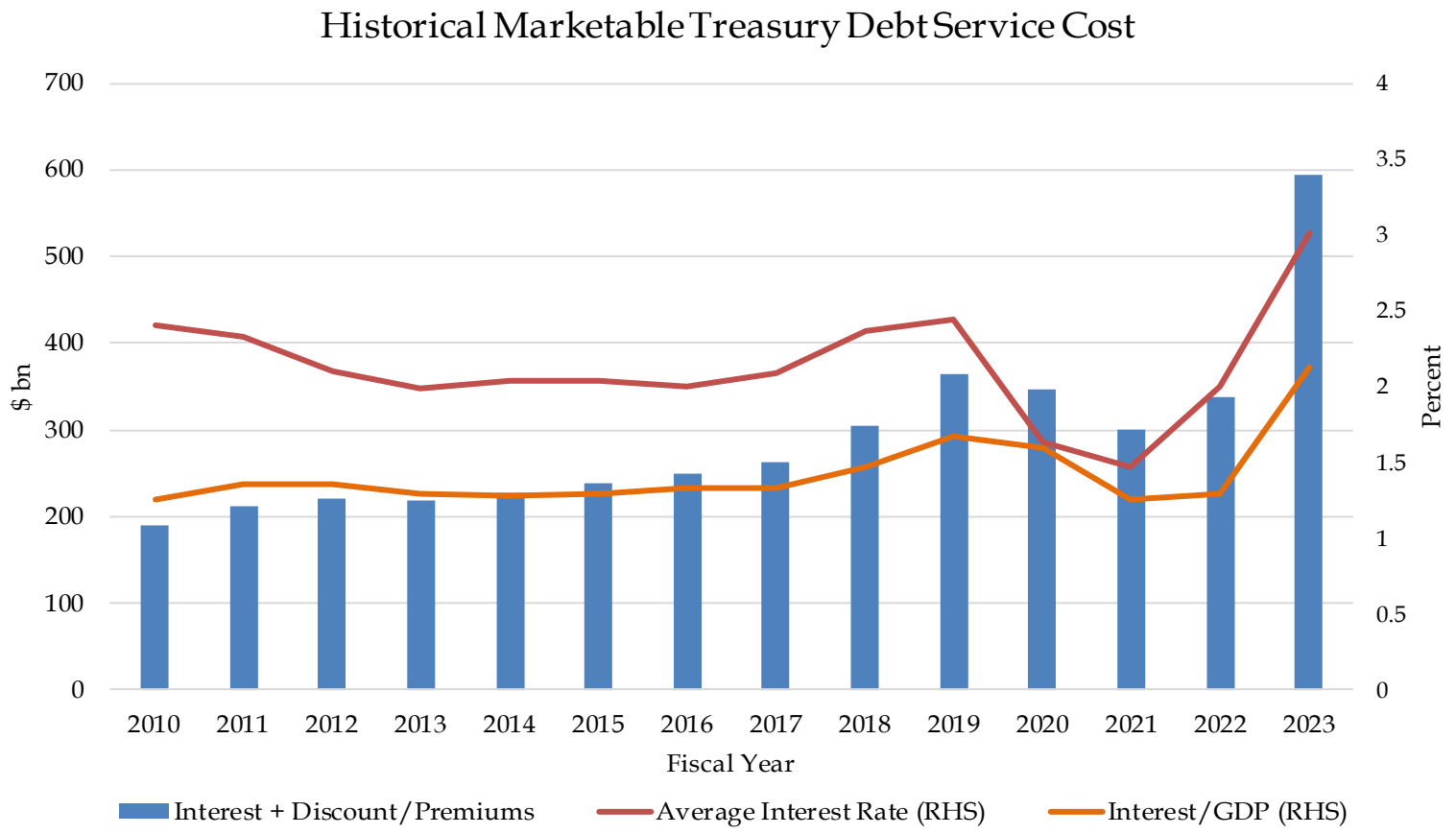
- Actual deficits are sourced from the Monthly Treasury Statement.
- Actual change in cash balance is sourced from the Daily Treasury Statement. Change in cash balance = cash balance of Sept 30, 2022 - cash balance of Sept 30, 2021
- Other Means of Financing include cash flows associated with federal credit programs, such as those related to student loans and loans to small businesses.
- Privately-Held Net Marketable Borrowing = Total Net Marketable Borrowing + SOMA Redemption
- SOMA redemption is the amount that the Federal Reserve redeems securities that Treasury has to replace with privately-held marketable borrowing. Actual SOMA redemptions amounts is from the Sources and Uses Reconciliation Table.
- Actual Privately-Held Net Marketable Borrowing is from the Sources and Uses Reconciliation Table.

FY 2025-2027 Deficits and Privately-Held Net Marketable Borrowing Estimates, in $ billions

	Primary Dealer			OMB	CBO
	25th	Median	75th		
FY 2025 Deficit	1,875	1,900	1,950	1,878	1,938
FY 2026 Deficit	1,850	1,910	2,013	1,601	1,851
FY 2027 Deficit	1,838	1,975	2,100	1,535	1,756
FY 2025 Change in Cash Balance	-136	-111	-36	0	0
FY 2026 Change in Cash Balance	0	0	29	0	0
FY 2027 Change in Cash Balance	0	0	43	0	0
FY 2025 Total Net Marketable Borrowing				1,901	2,010
FY 2026 Total Net Marketable Borrowing				1,695	1,930
FY 2027 Total Net Marketable Borrowing				1,648	1,831
FY 2025 SOMA Redemption	75	150	225		
FY 2026 SOMA Redemption	0	0	0		
FY 2027 SOMA Redemption	0	0	0		
FY 2025 Privately-Held Net Marketable Borrowing*	2,067	2,169	2,220	2,051	2,160
FY 2026 Privately-Held Net Marketable Borrowing*	1,895	2,000	2,094	1,695	1,930
FY 2027 Privately-Held Net Marketable Borrowing*	1,900	2,025	2,198	1,648	1,831
Estimates as of:		Oct-24		Jul-24	Jun-24

* All privately-held net marketable borrowing estimates are "normalized" using:
- 1) the median Primary Dealer's estimates for SOMA redemptions, and
- 2) assumed fiscal year 2025 cash balance of $850 billion, held constant in out years.

- OMB projections are using estimates are from Table S-3 of "Mid-Session Review Budget of The U.S. Government, Fiscal Year 2025," July 2024.
- CBO projections are using estimates are from "An Update to the Budget and Economic Outlook: 2024 to 2034," June 2024.

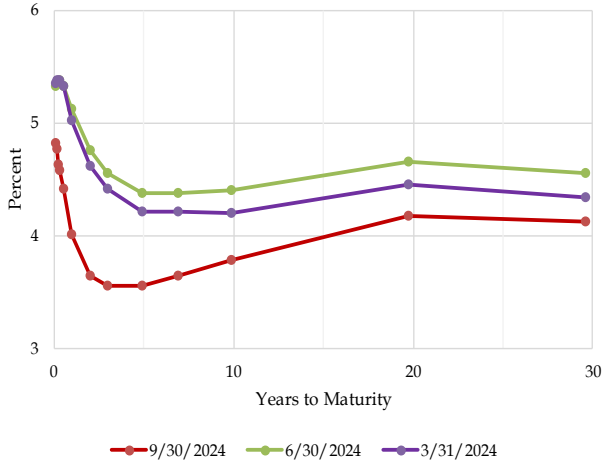


Source: https://fiscaldata.treasury.gov/datasets

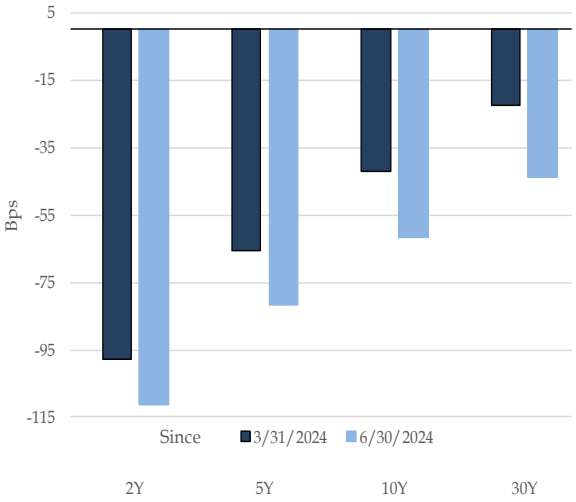
The average interest rates for total marketable debt do not include the Treasury Inflation-Indexed Securities and the Treasury Floating Rate Notes. However, they include securities from Federal Financing Bank. The average interest rates in the chart are as of corresponding fiscal year-end-dates.

Various Historical Treasury Interest Rate Metrics

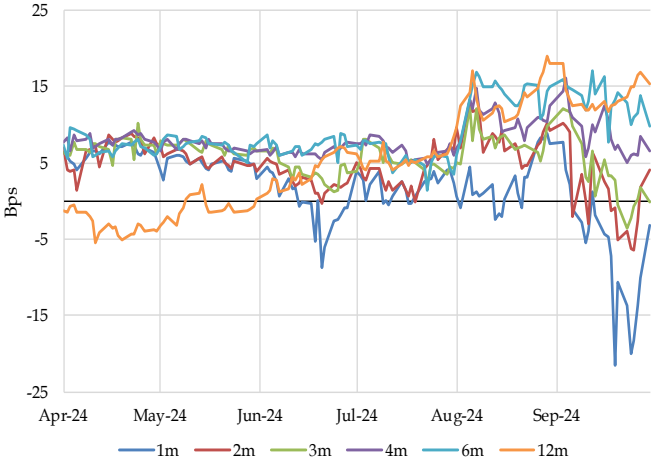
Treasury Nominal Yield Curve
as of specified dates



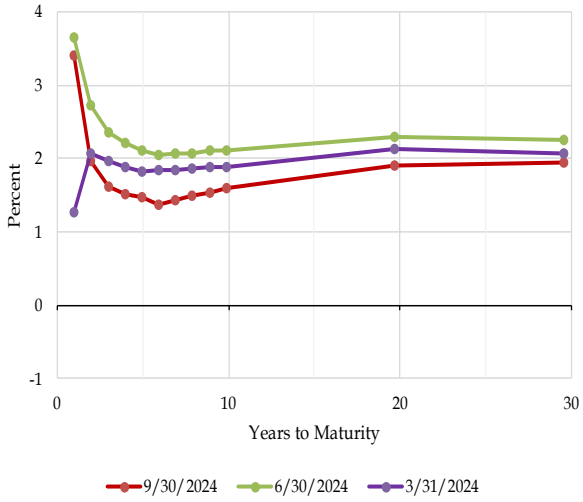
Nominal Yield Changes in Selected Tenors
Through the end of 09/30/24



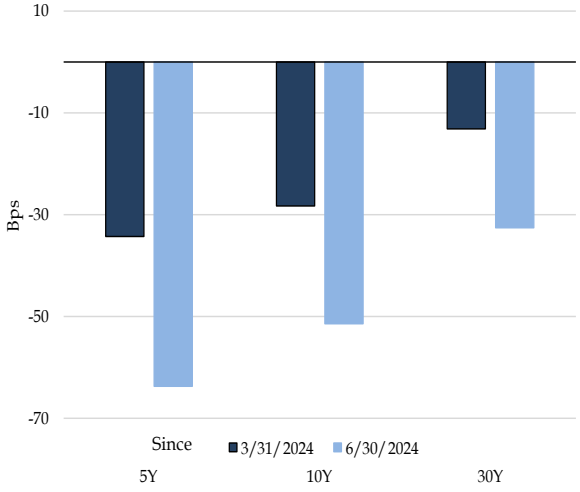
Bills-SOFR OIS spreads
Through the end of 09/30/24



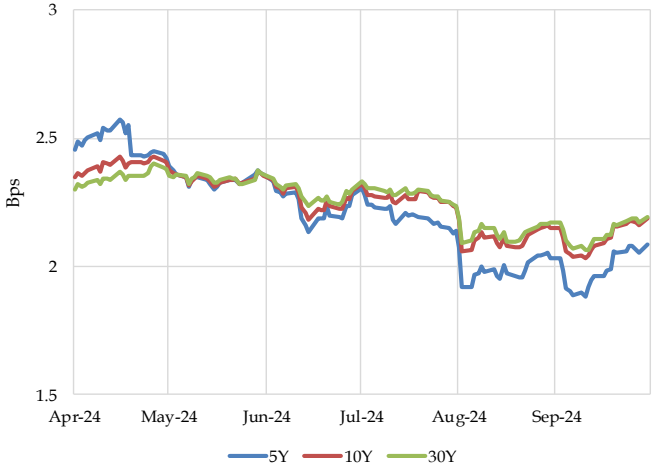
Treasury Real Yield Curve
as of specified dates



Real Yield Changes in Selected Tenors
Through the end of 09/30/24



Breakevens
Through the end of 09/30/24



Source: Bloomberg

Projected Privately-Held Net Marketable Borrowing
Assuming Private Coupon Issuance & Total Bills Outstanding Remain Constant as of 10/31/2024*

Fiscal Year	Bills	2/3/5	7/10/20/30	TIPS	FRN	Historical/Projected Net Borrowing Capacity
2020	2,652	538	724	46	55	4,015
2021	(1,315)	1,260	1,328	55	92	1,420
2022	(53)	744	1,027	61	42	1,821
2023	1,689	319	680	50	(38)	2,699
2024	789	737	902	87	52	2,567
2025	182	825	957	33	68	2,064
2026	0	444	954	52	10	1,460
2027	0	326	839	34	0	1,199
2028	0	294	513	13	0	820
2029	0	84	639	12	0	736
2030	0	(0)	767	21	0	789
2031	0	0	505	9	0	514
2032	0	0	507	(14)	0	493
2033	0	0	519	(7)	0	512
2034	0	0	437	(18)	0	419
2035	0	0	444	(22)	0	422

*Projections reflect only SOMA rollovers at auction of principal payments of Treasury securities. No adjustments are made for open-market outright purchases and subsequent rollovers.

Bills										
Issue	Settle Date	Stop Out Rate (%)	Bid-to-Cover Ratio	Competitive Awards ($bn)	% Primary Dealer	% Direct	% Indirect	Non-Competitive Awards ($bn)	SOMA "Add Ons" ($bn)	10-Year Equivalent ($bn)*
4-Week	7/9/2024	5.280	2.81	79.5	27.8	3.5	68.7	5.5	0.2	0.8
4-Week	7/16/2024	5.270	2.69	83.5	30.9	4.2	64.9	6.5	0.2	0.9
4-Week	7/23/2024	5.270	2.59	84.0	37.7	4.2	58.1	6.0	0.3	0.9
4-Week	7/30/2024	5.285	2.77	84.0	32.9	3.6	63.5	6.0	0.3	0.9
4-Week	8/6/2024	5.285	2.87	83.6	32.0	3.6	64.5	6.4	0.3	0.9
4-Week	8/13/2024	5.285	2.77	88.6	27.0	2.8	70.2	6.4	0.3	0.9
4-Week	8/20/2024	5.260	2.90	88.7	28.6	7.6	63.8	6.3	0.3	0.9
4-Week	8/27/2024	5.240	2.67	88.7	39.9	7.2	52.9	6.3	0.3	0.9
4-Week	9/3/2024	5.170	2.83	78.6	29.7	4.5	65.9	6.4	0.3	0.8
4-Week	9/10/2024	5.080	3.03	73.5	25.6	4.5	69.9	6.5	0.2	0.7
4-Week	9/17/2024	4.965	2.92	74.0	24.0	7.6	68.4	6.0	0.3	0.7
4-Week	9/24/2024	4.700	2.87	73.9	34.0	4.3	61.7	6.1	0.3	0.7
4-Week	10/1/2024	4.700	2.81	84.0	27.8	3.1	69.1	6.0	0.3	0.8
8-Week	7/9/2024	5.275	2.76	78.5	42.3	4.4	53.3	1.5	0.2	1.5
8-Week	7/16/2024	5.260	2.63	83.1	35.4	5.0	59.6	1.9	0.2	1.6
8-Week	7/23/2024	5.260	2.68	83.3	47.3	4.0	48.7	1.7	0.2	1.6
8-Week	7/30/2024	5.260	2.89	83.2	33.0	3.8	63.2	1.8	0.3	1.6
8-Week	8/6/2024	5.230	2.74	83.3	40.4	4.3	55.3	1.7	0.3	1.6
8-Week	8/13/2024	5.190	2.74	88.4	28.5	4.2	67.3	1.6	0.3	1.7
8-Week	8/20/2024	5.175	2.77	88.4	33.4	3.6	63.0	1.6	0.3	1.7
8-Week	8/27/2024	5.125	2.83	88.4	31.8	2.9	65.3	1.6	0.2	1.7
8-Week	9/3/2024	5.100	2.60	78.4	45.4	5.9	48.7	1.6	0.2	1.5
8-Week	9/10/2024	5.040	2.78	78.3	33.3	4.9	61.9	1.7	0.2	1.5
8-Week	9/17/2024	4.990	2.45	78.2	54.0	9.8	36.3	1.8	0.3	1.5
8-Week	9/24/2024	4.690	2.80	78.2	35.5	3.8	60.7	1.8	0.3	1.5
8-Week	10/1/2024	4.650	2.42	83.3	55.6	4.1	40.3	1.7	0.3	1.6

*Approximated using prices at settlement and includes both competitive and non-competitive awards.

Bills (cont.)										
Issue	Settle Date	Stop Out Rate (%)	Bid-to-Cover Ratio	Competitive Awards ($bn)	% Primary Dealer	% Direct	% Indirect	Non-Competitive Awards ($bn)	SOMA "Add Ons" ($bn)	10-Year Equivalent ($bn)*
13-Week	7/5/2024	5.240	2.76	70.8	41.3	4.4	54.2	2.2	4.5	2.4
13-Week	7/11/2024	5.230	2.84	73.5	39.1	6.2	54.7	2.5	4.3	2.5
13-Week	7/18/2024	5.195	2.69	73.3	44.8	5.2	50.0	2.7	4.5	2.5
13-Week	7/25/2024	5.190	3.08	73.2	34.1	5.4	60.6	2.8	4.3	2.5
13-Week	8/1/2024	5.145	3.01	73.6	35.0	5.0	60.0	2.4	7.8	2.6
13-Week	8/8/2024	5.075	2.62	73.4	40.0	5.1	54.9	2.6	6.1	2.5
13-Week	8/15/2024	5.070	2.95	73.4	31.6	4.8	63.5	2.6	7.0	2.6
13-Week	8/22/2024	5.055	3.12	73.6	30.1	5.0	64.8	2.4	5.6	2.4
13-Week	8/29/2024	4.980	3.03	73.7	28.3	8.0	63.8	2.3	5.3	2.4
13-Week	9/5/2024	4.970	2.62	73.6	39.3	7.3	53.4	2.4	0.9	2.3
13-Week	9/12/2024	4.895	3.22	73.3	31.7	5.7	62.5	2.7	0.9	2.3
13-Week	9/19/2024	4.750	2.61	73.4	37.8	6.3	55.9	2.6	0.3	2.3
13-Week	9/26/2024	4.540	2.84	73.8	34.8	6.3	58.9	2.2	1.0	2.3
13-Week	10/3/2024	4.500	2.71	76.9	31.3	4.8	63.8	2.1	4.9	2.5
17-Week	7/9/2024	5.205	3.15	59.3	44.6	4.9	50.4	0.7	0.2	2.4
17-Week	7/16/2024	5.195	3.16	59.3	36.7	8.6	54.7	0.7	0.2	2.4
17-Week	7/23/2024	5.135	3.12	59.3	44.4	4.9	50.7	0.7	0.2	2.4
17-Week	7/30/2024	5.115	3.00	59.3	36.5	7.0	56.5	0.7	0.2	2.4
17-Week	8/6/2024	5.090	3.24	59.5	32.0	6.1	61.9	0.5	0.2	2.4
17-Week	8/13/2024	4.990	2.89	59.4	36.4	3.8	59.8	0.6	0.2	2.4
17-Week	8/20/2024	4.980	3.34	59.3	30.1	4.8	65.1	0.7	0.2	2.4
17-Week	8/27/2024	4.920	3.28	59.3	35.2	4.5	60.3	0.7	0.2	2.3
17-Week	9/3/2024	4.870	3.25	59.4	34.3	5.1	60.5	0.6	0.2	2.3
17-Week	9/10/2024	4.810	3.21	59.4	28.3	6.3	65.4	0.6	0.2	2.3
17-Week	9/17/2024	4.740	2.74	59.4	42.6	5.5	51.9	0.6	0.2	2.4
17-Week	9/24/2024	4.660	3.05	59.3	38.2	3.3	58.5	0.7	0.2	2.4
17-Week	10/1/2024	4.430	2.80	61.4	36.1	5.0	58.9	0.6	0.2	2.4

*Approximated using prices at settlement and includes both competitive and non-competitive awards.

Bills (cont.)										
Issue	Settle Date	Stop Out Rate (%)	Bid-to-Cover Ratio	Competitive Awards ($bn)	% Primary Dealer	% Direct	% Indirect	Non-Competitive Awards ($bn)	SOMA "Add Ons" ($bn)	10-Year Equivalent ($bn)*
26-Week	7/5/2024	5.115	2.99	67.5	25.7	8.6	65.7	2.5	4.3	4.5
26-Week	7/11/2024	5.080	2.95	67.8	27.7	8.2	64.1	2.2	3.9	4.5
26-Week	7/18/2024	4.985	2.85	67.4	26.8	7.3	65.9	2.6	4.1	4.6
26-Week	7/25/2024	4.990	2.85	67.6	31.6	8.7	59.7	2.4	4.0	4.6
26-Week	8/1/2024	4.930	2.95	67.6	21.1	6.0	72.9	2.4	7.2	4.8
26-Week	8/8/2024	4.700	2.67	67.8	41.6	3.9	54.5	2.2	5.6	4.7
26-Week	8/15/2024	4.795	2.73	67.6	38.4	7.9	53.7	2.4	6.4	4.7
26-Week	8/22/2024	4.770	3.05	67.5	34.6	7.2	58.2	2.5	5.2	4.5
26-Week	8/29/2024	4.685	3.05	67.8	35.4	4.6	60.0	2.2	4.9	4.5
26-Week	9/5/2024	4.645	3.08	67.9	25.1	6.3	68.6	2.1	0.8	4.2
26-Week	9/12/2024	4.530	2.98	67.9	30.3	6.5	63.2	2.1	0.9	4.2
26-Week	9/19/2024	4.410	2.98	68.0	33.0	4.8	62.1	2.0	0.2	4.2
26-Week	9/26/2024	4.270	3.42	68.4	28.5	7.6	64.0	1.6	0.9	4.3
26-Week	10/3/2024	4.215	3.28	70.2	22.4	3.3	74.3	1.8	4.5	4.6
52-Week	7/11/2024	4.775	2.85	44.4	44.8	3.0	52.1	1.6	2.6	6.0
52-Week	8/8/2024	4.255	2.93	44.6	42.8	2.5	54.7	1.4	3.7	6.1
52-Week	9/5/2024	4.150	3.00	44.7	32.7	2.2	65.1	1.3	0.5	5.6
6-Week CMB	7/5/2024	5.270	3.13	64.7	36.5	5.8	57.7	0.3	0.0	0.9
6-Week CMB	7/11/2024	5.270	2.92	69.7	43.9	9.3	46.8	0.3	0.0	1.0
6-Week CMB	7/18/2024	5.265	2.92	69.7	38.8	7.1	54.1	0.3	0.0	1.0
6-Week CMB	7/25/2024	5.270	2.76	69.7	50.8	6.2	43.0	0.3	0.0	1.0
6-Week CMB	8/1/2024	5.280	2.93	69.7	27.7	4.7	67.6	0.3	0.0	1.0
6-Week CMB	8/8/2024	5.270	2.76	74.7	41.6	7.1	51.2	0.3	0.0	1.1
6-Week CMB	8/15/2024	5.230	2.81	74.7	41.8	3.8	54.4	0.3	0.0	1.1
6-Week CMB	8/22/2024	5.185	2.72	74.6	40.3	7.3	52.4	0.4	0.0	1.0
6-Week CMB	8/29/2024	5.150	2.67	74.6	35.3	7.4	57.4	0.4	0.0	1.0
6-Week CMB	9/5/2024	5.120	3.01	64.7	28.6	8.0	63.4	0.3	0.0	0.9
6-Week CMB	9/12/2024	4.980	2.97	59.6	31.9	5.7	62.4	0.4	0.0	0.8
6-Week CMB	9/19/2024	4.920	2.66	59.7	46.2	7.0	46.8	0.3	0.0	0.8
6-Week CMB	9/26/2024	4.620	3.26	59.7	30.2	2.6	67.2	0.3	0.0	0.8
CMB	8/27/2024	5.260	3.10	34.9	66.4	6.8	26.8	0.1	0.0	0.2

*Approximated using prices at settlement and includes both competitive and non-competitive awards.

Nominal Coupons & FRNs										
Issue	Settle Date	Stop Out Rate (%)*	Bid-to-Cover Ratio	Competitive Awards ($bn)	% Primary Dealer	% Direct	% Indirect	Non-Competitive Awards ($bn)	SOMA "Add Ons" ($bn)	10-Year Equivalent ($bn)**
2-Year	7/31/2024	4.434	2.81	68.2	9.0	14.4	76.6	0.8	3.8	17.4
2-Year	9/3/2024	3.874	2.68	68.1	11.9	19.1	69.0	0.9	5.5	17.3
2-Year	9/30/2024	3.520	2.59	68.3	12.8	19.6	67.6	0.7	1.4	16.5
3-Year	7/15/2024	4.399	2.67	57.5	14.8	21.3	64.0	0.5	9.4	23.6
3-Year	8/15/2024	3.810	2.55	57.7	15.4	20.3	64.4	0.3	11.0	24.4
3-Year	9/16/2024	3.440	2.66	57.7	10.5	11.3	78.2	0.3	0.6	20.2
5-Year	7/31/2024	4.121	2.40	69.8	14.0	18.8	67.2	0.2	3.9	41.9
5-Year	9/3/2024	3.645	2.41	69.7	13.2	16.3	70.5	0.3	5.6	41.7
5-Year	9/30/2024	3.519	2.38	69.8	11.5	18.2	70.3	0.2	1.4	39.8
7-Year	7/31/2024	4.162	2.64	43.9	8.9	16.8	74.4	0.1	2.4	35.3
7-Year	9/3/2024	3.770	2.50	43.8	13.7	11.2	75.1	0.2	3.5	35.3
7-Year	9/30/2024	3.668	2.63	43.8	8.9	20.3	70.8	0.2	0.9	33.8
10-Year	7/15/2024	4.276	2.58	38.9	11.5	20.9	67.6	0.1	6.3	45.3
10-Year	8/15/2024	3.960	2.32	41.9	17.9	16.0	66.2	0.1	8.0	51.8
10-Year	9/16/2024	3.648	2.64	38.9	10.2	13.7	76.0	0.1	0.4	39.3
20-Year	7/31/2024	4.466	2.68	13.0	8.5	14.3	77.2	0.0	0.7	22.2
20-Year	9/3/2024	4.160	2.54	15.9	9.7	19.3	71.0	0.1	1.3	28.1
20-Year	9/30/2024	4.039	2.51	13.0	18.6	16.3	65.1	0.0	0.3	21.6
30-Year	7/15/2024	4.405	2.30	22.0	15.9	23.4	60.8	0.0	3.6	52.2
30-Year	8/15/2024	4.314	2.31	24.9	19.2	15.5	65.3	0.1	4.8	63.4
30-Year	9/16/2024	4.015	2.38	22.0	15.7	15.7	68.7	0.0	0.2	46.3
2-Year FRN	7/31/2024	0.182	3.25	29.9	24.3	0.8	74.8	0.1	1.7	0.1
2-Year FRN	8/30/2024	0.235	2.65	28.0	37.5	0.9	61.6	0.0	0.0	0.0
2-Year FRN	9/27/2024	0.261	2.86	28.0	42.6	0.9	56.5	0.0	0.0	0.0

TIPS										
Issue	Settle Date	Stop Out Rate (%)	Bid-to-Cover Ratio	Competitive Awards ($bn)	% Primary Dealer	% Direct	% Indirect	Non-Competitive Awards ($bn)	SOMA "Add Ons" ($bn)	10-Year Equivalent ($bn)**
10-Year TIPS	7/31/2024	1.883	2.38	18.9	7.9	23.4	68.7	0.1	1.0	22.6
10-Year TIPS	9/30/2024	1.592	2.44	17.0	6.6	21.5	71.9	0.0	0.4	18.8
30-Year TIPS	8/30/2024	2.055	2.61	8.0	6.9	15.6	77.6	0.0	0.0	21.1

*FRNs are reported on discount margin basis.
**Approximated using prices at settlement and includes both competitive and non-competitive awards.
For TIPS 10-Year equivalent, a constant auction BEI is used as the inflation assumption.

Office of Debt Management

Review of Treasury Buyback Results

10/29/2024

Overview of Treasury Buybacks

- In May 2024, Treasury announced the launch of its buyback program and its plan to conduct weekly liquidity support buybacks of up to $2 billion per operation for nominal coupon securities and up to $500 million per operation for TIPS.

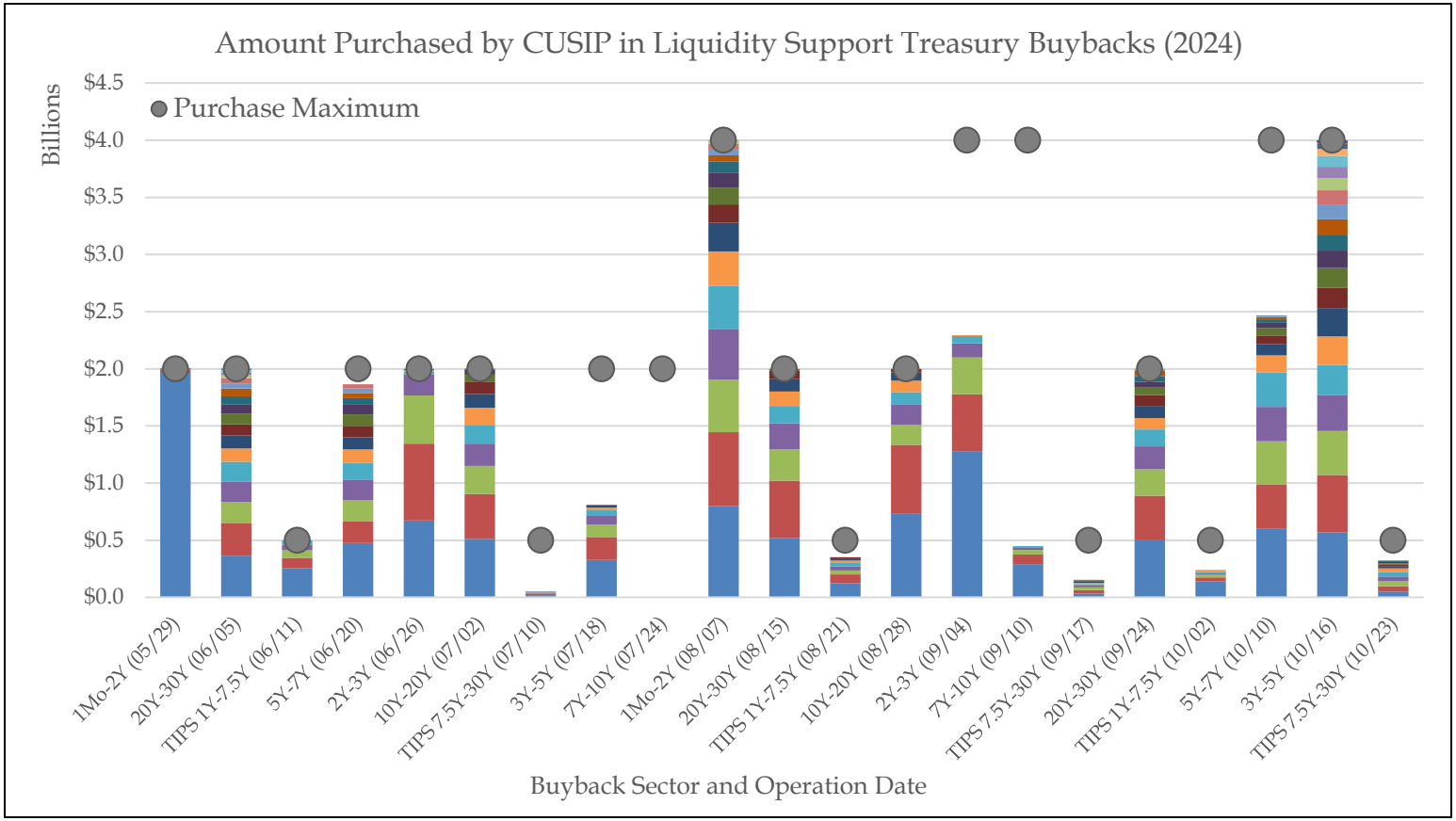
- In July 2024, Treasury announced increases to the size of liquidity support buybacks during the August through October refunding quarter and a plan to conduct $20 billion of cash management buybacks during September 2024. Specifically:
  - Up to $4 billion per liquidity support operation in nominal coupon securities.
    - Two buybacks for up to $2 billion each for the 10Y-20Y and 20Y-30Y nominal coupon sectors.
  - Two buybacks for up to $500 million each for the short-end and long-end TIPS sectors.
  - Four cash management buybacks, each for up to $5 billion.

- Between 5/29/24 and 10/23/24, Treasury conducted 21 liquidity support and 4 cash management buyback operations.
  - During this period, Treasury offered to buy back up to $43 billion of off-the-run securities for liquidity support. Treasury received approximately $148 billion of offers for these buybacks.
    - In total, Treasury purchased $31.5 billion for liquidity support purposes.
    - Treasury bought less than the maximum purchase amount in 11 of the 21 liquidity support operations.

  - In September 2024, Treasury completed four cash management buybacks.
    - Treasury received approximately $75 billion of offers across all four cash management buybacks.
    - Treasury bought back the $5 billion maximum amount each time for a total of $20 billion in cash management purchases.

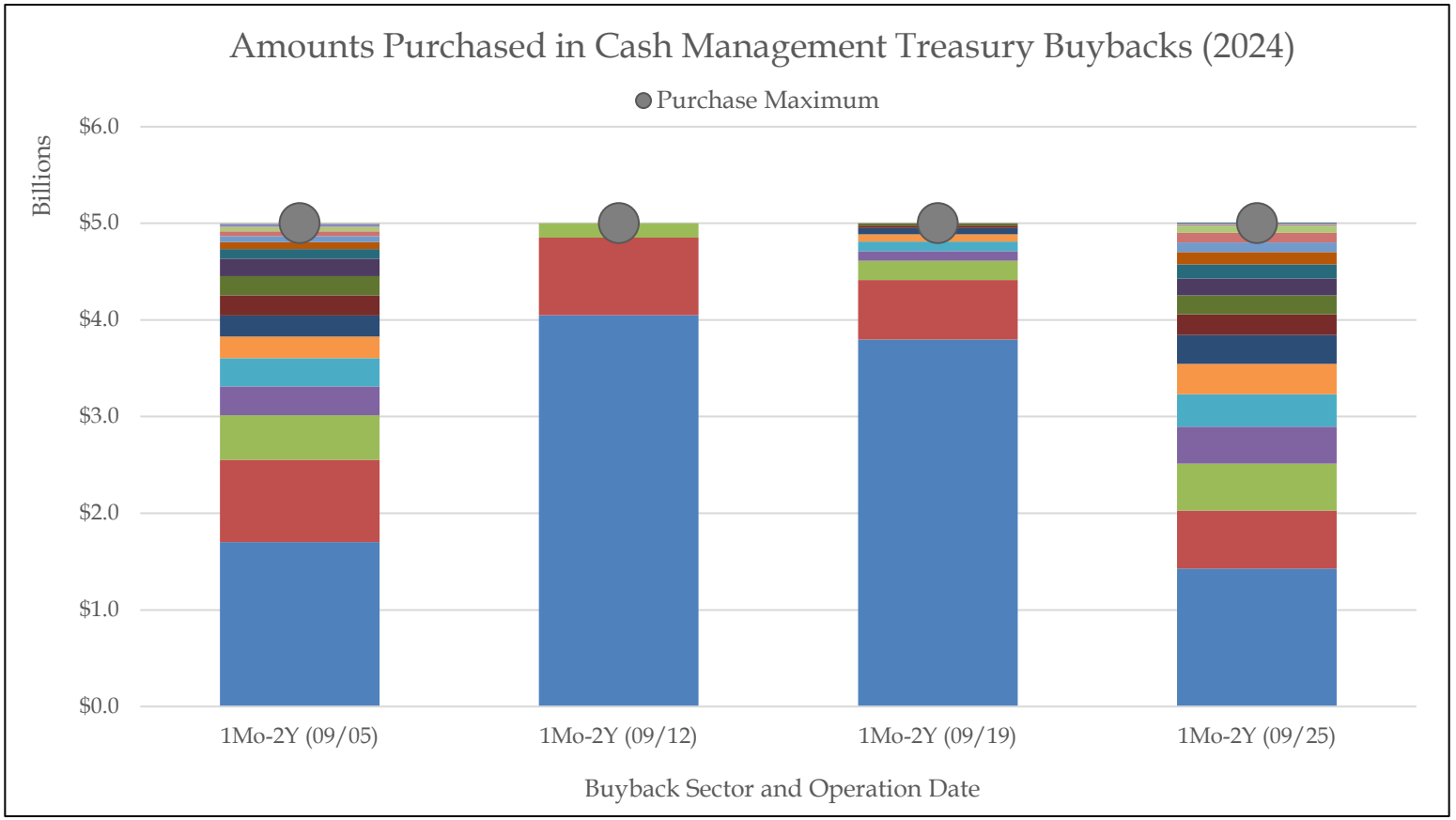
- Liquidity support buybacks establish a predictable opportunity for market participants to sell off-the-run securities, while cash management buybacks reduce volatility in Treasury's cash balance and bill issuance, minimize bill supply disruptions, and reduce borrowing costs over time.

Buyback Amounts & CUSIP Concentration (Liquidity Support)



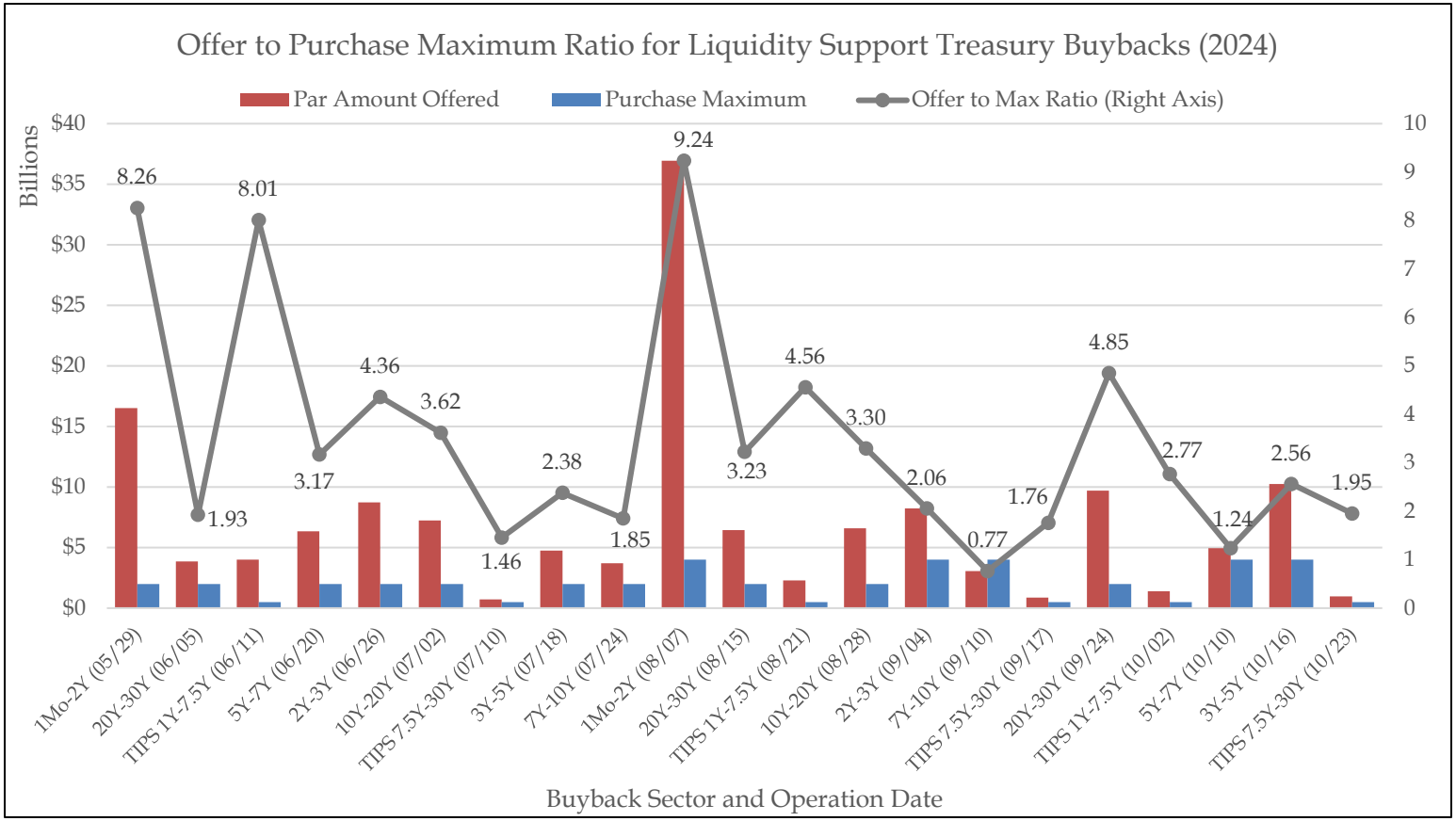
- Chart shows the total par amount purchased in each liquidity support buyback operation relative to the maximum purchase amount.
- Different colors within each bar correspond to the CUSIP-level purchase amounts.

Buyback Amounts & CUSIP Concentration (Cash Management)



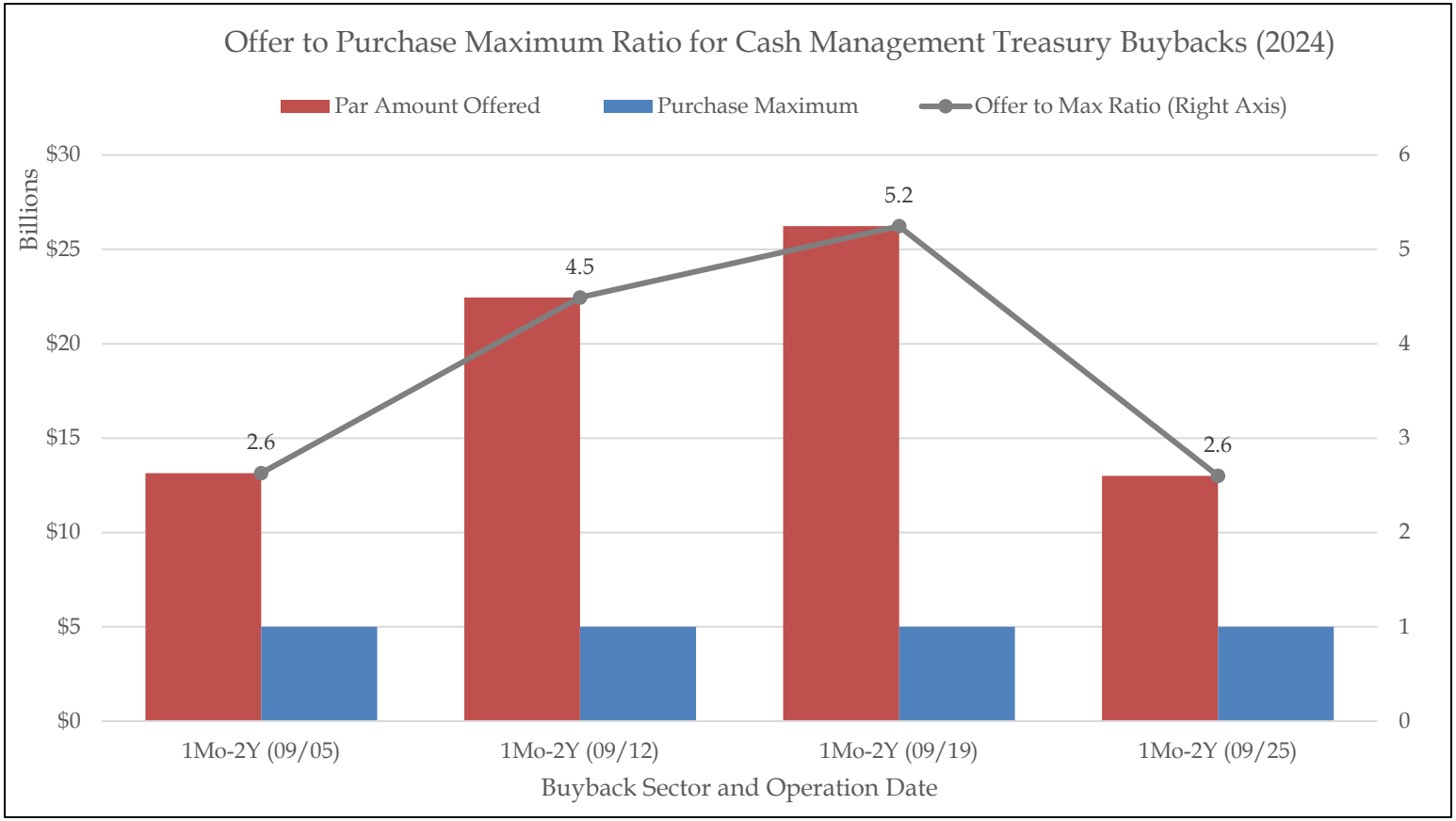
- Chart shows the total par amount purchased in each cash management buyback operation relative to the maximum purchase amount.
- Different colors within each bar correspond to the CUSIP-level purchase amounts.

Offer to Purchase Maximum Ratio (Liquidity Support)



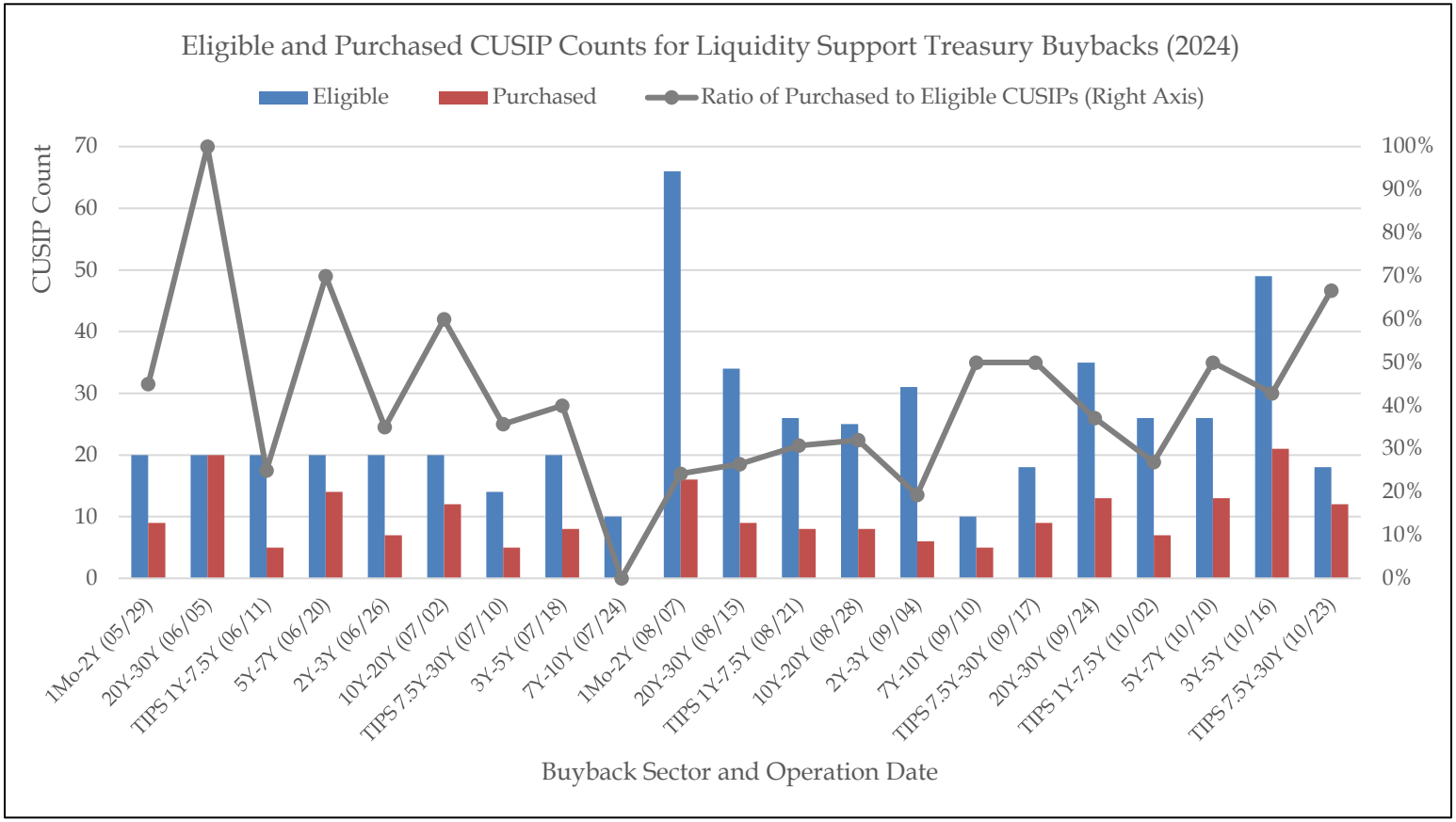
- Chart shows the "offer to max" ratio for each liquidity support buyback.
- The "offer to max" ratio is the ratio of the total par amount offered (red bar) in a buyback operation to Treasury's maximum purchase amount (blue bar).

Offer to Purchase Maximum Ratio (Cash Management)



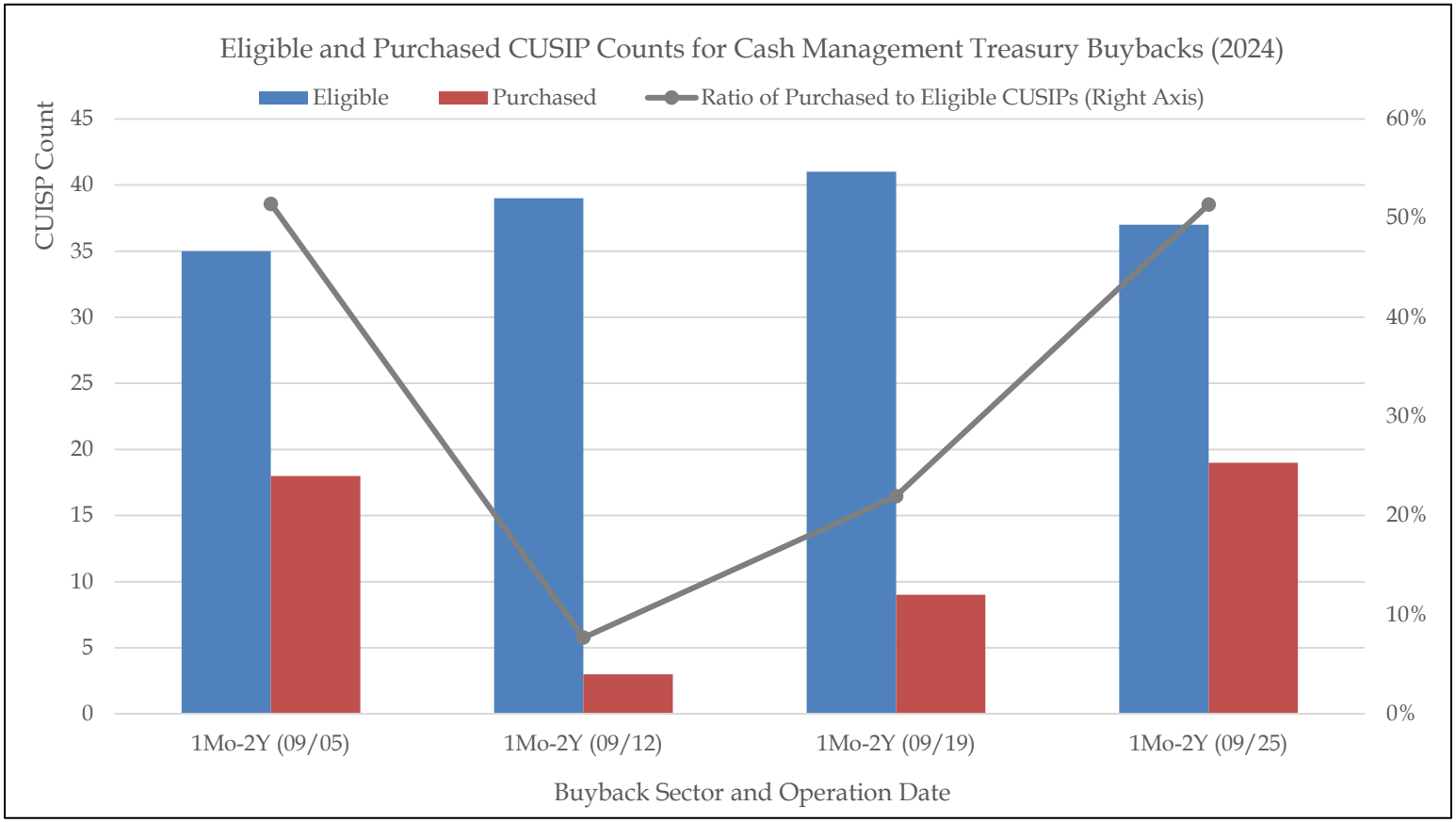
- Chart shows the "offer to max" ratio for each cash management buyback.
- The "offer to max" ratio is the ratio of the total par amount offered (red bar) in a buyback operation to Treasury's maximum purchase amount (blue bar).

Buyback Eligible and Purchased CUSIPs (Liquidity Support)



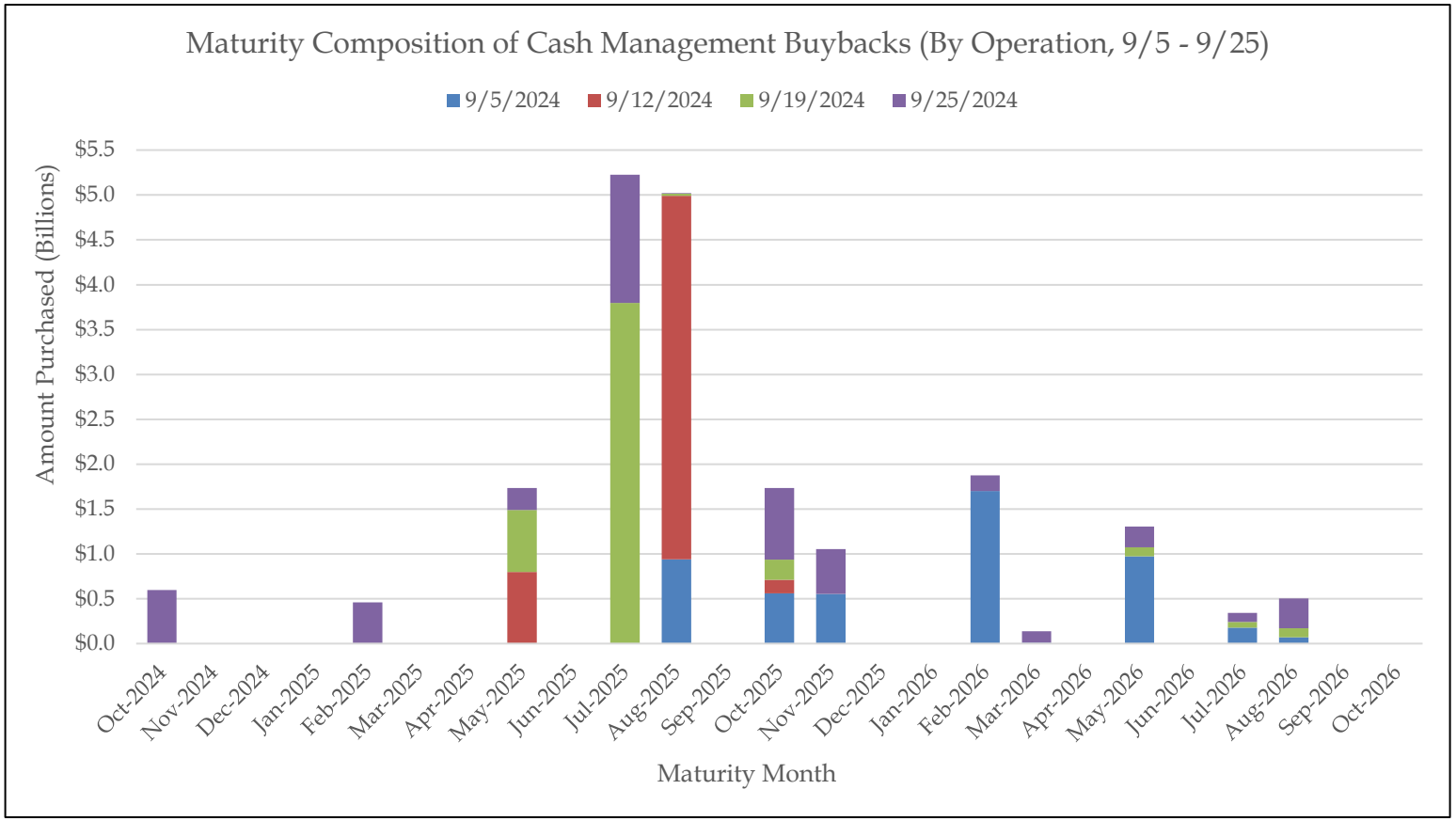
- Chart shows the count of eligible (blue) and purchased (red) CUSIPs for each liquidity support buyback operation as well as the ratio of purchased to eligible securities.
- Prior to August 2024, Treasury limited the buyback eligible population to at most 20 CUSIPs.

Buyback Eligible and Purchased CUSIPs (Cash Management)



- Chart shows the count of eligible (blue) and purchased (red) CUSIPs for each cash management buyback operation as well as the ratio of purchased to eligible securities.
- Certain securities are excluded from buybacks, as described in Treasury's buyback FAQs. In particular for cash management buyback operations, Treasury excludes coupon securities that mature around quarterly tax payment dates or the April tax season.

Maturity Structure of Cash Management Purchases



- Charts above show the par amount purchased by maturity month for each of four cash management buybacks that took place between 9/5 and 9/25.

Inter-Agency Working Group's efforts on Treasury Market Resilience

Treasury Borrowing Advisory Committee

October 29, 2024

Treasury Market Resilience: Since 2021, the Inter-Agency Working Group on Treasury Market Surveillance (IAWG) has been conducting an extensive program of analysis and policymaking to enhance Treasury market resilience. The IAWG has organized around five workstreams and issued four annual reports highlighting its progress (2024, 2023, 2022, 2021). Please comment on the effectiveness of the IAWG efforts to date. To what extent will the policies that have been or are being implemented improve Treasury market resilience? In which areas are additional policy changes needed? Please elaborate.

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Executive summary

- The IAWG has done extensive work since 2021 to enhance the resilience of the Treasury market. There are many positive indicators to suggest that the IAWG's efforts have had the intended impact, such as:
  - Improvements across Treasury market liquidity metrics
  - Availability of funding liquidity for leveraged investors
  - Smooth market functioning through the SVB stress
  - More available public data to improve transparency and strengthen investor confidence
- Several initiatives that are being worked on or will be fully implemented in coming years should further the progress
- However, it is difficult to isolate the extent to which these developments are due to IAWG efforts or helped by other market forces
  - For example, the substantial Fed balance sheet expansion from Covid remains partially in place today; as the Fed continues to reduce its balance sheet, there is risk that market resiliency could be tested
- At the same time, continued evolution in the Treasury market has created potential new vulnerabilities that may require the IAWG to consider new policies or changes to existing policies

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What is the Inter-Agency Working Group (IAWG)?





U.S. Department of the Treasury

Board of Governors of the Federal Reserve System

Federal Reserve Bank of New York

U.S. Securities and Exchange Commission

U.S. Commodity Futures Trading Commission

- Composed of staff from the U.S. Treasury, Federal Reserve Board, FRBNY, SEC, and CFTC
- Formed in 1992 to improve monitoring and surveillance and strengthen interagency coordination with respect to the Treasury market following the Salomon Brothers auction bidding scandal
- Individual agencies have authority to enact policy measures that support the IAWG objectives
- Recently convened the tenth[1] annual U.S. Treasury Market Conference in September

[1] *See: "Enhancing The Resilience Of The U.S. Treasury Market: 2024 Staff Progress Report"*

Workstreams for Treasury market resilience guided by six principles

Guiding Principles

Resilient and elastic **liquidity**

Transparency that fosters public confidence, fair trading, and a liquid market

Prices that reflect prevailing and expected economic and financial conditions

Economic integration across cash, funding, and derivatives markets

Financing that does not pose a significant threat to financial stability

Infrastructure that operates efficiently and effectively

Current Workstreams and Future Developments

Resiliency of intermediation: Regulatory initiatives to strengthen oversight of Treasury market participants and improve market intermediation

Data quality and availability: Enhanced transaction-level data reporting for various market segments, including non-centrally cleared bilateral repo (NCCBR) transactions and hedge funds

Expanded central clearing: Requirements to expand central clearing of certain Treasury market transactions and improve cross-margining arrangements

Venue transparency and oversight: Proposed regulations for alternative trading systems (ATSs) to enhance transparency and oversight

Leverage and liquidity: Ongoing efforts to examine leverage and liquidity risks, including the launch of a hedge fund monitor and establishment of risk management working groups

Future Developments

- NCCBR transaction reporting (December 2024)
- Form PF reporting requirements (March 2025)
- SEC dealer registration (April 2025)
- Regulatory groups to continue work and review existing initiatives

https://home.treasury.gov/system/files/136/IAWG-Treasury-Report.pdf; *See appendix table for workstream details*

Notable efforts on Treasury market resilience since 2021

	2021	2022	2023	2024	2025 - 2026
Resilience of Intermediation	**Established SRF and FIMA repo facility**			**Launched a Treasury buyback program**	Comply with expanded SEC dealer registration requirement (Apr 2025) Working paper on off-the-run Treasuries
Data Quality and Availability		**OFR pilot to collect uncleared repo data** **Expanded TRACE reporting**	**Launch of daily aggregate statistics on Treasury volumes**	**EOD dissemination of OTR nominal coupon transactions** **Daily reporting of uncleared repo transactions**	Comply with expanded Form PF for systemic risk monitoring (Mar 2025)
Expanded Central Clearing			**SEC adoption of central clearing rules**		Full implementation of central clearing for Treasuries (Dec 2025) and repos (Jun 2026)
Venue Transparency and Oversight			**Proposal to amend definition of exchanges and trading systems for crypto assets**		
Leverage and Fund Liquidity Risks		**Developed hedge fund risk monitoring framework**		**Launched Hedge Fund Monitor tool** **Further studies on the NCCBR market**	

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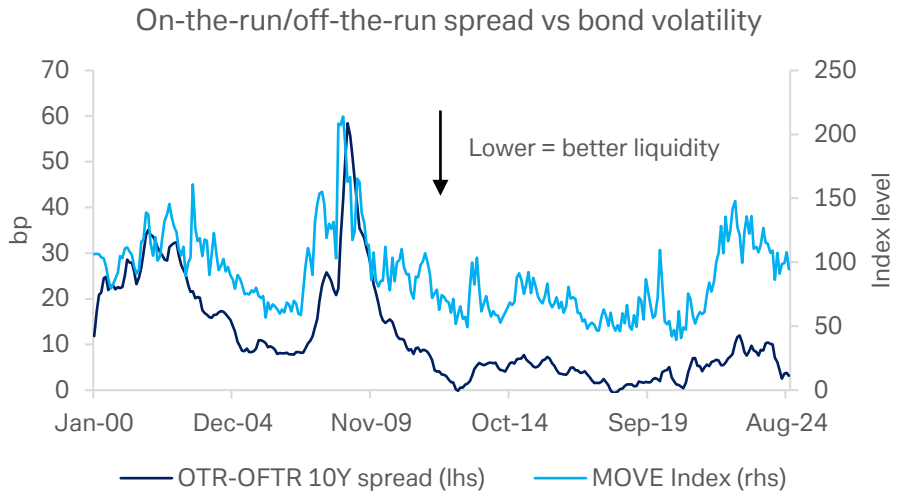
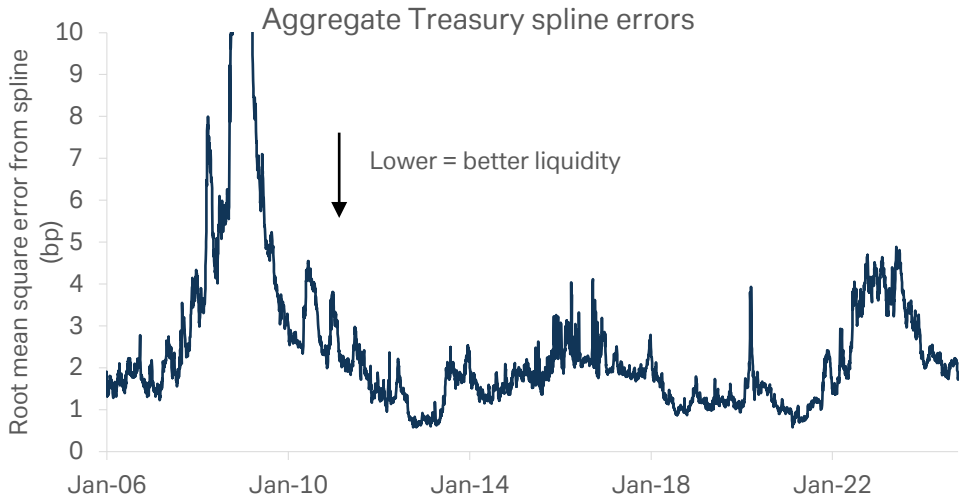
Resilient and elastic liquidity

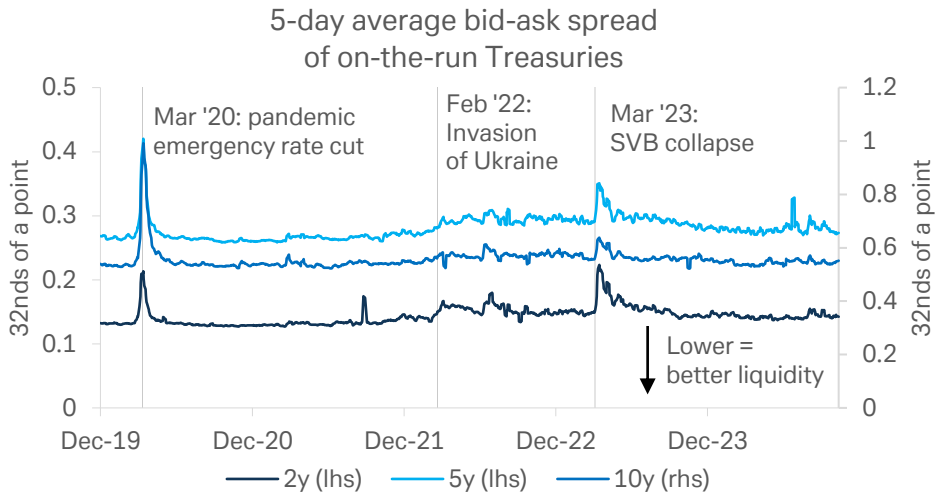
- Treasury market liquidity has been good since the pandemic with no acute stress events
- Most liquidity metrics (such as OTR/OFTR spreads, Treasury spread to fitted yields, order book depth) have either been stable or improved despite volatility remaining somewhat elevated
- TRACE trading volumes have steadily risen, both in absolute terms and as a percentage of outstanding Treasury debt, indicating healthy market activity
- The market has adapted well to significant shifts in actual and expected economic and financial conditions, including historic economic data surprises and banking sector stress during the SVB collapse
- Funding conditions remain healthy, supported by still-abundant reserves provided by the Fed securities holdings; however, the market is focused on impact of the Fed balance sheet unwind, which bears watching
- The recently launched Treasury buyback program is expected to improve liquidity, although more time is needed to fully assess its impact on market conditions
    - Dealers have generally characterized operations so far as “moderately supportive of liquidity and market-making” in specific sectors[1]

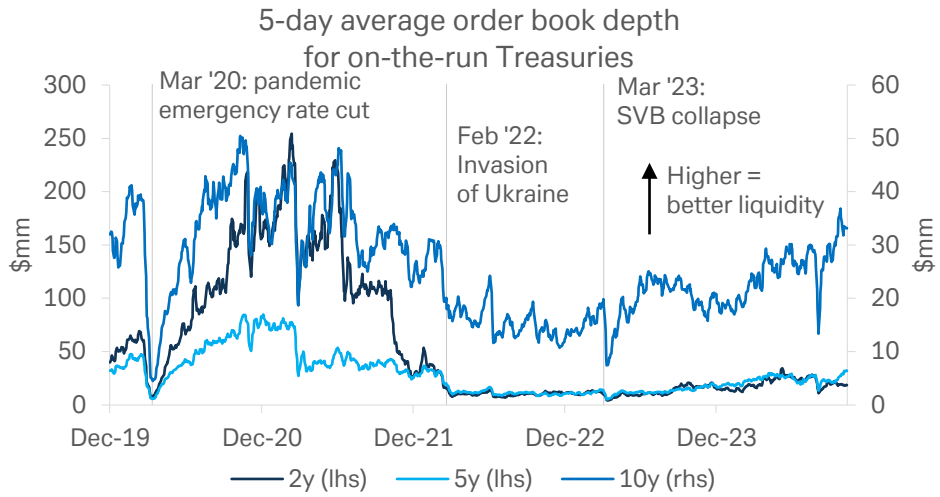
[1] See August 2024 TBAC meeting minutes

Treasury market liquidity appears robust across various metrics









Source: BrokerTec, Bloomberg Finance LP, Deutsche Bank data

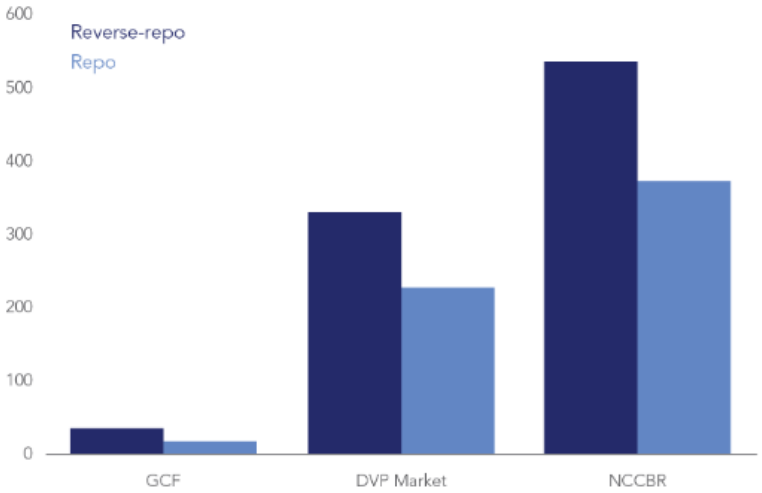
Transparency of the market

- In 2020, FINRA began monthly publication of TRACE aggregate statistics on Treasury market activity
  - In 2023, publication switched to weekly with details added (for example: daily VWAP for on-the-runs)
  - In 2024, publication began of transaction data for on-the-runs at the end of each day, initially with size caps and later uncapped historical transactions with a 6-month delay
- Feedback on the initial proposal from primary dealers was broadly supportive, although views differed on ideal cap sizes[1]
  - Dealers generally agreed that releasing transaction-level data on less liquid securities which take longer to recycle on dealer balance sheets could adversely affect bid-offer spreads and market liquidity; as a result, off-the-run transactions are not released around time of trade
  - Dealers also viewed the publication of uncapped historical transactions with a 6-month delay as having little to no impact[2]
- OFR data collection on uncleared bilateral repo (2022) enabled additional studies of the basis trade and financial leverage
- The Hedge Fund Monitor tool (2024) presents data collected across agencies to track risks associated with liquidity, leverage, and risk management
- FINRA enhanced its market oversight by reducing membership exemptions, bringing more proprietary trading firms under its supervision
- The Fed adopted extensions for dealer reports to list GC and triparty repo transactions separately, allowing for closer monitoring of the two segments

[1] See February 2023 TBAC meeting minutes
[2] See August 2024 TBAC meeting minutes

Increased transparency on non-centrally cleared bilateral repos

Figure 1. Outstanding Volume by Repo Market Segment for Pilot Participants ($ billions)



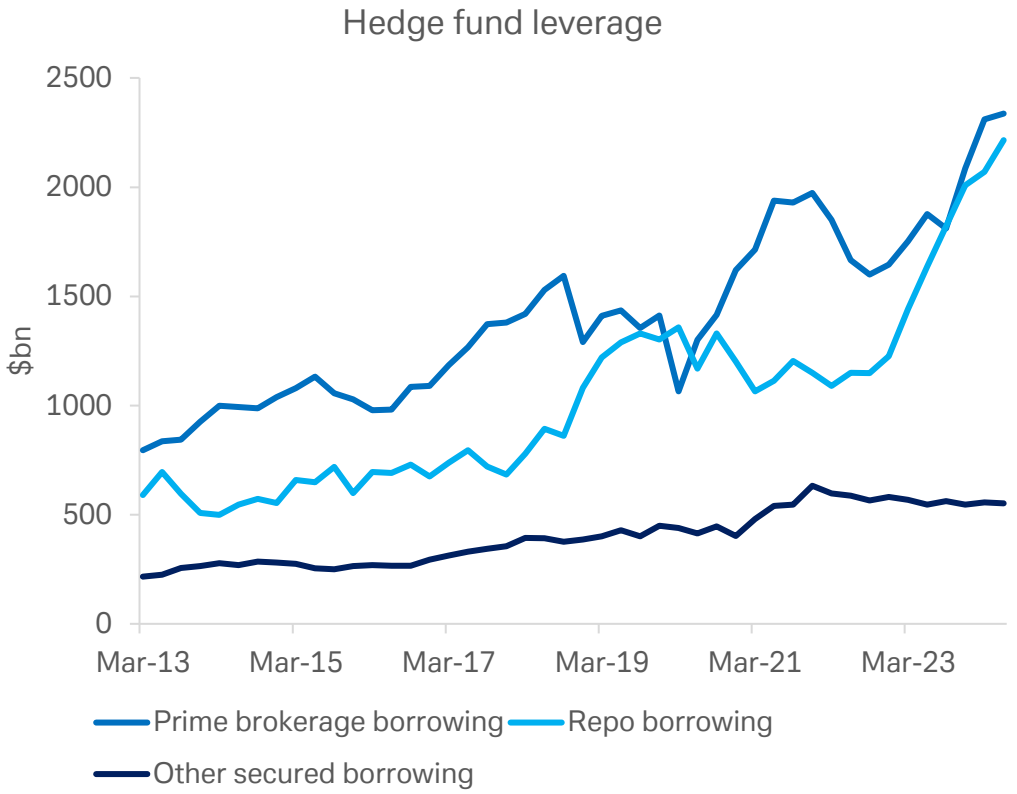
Note: Volumes are for nine pilot participants on June 15, 2022.
Sources: 2022 OFR NCCBR Pilot, OFR Cleared Repo Collection, Office of Financial Research

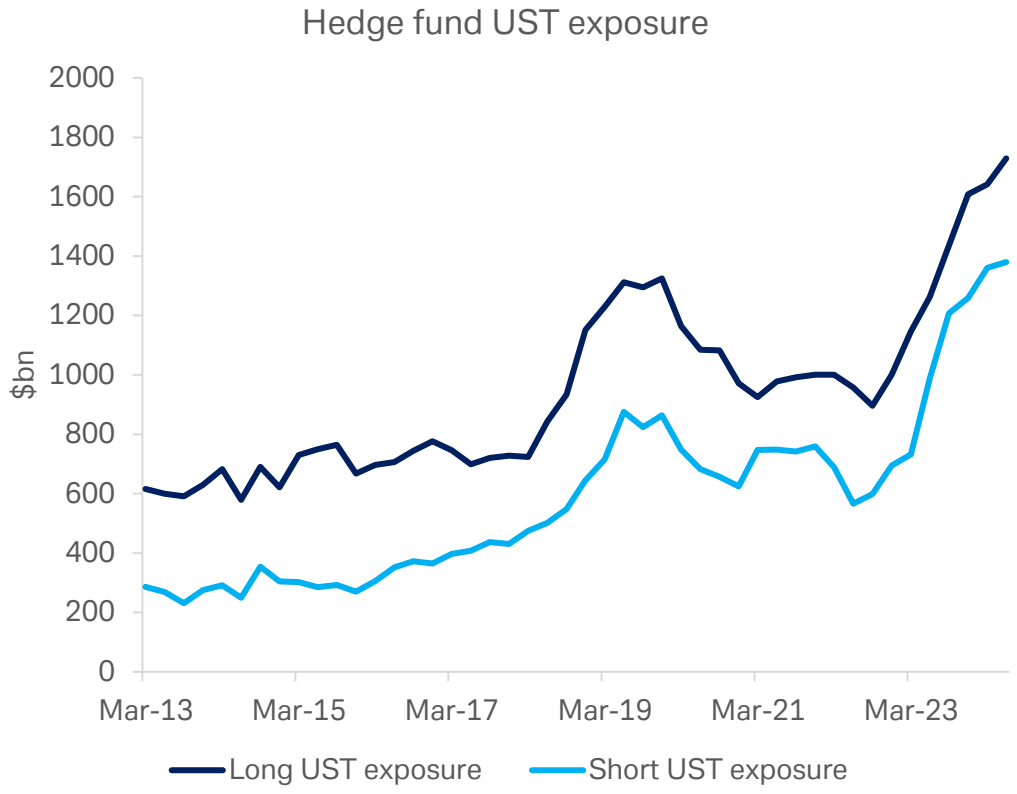
[OFR's Pilot Provides Unique Window Into the Non-centrally Cleared Bilateral Repo Market | Office of Financial Research]

[Non-centrally Cleared Bilateral Repo Data | Office of Financial Research]

	Submissions testing can begin as early as...	Compliance Date	Daily reporting begins no later than...
Category 1 Covered Reporter	July 5, 2024	December 2, 2024	December 3, 2024 11 a.m. ET
Category 2 Covered Reporter	July 5, 2024	April 1, 2025	April 2, 2025 11 a.m. ET

OFR's new monitoring tool provides additional transparency on hedge fund characteristics and potential risk factors

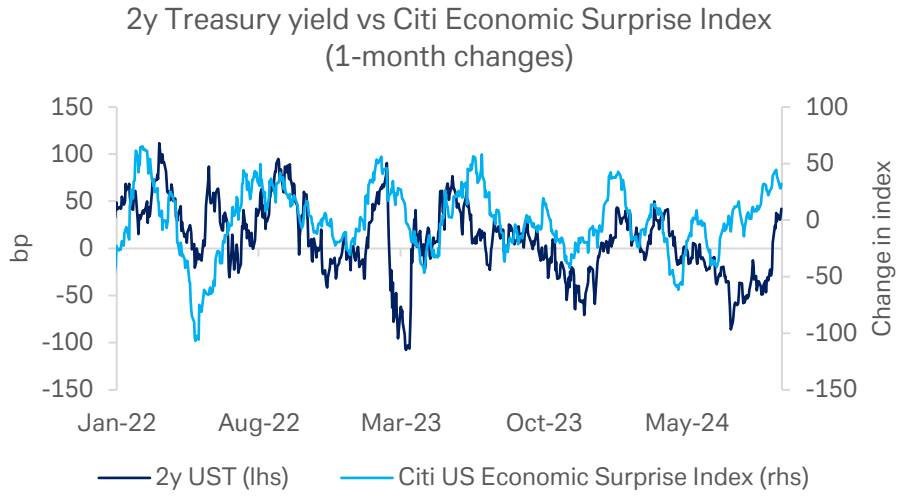


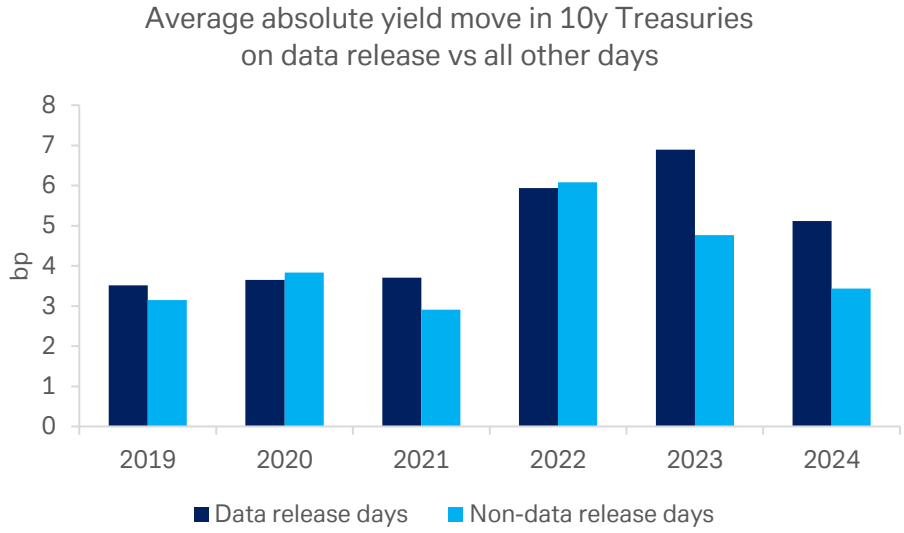


Source: OFR, SEC

Prices reflective of prevailing and expected conditions

- Treasury yields and the yield curve have seemingly reflected shifts in market expectations for the economy and Fed policy as highlighted by the high correlation between yield moves and the Citi Economic Surprise Index
- Treasury prices have responded to significant economic data releases and key market news in a swift and orderly fashion
- Low term premia[1] (potentially as a legacy effect of global QE) could affect Treasury prices and influence how they reflect prevailing and future expected conditions





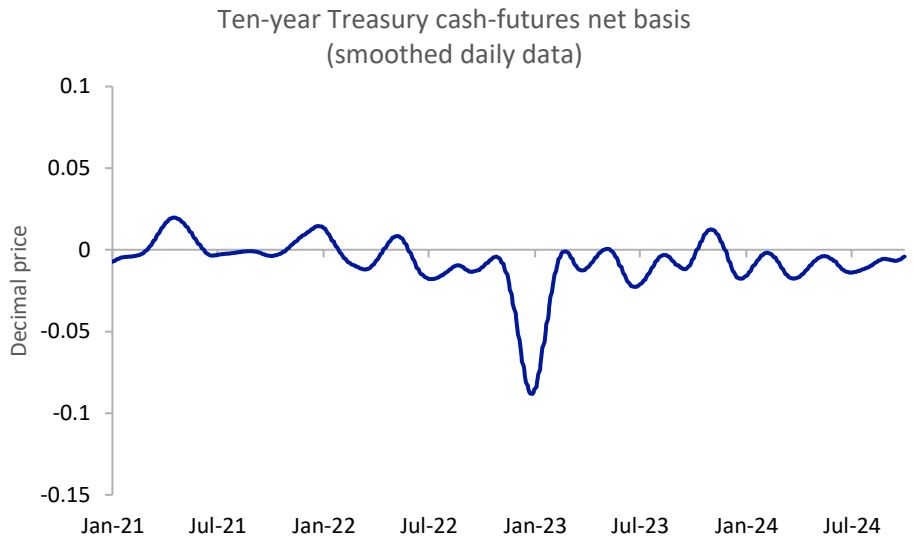
Note: Data releases include ADP employment, nonfarm payrolls, jobless claims, CPI, GDP, ISM manufacturing, PPI, PCE, University of Michigan survey

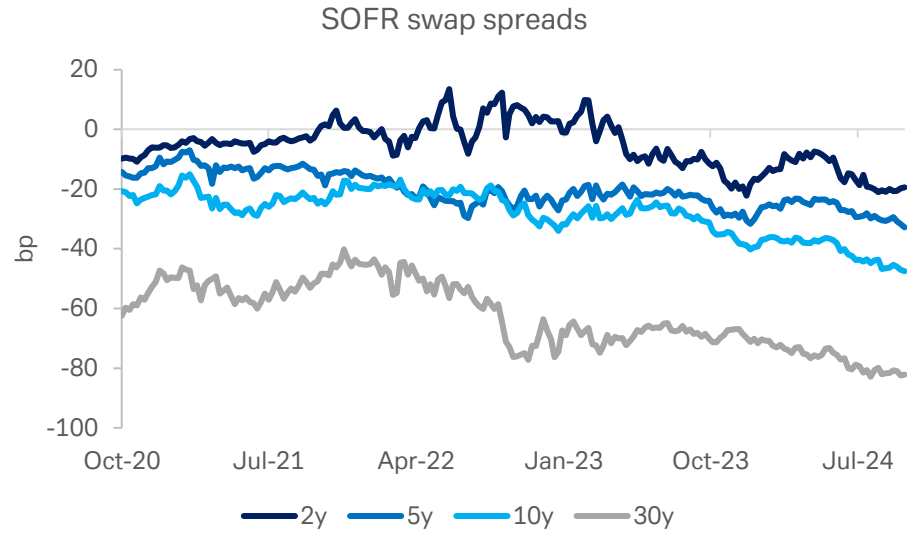
[1] See November 2023 TBAC discussion on term premia

Source: Bloomberg Finance LP, Citigroup

Economic integration across markets

- Basis and swap spread markets provide tight linkages across funding, cash, and derivatives markets. Robust volumes in these markets and large hedge fund positions in Treasuries (driven in part by basis trades) reflect healthy market integration
- However, both the Treasury-futures basis and swap spreads have steadily moved lower in recent years (cash cheapening relative to futures and swaps)
- Structural factors such as shifts in investor preference for cash vs futures[1] and the outlook for fiscal deficits likely explain these moves





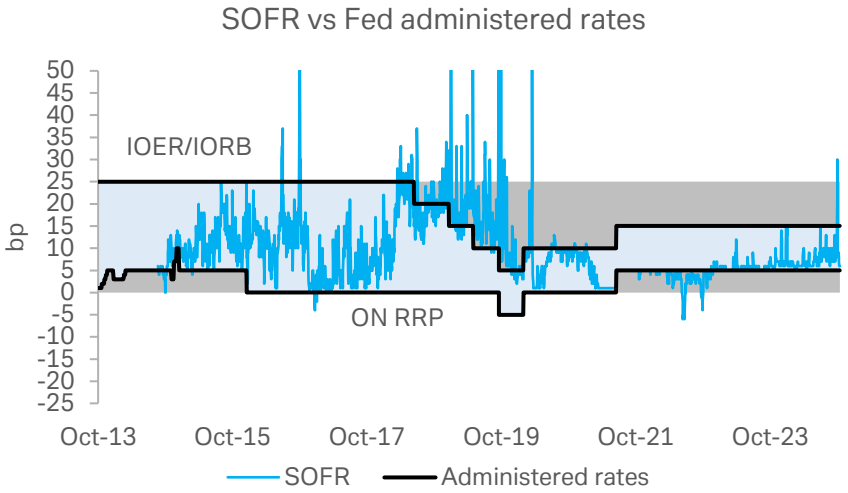
[1] See February 2024 TBAC discussion on asset manager and hedge fund use of Treasury futures

Source: Bloomberg Finance LP, Deutsche Bank data

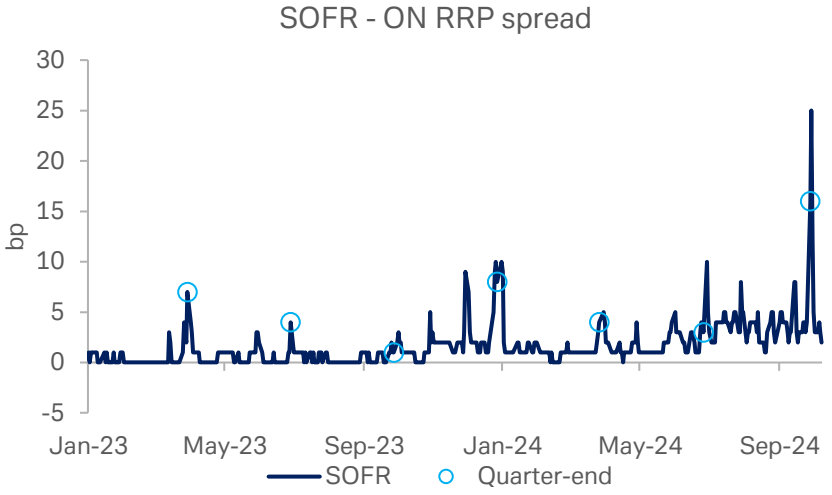
Financing risk and financial stability

- Despite increases in hedge fund presence and the basis trade[1], movements of repo relative to the Fed's administered rates have been relatively benign compared to before Covid
  - It is unclear how much of this should be attributed to IAWG efforts versus the continued abundance of funding liquidity
- Money market reform has reduced the risk of runs during periods of financial stress and keeps funding liquidity in private markets
- The Standing Repo Facility (SRF) and FIMA Repo Facility provide backstops that should reduce risks of precautionary sales of Treasuries
  - However, the facilities are untested in periods of acute stress
  - The SRF also faces limitations given its triparty structure (not centrally cleared). The late-day operation time also presents a challenge to dealers who need to borrow cash in the morning to prevent daylight overdrafts with their settlement bank. As a result, the SRF can dampen repo pressures but does not function as a ceiling on rates

SOFR remains mostly inside the Fed's target range



Increased volatility over quarter-end with SRF not being able to act as a cap

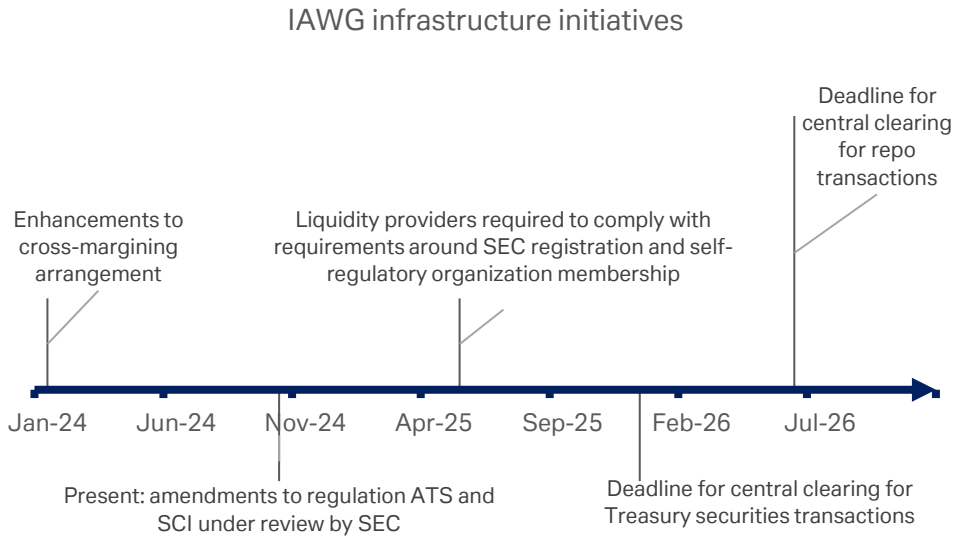


[1] February 2024 TBAC discussion charts

Source: FRBNY

Efficient and effective infrastructure

- Key liquidity providers have to register with the SEC and join a self-regulatory organization by April 2025. These requirements help ensure that dealers are acting with the responsibility and integrity required of their roles
- The completion of central clearing for Treasury securities (December 2025) and repo (June 2026) should substantially reduce settlement risks in these markets
- Amendments to Reg ATS (alternative trading system) and Reg SCI (systems compliance and integrity), currently under SEC review, should promote resilience of market systems. Proposed changes for strengthening the governance of platforms include:
  - Expanding Reg ATS by broadening the definition of exchanges to include systems for trading crypto and removing exemptions around certain ATSs specializing in USTs and repo
  - Applying fair access requirements to ATSs exceeding UST/agency security trade volume thresholds



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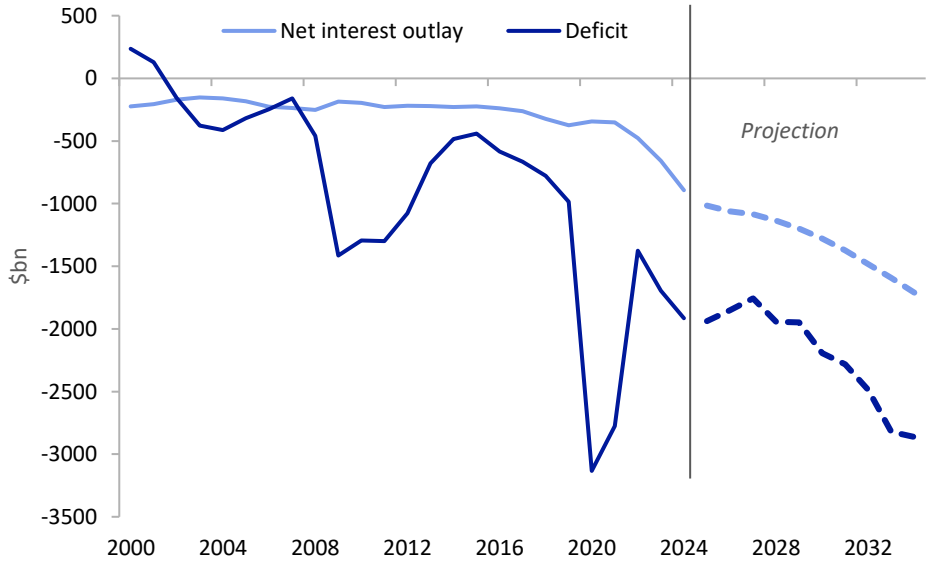
Large structural deficits leading to rapid Treasury market growth

- Treasury debt outstanding has increased by $11tn or 66% since the end of 2019, driven by pandemic-era fiscal stimulus and ongoing high deficits
- The CBO projects annual deficits of $1.8tn-$1.9tn over the next five years, rising to close to $2.9tn by 2034 under current law
- The CRFB estimates[1] that new policies could raise the national debt by $3.5tn to $7.5tn through 2035 over the CBO baseline
- Higher interest rates have increased the average coupon on Treasury securities, with interest outlays projected to exceed $1 trillion per year going forward. The high cost of debt poses substantial challenges to meaningful deficit reduction

CBO projections of the budget deficit and net interest outlay



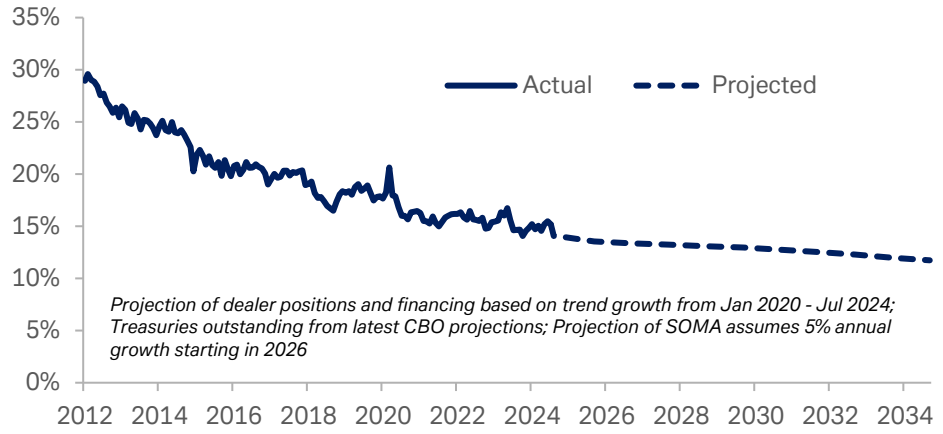
[1] See: Committee for a Responsible Federal Budget, "The Fiscal Impact of the Harris and Trump Campaign Plans"

Source: CBO June 2024 update of baseline projections

Dealer intermediation capacity has not kept pace with issuance

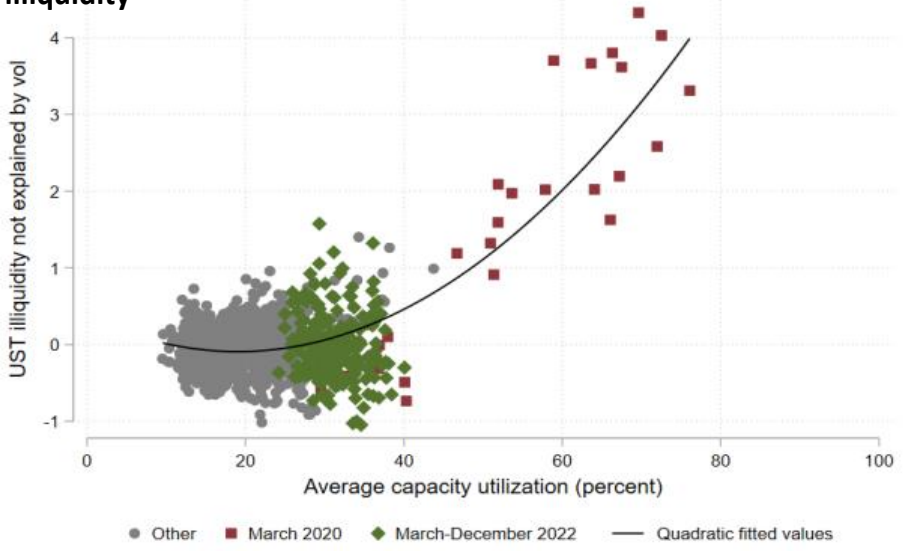
- In contrast, dealer intermediation capacity has been relatively fixed and limited by regulatory constraints
- Holding UST inventory does not generally produce sufficient returns on capital. There are many nuances to this, such as if the particular institution has balance sheet or RWAs as a constraining factor
- However, dealer balance sheets devoted to USTs have not come close to keeping pace with growth of UST debt outstanding. Assuming capital rules and bank return targets stay roughly unchanged, dealer holdings are not likely to meaningfully increase unless USTs cheapen substantially vs. swaps or futures or bid-offer spreads on off-the-runs widen a lot
- Primary dealers' intermediation capacity, when measured as gross positions and financing in Treasuries as a percentage of total market outstanding, has steadily declined over the last decade and could fall further based on trend growth and CBO's debt projections
- A 2023 FRBNY staff report[1] shows a positive relationship between Treasury illiquidity and high average dealer capacity utilization after controlling for the level of implied volatility

Primary dealer gross positions and financing in Treasuries as % of total outstanding (excl. SOMA)



Projection of dealer positions and financing based on trend growth from Jan 2020 - Jul 2024; Treasuries outstanding from latest CBO projections; Projection of SOMA assumes 5% annual growth starting in 2026

High dealer capacity utilization correlated with Treasury market illiquidity

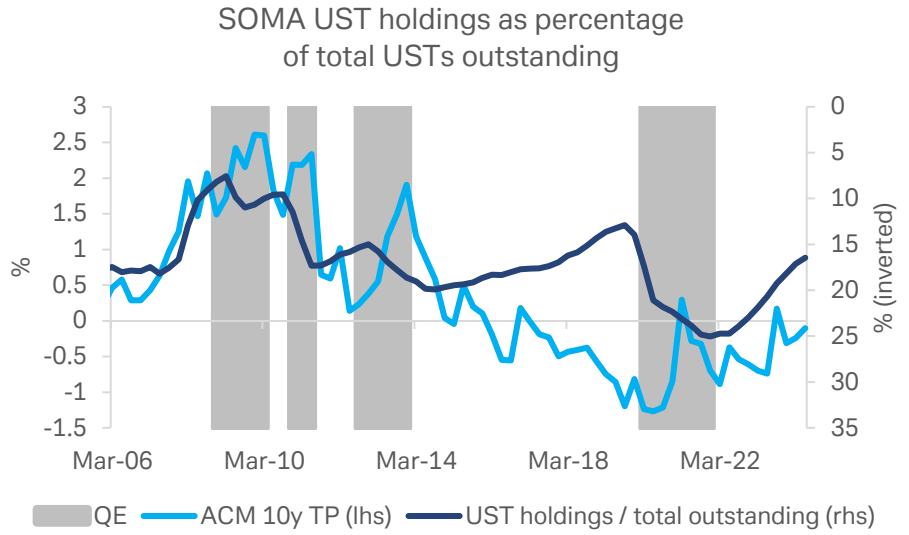


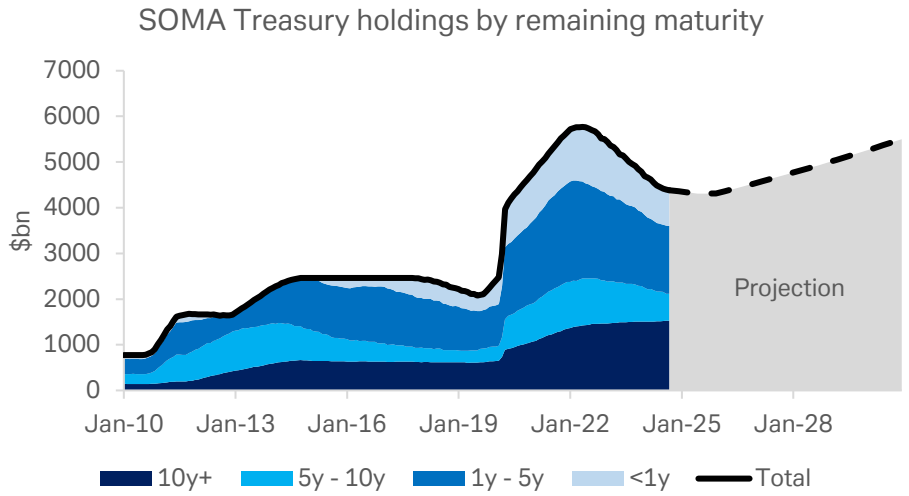
[1] *See: FRBNY Staff Report: "Dealer Capacity and U.S. Treasury Market Functionality". Treasury illiquidity measured by the first principal component of six illiquidity measures (price impact, bid-ask spread, order book depth, RMSE, price dispersion, and OTR premium). Average capacity utilization measures based on dealer gross positions, dealer net positions, gross dealer-to-customer volume, and net dealer-to-customer volume.*

Source: CBO, Accessible data for FEDS Notes, "Assessment of Dealer Capacity to Intermediate in Treasury and Agency MBS Markets"

Increased Fed intervention

- Fed large-scale asset purchases (LSAPs) have increased in frequency and size since the GFC as the effective lower bound on the Fed's policy rate has been binding
- Reduction of the Fed's balance sheet creates an extended period of uncertainty around Treasury auction sizes and resulting supply held by the private-sector
- The Fed's adoption of an ample-reserve regime requires it to hold a large quantity of Treasuries, but the long-run maturity composition of the SOMA portfolio is an open question
- Various Fed facilities (e.g., SRF, FIMA repo, and ON RRP) enhance interest rate control and support effective monetary policy implementation, but also enlarge the Fed's presence in markets and risk encroaching on private market activities



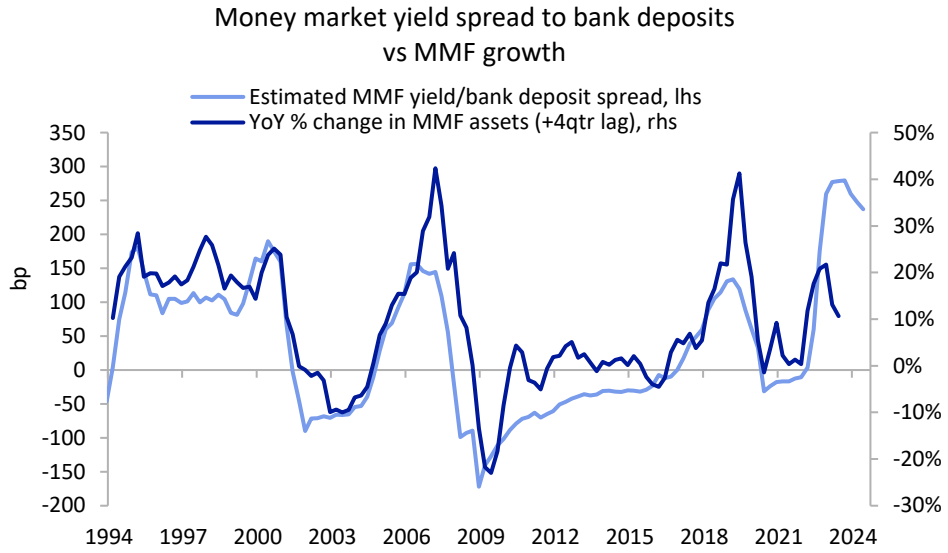


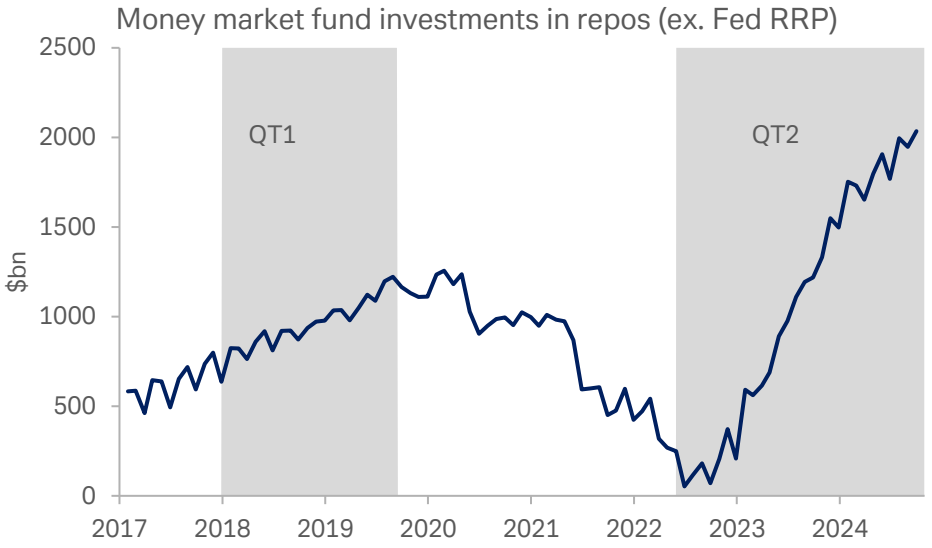
Assumes current pace of SOMA reductions through Q2 2025, and growth restarts in Q1 2026 at 5% per annum

Source: Federal Reserve Board, FRBNY

Increasing size of money market funds

- Flight to safety during Covid, capacity constraints for banks to accept deposits, and Fed rate hikes have led to money market fund (MMF) assets doubling over the past 5 years
- MMFs transmitting a higher Fed policy rate to their investors, and banks unable or unwilling to raise deposit rates due to margin pressure, could sustain or increase the relative attractiveness of MMFs, keeping their assets elevated for the foreseeable future
- High MMF asset levels combined with weaker bank deposit growth could shift the demand for Treasuries away from the intermediate sector and toward T-bills and FRNs
- Additionally, high MMF assets could encourage the use of repo leverage, as money market funds have a higher propensity and a lower opportunity cost for lending into repo markets compared to commercial banks. This dynamic could influence the behavior of leveraged investors, such as hedge funds, and potentially drive their increased presence in the Treasury market

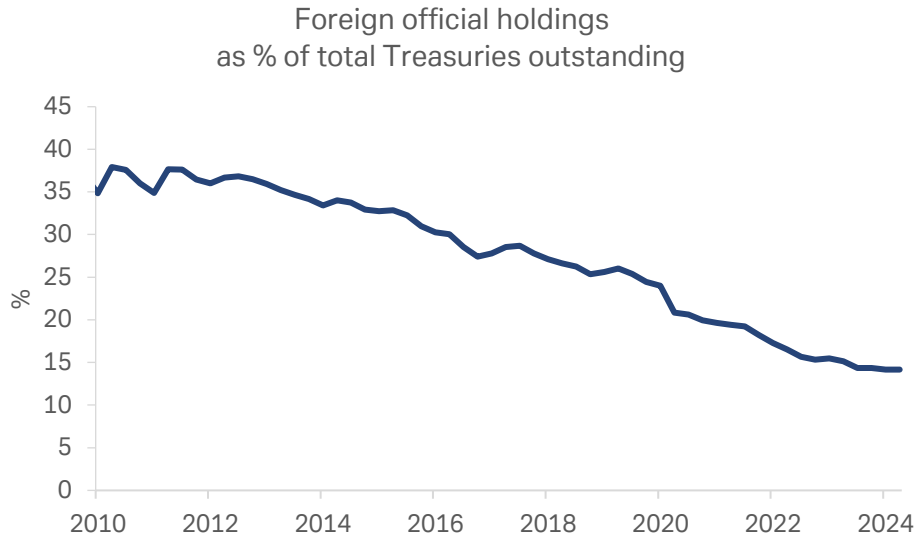


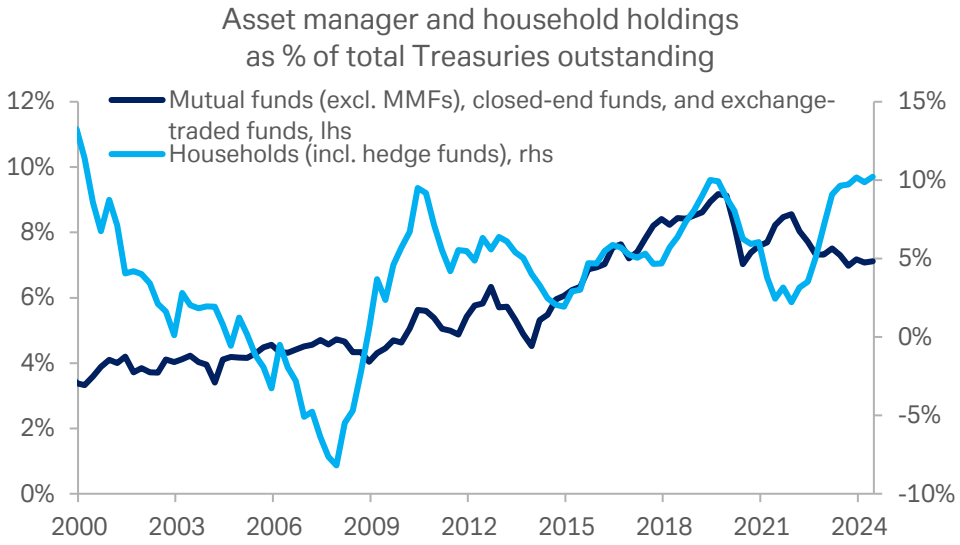


Source: Treasury, FDIC, Investment Company Institute, FRBNY

Shifting preferences of reserve managers and asset managers

- The decline in the share of foreign ownership of Treasuries has been driven by foreign official sector as demand has not kept pace with market growth
- While cyclical factors like yields and the exchange value of the US dollar may influence demand[1], the longer-term trend since 2010 suggests that more structural elements, such as a desire for diversification and rise of alternative investment opportunities, could be driving the reduction in ownership share
- At the same time, the share of Treasuries owned by domestic asset managers may have peaked. A previous TBAC study[2] suggests a preference shift by asset managers toward Treasury futures for a host of reasons (simplified execution, elimination of repo interest expense reporting, more flexible use of leverage)
- Persistent and elevated demand from asset managers for Treasury futures contributes to conditions for attractive basis trades, leading to a symbiotic relationship between asset managers and hedge funds and increased presence of hedge funds in the Treasury market





[1] See August 2024 TBAC discussion on outlook for demand of Treasury securities
[2] See February 2024 TBAC discussion on asset manager and hedge fund use of Treasury futures

Source: Treasury, Federal Reserve Board

Rise of non-traditional investor types

Electronic and high-frequency trading

- The shift of market intermediation towards principal trading firms (PTFs) and high-frequency trading (HFT) contributes to increased market liquidity in normal market environments and helps promote efficient price discovery
- However, PTFs typically hold less capital than bank-affiliated dealers, which could increase the vulnerability of the financial system. PTFs and HFT firms may also exacerbate market stress by withdrawing liquidity amid extreme market volatility, such as during Covid
- High-frequency trading also has increased the pace of market developments, which brings faster innovation but reduces the time for the official sector to evaluate and implement policy responses in times of financial stress

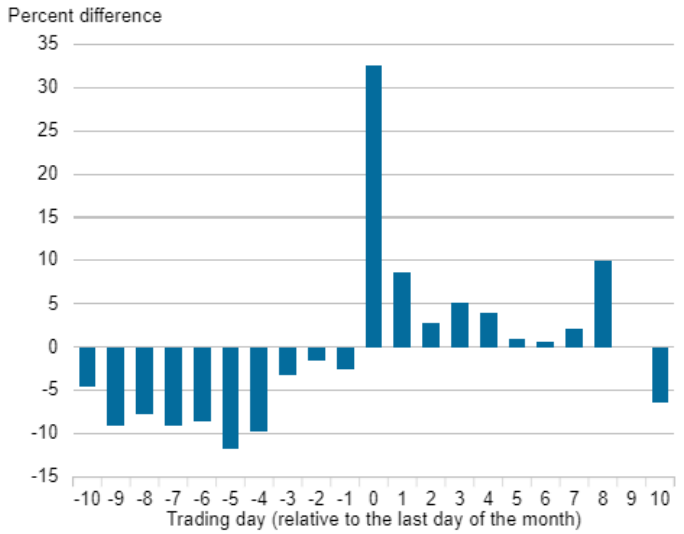
Index investing

- The increasing prevalence of index investing may enhance market liquidity by increasing end-user demand for Treasuries
- However, it also increases month-end trading volumes, potentially creating a large idiosyncratic day-of-month effect as discussed in a recent Liberty Street Economics blog[1]

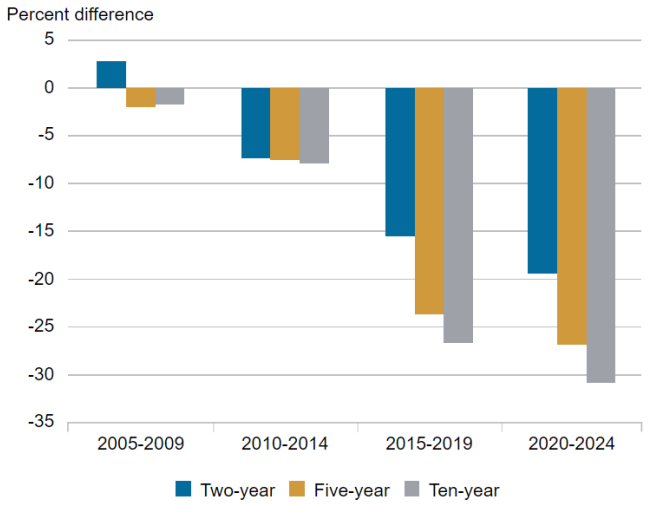
[1] See "End-of-Month Liquidity in the Treasury Market", Liberty Street Economics

Rise in month-end trading volume

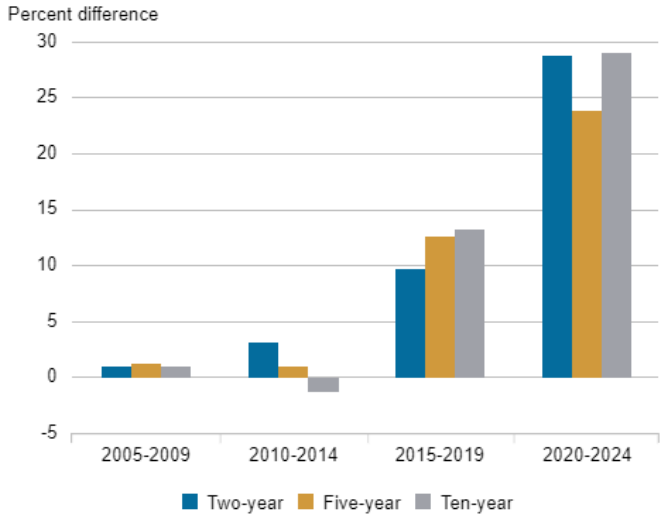
Trading Volume Is Higher on the Last Day of the Month



End-of-Month Price Impact Effects Have Been Increasing in Magnitude over Time



End-of-Month Effects Have Been Growing over Time



- Both the quantity and size of Treasury settlements have grown since Covid and with the introductions of the FRN and the 20-year bond. There have been notable increases in month-end trading volume
- Trading becomes very active into the 4pm close at month-end as pensions rebalance and indexers extend to match their benchmark, with improved Treasury market liquidity on those dates

[1] See "End-of-Month Liquidity in the Treasury Market", Liberty Street Economics

Source: FRBNY

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Centrally clear the Standing Repo Facility[1]

- **Issue:** The SRF may have limited impact on funding pressures that arise from limits to dealer intermediation capacity because borrowing in the facility is not netted
- **Policy consideration:** Centrally clear SRF operations to enable netting of funds borrowed to support onward lending to other market participants
- **Improves:** Liquidity, Pricing, Financing

[1] *"To further enhance the effectiveness of our tools, the FOMC could consider the benefits of centrally clearing SRF and other open market operations. Central clearing would reduce our counterparties' cost of intermediating funding to the broader market.",* Lorie Logan speech "Normalizing the FOMC's monetary policy tools", October 21, 2024.

"Several [FOMC] participants suggested that, in order to ensure an SRF continues to be effective, it may be appropriate to study the costs and benefits of additional adjustments over time, such as moving to a cleared settlement structure.", June 2021 FOMC meeting minutes.

SLR exemptions

- **Issue:** The SLR disincentivizes banks from holding low-risk, high-quality assets because they count toward banks' total exposure, which increases the amount of costly regulatory capital they are required to hold

- **Policy consideration:** A countercyclical design to temporarily exempt Treasuries and central bank reserves from the SLR, in either a systematic or discretionary fashion, to allow banks to support market liquidity during market stress. A permanent exemption could also be considered as part of holistic update of bank capital rules that balances the liquidity needs of the financial system while preserving resilience and stability of banks

- **Improves:** Liquidity, Pricing, Economic integration

Consistent treatment of leverage expenses for cash and futures

- **Issue:** The 40-Act expense accounting requires interest expense associated with repos to be reported separately, which drives mutual funds toward the use of Treasury futures instead of cash securities
- **Policy consideration:** (a) exempt repo interest from expense ratios; (b) require disclosure of leverage expense embedded in the use of futures
- **Improves:** Liquidity, Transparency, Pricing

Address challenges for CCP implementation

- **Issue:** Central clearing for Treasuries and repo is going to be impactful, however there are outstanding implementation challenges. One is that central clearing could increase margin for clients unless and until client cross margining is more established. If that happens, leverage funds will require higher implicit financing rates in cash-futures basis trades, which could hurt demand from asset managers and increase cost to the taxpayer

- **Policy consideration:** Work with participants to develop cross-margining between FICC and CME

- **Improves:** Infrastructure, Liquidity

Month-end resiliency

- **Issue:** Increased volumes that go through in the last 15 minutes of a month-end put strains on systems and increases the risk of human error
- **Policy consideration:** A greater focus on primary dealers' infrastructure and contingency planning; possible inclusion of month-end scenarios to stress testing
- **Improves:** Resiliency

Conclusion

- While it is difficult to isolate the impacts of IAWG initiatives, liquidity has been solid, prices have reacted sensibly to data on Fed policy and economic conditions, and market functioning has been resilient during periods of stress
- IAWG initiatives designed to increase transparency have been helpful in increasing the dissemination of information for private and public parties to evaluate market risks, with OFR data collection on bilateral repo and FINRA's release of transaction-level data as recent examples
- Potential concerns such as the large deficits, limited growth in dealer intermediation capacity compared to increases in issuance, the change in demand for Treasuries from traditional parties such as asset managers, and the growing role of PTFs in market intermediation are risk factors that should be monitored
- The IAWG should consider additional initiatives such as centrally clearing the SRF, various ways of exempting Treasuries from the SLR, and putting a greater focus on risks generated by month-end spikes in trading volume for existing stress tests

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IAWG workstreams

Workstream 1 (improving the resilience of market intermediation): Investigating factors that go into market intermediation and fixing flaws helps maintain smooth market functioning in times of market stress, especially as increases in USTs outstanding have outpaced dealer balance sheet growth in recent years.			
Initiative	***Description/Motivation***	***Progress to-date***	***Future***
Treasury buyback program	Improves liquidity in markets and increases dealer confidence	Launched in May 2024, cash management buybacks launched in September 2024.	The Treasury will continue buybacks and may consider incremental updates as it gains experience.
SEC dealer registration requirement	Key liquidity providers have to register with the SEC, join a self-regulatory organization, and comply with related laws	In 2022, the SEC first proposed new rules before adjusting and adopting these rules in Feb 2024. In Apr 2024, the rules went into effect.	Compliance date is in Apr 2025.
Analysis of off-the-run market structure and liquidity	Examines how potential changes in UST market structure could contribute to resilience of intermediation	From 2023 – 2024, IAWG staff analyzed off-the-run UST markets by producing liquidity measures, studying trade activity, and reaching out to market participants.	A working paper leveraging IAWG staff research is expected to be released in the future.
FINRA membership exemption amendments	Amendments reduced the scope of previous exemptions to FINRA membership	In August 2023, amendments rescinding a prior exemption were adopted such that proprietary trading firms that are SEC-registered broker-dealers must generally join FINRA.	N/A
Study on all-to-all trading	More widespread all-to-all trading could enhance the supply of liquidity in the Treasury market	In Oct 2022, IAWG staff produced a report titled "All-to-All Trading in the U.S. Treasury Market" on how Treasury market structure affects intermediation capacity.	N/A
SRF/FIMA repo	The establishment of facilities helps with pressures in money markets that affect the implementation of monetary policy	In Jul 2021, the establishment of these facilities was approved.	N/A
Workstream 2 (improving data quality and availability): Given periods of stress in the UST market, high-quality data allows public and private sectors to monitor market conditions and changes in market structure. Timely and robust data allows officials to tackle vulnerabilities in the market and respond appropriately to issues.			
FINRA end-of-day data dissemination	Release of detailed transaction data increases the transparency of the UST market	In Mar 2024, began releasing transaction-level data for OTR USTs (with trade size caps) at end of each trading day. In Apr 2024, began releasing data on uncapped transactions (6-month delayed basis).	N/A
Non-centrally cleared bilateral repo (NCCBR) transaction reporting	NCCBR is the last U.S. repo market segment lacking a transaction-level data source	Rule was finalized in May 2024, requires daily reporting of NCCBR transactions by certain brokers, dealers, and other financial companies with large exposures.	Covered brokers and dealers will be required to report data starting in early Dec 2024.
Extension of government securities dealer reports	Extension of form allows for more data on repo markets	In Jul 2024, adopted extension for the FR2004C to separately list sponsored GC and traditional triparty repo transactions.	N/A
Form PF and Form N-MFP improvements	Changes to the forms help improve reporting by market participants	In Jul 2023, changes to Form PF and N-MFP adding additional reporting requirements were adopted. In Feb 2024, changes to Form PF designed to improve monitoring of systemic risk and oversight of private fund advisers were adopted.	Compliance date for amendments is in Mar 2025.
Treasury Market Practices Group (TPMG) guidelines on voice trades	Improved guidelines help maintain consistent price transparency across voice and electronic trade execution	At start of 2024, the TMPG updated its best practice recommendations to improve clarification around publishing voice trades to electronic trading screens.	N/A
Securities lending data collection final rule	The rule gives more data and transparency on securities lending transactions	Rule adopted in Oct 2023 requiring "covered [people]" who agree to a covered securities loan to provide information to a registered national securities association.	N/A
TRACE data enhancements	Improvements to TRACE data allow for officials to receive and analyze data in a timelier fashion to gain additional insights into UST transactions	In Aug 2022, rule amendment enabling the release of aggregated UST data on a more frequent basis was approved. In Feb 2023, FINRA replaced weekly reports on aggregate Treasury securities data with daily and monthly reports that provided additional information. In May 2023, FINRA began requiring members to report transactions as soon as practical (no later than 60 minutes from the time of execution). In Nov 2023, FINRA started requiring members to report the time that transactions were executed to the finest increment possible.	N/A

Source: IAWG staff progress reports

IAWG workstreams (cont.)

Workstream 2 (improving data quality and availability): Given periods of stress in the UST market, high-quality data allows public and private sectors to monitor market conditions and changes in market structure. Timely and robust data allows officials to tackle vulnerabilities in the market and respond appropriately to issues.			
Initiative	***Description/Motivation***	***Progress to-date***	***Future***
Study of data available in UST markets	A better understanding of available data helps the IAWG identify and investigate potential areas of improvement	In Mar 2023, the TMPG released a white paper on availability of data in Treasury markets based on research, outreach to market participants, and previous notes from 2021 to 2022.	N/A
Participant identifiers	The universal use of legal entity identifiers (LEIs) would help streamline data compilation on market participants	In 2022, IAWG staff formed a working group to evaluate the official sector's ability to identify participants' activities across data collections. The working group identified several potential solutions focused around the use of common entity identifiers in data collections.	N/A
Workstream 3 (evaluating expanded central clearing): Central clearing is used to reduce risk and improve efficiency, but certain sectors in the UST market are not centrally cleared. Bringing central clearing to these sectors brings benefits and downsides.			
Adoption of SEC rules on clearing of UST transactions	Rules were amended to reduce risks, improve market efficiency, and increase regulatory visibility into the market	Amendments proposed in Sept 2022 to improve risk management and provide clearing for certain transactions. All direct participants in covered clearing agencies (CCAs) were to submit eligible secondary market transactions in USTs for clearance and settlement. In Dec 2023, these amendments (with modifications) were adopted.	Amendments on expanded access to clearance and settlement services, improvements to CCAs' risk management practices, and protection of customer assets have a compliance date in Mar 2025. Compliance by CCAs' direct participants is required by Dec 2025 and Jun 2026 respectively for cash and repo transactions. The FICC has filed three sets of proposed changes to rules aimed at implementing SEC amendments to CCA standards. SEC staff are currently reviewing the proposals.
Enhancements to cross-margining	The changes improved efficiency and reduced risks through the modification of procedures and eligible products	In Sept 2023, CME and FICC rule changes enhancing the cross-margining arrangement were approved, with these changes launched in Jan 2024.	N/A
Study of Secured Financing Transactions (SFT)	Studying SFTs allows for the identification of potential risk and resiliency issues	In Nov 2021, the TMPG released note on current clearing and settlement processes for common SFT types. In Nov 2022, the TMPG published a white paper on potential risks in SFT clearing and settlement.	N/A
Workstream 4 (enhanced trading venue transparency and oversight): Effective oversight of trading venues is important as their efficiency and effectiveness affects the authorities' goals for Treasury market resilience.			
Proposals to amend Regulations ATS and SCI	With Alternative Trading Systems (ATSs) becoming a large player in the interdealer UST market but with less regulatory oversight compared to their counterparts in credit or equity markets, applying additional regulations to ATSs would improve transparency and protect investors	In 2020, original proposal on ATSs which participate in repo transactions collateralized by USTs was submitted. In 2022, the SEC re-proposed these changes and suggested broadening definition of exchanges in an SEC rule to include marketplaces that offer the use of non-firm trading interest and communication protocols to bring together buyers and sellers of securities. In Apr 2023, the SEC amended definition of exchanges, provided information on how this proposal would apply to crypto, and solicited comments on alternative rule text to the 2022 proposal, reopening the comment period in the process.	The SEC continues to review and analyze comments on the proposed changes to Regulations ATS and SCI.

Source: IAWG staff progress reports

IAWG workstreams (cont.)

Workstream 5 (examining effects of leverage and fund liquidity risk management practices): Given the growing influence of hedge funds and open-end funds on the UST market and the highly-leveraged nature of the latter, they pose a risk to market stability (especially during periods of financial stress) as they can magnify the impact of price movements.			
Initiative	***Description/Motivation***	***Progress to-date***	***Future***
Activities of the Hedge Fund Working Group (HFWG)	The HFWG monitors vulnerabilities in the UST market stemming from hedge funds, helping address risks to market stability	In Jul 2024, the OFR launched a hedge fund monitor which provides the public with data on hedge fund leverage. The HFWG briefed the Financial Stability Oversight Council on the latest developments in risks related to hedge funds and policy initiatives on these risks. Based on case studies, HFWG staff have identified three channels where hedge funds create stability risks.	The HFWG continues to refine its risk monitoring framework to proactively address threats. The HFWG has been monitoring the growth of the basis trade and the increase in hedge fund borrowing. The HFWG has continued studying potential vulnerabilities stemming from haircutting practices in NCCBR market given the popularity of the basis trade.
Activities of the Treasury Market Practices Group (TMPG)	The TMPG supports the integrity and efficiency of the UST, agency debt, and agency MBS markets	In 2024, the TMPG established a working group to review best risk management practices for service providers, critical venues, and clearing and settlement services given cyber events that had occurred recently. In 2023, the TMPG established a working group to better understand risk management practices in NCCBR market, conduct outreach to market participants, and consider potential changes to TMPG best practice recommendations.	The TMPG is drafting a white paper on NCCBR risk management practices after reaching out to market participants. It also plans to consider potential additions or revisions to its best practice guidance. The TMPG continues to engage on topics related to the SEC's central clearing rule, including access models at FICC and SIFMA's Treasury Clearing Standardized Documentation Project. The TMPG has continued its study of risk management practices in the NCCBR market.
Mutual fund reforms	Mutual fund reforms address problems experienced during the pandemic and provide a larger liquidity buffer in the event of rapid redemptions	In Nov 2022, the SEC voted to propose amendments to better prepare open-end funds for stressed conditions and mitigate the dilution of shareholders' interests. In Jul 2023, the SEC adopted amendments designed to reduce the risk of investor runs on MMFs during periods of market stress.	N/A
Activities of the Open-end Funds Working Group (OFWG)	The establishment of the OFWG provides for additional information around risks presented by open-end funds	In 2021, the Financial Stability Oversight Council established the Open-end Fund Working Group (OFWG) for agencies to share information and knowledge on risks to financial stability from open-end funds. In Feb 2022, the Financial Stability Oversight Council issued a statement on nonbank financial intermediation that highlighted its work evaluating and addressing the risks to financial stability, including updated findings from the OFWG and the HFWG which highlighted the roles of certain types of funds in market disruptions during the onset of the pandemic.	The OFWG will continue to monitor risks from open-end funds going forward.

Source: IAWG staff progress reports

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Digital Assets and the Treasury Market

TBAC presentation
October 2024

Charge:

A. Please comment on the effects of the growth in digital assets on the Treasury market

B. Please summarize existing efforts at using blockchain technology or tokenization for Treasury market related applications

C. How might blockchain technology be used to innovate or improve on Treasury market operations?

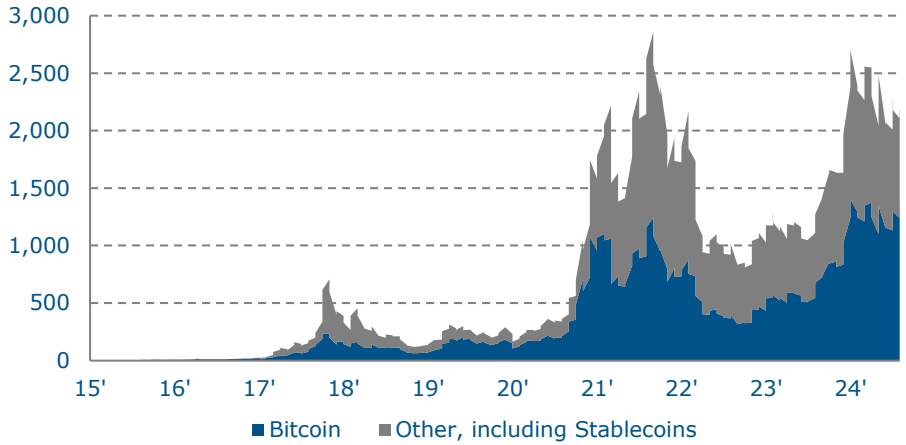
D. What are the potential benefits and costs of tokenization of Treasuries?

E. What effects might these trends have on recommended Treasury issuance or the health of the Treasury secondary market?

Trends in digit asset growth and usage – rapid growth from very low levels

- Digital assets have witnessed rapid growth albeit from a small base. Growth has come both from native crypto coins like Bitcoin and Ethereum, as well as stablecoins
- To date, household and industry adoption of cryptocurrency has been limited to holding digital assets for investment purposes**
- Digital asset market cap remains low relative to other financial and real assets, and growth thus far does not seem to have cannibalized demand for Treasuries
- The use case of digital assets continues to evolve, but interest has proceeded along two main tracks
- Primary use case for Bitcoin seems to be a store of value aka "digital gold" in a decentralized finance (DeFi) world; speculative interest seems to have played a prominent role in the growth of digital tokens thus far
- Efforts to leverage blockchain and distributed ledger technology (DLT) to develop new applications and improve the legacy financial market clearing and settlement infrastructure

Total Cryptocurrency Market Cap ($bn)



Size of Digital Assets in Relation to Other Asset Classes*

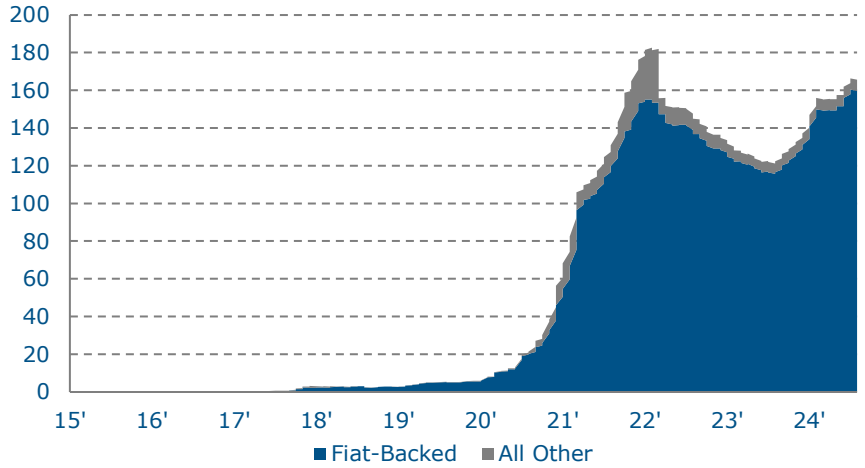
$bn	2015	2019	2024
Total Crypto Market Cap	$7.0	$197	$2,385
Bitcoin Market Cap	*$6.4*	*$134*	*$1,364*
Other Coin Market Cap	*$0.6*	*$57*	*$855*
Stablecoins Market Cap	*$0.0*	*$5*	*$166*
Total U.S. Equity Market Cap	$23,364	$33,935	$59,787
Total Marketable Tsy Debt	$13,207	$16,682	$27,728
Treasury Bills	*$1,514*	*$2,417*	*$6,005*
Total Real Estate Market Cap	$25,990	$33,479	$52,319
Money Market Funds AUM	$2,759	$3,604	$6,468
Commercial Bank Deposits	$10,991	$13,291	$17,732
Currency in Circulation	$1,426	$1,802	$2,359

Sources (all charts and tables): Coinmarketcap; BBG; FRB; ICI
* Year-end values for 2015/2019, latest available for 2024;
** FRB, "*Economic Well-Being of U.S. Households in 2023*", May 2023

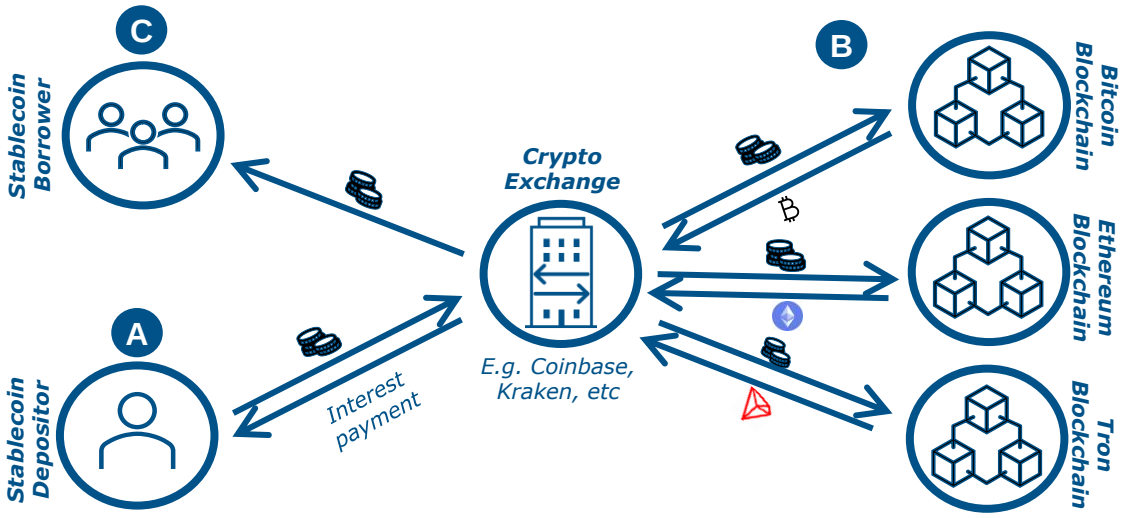
What are stablecoins and why are they growing?

- Stablecoins are a type of cryptocurrency that are designed to maintain a stable value, typically by linking the value of the currency to an underlying pool of collateral[1]
- Use has grown rapidly in recent years as the digital asset market matures, including increased demand for crypto assets with stable cash-like characteristics
- Stablecoins have also gained popularity as they have been attractive collateral to lend on DeFi networks
- While there are different types of stablecoins, fiat-backed ones have shown the most significant growth
- Stablecoins play an integral role intermediating transactions in digital asset markets - **over 80% of all crypto transactions now use a stablecoin as one leg of the transaction[2]**

Total Stablecoin Market Cap ($bn)



Main Uses of Stablecoins in the Digital Asset Ecosphere



A. An investor holds their stablecoins at a Crypto exchange. Most exchanges now pay interest on their stablecoin holdings, effectively making them (unregulated and uninsured) deposits[3]

B. Since stablecoins are issued on multiple chains, they serve as a vital source of liquidity for the exchange to facilitate transactions between and within different chains, allowing for more efficient and user-friendly cross-chain services. Over 80% of all crypto transactions involve Stablecoins[1]

C. In addition, many exchanges and defi platforms provide some sort of margin trading or direct lending services, of which stablecoins are used as the major source of funds or collateral

= Stablecoin in the diagram above

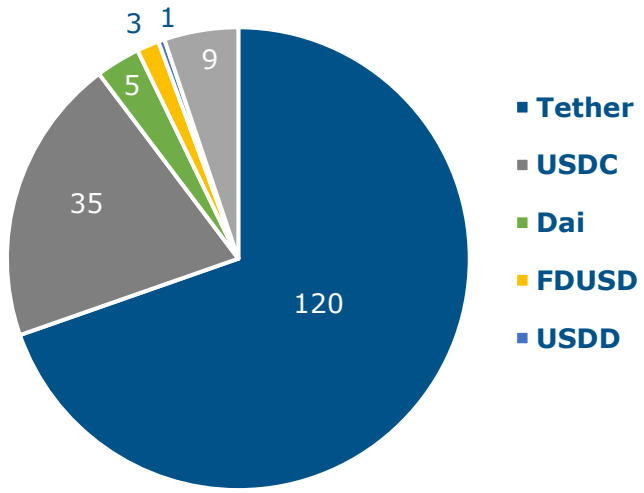
Sources (top-right): coinmarketcap.com

[1] A very small subset of Stablecoins do not link to a pool of collateral, but algorithmically create/destroy tokens to maintain their peg
[2] FRB, "*The Stable in Stablecoins*", December 2022; See also data on theblock.co
[3] This is somewhat of a simplification to make the point that exchanges are playing the economic function of banks in the digital asset ecosphere

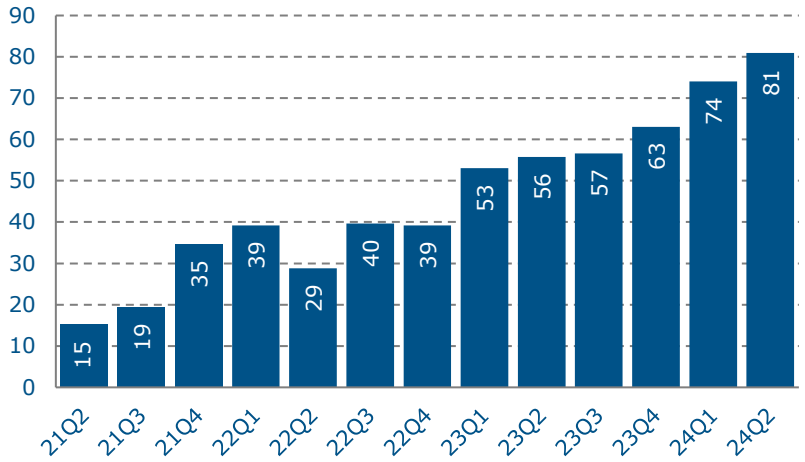
Growth in stablecoins has resulted in a modest increase in demand for short-dated Treasuries

- The most prevalent stablecoins in the market today are fiat-backed stablecoins
- A very significant portion of that collateral is taking the form of T-bills and Treasury-backed repo transactions
  - We estimate that $120bn in total stablecoin collateral is directly invested in Treasuries
- Over the near term, we expect continued growth in stablecoin markets along with the overall size of the digital asset market
- Medium-term regulatory and policy choices will determine the fate of this "private currency"
- History shows that "private currency" that does not meet NQA requirements leads to financial instability and as such is highly undesirable*

Top Stablecoins by Market Cap ($bn)



U.S. Treasury Bills Held by Tether ($bn)



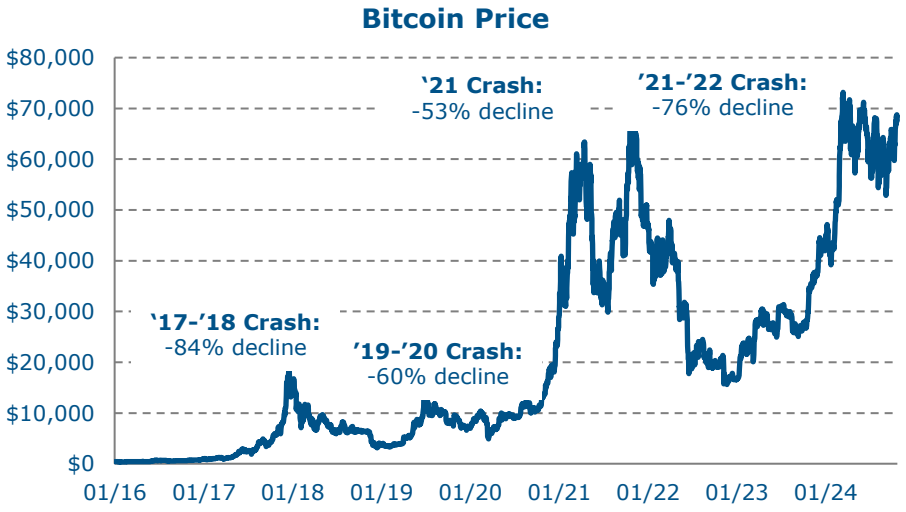
Example of Tether's 24Q2 Collateral Backing

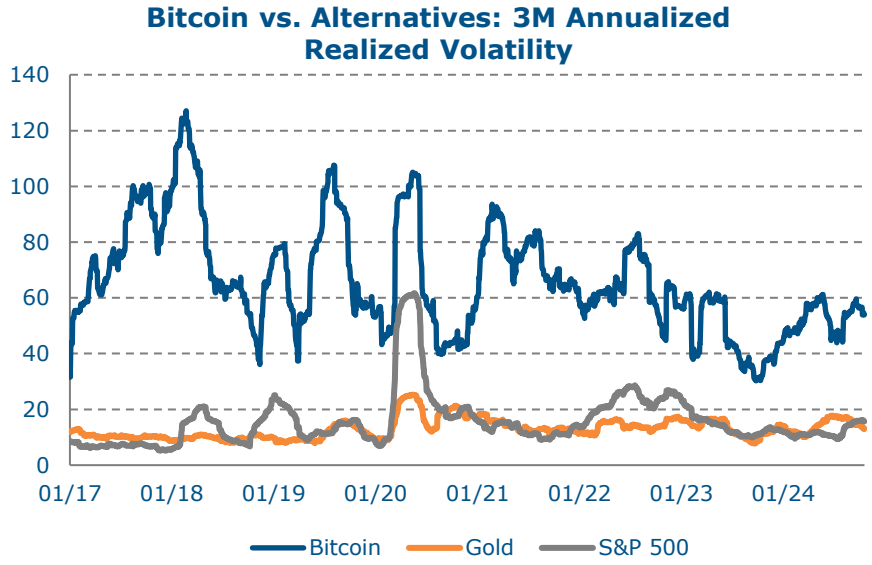
Asset	$bn	% of Total
Cash & Cash Equivalents	$99.8bn	84.2%
U.S. Treasury Bills	**$80.9bn**	**68.3%**
Repo	$12.3bn	10.3%
Money Market Funds	$6.4bn	5.4%
Cash & Deposits	$0.1bn	0.1%
Non-U.S. Bills	$0.1bn	0.1%
Corporate Bonds	$0.0bn	0.0%
Precious Metals	$3.8bn	3.2%
Bitcoin	$4.7bn	4.0%
Other Investments/Loans	$10.1bn	8.5%
Total	**$118.4bn**	**100.0%**

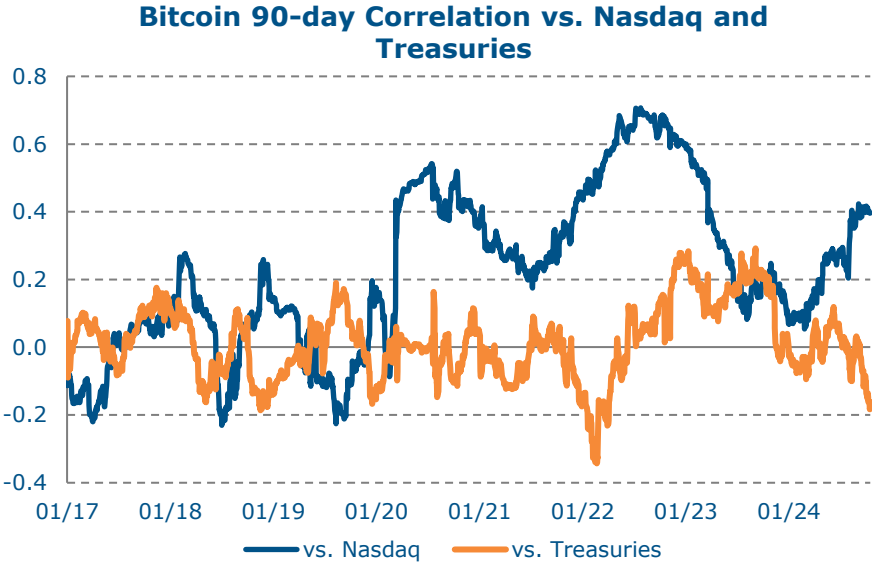
Sources (top-right to bottom-right): Tether disclosures; coinmarketcap.com; Tether disclosures
** NQA = No Questions Asked, see Gorton, Gary B., and Jeffery Zhang. "Taming Wildcat Stablecoins." The University of Chicago Law Review, 2021.*

Rapid growth and massive volatility might lead to future hedging needs and flight-to-quality demand for Treasuries

- Native crypto assets like Bitcoin have seen significant price increases in recent years, but volatility remains very high
  - Bitcoin has experienced four large price corrections since 2017
- To date, digital asset markets have limited access to traditional safe-haven or risk hedging instruments like Treasuries
- In recent years, institutional sponsorship of Bitcoin (BlackRock ETF, MicroStrategy) has been growing and crypto assets have behaved like "high beta" assets
- Structural demand for Treasuries may increase as the digital asset market cap grows, both as a hedge against downside price volatility and as an "on-chain" safe-haven asset

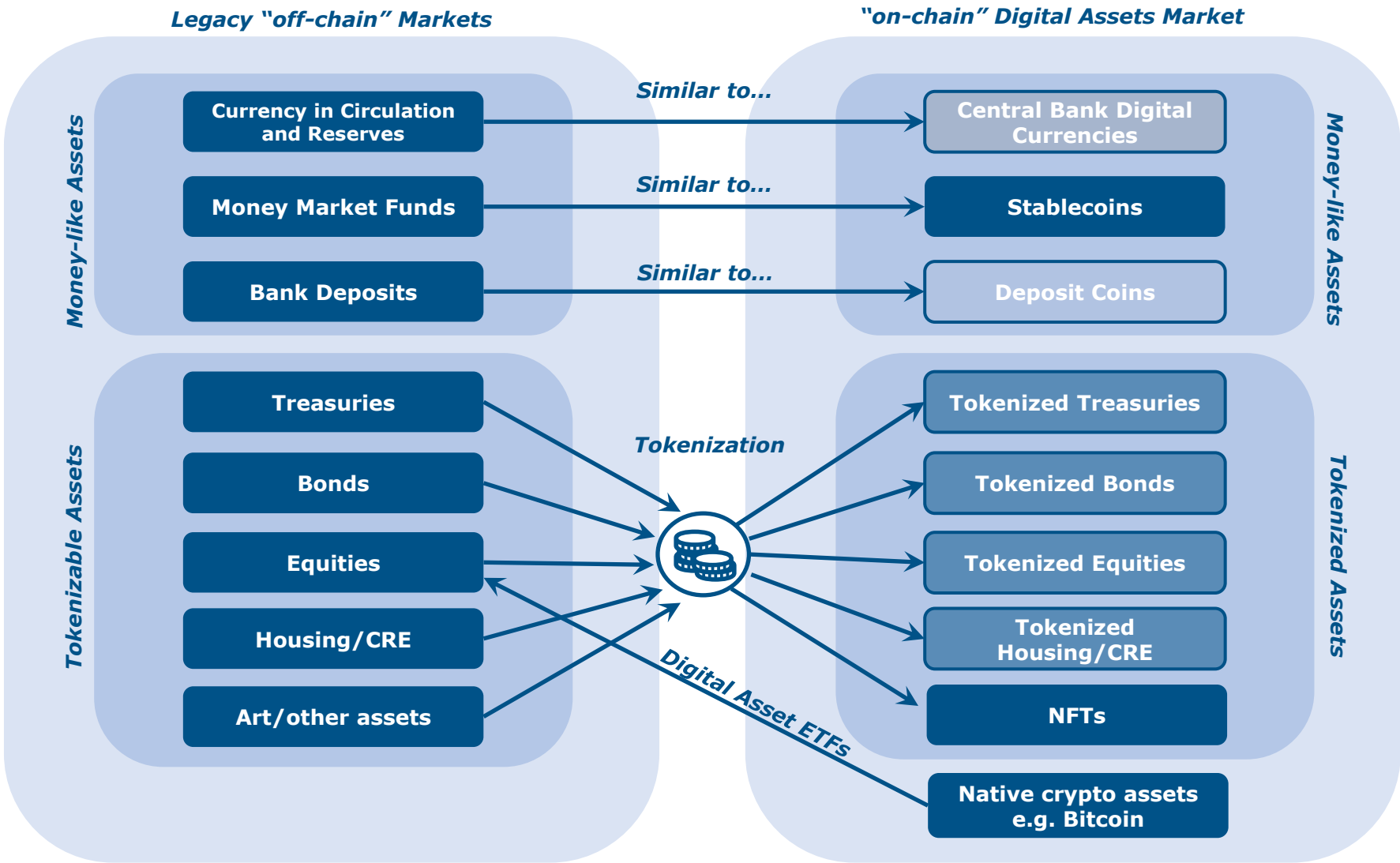






Sources (all charts): Bloomberg

Parallels between the digital asset ecosphere and existing financial markets

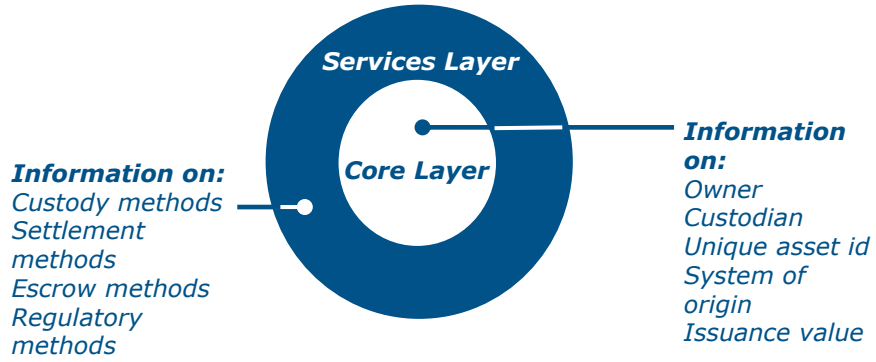


Sources: PNC

What is tokenization? A broad overview

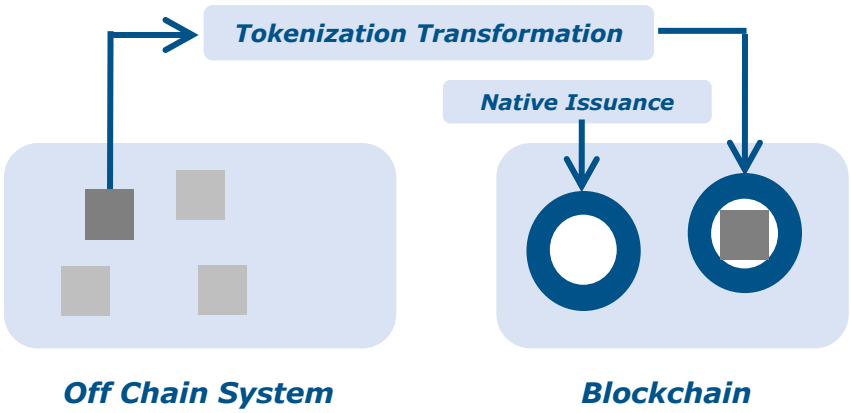
- Tokenization is the process of representing claims digitally in the form of tokens on a programmable platform like a distributed ledger/blockchain[1]
  - Tokens can be issued in "native form" on the DLT platform, or they can be digital representations of existing assets
- Tokenization has the potential to unlock the benefits of programmable, interoperable ledgers to a wider array of legacy financial assets
- Key characteristics and benefits of tokenization[2]:
  - Core and Service Layers: Tokenized assets integrate both a "core layer" containing information about the asset and ownership with a "service layer" governing rules on transfer and settlement
  - Smart Contracts: Tokenization enables automation through smart contracts, which execute transactions automatically when predefined conditions are met, allowing for contingent transfers of assets and claims
  - Atomic Settlement: Settlement can be streamlined by ensuring all parts of a transaction occur simultaneously across all parties involved, reducing the risk of settlement failure and improving the reliability
  - Composability: Different tokenized assets can be bundled together to create more complex and new financial products, allowing for highly customizable solutions for asset management and transfer
  - Fractional Ownership: Tokenized assets can be divided into smaller, more accessible portions

Anatomy of a Token: Core and Services Layer



*e.g. For a U.S. Treasury, the "**core layer**" would have information on the specific CUSIP, the owner, where it is held in custody, etc, and the "**service layer**" would contain specific instructions settlement, where the coupon payments are to be sent, etc*

Example of Tokenization



[1] BIS, *"Blueprint for the future monetary system: improving the old, enabling the new"*, 2023
[2] For more discussion see FRB, *"Tokenization: Overview and Financial Stability Implications"*, 2023, and Hilary J. Allen, *"Hearing on Next Generation Infrastructure: How Tokenization of Real-World Assets will Facility Efficient Markets"*, 2024

Promise of a tokenized financial market infrastructure

- The benefits of tokenization extend far beyond and are independent of native crypto assets like Bitcoin as well as the public, permissionless blockchain technology those assets have popularized
  - Tokenization of a variety of financial and real-word assets across interoperable ledger systems promises to unleash new economic arrangements and enhance efficiencies

- Some markets – like international payments or repo – stand to gain immediate and large potential benefits from tokenization, while the gains for other markets will be more incremental
  - The Treasury market is already highly efficient, so gains from tokenization are likely to be incremental
  - Still, even small incremental improvements in a very large market like the Treasuries market can be impactful at scale

- To fulfill this potential though, there is a need for a unified ledger, or at least a highly interoperable set of integrated ledgers that work together seamlessly[1]
  - Legacy systems are built from individually maintained ledgers that are often "siloed", with a need for complex messaging protocols between the institutions maintaining these ledgers
  - This creates significant inefficiencies and settlement fail risk for a variety of transactions which tokenization on a unified ledger could help streamline

- These ledgers will also need to be developed under the auspices of Central Banks and the foundation of trust they provide
  - The full potential of tokenization requires some monetary unit of account that denominates transactions, accompanies the means of payment, and is accepted without question by market participants
  - In a similar manner to how privately-issued "wildcat" currencies were replaced by government-backed central currencies in the late-1800s, Central Bank Digital Currencies (CBDC) will likely need to replace stablecoins as the primary form of digital currency underpinning tokenized transactions[2]

[1] BIS, *"Blueprint for the future monetary system: improving the old, enabling the new"*, 2023
[2] Gordon et al, *"Taming Wildcat Stablecoins"*, 2021

Key ongoing projects in tokenizing U.S. Treasuries

- The tokenization of U.S. Treasuries is a relatively new trend, and most projects have yet to scale; some of the notable public and private initiatives underway are as follows:

- Tokenized Treasury Funds: Provides investors access to "tokenized" forms of Treasuries on blockchains that behave in many ways like Treasury ETFs or government MMFs
  - The largest of these funds are BlackRock's BUIDL Fund and Franklin Templeton's OnChain U.S. Government Money Fund
  - Other notable funds or projects include Ondo Financial, Hashnote, and CoinShares
  - The total tokenized Treasury fund market is estimated to have a market cap of ~$2bn[1]

- Tokenized Treasury Repo Projects: Tokenized Treasuries allow for instantaneous, 24/7 settlement and trading, potentially paving the way for timelier intraday repo transactions
  - JPM's Onyx platform uses tokenized Treasuries to provide intraday, Treasury-backed repo solutions
  - Smart Contracts can be programmed directly into the tokenized Treasury that simplify and automate the transfer of Treasuries as collateral over several different transactions

- Ongoing pilot projects from DTCC and others: Several private and public market participants are running pilots using tokenization to streamline payment and securities settlement
  - DTCC/Digital Asset Treasury Tokenization Pilot[2]: Collaboration with many different financial market agents, including banks and custody agents, to use tokenized Treasuries in different applications ranging from posting/return collateral for a margin trade and hypothecating a tokenized Treasury in case of a default
  - There are also many pilot projects underway from SIFMA, the BIS, and numerous central banks around using tokenized assets to improve payments and settlement processes

[1] RWA.xyz
[2] DTCC, "*Digital Dollar Project and DTCC: Security Settlement Pilot*", 2022

Projects leveraging blockchain and tokenization

Project	Public/ Private	Description
SIFMA Multi-Asset Ledger Settlement Pilot (2024)	Private	Pilot uses shared ledger technology to explore how blockchain can streamline and enhance post-trade processes across various asset classes using a shared immutable ledger
DTCC/Digital Asset Treasury Tokenization Project (2024)	Private	Collaboration between several private-market agents to simulate four key transactions using tokenized Treasuries, including posting/returning tokenized Treasuries as collateral and seizing collateral during defaults
DTCC Project Ion (2022-)	Private	Project Ion is a blockchain-based platform launched by DTCC designed to modernize and accelerate securities settlement, offering near real-time capabilities using blockchain technology.
JPM Onyx Platform (2020-)	Private	Provides real-time, intraday repo solutions using tokenized Treasuries as collateral
Numerous Tokenization Projects	Private	Several funds now provide "on-chain" access to tokenized Treasuries with over $2bn in total market cap outstanding, including BlackRock's BUIDL and Franklin Templeton's FOBXX fund. Other platforms include RSN/RSL
Project Agorá (2024)	Public/Private	Consortium of 40 private sector financial firms, the BIS, and a group of central banks aiming to explore how tokenization can enhance wholesale cross-border transactions
Project Cedar (2024)	Public	Collaboration between the NYFRB and the Monetary Authority of Singapore to examine the use of DLT to facility cross-border payments for trade, commerce, and finance
European Investment Bank (2023)	Public	The EIB issued £50bn in digital bonds directly onto a private blockchain in 2023, the first major government entity to issue bonds directly onto a blockchain to date
Numerous CBDC Pilot Projects	Public	A 2021 BIS survey of central banks found that 86% were actively researching the potential for CBDCs, 60% were experimenting with the technology, and 14% were deploying pilot projects

Key potential benefits of tokenizing U.S. Treasuries

- Improvements in clearing and settlement
  - Tokenized Treasuries allow for more streamlined, "atomic settlement", where all parts of a transaction involving Treasuries settle simultaneously across all parties, reducing the risk of settlement failure
- Improved collateral management
  - Smart contracts programmed directly into the tokenized Treasury allow for more efficient collateral management, including pre-programmed collateral transfers once pre-set conditions are met
- Improved transparency and accountability
  - Immutable ledgers could allow for greater transparency in Treasury market operations, reducing opacity, and providing regulators, issuers, and investors with more real-time insight into trading activities
- Composability and innovation
  - The ability to bundle different tokenized assets could lead to the creation of new and highly customizable financial products and services based on U.S. Treasury securities, such as derivatives and structured products
- Increased inclusion and demand?
  - Tokenization can make Treasuries more accessible to a wider range of investors, including smaller retail investors through fractionalization and those in emerging markets
- Increased liquidity?
  - Tokenization could potentially create new investment and trading strategies through seamless integrations and programmable logic; tokenized Treasuries may trade 24/7 on blockchain networks, though the impact of this could work in two ways

Tokenization of the Treasury market holds promise but needs further study; caution is warranted as the Treasury market is already highly liquid and efficient

Potential risks and challenges in tokenizing U.S. Treasuries

Although the tokenization of U.S. Treasuries has potential benefits, design choices can present certain risks and challenges that need to be carefully considered

- Technological Risks:
  - Tokenized infrastructure will be difficult to develop in parallel in a cost-effective manner and is unlikely to be as efficient as the legacy market until it achieves sufficient scale ("incumbent advantage")
  - It is unclear if DLT platforms offer a compelling technological advantage versus legacy systems and transition costs are also likely to be high given a large and growing installed base of Treasuries
  - Cybersecurity Threats: Certain types of DLT solutions (public, permissionless blockchains) are vulnerable to hacking and other cybersecurity attacks, which could pose risks to the security of tokenized Treasuries
- Operational Risks:
  - Counterparty Risk: Investors may be exposed to counterparty risk, which is the risk that the issuer or custodian of the tokenized securities may default on their obligations
  - Custody Risks: Ensuring the safekeeping of tokenized Treasuries requires robust custody solutions, and there may be challenges associated with the custody of digital assets
  - Privacy Issues: Some participants will view the increased transparency of public blockchains as a downside
- Regulatory and Legal Uncertainty:
  - Evolving Regulations: Legal requirements/compliance obligations regarding tokenized assets remain unclear
  - Jurisdictional Challenges: Varying regulatory frameworks across jurisdictions can complicate cross-border transactions and create legal complexities
- Financial Stability and Market Risks if the tokenized markets grows significantly:
  - Contagion Risk
  - Complexity and Interconnectedness
  - Banking/Payment Disintermediation
  - "Basis Risks"
  - 24/7 Trading: Could make it more vulnerable to market manipulation and higher volatility

Financial stability risks in a future state when the tokenized market is significantly bigger

- Contagion and Interconnectedness Risk:
  - Tokenization provides a bridge by which "on-chain" asset volatility could spill over into the broader financial markets as the size of tokenized assets become more significant
  - In times of stress, seamless ledgers can become a negative as deleveraging and fire sales can rapidly spread across assets
- Liquidity and Maturity Mismatch Risk:
  - Potential to have liquidity and maturity mismatches between non-native tokens and the underlying assets, with these mismatches setting-up potential deleveraging driven price volatility; similar to issues witnessed in ETFs, MMFs, and Treasury futures
  - Can lead to liquidity pressures from smart contracts driven automated margin liquidation and, also a need to meet fast settlement goals
- Increased Leverage:
  - Tokenization can directly increase financial system leverage. For example, the underlying asset to a token could be rehypothecated, or the token itself can be structured to be a derivative
  - Potential to create marketable securities out of illiquid or physical assets which might potentially be used as collateral
- Increased Complexity and Opacity:
  - Tokenization leads to more composability, which could significantly add complexity and opacity to the financial system from new and non-traditional assets being added to the digital financial ecosystem
  - Improperly coded smart contracts can rapidly trigger unwanted financial transactions with unintended consequences
- Banking Disintermediation:
  - Tokenized short-dated Treasuries could prove to be an attractive alternative to bank deposits and potentially disrupt the banking system which could negatively impact core banking activities of deposit gathering and lending
- Stablecoin Run Risk:
  - Even with better collateral backing, unlikely stablecoins will satisfy NQA principle needed to underpin tokenization
  - Runs on stablecoins have been a common occurrence in recent years, and a collapse of a major stablecoin like Tether could lead to a fire sale of short-dated Treasuries

FRB, "*Tokenization: Overview and Financial Stability Implications*", 2024
NYFRB, "*Runs on Stablecoins*", 2023
"The Financial Stability Implication of Tokenisation." Financial Stability Board, October 2024

Designing DLT/blockchain for tokenized Treasuries: framework elements

- Establishing a framework that encourages trust and industry-wide buy-in will be necessary for digital assets and distributed ledger technology to scale
- Fraud, scams, and theft have grown proportionately with the digital asset market, eroding trust in the underlying technology

DTCC Principles to Building a Secure Digital Asset Settlement Ecosystem[1]

Legal Certainty

Ensure operations comply with existing laws and regulations to maintain market integrity and investor confidence

Regulatory Compliance

Encourage alignment with regulatory frameworks to build a foundation of trust and safety in digital asset markets

Resiliency and Security

Develop repost infrastructure capable of resisting disruptions, while protecting sensitive data and ensuring the continuous operation of digital asset services

Safeguarding Customer Assets

Implement governance over smart contracts to manage and protect assets within the digital asset ecosystem securely

Connectivity and Interoperability

Facilitating transactions and flexible settlements across diverse networks to enable seamless transfer and settlement

Operational Scalability

Gaining efficiency and cost-effectiveness through standardized roles and smart contract functions to accommodate market growth.

[1]DTCC, *"Building the Digital Asset Securities Ecosystem Whitepaper"*, 2024

Designing a DLT platform for tokenized Treasuries: architecture elements

- Most of the major crypto projects to date have been developed on public and permissionless blockchains, which has been heralded as one of its major appeals
- We argue that this architecture will not be suitable for more widespread adoption of tokenized Treasuries[1]:
  - Technology choices: Public, permissionless blockchains use complex consensus mechanisms (e.g., proof-of-work, proof-of-stake), making it difficult for them to process large transaction volumes efficiently
  - Operational Fragility: These blockchains rely on decentralized nodes with no centralized authority, which leads to vulnerabilities
  - Governance Gaps: Public blockchains lack clear governance structures, which increases the risks of system failures or bad actors taking advantage
  - Security Risks: The decentralized nature and lack of vetting in public blockchains increase the risk of bugs, exploits, and attacks, as seen in historical cases of vulnerabilities being exploited in Bitcoin and Ethereum
  - Money Laundering and Compliance Issues: Public, permissionless blockchains allow for anonymity, which can facilitate illegal activities such as money laundering and sanctions evasion
- Tokenization in the Treasury market will likely require the development of a privately controlled and permissioned blockchain managed by one or more trusted private or public authorities

Public vs. Private Blockchain: A **public** blockchain is an open network where anyone can participate without permission, while a **private** blockchain is a restricted network where only authorized participants can validate transactions and access the ledger

Permissioned vs. Permissionless Blockchain: A **permissioned** blockchain restricts who can participate in the network and validate transactions, while a **permissionless** blockchain allows anyone to join and participate in consensus without needing prior approval

Optimal Blockchain Design

	Permissionless	Permissioned
Public	✗ *E.g. Bitcoin, Ethereum*	✗
Private	✗	✓ *Ideally managed by trusted govt. authority*

[1] For more discussion see Hilary J. Allen, *"Hearing on Next Generation Infrastructure: How Tokenization of Real-World Assets will Facility Efficient Markets"*, 2024

Designing a DLT platform for tokenized Treasuries: regulatory elements

- Efforts to regulate digital assets and cryptocurrencies have intensified globally in recent years, but remain highly fragmented and porous
- United States: Regulation in the U.S. remains fragmented, with oversight split between multiple agencies like the SEC, CFTC, and FinCEN
  - Ensuring Responsible Development of Digital Assets (2022): executive order signed in 2022 outlining a government-wide strategy to address the opportunities and risks of digital assets. The order called for the development of a regulatory framework for digital assets
  - Financial Innovation and Technology for the 21st Century Act (FIT21) passed the house in 2024, and would be the most significant and comprehensive effort to regulate digital assets, stablecoins, and cryptocurrencies
- European Union: Markets in Crypto-Assets Regulation (MiCA) went into effect in 2024
  - MiCA is the EU's first comprehensive regulatory framework to cryptocurrencies and digital assets
  - It establishes rules for issuing crypto assets, stablecoins, and utility tokens, and regulates service providers like exchanges and custodians
  - Focuses on consumer projection, stablecoin oversight, AML measures, and environmental impact transparency
  - Licensed entities under MiCA can operate across the EU with a "passport" model, allowing them to serve all member states under a unified framework

What effects might these trends have on recommended Treasury issuance or the health of the Treasury secondary market?

- Continued growth in stablecoins, assuming the current trend in stablecoin collateral choices continues (or is forced by a regulator), will create structural demand for short-dated U.S. Treasuries
  - Recommended issuance should on the margin lean to a higher proportion of T-bills
- While stablecoins currently represent a marginal segment of the T-bills market, growth over time may expose the T-bills market to increased risk of fire sales due to runs in the stablecoin market
- Different redemption and settlement characteristics can lead to liquidity and maturity mismatches between tokens and the underlying assets which in turn can create potential for heightened financial instability in the Treasury market
- Tokenized "derivative" Treasury products could create a basis market between digital and native markets (like futures or total return swaps) – this can both create additional demand and lead to heightened volatility during deleveraging episodes
- Growth in, and institutionalization of, crypto markets (Bitcoin) could create additional hedging and flight-to-quality demand for tokenized Treasuries in periods of heightened downside volatility
  - Flight-to-quality demand can be hard to predict. Hedging demand could be structural, but depends on how well Treasuries continue to hedge downside crypto-volatility
- Tokenization might create additional access to Treasuries from both domestic and global pools of savings, particularly from households and smaller financial institutions, which can lead to incremental demand for U.S. Treasuries
- Tokenization can potentially improve liquidity in the trading of Treasuries by reducing operational and settlement frictions

Conclusions

- Though the overall market for digital assets remains quite small in comparison to traditional financial assets likes equities or bonds, interest has grown substantially over the past decade
- To date, growth in digital assets has created marginal incremental demand for short-dated Treasuries
  - This has so far come primarily though increased use and prevalence of stablecoins
  - Institutional adoption of "high-beta" bitcoin and crypto might lead to increased future hedging demand for Treasuries
- Advances in DLT and blockchain offer the promise of a new financial market infrastructure with "unified ledgers" leading to enhanced operational and economic efficiencies
  - There are several ongoing projects and pilots from both private- and public-sector actors to leverage blockchain technology in the legacy financial market ecosystem, particularly by DTCC and the BIS
  - Will likely require the central bank and tokenized USD (CBDC) to play a pivotal role in a future tokenized payments and settlements infrastructure
- Legal and regulatory landscape will need to evolve alongside advances in tokenization of legacy assets
- Operational, legal, and technology risks need to be considered carefully in making design choices around the technology infrastructure and tokenization
  - Projects of study should include the design, nature, and concerns around Treasury tokenization, introduction of sovereign CBDCs, technology and financial architecture choices, and financial stability considerations
- Currently, financial stability risks remain low given the relatively small size of the tokenized asset market; however, strong growth in tokenized assets could lead to a myriad of financial instability risks
- The way forward should involve a cautious approach spearheaded by a trusted central authority, with widespread buy-in from private sector participants

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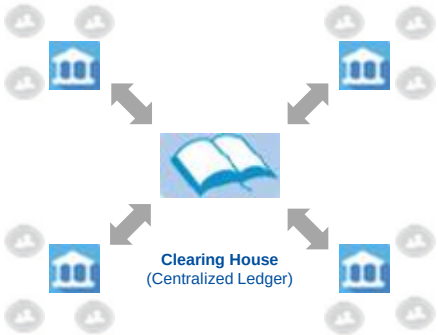
Appendix

Cryptocurrency and blockchain

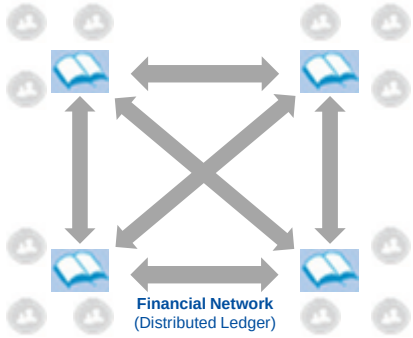
- **Cryptocurrency** is an internet-based medium of exchange which uses cryptographical functions and distributed database technology to conduct financial transactions
- Cryptocurrencies leverage **distributed ledger technology (DLT)** technology to gain decentralization, transparency, and immutability
  - Bitcoin is a one example of such a cryptocurrency or digital cash system; the history of every Bitcoin is known and kept in a blockchain, a distributed ledger in cyberspace using a cryptographic network to provide a single and verifiable source of truth
  - One challenge of decentralized networks for payments is that it is more difficult to exercise government/regulatory oversight compared to a centralized ledger; this is especially true for cryptocurrencies where access is permissionless
- **Blockchain** is a subset of DLT and allows untrusting parties with common interests to co-create a permanent, unchangeable, and transparent record of exchange, and processing without relying on a central authority

The Blockchain Distributed Ledger Model has the Potential to Improve Speed and Efficiency of Financial Flows

Financial Intermediaries (Today)
+ Requires trusted, centralized intermediaries
+ Batch clearing and settlement
+ Higher fees and costly infrastructure



Financial Protocol (Emerging)
+ No (or fewer) intermediaries required
+ Near real-time processing and management
+ Lower fees and reduced infrastructure



Source: Citi

Key features of DLT/blockchain

- **Distributed ledger technology (DLT)** is an evolving technology with many designs and configurations, but generally includes four key features

1. Distributed Nature of the Ledger

- Perhaps the most important innovation of DLT is the elimination of reliance on a single centralized record keeper; instead, control over the ledger lies with the network participants
- At any point in time, there exists only one version of the ledger with each network participant owning a full and up-to-date copy of the ledger

2. Consensus Mechanism

- No single entity can amend or approve new additions to the ledger; instead, a predefined consensus mechanism is used to validate all new entries to the ledger
- The consensus mechanism is specified in the design of the DLT and creates a set of rules or protocol for determining the legitimacy of new entries

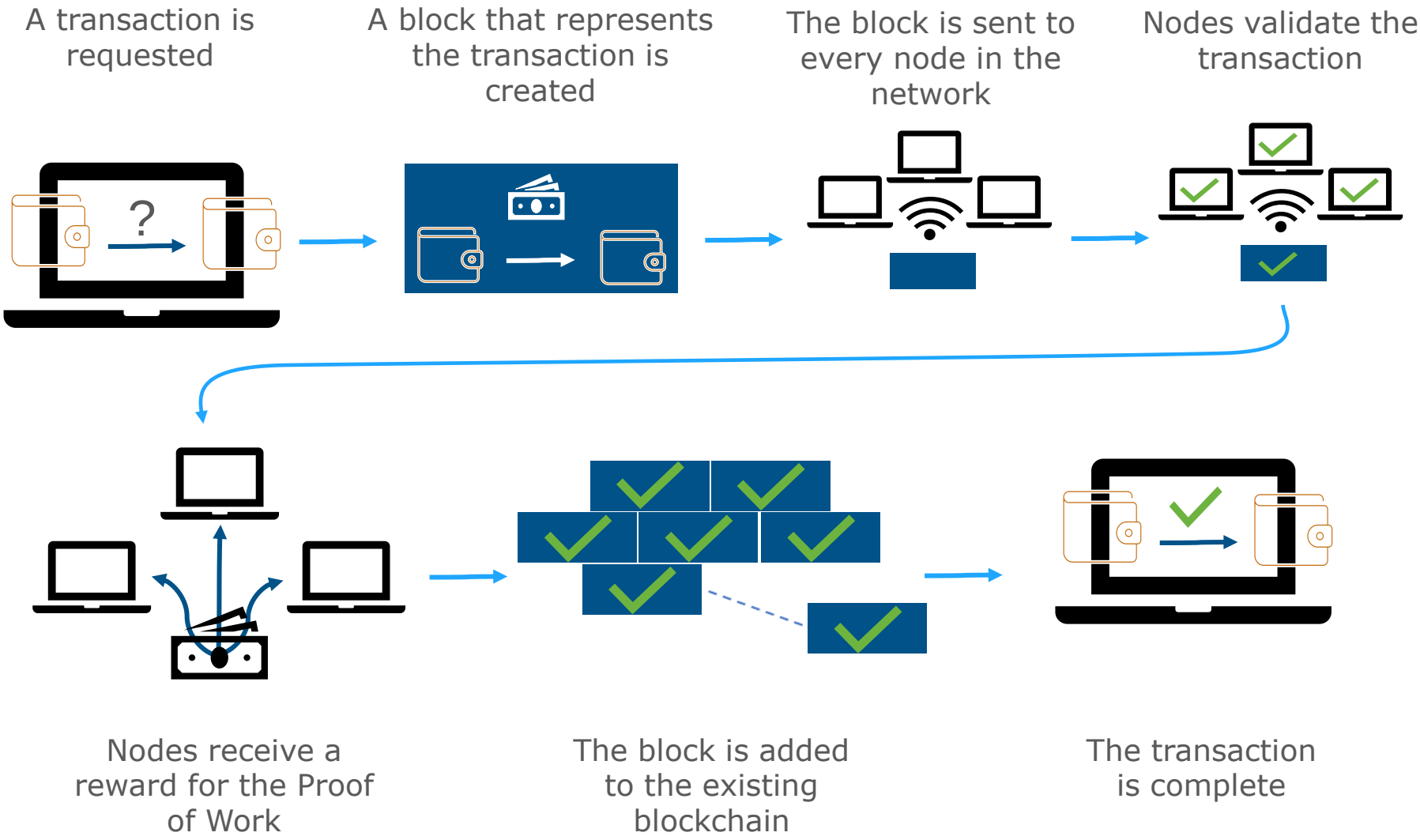
3. Cryptographic Mechanism

- Each transaction entry into a ledger is encrypted and includes a timestamp and digital signature; this allows for detection of tampering with past transaction data

4. Smart contracts

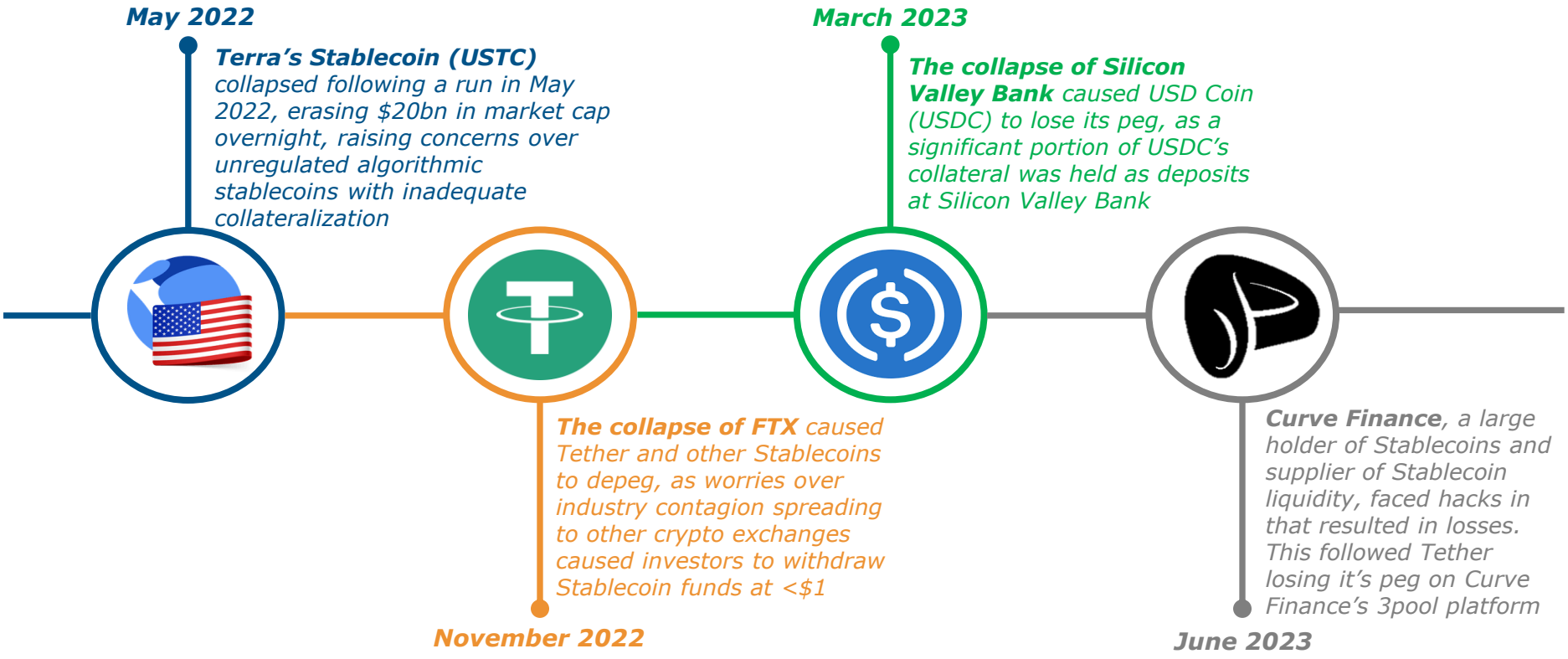
- Blockchain improves automation by allowing for the execution of rules-based transactions with the aim of improving speed, security, and innovation

How do blockchains work?



Financial stability considerations: risk of runs on stablecoins

- Stablecoins have increasingly elected to hold significant short-dated US Treasury collateral, and we expect regulatory efforts in the years to come to encourage this trend
- Despite the improved collateral backing of stablecoins, significant risks remain. Runs on stablecoins have been a common occurrence in recent years, with stablecoins losing their peg to the U.S. dollar or collapsing entirely[1,2,3]
- A collapse of a major stablecoin like Tether could result in a "fire-sale" of their U.S. Treasuries holdings
- **If history serves as any guide, stablecoins will need to be regulated like narrow banks or money market funds to prevent contagion of stress in stablecoin markets to broader financial markets and the Treasury market**



[1] Moody's, "*Stablecoins have been unstable, Why?*", 2023
[2] BIS, "*Public information and stablecoin runs*", 2024
[3] NYFRB, "*Runs on Stablecoins*", 2023

If history serves as any guide, stablecoins will need to be regulated like narrow banks or money market funds

- While stablecoins currently elect to hold significant short-dated U.S. Treasury collateral, **it is not required**
- Stablecoins are also currently functioning like a form of private, "on-chain" money
- "Private money" during the wildcat banking era in the 1800s was regularly subject to panics, collapses in value, and ultimately required the government to step and issue a single unified form of money (Greenbacks)
- Prime money market funds holding collateral other than short-dated US Tresuries experienced runs during 2008 and 2020
- History indicates that stablecoins cannot function as private money, and will ultimately need to be strictly regulated like government money market funds are today to hold risk-free collateral

Lessons learned from the "Wild Cat" Era of Banking[1]: Prior to a centralized monetary authority, banks in the U.S. used to issue their own individual banknotes that were poorly collateralized, prone to runs, and regularly traded at a discount in secondary markets. In responds to these issues, most state governments began requiring these notes be backed one-for-one with government bonds. Ultimately, difficulty interchanging numerous forms of paper currency paved the way to the National Bank Act of 1963 and ultimately the creation of the U.S. dollar as the only national-level currency in circulation

Lessons learned from the runs on MMFs in '08: Despite holding shares in what had been traditionally considered a "risk free investment", prime money market funds experienced significant runs during the 2008 crisis as a drop in prices on short-dated financial commercial paper tanked confidence in the solvency of the money market funds that held them. Despite the addition of gate fees to discourage runs, prime money market funds again experienced runs in 2020 when prices on commercial paper again plummeted. **The lesson, repeated, is that a "risk-free" investment vehicle will only behave as such when backed by actual risk-free collateral - which is short dated U.S. Treasuries**

[1] Gary Gorden et al, "*Taming Wildcat Stablecoins*", 2021