Treasury Presentation to TBAC

Office of Debt Management

Fiscal Year 2021 Q3 Report

Table of Contents

Section I:
Executive Summary

Highlights of Treasury's August 2021 Quarterly Refunding Presentation to the Treasury Borrowing Advisory Committee (TBAC)

Receipts and Outlays through Q3 FY2021

- Overall receipts totaled $3.056 trillion, reflecting an increase of $796 billion (35%) compared to the same period last fiscal year. Non-withheld and SECA taxes were $476 billion (176%) higher because last year both estimated and final taxes were delayed until July 15. Corporate taxes were $178 billion (142%) higher, as every month except one (November 2020) has seen higher levels than last fiscal year. The difference will narrow when looking at the full fiscal year as last year's due dates were deferred to Q4 FY2020. Adjusted withheld and FICA taxes were up $147 billion (8%) due to the economic impact of COVID-19 and the end of the deferral of certain employer taxes through the end of December 2020. Half of these deferred taxes are due by the end of this calendar year and the remaining half by the end of 2022. Federal Reserve earnings were $14 billion (25%) higher reflecting lower interest rates that reduce the Fed's interest expenses and higher System Open Market Account (SOMA) holdings that can increase remittances. Partially offsetting the overall gains to receipts, individual refunds were $32 billion (16%) higher, but close to the 2019 level. This refund season is exhibiting a different pattern from last year due to tax season timing changes and other factors. Corporate refunds were $5 billion (15%) higher, likely due to provisions of the CARES Act that expand allowances for net operating losses. Receipts were 18.2% of GDP, compared to 14.3% for the same period last year.

- Overall outlays were $5.29 trillion, reflecting an increase of $290 billion (6%) over the comparable period last fiscal year. Department of Treasury outlays were $379 billion (37%) higher due to higher Economic Impact Payments and other tax credits $305 billion (74%), Coronavirus Relief Fund payments to state, territorial, local, and tribal governments $45 billion (30%), rental assistance payments $33 billion, interest on the public debt $14 billion (3%), and airline assistance grants $8 billion (34%). Exchange Stabilization Fund activities were lowered by $32 billion (-145%). Department of Labor outlays were $50 billion (18%) higher due to increased unemployment and expanded benefits attributable to the COVID-19 pandemic. Small Business Administration outlays were $212 billion (-40%) lower, mainly due to the differences in the recognition of subsidy costs for PPP. Health and Human Services spending was $42 billion (-4%) lower mainly due to the COVID-19 effects seen in Medicare last year and somewhat offset by increases in Medicaid. Outlays were 31.4% of GDP, compared to 31.8% for the same period last year.

Projected Net Marketable Borrowing

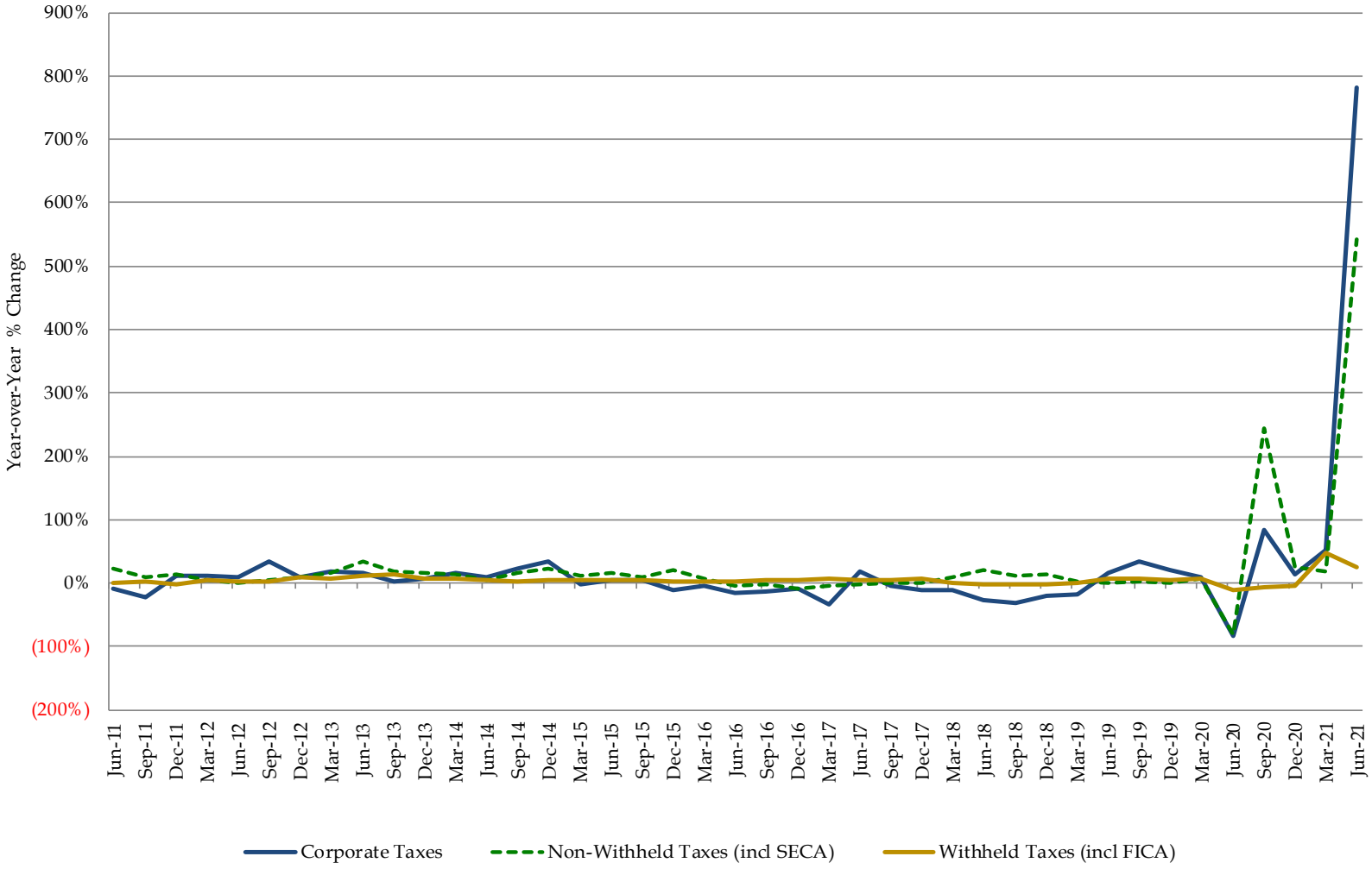
- Treasury's Office of Fiscal Projections (OFP) currently forecasts a net privately-held marketable borrowing need of $673 billion for Q4 FY2021, with an end-of-September cash balance of $750 billion. For Q1 FY2022, OFP forecasts a net privately-held marketable borrowing need of $703 billion and assuming an end-of-December cash balance of $800 billion. These borrowing estimates are based upon current law and do not include any assumptions for the impact of additional legislation that may be passed. The end-of-September and December cash balances assume enactment of a debt limit suspension or increase.

Demand for Treasury Securities

- Bid-to-cover ratios for all securities were within historical ranges over the last quarter.
- Foreign demand remained stable.

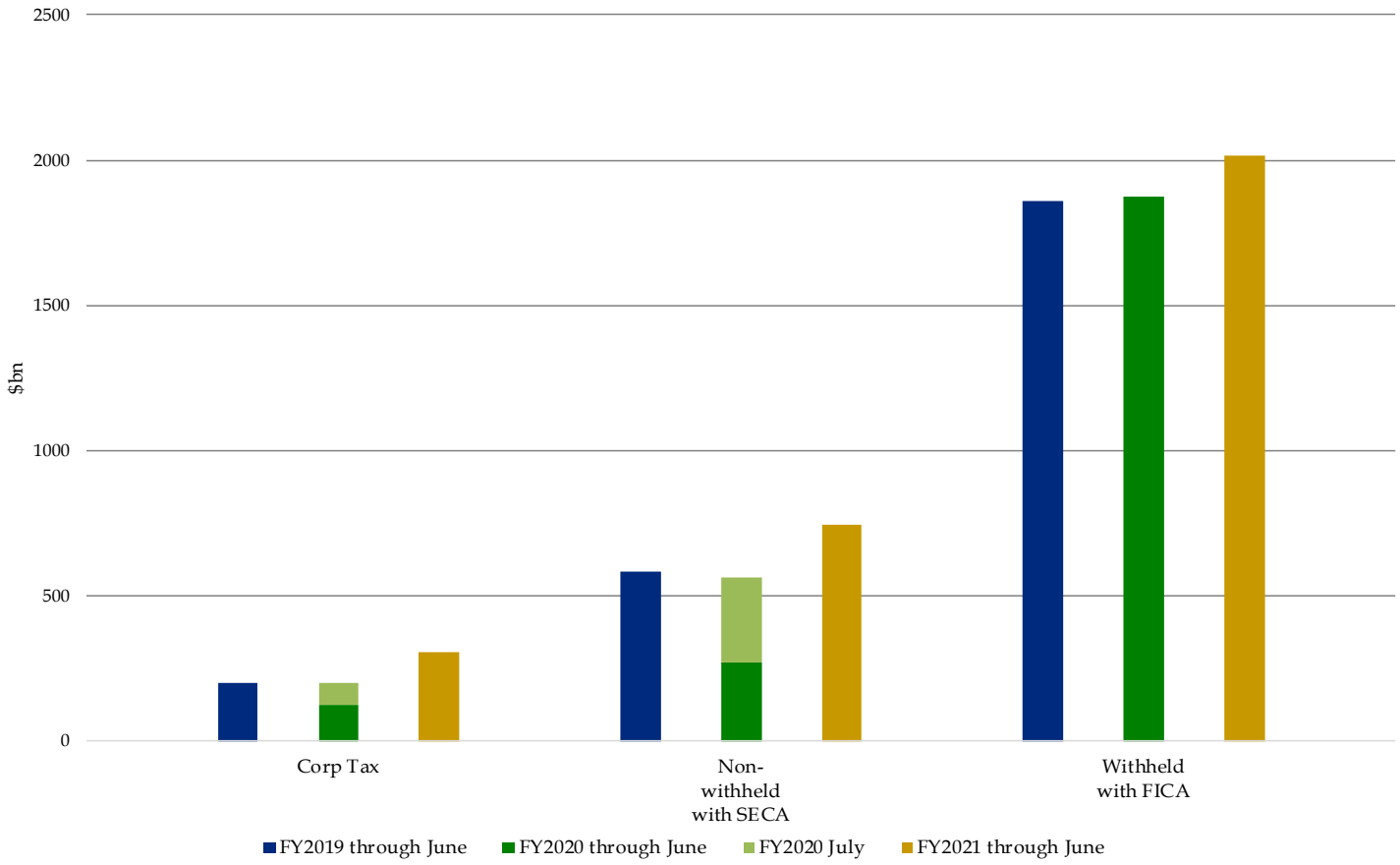
Section II: Fiscal

Quarterly Tax Receipts

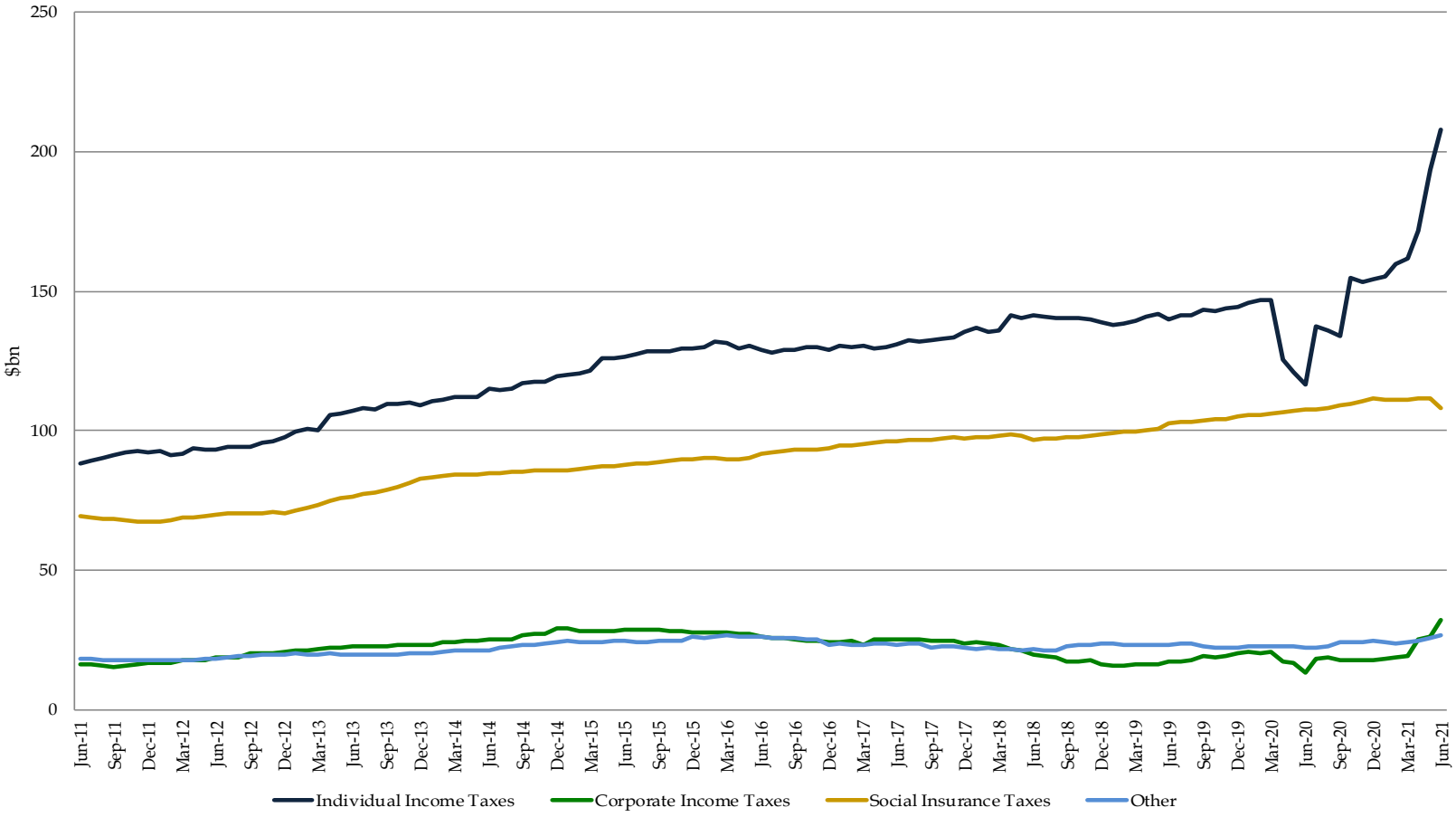


Quarterly tax receipts for Q4 FY2020 reflect the adjustment of April and June 2020 tax deadlines to July 15th, 2020.
Source: United States Department of the Treasury

Fiscal Year Cumulative Receipts

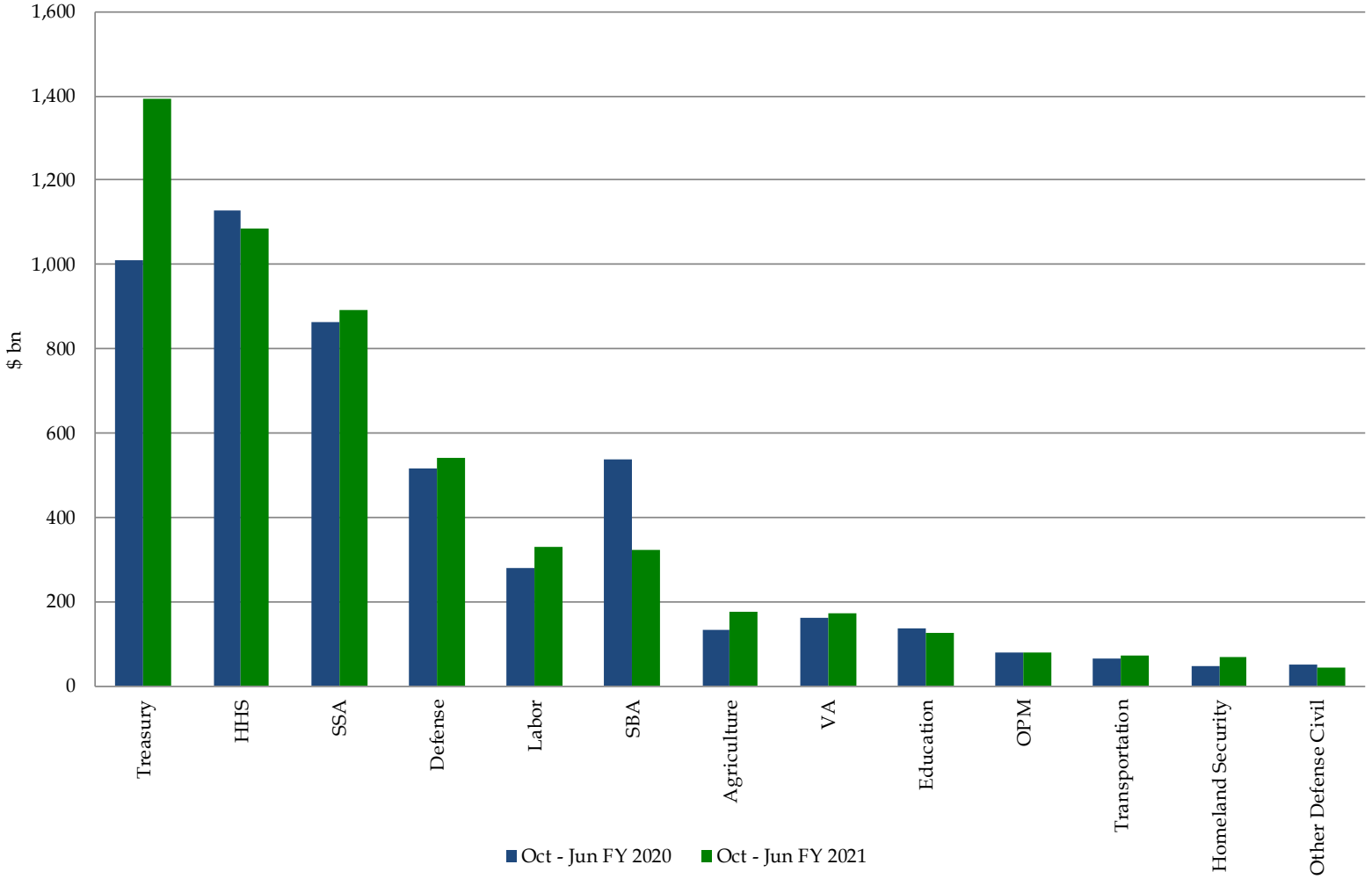


Monthly Receipt Levels
(12-Month Moving Average)



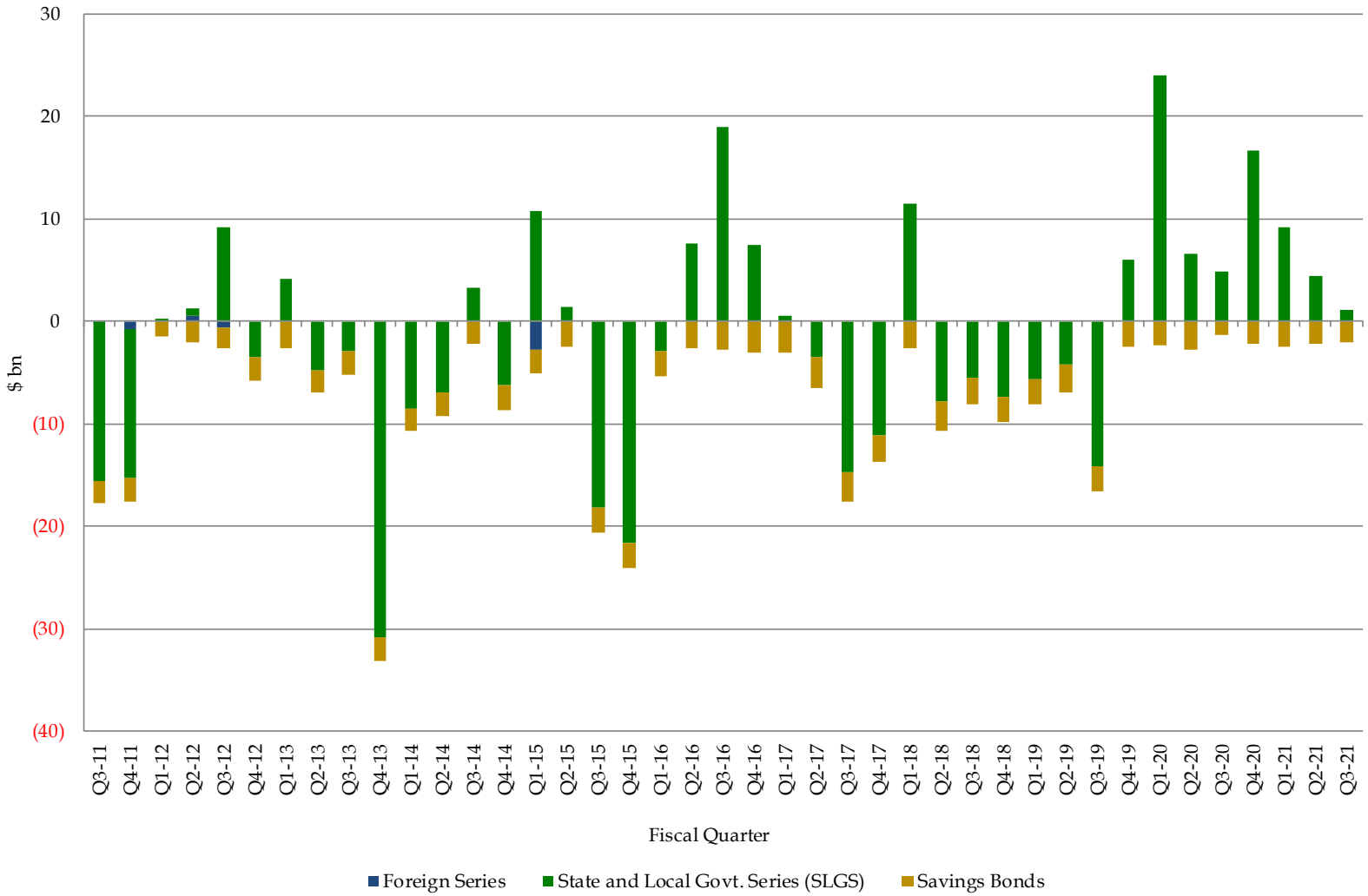
Quarterly tax receipts for Q4 FY2020 reflect the adjustment of April and June 2020 tax deadlines to July 15th, 2020. Individual Income Taxes include withheld and non-withheld. Social Insurance Taxes include FICA, SECA, RRTA, UTF deposits, FUTA and RUIA. Other includes excise taxes, estate and gift taxes, customs duties and miscellaneous receipts.
Source: United States Department of the Treasury

Largest Outlays



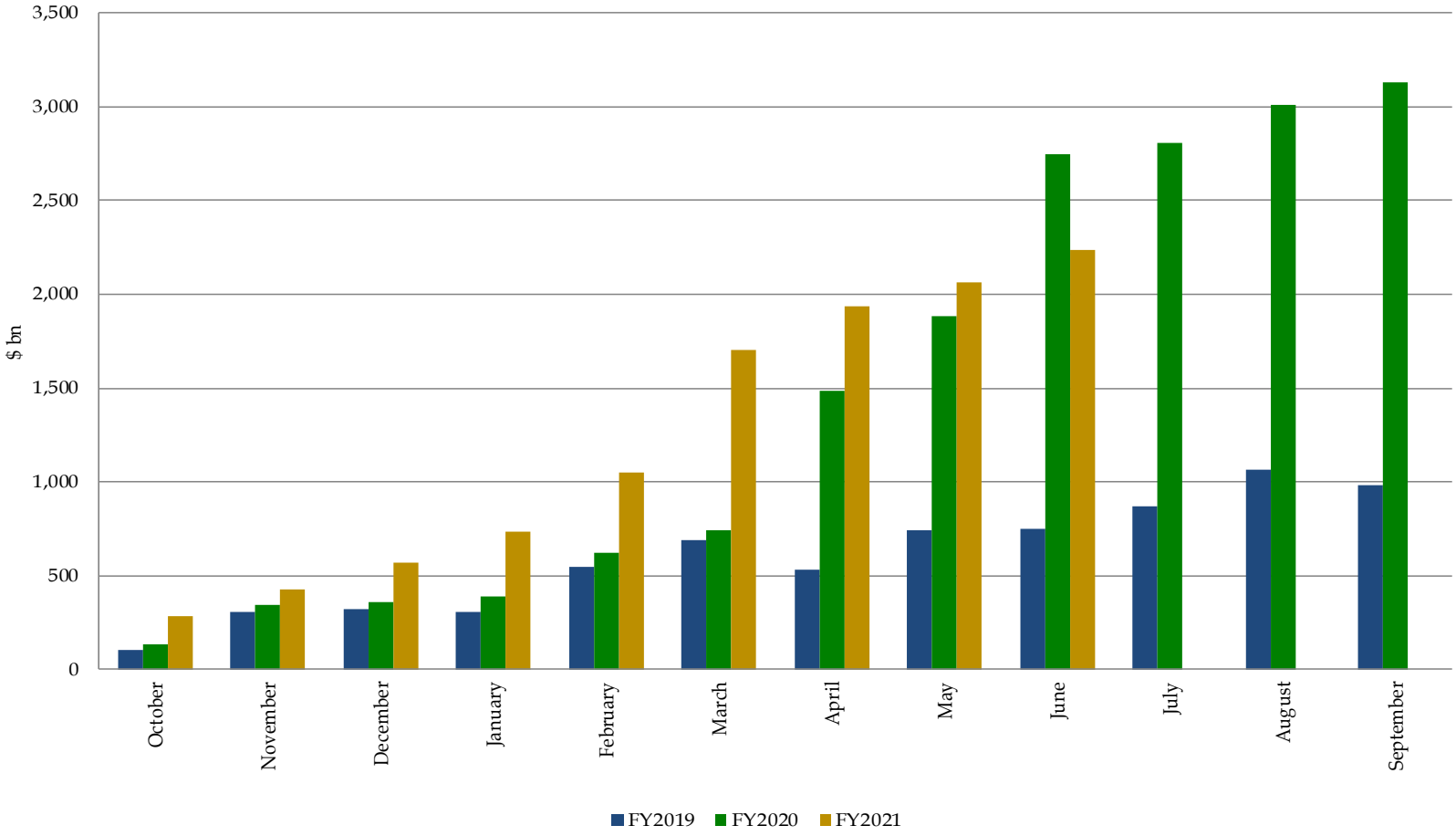
Source: United States Department of the Treasury

Treasury Net Nonmarketable Borrowing



Source: United States Department of the Treasury

Cumulative Budget Deficits by Fiscal Year



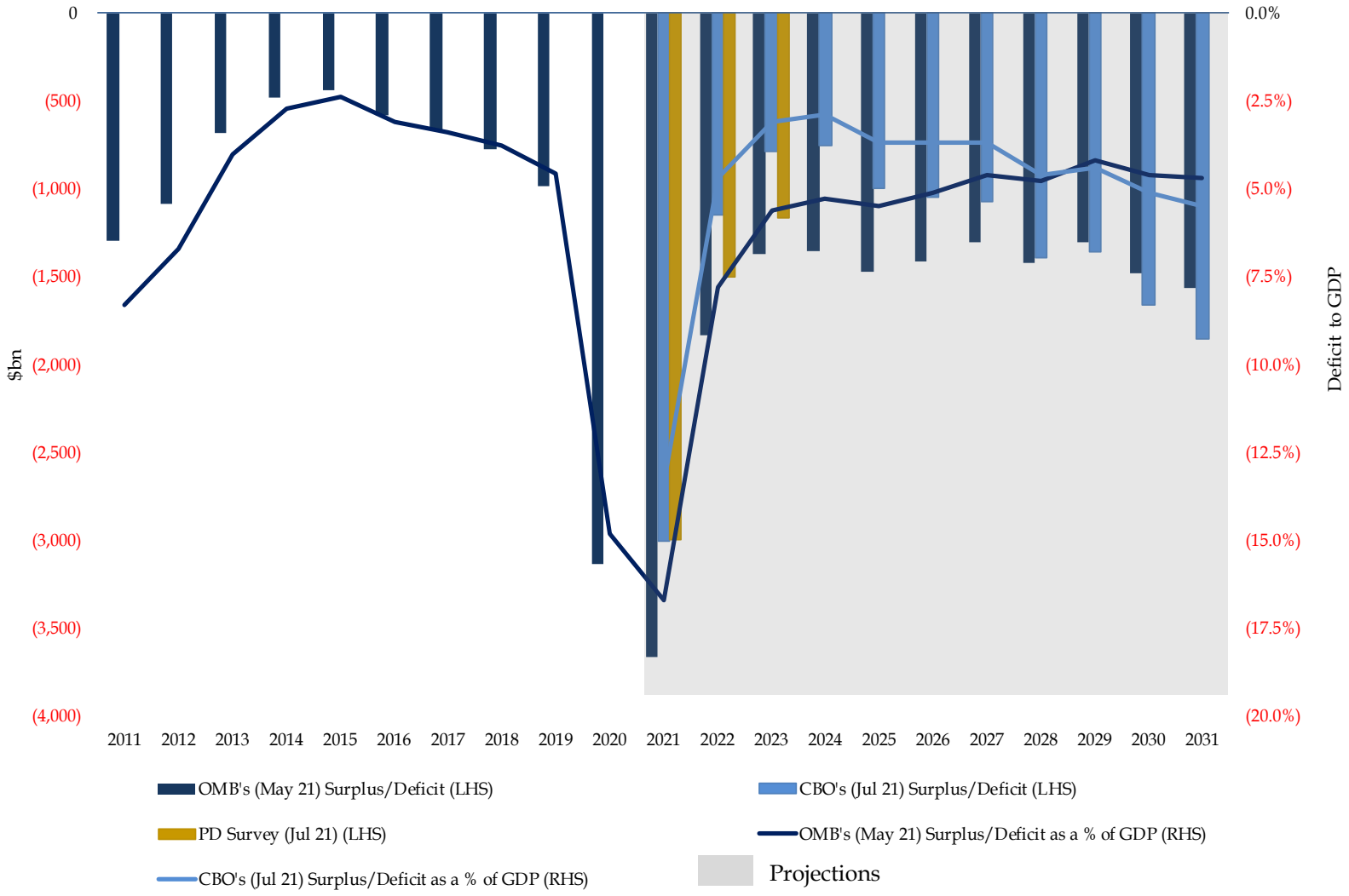
Source: United States Department of the Treasury

FY 2021-2023 Deficits and Privately-Held Net Marketable Borrowing Estimates*, in $ billions

	Primary Dealers[1]	OFP[2]	CBO[3]	OMB[4]
FY2021 Deficit Estimate	3,000		3,003	3,669
FY2022 Deficit Estimate	1,500		1,153	1,837
FY2023 Deficit Estimate	1,164		789	1,372
FY2021 Deficit Estimate Range	2,800-3,468			
FY2022 Deficit Estimate Range	1,130-1,930			
FY2023 Deficit Estimate Range	789-1,600			
FY2021 Privately-Held Net Marketable Borrowing Estimate	2,075	1,990	1,995	3,150
FY2022 Privately-Held Net Marketable Borrowing Estimate	1,553		1,380	2,098
FY2023 Privately-Held Net Marketable Borrowing Estimate	1,129		764	1,418
FY2021 Privately-Held Net Marketable Borrowing Range	1,785-3,400			
FY2022 Privately-Held Net Marketable Borrowing Range	1,150-2,450			
FY2023 Privately-Held Net Marketable Borrowing Range	790-1,600			
Estimates as of:	Jul-21	Aug-21	Jul-21	May-21

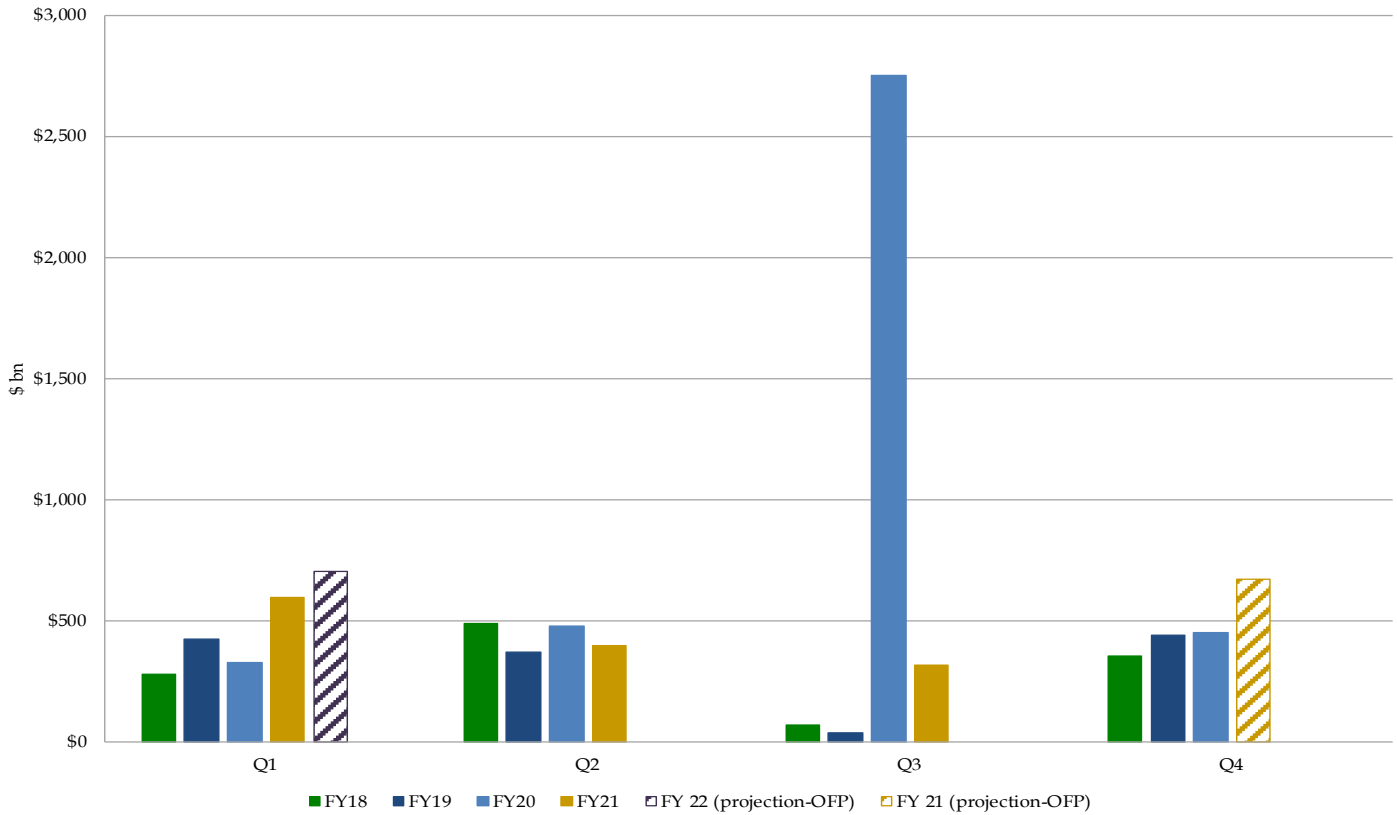
[1] Estimates represent the medians from the primary dealer survey in July 2021. The FY2021 net borrowing estimates are normalized with an assumption of end-of-September 2021 cash balance of $750 billion.
[2] Treasury's Office of Fiscal Projections (OFP) borrowing estimates announced on August 2, 2021.
[3] CBO projections are using estimates are from Table 1 of "An Update to The Budget and Economic Outlook: 2021 to 2031," July 2021.
[4] OMB projections are using estimates are from Table 10 of "Budget of The U.S. Government Fiscal Year 2022," May 2021.
*Privately-held marketable borrowing excludes rollovers (auction "add-ons") of Treasury securities held in the Federal Reserve's 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 net privately-held marketable borrowing but, all else equal, when the securities mature and assuming the Fed does not redeem any maturing securities, would increase the amount of cash raised for a given privately-held auction size by increasing the SOMA "add-on" amount.

Budget Surplus/Deficit*



*OMB's projections are from OMB's Table S-10 of "Budget of The U.S. Government Fiscal Year 2021," May 2021.
CBO's deficit projections are using estimates from CBO's Table 1 of "An Update to The Budget and Economic Outlook: 2021 to 2031," May 2021.

Privately-Held Net Marketable Borrowing Outlook*



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Section III: Financing

Assumptions for Financing Section (pages 16 to 19)

- Portfolio and SOMA holdings as of 06/30/2021.
- Estimates assume private announced issuance sizes and patterns remain constant for nominal coupons, TIPS, and FRNs given changes made before the August 2021 refunding, while using total bills outstanding of ~$4.28 trillion.
- The principal on the TIPS securities was accreted to each projection date based on market ZCIS levels as of 06/30/2020.
- No attempt was made to account for future financing needs.

Sources of Privately-Held Financing in FY21 Q3*

April - June 2021	
Net Bill Issuance	(394)
Net Coupon Issuance	713
Subtotal: Net Marketable Borrowing	319
Ending Cash Balance	852
Beginning Cash Balance	1,122
Subtotal: Change in Cash Balance	(270)
Net Implied Funding for FY 2021 Q3**	589

Security	April - June 2021 Bill Issuance Gross	Maturing	Net	Fiscal Year-to-Date Bill Issuance Gross	Maturing	Net
4-Week	520	500	20	1,320	1,280	40
8-Week	520	490	30	1,440	1,400	40
13-Week	741	708	33	2,151	2,112	39
26-Week	702	663	39	2,034	1,986	48
52-Week	102	93	9	340	221	119
CMBs						
6-Week	520	475	45	1,315	1,255	60
15-Week	0	225	(225)	500	890	(390)
17-Week	455	390	65	1,245	1,225	20
22-Week	0	390	(390)	600	1,240	(640)
39-Week	0	20	(20)	0	90	(90)
Bill Subtotal	3,560	3,954	(394)	10,945	11,699	(754)

Security	April - June 2021 Coupon Issuance Gross	Maturing	Net	Fiscal Year-to-Date Coupon Issuance Gross	Maturing	Net
2-Year FRN	80	56	24	234	167	67
2-Year	180	50	130	528	185	343
3-Year	174	62	112	510	177	333
5-Year	183	79	104	537	245	292
7-Year	186	89	97	540	234	306
10-Year	117	25	92	348	109	239
20-Year	75	0	75	223	0	223
30-Year	75	3	72	224	6	218
5-Year TIPS	34	41	(7)	66	41	25
10-Year TIPS	13	0	13	53	38	15
30-Year TIPS	0	0	0	9	0	9
Coupon Subtotal	1,117	404	713	3,272	1,201	2,071

*Privately-held marketable borrowing excludes rollovers (auction "add-ons") of Treasury securities held in the Federal Reserve's 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 net privately-held marketable borrowing but, all else equal, when the securities mature and assuming the Fed does not redeem any maturing securities, would increase the amount of cash raised for a given privately-held auction size by increasing the SOMA "add-on" amount.

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

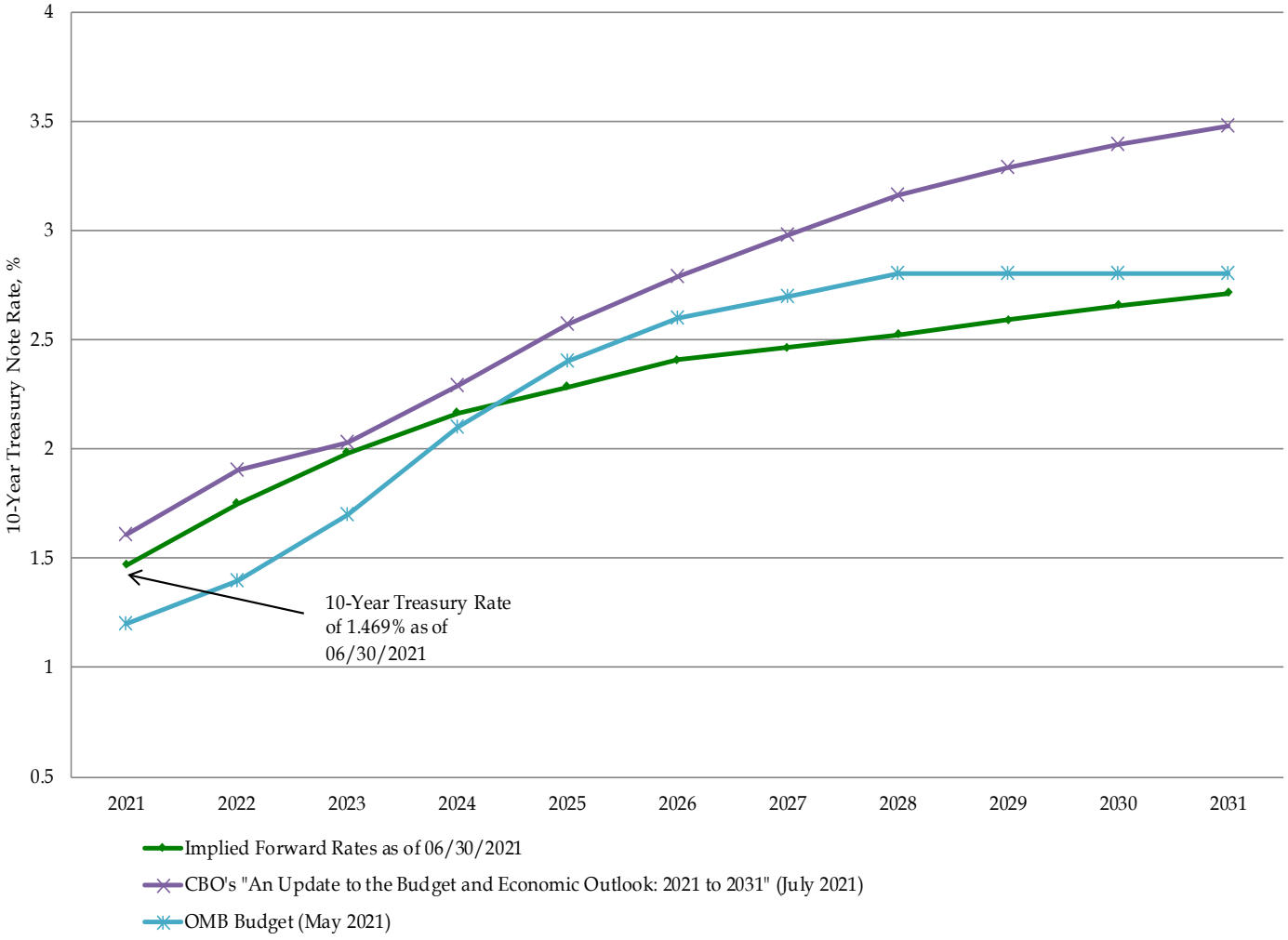
Sources of Privately-Held Financing in FY21 Q4*

July - September 2021	
Assuming Constant Coupon Issuance Sizes**	
Treasury Announced Net Marketable Borrowing***	673
Net Coupon Issuance	661
Implied Change in Bills	12

Security	July - September 2021 Coupon Issuance			Fiscal Year-to-Date Coupon Issuance		
	Gross	Maturing^	Net	Gross	Maturing	Net
2-Year FRN	80	55	25	314	222	92
2-Year	180	91	89	708	276	432
3-Year	174	71	103	684	248	436
5-Year	183	85	98	720	329	391
7-Year	186	77	109	726	311	415
10-Year	117	32	85	465	141	324
20-Year	75	0	75	298	0	298
30-Year	75	3	72	299	9	290
5-Year TIPS	0	0	0	66	41	25
10-Year TIPS	29	32	(3)	82	70	12
30-Year TIPS	7	0	7	16	0	16
Coupon Subtotal	1,106	445	661	4,378	1,646	2,732

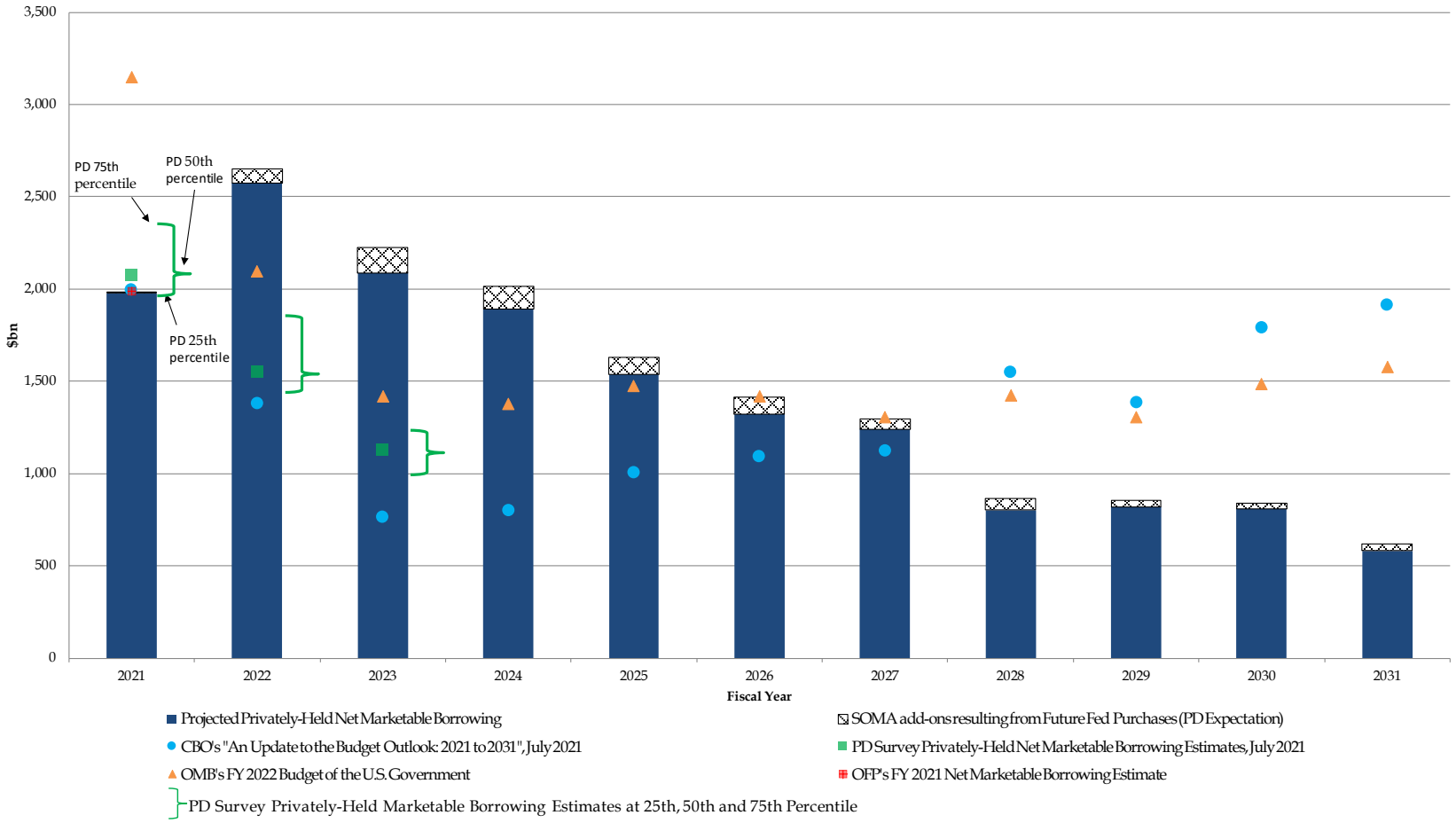
* Privately-held marketable borrowing excludes rollovers (auction "add-ons") of Treasury securities held in the Federal Reserve's System Open Market Account (SOMA) but includes financing required due to SOMA redemptions. Secondary market purchases of Treasury securities by SOMA do not directly change net privately-held marketable borrowing but, all else equal, when the securities mature and assuming the Fed does not redeem any maturing securities, would increase the amount of cash raised for a given privately-held auction size by increasing the SOMA "add-on" amount.
** Keeping announced issuance sizes and patterns constant for nominal coupons, TIPS, and FRNs based on changes made before the August 2021 refunding.
*** Assumes an end-of-September 2021 cash balance of $750 billion versus a beginning-of-June 2021 cash balance of $852 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
^ Maturing amounts could change based on future Federal Reserve purchases.

Interest Rate Assumptions: 10-Year Treasury Note



Projected Privately-Held Net Marketable Borrowing

Assuming Private Coupon Issuance & Total Bills Outstanding Remain Constant as of 06/30/2021*



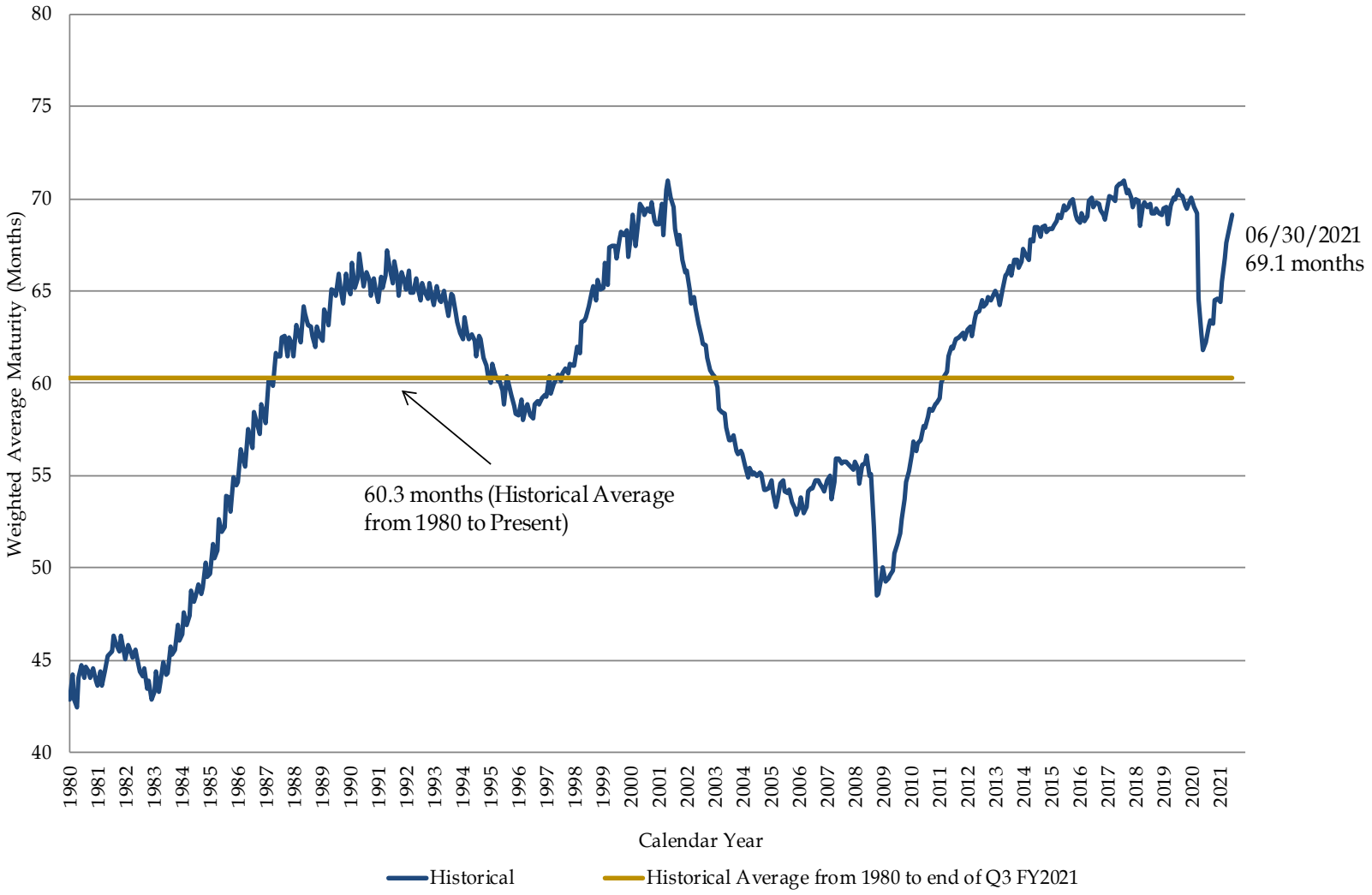
Treasury's latest primary dealer survey median estimates can be found on page 12. OMB's borrowing projections are from Table S-10 of "Budget of the U.S. Government Fiscal Year 2022," May 2021. CBO's borrowing projections are using estimates from Table 1 of CBO's "An Update to The Budget and Economic Outlook: 2021 to 2031," July 2021.

Future Fed purchases are derived from the Fed's June 2021 Primary Dealer Survey median results with maturity bucket weights based on current operations and pro-rata across securities within each maturity bucket. https://www.newyorkfed.org/medialibrary/media/markets/survey/2021/june-2021-spd-results.pdf

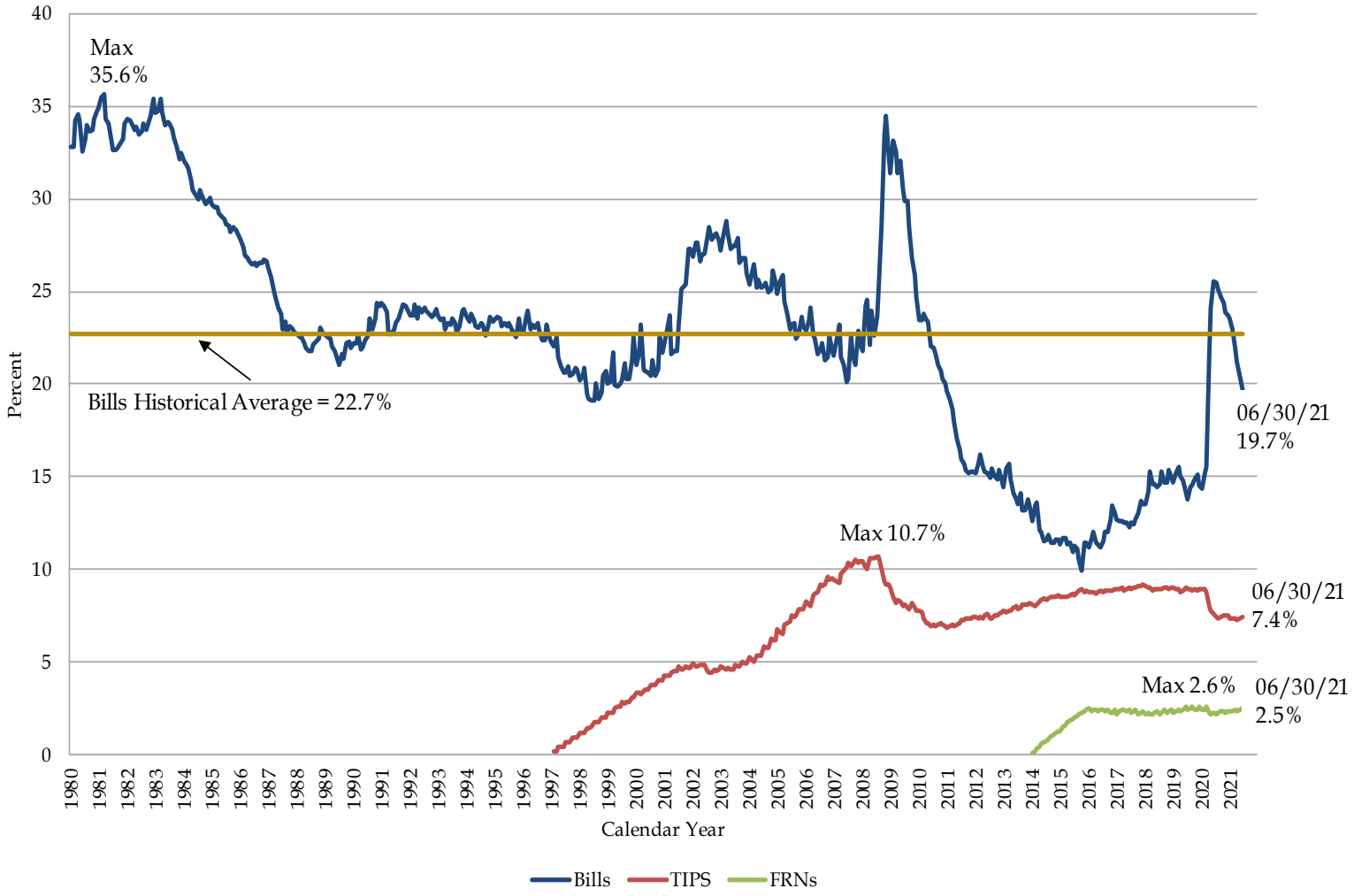
* Privately-held marketable borrowing excludes rollovers (auction "add-ons") of Treasury securities held in the Federal Reserve's System Open Market Account (SOMA) but includes financing required due to SOMA redemptions. No adjustments are made for open-market outright purchases.

Section IV:
Portfolio Metrics

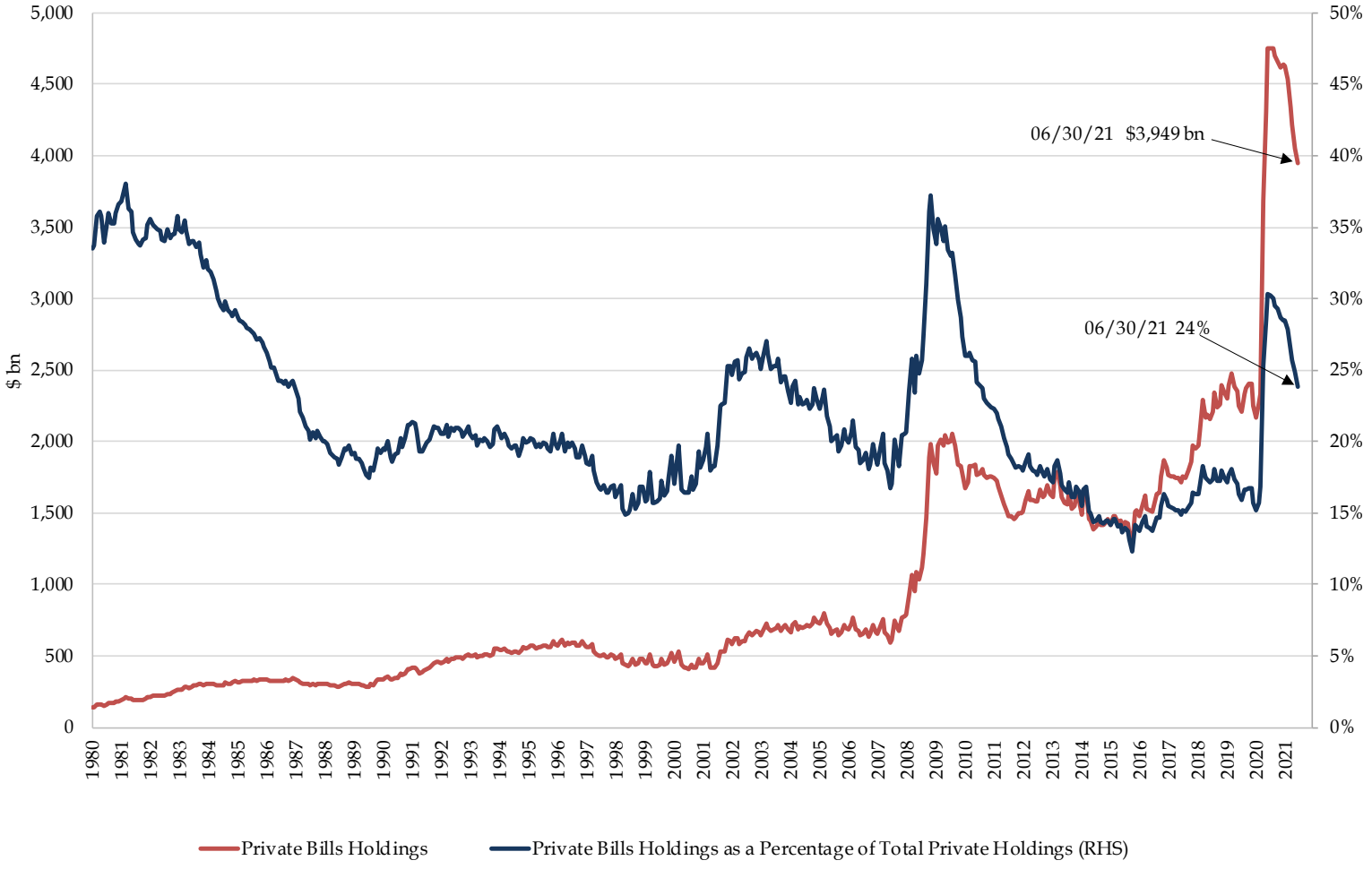
Historical Weighted Average Maturity of Marketable Debt Outstanding



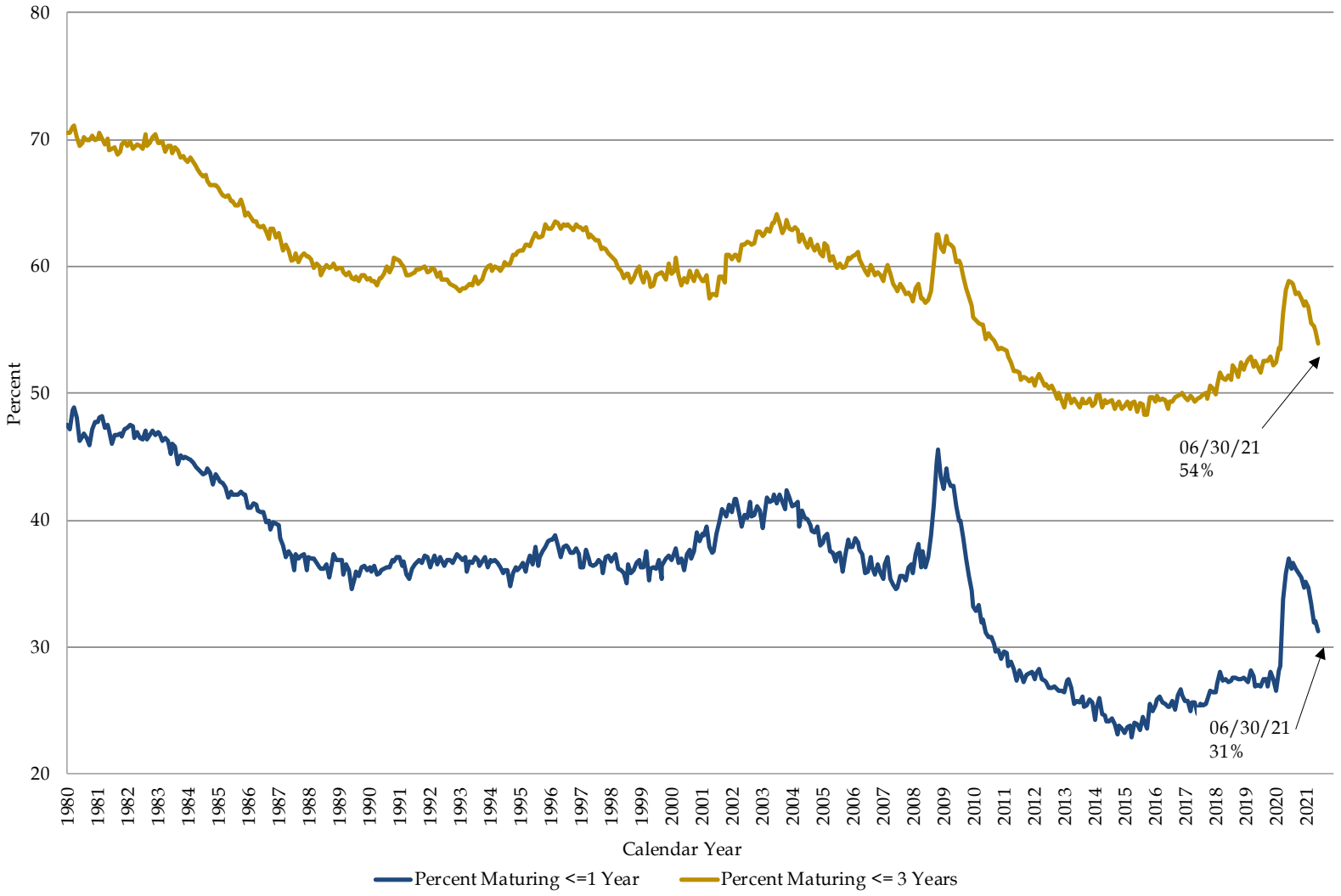
Bills, TIPS & FRNs Outstanding as a Percent of Marketable Debt Outstanding



Private Bills Holdings as a Percentage of Total Private Holdings



Treasury Maturity Profile History



Section V: Demand

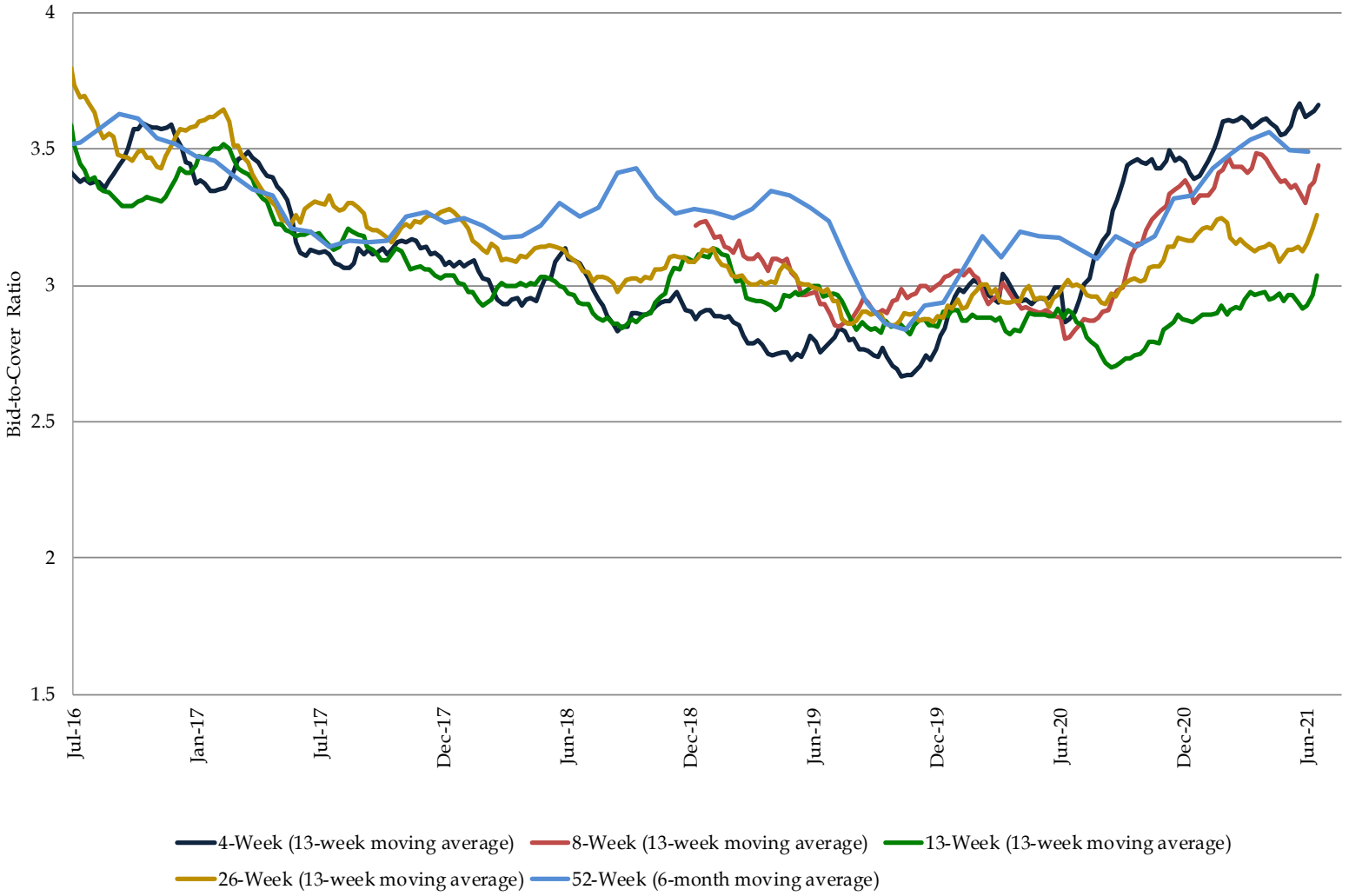
Summary Statistics for Fiscal Year 2021 Q3 Auctions

Security Type	Term	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)**
Bill	4-Week	0.011	3.6	507.0	47.6	5.8	46.6	13.03	40.1	4.7
Bill	8-Week	0.017	3.4	512.8	53.2	7.6	39.3	7.19	40.1	9.3
Bill	13-Week	0.024	3.0	726.6	44.8	8.0	47.2	14.44	81.0	22.2
Bill	26-Week	0.039	3.3	689.9	40.5	5.2	54.4	12.14	76.7	42.2
Bill	52-Week	0.063	3.4	101.4	55.6	5.1	39.3	0.65	11.6	12.3
CMB	6-Week	0.015	3.5	519.6	45.8	7.5	46.7	0.47	0.0	6.5
CMB	17-Week	0.029	3.6	454.4	49.2	7.6	43.2	0.64	0.0	16.1
Coupon	2-Year	0.192	2.5	179.4	31.2	18.3	50.4	0.60	32.2	46.3
Coupon	3-Year	0.343	2.4	173.6	31.0	17.4	51.6	0.44	45.0	71.2
Coupon	5-Year	0.847	2.4	182.7	23.2	16.8	60.0	0.32	32.7	115.2
Coupon	7-Year	1.285	2.4	185.9	20.3	20.9	58.9	0.06	33.3	160.1
Coupon	10-Year	1.622	2.5	116.9	19.8	17.5	62.7	0.06	31.1	148.2
Coupon	20-Year	2.187	2.3	75.0	20.9	20.0	59.1	0.01	13.5	155.0
Coupon	30-Year	2.300	2.3	75.0	18.4	20.0	61.6	0.02	20.2	224.7
TIPS	5-Year	-1.530	2.6	33.9	9.2	13.2	77.6	0.13	5.9	21.3
TIPS	10-Year	-0.805	2.5	13.0	15.5	15.9	68.6	0.02	0.0	13.6
FRN	2-Year	0.031	3.1	79.9	36.0	2.3	61.7	0.07	5.3	0.0

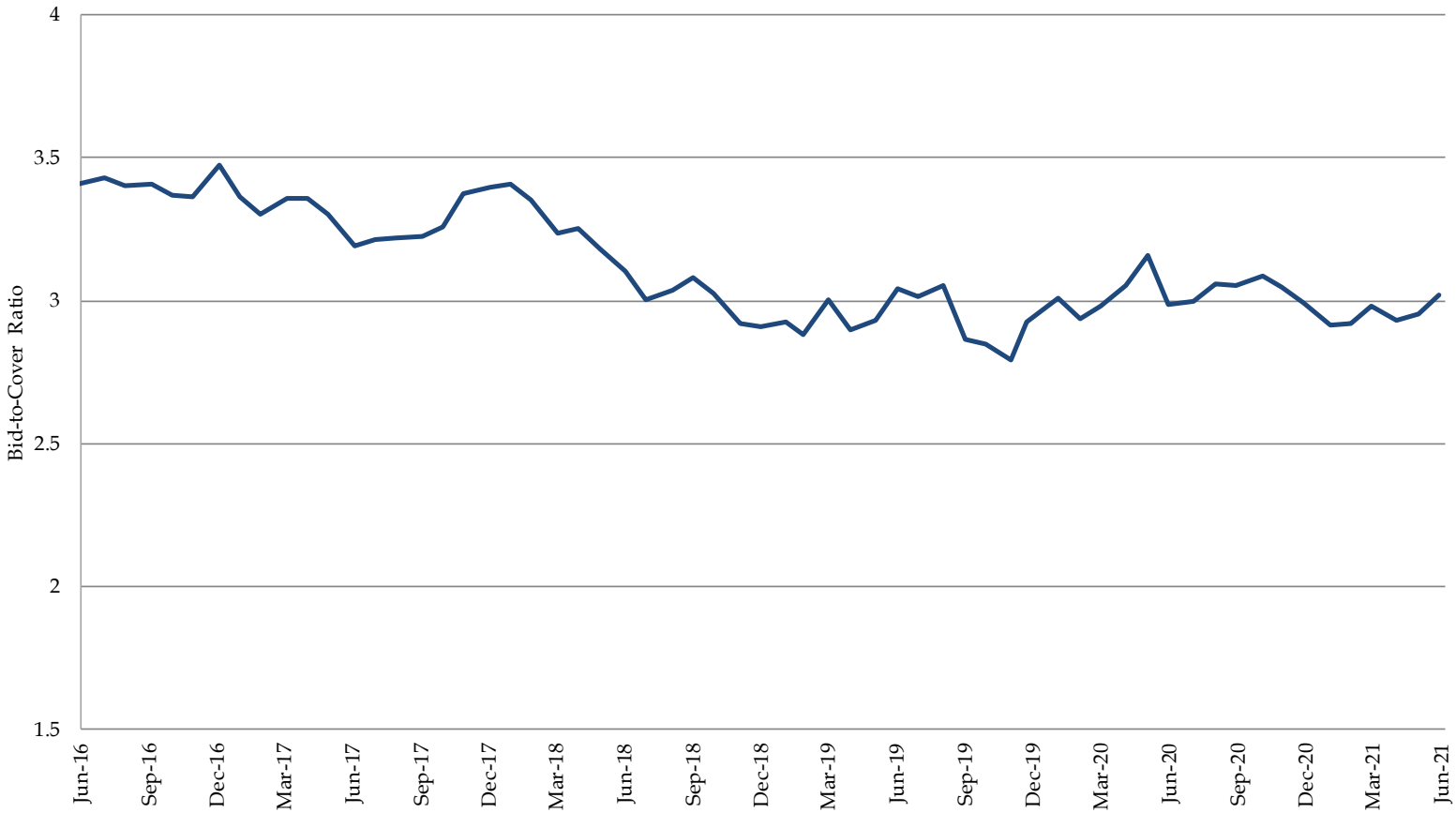
Total Bills	0.024	3.4	3,511.5	46.6	6.8	46.5	48.57	249.6	113.3
Total Coupons	1.026	2.4	988.5	24.5	18.5	56.9	1.53	208.0	920.6
Total TIPS	-1.329	2.6	46.9	10.9	14.0	75.1	0.14	5.9	35.0
Total FRN	0.031	3.1	79.9	36.0	2.3	61.7	0.07	5.3	0.0

*Weighted averages of Competitive Awards. 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.

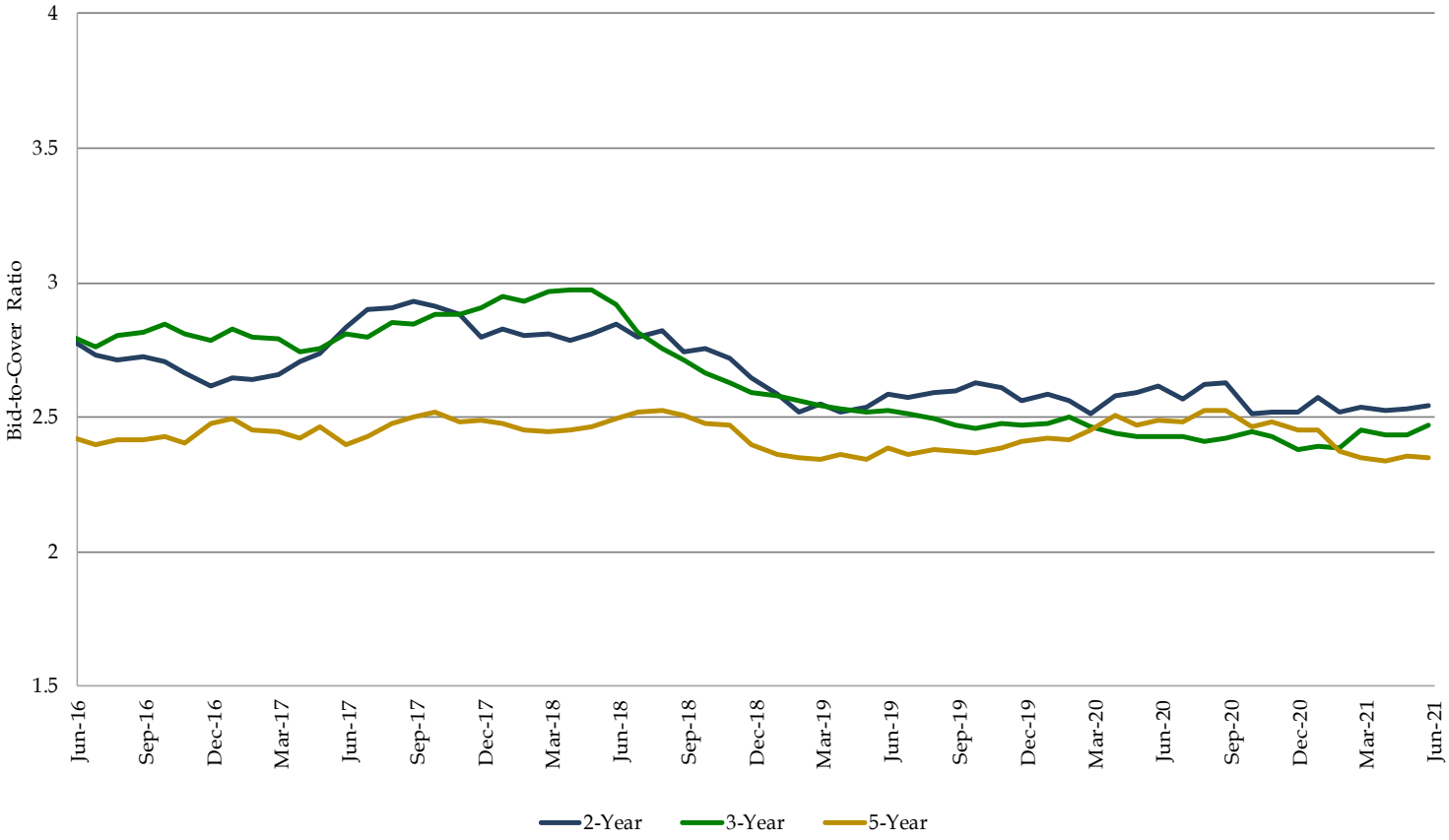
Bid-to-Cover Ratios for Treasury Bills



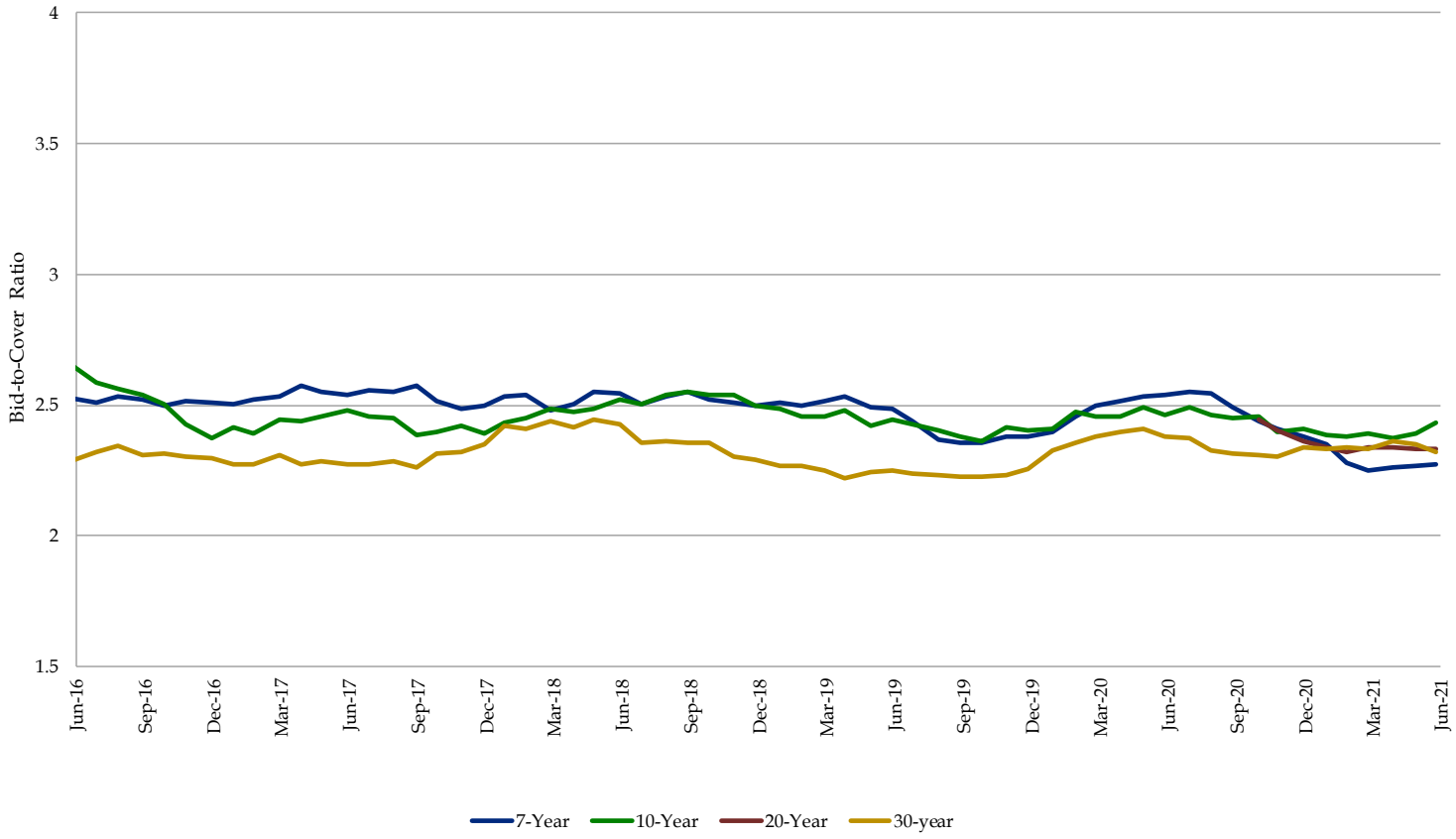
Bid-to-Cover Ratios for FRNs
(6-Month Moving Average)



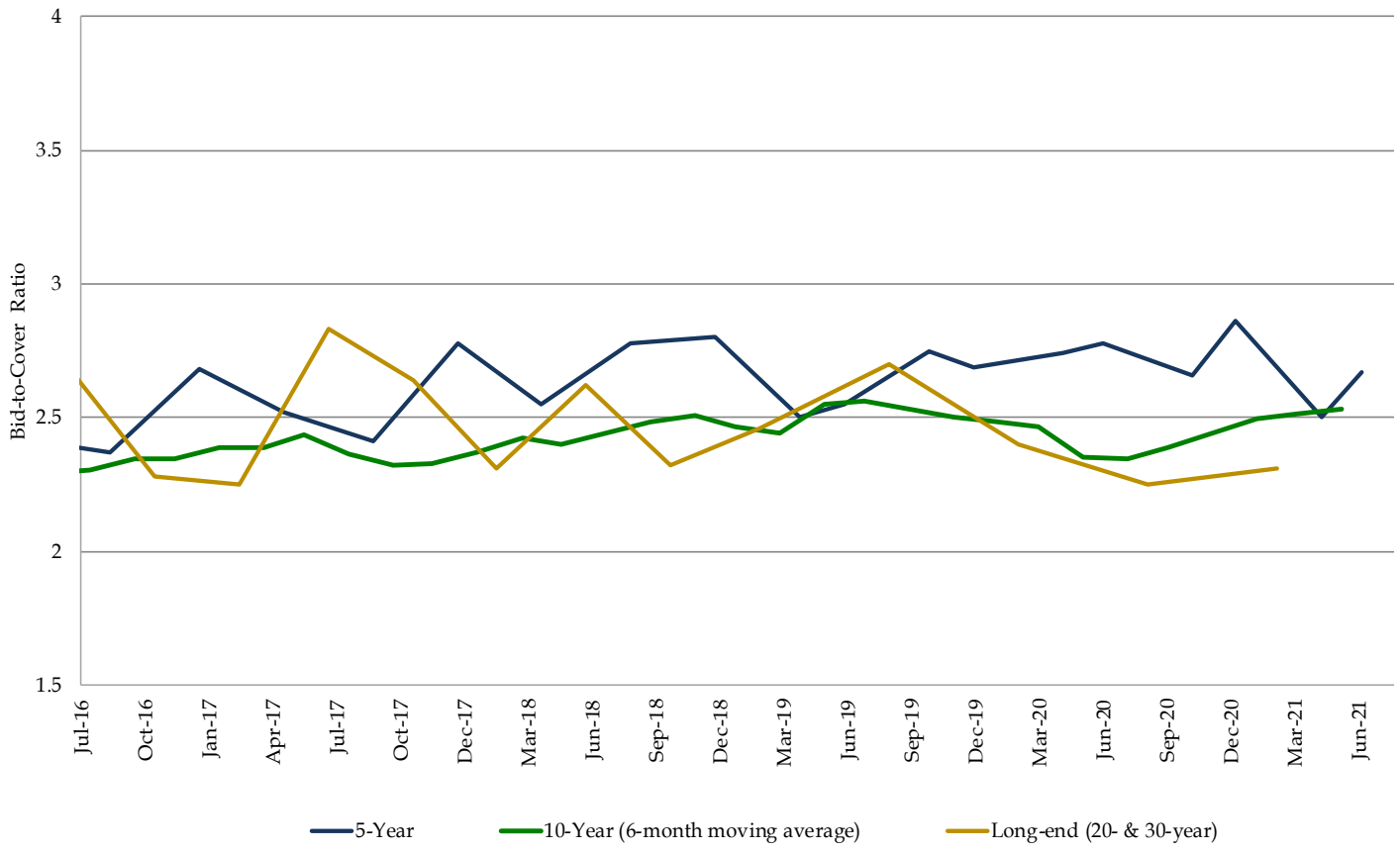
Bid-to-Cover Ratios for 2-, 3-, and 5-Year Nominal Securities (6-Month Moving Average)

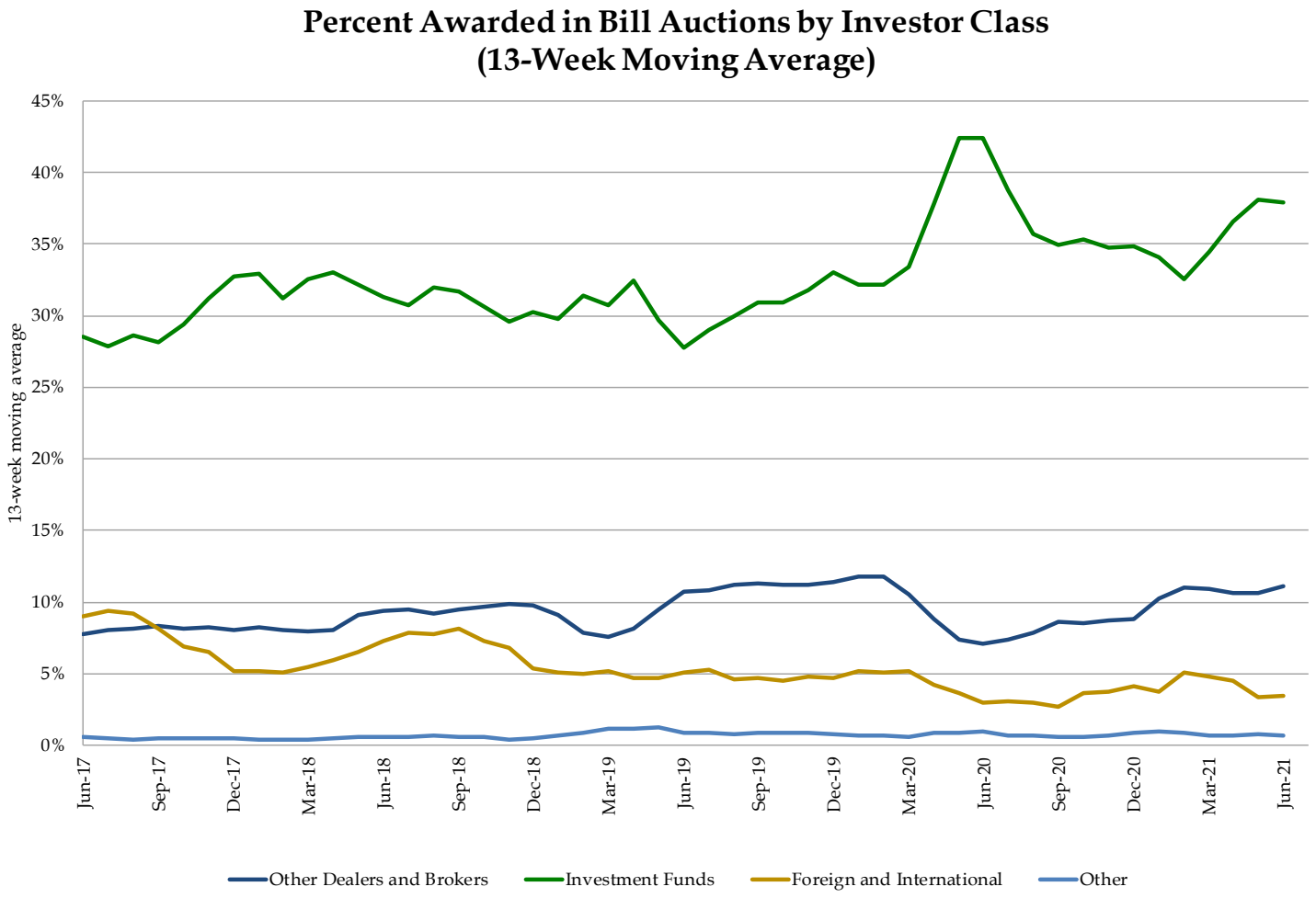


Bid-to-Cover Ratios for 7-, 10-, 20-, and 30-Year Nominal Securities (6-Month Moving Average)



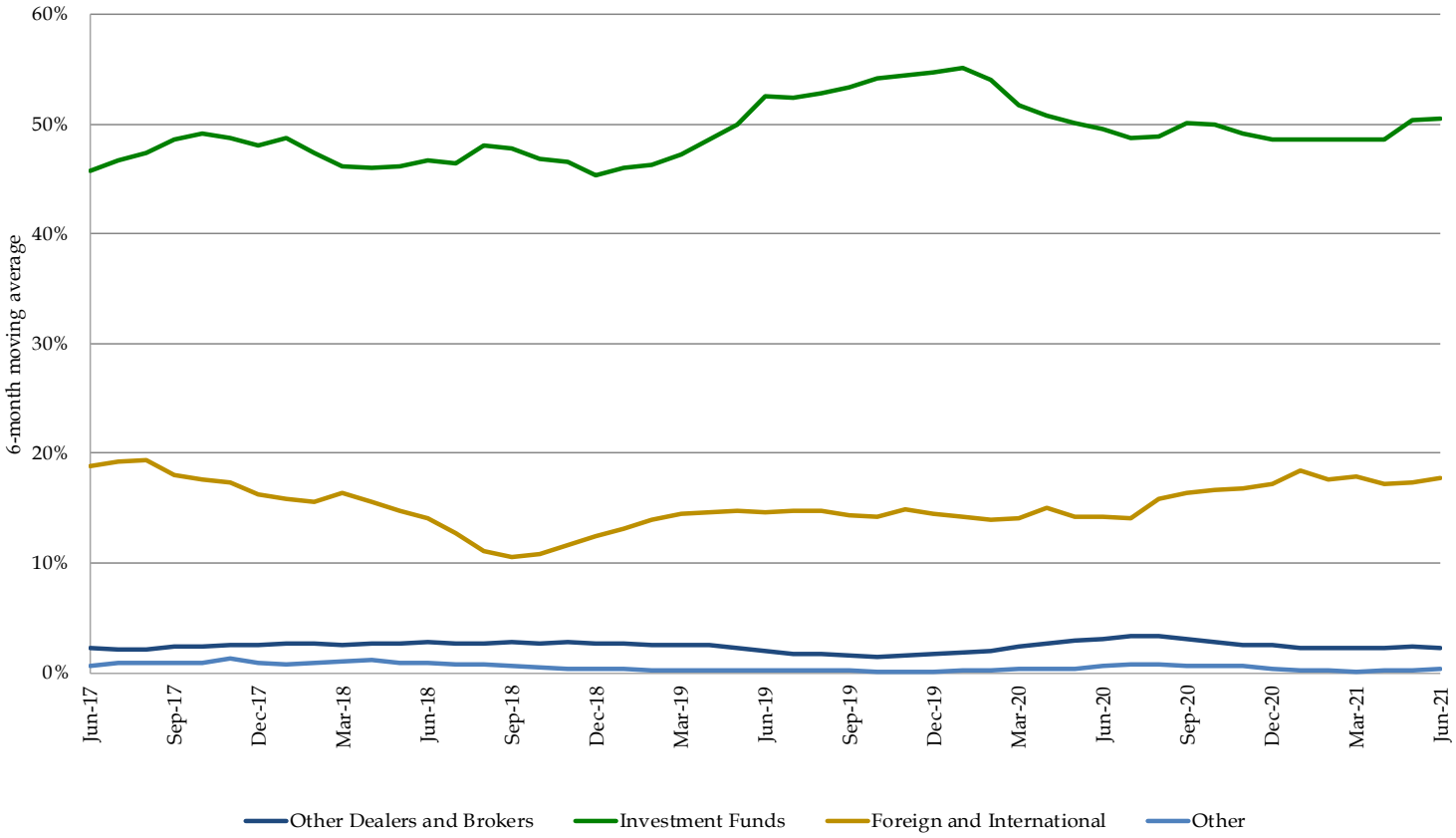
Bid-to-Cover Ratios for TIPS





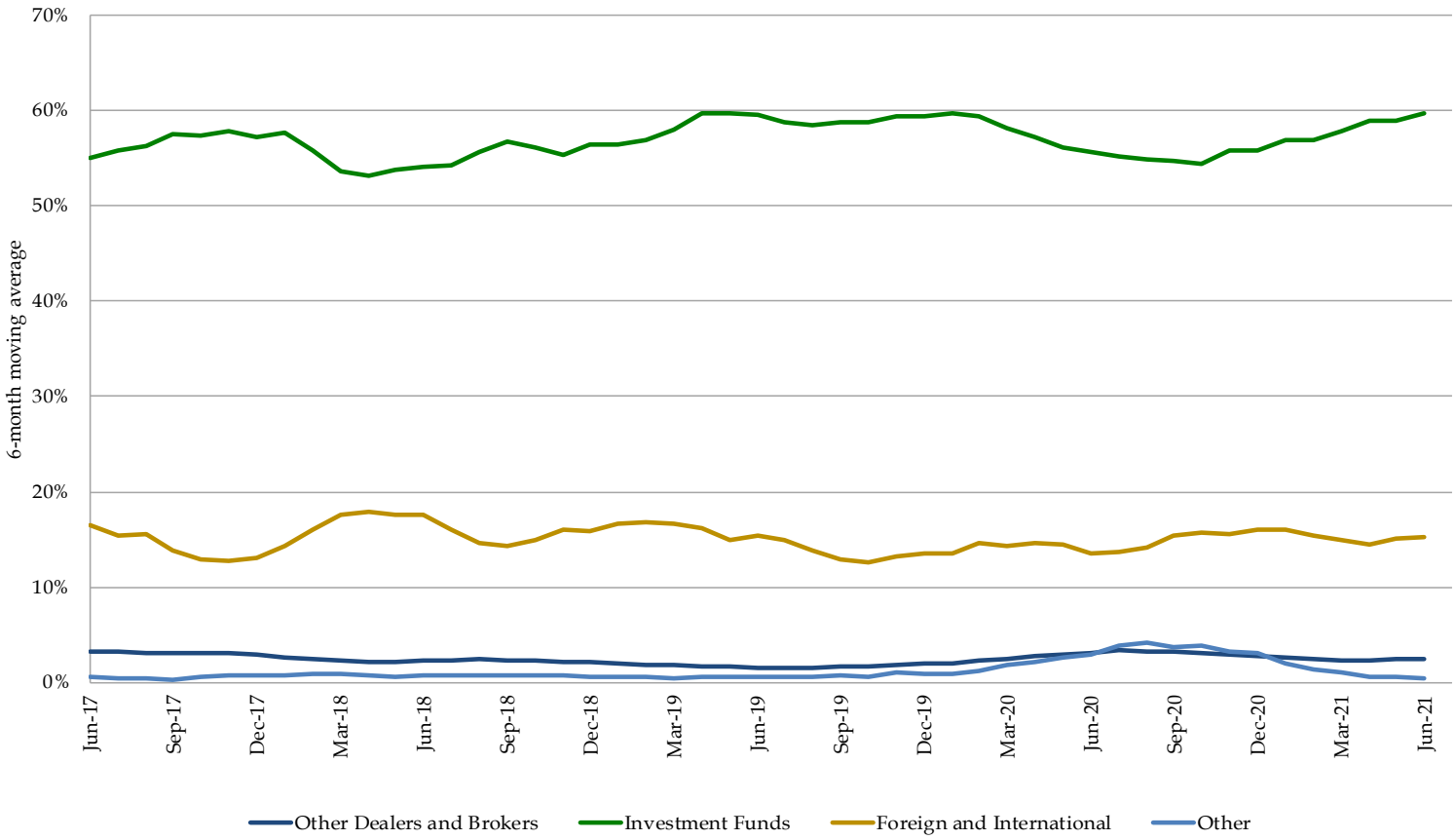
Excludes SOMA add-ons. The "Other" category includes categories that are each less than 5%, which include Depository Institutions, Individuals, Pension and Insurance.

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



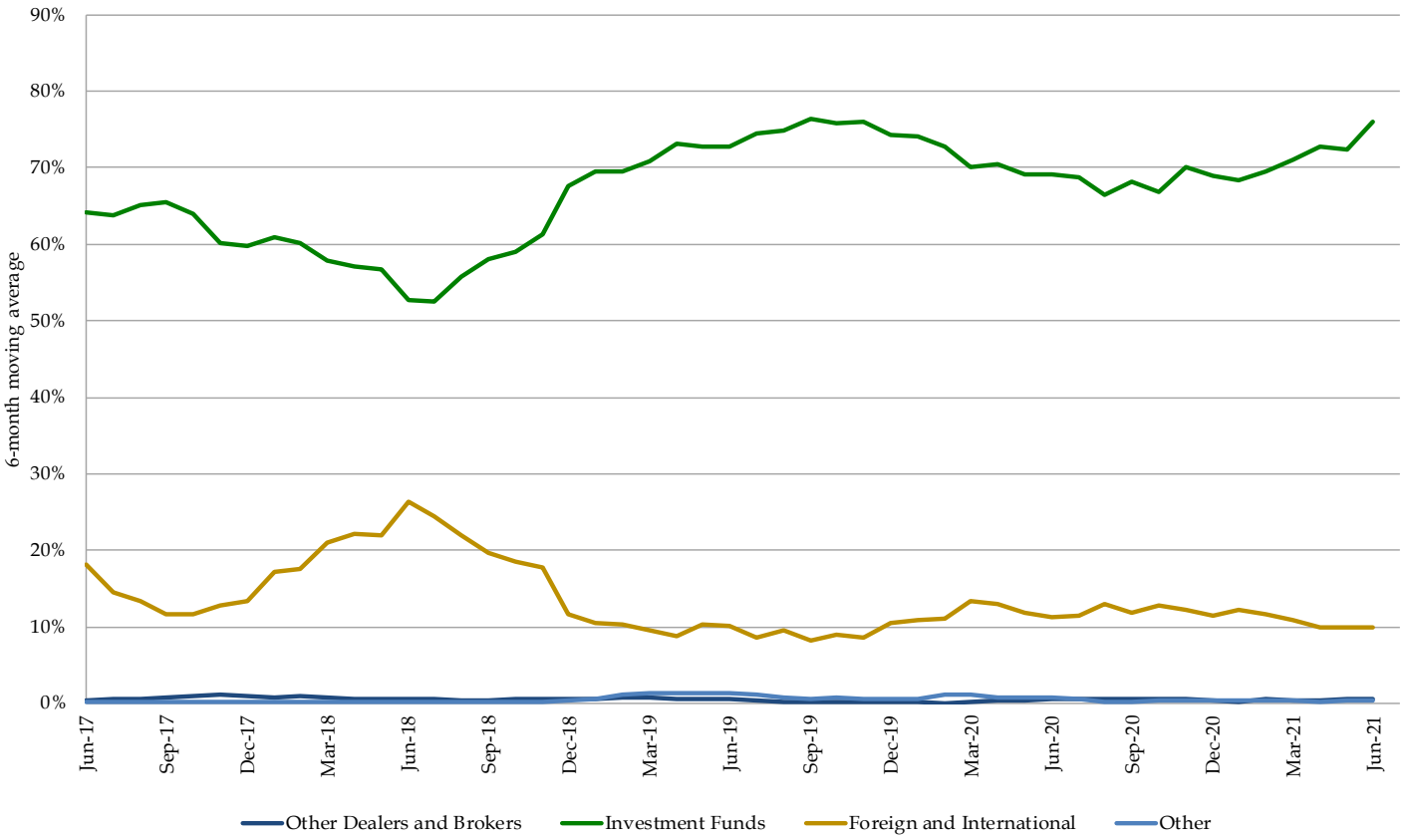
Excludes SOMA add-ons. The "Other" category includes categories that are each less than 5%, which include Depository Institutions, Individuals, Pension and Insurance.

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



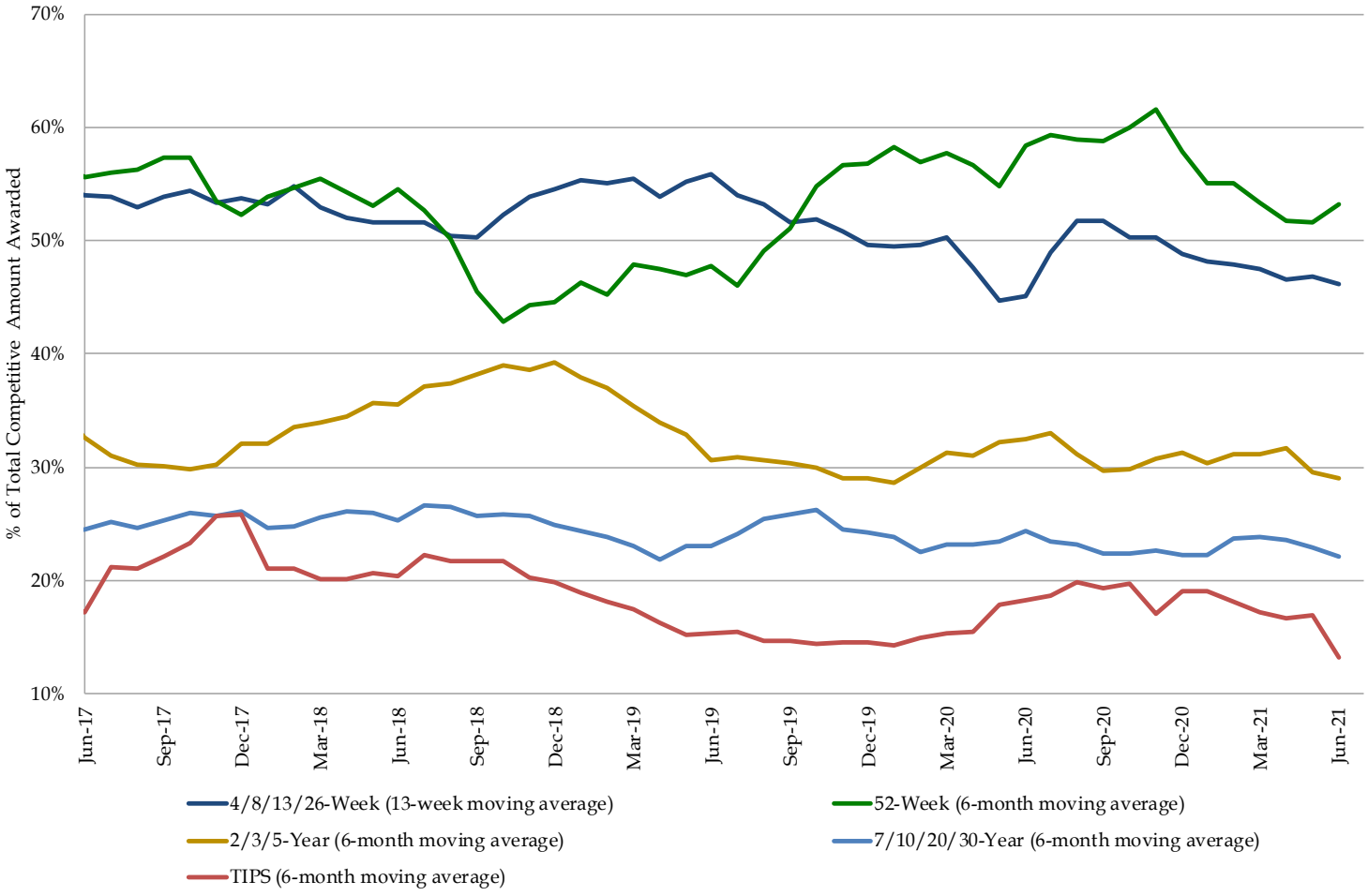
Excludes SOMA add-ons. The "Other" category includes categories that are each less than 5%, which include Depository Institutions, Individuals, Pension and Insurance.

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



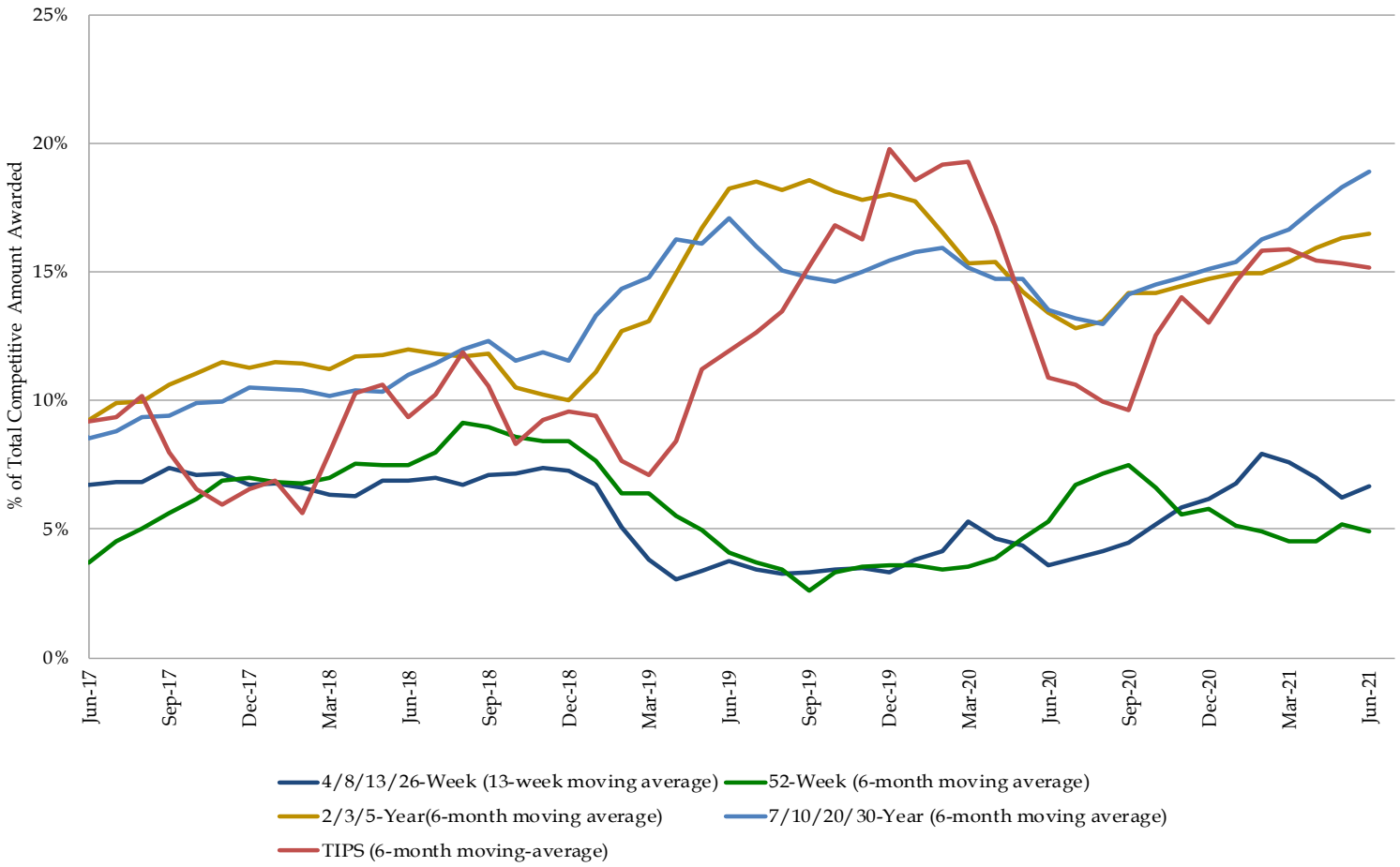
Excludes SOMA add-ons. The "Other" category includes categories that are each less than 5%, which include Depository Institutions, Individuals, Pension and Insurance.

Primary Dealer Awards at Auction



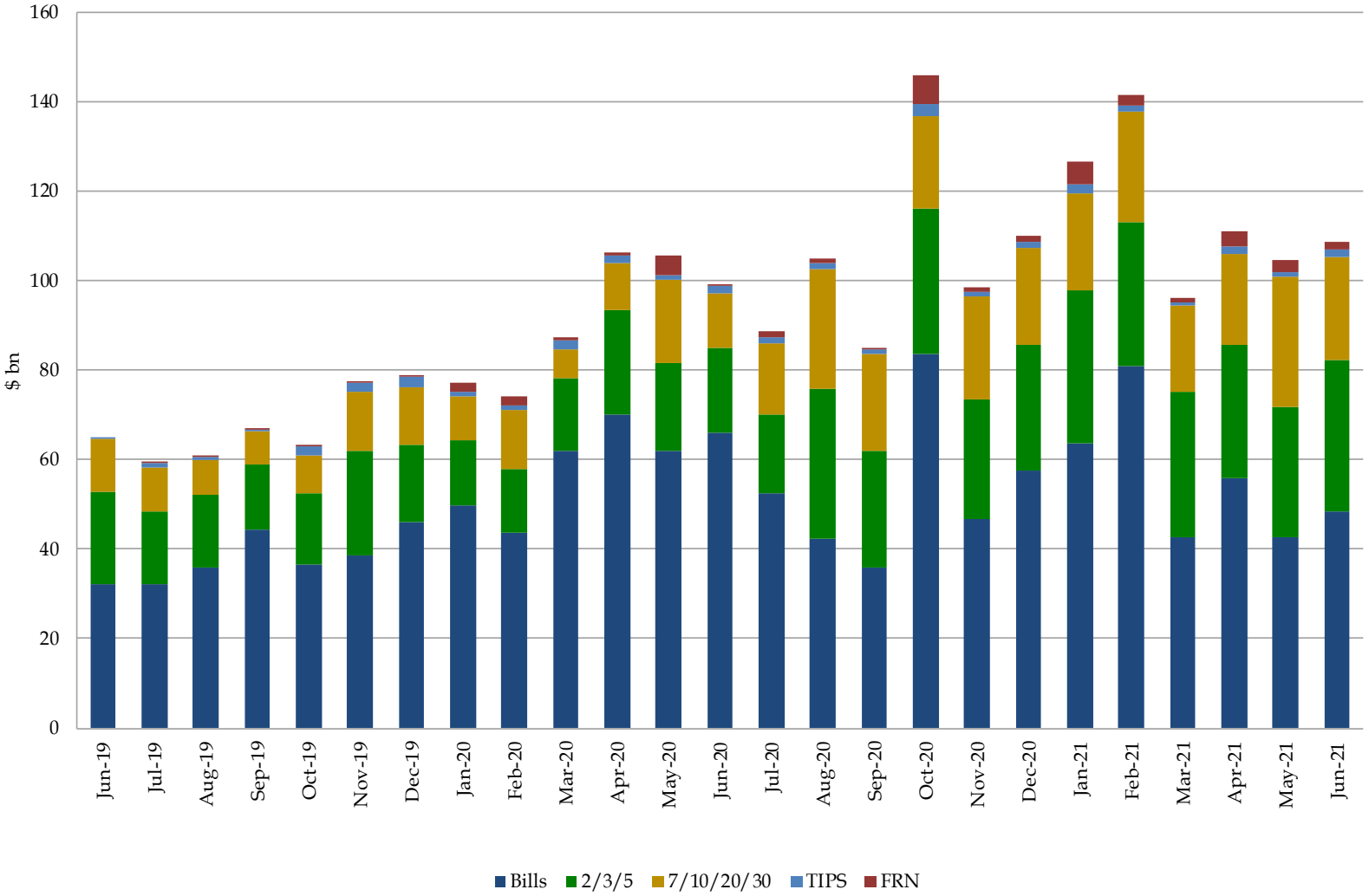
Competitive Amount Awarded excludes SOMA add-ons.

Direct Bidder Awards at Auction



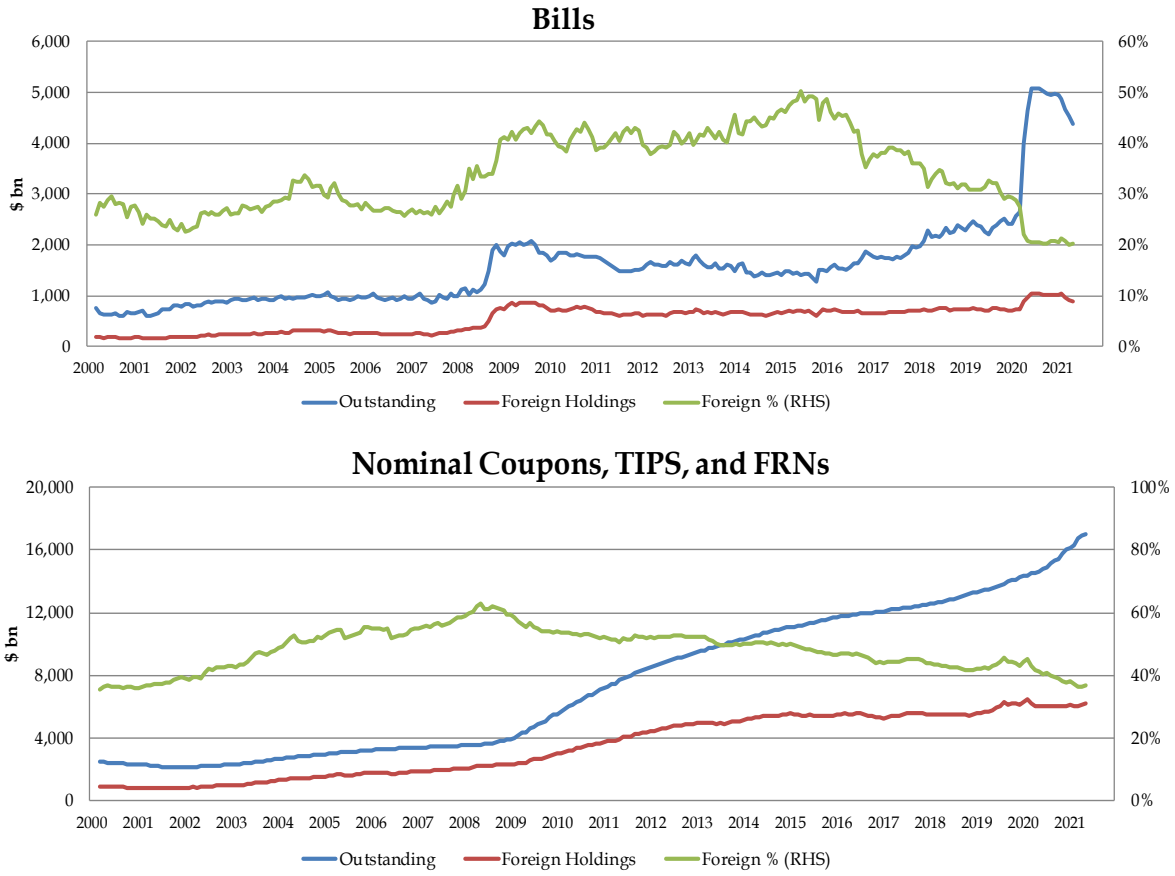
Competitive Amount Awarded excludes SOMA add-ons.

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 May 2021.
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.

Appendix

Projected Privately-Held Net Marketable Borrowing
Assuming Private Coupon Issuance & Total Bills Outstanding Remain Constant as of 6/30/2021*

Fiscal Year	Bills	2/3/5	7/10/20/30	TIPS	FRN	Historical/Projected Net Borrowing Capacity
2016	289	(107)	515	58	41	795
2017	155	(66)	378	51	(0)	519
2018	438	197	493	45	23	1,196
2019	137	498	534	51	59	1,280
2020	2,652	538	724	46	55	4,014
2021	(754)	1,259	1,328	53	92	1,978
2022	0	1,065	1,379	51	80	2,574
2023	0	828	1,222	33	6	2,089
2024	0	524	1,312	55	0	1,891
2025	0	250	1,299	(11)	0	1,538
2026	0	24	1,299	1	0	1,324
2027	0	0	1,238	2	0	1,241
2028	0	0	819	(16)	0	803
2029	0	0	831	(11)	0	820
2030	0	0	805	5	0	811
2031	0	0	593	(12)	0	582

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.

*Privately-held marketable borrowing excludes rollovers (auction "add-ons") of Treasury securities held in the Federal Reserve's System Open Market Account (SOMA) but includes financing required due to SOMA redemptions.

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	4/6/2021	0.015	3.19	38.8	49.0	6.8	44.2	1.2	3.1	0.4
4-Week	4/13/2021	0.010	3.72	38.7	55.0	10.6	34.4	1.3	3.1	0.4
4-Week	4/20/2021	0.010	3.64	38.9	45.5	6.4	48.2	1.1	3.3	0.4
4-Week	4/27/2021	0.005	3.73	38.6	41.4	4.6	54.0	1.4	2.7	0.4
4-Week	5/4/2021	0.000	3.75	38.3	39.5	6.4	54.2	1.7	3.3	0.4
4-Week	5/11/2021	0.010	3.48	39.3	49.0	4.8	46.2	0.7	3.2	0.4
4-Week	5/18/2021	0.000	4.17	38.8	44.0	3.8	52.2	1.2	3.2	0.4
4-Week	5/25/2021	0.000	3.98	39.3	52.6	9.0	38.4	0.7	2.7	0.4
4-Week	6/1/2021	0.000	4.06	39.4	53.8	3.1	43.1	0.6	3.2	0.4
4-Week	6/8/2021	0.000	3.73	39.3	31.5	1.2	67.3	0.7	3.1	0.4
4-Week	6/15/2021	0.005	3.16	39.3	54.3	6.5	39.2	0.7	3.3	0.4
4-Week	6/22/2021	0.045	3.48	38.8	54.8	3.3	42.0	1.2	2.7	0.4
4-Week	6/29/2021	0.045	3.24	39.3	47.8	9.1	43.1	0.7	3.2	0.4
8-Week	4/6/2021	0.015	3.62	39.3	41.5	4.4	54.0	0.7	3.1	0.7
8-Week	4/13/2021	0.010	3.71	39.4	44.2	7.9	47.9	0.6	3.1	0.7
8-Week	4/20/2021	0.015	2.99	39.2	70.8	11.5	17.7	0.8	3.3	0.7
8-Week	4/27/2021	0.015	3.14	39.5	48.4	10.5	41.1	0.5	2.7	0.7
8-Week	5/4/2021	0.010	3.40	38.9	43.8	6.6	49.6	1.1	3.3	0.7
8-Week	5/11/2021	0.010	3.59	39.7	53.1	3.9	43.0	0.3	3.2	0.7
8-Week	5/18/2021	0.010	3.47	39.7	67.7	9.8	22.5	0.3	3.2	0.7
8-Week	5/25/2021	0.005	3.38	39.6	66.1	7.8	26.1	0.4	2.7	0.7
8-Week	6/1/2021	0.005	3.23	39.8	62.6	11.7	25.7	0.2	3.2	0.7
8-Week	6/8/2021	0.015	2.97	39.3	63.8	9.3	26.9	0.7	3.1	0.7
8-Week	6/15/2021	0.020	2.89	39.4	59.4	9.3	31.3	0.6	3.3	0.7
8-Week	6/22/2021	0.035	3.92	39.3	30.0	1.0	68.9	0.7	2.7	0.7
8-Week	6/29/2021	0.050	3.60	39.8	39.3	4.4	56.2	0.2	3.2	0.7

*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	4/8/2021	0.020	3.00	56.1	32.7	4.7	62.5	0.9	7.5	1.7
13-Week	4/15/2021	0.020	3.02	55.7	53.1	6.5	40.3	1.3	6.2	1.7
13-Week	4/22/2021	0.025	2.64	56.2	52.3	7.2	40.5	0.8	6.7	1.7
13-Week	4/29/2021	0.020	2.99	55.4	47.7	6.2	46.1	1.6	6.1	1.7
13-Week	5/6/2021	0.015	3.05	55.5	42.1	8.0	49.9	1.5	7.9	1.7
13-Week	5/13/2021	0.015	2.72	56.1	47.6	9.1	43.3	0.9	6.0	1.7
13-Week	5/20/2021	0.015	2.94	55.5	47.9	9.7	42.4	1.5	7.1	1.7
13-Week	5/27/2021	0.015	2.88	56.3	49.4	8.0	42.6	0.8	5.3	1.7
13-Week	6/3/2021	0.020	2.74	55.5	53.2	15.2	31.6	1.5	7.6	1.8
13-Week	6/10/2021	0.025	2.79	55.6	46.6	8.7	44.6	1.4	4.9	1.7
13-Week	6/17/2021	0.025	3.45	55.8	31.5	4.1	64.4	1.2	5.6	1.7
13-Week	6/24/2021	0.045	3.62	56.3	39.0	6.8	54.2	0.7	2.1	1.6
13-Week	7/1/2021	0.050	3.62	56.6	40.1	9.0	50.9	0.4	7.9	1.8
26-Week	4/8/2021	0.035	3.38	53.0	31.3	3.8	64.9	1.0	7.1	3.3
26-Week	4/15/2021	0.040	3.39	53.1	39.7	4.1	56.2	0.9	5.9	3.2
26-Week	4/22/2021	0.040	3.23	53.3	41.4	2.9	55.7	0.7	6.4	3.3
26-Week	4/29/2021	0.035	3.32	52.5	37.3	2.7	60.0	1.5	5.8	3.2
26-Week	5/6/2021	0.035	2.72	53.2	62.8	5.8	31.4	0.8	7.5	3.3
26-Week	5/13/2021	0.035	3.28	53.4	32.4	3.4	64.2	0.6	5.7	3.2
26-Week	5/20/2021	0.030	3.28	53.1	41.6	5.7	52.7	0.9	6.8	3.3
26-Week	5/27/2021	0.030	2.78	52.5	56.3	7.4	36.4	1.5	5.0	3.2
26-Week	6/3/2021	0.035	3.10	52.6	43.0	14.1	42.8	1.4	7.2	3.3
26-Week	6/10/2021	0.040	3.31	53.1	41.9	3.8	54.4	0.9	4.6	3.2
26-Week	6/17/2021	0.040	3.32	53.1	37.9	6.4	55.7	0.9	5.3	3.2
26-Week	6/24/2021	0.055	3.64	53.5	28.1	5.2	66.7	0.5	2.0	3.1
26-Week	7/1/2021	0.055	3.60	53.5	33.0	1.6	65.4	0.5	7.5	3.3
52-Week	4/22/2021	0.065	3.69	33.8	46.8	2.8	50.4	0.2	4.0	4.1
52-Week	5/20/2021	0.055	3.32	33.8	57.4	6.9	35.7	0.2	4.3	4.2
52-Week	6/17/2021	0.070	3.19	33.8	62.6	5.5	31.9	0.2	3.3	4.1

*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)*
6-Week	4/8/2021	0.020	3.50	40.0	58.4	10.9	30.7	0.0	0.0	0.5
6-Week	4/15/2021	0.015	3.34	40.0	53.7	9.0	37.3	0.0	0.0	0.5
6-Week	4/22/2021	0.010	3.56	40.0	34.0	8.6	57.3	0.0	0.0	0.5
6-Week	4/29/2021	0.010	3.41	39.8	44.7	8.6	46.7	0.2	0.0	0.5
6-Week	5/6/2021	0.010	3.58	40.0	40.9	4.3	54.7	0.0	0.0	0.5
6-Week	5/13/2021	0.005	3.95	40.0	40.0	8.9	51.0	0.0	0.0	0.5
6-Week	5/20/2021	0.005	3.86	40.0	60.7	5.9	33.4	0.0	0.0	0.5
6-Week	5/27/2021	0.005	3.60	40.0	46.1	4.5	49.5	0.0	0.0	0.5
6-Week	6/3/2021	0.005	3.46	39.9	27.0	3.9	69.1	0.1	0.0	0.5
6-Week	6/10/2021	0.010	3.12	40.0	47.9	7.9	44.2	0.0	0.0	0.5
6-Week	6/17/2021	0.015	3.22	39.9	40.2	4.8	55.0	0.1	0.0	0.5
6-Week	6/24/2021	0.040	3.06	40.0	55.3	13.3	31.4	0.0	0.0	0.5
6-Week	7/1/2021	0.050	3.43	40.0	46.4	6.9	46.7	0.0	0.0	0.5
17-Week	4/13/2021	0.025	4.06	35.0	36.9	8.1	55.0	0.0	0.0	1.2
17-Week	4/20/2021	0.025	3.60	35.0	54.0	4.8	41.2	0.0	0.0	1.2
17-Week	4/27/2021	0.025	3.55	35.0	46.0	12.5	41.5	0.0	0.0	1.2
17-Week	5/4/2021	0.025	3.56	34.9	53.1	7.6	39.3	0.1	0.0	1.2
17-Week	5/11/2021	0.025	3.62	35.0	40.9	4.7	54.4	0.0	0.0	1.2
17-Week	5/18/2021	0.020	3.24	35.0	58.9	8.2	32.9	0.0	0.0	1.2
17-Week	5/25/2021	0.015	3.51	34.9	50.1	9.8	40.1	0.1	0.0	1.2
17-Week	6/1/2021	0.020	3.12	35.0	55.1	8.2	36.7	0.0	0.0	1.2
17-Week	6/8/2021	0.030	3.29	34.9	59.0	7.9	33.0	0.1	0.0	1.2
17-Week	6/15/2021	0.030	3.95	34.7	37.8	4.8	57.3	0.3	0.0	1.2
17-Week	6/22/2021	0.035	3.72	35.0	46.1	7.5	46.4	0.0	0.0	1.2
17-Week	6/29/2021	0.050	3.90	35.0	45.1	7.6	47.3	0.0	0.0	1.2
17-Week	7/6/2021	0.050	4.16	35.0	57.1	6.5	36.4	0.0	0.0	1.2

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

Nominal Coupons										
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	4/30/2021	0.175	2.34	59.7	37.9	18.5	43.6	0.3	11.5	15.5
2-Year	6/1/2021	0.152	2.74	59.8	24.9	18.0	57.1	0.2	11.6	15.6
2-Year	6/30/2021	0.249	2.54	59.9	30.9	18.5	50.6	0.1	9.1	15.2
3-Year	4/15/2021	0.376	2.32	57.7	33.1	15.8	51.1	0.3	8.9	21.6
3-Year	5/17/2021	0.329	2.42	57.9	32.3	18.1	49.6	0.1	30.8	28.9
3-Year	6/15/2021	0.325	2.47	58.0	27.6	18.3	54.2	0.0	5.3	20.7
5-Year	4/30/2021	0.849	2.31	60.9	24.6	17.5	57.9	0.1	11.6	38.7
5-Year	6/1/2021	0.788	2.49	60.9	20.8	14.9	64.4	0.1	11.8	38.9
5-Year	6/30/2021	0.904	2.36	61.0	24.3	18.1	57.6	0.0	9.3	37.7
7-Year	4/30/2021	1.306	2.31	62.0	22.3	20.6	57.1	0.0	11.8	53.7
7-Year	6/1/2021	1.285	2.41	62.0	19.7	20.7	59.6	0.0	12.0	54.0
7-Year	6/30/2021	1.264	2.36	62.0	18.7	21.3	60.0	0.0	9.4	52.5
10-Year	4/15/2021	1.680	2.36	38.0	24.2	16.2	59.6	0.0	5.8	43.8
10-Year	5/17/2021	1.684	2.45	41.0	19.5	17.1	63.4	0.0	21.8	63.0
10-Year	6/15/2021	1.497	2.58	38.0	15.7	19.2	65.0	0.0	3.5	41.4
20-Year	4/30/2021	2.144	2.42	24.0	21.1	20.2	58.7	0.0	4.6	50.5
20-Year	6/1/2021	2.286	2.24	27.0	23.8	19.5	56.7	0.0	5.2	56.1
20-Year	6/30/2021	2.120	2.40	24.0	17.5	20.4	62.1	0.0	3.6	48.4
30-Year	4/15/2021	2.320	2.47	24.0	17.1	21.9	61.0	0.0	3.7	66.6
30-Year	5/17/2021	2.395	2.22	27.0	20.1	20.1	59.9	0.0	14.3	96.4
30-Year	6/15/2021	2.172	2.29	24.0	18.0	18.0	64.0	0.0	2.2	61.7
2-Year FRN	4/30/2021	0.034	2.91	28.0	36.7	3.6	59.7	0.0	5.3	0.0
2-Year FRN	5/28/2021	0.030	3.03	26.0	39.5	1.3	59.2	0.0	0.0	0.0
2-Year FRN	6/25/2021	0.030	3.23	26.0	31.8	1.9	66.3	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)**
5-Year TIPS	4/30/2021	(1.631)	2.50	17.9	13.1	17.9	69.0	0.1	3.4	11.6
5-Year TIPS	6/30/2021	(1.416)	2.67	16.0	4.7	7.9	87.3	0.0	2.4	9.7
10-Year TIPS	5/28/2021	(0.805)	2.50	13.0	15.5	15.9	68.6	0.0	0.0	13.6

*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.

TBAC Charge

Given your borrowing forecasts for the next two fiscal years, please comment on how Treasury should consider adjustments to coupon issuance sizes in the coming quarters. When should Treasury consider making adjustments to nominal coupon auction sizes, and how should these adjustments be allocated across the curve?

August 2021

Outline

1. Framework for Addressing TBAC Charge
2. Projection of Funding Needs
3. Coarse Auction Resizing Scenarios
4. Demand Assessment of Auction Points
5. Fine Tuning Auction Adjustment Scenarios
6. Additional Considerations
7. Conclusions and Recommendations
8. Appendix

1. Framework for Addressing TBAC Charge

Framework for Addressing TBAC Charge

- To address the questions of when and by how much Treasury should alter future coupon bond issuance a model has been used to estimate how overfunded Treasury would be under the current auction schedule and an assumed path of fiscal spending and SOMA management. This provides a baseline estimate of how much coupon issuance needs to be reduced.
- When analyzing auction adjustments, we considered the following:
  - The goal of maintaining regular and predictable issuance patterns while ensuring sufficient liquidity at existing nodes
    - While the issuance tables shown throughout the analysis are in annual terms, the underlying auction adjustments were implemented in a monthly regular and predictable fashion (e.g., consistently reducing an auction point by $1 billion each month, beginning in the first month of the year, reduces annual issuance by $78 billion in the first year, and then $144 billion in future years)
  - The goal to target T-bills within a long-term range of 15% to 20% of total debt outstanding
  - The impact on overall profile of the outstanding debt (WAM, duration and belly share*)
    - Given the TBAC Optimal Debt Model's preference for increasing belly share, we track this statistic throughout the analysis
  - The relative cost of each issuance point and the expected overall cost of issuance
- We evaluated different issuance scenarios under consistent fiscal spending and SOMA management assumptions.
- The scenarios are intended to assist in the decision of when and how issuance should be reduced over the next several years, and more broadly, the debt issuance strategy going forward.

Assumptions for Addressing TBAC Charge

- The following assumptions have been made in each of the scenarios:
  - The Fed's net new purchases of Treasuries are assumed to decline linearly by $6.7 billion per month between January 2022 and December 2022, and reinvestment of maturing debt is continued over the projection horizon
  - The fiscal spending requirements use the CBO budget projections (as of July 2021) with an adjustment of $1.5 trillion for additional fiscal packages not included in that baseline
  - Unless otherwise stated, SOMA holdings are included within the measures of the outstanding Treasury debt
    - For the purposes of calculating duration and WAM, SOMA holdings are treated as FRNs with the same maturities
  - 2-year FRN issuance is held constant at current levels
  - Treasury General Account (TGA) is held constant at current levels throughout the projection period
  - T-bills are issued as needed to meet the overall funding requirements in each coupon auction scenario

** Note: Belly share is defined as the % of outstanding debt with remaining maturity greater than 1 year and less than 8.5 years.*

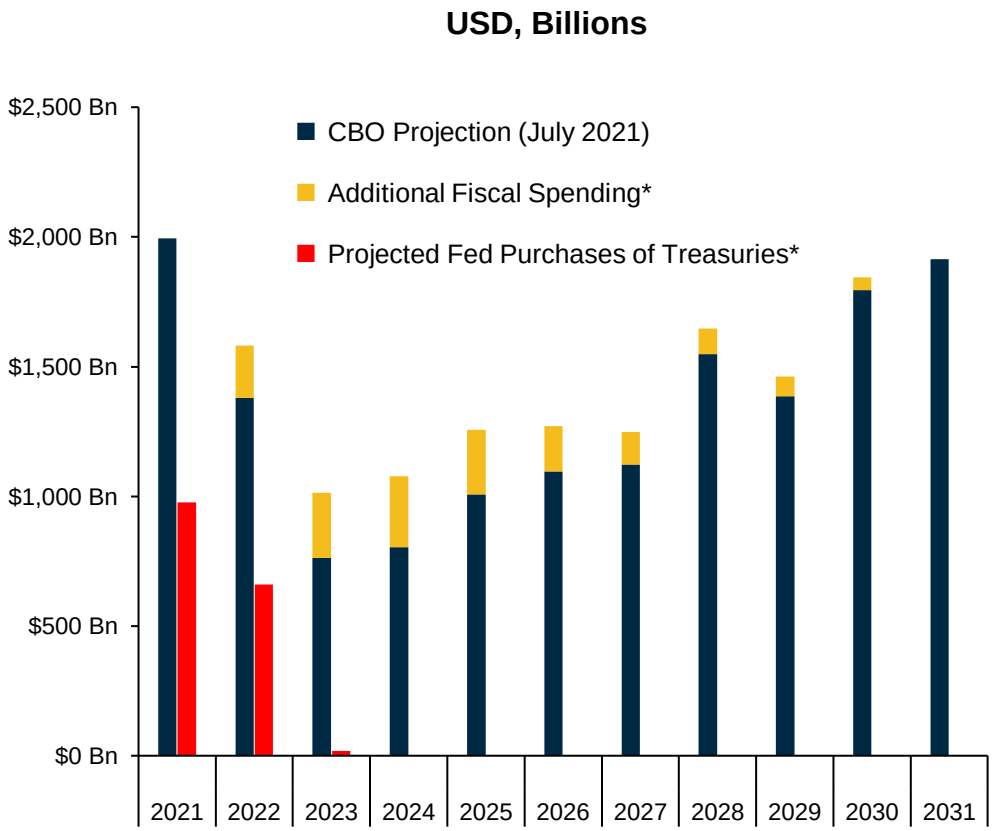
2. Projection of Funding Needs

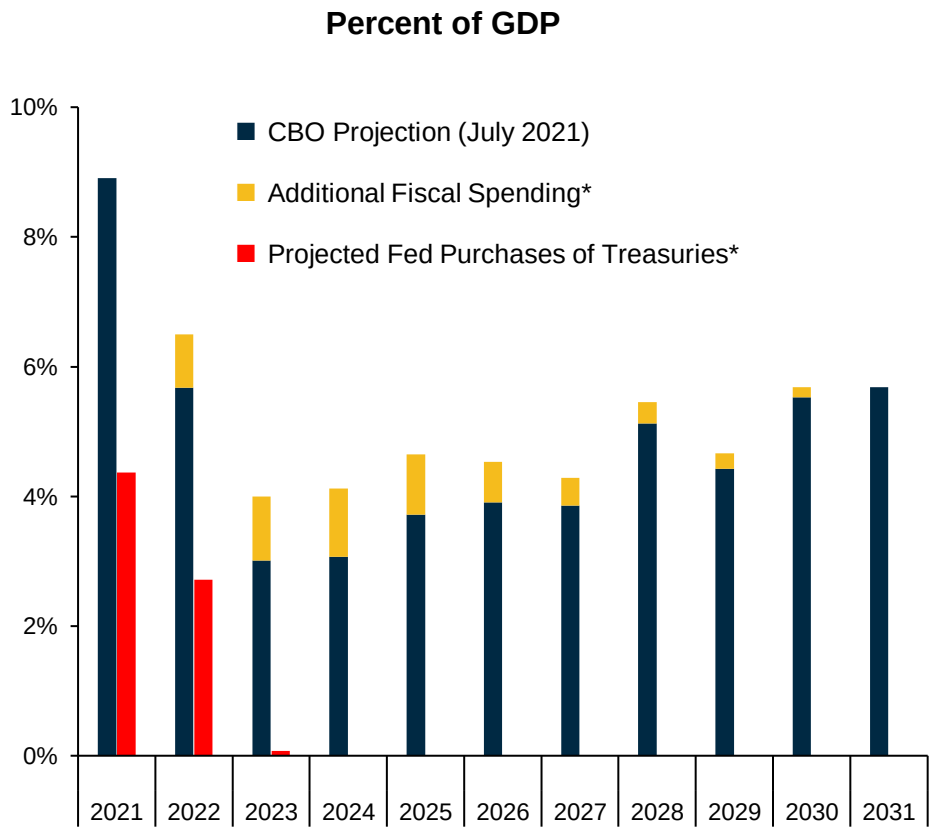
Federal Borrowing Requirements are Expected to Remain Large in Coming Years

- While Federal government borrowing needs are projected to decline as the economy recovers from the impact of the global pandemic over the next few years, they nonetheless are expected to remain quite large in historical terms.
- We assume additional fiscal packages are likely to be passed this year, resulting in additional aggregate net federal spending of $1.5 trillion through 2030 (over the next 9 years*). This would further add to Treasury's financing requirements in coming years.

Federal Government Net Borrowing Needs (Fiscal Year)

As of June 30, 2021





*Source: CBO and committee participant. * Based on committee participant's estimates.*

3. Coarse Auction Resizing Scenarios

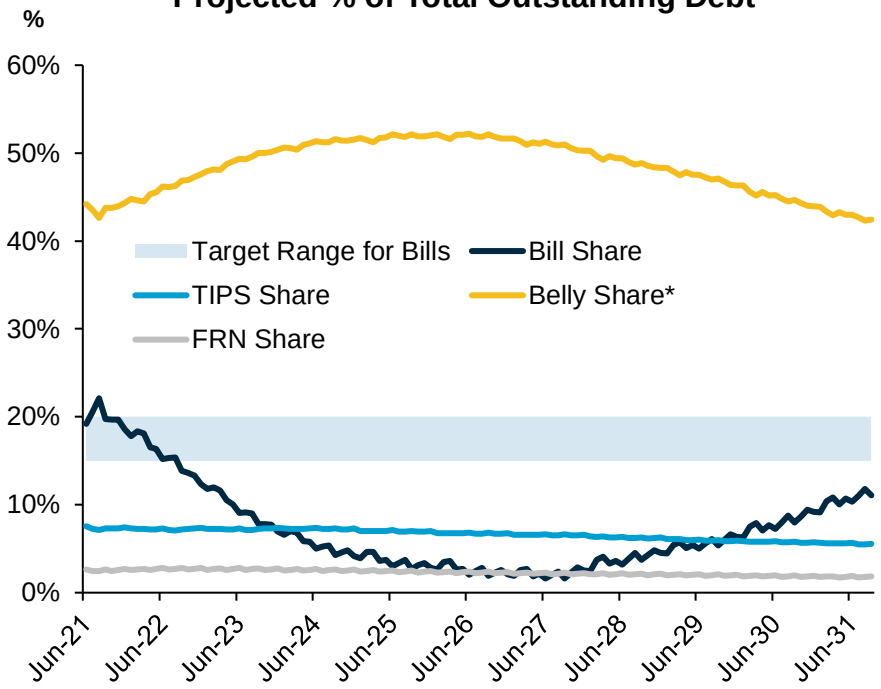
Scenario 1—Maintain Current Auction Schedule

- This scenario holds coupon issuance constant based on the most recent actual quarterly issuance cycle (May - July) totals.
- Under this scenario, Treasury will be significantly overfunded, the T-bill share will drop well outside the target range and the WAM and WAD will both extend longer
  - In this scenario T-bill share falls to approximately 2% in 2026-2027, a clearly unacceptable outcome
- TIPS share gradually declines as a percent of outstanding debt

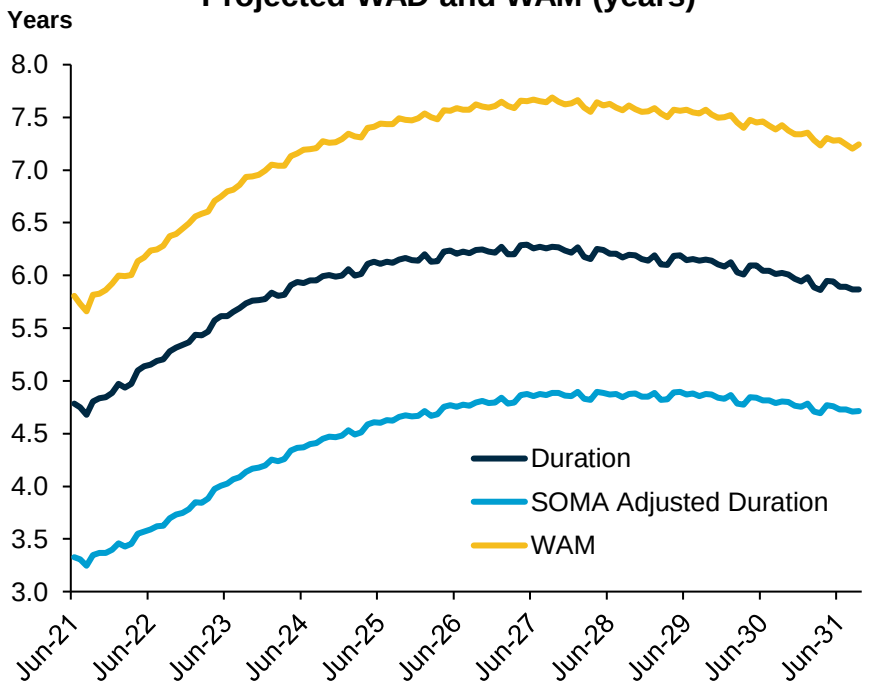
Assumed Annual Issuance Schedule ($bn)

Calendar Year	2Y	3Y	5Y	7Y	10Y	20Y	30Y	5Y TIPS	10Y TIPS	30Y TIPS
2022	720	696	732	744	468	300	300	68	88	18
2023	720	696	732	744	468	300	300	68	88	18
2024	720	696	732	744	468	300	300	68	88	18
2025	720	696	732	744	468	300	300	68	88	18
2026	720	696	732	744	468	300	300	68	88	18
2027	720	696	732	744	468	300	300	68	88	18
2028	720	696	732	744	468	300	300	68	88	18
2029	720	696	732	744	468	300	300	68	88	18
2030	720	696	732	744	468	300	300	68	88	18
2031	720	696	732	744	468	300	300	68	88	18

Projected % of Total Outstanding Debt



Projected WAD and WAM (years)



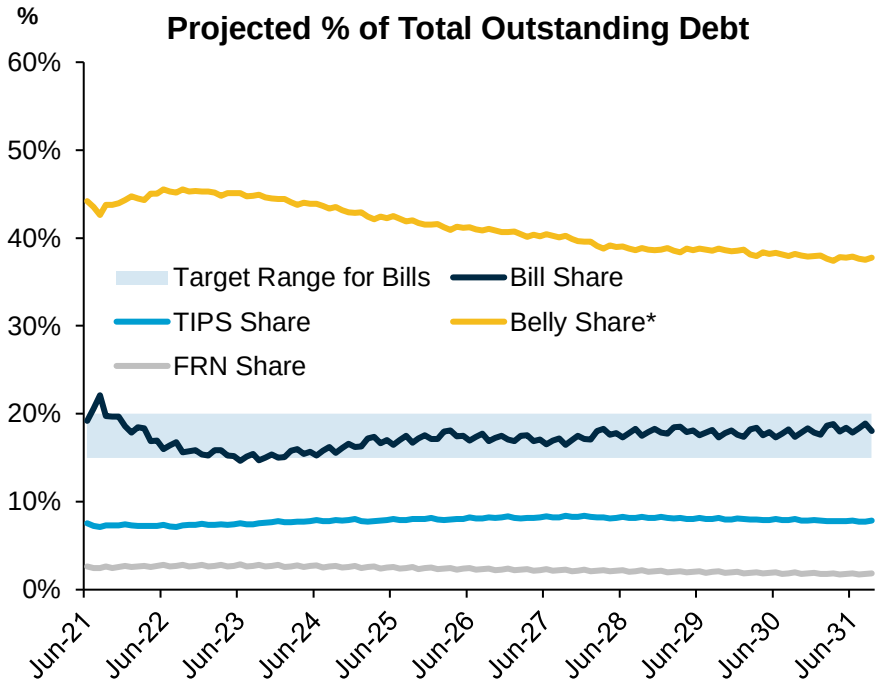
*Source: Committee participant. * Note: Belly share is defined as the % of outstanding debt with remaining maturity greater than 1 year and less than 8.5 years.*

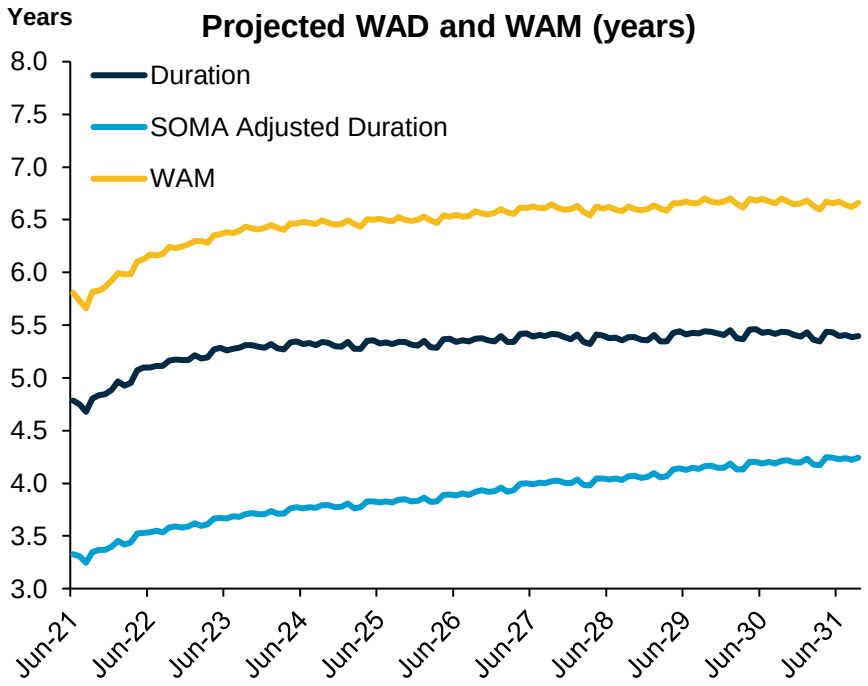
Scenario 2—Reduce Nominal Coupon Auction Sizes Pro-Rata

- This scenario is designed to serve as our initial baseline, incorporating the goal of maintaining T-bill share within the target range
- Nominal coupon auctions are reduced by 35% over the next 12 months to maintain T-bill share within the target range. Given current fiscal projections, nominal coupons would need to gradually increase beginning in 2025 to fund increasing deficits
- After these cuts, auction sizes will be largely in line with pre-COVID levels, with the exception of the 20-year which was re-introduced in May 2020 and accounts for nearly all of the aggregate increase in nominal coupons
- TIPS issuance is gradually increased to approximately 8%-9% share over the scenario horizon
- This scenario increases the WAM/duration profile over the projection horizon, although less so than in Scenario 1

Assumed Annual Issuance Schedule ($bn)

Calendar Year	2Y	3Y	5Y	7Y	10Y	20Y	30Y	5Y TIPS	10Y TIPS	30Y TIPS
Current	720	696	732	744	468	300	300	68	88	18
2022	585	564	593	603	380	243	243	80	97	20
2023	468	456	480	480	308	200	200	92	109	22
2024	468	456	480	480	308	200	200	104	121	24
2025	489	471	495	504	318	204	204	116	133	26
2026	546	525	552	562	352	226	226	116	133	26
2027	576	552	588	600	372	240	240	116	133	26
2028	618	594	624	636	401	256	256	116	133	26
2029	669	645	678	690	434	280	280	116	133	26
2030	705	681	714	726	458	294	294	116	133	26
2031	720	696	732	744	468	300	300	116	133	26





*Source: Committee participant. * Note: Belly share is defined as the % of outstanding debt with remaining maturity greater than 1 year and less than 8.5 years.*

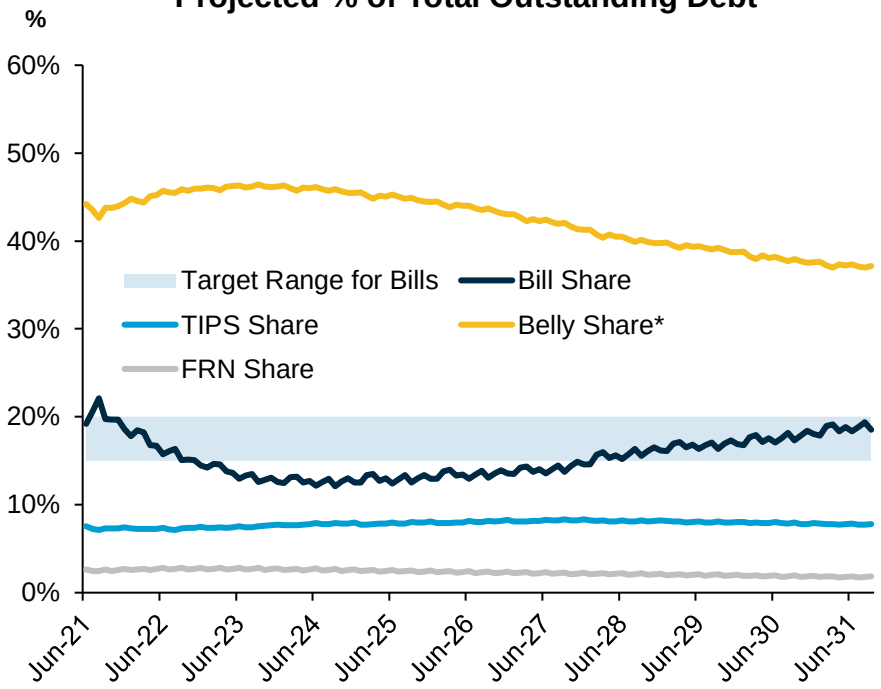
Scenario 2 ALT—Reduce Nominal Coupon Auction Sizes by a Smaller Pro-Rata Amount

- This alternative scenario allows T-bill share to drop outside the target range in order to keep nominal coupon auctions more stable over the horizon
- Nominal coupon auctions are reduced by 25% over the next 12 months and are then increased beginning in 2027
- Like Scenario 2, TIPS issuance is gradually increased to approximately 8%-9% share over the scenario horizon
- Relative to Scenario 2, this scenario has a lower T-bill share and a longer WAM/Duration in the early/middle years of the scenario horizon

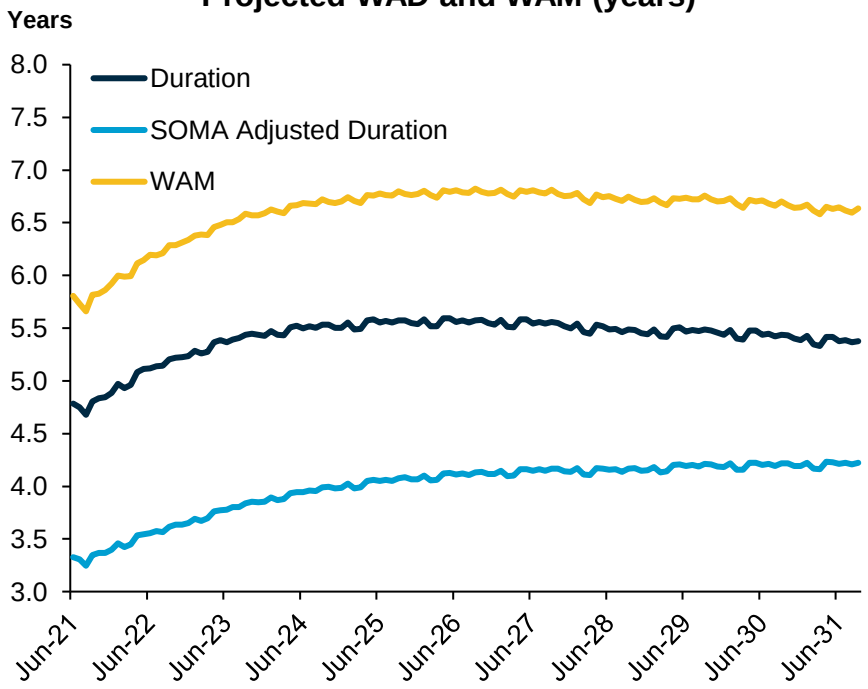
Assumed Annual Issuance Schedule ($bn)

Calendar Year	2Y	3Y	5Y	7Y	10Y	20Y	30Y	5Y TIPS	10Y TIPS	30Y TIPS
Current	720	696	732	744	468	300	300	68	88	18
2022	624	603	633	644	405	262	262	80	97	20
2023	540	528	552	564	356	224	224	92	109	22
2024	540	528	552	564	356	224	224	104	121	24
2025	540	528	552	564	356	224	224	116	133	26
2026	540	528	552	564	356	224	224	116	133	26
2027	561	540	570	579	364	232	232	116	133	26
2028	597	576	606	615	388	249	249	116	133	26
2029	633	611	642	653	410	264	264	116	133	26
2030	669	645	678	690	434	280	280	116	133	26
2031	705	681	714	726	458	294	294	116	133	26

Projected % of Total Outstanding Debt



Projected WAD and WAM (years)



*Source: Committee participant. * Note: Belly share is defined as the % of outstanding debt with remaining maturity greater than 1 year and less than 8.5 years.*

4. Demand Assessment of Auction Points

Framework for Assessing Relative Demand Across Auction Points

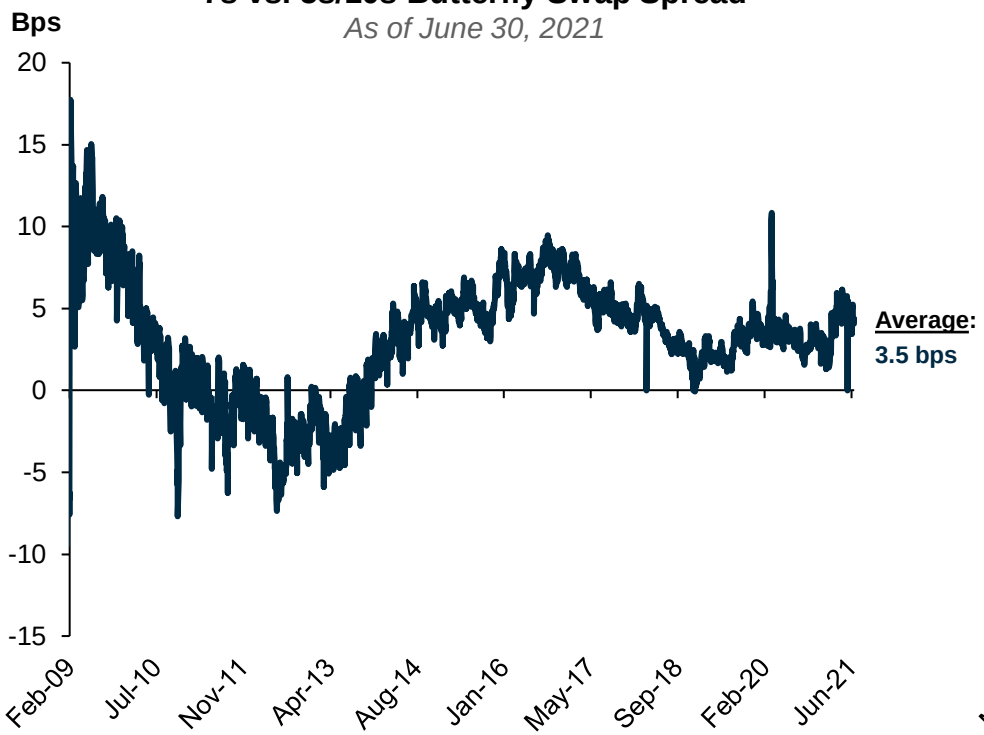
- Within a regular and predictable framework, Treasury may reduce its funding cost by adjusting issuance at curve points based on perceived relative demand.
  - Relative value measures are one method to gauge relative demand among auction points.
  - A key question is whether these relative demand indicators are transitory or persistent.
- The most liquid on-the-runs tend to trade at a greater liquidity premium and therefore Treasury can benefit by issuing a greater proportion of these highly liquid securities.
- In this section different relative cost measures will be used to identify the most highly sought after and attractive points for Treasury issuance.
  - First, a model independent method of measuring relative cost is employed using swap spreads.
  - Second, a committee participant term structure model is used to fit a fair value curve and relative cost is measured to that fair value curve. This second approach produces results consistent with the swap spread analysis.
  - A market repo analysis and a comparison of secondary trading volume with issuance are also presented to complement these relative cost analyses.
  - We focused our analysis on comparing 7s and 20s against butterflies of 5s, 10s and 30s.
- Finally, a committee participant term structure model is used to assess demand differences across auction points broadly.

Assessing Relative Demand Using Swap Spreads

- Swap spreads can provide a model independent method of identifying relative cost of specific auction points.
- Duration neutral butterflies of swap spreads indicate that:
  - On-the-run 7s have generally been cheap vs. a butterfly of on-the-run 5s and on-the-run 10s.
  - On-the-run 20s have generally been cheap vs. a butterfly of on-the-run 10s and on-the-run 30s.

7s vs. 5s/10s Butterfly Swap Spread

As of June 30, 2021



20s vs. 10s/30s Butterfly Swap Spread

As of June 30, 2021

Note: Re-introduced 7-year auctions in February 2009.
Re-introduced 20-year auctions in May 2020.
Swap spread is defined as on-the-run treasury yield minus corresponding LIBOR swap rate.

Source: Bloomberg and committee participant.

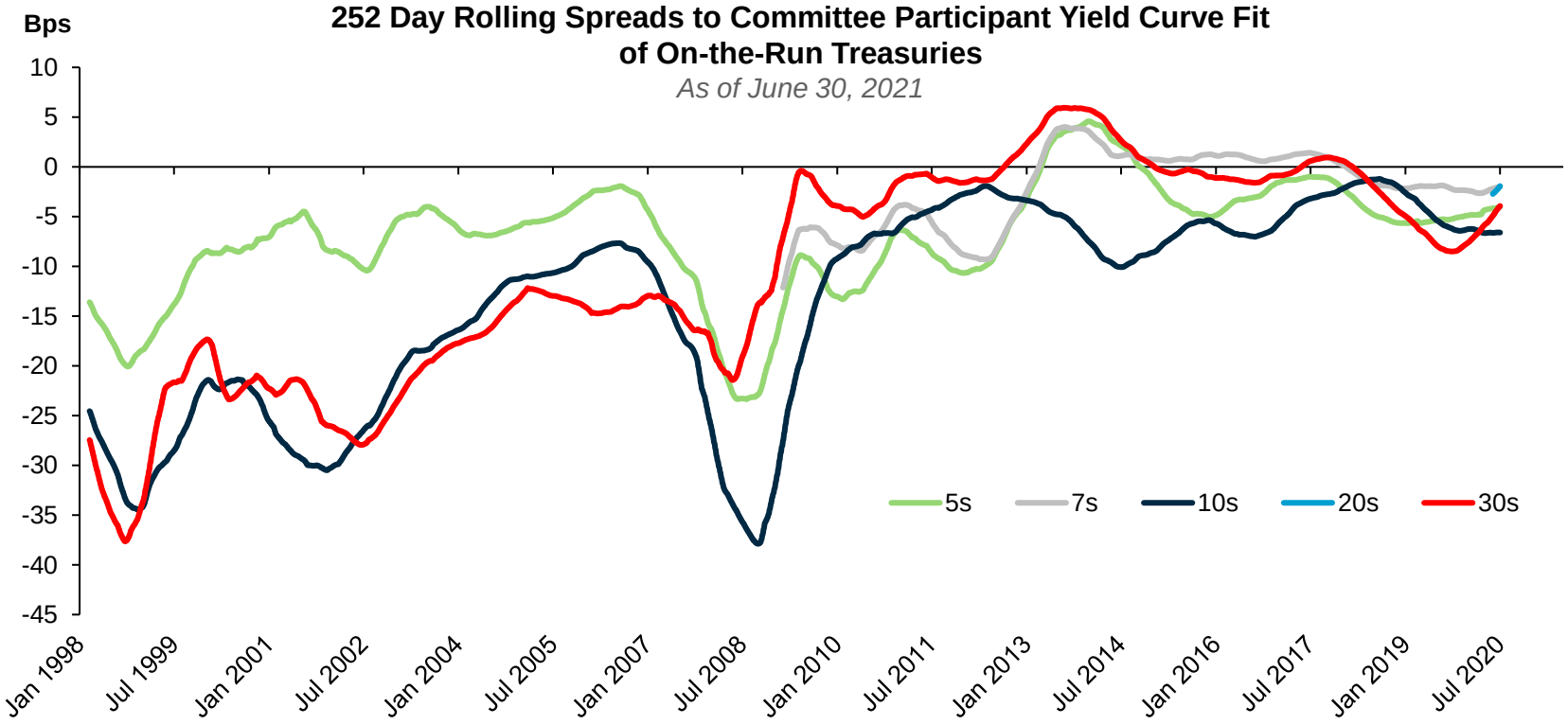
Assessing Relative Demand Using Fitted Treasury Yield Curve

- Committee participant fitted yield curve provides an estimate of the relative cost of specific auction points[1].
- The relative cost estimate of each on-the-run Treasury is shown below:

Average Spreads of On-the-Run Treasuries to Committee Participant Yield Curve Fit (Bps)

As of June 30, 2021

	5s	7s	10s	20s	30s
Average Since 2/27/1998	-7.0	N/A	-13.7	N/A	-10.4
Average Since 2/26/2009	-5.2	-2.7	-7.2	N/A	-1.7
Average Since 5/20/2020	-4.1	-2.0	-6.7	-2.3	-4.7

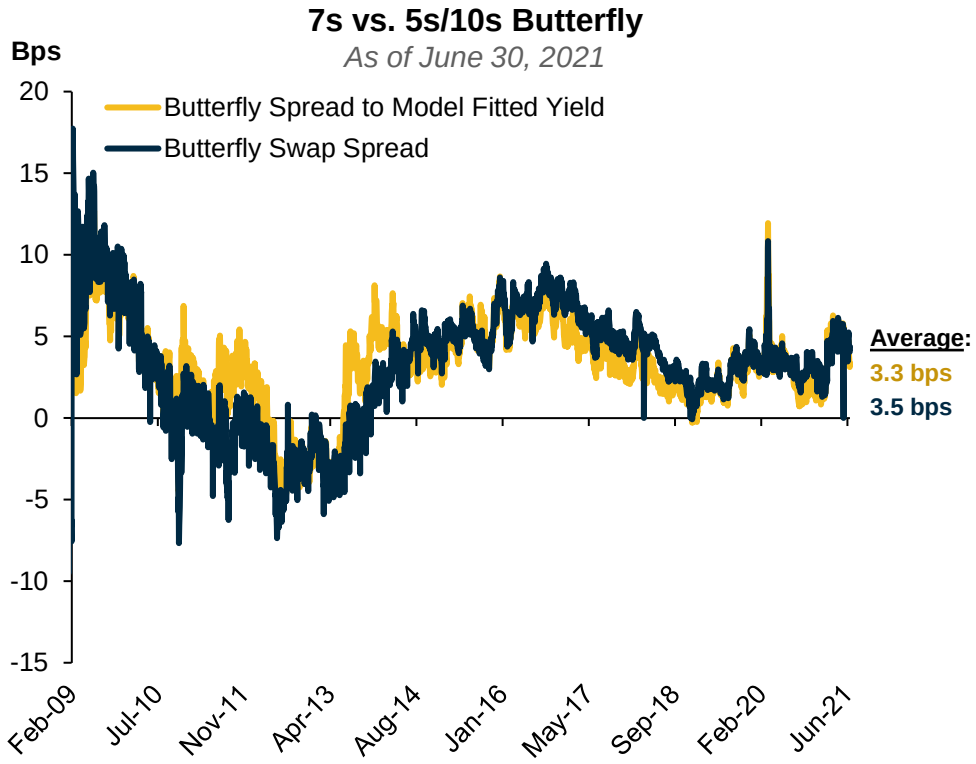


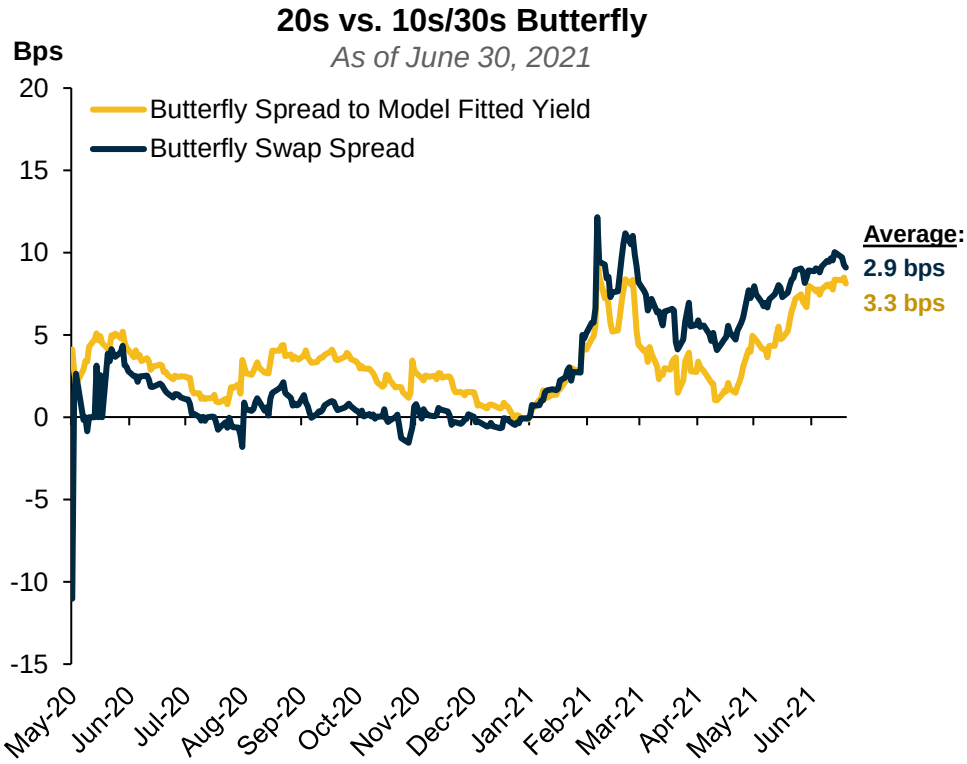
Note: Re-introduced 7-year auctions in February 2009.
Re-introduced 20-year auctions in May 2020.

Source: Committee participant model. [1] Presenting members model used for fitted Treasury yield is a proprietary stochastic term structure model which fits fair value for off the run Treasury bonds and bond volatility.

Assessing Relative Demand Using Fitted Treasury Yield Curve

- Duration neutral butterflies of these fitted yield deviations support the findings from the swap spread butterfly analysis:
  - On-the-run 7s have generally been cheap vs. a butterfly of on-the-run 5s and on-the-run 10s.
  - On-the-run 20s have generally been cheap vs. a butterfly of on-the-run 10s and on-the-run 30s.





Note: Re-introduced 7-year auctions in February 2009.
Re-introduced 20-year auctions in May 2020.
Swap spread is defined as on-the-run treasury yield minus corresponding LIBOR swap rate.

Source: Bloomberg and committee participant.

Assessing Market Demand Using Repo Rate Analysis

- On-the-run Treasury specialness is defined as the difference in financing costs to repo on-the-run Treasuries and off-the-run Treasuries.
- While explaining only a portion of the fitted yields, this provides additional support for the relative cost of on-the-run Treasuries.

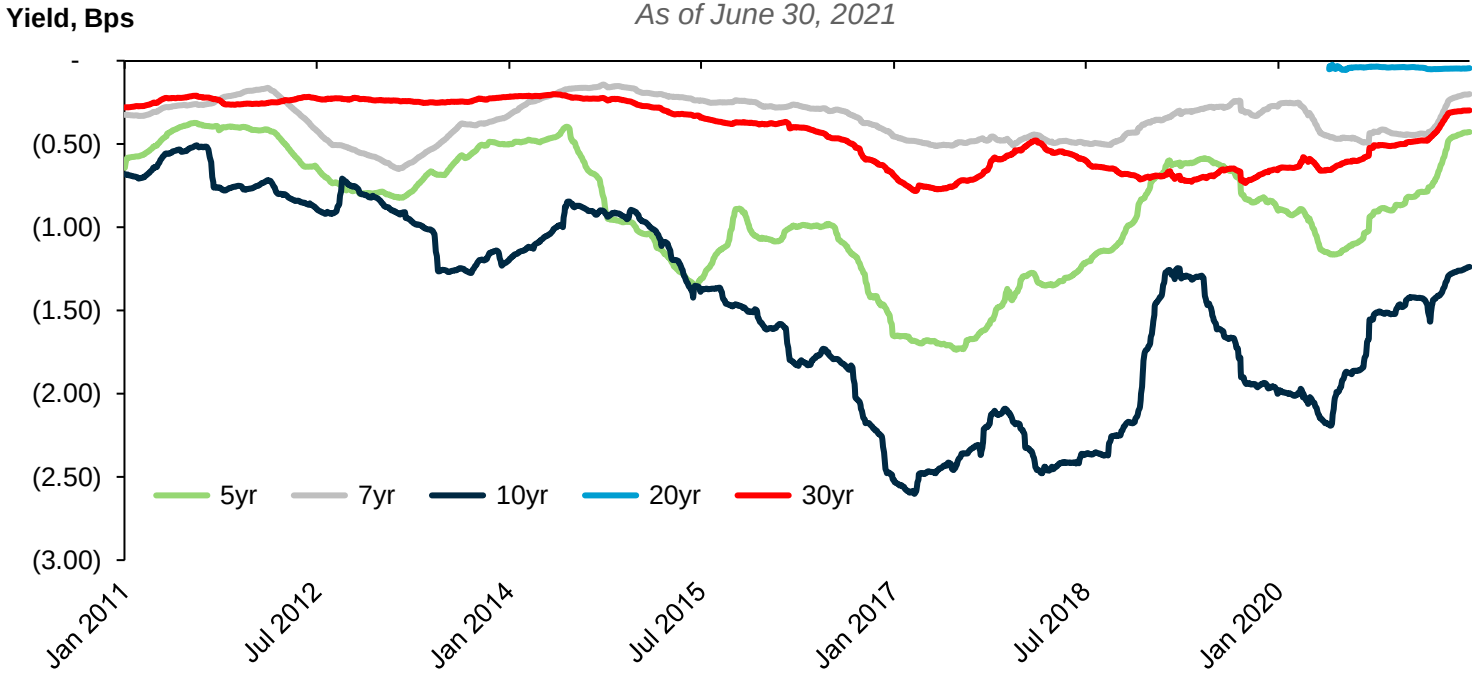
Yield Value of the Cumulative Repo Richness of On-The-Run Treasuries* (Price Yield, Bps)

As of June 30, 2021

	5s	7s	10s	20s	30s
Average Since 1/1/2010	(0.87)	(0.34)	(1.44)	--	(0.43)
Average Since 5/20/2020	(0.45)	(0.22)	(1.23)	(0.05)	(0.30)

252 Day Rolling Average of Yield Value of the Cumulative Repo Richness of On-The-Run Treasuries*

As of June 30, 2021



Note: Re-introduced 20-year auctions in May 2020.

*Source: Bloomberg, JPMorgan Markets. * Cumulative repo richness includes the repo richness of on-the-run until it becomes the 4th old.*

Assessing Market Demand Using Trading Volumes Relative to Auction Size

- Secondary Treasury trading volumes relative to issuance size are much higher in 5s and 10s than other nodes.
- Over the past 18 months, 54% of on-the-run Treasury trading volume has been in 5s and 10s, despite representing only 29% of the issuance.
- These are the most liquid points on the Treasury curve and this is likely due to MBS and corporate bond hedging activity.
- 30-year trading volume is more than double 20-year trading volume despite equal issuance amounts. Furthermore, 30-year on-the-run volume understates the liquidity demands at the 30-year point because 30-year corporates are priced/hedged using the once old 30-year.
- Investors are willing to accept a lower yield for these more liquid securities.
- This suggests there is capacity for Treasury to consider issuing a greater proportion in 5s, 10s and 30s and benefit more from the richness of these points.

Trading Volumes and Issuance

January 1, 2020 – June 30, 2021

	Treasury Volume	Treasury Issuance	Trading $ / Issuance $*
2s	13%	17%	16.63
3s	12%	17%	16.89
5s	**29%**	**18%**	**36.83**
7s	**10%**	**18%**	**13.24**
10s	**26%**	**11%**	**52.10**
> 10Y	8%	15%	12.47
TIPS	2%	4%	13.52

Trading Volumes and Issuance

May and June 2021

	Treasury Volume	Treasury Issuance	Trading $ / Issuance $*
2s	11%	17%	16.12
3s	13%	17%	19.69
5s	**28%**	**18%**	**38.53**
7s	**10%**	**18%**	**13.95**
10s	**25%**	**11%**	**54.53**
20s	**3%**	**7%**	**11.65**
30s	**7%**	**7%**	**23.09**
TIPS	3%	4%	15.36

Notes on Data Provided:

- FINRA has provided trading volume statistics for 20-year on the runs since May 2021.
- Since this period is so short, we compare the trading volumes of the prior 18 months to show that May and June 2021 period is representative of the longer period.

*Source: FINRA and TRACE. *Annualized Treasury on-the-run trading volume divided by annualized issuance volume.*

Assessing Relative Demand Across Broad Yield Curve Segments*

- Committee participant fitted Treasury and fitted Swap yield curves are compared to assess demand differences across the yield curve broadly.
- Before the global financial crisis, Treasuries consistently traded at lower yields than Swaps across the entire yield curve.
  - Swap spreads were generally flat across the term structure.
- Since then, Swap spreads have been significantly lower.
  - The Treasury curve has been persistently steeper than the Swap curve.

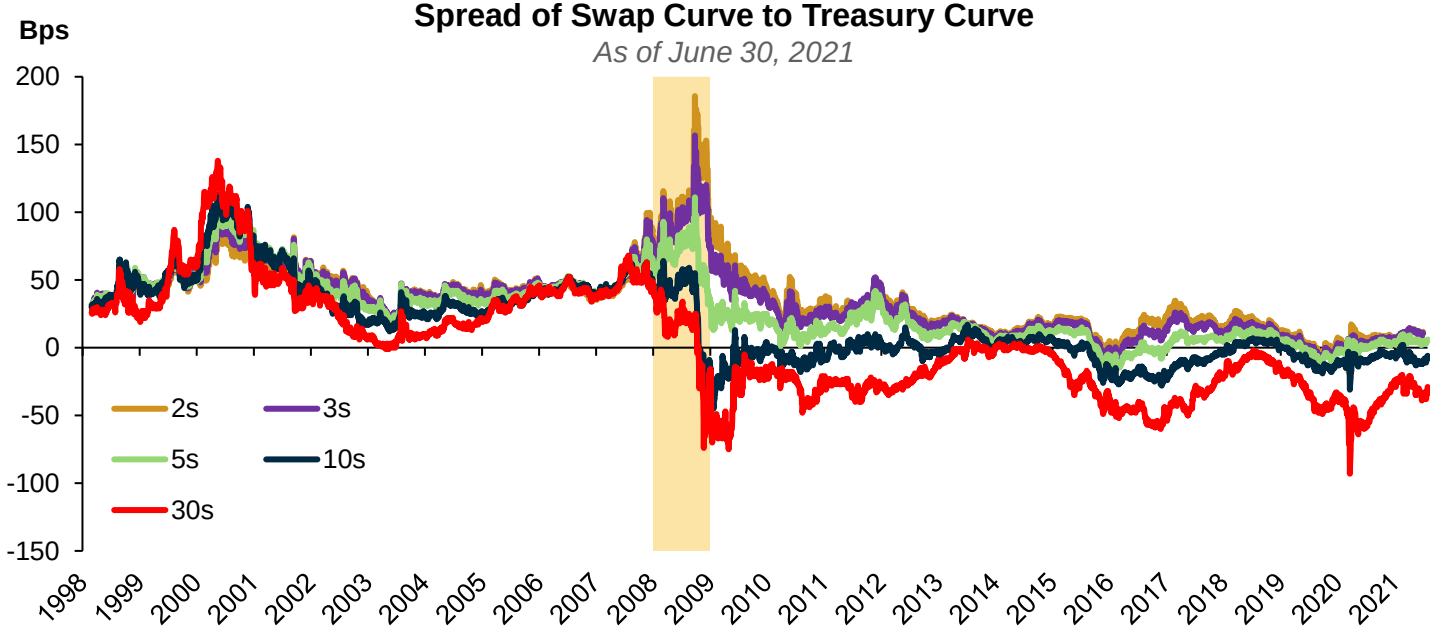
Average Spread of Swap Curve to Treasury Curve (Bps)

As of June 30, 2021

	2s	3s	5s	10s	30s
Average From 2/27/1998 to 12/31/2007	48	50	49	45	40
Average From 1/1/2009 to 6/30/2021	21	17	9	-5	-27

Spread of Swap Curve to Treasury Curve

As of June 30, 2021



*Source: Committee participant model. * For a more in-depth discussion, see previous TBAC charge from February 2021.*

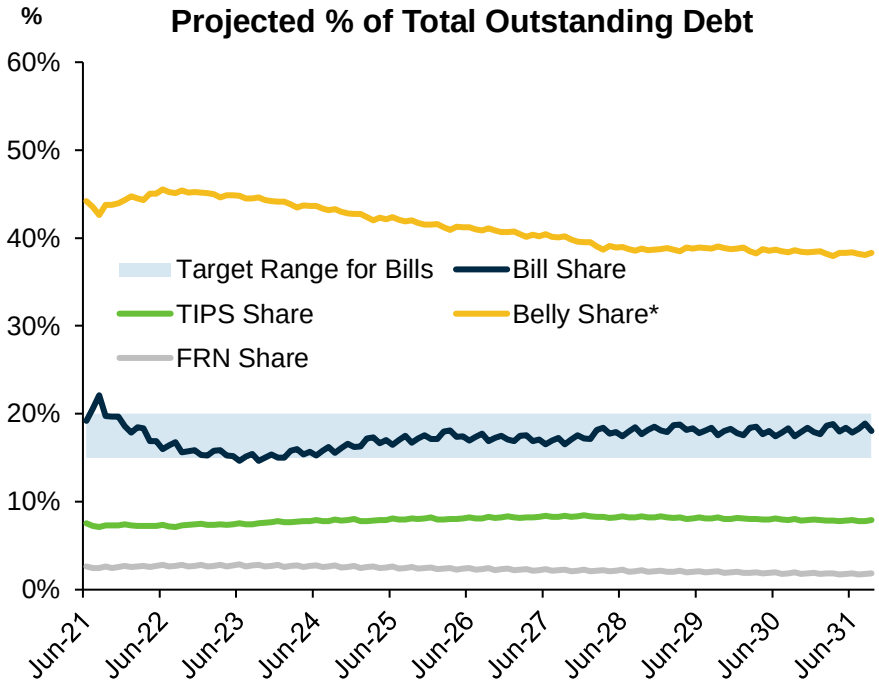
5. Fine Tuning Auction Adjustment Scenarios

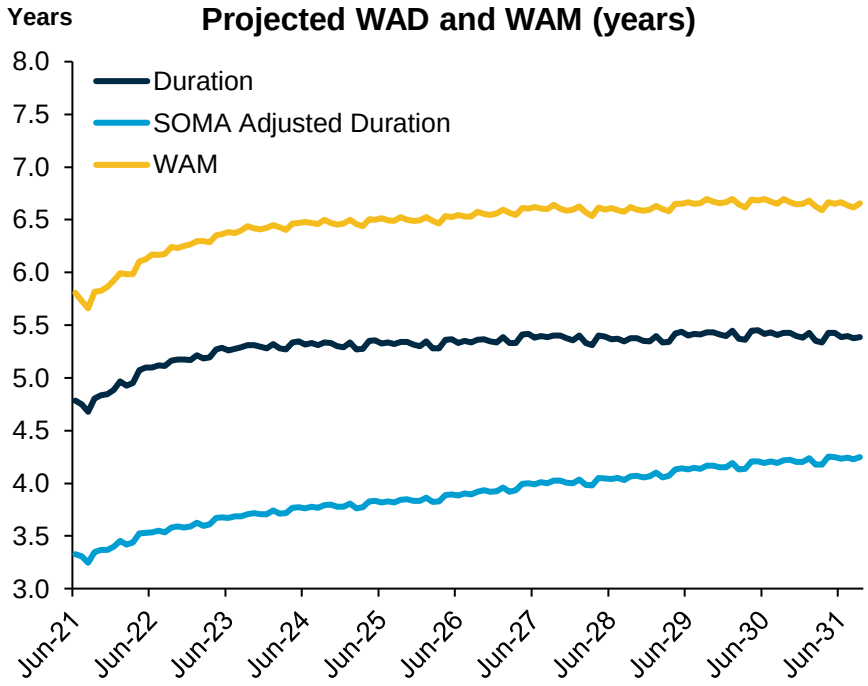
Scenario 3—Relative Market Demand Adjustments

- Given the preceding relative market demand analysis, this scenario further reduces the 7 and 20-year auctions relative to Scenario 2. For illustrative purposes, 7-year auctions are reduced by approximately $100bn and 20-year auctions are reduced by approximately $50bn, annually
- Offsetting increases are made to the 5, 10 and 30-year auctions using a par weighted butterfly approach
- We reduced the 20-year auction by a smaller amount to ensure sufficient liquidity at the 20-year point
- This method has little impact on WAM/duration profile, as well as belly share and T-bill share of the outstanding debt, relative to Scenario 2, while likely achieving a lower cost of issuance

Assumed Annual Issuance Schedule ($bn)

Calendar Year	2Y	3Y	5Y	7Y	10Y	20Y	30Y	5Y TIPS	10Y TIPS	30Y TIPS
Current	720	696	732	744	468	300	300	68	88	18
2022	585	564	619	549	422	217	257	80	97	20
2023	468	456	528	384	380	152	224	92	109	22
2024	468	456	528	384	380	152	224	104	121	24
2025	489	471	543	408	390	156	228	116	133	26
2026	546	525	600	466	424	178	250	116	133	26
2027	576	552	636	504	444	192	264	116	133	26
2028	618	594	672	540	473	208	280	116	133	26
2029	669	645	726	594	506	232	304	116	133	26
2030	705	681	762	630	530	246	318	116	133	26
2031	720	696	780	648	540	252	324	116	133	26





Source: Committee participant. * Note: Belly share is defined as the % of outstanding debt with remaining maturity greater than 1 year and less than 8.5 years.

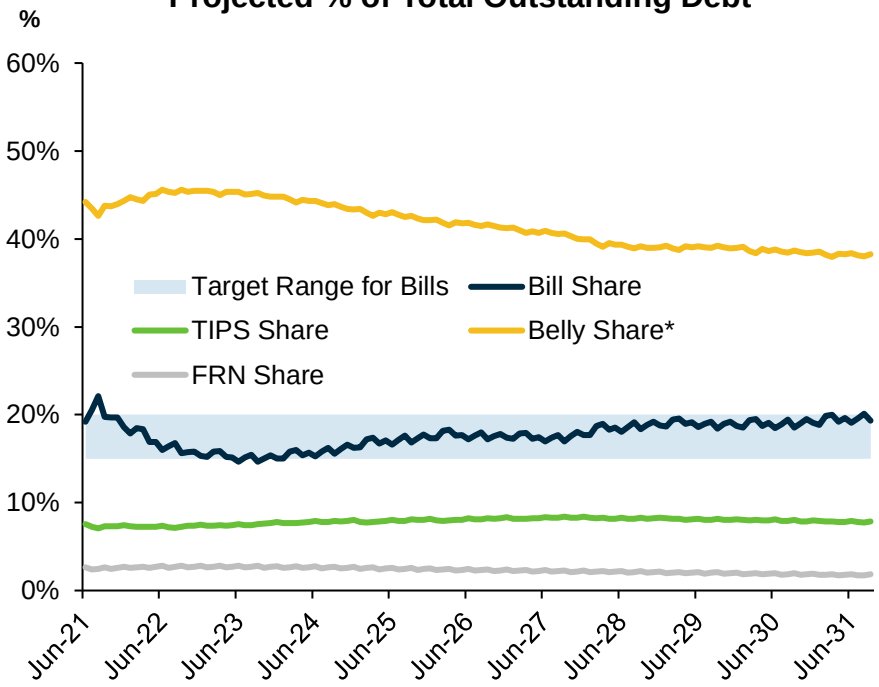
Scenario 4—Increase the Belly Share

- This scenario increases the belly share of the debt, as favored by the TBAC Optimal Debt Model, while making an offsetting decrease of long end issuance
- For illustrative purposes, in this scenario we modify Scenario 3 to reallocate approximately $100bn of issuance from 10s, 20s and 30s to 2s, 3s, 5s and 7s
- This scenario results in a decrease in the WAM/duration profile relative to Scenarios 2 and 3, while also potentially reducing term premia costs

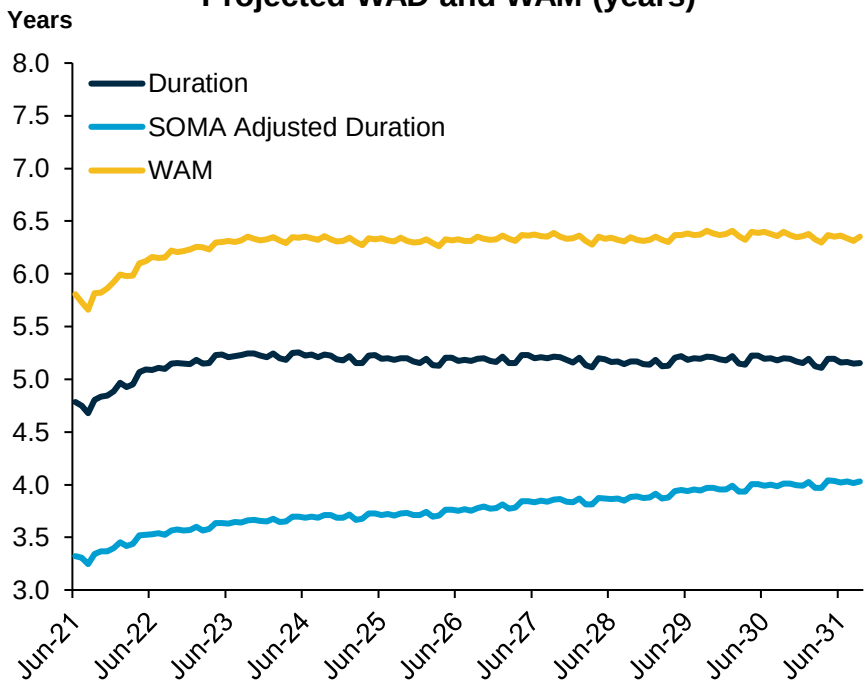
Assumed Annual Issuance Schedule ($bn)

Calendar Year	2Y	3Y	5Y	7Y	10Y	20Y	30Y	5Y TIPS	10Y TIPS	30Y TIPS
Current	720	696	732	744	468	300	300	68	88	18
2022	599	578	634	562	396	205	242	80	97	20
2023	492	480	552	408	332	128	200	92	109	22
2024	492	480	552	408	332	128	200	104	121	24
2025	513	495	567	432	342	132	204	116	133	26
2026	570	549	624	490	376	154	226	116	133	26
2027	600	576	660	528	396	168	240	116	133	26
2028	642	618	696	564	425	184	256	116	133	26
2029	693	669	750	618	458	208	280	116	133	26
2030	729	705	786	654	482	222	294	116	133	26
2031	744	720	804	672	492	228	300	116	133	26

Projected % of Total Outstanding Debt



Projected WAD and WAM (years)



Source: Committee participant. * Note: Belly share is defined as the % of outstanding debt with remaining maturity greater than 1 year and less than 8.5 years.

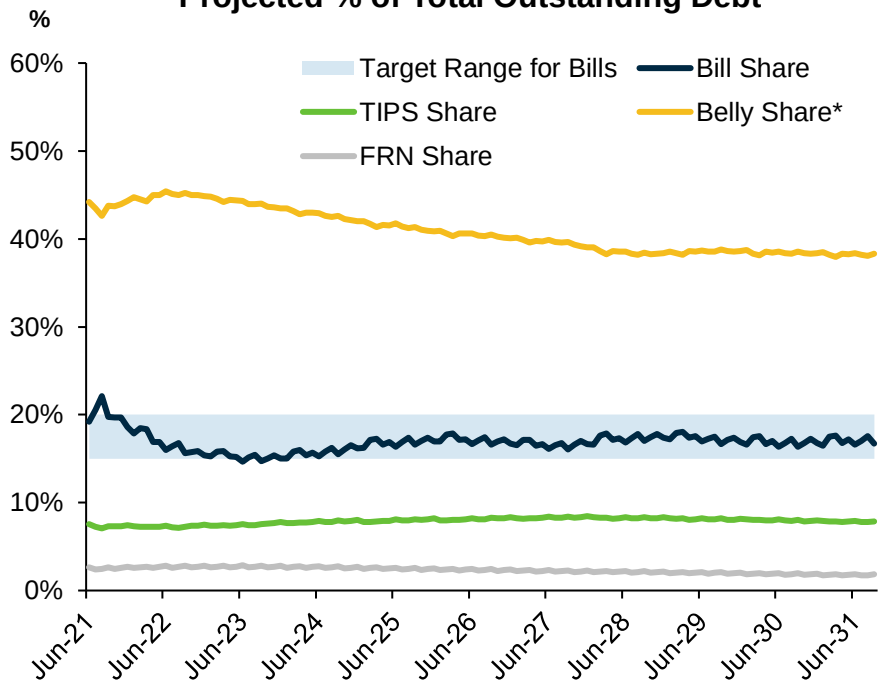
Scenario 5—Decrease the Belly Share

- This scenario decreases the belly share of the debt, to reduce the uncertainty of interest costs in future budgets, while making an offsetting increase of long end issuance
- For illustrative purposes, in this scenario we modify Scenario 3 to reallocate approximately $100bn of issuance from 2s, 3s, 5s and 7s to 10s, 20s and 30s
- This scenario results in an increase in the WAM/duration profile relative to Scenarios 2 and 3, although it potentially increases term premia costs

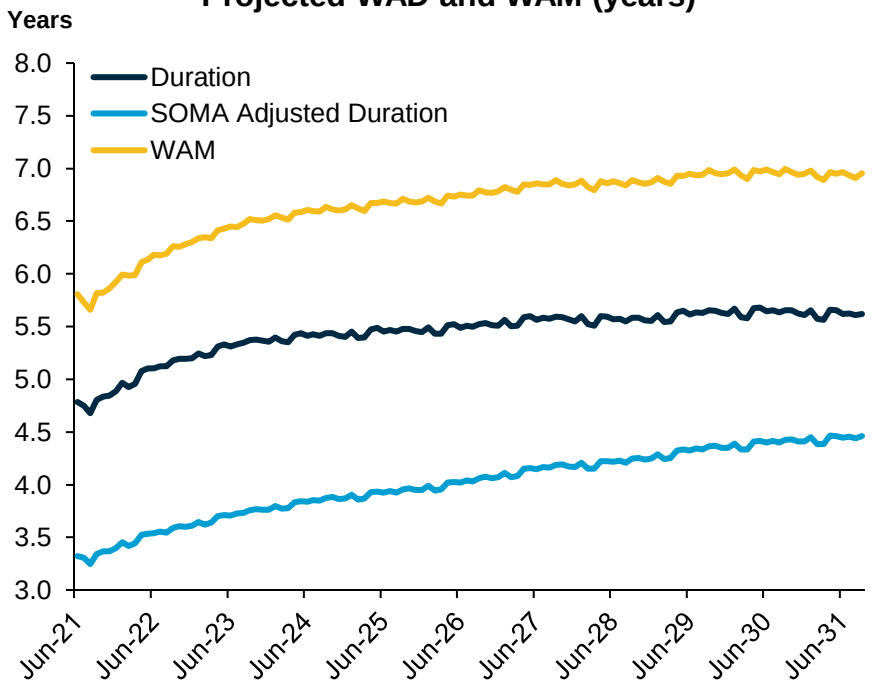
Assumed Annual Issuance Schedule ($bn)

Calendar Year	2Y	3Y	5Y	7Y	10Y	20Y	30Y	5Y TIPS	10Y TIPS	30Y TIPS
Current	720	696	732	744	468	300	300	68	88	18
2022	571	550	604	536	448	229	272	80	97	20
2023	444	432	504	360	428	176	248	92	109	22
2024	444	432	504	360	428	176	248	104	121	24
2025	465	447	519	384	438	180	252	116	133	26
2026	522	501	576	442	472	202	274	116	133	26
2027	552	528	612	480	492	216	288	116	133	26
2028	594	570	648	516	521	232	304	116	133	26
2029	645	621	702	570	554	256	328	116	133	26
2030	681	657	738	606	578	270	342	116	133	26
2031	696	672	756	624	588	276	348	116	133	26

Projected % of Total Outstanding Debt

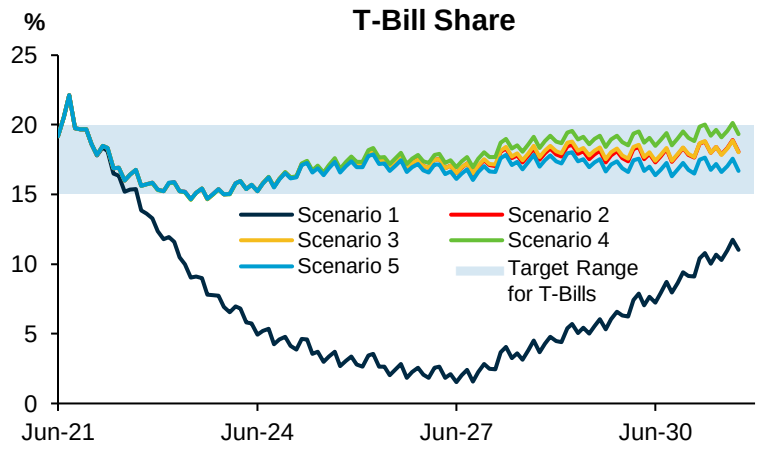


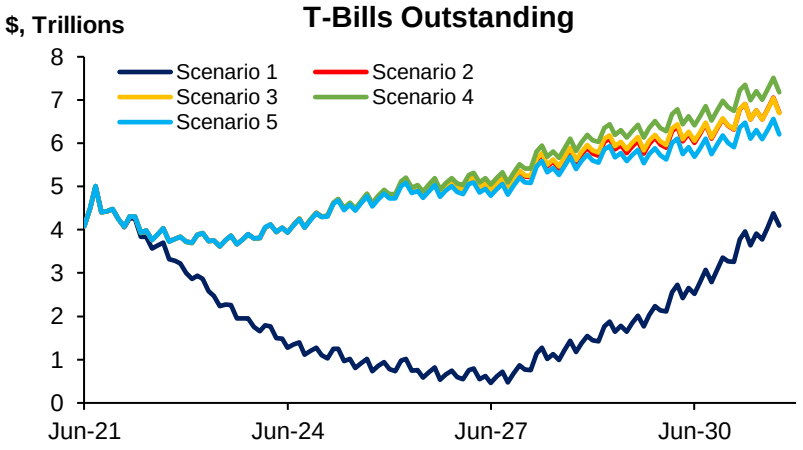
Projected WAD and WAM (years)

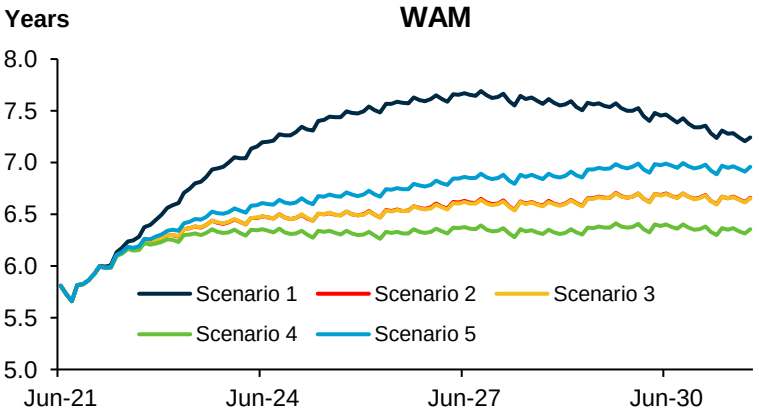


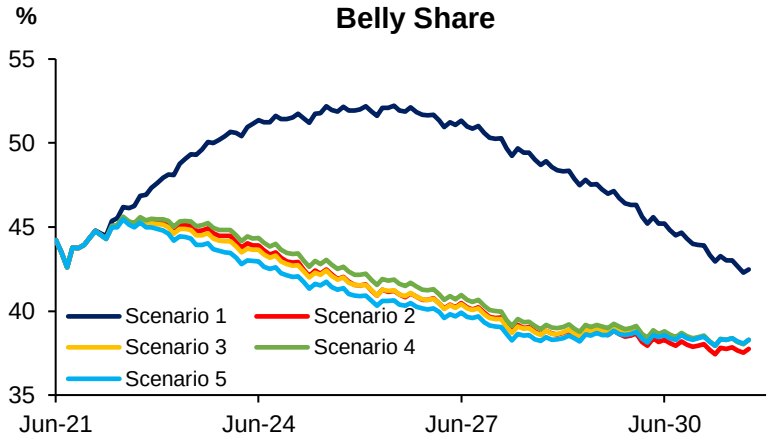
Source: Committee participant. * Note: Belly share is defined as the % of outstanding debt with remaining maturity greater than 1 year and less than 8.5 years.

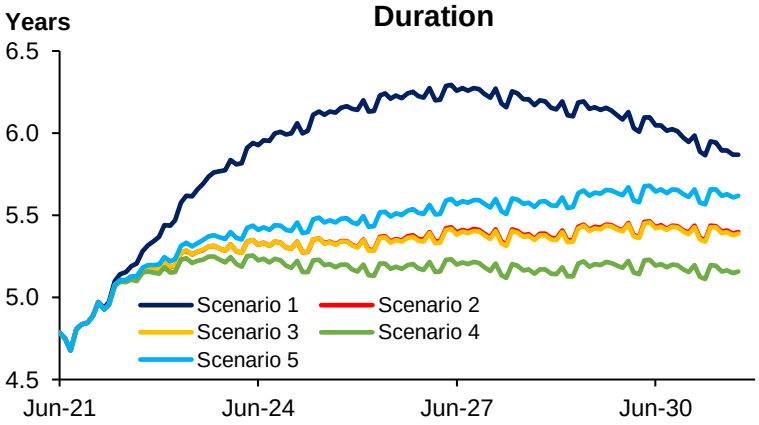
Summary of Scenarios

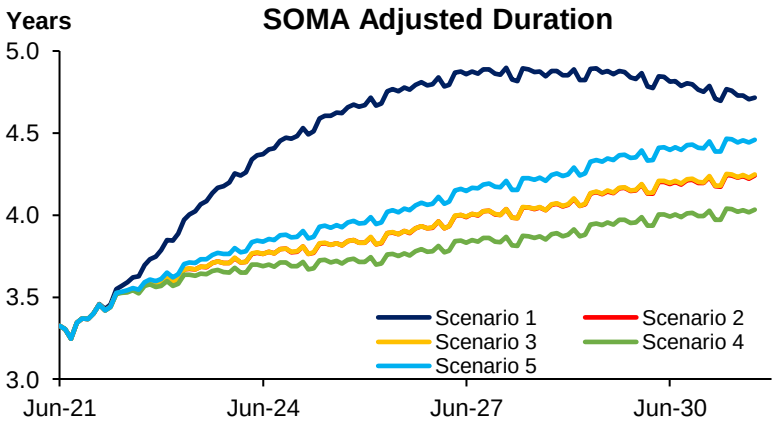












Scenario 1

Flat issuance

Scenario 2*

35% Pro-rata cut
(with issuance gradually increasing starting in 2025)

Scenario 3

Scenario 2 +
RV adjustment

Scenario 4

Scenario 3 +
Increased belly share

Scenario 5

Scenario 3 +
Decreased belly share

As of June 30, 2021. Source: Committee participant. Belly share is defined as the % of outstanding debt with remaining maturity greater than 1 year and less than 8.5 years. * Where Scenario 2 is not visible, it is being hidden by the Scenario 3 line.

6. Additional Considerations

Other Considerations

- Treasury is faced with a number of significant uncertainties and must continue to maintain a flexible approach.
  - Major fiscal policy initiatives can significantly alter the future path of fiscal deficits, creating uncertainty around Treasury funding requirements; examples include fiscal packages currently under discussion as well as potential extensions of household tax cuts when they expire at the end of 2025.
  - Differences between actual and CBO's projected paths of real GDP can be expected to result in unanticipated changes in Treasury's funding needs.
  - In addition, given elevated levels of debt/GDP, interest rate volatility also introduces greater uncertainty looking forward.
  - Finally, the Federal Reserve's balance sheet policies over time add additional uncertainty to Treasury's future funding needs.
- Treasury’s implementation of its regular and predictable philosophy should consider both uncertain funding requirements and the need to maintain sufficient outstanding supply of T-bills.

7. Conclusions and Recommendations

Conclusions and Recommendations

- The current auction schedule would likely leave Treasury significantly overfunded.
- Issuance will need to be cut in coming years to maintain a reasonable share of T-bills.
- Choosing between Scenario 2 and Scenario 2-ALT is a trade-off between maintaining T-bill share within the target range and keeping nominal coupon auctions more stable over time.
  - Scenario 2 maintains more stability in the share of T-bills and adjusts coupons gradually over a one year time frame. This approach recognizes the significant fiscal uncertainty Treasury faces and the historically large current size of coupon auctions.
  - The presenting member favors initially sizing coupon reductions consistent with Scenario 2-ALT, thereby leaving flexibility for further reductions later if needed.
- The presenting member recommends a reduction in 7 and 20-year issuance, with offsetting adjustments to 5, 10 and 30-year auctions as illustrated in Scenario 3. We recommend that Treasury make these adjustments gradually over time while observing market feedback and adhering to regular and predictable principles.
- Choosing between Scenarios 4 and 5 is a trade-off between potentially increasing term premia costs and the uncertainty of interest costs in future budgets.
  - The TBAC optimal debt model favors increasing belly share and, therefore, would tend to favor Scenario 4.
  - Given all the elements of uncertainty that Treasury faces, the presenting member favors the adjustments implied in Scenario 5 to reduce the uncertainty of interest costs in future budgets.
- The scenarios presented are illustrative and meant to convey both a guiding framework and a general direction for auction adjustments.
  - We recommend that Treasury consider implementing near term auction changes with an eye on long term debt dynamics (T-bill share, belly share, WAM, and duration).
  - While more distant years are of course more uncertain, looking at these long-term projections can provide insights into how debt characteristics may evolve over time.
- In practice, when implementing specific auction adjustments, Treasury should consider both changing fiscal dynamics and market factors, while keeping changes gradual, well telegraphed, and in keeping with regular and predictable principles.

8. Appendix

Summary—Change in Gross Issuance from Scenario 1 (in $bn)

Scenario 2 ($bn)

Calendar Year	2Y	3Y	5Y	7Y	10Y	20Y	30Y	5Y TIPS	10Y TIPS	30Y TIPS
2022	-135	-132	-139	-141	-88	-57	-57	12	9	2
2023	-252	-240	-252	-264	-160	-100	-100	24	21	4
2024	-252	-240	-252	-264	-160	-100	-100	36	33	6
2025	-231	-225	-237	-240	-150	-96	-96	48	45	8
2026	-174	-171	-180	-182	-116	-74	-74	48	45	8
2027	-144	-144	-144	-144	-96	-60	-60	48	45	8
2028	-102	-102	-108	-108	-67	-44	-44	48	45	8
2029	-51	-51	-54	-54	-34	-20	-20	48	45	8
2030	-15	-15	-18	-18	-10	-6	-6	48	45	8
2031	0	0	0	0	0	0	0	48	45	8

Scenario 3 ($bn)

Calendar Year	2Y	3Y	5Y	7Y	10Y	20Y	30Y	5Y TIPS	10Y TIPS	30Y TIPS
2022	-135	-132	-113	-195	-46	-83	-43	12	9	2
2023	-252	-240	-204	-360	-88	-148	-76	24	21	4
2024	-252	-240	-204	-360	-88	-148	-76	36	33	6
2025	-231	-225	-189	-336	-78	-144	-72	48	45	8
2026	-174	-171	-132	-278	-44	-122	-50	48	45	8
2027	-144	-144	-96	-240	-24	-108	-36	48	45	8
2028	-102	-102	-60	-204	5	-92	-20	48	45	8
2029	-51	-51	-6	-150	38	-68	4	48	45	8
2030	-15	-15	30	-114	62	-54	18	48	45	8
2031	0	0	48	-96	72	-48	24	48	45	8

Scenario 4 ($bn)

Calendar Year	2Y	3Y	5Y	7Y	10Y	20Y	30Y	5Y TIPS	10Y TIPS	30Y TIPS
2022	-121	-118	-98	-182	-72	-95	-58	12	9	2
2023	-228	-216	-180	-336	-136	-172	-100	24	21	4
2024	-228	-216	-180	-336	-136	-172	-100	36	33	6
2025	-207	-201	-165	-312	-126	-168	-96	48	45	8
2026	-150	-147	-108	-254	-92	-146	-74	48	45	8
2027	-120	-120	-72	-216	-72	-132	-60	48	45	8
2028	-78	-78	-36	-180	-43	-116	-44	48	45	8
2029	-27	-27	18	-126	-10	-92	-20	48	45	8
2030	9	9	54	-90	14	-78	-6	48	45	8
2031	24	24	72	-72	24	-72	0	48	45	8

Scenario 5 ($bn)

Calendar Year	2Y	3Y	5Y	7Y	10Y	20Y	30Y	5Y TIPS	10Y TIPS	30Y TIPS
2022	-149	-146	-128	-208	-20	-71	-28	12	9	2
2023	-276	-264	-228	-384	-40	-124	-52	24	21	4
2024	-276	-264	-228	-384	-40	-124	-52	36	33	6
2025	-255	-249	-213	-360	-30	-120	-48	48	45	8
2026	-198	-195	-156	-302	4	-98	-26	48	45	8
2027	-168	-168	-120	-264	24	-84	-12	48	45	8
2028	-126	-126	-84	-228	53	-68	4	48	45	8
2029	-75	-75	-30	-174	86	-44	28	48	45	8
2030	-39	-39	6	-138	110	-30	42	48	45	8
2031	-24	-24	24	-120	120	-24	48	48	45	8

Summary—Change in Gross Issuance from Scenario 1 (in %)

Scenario 2 (%)

Calendar Year	2Y	3Y	5Y	7Y	10Y	20Y	30Y	5Y TIPS	10Y TIPS	30Y TIPS
2022	-19	-19	-19	-19	-19	-19	-19	18	10	11
2023	-35	-34	-34	-35	-34	-33	-33	35	24	22
2024	-35	-34	-34	-35	-34	-33	-33	53	38	33
2025	-32	-32	-32	-32	-32	-32	-32	71	51	44
2026	-24	-25	-25	-24	-25	-25	-25	71	51	44
2027	-20	-21	-20	-19	-21	-20	-20	71	51	44
2028	-14	-15	-15	-15	-14	-15	-15	71	51	44
2029	-7	-7	-7	-7	-7	-7	-7	71	51	44
2030	-2	-2	-2	-2	-2	-2	-2	71	51	44
2031	0	0	0	0	0	0	0	71	51	44

Scenario 3 (%)

Calendar Year	2Y	3Y	5Y	7Y	10Y	20Y	30Y	5Y TIPS	10Y TIPS	30Y TIPS
2022	-19	-19	-15	-26	-10	-28	-14	18	10	11
2023	-35	-34	-28	-48	-19	-49	-25	35	24	22
2024	-35	-34	-28	-48	-19	-49	-25	53	38	33
2025	-32	-32	-26	-45	-17	-48	-24	71	51	44
2026	-24	-25	-18	-37	-9	-41	-17	71	51	44
2027	-20	-21	-13	-32	-5	-36	-12	71	51	44
2028	-14	-15	-8	-27	1	-31	-7	71	51	44
2029	-7	-7	-1	-20	8	-23	1	71	51	44
2030	-2	-2	4	-15	13	-18	6	71	51	44
2031	0	0	7	-13	15	-16	8	71	51	44

Scenario 4 (%)

Calendar Year	2Y	3Y	5Y	7Y	10Y	20Y	30Y	5Y TIPS	10Y TIPS	30Y TIPS
2022	-17	-17	-13	-24	-15	-32	-19	18	10	11
2023	-32	-31	-25	-45	-29	-57	-33	35	24	22
2024	-32	-31	-25	-45	-29	-57	-33	53	38	33
2025	-29	-29	-23	-42	-27	-56	-32	71	51	44
2026	-21	-21	-15	-34	-20	-49	-25	71	51	44
2027	-17	-17	-10	-29	-15	-44	-20	71	51	44
2028	-11	-11	-5	-24	-9	-39	-15	71	51	44
2029	-4	-4	2	-17	-2	-31	-7	71	51	44
2030	1	1	7	-12	3	-26	-2	71	51	44
2031	3	3	10	-10	5	-24	0	71	51	44

Scenario 5 (%)

Calendar Year	2Y	3Y	5Y	7Y	10Y	20Y	30Y	5Y TIPS	10Y TIPS	30Y TIPS
2022	-21	-21	-17	-28	-4	-24	-9	18	10	11
2023	-38	-38	-31	-52	-9	-41	-17	35	24	22
2024	-38	-38	-31	-52	-9	-41	-17	53	38	33
2025	-35	-36	-29	-48	-6	-40	-16	71	51	44
2026	-28	-28	-21	-41	1	-33	-9	71	51	44
2027	-23	-24	-16	-35	5	-28	-4	71	51	44
2028	-18	-18	-11	-31	11	-23	1	71	51	44
2029	-10	-11	-4	-23	18	-15	9	71	51	44
2030	-5	-6	1	-19	24	-10	14	71	51	44
2031	-3	-3	3	-16	26	-8	16	71	51	44

August 2021

Proposals to reduce prime MMFs vulnerabilities

A recent President's Working Group on Financial Markets (PWG) report on money market fund (MMF) reform described 10 potential regulatory options to address existing vulnerabilities in the sector given the events of March 2020.

1. Please discuss the primary drivers of the stress experienced by MMFs in March 2020, as well as any other inherent vulnerabilities that currently exist in the MMF sector.

2. How would the specific reform proposals presented in the PWG report be expected to impact the MMF industry and broader short-term funding markets, including the front-end of the Treasury market and Treasury repo, both under normal market conditions and during future episodes of market stress?

Executive Summary

Drivers of stress experienced by prime Money Market Funds (MMFs)

- Events of March 2020 show that despite significant reforms, prime MMFs still suffer from vulnerabilities in times of market stress
- Fees and gates have added a fundamental first-mover advantage for pre-emptive redemptions in times of stress. In addition, the Weekly Liquid Asset (WLA) requirement accentuates a reluctance to dip into Treasuries to fund redemptions
- Limited secondary market intermediation in credit products also puts prime MMF vulnerabilities in greater focus
- Another component of vulnerability is the significant dispersion among prime MMFs. Smaller sized funds have lesser allocation to Treasuries, lower WLA and show greater propensity for bar-belling portfolios
    - Redemptions that start at prime MMFs with riskier asset allocation can become industry wide episodes

President's Working Group on Financial Markets' proposal evaluation

- Listed proposals range from modest to those requiring aggressive changes
- Changes to prime MMFs should effectively balance the tradeoffs between attractiveness of yields in normal times and resilience in times of stress
- Proposals that strike the best balance, in our opinion, are:
    - *Weaken link between regulatory thresholds and gates/fees* - Provide greater flexibility to tap liquid assets to meet redemptions
    - *Reform conditions for imposing redemption gates* - Reduce incentive for investors to pre-emptively redeem
    - *Changes to liquidity management requirement* - Increase liquidity profile through additional categories like biweekly liquid assets
    - *Floating NAV for all Prime and Tax-exempt MMFs* – Improve transparency and set clearer expectations of fund risks for investors

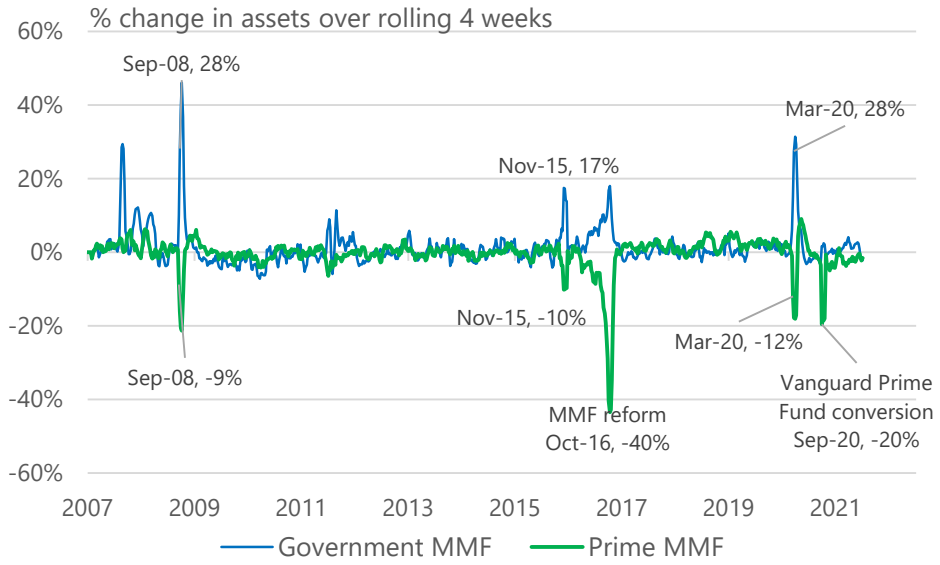
Other potential reforms for consideration

1. Given large variation in prime MMF profiles, proposals that seek to reduce dispersion in Treasury holdings and WLA between various funds would be a positive step
    - This would reduce odds of lower WLA funds being the focus of investors looking to benefit from first-mover advantage, and
    - Promote standardization in the industry benefiting investors
2. Prime MMFs have required multiple backstops while not offering investors much *net* yield pickup over government MMFs. Should regulators take steps to minimize or eliminate prime MMFs?

Primary drivers of stress experienced by prime MMFs

Prime MMFs remain susceptible to redemption pressures

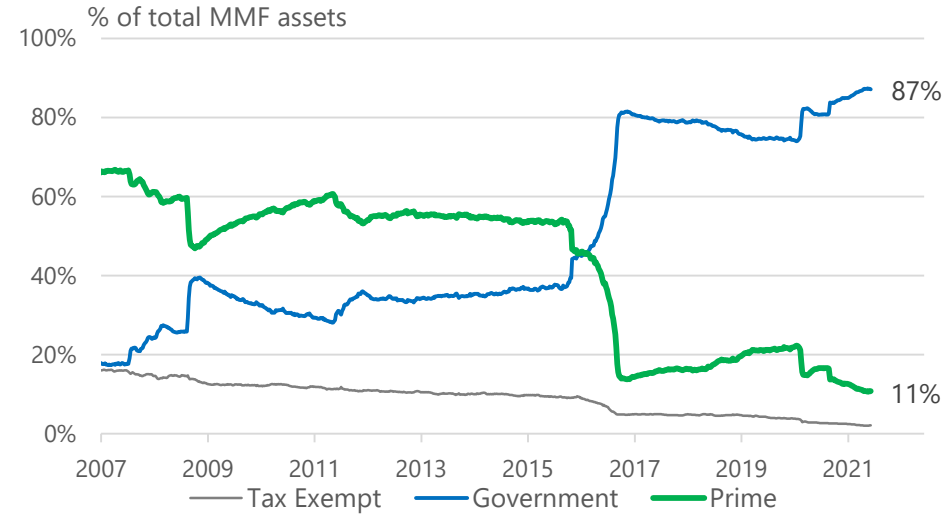
Prime MMFs experienced greater redemption, as % of assets, in March 2020 than in 2008



Source: ICI

- Prime MMFs remain susceptible to redemption pressures in times of stress. In Mar'20, prime MMFs lost 12% of assets, which was greater than in 2008
- Prime funds assets have shrunk significantly post 2014 reform and stand at ~$900bn in Jun'21, compared with $1.6trn pre-reform
- Prime inst'l funds are estimated to be ~$650bn with roughly 60% in non-public internal cash management funds

Prime MMFs are now a significantly smaller share of the money market universe



Source: ICI

- In periods of stress, redemptions from prime MMFs correspond with roughly equal inflows into government MMFs
  - For example, ICI data show that $186bn outflow in 4wk period in September 2008 coincided with $260bn inflow into government MMFs
  - Likewise, $145bn outflow from prime funds in November 2015 coincided with $180bn inflow into government MMFs. Same experience was repeated in October 2016 (MMF reform)
  - From Treasury's perspective, this translates into additional demand for short-term Treasuries as government MMFs hold ~60% of assets in Treasuries, compared with 18% at prime MMFs

Prime MMFs do not rely on Treasuries to fund redemptions, even post reform

How have prime MMFs funded redemptions in previous large episodes

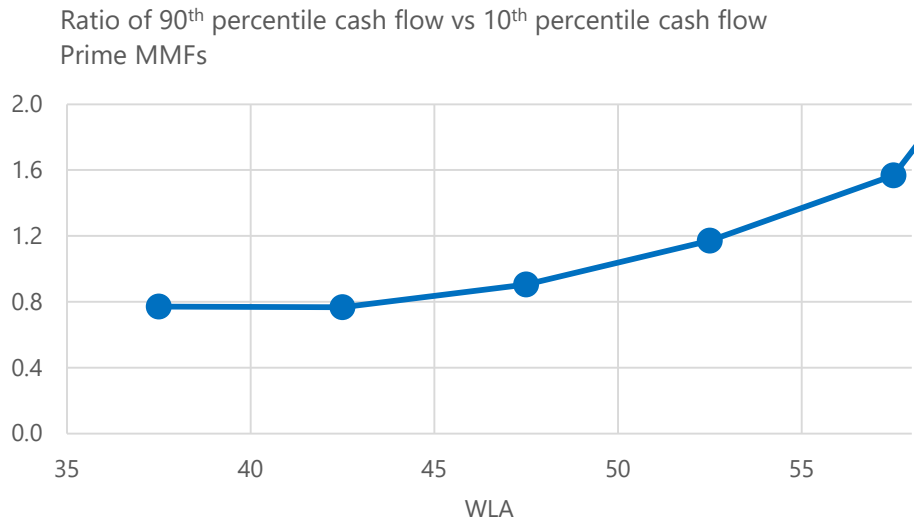
Nov15 Episode (pre-reform)	Assets	Treasuries	Agencies	Repo	CD	CP	Other
Pre-drawdown (Oct'15), $bn	$1,382	$44	$121	$330	$455	$240	$192
Redemption (Nov'15) , $bn	$1,240	$38	$60	$194	$477	$241	$230
Change, $bn (%)	-$142	-$6 (-13%)	-$61 (-50%)	-$136 (-41%)	$22 (5%)	$1 (1%)	$38 (20%)
MMF reform		Treasuries	Agencies	Repo	CD	CP	Other
Pre-drawdown (Feb'16) , $bn	$1,236	$58	$60	$165	$487	$223	$243
Drawdown (Mar-Oct'16) , $bn	$374	$28	$5	$69	$151	$61	$60
Change, $bn (%)	-$862	-$30 (-52%)	-$55 (-92%)	-$97 (-58%)	-$336 (-69%)	-$162 (-72%)	-$183 (-75%)
Mar20 Episode		Treasuries	Agencies	Repo	CD	CP	Other
Pre-drawdown (Feb'20) , $bn	$1,089	$88	$67	$210	$286	$262	$175
Drawdown (Mar'20) , $bn	$930	$96	$42	$182	$239	$230	$141
Change, $bn (%)	-$159	$8 (9%)	-$25 (-37%)	-$28 (-13%)	-$47 (-17%)	-$33 (-12%)	-$35 (-20%)
Prime fund conversion		Treasuries	Agencies	Repo	CD	CP	Other
Pre-drawdown (Jul'20) , $bn	$1,122	$326	$75	$152	$202	$218	$149
Drawdown (Oct'20) , $bn	$959	$268	$62	$156	$149	$173	$152
Change, $bn (%)	-$163	-$58 (-18%)	-$13 (-17%)	$4 (2%)	-$53 (-26%)	-$45 (-21%)	$3 (2%)

Source: Crane Data

- In four large redemption episodes since 2008, the common theme is that prime MMFs were reluctant to sell Treasuries to fund redemptions when risk aversion was high
- Specifically,
  - In Nov'15, prime MMFs total assets declined by $142bn (by 10%). Treasury holdings were largely unchanged and redemption was funded through a decline in Repo/agency holdings
    - CP holdings were unchanged, and CD share of holdings increased. This highlights lack of secondary market intermediation in these instruments
  - During money market reform driven redemptions in 2016, prime MMF assets declined ~$850bn (by 70%). Given the structural asset realignment, all assets declined roughly pro-rata, with Treasuries falling $30bn
    - Allocation to Treasuries increased post reform and Weekly Liquid Assets ("WLA") metric increased
  - In Mar'20 (pandemic), despite having higher liquidity profile, prime MMFs did not rely on Treasuries when faced with $160bn (or 15% of assets) in redemptions in Mar'20 (pandemic).
    - Rather, Treasury holdings actually increased $8bn. CP and CD holdings, as percent of assets, declined far less than agencies
  - Several large sponsors, such as Vanguard, Fidelity and Northern Trust, tilted their MMF offerings more toward a government portfolio in Q3-Q4'20. Given that this was also a structural shift like 2016, all holdings declined roughly pro-rata
  - In times of high risk aversion, prime MMFs are reluctant to sell Treasuries to maintain the liquidity profile and keep dry powder for possible further redemptions

Alignment of WLA thresholds with gates/fees often serve as triggers for action

Prime fund redemptions tend to pick up at lower WLAs ….

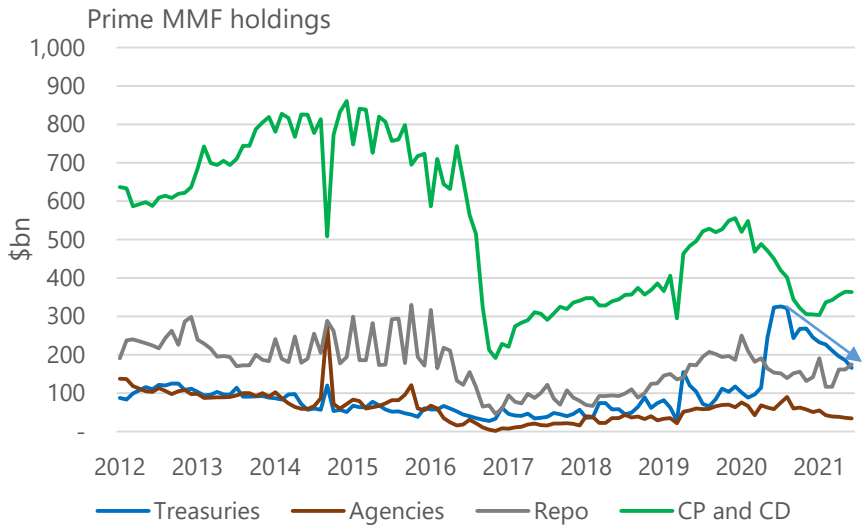


- Prime MMFs investor behavior shows greater redemption pressure at lower WLA levels
- The chart plots the ratio of 90th percentile cash flow and 10th percentile cash flow at various levels of WLA
- At lower WLA, the size of the "chunkier" outflows is significantly larger than the size of chunkier inflows. This is not true at higher WLAs
- This demonstrates that investors tend to pre-emptively withdraw larger amounts as funds approach WLA levels where imposition of gates/fees is a possibility
- Under the gates/fees provisions provided in the 2014 money market reforms, boards of MMFs funds are permitted to impose a liquidity fees of up to 2% or to temporarily suspend redemptions if the fund's WLA falls below the 30% minimum threshold.
    - Funds must impose a 1% liquidity fee if WLA falls below 10% threshold, unless the fund's board determines that imposing the fee is not in the best interests of the fund
- These provisions linked levels of liquidity with redemption gates/fee, and exacerbated first-mover advantage for pre-emptive redemption (notably institutional investors)
- Therefore, proposals that reform conditions for imposing redemption gates/fees, such as through a biweekly WLA, might result in more stable cash flows at prime MMFs

Source: Crane data

Prime MMFs holdings of Treasuries are not significant, even as those of CP/CD are

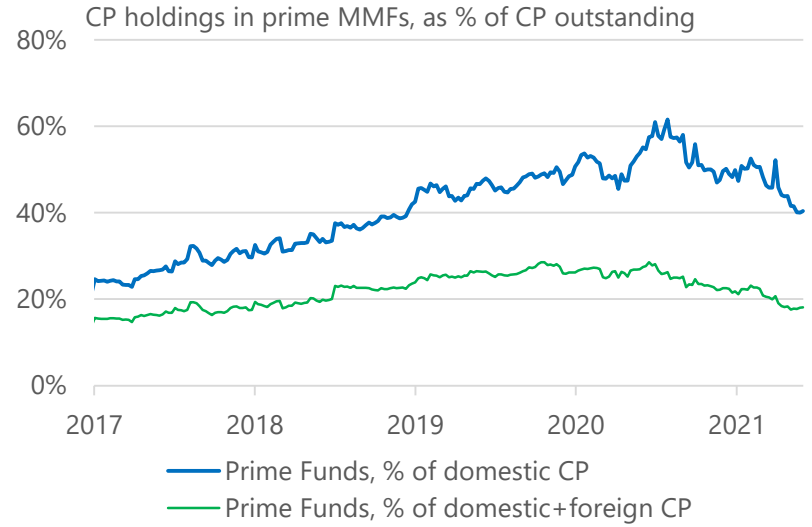
Prime MMFs hold relatively small amounts of Treasuries and Treasury Repo



Source: Crane data data

- As total assets in prime MMFs have shrunk over the past year, Treasury holdings have reduced relative to CP (commercial paper)/CD/repo holdings, reversing the earlier trend
  - This is likely driven by competitive pressures in a low yield environment
- Prime MMFs hold a small amount of Treasuries ($160bn), relative to government MMFs ($2.2trn). For context, there are $4.3trn T-bills and $21.7trn marketable Treasury debt outstanding
- Therefore, the vulnerability of prime funds to "run-like" behavior is not a challenge to the Treasury market from a macro perspective

While prime MMFs hold a small share of Treasuries outstanding, their holdings of CP are significant



Source: ICI, Federal Reserve

- However, prime MMFs are a much larger presence in non-Treasury short-term funding markets
- Prime MMF CP holdings are 40% of domestic CP outstanding and 20% of total CP outstanding
- As spreads on these assets widen in times of stress, prime funds with large allocation to these assets experience redemptions, worsened by the first-mover advantage and limited secondary market intermediation

President's Working Group (PWG) on Financial Markets' Proposal Evaluation

PWG's potential reform options for money market funds - Effective in presenter's view

Proposal	Details	SIFMA AMG Response	Presenter's View
Removal of tie between MMF liquidity and fee and gate thresholds	Remove link between the 30 percent and 10 percent WLA thresholds and the imposition of fees and gates	"Strongly supports", "most directly and meaningfully addresses"	Very effective – greater flexibility to tap liquid assets
Money market fund liquidity management changes	New categories of liquidity requirements (bi-weekly liquid assets - BWLA), additional liquidity thresholds	"Does not generally oppose", "Focus on [funds] that experienced higher redemptions"	Effective in conjunction with above proposal We believe that delinking WLA requirements from imposition of gates/fees is the most effective reform. This can be best achieved in combination with liquidity management changes that create a "gap" between gates/fees and liquidity thresholds Proposals such as the following would improve the resilience of prime MMFs • mandating a minimum holding of Treasuries/government securities, • limiting CP exposure, • maturity cap on CP purchases (for example 3m), and • shortening the weighted average life limit from 120days
Floating NAV for all prime and tax-exempt money market funds	Retail prime MMFs and tax-exempt MMFS sell and redeem shares at market prices	"Generally oppose", "did not prove effective"	Effective in promoting transparency Floating NAVs are generally much more transparent than most other measures such as MBR and swing pricing. Given that shadow NAV's are published daily, they are effectively another trigger Floating NAVs will likely force a reallocation of risk, and thereby, make the industry more resilient Downside is that it likely increases funding costs for CP issuers, assuming the market does not evolve and create non-MMF sources of funding for credit issuers
Reform of conditions for imposing redemption gates	Notify the SEC prior to imposing gates, Consider liquidity fee before gates, lower WLA threshold to 10% for gates, soft/partial gates	"Less effective"	Effective when combined with liquidity management changes that result in a higher liquidity profile

PWG's potential reform options for money market funds - Ineffective in presenter's view

Proposal	Details	SIFMA AMG Response	Presenter's View
Minimum Balance At Risk ("MBR")	A portion of balance is available for redemption only with a time delay	"Strongly opposes"	Less effective. This proposal will explicitly apportion a certain amount of assets that are not available for immediate liquidation. In the event of a loss, redeeming shareholders would lose their MBRs first Implementation hurdles would be determining the size of the MBR and communication challenges around its calibrated, and assessment over time
Countercyclical WLA requirements	Minimum WLA requirements could automatically decline in certain circumstances	"Less effective policy measure", "Potential to create a bright line test"	Less effective. Allowing WLA requirements decline during times of stress seems much less effective and less straightforward than simply de-linking WLA requirements and the trigger for fees and gates Both measures endeavor to diminish the run-risk created by the WLA threshold
Swing pricing requirement	Adjust fund's NAV downward when net redemptions exceed a threshold	"Does not support", "significant costs and burdens associated with implementation"	Less effective. This proposal would adjust NAVs downward for transactions cost when net redemptions exceed some threshold, and presumably this netting occurs at the end of day It seems redundant considering that MMFs can already charge liquidity fees. They both achieve the same outcome Operational hurdles in implementing swing pricing: • It has not been tested in a cash settlement environment, and if the swing price is determined on a net basis, same day settlement will be difficult, if not impossible, due to timing issues. • This change could impair same day liquidity • Some MMFs strike NAVs intraday. So, it's not clear how swing pricing can be overlaid in this context
Capital buffer requirements	Dedicated resources within or alongside a fund to absorb losses	"Strongly opposes"	A buffer designed to absorb credit and liquidity risk could be significant, and therefore, reduce the attractiveness and viability of prime funds
Require Liquidity Exchange Bank ("LEB") membership	Prime MMFs required to be members of a private liquidity exchange bank	"Strongly opposes"	Presumably there is a significant cost associated with membership as the potential size of the support could be significant. The impact is similar to capital buffers. This proposal reduces product viability
New requirement governing sponsor support	A regulatory framework governing sponsor support to clarify who bears MMF risks	"Strongly opposes"	Mandating sponsor support would likely increase cost for investors, and similar to capital buffers and LEB membership, reduce the viability of prime funds

Tradeoffs in presented prime MMF reform proposals

Proposal	Ease of implementation	Impact on prime MMFs in normal times	Impact on prime MMFs in times of stress	Shift towards Gov't MMFs
Removal of tie between MMF Liquidity and Fee and Gate Thresholds	+	o	+	o
Money Market Fund Liquidity Management Changes	+	-	+	o
Floating NAV for all Prime and Tax-exempt Money Market Funds	o	o	+	+
Reform of conditions for imposing Redemption Gates	+	o	+	o
Minimum Balance At Risk ("MBR")	-	-	+	+
Countercyclical WLA Requirements	-	o	+	o
Swing Pricing Requirement	-	-	+	o
Capital Buffer Requirements	-	-	+	+
Require Liquidity Exchange Bank ("LEB") Membership	-	-	+	+
New Requirement Governing Sponsor Support	-	-	+	+

+: positive, -: negative, o: neutral

Summary of proposal evaluation

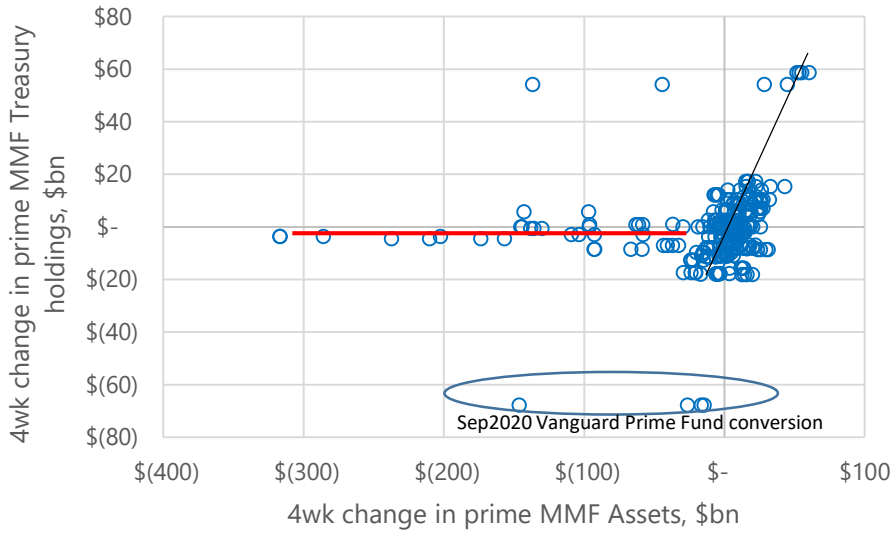
- Proposals presented in the President's Working Group on Financial Markets range from modest but easily implementable to those requiring aggressive changes
- Changes to prime MMFs should effectively balance the tradeoffs between attractiveness of yields in normal times and resilience in times of stress
    - However, proposals that promote greater liquid holdings also tend to lower yields and reduce the gap between prime and government MMFs
    - Proposals that seek to reduce the first-mover advantage in redemptions through liquidity or credit cost sharing often are complex to administer or costly to institute and achieve the stated goals only partially

- Overall, the following proposals appear to strike the best balance:
    - *Weaken link between regulatory thresholds and gates/fees* - Provide greater flexibility to tap liquid assets to meet redemptions
    - *Reform conditions for imposing redemption gates* - Reduce incentive for investors to pre-emptively redeem
    - *Liquidity management requirement changes* - Increase liquidity profile through additional categories like biweekly liquid assets
    - *Floating NAV for all Prime and Tax-exempt MMFs* – Improve transparency and set clearer expectations of fund risks for investors

- Other proposals, in our opinion, might face greater challenges in their implementation
    - *Minimum balance at risk and swing pricing requirement* - Complex and hard to administer
    - Likewise, implementation of *countercyclical WLA requirements* would be challenging, while addressing the pre-emptive redemption incentive problem only partially
    - *Capital buffers*, *liquidity exchange membership* and *new requirements for sponsor support* are challenging from appropriate sizing and cost perspective and can reduce product viability

Proposals promoting dipping into Treasuries in times of stress could be effective

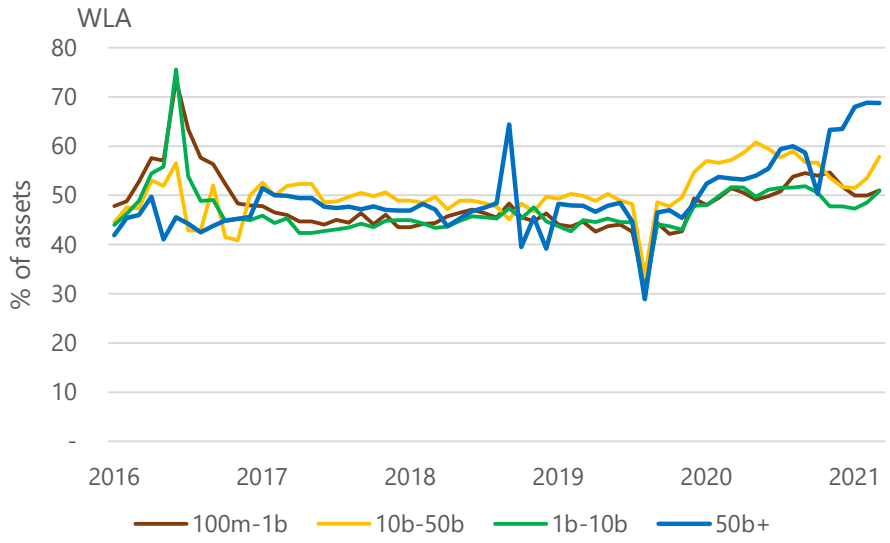
Prime MMFs tend not to dip into Treasury holdings to fund large redemptions



Source: ICI

- The chart on the left plots changes in Treasury holdings for prime MMFs vs changes in assets over a rolling 4 week period
- It shows that prime MMFs are reluctant to dip into Treasury reserves to fund large redemptions
- Concerns around dipping below the WLA threshold and triggering gates, which would further prompt investor redemptions, contribute to this behavior
- Therefore proposals that weaken the tie between regulatory thresholds and gates/fees are attractive

WLA metrics show large gap between larger and smaller prime MMFs

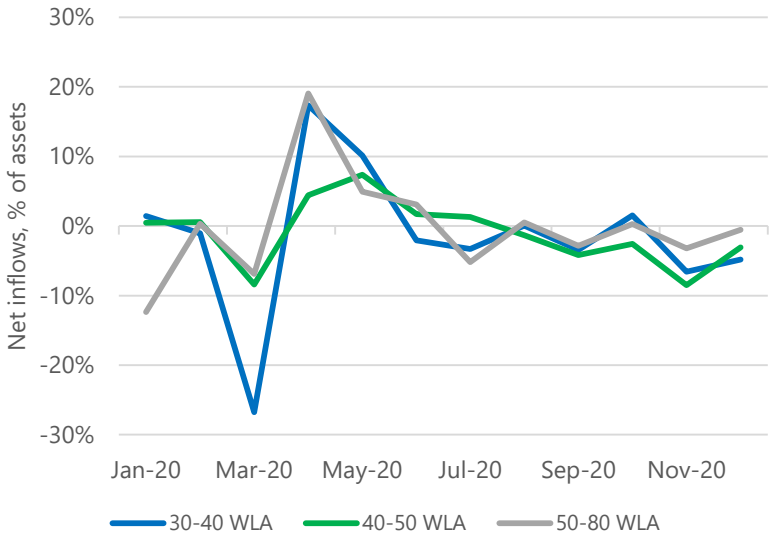


Source: Crane data

- WLA holdings at prime funds differs significantly by size of the fund, with larger funds typically holding higher WLAs
- Proposals that set WLA thresholds higher would standardize the prime MMF industry more and aid in weakening the tie between regulatory WLA thresholds and gates/fees
- This is likely to create a cushion for prime MMFs to dip into Treasuries to fund redemptions in times of stress

Additional recommendation 1:
Proposals promoting higher liquidity thresholds, and thereby reduced dispersion, are likely to be effective

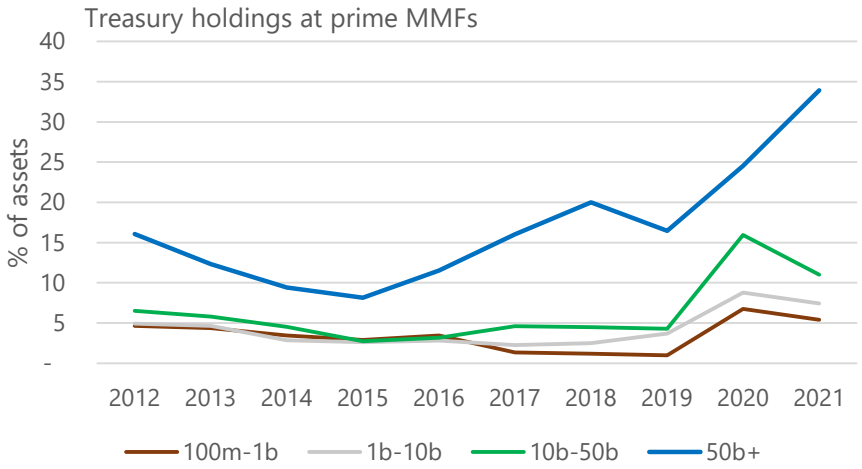
Even though lower WLA funds saw greater redemption, higher WLA funds experienced redemptions too



Source: Crane data

- Redemptions that start at prime MMFs with riskier asset allocation in times of stress can become industry wide episodes
- For instance, even though 30-40% WLA funds saw greater redemptions as % of assets, even 50-80% WLA funds had outflows
- This necessitates a focus on dispersion between prime MMFs
  - Funds with AUM larger than $50bn on average allocate 35% of assets to Treasuries . For funds smaller than $50bn in assets, allocation to Treasuries has increased since 2019 but still remains at 5-10%
  - WLAs at larger funds are meaningfully higher
  - Smaller funds have a greater inclination for bar-belling portfolios

Larger prime MMFs have significantly greater % of assets in Treasuries

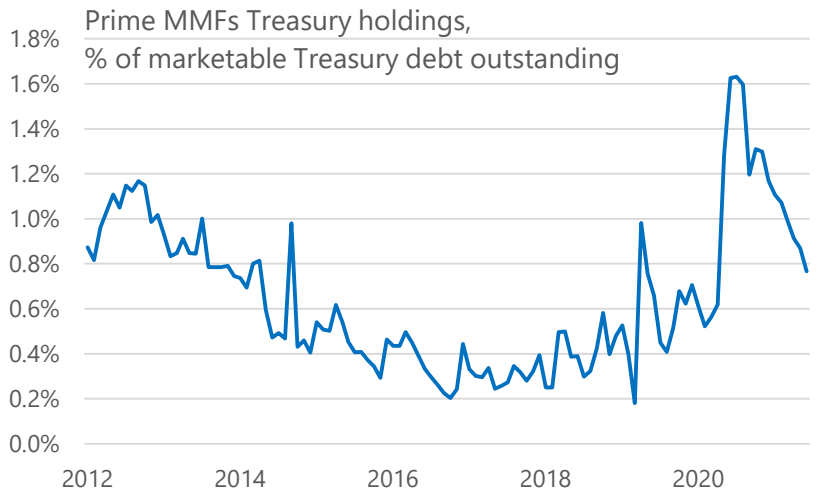


Source: Crane data

- In this context, regulations that reduce the highlighted dispersion would be a positive step
- These regulations could raise the liquidity profile of prime funds to a greater threshold - perhaps even mandating allocation to Treasuries and Treasury repo
- If all prime funds allocated the same proportion of assets to Treasuries as $50bn+ sized funds, it would increase demand for short-term Treasuries by $170bn (4% of T-bills outstanding)

Additional recommendation 2
Should regulators take steps to minimize or eliminate prime MMFs?

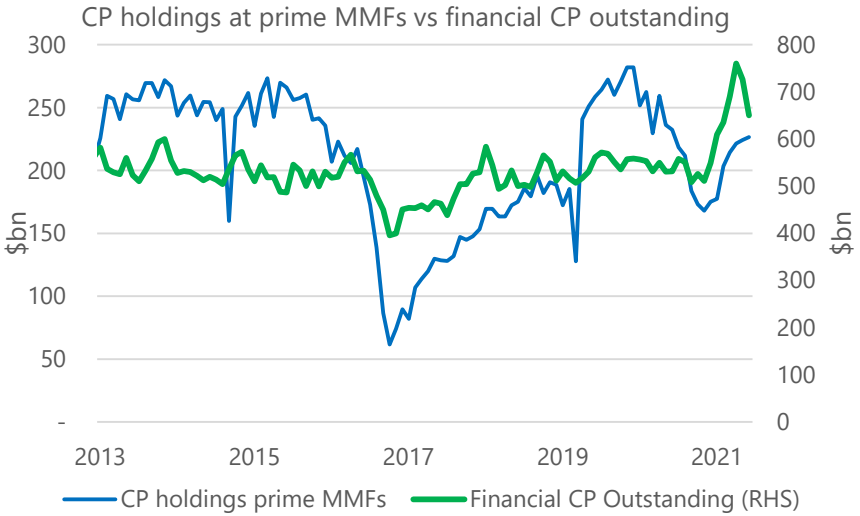
Prime MMFs hold relatively small share of Treasuries outstanding



Source: Crane data, Bloomberg

- Prime MMFs have required multiple government backstops over the past fifteen years, despite meaningful reforms
- At the same time, high expense ratios have limited the pass through of higher yields (vis a vis government MMF) to final investors
- Proposals that make prime MMFs more liquid also necessarily make them more "government MMF" like
- Therefore, should regulators take steps to minimize or eliminate the existence of prime MMFs?
- Some of the PWG proposals being considered could have this impact due to the operational complexity or costs associated with implementation

Financial CP outstanding remained steady even as prime MMFs' CP holdings declined post 2014 reform and then recovered



Source: Crane data, Macrobond

- Impact of prime MMF industry shrinking further:
  - From Treasury perspective, $1 lesser AUM in prime MMFs would translate into extra $0.40 demand for short-term Treasuries, assuming this dollar shifts to government MMFs and static allocation
  - Experience post 2014 reform shows that financial CP outstanding remained relatively steady even as CP holdings of prime MMFs declined.
    - The impact on non-financial CP was even lesser
  - In addition, short-term securities issued by corporate/other sponsors can potentially be purchased by mutual funds whose mandate includes a short-term allocation. On the margin, this might encourage the issuing entities to further term out debt

Case study: Market reaction to closure of prime MMFs in late Q3'20 was minimal

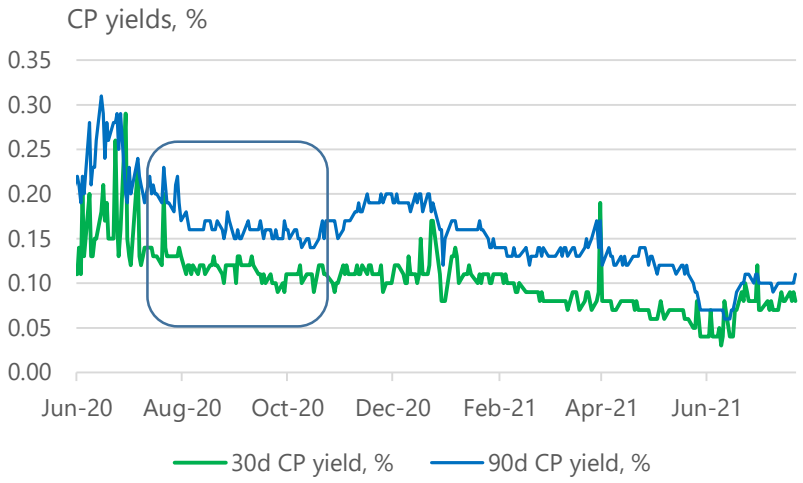
Prime MMF assets declined 18% in Sep'20

$bn	Jul'20	Nov'20	Current (Jun'21)	Change from Jul'20 to Nov'20	Change from Jul'20 to Jun'21
Prime MMF Assets	$1,122	$924	$900	-$199 (-18%)	-$222 (-20%)
Prime Institutional	$678	$637	$672	-$41 (-6%)	-$6 (-1%)
Prime Retail	$444	$287	$228	-$157 (-35%)	-$216 (-49%)
Treasury holdings	$326	$268	$166	-$58 (-18%)	-$160 (-49%)
Repo holdings	$152	$132	$175	-$20 (-13%)	$23 (15%)
CP holdings	$218	$168	$227	-$50 (-23%)	$8 (4%)

Source: Crane data

- Prime assets shrank 18% in late Q3'20, driven by a 35% decline in retail funds. Several large sponsors, such as Vanguard, Fidelity and Northern Trust, tilted their MMF offerings more toward a government portfolio[1]

In the period where prime MMF CP holdings declined sharply, CP yields actually declined



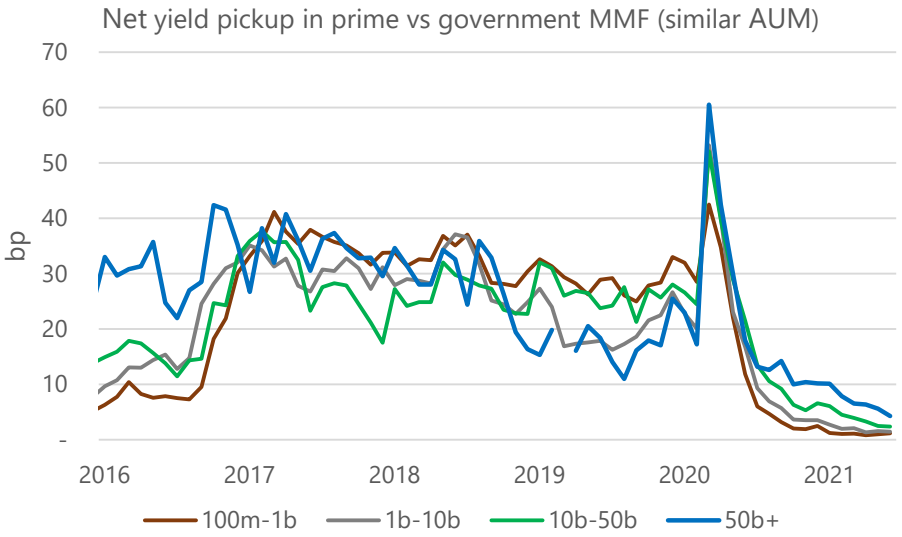
Source: Bloomberg

- This time period offers a window to assess impact of prime assets declining, as these outflows were not driven by a risk-off environment
  - In this period, Treasury holdings of prime MMFs declined by $58bn and have declined by $160bn (~50%) cumulatively from July'20 to date
  - This decline of $160bn does not appear material in the context of $4.3trn in marketable bills outstanding and $2.2trn Treasury bills holdings at government MMFs
  - Amid the decline in prime assets, CP holdings shrank by 23% of assets. However, 30day and 90day CP yields actually declined in this time period, likely as financial CP outstanding declined as well.

1:https://institutional.vanguard.com/VGApp/iip/site/institutional/researchcommentary/article/NewsInstInfo08272020

Prime MMFs yield advantage over government funds has shrunk post pandemic

Prime MMFs offer increasing smaller yield pickup over similar sized government MMFs



Source: Crane data

- Prime MMFs yield pickup over similar sized government MMFs has shrunk in the current low yield environment
  - In the higher yield environment of 2016-20, prime MMFs offered 20-30bp yield pickup versus similar sized government funds, but this has shrunk significantly to sub 5bp post Fed easing in the pandemic
  - A low yield environment benefits funds with economies of scale and low expense ratio

Source: Crane data