Treasury Presentation to TBAC

Office of Debt Management

Fiscal Year 2015 Q4 Report

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Section I:
Executive Summary

Highlights of Treasury's November 2015 Quarterly Refunding Presentations to the Treasury Borrowing Advisory Committee (TBAC)

Debt Ceiling and Minimum Cash Balance Objectives

- As a result of the debt ceiling, Treasury is currently operating below the $150 billion minimum daily cash balance that was established in May 2015. Treasury will rapidly increase net marketable borrowing over the coming quarter in order to reach its operating cash balance objectives.
- Net marketable borrowing over the next quarter is forecast at $344 billion, with an end-of-December cash balance of $325 billion (page 16).
- Based on the current auction schedule, Treasury is forecast to increase net bill issuance by $147 billion through the end of December 2015 (page 16).

Sources of Financing in Fiscal Year 2016

- Demand for Treasury bills is high and is expected to continue to grow through the end of 2016. Treasury believes that it is prudent to increase the level of Treasury bills outstanding over the coming quarters. Increasing bill issuance will help achieve our objective of lowest cost of funding over time and will also enhance market functioning and liquidity.
- If the Federal Reserve continues to reinvest its SOMA portfolio throughout 2016 and coupon sizes remain at current levels, Treasury is projected to be underfunded by $68 billion (Page 20).
- Adjusting the size of coupon auctions may be necessary, depending on the extent to which Treasury intends to increase the level of Treasury bills outstanding.

Bid-to-Cover Ratios (BTC)

- Bill auctions in late September and October 2015 were characterized by elevated BTC ratios, due to debt ceiling constraints on the offering amounts and strong investor demand. The 10.7x BTC ratio for the September 29 4-week bill auction was the highest ever.
- BTC ratios for longer-dated coupons have risen in recent months, particularly those with 7-and 30-year maturities (page 36).

Investor Class Allotments

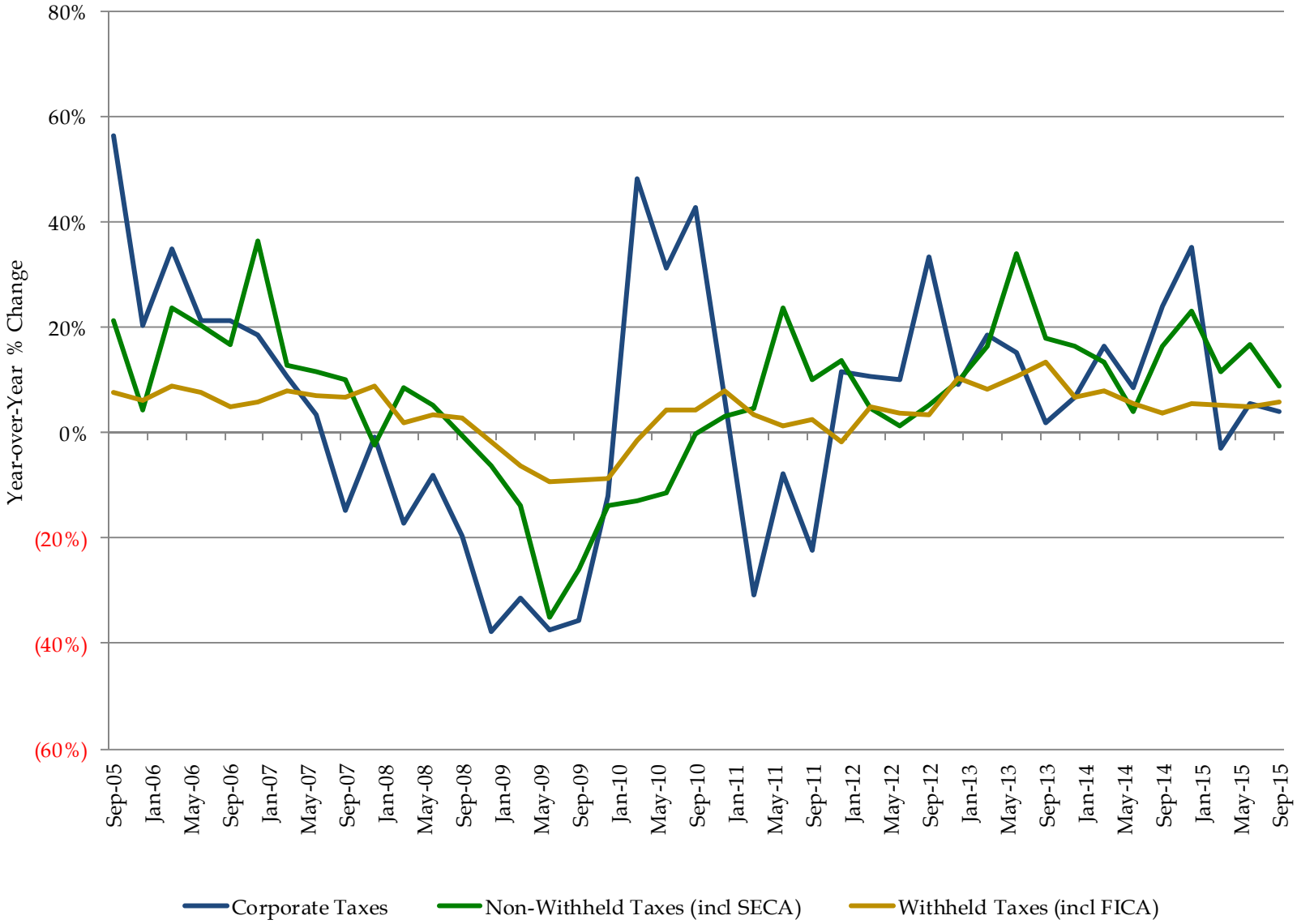
- Relative to other auction participants, foreign awards have increased in bills, but have decreased slightly in long coupons. In aggregate, however, foreign awards are broadly within their multi-year range.
  - In nominal terms, foreign bill awards were necessarily smaller as a result of reduced issuance due to debt ceiling constraints (page 44).
- Investment fund awards continue to increase in long coupons (7-, 10- and 30-year) and TIPS, but have declined in bills (page 40).

2-Month Bill Presentation

- A variety of changes to market structure are expected to lead to an increase in demand for Treasury bills.
- The addition of a 2-month bill could allow Treasury to moderate increases in auctions sizes at other maturity points and could provide for a more effective maturity ladder that potentially reduces the size of future weekly adjustments to bill issuance.
- Treasury seeks feedback from the Committee on the settlement and maturity cycle of a 2-month bill, as well as comments on operational considerations, frequency and size of such a security.

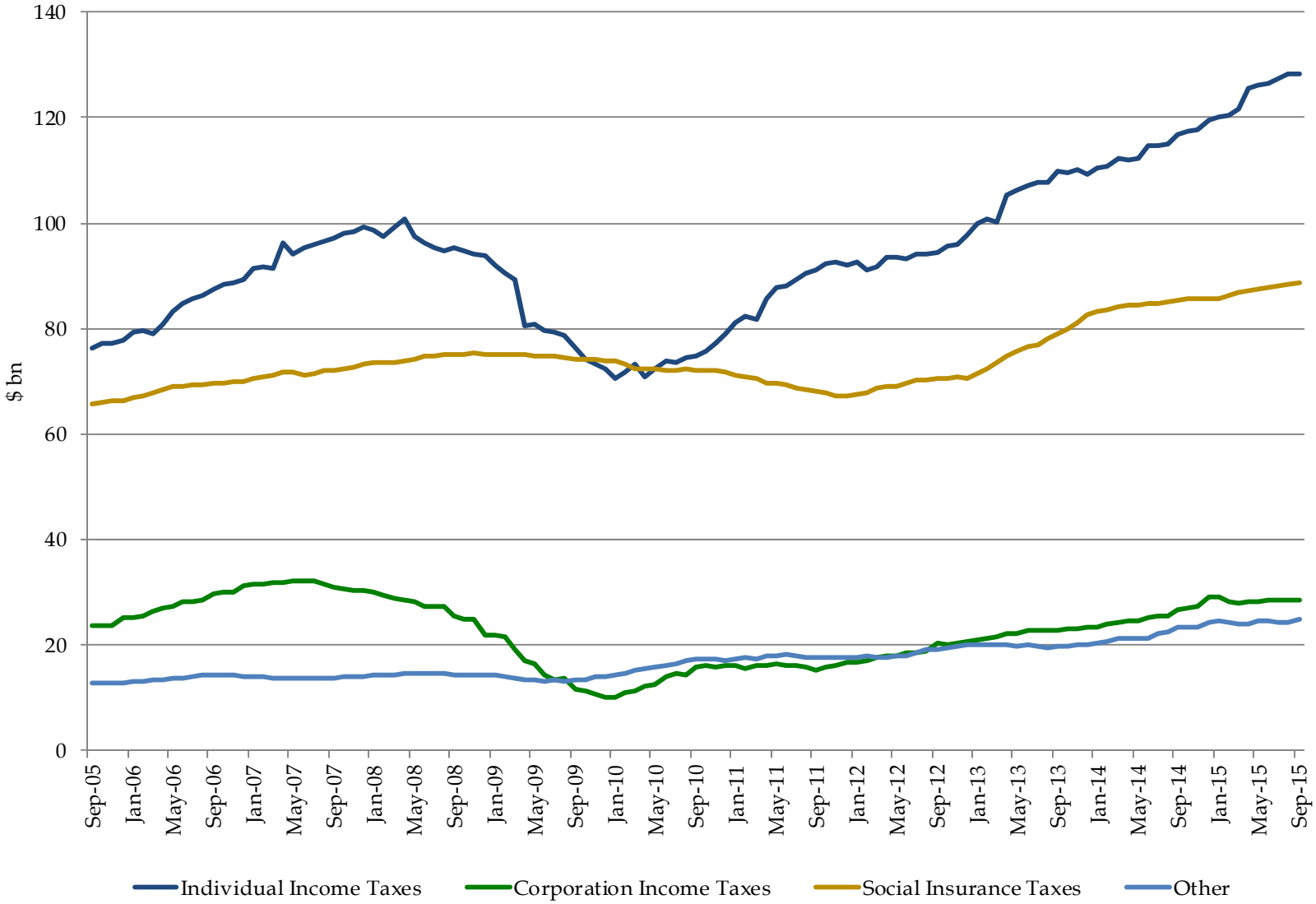
Section II:
Fiscal

Quarterly Tax Receipts



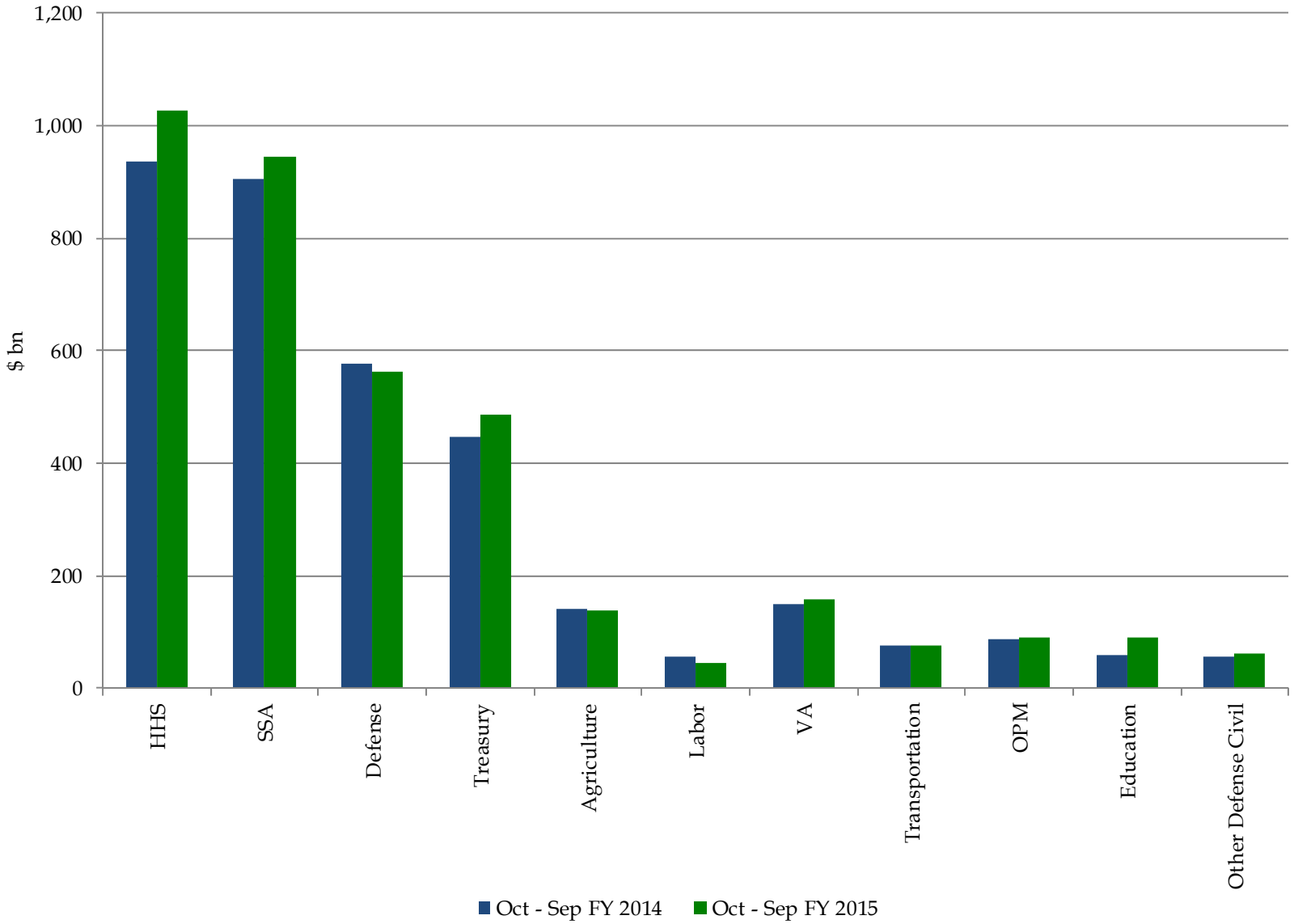
Source: United States Department of the Treasury

Monthly Receipt Levels
(12-Month Moving Average)



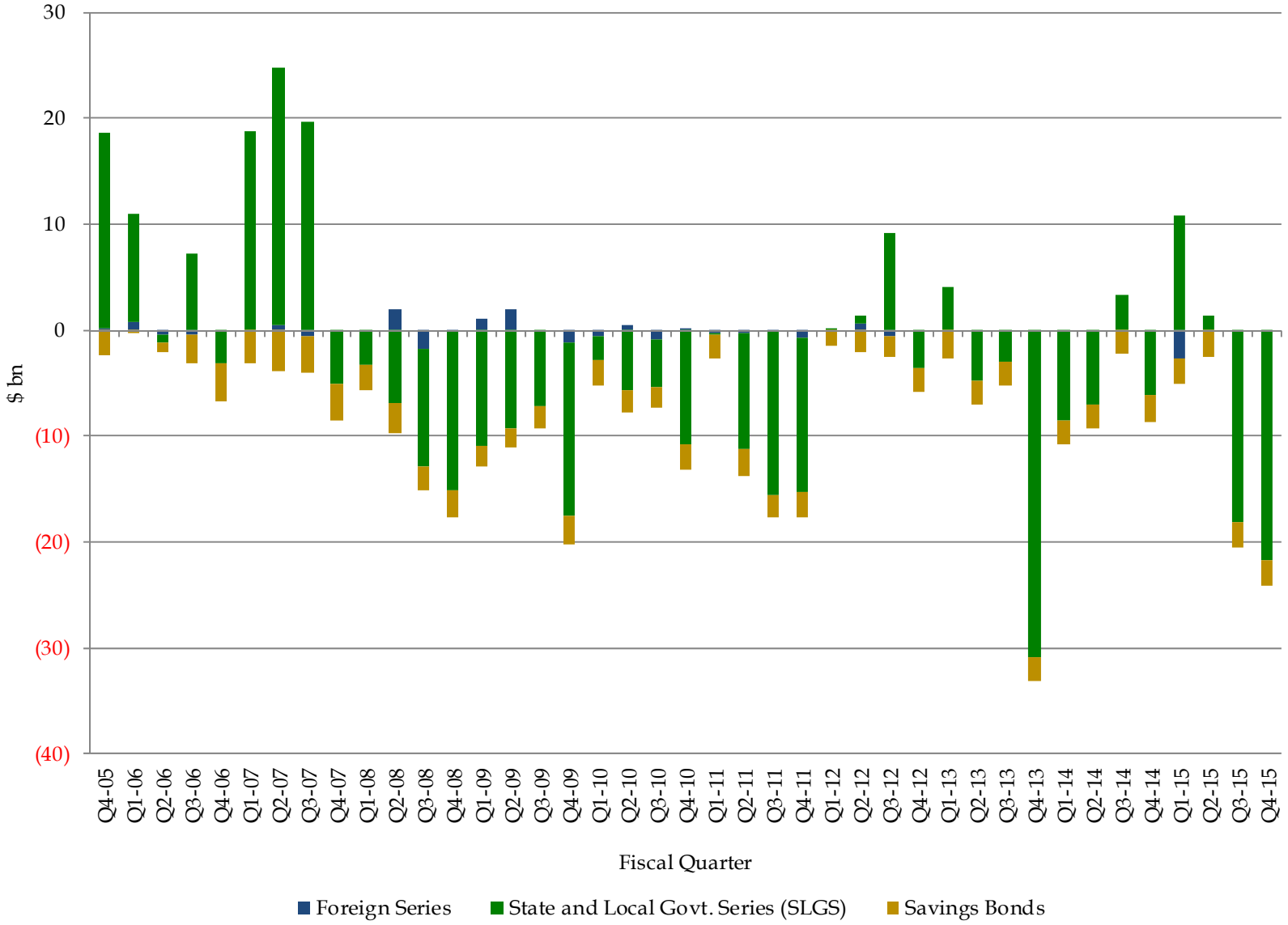
Individual Income Taxes include withheld and non-withheld. Social Insurance Taxes include FICA, SECA, RRTA, UTF deposits, FUTA and RUIA. Other includes excise taxes, estate and gift taxes, customs duties and miscellaneous receipts.
Source: United States Department of the Treasury

Eleven Largest Outlays



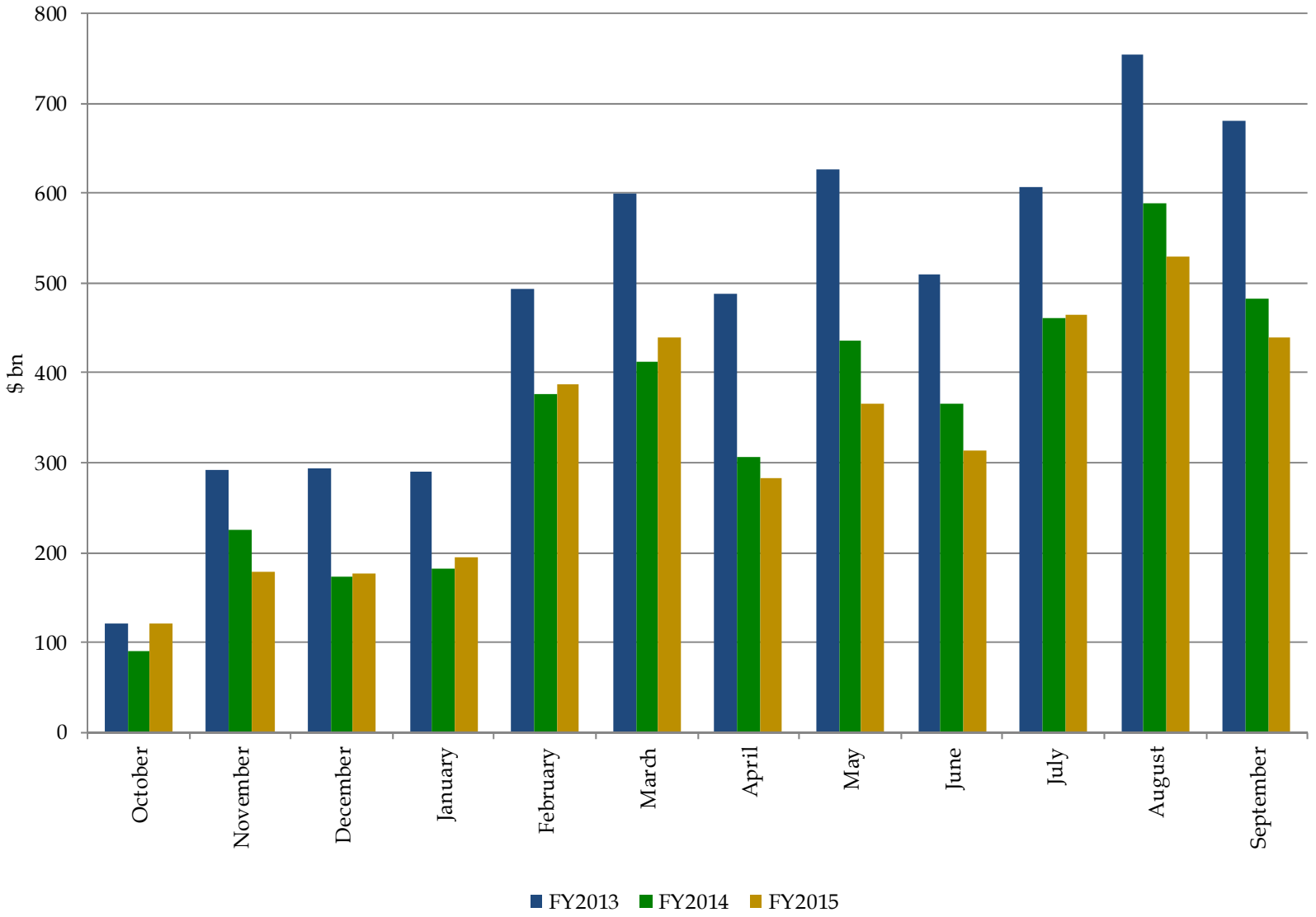
Source: United States Department of the Treasury

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 2015-2017 Deficits and Net Marketable Borrowing Estimates

In $ billions

	Primary Dealers[1]	CBO[2]	OMB MSR[3]	CBO[4]	OMB[5]
FY 2015 Deficit Estimate	466	486	455	486	583
FY 2016 Deficit Estimate	472	455	429	380	474
FY 2017 Deficit Estimate	513	455	436	401	463
FY 2015 Deficit Range	375-595				
FY 2016 Deficit Range	375-575				
FY 2017 Deficit Range	400-696				
FY 2015 Net Marketable Borrowing Estimate	563	586	631	595	726
FY 2016 Net Marketable Borrowing Estimate	553	531	563	469	602
FY 2017 Net Marketable Borrowing Estimate	600	531	567	488	596
FY 2015 Net Marketable Borrowing Range	440-794				
FY 2016 Net Marketable Borrowing Range	410-675				
FY 2017 Net Marketable Borrowing Range	460-775				
Estimates as of:	Oct-15	Aug-15	Jul-15	Mar-15	Feb-15

[1]Based on primary dealer feedback on October 27, 2015. Estimates above are averages.

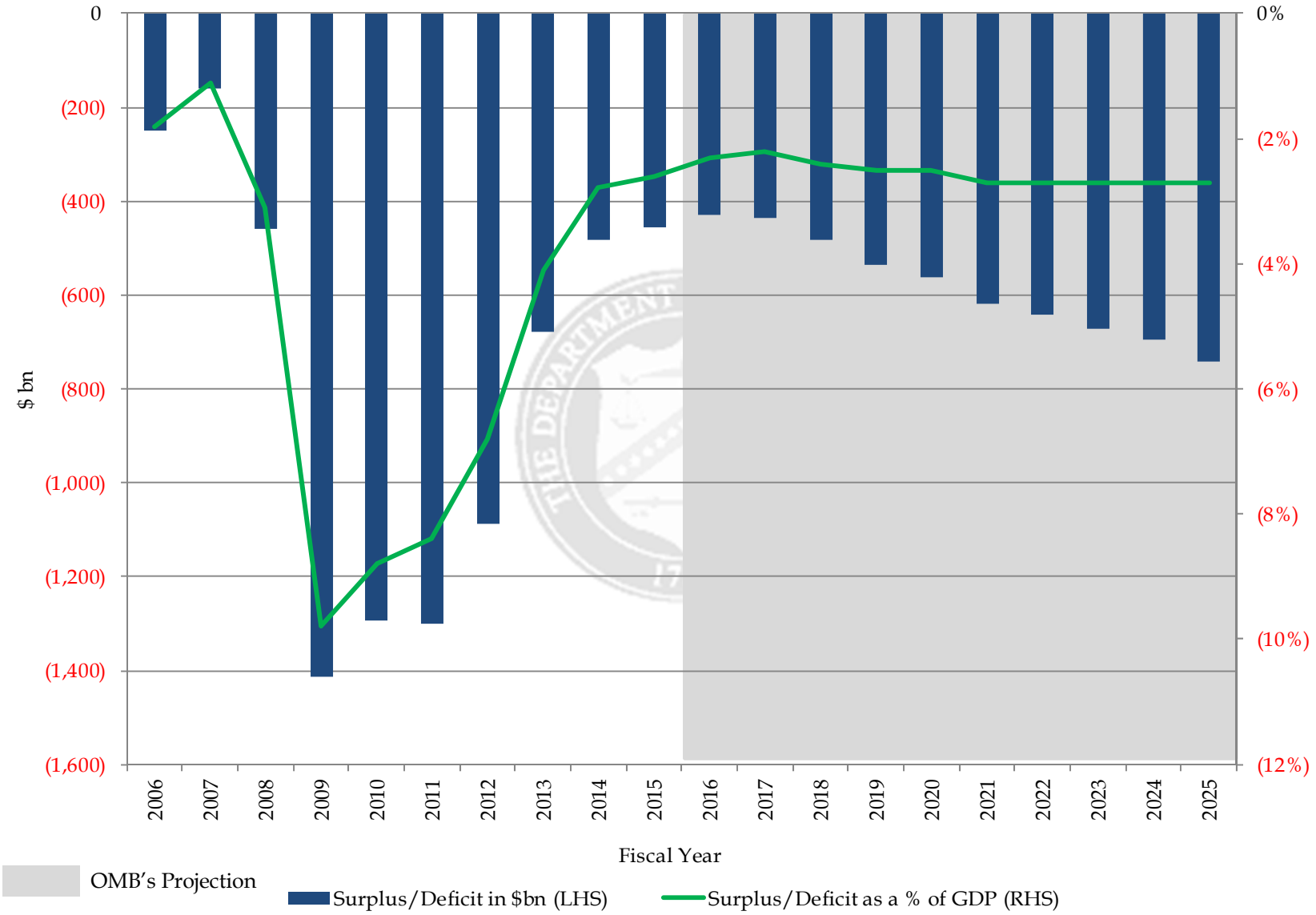
[2]Table 1 and 3 of CBO's "An Update to the Budget and Economic Outlook: 2015 to 2025"

[3]Table S-11 of OMB's "Fiscal Year 2016 Mid-Session Review"

[4]Table 1 and 3 of CBO's "An Analysis of the President's 2016 Budget"

[5]Table S-13 of OMB's "Fiscal Year 2016 Budget of the US Government"

Budget Surplus/Deficit



Projections are from Table S-1 of OMB's "Fiscal Year 2016 Mid-Session Review"

Section III: Financing

Assumptions for Financing Section (pages 15 to 22)

- Portfolio and SOMA holdings as of 9/30/2015.
- SOMA redemptions until and including June 2021. These assumptions are based on Chairman Bernanke's June 2013 press conference.
- Assumes announced issuance sizes and patterns constant for Nominal Coupons, TIPS, and FRNs as of 9/30/2015, while using an average of ~$1.3 trillion of Bills outstanding.
- The principal on the TIPS securities was accreted to each projection date based on market ZCIS levels as of 9/30/2015.
- No attempt was made to match future financing needs.

Sources of Financing in Fiscal Year 2015 Q4

July - September 2015	
Net Bill Issuance	(37)
Net Coupon Issuance	170
Subtotal: Net Marketable Borrowing	133
Ending Cash Balance	199
Beginning Cash Balance	254
Subtotal: Change in Cash Balance	(56)
Net Implied Funding for FY 2015 Q4*	188

Security	July - September 2015 Bill Issuance			Fiscal Year-to-Date Bill Issuance		
	Gross	Maturing	Net	Gross	Maturing	Net
4-Week	455	475	(20)	1,844	1,889	(45)
13-Week	302	312	(10)	1,252	1,295	(43)
26-Week	302	326	(24)	1,291	1,285	6
52-Week	67	75	(8)	317	313	4
CMBs	75	50	25	105	80	25
Bill Subtotal	1,201	1,238	(37)	4,809	4,862	(53)

Security	July - September 2015 Coupon Issuance			Fiscal Year-to-Date Coupon Issuance		
	Gross	Maturing	Net	Gross	Maturing	Net
2-Year FRN	41	0	41	164	0	164
2-Year	78	102	(24)	318	417	(99)
3-Year	72	96	(24)	295	406	(111)
5-Year	105	111	(6)	420	492	(72)
7-Year	87	0	87	348	0	348
10-Year	66	32	34	265	127	138
30-Year	42	4	38	169	15	154
5-Year TIPS	16	0	16	50	23	27
10-Year TIPS	28	21	7	82	44	38
30-Year TIPS	0	0	0	23	0	23
Coupon Subtotal	536	366	170	2,134	1,523	611

Total	1,737	1,604	133	6,943	6,385	558

*An end-of-September 2015 cash balance of $199 billion versus a beginning-of-July 2015 cash balance of $254 billion. By keeping the cash balance constant, Treasury arrives at the net implied funding number.

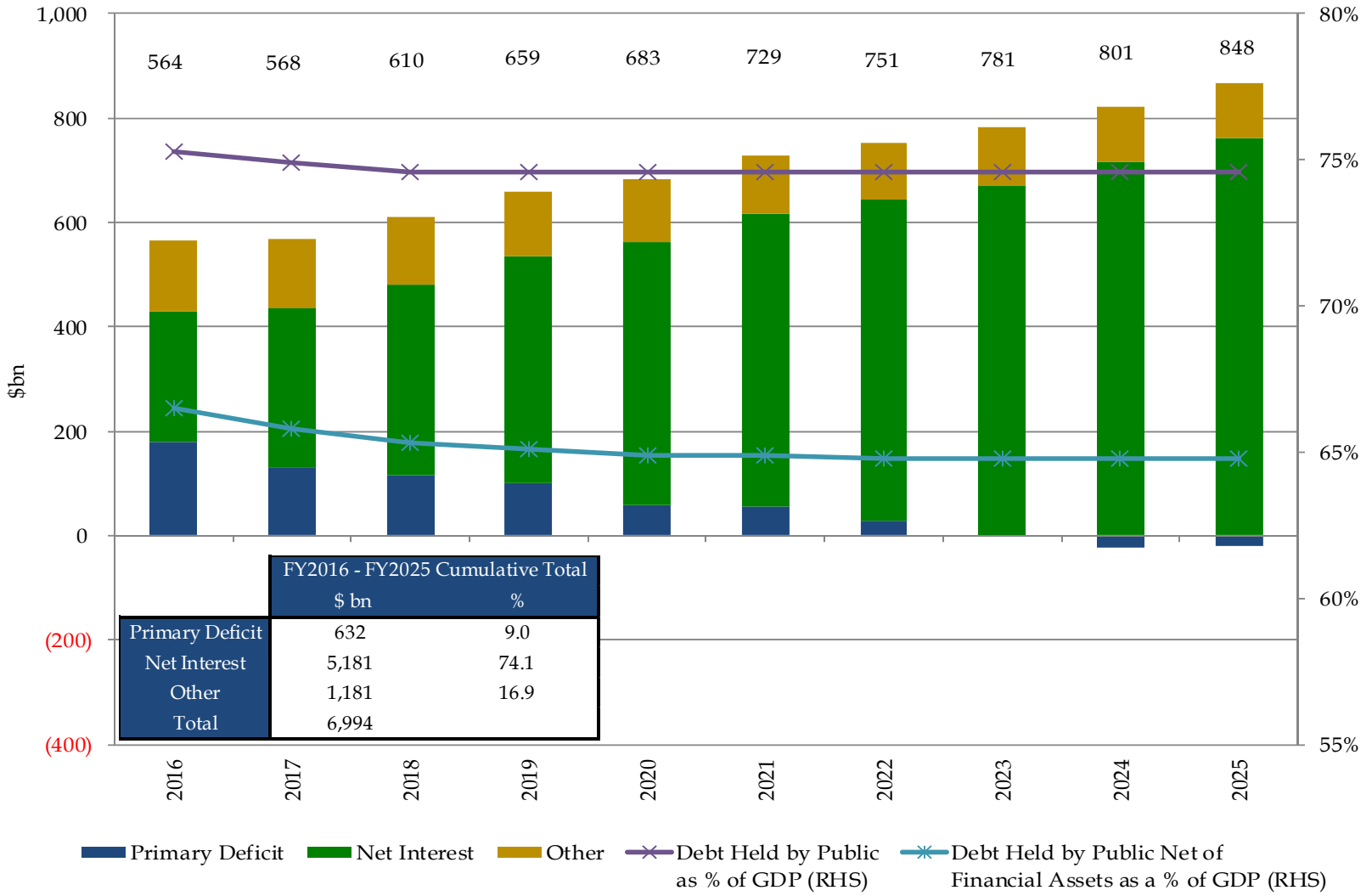
Sources of Financing in Fiscal Year 2016 Q1

October - December 2015	
Assuming Constant Coupon Issuance Sizes*	
Treasury Announced Net Marketable Borrowing**	344
Net Coupon Issuance	197
Implied Increase in Bills	147

Security	October - December 2015 Coupon Issuance			Fiscal Year-to-Date Coupon Issuance		
	Gross	Maturing	Net	Gross	Maturing	Net
2-Year FRN	41	0	41	41	0	41
2-Year	78	96	(18)	78	96	(18)
3-Year	72	96	(24)	72	96	(24)
5-Year	105	109	(4)	105	109	(4)
7-Year	87	0	87	87	0	87
10-Year	66	23	43	66	23	43
30-Year	42	6	36	42	6	36
5-Year TIPS	16	0	16	16	0	16
10-Year TIPS	13	0	13	13	0	13
30-Year TIPS	7	0	7	7	0	7
Coupon Subtotal	527	330	197	527	330	197
Total	1,664	1,506	158	1,664	1,506	158

*Keeping announced issuance sizes and patterns constant for Nominal Coupons, TIPS, and FRNs as of 9/30/2015.
**Assumes an end-of-December 2015 cash balance of $325 billion versus a beginning-of-October 2015 cash balance of $199 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

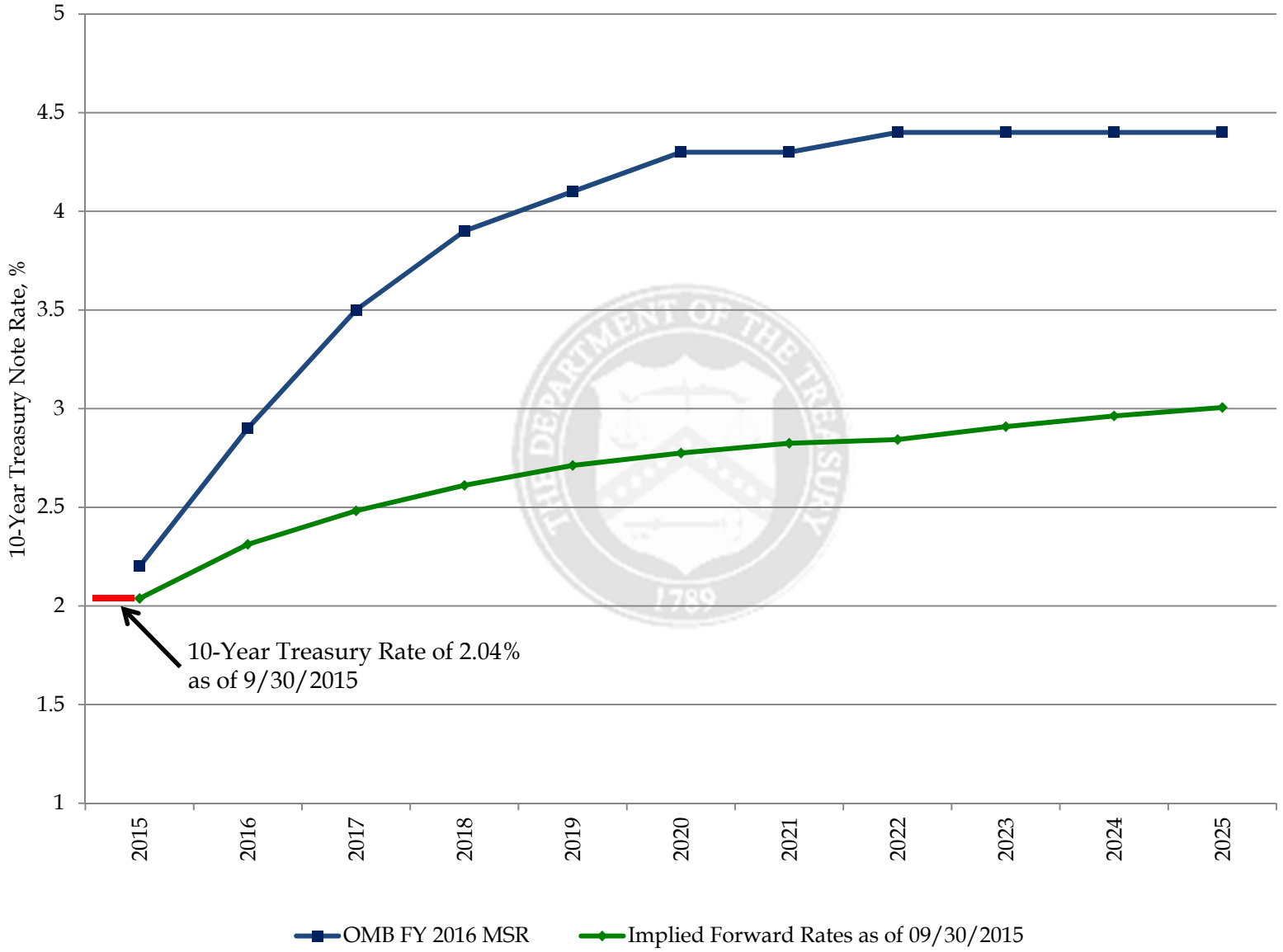
OMB's Projection of Borrowing from the Public



	FY2016 - FY2025 Cumulative Total	
	$ bn	%
Primary Deficit	632	9.0
Net Interest	5,181	74.1
Other	1,181	16.9
Total	6,994	

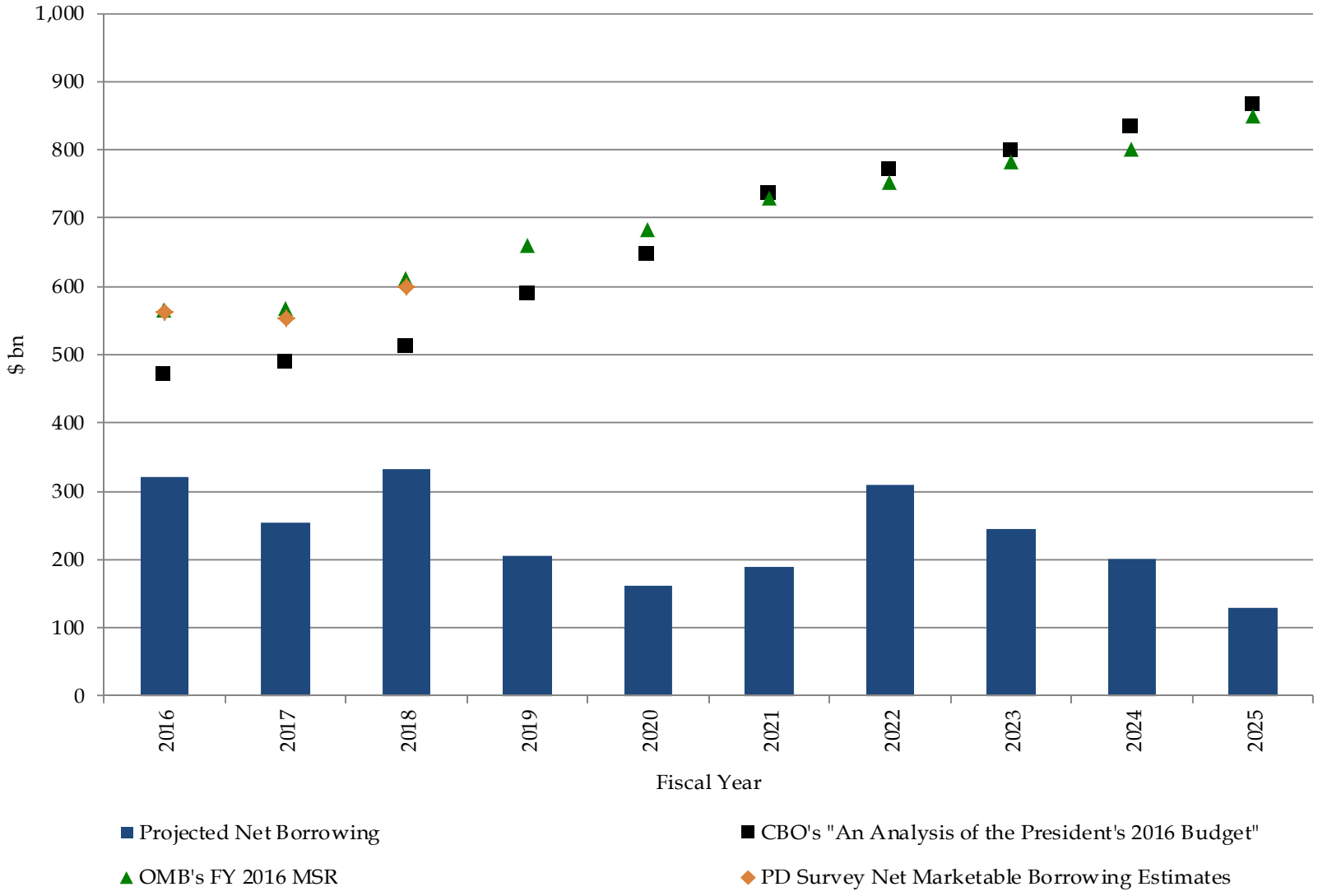
OMB's projections of net borrowing from the public are from Table S-11 of the "Fiscal Year 2016 Mid-Session Review." Data labels at the top represent the change in debt held by the public in $ billions. "Other" represents borrowing from the public to provide direct and guaranteed loans.

Interest Rate Assumptions: 10-Year Treasury Note



OMB's economic assumption of the 10-Year Treasury Note rates are from Table 2 of the "Fiscal Year 2016 Mid-Session Review." The forward rates are the implied 10-Year Treasury Note rates on September 30 of that year.

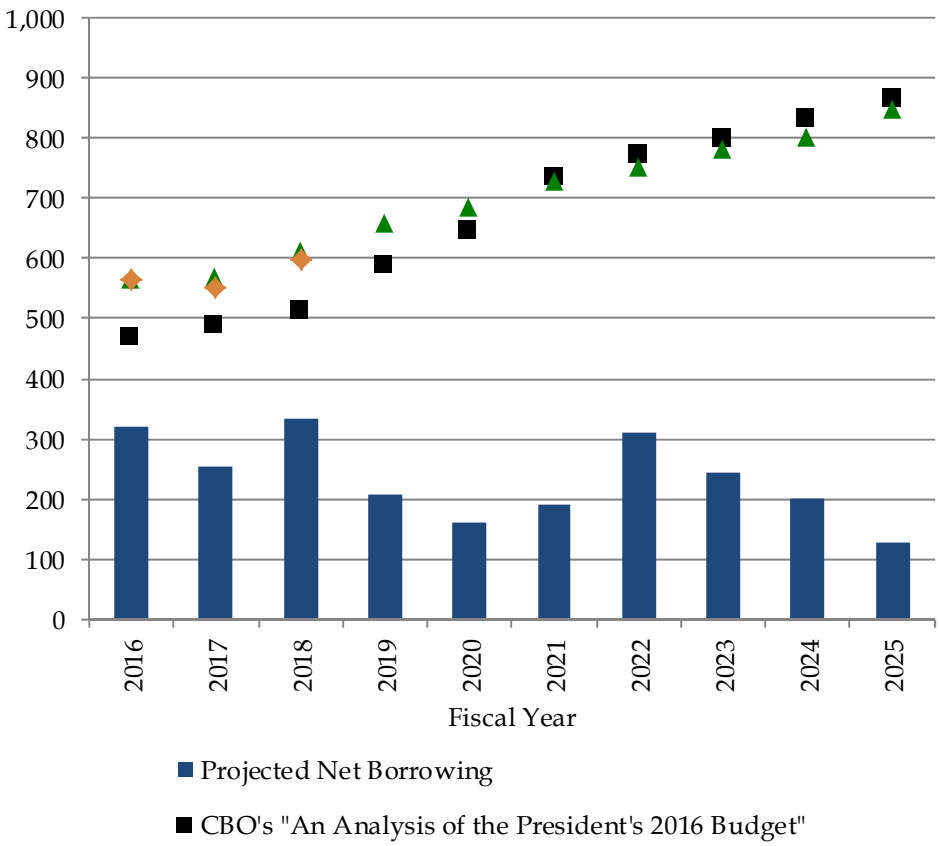
Projected Net Borrowing Assuming Constant Future Issuance



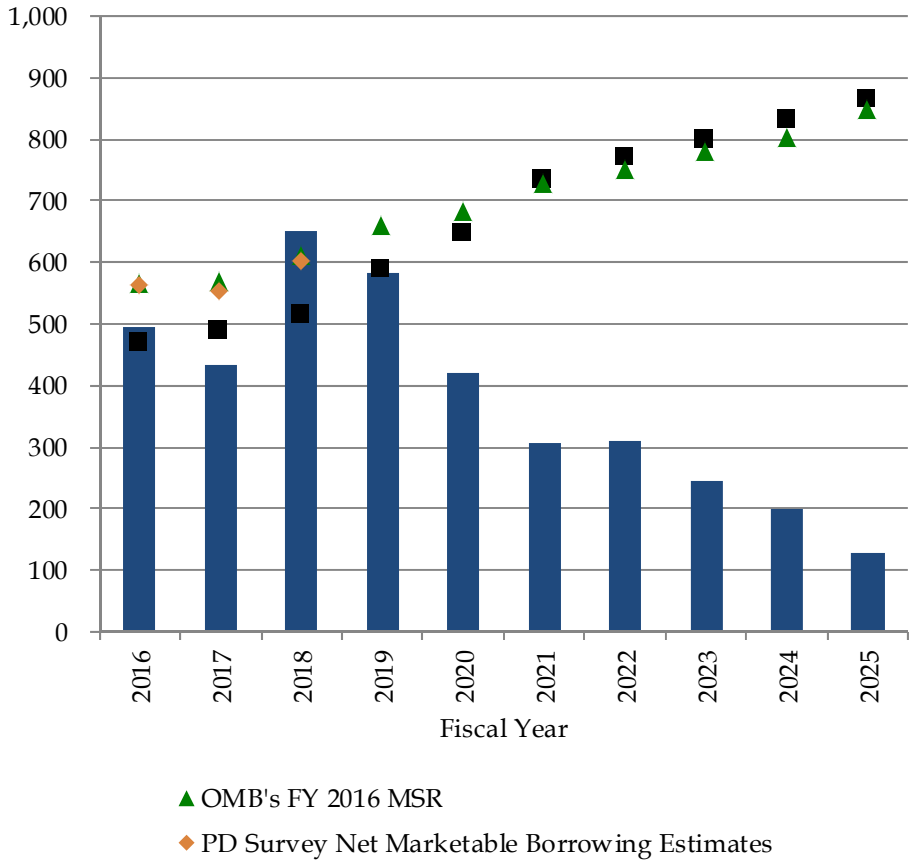
Treasury's primary dealer survey estimates can be found on page 9. OMB's projections of net borrowing from the public are from Table S-11 of the "Fiscal Year 2016 Mid-Session Review." CBO's estimates of the borrowing from the public are from Table 1 and 3 of "An Analysis of the President's 2016 Budget ." See table at the end of this section for details.

Impact of SOMA Actions on Projected Net Borrowing Assuming Future Issuance Remains Constant

Without Fed Reinvestments ($ bn)



With Fed Reinvestments ($ bn)



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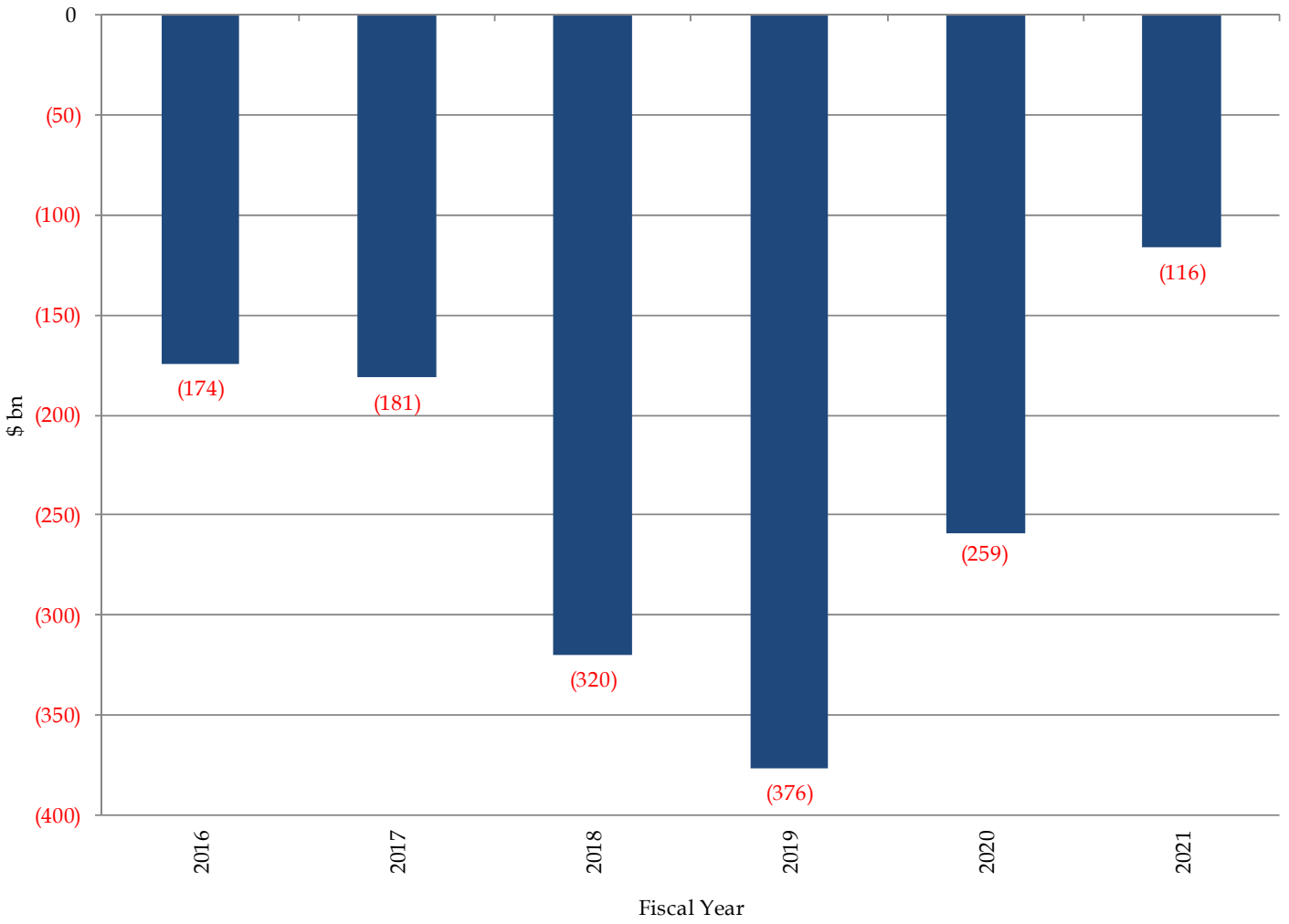
Additional Funding Gap Assuming No SOMA Roll



Historical Net Marketable Borrowing and Projected Net Borrowing Assuming Future Issuance Remains Constant, $ billions

Fiscal Year	Bills	2/3/5	7/10/30	TIPS	FRN	Historical/Projected Net Borrowing Capacity	OMB's FY 2016 Mid-Session Review	CBO's "An Analysis of the President's 2016 Budget"	Primary Dealer Survey
2011	(311)	576	751	88	0	1,104			
2012	139	148	738	90	0	1,115			
2013	(86)	86	720	111	0	830			
2014	(119)	(92)	669	88	123	669			
2015	(53)	(282)	641	88	164	558			
2016	(59)	(173)	442	70	41	322	564	469	563
2017	0	(73)	256	71	(0)	253	568	488	553
2018	0	28	238	66	0	332	610	512	600
2019	0	35	104	68	0	206	659	588	
2020	0	(0)	119	42	0	161	683	646	
2021	0	15	157	18	0	190	729	735	
2022	0	72	231	7	0	309	751	770	
2023	0	43	195	7	0	245	781	798	
2024	0	2	192	6	(0)	200	801	832	
2025	0	(33)	199	(37)	(0)	129	848	865	

*OFP's FY 2015 Net Marketable Borrowing Projection

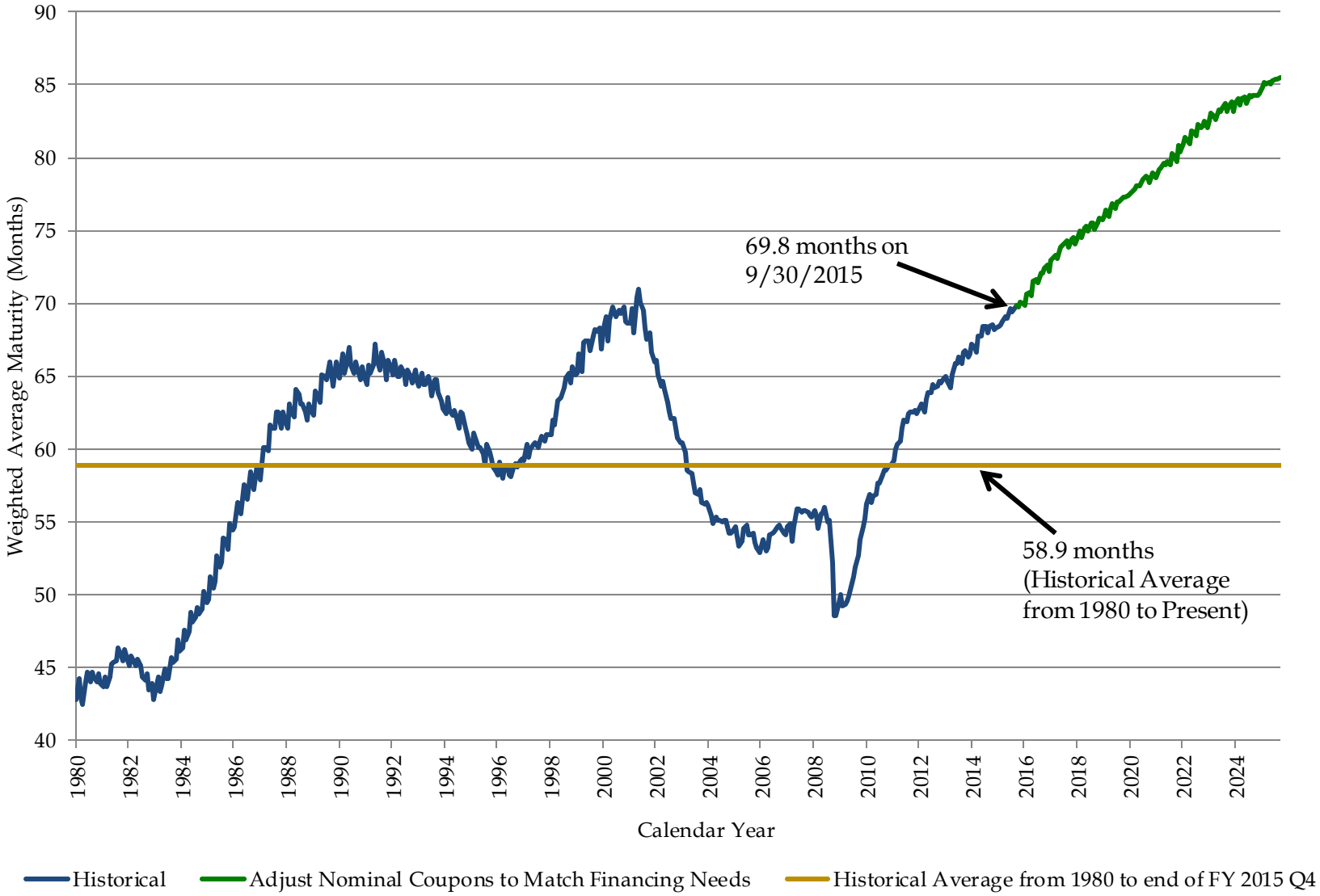
Treasury's primary dealer survey estimates can be found on page 9. OMB's projections of net borrowing from the public are from Table S-11 of the "Fiscal Year 2016 Mid-Session Review." CBO's estimates of the borrowing from the public are from Table 1 and 3 of "An Analysis of the President's 2016 Budget ."

Section IV:
Portfolio Metrics

Assumptions for Portfolio Metrics Section (pages 25 to 30) and Appendix

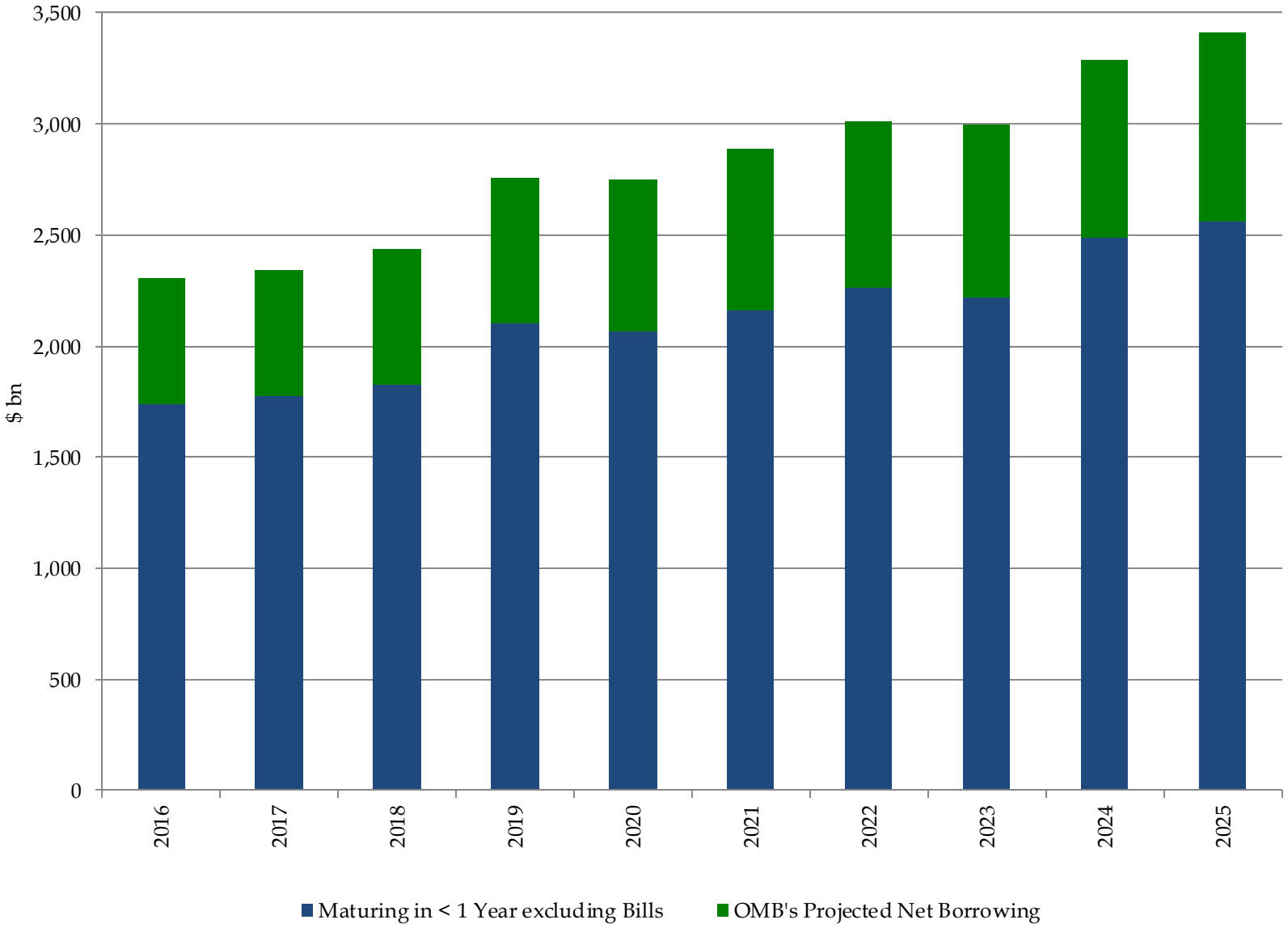
- Portfolio and SOMA holdings as of 9/30/2015.
- SOMA redemptions until and including June 2021. These assumptions are based on Chairman Bernanke's June 2013 press conference.
- To match OMB's projected borrowing from the public for the next 10 years, Nominal Coupon securities (2-, 3-, 5-, 7-, 10-, and 30-year) were adjusted by the same percentage.
- The principal on the TIPS securities was accreted to each projection date based on market ZCIS levels as of 9/30/2015.
- OMB's estimates of borrowing from the public are Table S-11 of the "Fiscal Year 2016 Mid-Session Review."

Weighted Average Maturity of Marketable Debt Outstanding



This scenario does not represent any particular course of action that Treasury is expected to follow. Instead, it is intended to demonstrate the basic trajectory of average maturity absent changes to the mix of securities issued by Treasury.

Projected Gross Borrowing excluding Bills for Fiscal Year



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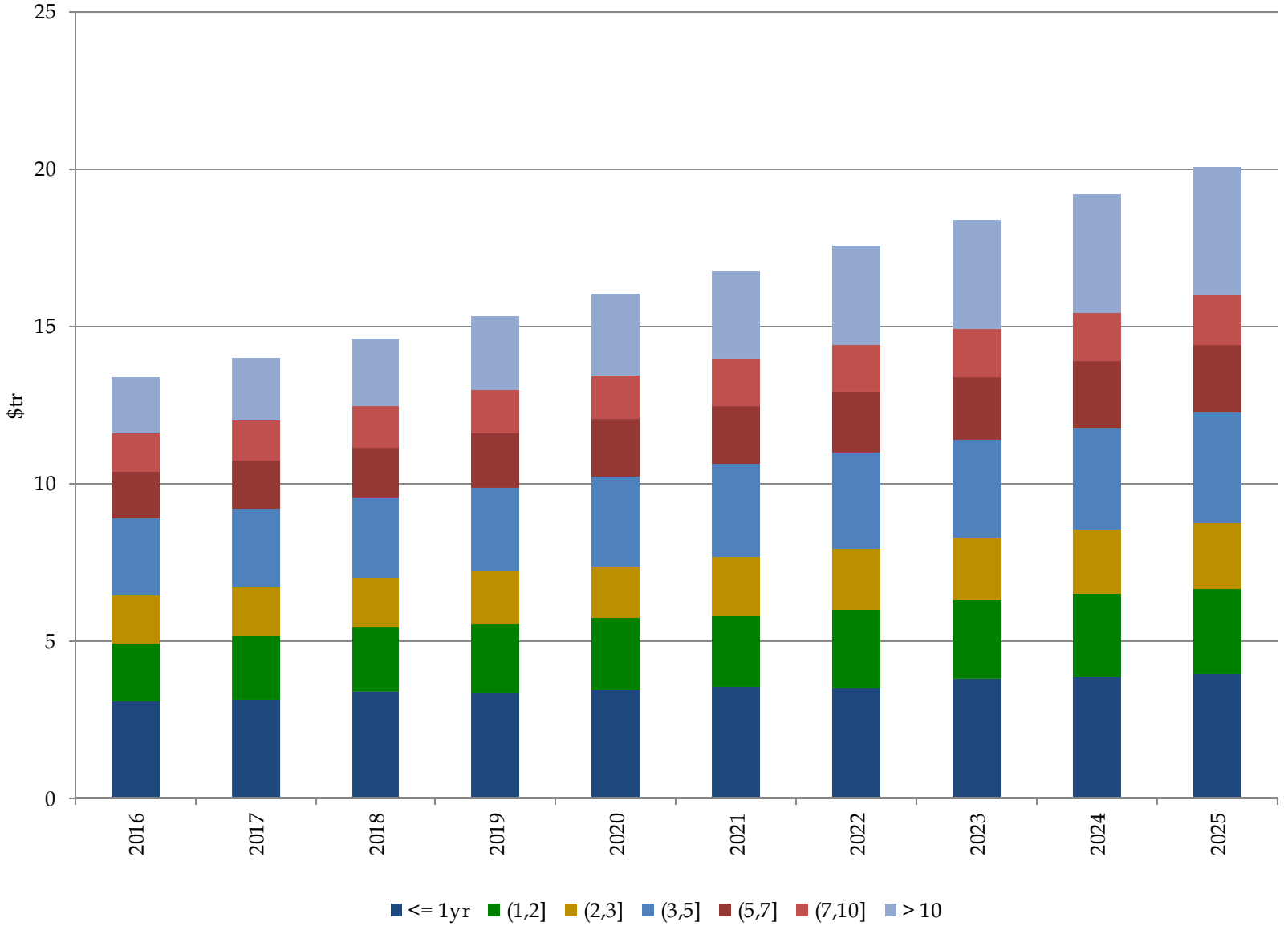
Projected Maturity Profile from end of Fiscal Year



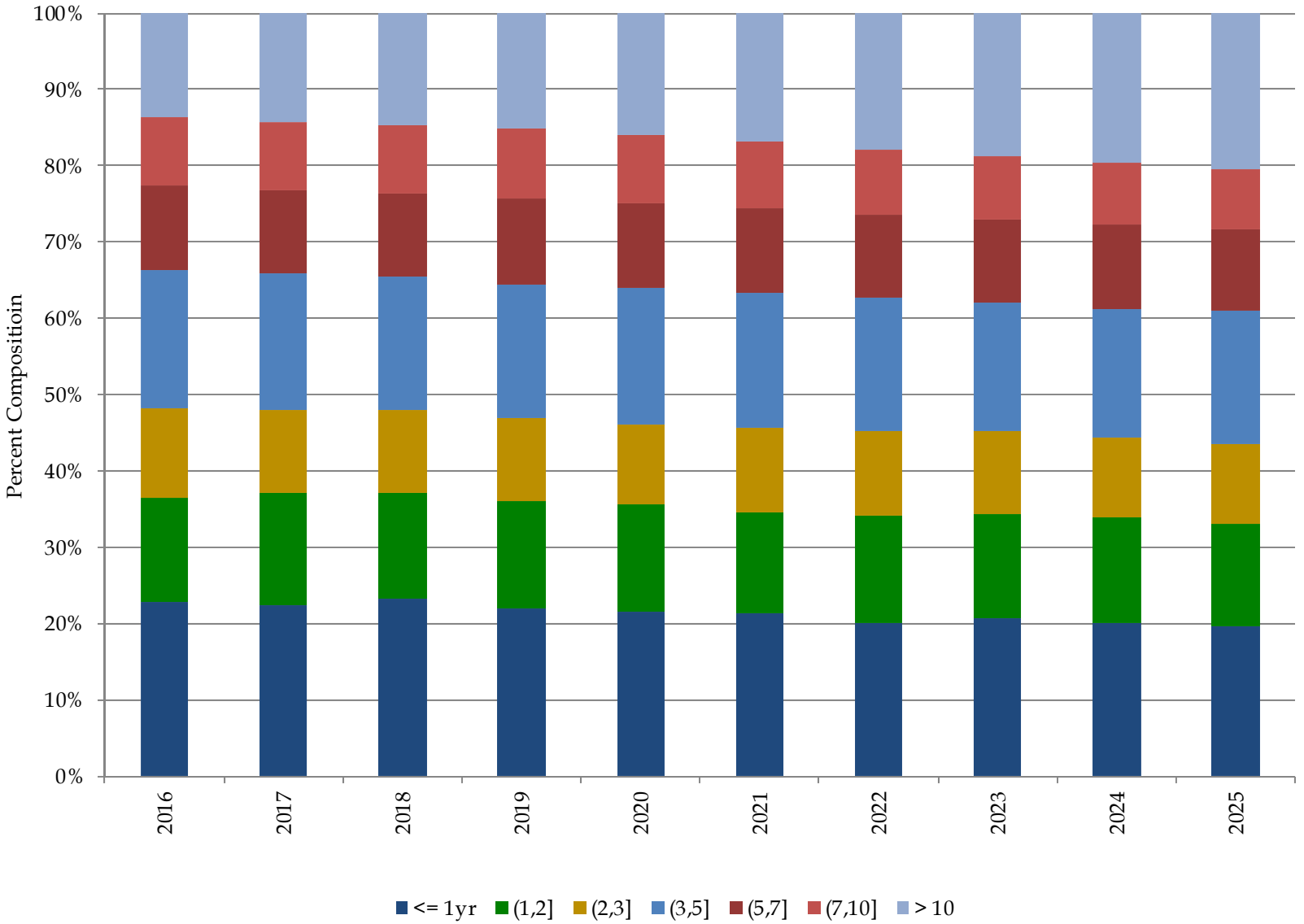
This scenario does not represent any particular course of action that Treasury is expected to follow. Instead, it is intended to demonstrate the basic trajectory of average maturity absent changes to the mix of securities issued by Treasury. See table on following page for details.

Recent and Projected Maturity Profile, $ billions

End of Fiscal Year	<= 1yr	(1,2]	(2,3]	(3,5]	(5,7]	(7,10]	> 10	Total	(0,5]
2008	2,152	711	280	653	310	499	617	5,222	3,796
2009	2,702	774	663	962	559	643	695	6,998	5,101
2010	2,563	1,141	895	1,273	907	856	853	8,488	5,872
2011	2,620	1,334	980	1,541	1,070	1,053	1,017	9,616	6,476
2012	2,951	1,373	1,104	1,811	1,214	1,108	1,181	10,742	7,239
2013	2,939	1,523	1,242	1,965	1,454	1,136	1,331	11,590	7,669
2014	2,935	1,739	1,319	2,207	1,440	1,113	1,528	12,281	8,199
2015	3,097	1,775	1,335	2,382	1,478	1,121	1,654	12,841	8,589
2016	3,074	1,822	1,565	2,421	1,509	1,189	1,825	13,405	8,882
2017	3,123	2,067	1,530	2,494	1,514	1,258	2,004	13,990	9,214
2018	3,398	2,030	1,589	2,545	1,586	1,317	2,155	14,620	9,563
2019	3,364	2,157	1,676	2,674	1,714	1,394	2,324	15,302	9,870
2020	3,458	2,261	1,649	2,864	1,803	1,408	2,567	16,011	10,232
2021	3,562	2,217	1,886	2,960	1,848	1,464	2,831	16,767	10,625
2022	3,519	2,484	1,924	3,066	1,926	1,489	3,141	17,549	10,992
2023	3,786	2,518	2,003	3,097	1,982	1,516	3,460	18,363	11,405
2024	3,861	2,651	2,019	3,243	2,113	1,542	3,771	19,200	11,774
2025	3,954	2,701	2,077	3,514	2,147	1,575	4,119	20,087	12,246

This scenario does not represent any particular course of action that Treasury is expected to follow. Instead, it is intended to demonstrate the basic trajectory of average maturity absent changes to the mix of securities issued by Treasury. Portfolio composition by original issuance type and term can be found in the appendix (Page 43).

Projected Maturity Profile from end of Fiscal Year



This scenario does not represent any particular course of action that Treasury is expected to follow. Instead, it is intended to demonstrate the basic trajectory of average maturity absent changes to the mix of securities issued by Treasury. See table on following page for details.

Recent and Projected Maturity Profile, percent

End of Fiscal Year	<= 1yr	(1,2]	(2,3]	(3,5]	(5,7]	(7,10]	> 10	(0,3]	(0,5]
2008	41.2	13.6	5.4	12.5	5.9	9.6	11.8	60.2	72.7
2009	38.6	11.1	9.5	13.7	8.0	9.2	9.9	59.1	72.9
2010	30.2	13.4	10.5	15.0	10.7	10.1	10.0	54.2	69.2
2011	27.2	13.9	10.2	16.0	11.1	10.9	10.6	51.3	67.3
2012	27.5	12.8	10.3	16.9	11.3	10.3	11.0	50.5	67.4
2013	25.4	13.1	10.7	17.0	12.5	9.8	11.5	49.2	66.2
2014	23.9	14.2	10.7	18.0	11.7	9.1	12.4	48.8	66.8
2015	24.1	13.8	10.4	18.5	11.5	8.7	12.9	48.3	66.9
2016	22.9	13.6	11.7	18.1	11.3	8.9	13.6	48.2	66.3
2017	22.3	14.8	10.9	17.8	10.8	9.0	14.3	48.0	65.9
2018	23.2	13.9	10.9	17.4	10.8	9.0	14.7	48.0	65.4
2019	22.0	14.1	10.9	17.5	11.2	9.1	15.2	47.0	64.5
2020	21.6	14.1	10.3	17.9	11.3	8.8	16.0	46.0	63.9
2021	21.2	13.2	11.2	17.7	11.0	8.7	16.9	45.7	63.4
2022	20.1	14.2	11.0	17.5	11.0	8.5	17.9	45.2	62.6
2023	20.6	13.7	10.9	16.9	10.8	8.3	18.8	45.2	62.1
2024	20.1	13.8	10.5	16.9	11.0	8.0	19.6	44.4	61.3
2025	19.7	13.4	10.3	17.5	10.7	7.8	20.5	43.5	61.0

This scenario does not represent any particular course of action that Treasury is expected to follow. Instead, it is intended to demonstrate the basic trajectory of average maturity absent changes to the mix of securities issued by Treasury. Portfolio composition by original issuance type and term can be found in the appendix (Page 43).

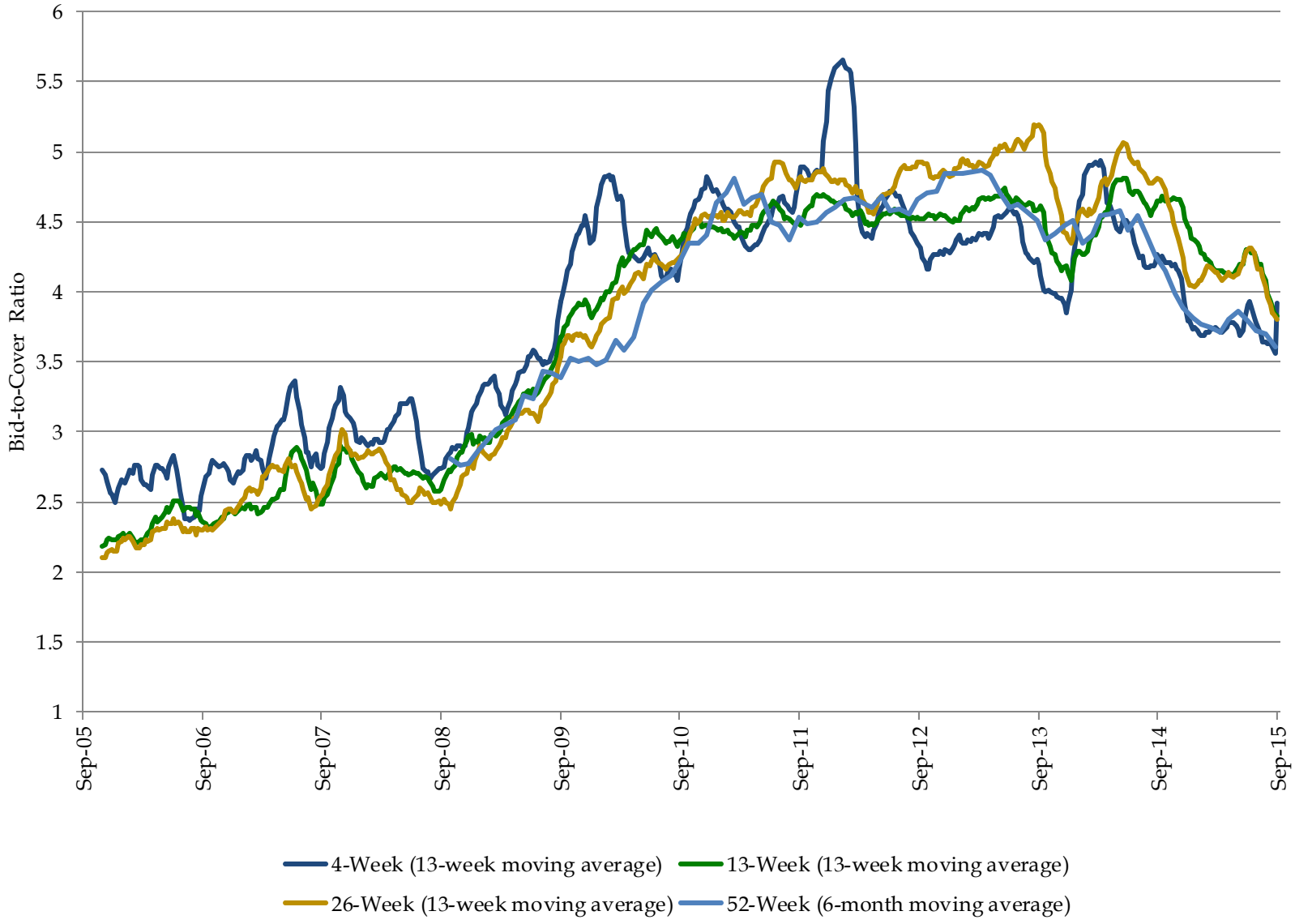
Section V:
Demand

Summary Statistics for Fiscal Year 2015 Q4 Auctions

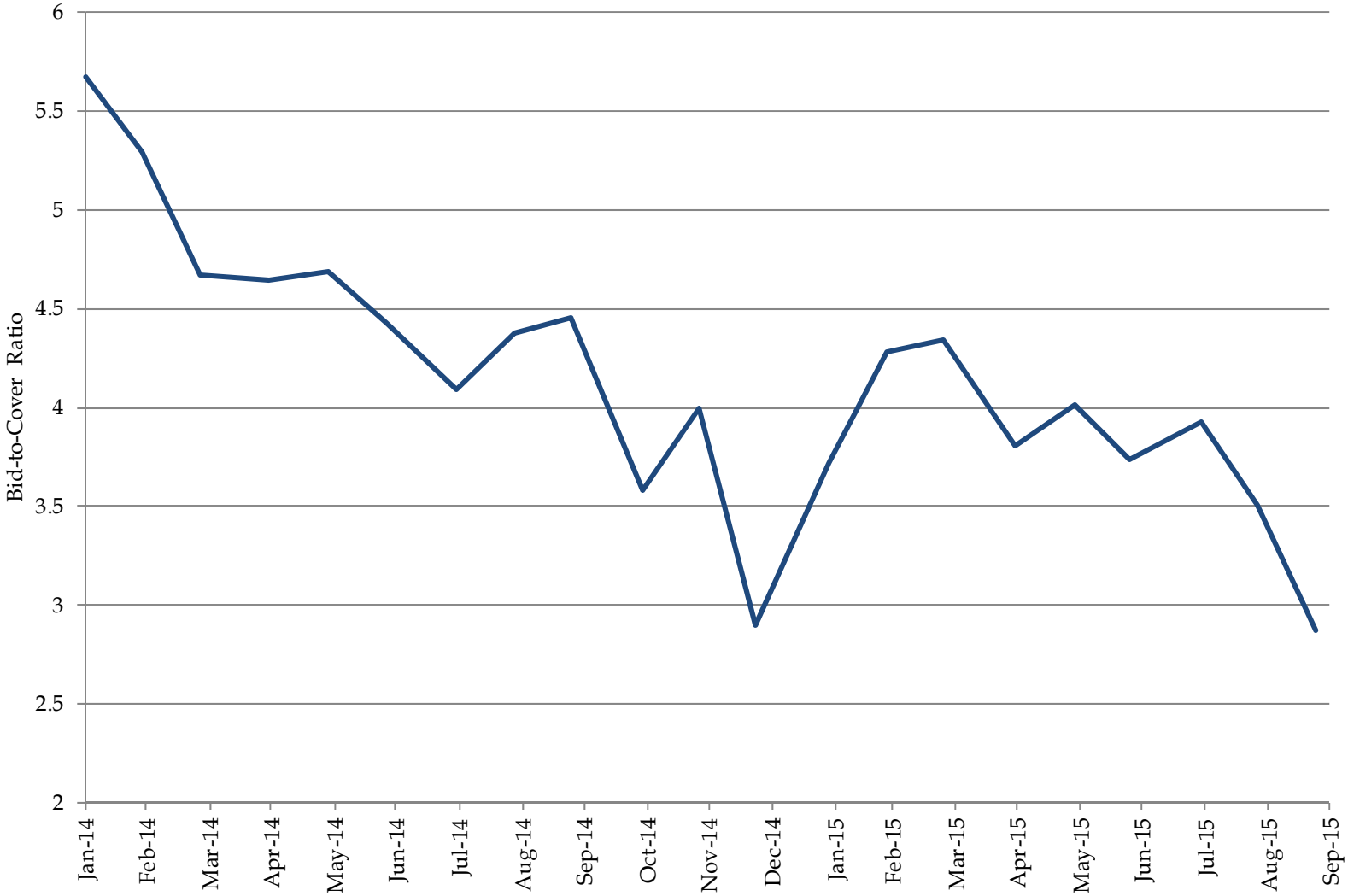
Security Type	Term	Stop Out Rate (%)*	Bid-to-Cover Ratio*	Competitive Awards ($bn)	% Primary Dealer*	% Direct*	% Indirect*	Non-Competitive Awards ($bn)	SOMA Add Ons ($bn)	10-Year Equivalent ($bn)**
Bill	4-Week	0.029	3.8	430.6	72.3	5.1	22.6	3.3	0.0	3.7
Bill	13-Week	0.056	3.8	287.8	67.3	7.5	25.2	4.8	0.0	8.3
Bill	26-Week	0.181	3.8	286.0	53.9	6.0	40.1	4.2	0.0	16.6
Bill	52-Week	0.389	3.5	66.4	62.3	4.1	33.6	0.4	0.0	7.5
Bill	CMBs	0.055	3.4	75.0	70.4	5.8	23.8	0.0	0.0	0.4
Coupon	2-Year	0.684	3.3	77.4	38.0	13.8	48.2	0.4	0.0	17.4
Coupon	3-Year	1.000	3.2	71.7	39.5	10.0	50.5	0.1	0.5	24.2
Coupon	5-Year	1.518	2.5	104.8	33.7	5.9	60.3	0.1	0.0	56.8
Coupon	7-Year	1.921	2.5	87.0	34.1	11.7	54.2	0.0	0.0	64.0
Coupon	10-Year	2.188	2.6	65.9	31.0	10.4	58.7	0.1	0.5	67.2
Coupon	30-Year	2.974	2.3	42.0	35.4	8.6	56.0	0.0	0.3	95.0
TIPS	5-Year	0.305	2.6	16.0	23.1	0.5	76.4	0.0	0.0	8.2
TIPS	10-Year	0.542	2.3	28.0	26.5	4.7	68.8	0.0	0.0	30.7
FRN	2-Year	0.093	3.5	41.0	58.3	1.5	40.3	0.0	0.0	0.0
Total Bills		0.096	3.7	1,145.8	65.8	5.9	28.3	12.7	0.0	36.5
Total Coupons		1.604	2.8	448.6	35.2	10.0	54.8	0.9	1.3	324.6
Total TIPS		0.456	2.4	43.9	25.3	3.2	71.5	0.1	0.0	38.9
Total FRNs		0.093	3.5	41.0	58.3	1.5	40.3	0.0	0.0	0.0

*Weighted averages of Competitive Awards.
**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.

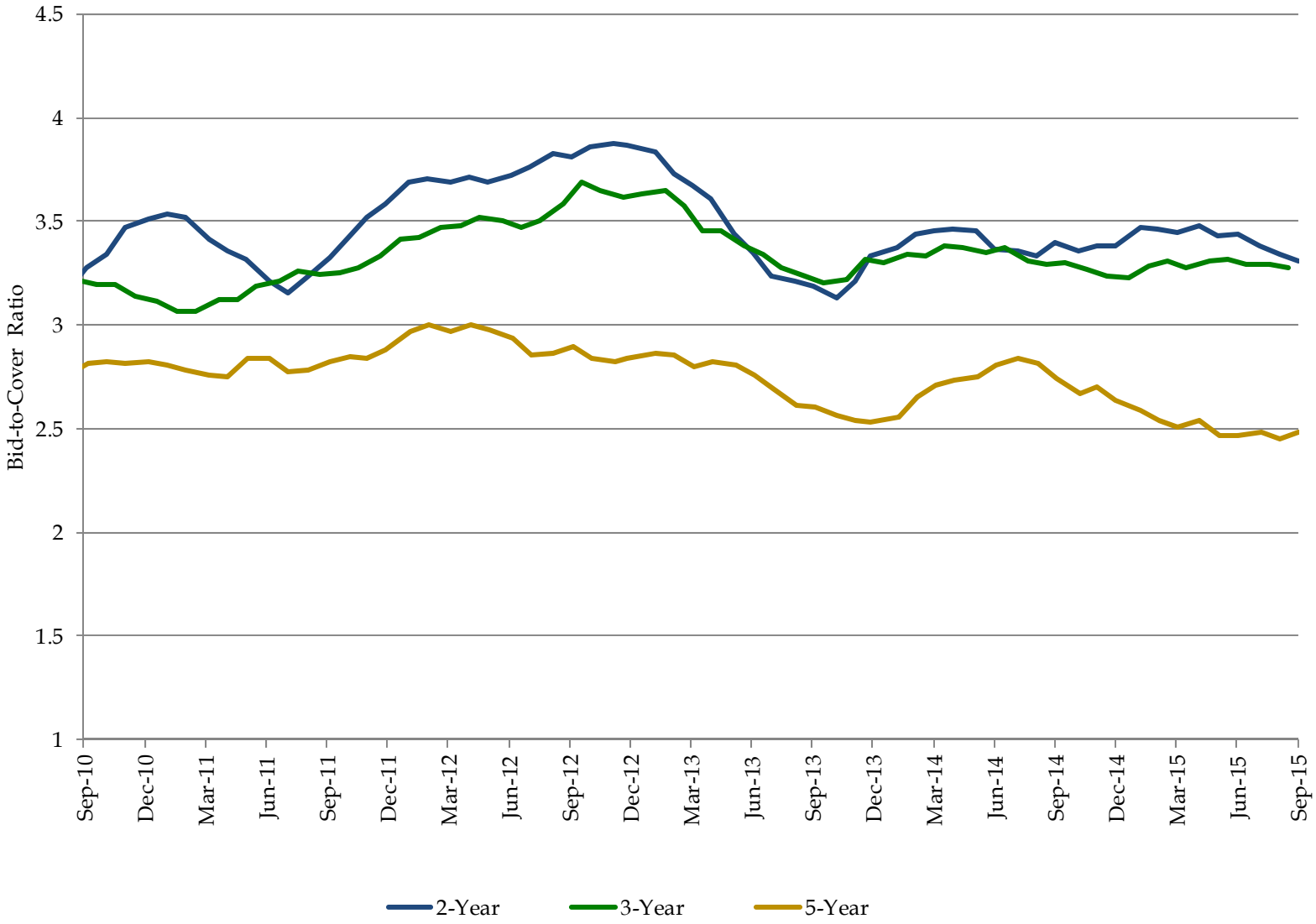
Bid-to-Cover Ratios for Treasury Bills



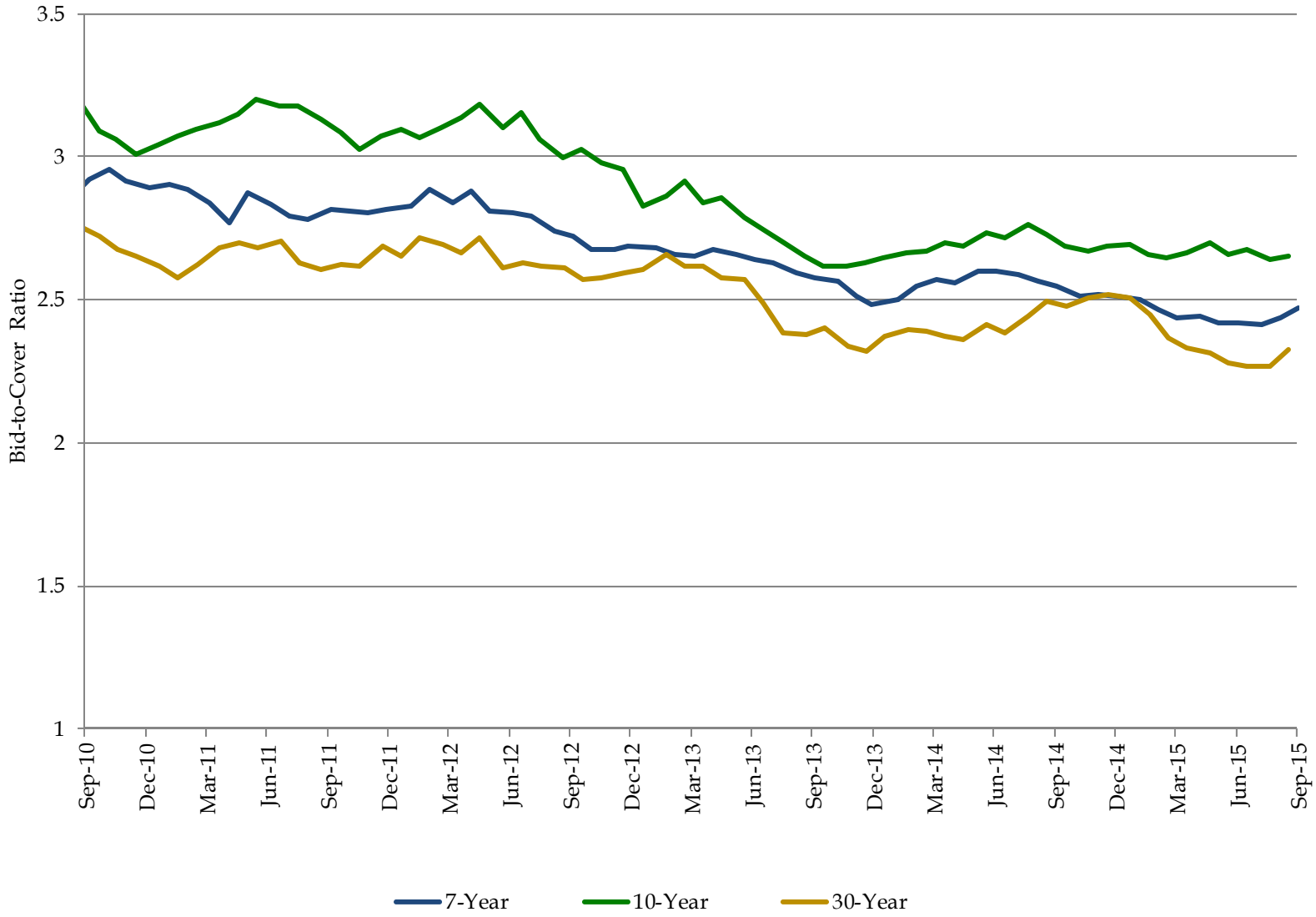
Bid-to-Cover Ratios for FRNs



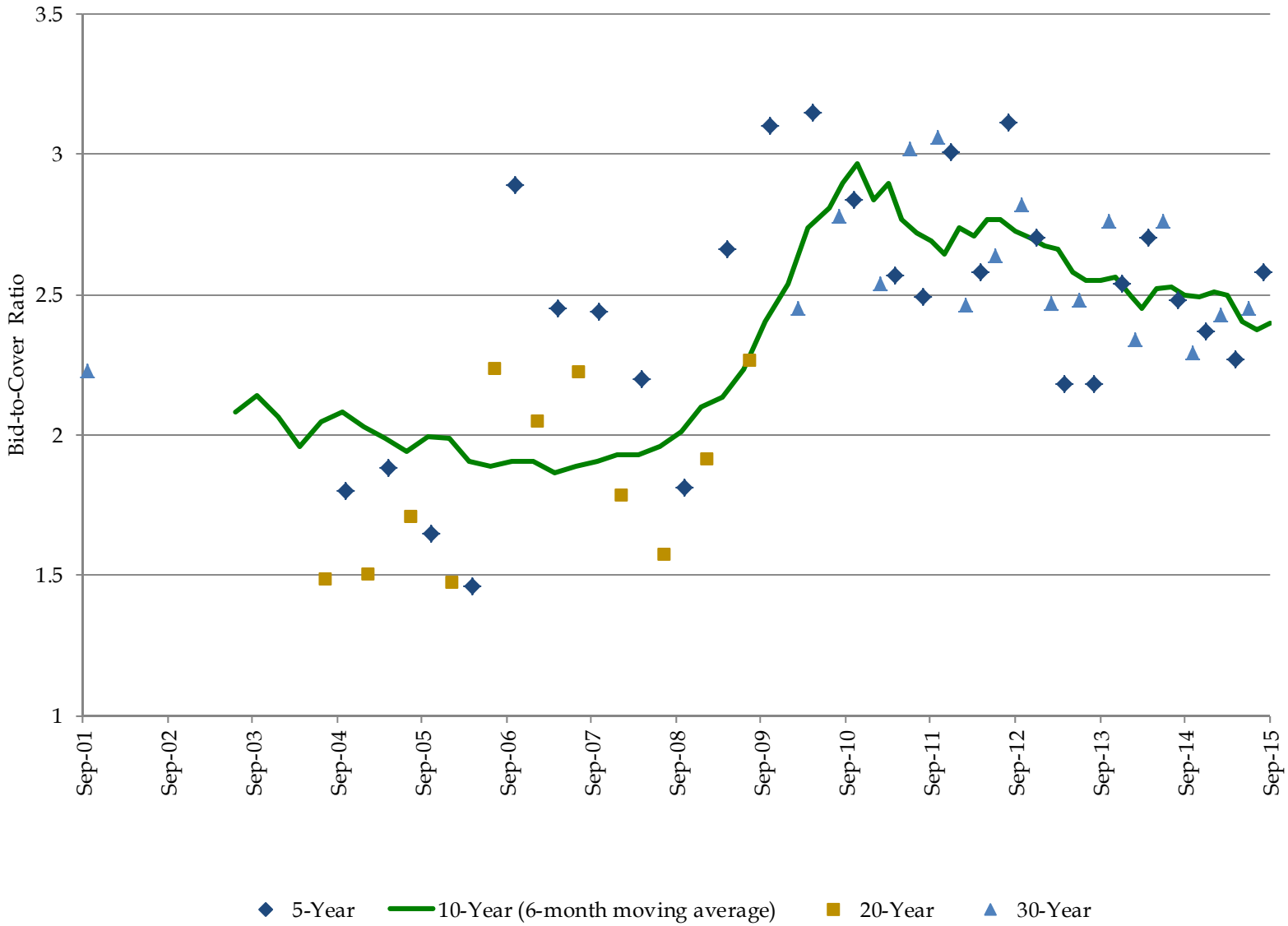
Bid-to-Cover Ratios for 2-, 3-, and 5-Year Nominal Securities (6-Month Moving Average)



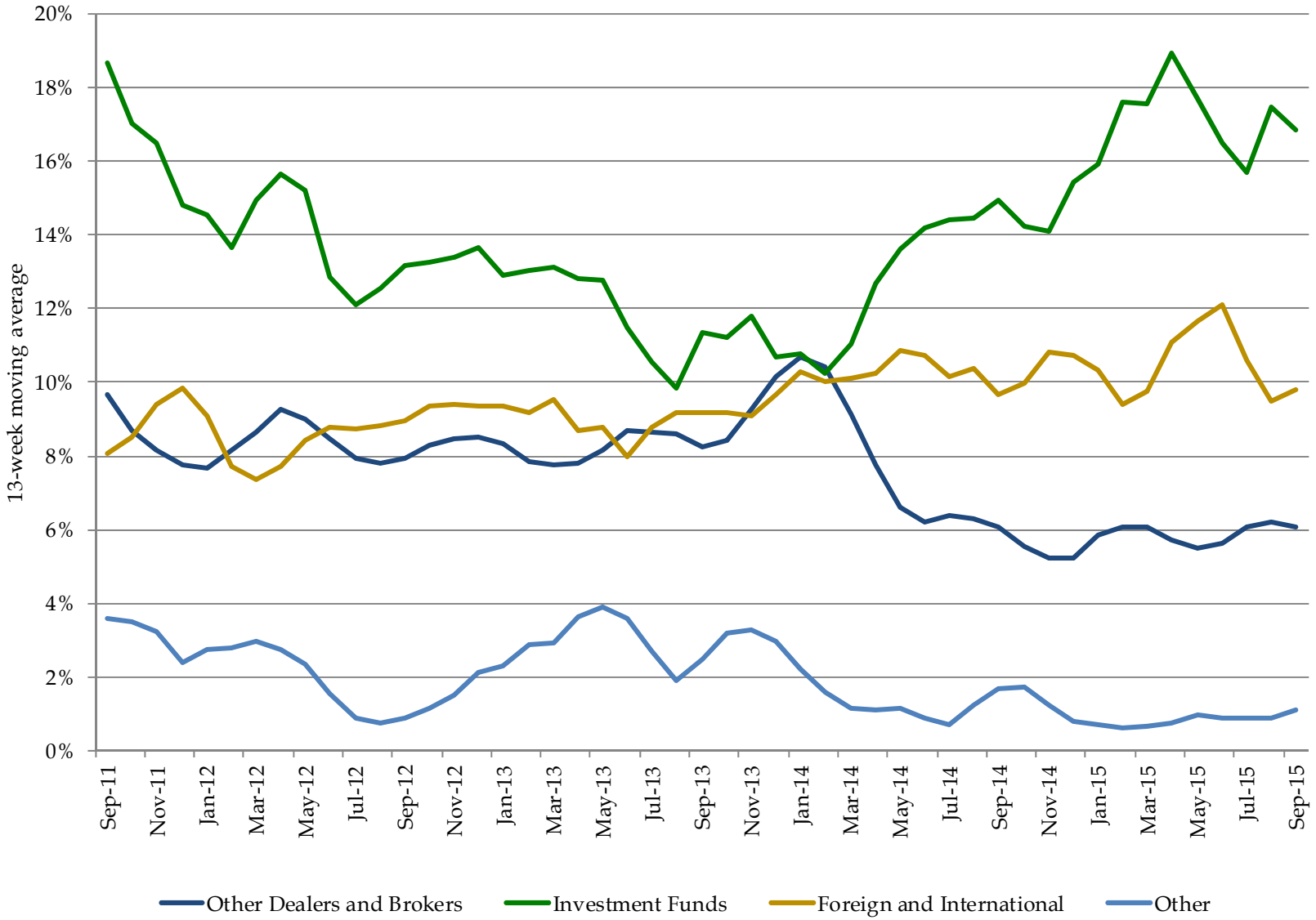
Bid-to-Cover Ratios for 7-, 10-, and 30-Year Nominal Securities (6-Month Moving Average)



Bid-to-Cover Ratios for TIPS

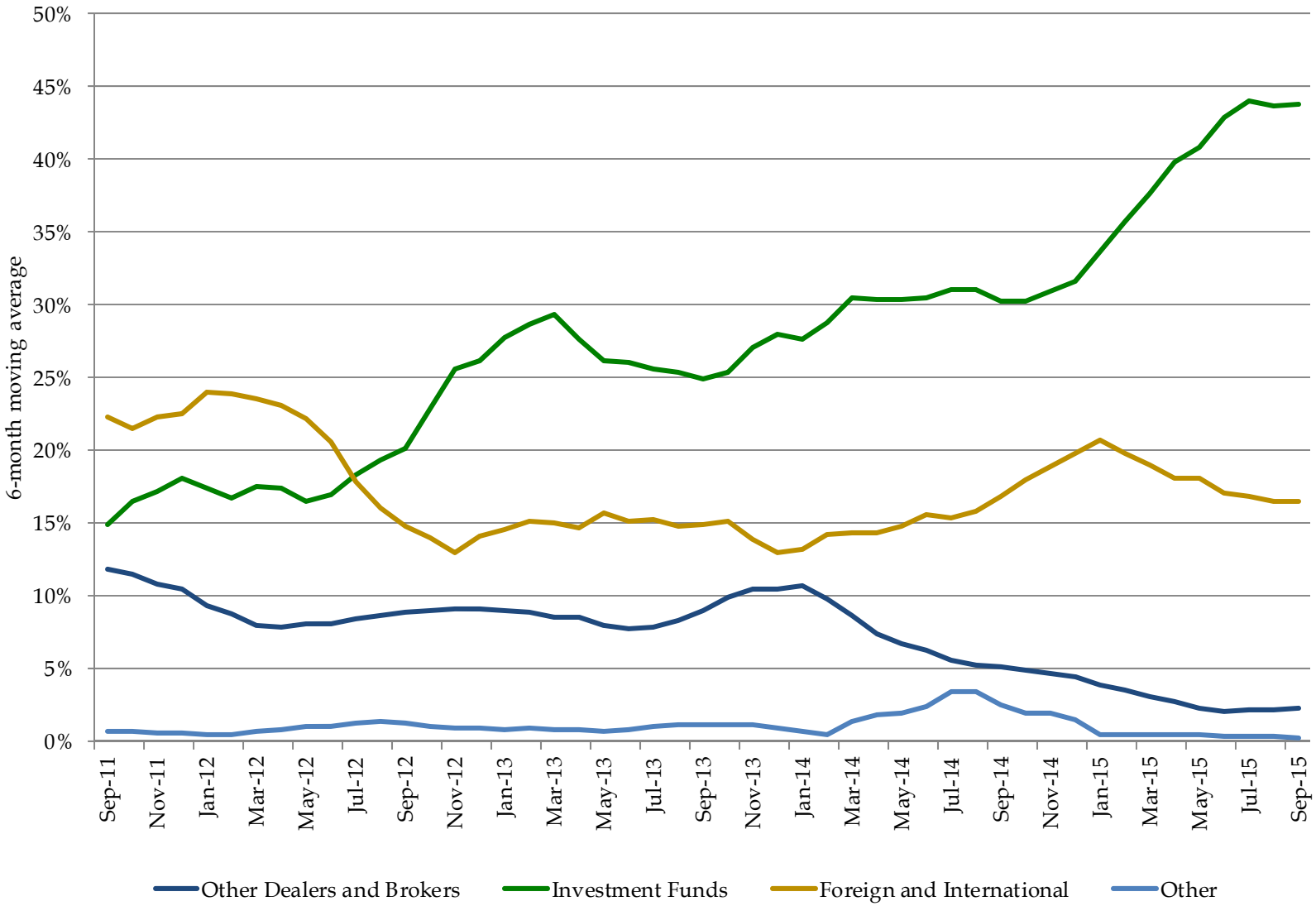


Percent Awarded in Bill Auctions by Investor Class (13-Week Moving Average)



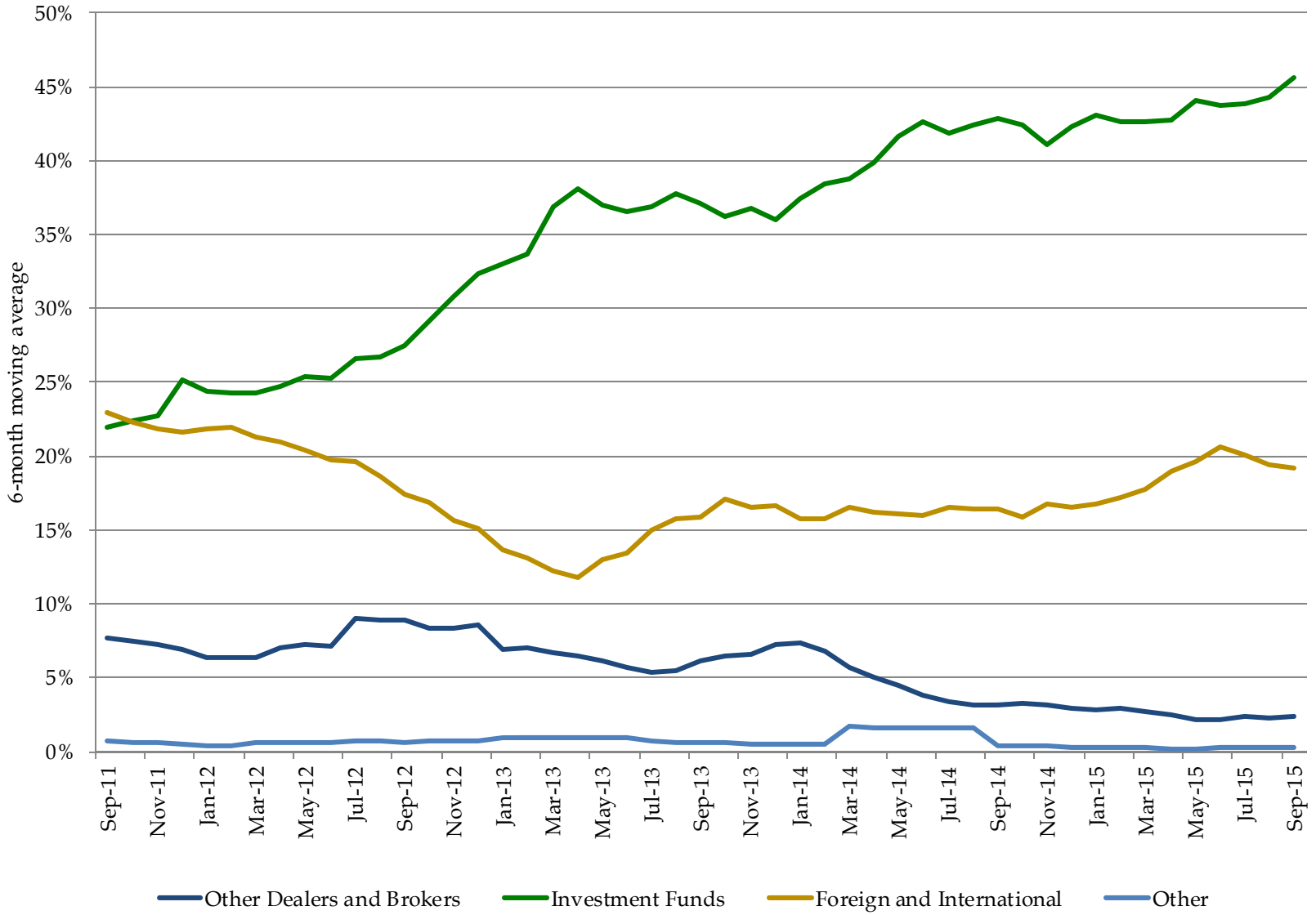
Excludes SOMA add-ons. The "Other" category includes categories that are each less than 2%, which include Depository Institutions, Individuals, Pension and Insurance.

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



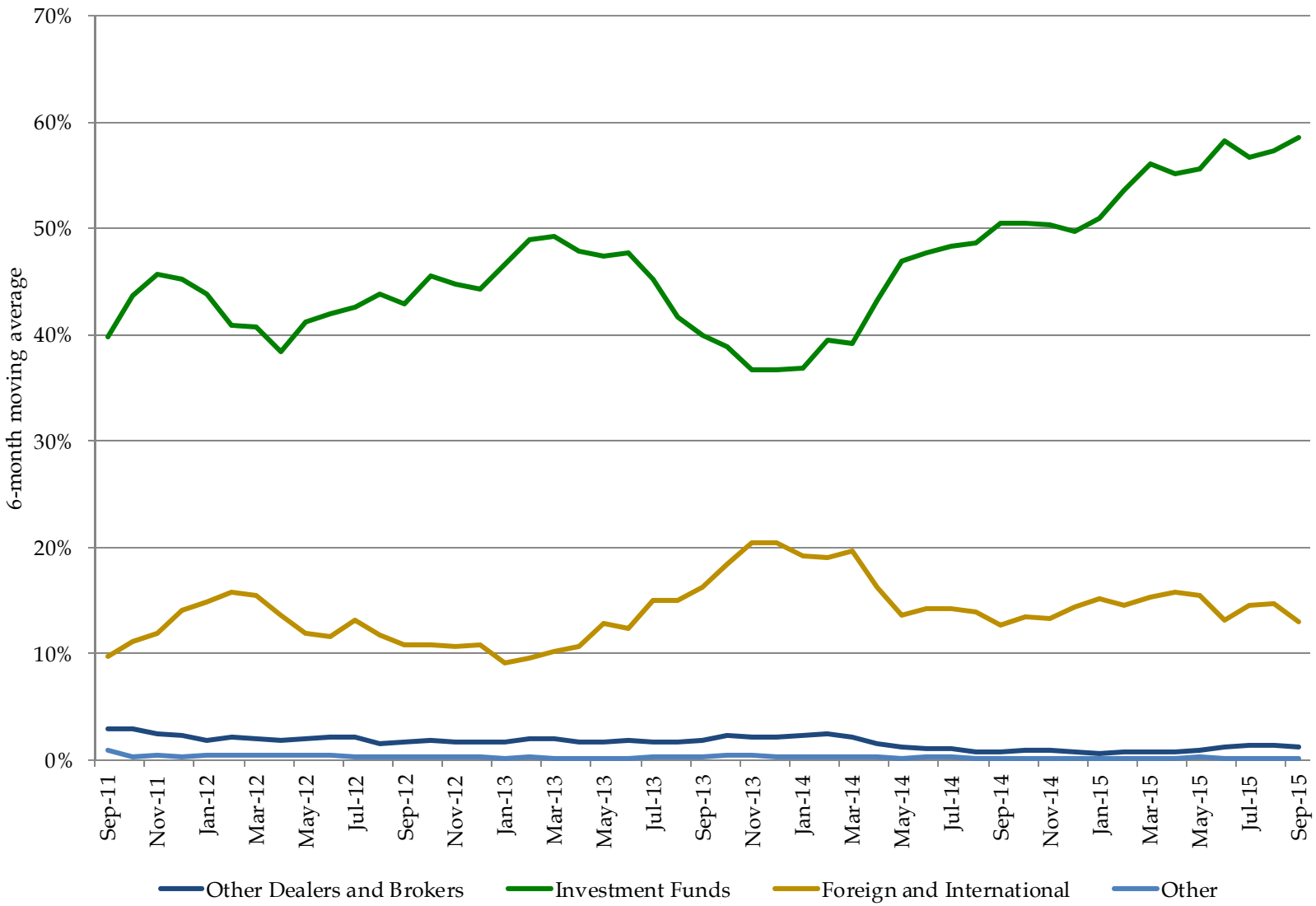
Excludes SOMA add-ons. The "Other" category includes categories that are each less than 2%, which include Depository Institutions, Individuals, Pension and Insurance.

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



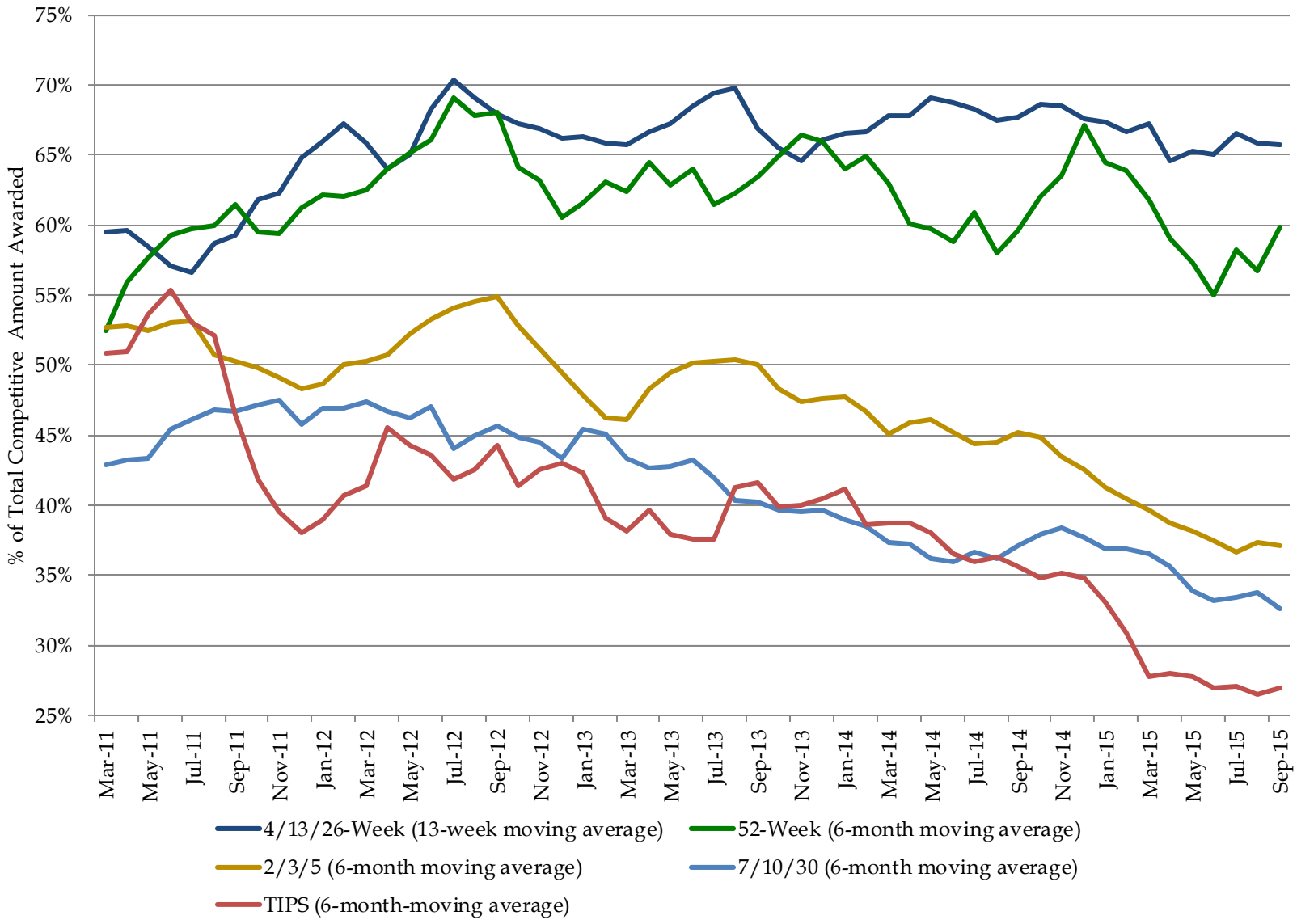
Excludes SOMA add-ons. The "Other" category includes categories that are each less than 2%, which include Depository Institutions, Individuals, Pension and Insurance.

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



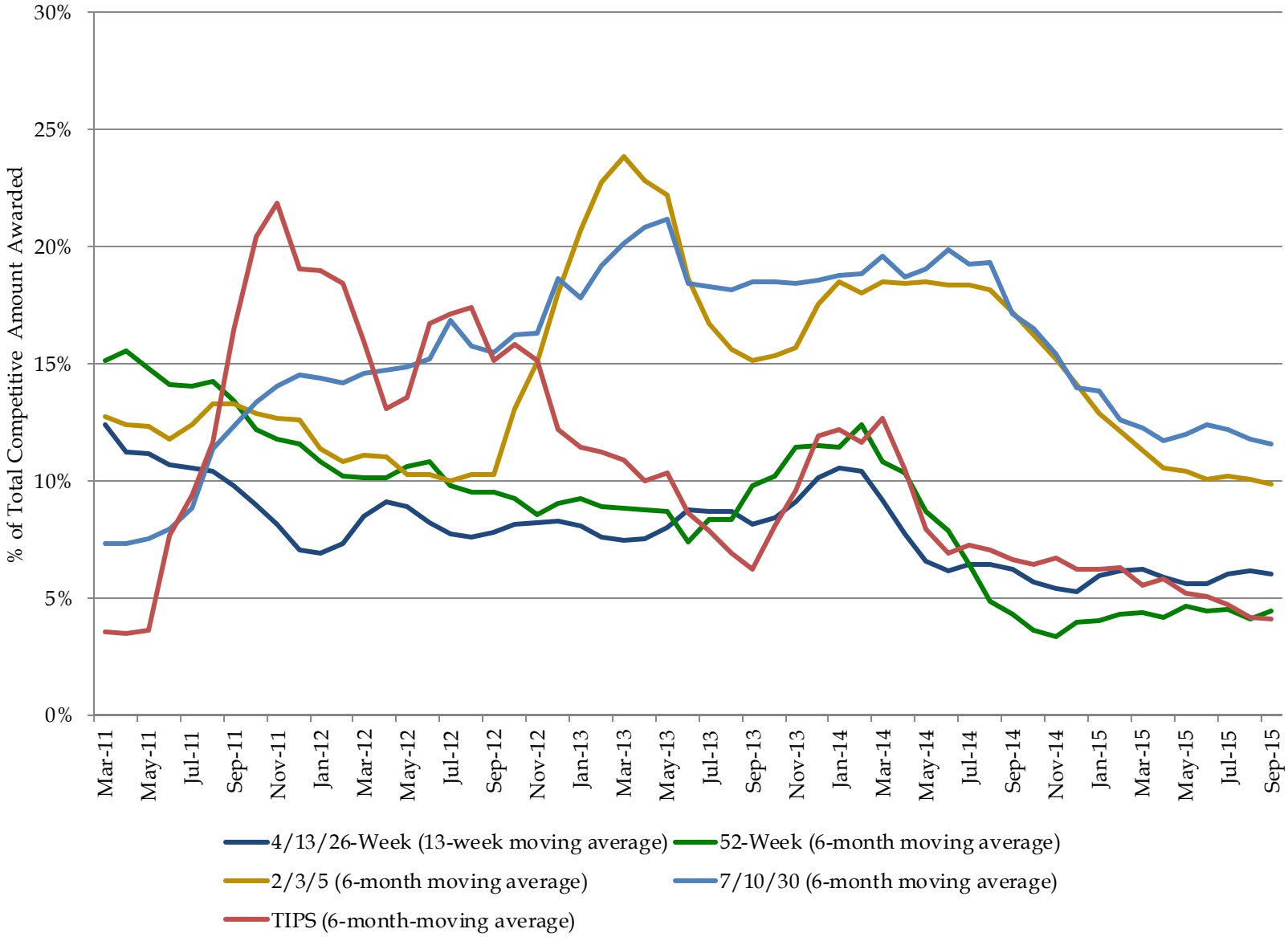
Excludes SOMA add-ons. The "Other" category includes categories that are each less than 2%, which include Depository Institutions, Individuals, Pension and Insurance.

Primary Dealer Awards at Auction



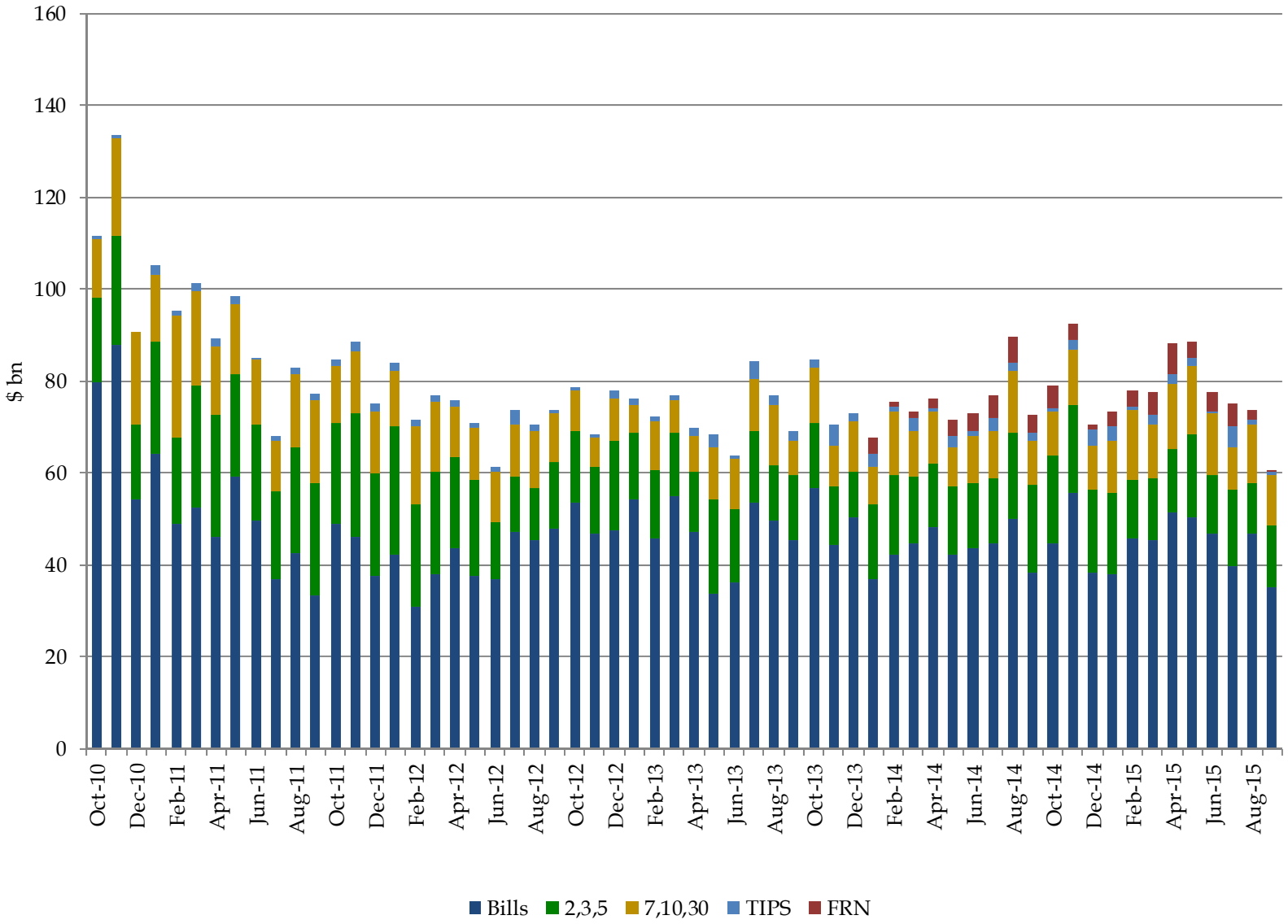
Excludes SOMA add-ons.

Direct Bidder Awards at Auction



Excludes SOMA add-ons.

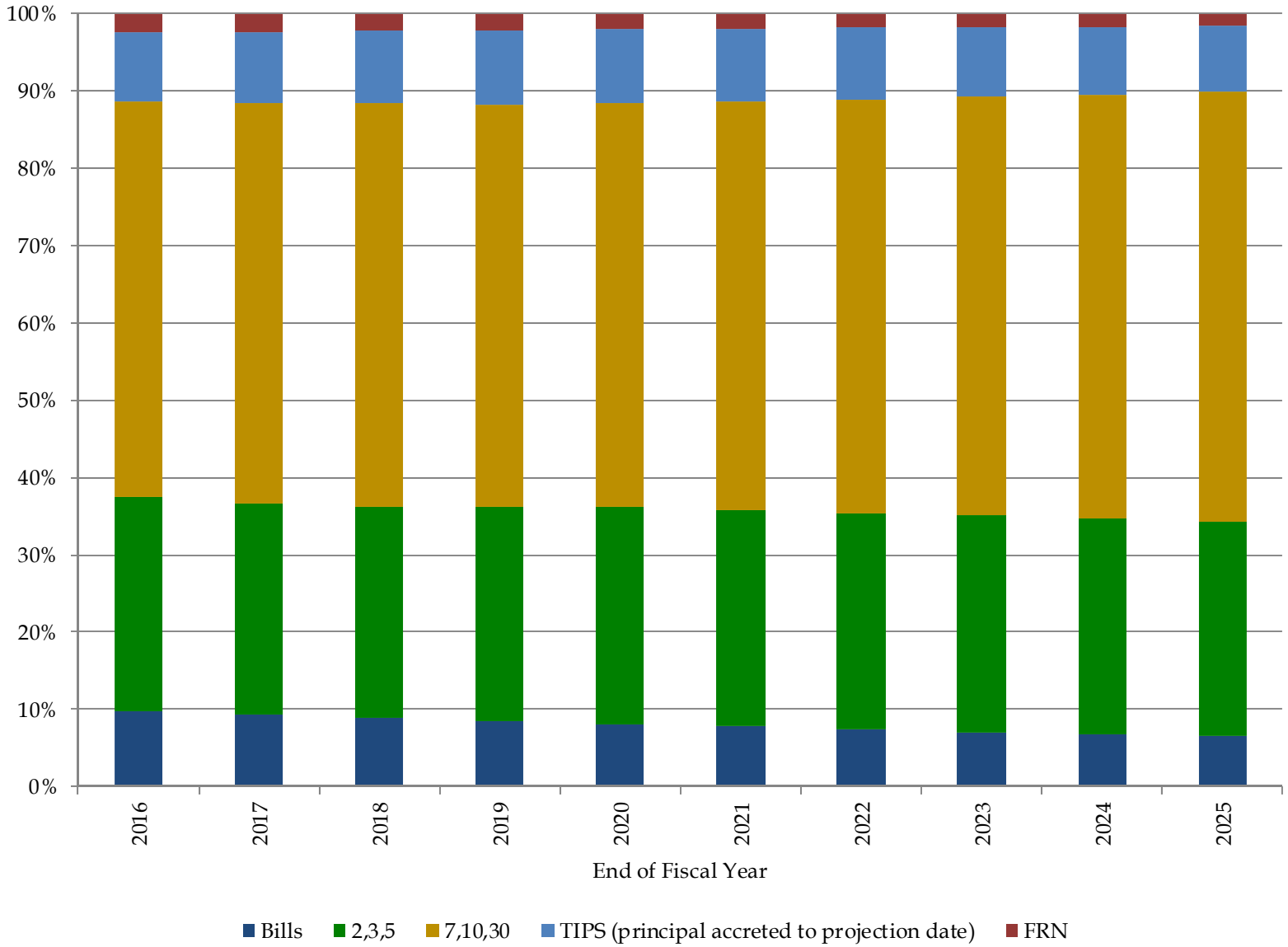
Total Foreign Awards of Treasuries at Auction, $ billions



Foreign includes both private sector and official institutions.

Appendix

Projected Portfolio Composition by Issuance Type



This scenario does not represent any particular course of action that Treasury is expected to follow. Instead, it is intended to demonstrate the basic trajectory of average maturity absent changes to the mix of securities issued by Treasury. See table on following page for details.

Recent and Projected Portfolio Composition by Issuance Type, Percent

End of Fiscal Year	Bills	2-, 3-, 5-Year Nominal Coupons	7-, 10-, 30-Year Nominal Coupons	Total Nominal Coupons	TIPS (principal accreted to projection date)	FRN
2008	28.5	34.5	26.9	61.4	10.0	0.0
2009	28.5	36.2	27.4	63.6	7.9	0.0
2010	21.1	40.1	31.8	71.9	7.0	0.0
2011	15.4	41.4	35.9	77.3	7.3	0.0
2012	15.0	38.4	39.0	77.4	7.5	0.0
2013	13.2	35.8	43.0	78.7	8.1	0.0
2014	11.5	33.0	46.0	79.0	8.5	1.0
2015	10.6	29.4	49.0	78.3	8.8	2.2
2016	9.7	27.8	51.0	78.9	9.0	2.4
2017	9.3	27.4	51.7	79.1	9.2	2.3
2018	8.9	27.3	52.1	79.4	9.4	2.2
2019	8.5	27.7	52.0	79.8	9.6	2.1
2020	8.1	28.0	52.2	80.2	9.6	2.0
2021	7.7	28.1	52.8	80.9	9.4	2.0
2022	7.4	28.0	53.5	81.5	9.2	1.9
2023	7.1	28.0	54.1	82.1	9.0	1.8
2024	6.8	27.9	54.8	82.7	8.9	1.7
2025	6.5	27.7	55.7	83.4	8.5	1.6

This scenario does not represent any particular course of action that Treasury is expected to follow. Instead, it is intended to demonstrate the basic trajectory of average maturity absent changes to the mix of securities issued by Treasury.

Bills										
Issue	Settle Date	Stop Out Rate (%)*	Bid-to-Cover Ratio*	Competitive Awards ($bn)	% Primary Dealer*	% Direct*	% Indirect*	Non-Competitive Awards ($bn)	SOMA Add Ons ($bn)	10-Year Equivalent ($bn)*
4-Week	7/9/2015	0.015	3.39	39.7	64.0	6.5	29.5	0.3	0.0	0.3
4-Week	7/16/2015	0.020	2.98	44.7	77.6	6.7	15.7	0.3	0.0	0.4
4-Week	7/23/2015	0.035	3.52	39.7	70.8	6.9	22.2	0.3	0.0	0.3
4-Week	7/30/2015	0.050	3.47	39.3	67.4	7.2	25.4	0.3	0.0	0.3
4-Week	8/6/2015	0.050	3.62	39.7	73.3	2.7	24.0	0.3	0.0	0.3
4-Week	8/13/2015	0.050	3.13	39.7	72.4	5.5	22.1	0.3	0.0	0.3
4-Week	8/20/2015	0.040	3.34	39.7	70.7	3.7	25.6	0.3	0.0	0.3
4-Week	8/27/2015	0.045	3.27	39.0	69.9	3.7	26.3	0.3	0.0	0.3
4-Week	9/3/2015	0.000	3.48	34.7	88.1	3.0	8.9	0.3	0.0	0.3
4-Week	9/10/2015	0.005	3.55	29.7	82.5	2.8	14.7	0.3	0.0	0.3
4-Week	9/17/2015	0.000	4.07	19.8	73.2	2.6	24.2	0.2	0.0	0.2
4-Week	9/24/2015	0.000	9.47	14.7	59.3	10.2	30.5	0.3	0.0	0.1
4-Week	10/1/2015	0.000	10.72	9.8	50.7	6.7	42.7	0.2	0.0	0.1
13-Week	7/9/2015	0.015	3.82	23.5	80.5	9.1	10.4	0.4	0.0	0.7
13-Week	7/16/2015	0.015	4.07	23.4	62.1	12.6	25.3	0.4	0.0	0.7
13-Week	7/23/2015	0.030	3.83	23.6	69.9	7.0	23.0	0.4	0.0	0.7
13-Week	7/30/2015	0.050	3.68	22.7	72.6	9.7	17.7	0.4	0.0	0.7
13-Week	8/6/2015	0.075	4.09	23.5	62.7	2.7	34.7	0.3	0.0	0.7
13-Week	8/13/2015	0.125	3.64	23.5	54.7	4.8	40.5	0.4	0.0	0.7
13-Week	8/20/2015	0.105	3.81	23.5	50.7	11.5	37.9	0.4	0.0	0.7
13-Week	8/27/2015	0.050	3.49	22.9	86.2	8.3	5.4	0.4	0.0	0.7
13-Week	9/3/2015	0.095	3.71	23.5	61.5	7.4	31.2	0.3	0.0	0.7
13-Week	9/10/2015	0.075	3.89	21.6	62.7	8.1	29.2	0.4	0.0	0.6
13-Week	9/17/2015	0.055	3.84	19.5	74.9	5.8	19.2	0.4	0.0	0.6
13-Week	9/24/2015	0.005	3.95	19.5	80.2	6.0	13.8	0.4	0.0	0.6
13-Week	10/1/2015	0.015	3.83	16.8	56.8	3.0	40.3	0.4	0.0	0.5
26-Week	7/9/2015	0.085	4.03	23.4	46.4	11.0	42.7	0.3	0.0	1.3
26-Week	7/16/2015	0.100	3.89	23.5	61.7	4.9	33.5	0.4	0.0	1.4
26-Week	7/23/2015	0.135	3.67	23.3	62.5	2.7	34.8	0.4	0.0	1.4
26-Week	7/30/2015	0.145	3.99	22.7	48.1	4.4	47.5	0.3	0.0	1.4
26-Week	8/6/2015	0.165	3.89	23.2	60.5	7.9	31.6	0.3	0.0	1.4
26-Week	8/13/2015	0.245	3.52	23.0	58.1	3.3	38.6	0.4	0.0	1.4
26-Week	8/20/2015	0.245	3.69	23.2	46.2	4.6	49.2	0.4	0.0	1.3
26-Week	8/27/2015	0.200	3.51	23.0	62.8	5.4	31.8	0.3	0.0	1.3
26-Week	9/3/2015	0.270	3.74	23.5	57.4	6.7	35.9	0.3	0.0	1.3
26-Week	9/10/2015	0.275	3.82	21.4	42.0	5.5	52.5	0.3	0.0	1.2
26-Week	9/17/2015	0.260	3.99	19.5	48.2	2.3	49.5	0.3	0.0	1.1
26-Week	9/24/2015	0.115	3.86	19.4	58.8	14.4	26.8	0.3	0.0	1.1
26-Week	10/1/2015	0.105	3.64	17.0	44.2	5.7	50.0	0.3	0.0	1.0
52-Week	7/23/2015	0.330	3.37	24.8	71.4	4.5	24.1	0.1	0.0	2.8
52-Week	8/20/2015	0.410	3.80	21.9	47.2	1.8	50.9	0.1	0.0	2.4
52-Week	9/17/2015	0.440	3.17	19.8	67.7	5.9	26.4	0.1	0.0	2.2
CMBs	8/12/2015	0.075	3.44	25.0	61.5	6.0	32.5	0.0	0.0	0.1
CMBs	9/1/2015	0.075	3.68	25.0	56.0	7.6	36.4	0.0	0.0	0.1
CMBs	9/10/2015	0.015	3.18	25.0	93.7	3.8	2.5	0.0	0.0	0.2

*Weighted averages of Competitive Awards.
**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	7/31/2015	0.690	3.42	25.7	27.8	17.9	54.4	0.2	0.0	5.9
2-Year	8/31/2015	0.663	3.16	25.8	42.6	10.3	47.1	0.1	0.0	5.7
2-Year	9/30/2015	0.699	3.27	25.9	43.5	13.3	43.2	0.1	0.0	5.8
3-Year	7/15/2015	0.932	3.16	23.9	38.4	13.9	47.7	0.0	0.0	8.0
3-Year	8/17/2015	1.013	3.34	23.8	39.0	8.2	52.8	0.1	0.5	8.3
3-Year	9/15/2015	1.056	3.23	24.0	41.0	8.0	51.0	0.0	0.0	7.9
5-Year	7/31/2015	1.625	2.58	34.9	27.2	5.3	67.5	0.0	0.0	19.1
5-Year	8/31/2015	1.463	2.34	35.0	42.5	7.5	50.1	0.0	0.0	18.8
5-Year	9/30/2015	1.467	2.57	35.0	31.5	5.0	63.5	0.0	0.0	18.9
7-Year	7/31/2015	2.021	2.47	29.0	38.8	12.0	49.1	0.0	0.0	21.5
7-Year	8/31/2015	1.930	2.53	29.0	35.0	14.2	50.8	0.0	0.0	21.1
7-Year	9/30/2015	1.813	2.51	29.0	28.5	8.9	62.6	0.0	0.0	21.4
10-Year	7/15/2015	2.225	2.72	21.0	29.8	12.1	58.1	0.0	0.0	20.9
10-Year	8/17/2015	2.115	2.40	24.0	34.0	5.8	60.1	0.0	0.5	25.3
10-Year	9/15/2015	2.235	2.70	21.0	28.7	13.8	57.5	0.0	0.0	21.0
30-Year	7/15/2015	3.084	2.23	13.0	40.8	8.1	51.1	0.0	0.0	28.7
30-Year	8/17/2015	2.880	2.26	16.0	38.2	9.9	51.9	0.0	0.3	37.4
30-Year	9/15/2015	2.980	2.54	13.0	26.6	7.4	66.0	0.0	0.0	28.8
2-Year FRN	7/31/2015	0.077	3.93	15.0	45.1	1.7	53.3	0.0	0.0	0.0
2-Year FRN	8/28/2015	0.086	3.50	13.0	56.5	0.0	43.5	0.0	0.0	0.0
2-Year FRN	9/25/2015	0.120	2.87	13.0	75.3	2.7	22.0	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	8/31/2015	0.305	2.58	16.0	23.1	0.5	76.4	0.0	0.0	8.2
10-Year TIPS	7/31/2015	0.491	2.31	15.0	27.0	8.1	64.8	0.0	0.0	16.7
10-Year TIPS	9/30/2015	0.600	2.36	13.0	26.0	0.8	73.3	0.0	0.0	14.0

*Weighted averages of Competitive Awards.
**Approximated using prices at settlement and includes both Competitive and Non-Competitive Awards. For TIPS' 10-Year Equivalent, a constant auction BEI is used as the inflation assumption.

Office of Debt Management

Initial Assessment of Potential 2-Month Treasury Bill Program

November 3, 2015

Review

- *May 2015 Quarterly Refunding Statement:*
  - "Treasury believes that it is prudent to increase the level of Treasury bills outstanding … This increase in issuance will help to achieve our objective of lowest cost of funding over time and will enhance market functioning and liquidity."

- *May 2015 Minutes of the Treasury Borrowing Advisory Committee (TBAC):*
  - "The Committee suggested that Treasury focus this additional bill issuance in one- and three-month securities, and study **the potential for a two-month bill auction program**."

- *Primary Dealer Auction Size Survey (October 26, 2015): Scope for Increasing Supply*
  - By focusing additional bill issuance in one- and three-month tenors, auction sizes could soon surpass dealer-recommended maximums - if there are no additions to the current suite of securities.

Tranche	Maximum auction size that could be issued without causing significant yield deviations from fair value ($bil)	
	Mean	Std.
Bills		
1-month	51	3.5
3-month	38	3.8
6-month	37	3.1
1-year	30	2.2

Increasing Demand for Treasury Bills

- Elevated demand for high-quality liquid assets is a well-documented phenomena that existed well before the financial crisis and regulatory response (Stein et al 2011).

- As discussed during the May 2015 TBAC meeting, there is a variety of changes that have already increased, and are expected to further increase, demand for Treasury bills, including:[1]
  - Market participants expect money fund reform to result in a significant reallocation of assets from prime to government-only funds.
  - New regulations have increased the costs for banks to fund with "non-operational" deposits. Accordingly, expectations are that at least a portion of these deposits may transition to government-only money market funds (MMFs) as a substitute.
  - Bank liquidity rules have encouraged an increased demand for high-quality liquid assets (HQLA) and a reduction of shorter-term or less stable funding sources.
  - Leverage ratios have also encouraged banks to reduce capital-intensive, low-return businesses such as repo (an imperfect Treasury bill substitute).
  - Under new derivatives margin requirements being implemented pursuant to Dodd-Frank, Treasury bills as collateral have a favorable haircut treatment.

[1] Source: May 2015 TBAC Presentation

Money Market Mutual Funds (MMFs)

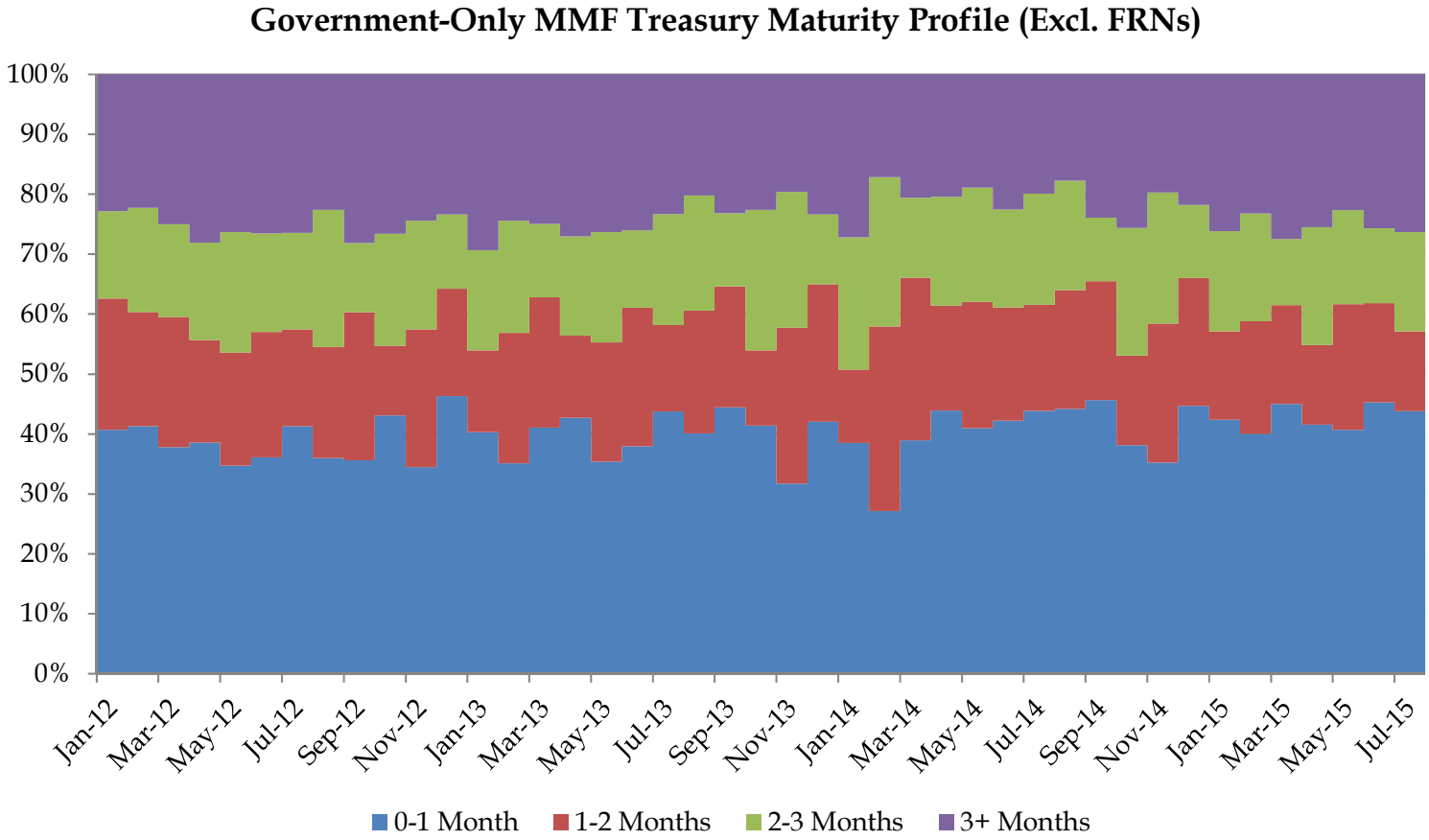
- Market participants expect inflows into government-only MMFs could total upwards of $1 trillion over the coming year. If portfolio allocations were to remain consistent, incremental demand for Treasury bills from MMFs could conceivably rise by $200 billion over the same time frame.

- MMFs tend to invest predominantly in short-maturity Treasury securities because of regulatory constraints that include:
  - The maximum weighted-average maturity (WAM) permissible for MMF portfolios is 60 days.
    - Note: In these calculations, the Treasury FRN is deemed to have a remaining maturity of one day.
  - The maximum weighted-average life (WAL) permissible for MMF portfolios is 120 days.
    - Note: Conversely, the actual maturity date of a Treasury FRN is incorporated into WAL.
  - 10 percent of assets must offer daily liquidity, for which Treasury securities qualify, and 30 percent of assets must offer weekly liquidity.

- Accordingly, expectations are that the majority of this additional demand will be focused in tenors of three months or fewer.

Money Market Mutual Funds (MMFs), cont.

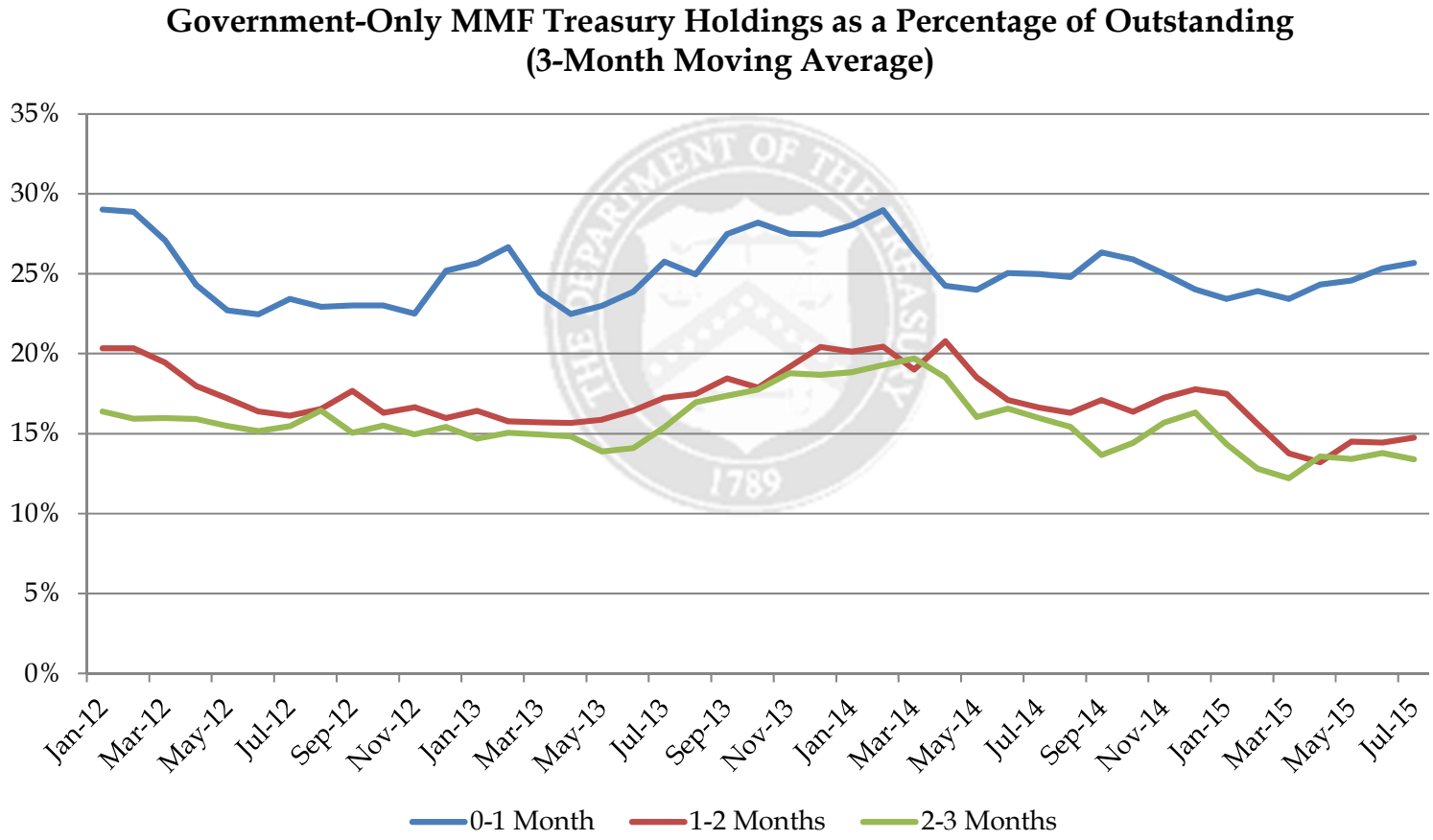
- From January 2012 through July 2015, 40 percent of government-only MMF Treasury holdings (excl. FRNs) typically mature within one month, and 76 percent within three months.[2]



[2] Source: SEC and Department of the Treasury – Office of Financial Research

Money Market Mutual Funds (MMFs), cont.

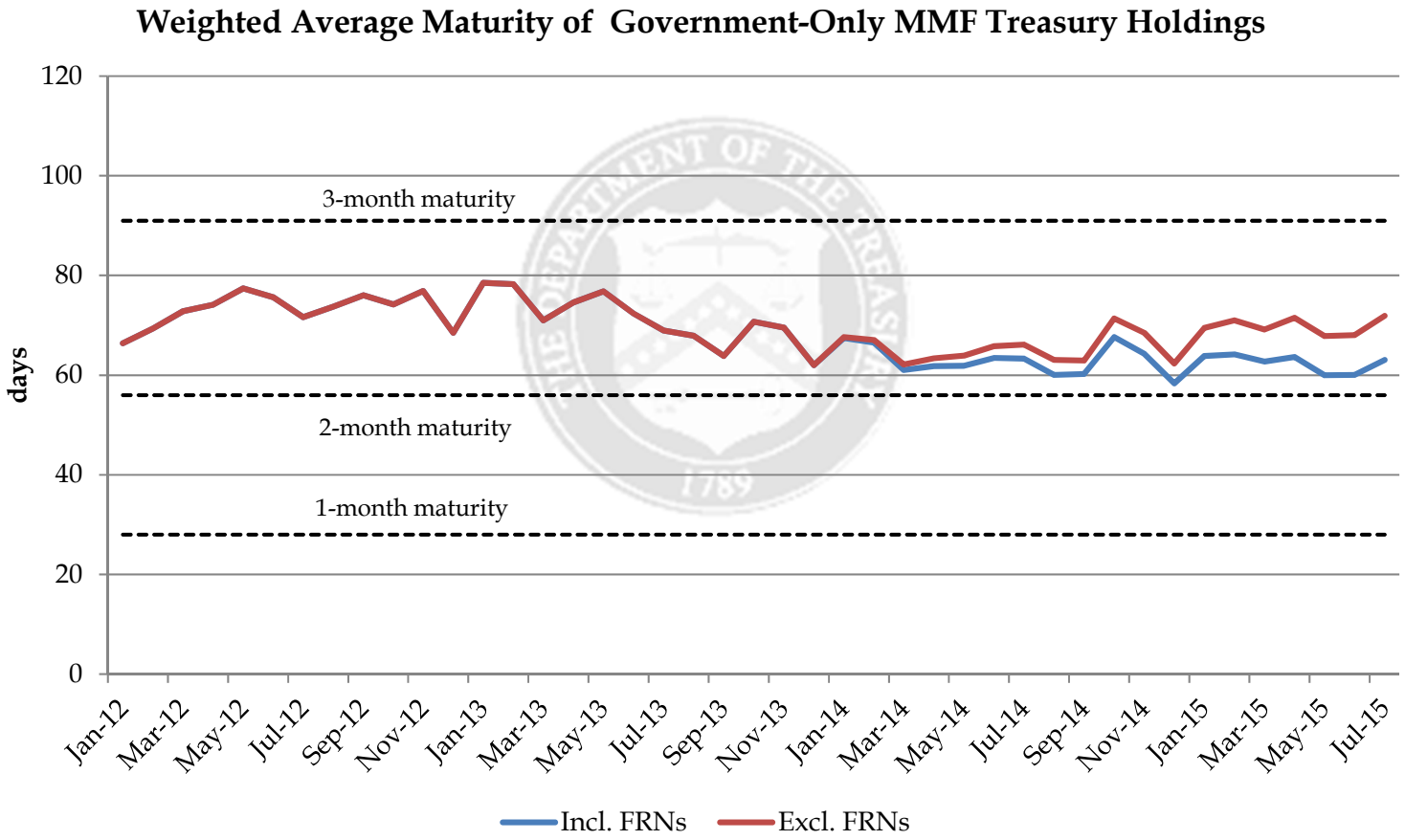
- Government-only MMFs typically own approximately 20 percent of Treasuries outstanding with less than three months to maturity.[3]



[3] Source: SEC and Department of the Treasury – Office of Financial Research

Money Market Mutual Funds (MMFs), cont.

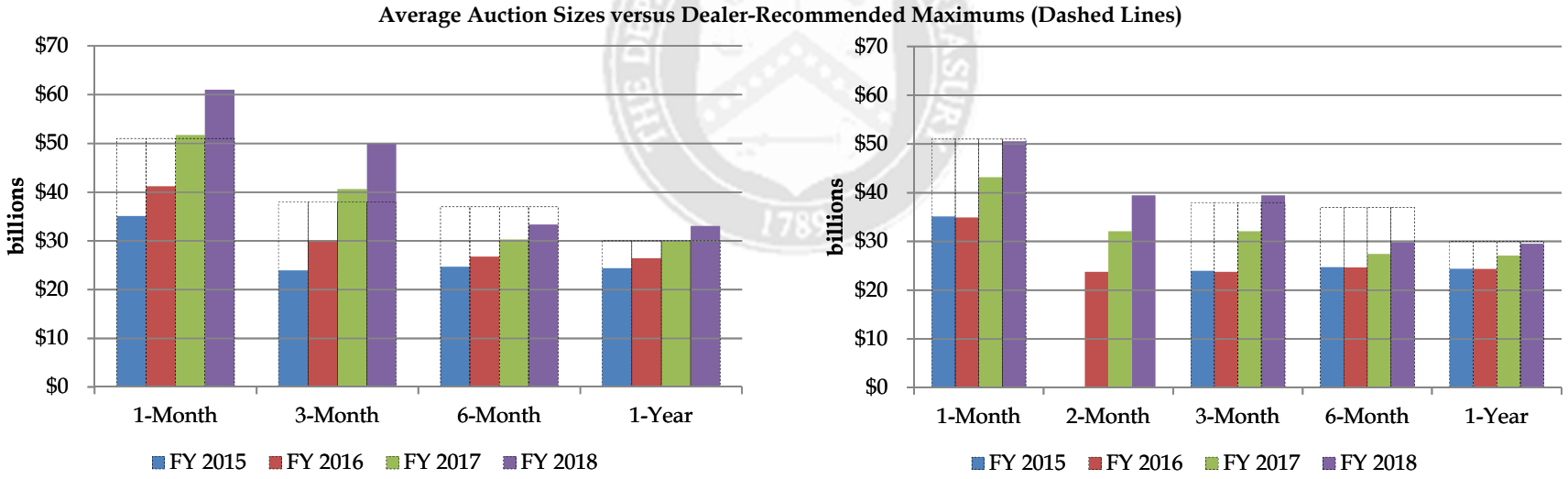
- The weighted-average maturity of government-only MMF Treasury holdings has oscillated between 60-80 days in recent years, roughly equidistant between a 2- and 3-month maturity.[4]



[4] Source: SEC and Department of the Treasury – Office of Financial Research

Potential Benefits of a 2-Month Bill Maturity

- If Treasury were to meet funding gaps over the next three years solely using bills, biasing the additional supply towards 1- and 3-month tenors could result in rapidly increasing auction sizes.
  - Within 2-3 years, average bill auction sizes could exceed dealer-recommended maximums.
    - This dynamic might affect auction pricing, resulting in sizable variations from fair value.[5]
- Introducing a 2-month tenor would enable Treasury to moderate increases in auction size at other maturity points. Additionally, Treasury could more effectively ladder its maturity profile with a 2-month tenor, potentially reducing the size of future weekly adjustments to bill issuance.

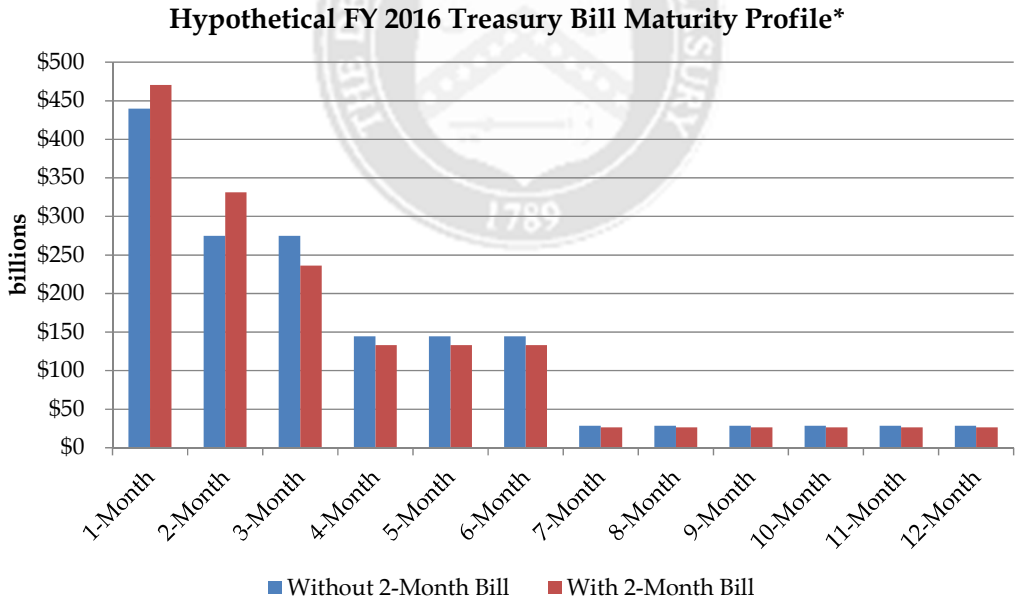


Assumptions: 1) No SOMA reinvestment; 2) Increased auction sizes are biased 75-25 in favor of securities with tenors of 3-months or fewer; 3) Initial 2-month auction size is set equal to the 3-month.

[5] During FY 2015, the 1-month auction size varied from a high of $50 billion to a low of $10 billion.

Potential Benefits of a 2-Month Bill Maturity, cont.

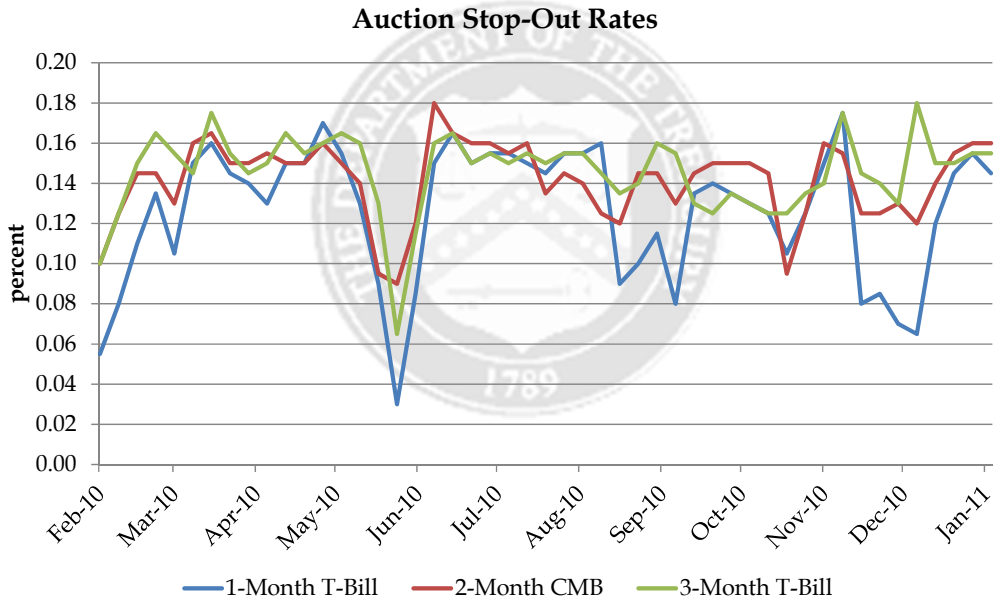
- A 2-month bill maturity could generate significant demand from MMFs, given their typical holdings.
  - For example, at eight weeks to maturity, a 2-month tenor would immediately fall within MMFs' 60-day WAM limit and would fall comfortably within MMFs' 120-day WAL limit.
  - Could present MMFs with greater opportunity to balance potential yield benefits as compared to a 1-month bill with lessened effects on WAM as compared to a 3-month bill.
  - Similar to Treasury, MMFs could also benefit from the ability to more easily ladder its maturity profile, and relatedly more easily manage its redemptions.



* Hypothetical maturity profile is generated using average auction sizes from slide 8.

Potential Drawback of a 2-Month Bill Maturity

- When Treasury issued the 2-month CMB in 2010-2011 during the Supplementary Financing Program (SFP), auction demand was lackluster in comparison to the 1- and 3-month tenors.
  - This lackluster performance is evidenced by a 2-month rate that typically printed closer to the 3-month rate than the 1-month rate, despite a smaller auction size, as well as a heavier reliance on the primary dealers:



Simple Averages

	Stop-Out Rate	Auction Size	Primary Dealer Allocation
1-Month T-Bill	0.126%	$28.3bn	57.5%
2-Month CMB	0.142%	$25.0bn	67.0%
3-Month T-Bill	0.146%	$28.2bn	56.5%

Potential Drawback of a 2-Month Bill Maturity

- However, there are some important caveats to the aforementioned results - principally that:
  - The 2-month program was not formally introduced as a permanent addition to Treasury's existing suite of securities. Accordingly, investors could not be convinced that these securities were going to be a consistent part of Treasury's portfolio moving forward. Instead:
    - The 2-month was issued as part of the Supplementary Financing Program (SFP), which raised cash specifically for use in the Federal Reserve's lending and liquidity initiatives. This cash was held in a segregated account at the Federal Reserve and was not available to Treasury as a means to fund outlays.
    - The 2-month was issued as a cash management bill (CMB), and although issued weekly, the program was in effect for less than a year.
  - Moreover, the 2-month was issued at a time when funding needs were already at historical highs. This fact, in conjunction with the aforementioned caveats, may have affected auction pricing.

FHLB 2-Month Discount Note Auction

- Results from the FHLB 2-month discount note (DN) auction program reinforce the premise that market demand for a 2-month Treasury bill could be robust.
  - The FHLBs typically auction the 2-month DN on a twice-weekly basis alongside 1-, 3-, and 6-month DNs.
    - On a relative basis, the FHLBs' 2-month DN auction yield has been roughly equidistant to the 1- and 3-month DN auction yields. In the year ending July 9, 2015, the average auction statistics were as follows:[6]

	Simple Averages	
	Stop-Out Rate	Auction Size
1-Month DN	0.052%	$2.5bn
2-Month DN	0.073%	$4.1bn
3-Month DN	0.087%	$4.6bn

    - Beginning on July 14, 2015, the FHLBs adjusted the maturity profile of their 2-month DN auction from nine weeks to eight weeks. Since that time, the yield relationship between those three securities has remained fairly consistent:

	Simple Averages	
	Stop-Out Rate	Auction Size
1-Month DN	0.049%	$1.1bn
2-Month DN	0.106%	$3.6bn
3-Month DN	0.155%	$4.9bn

[6] Source: FHLBanks Office of Finance

Questions

- The introduction of a 2-month maturity would enable Treasury to moderate increases to issuance at its other tenors, lessening the risk of exceeding dealer-recommended maximums.
  - Given the projected increases to bill supply, should Treasury consider alternative issuance cycles to reduce the amount of securities settling on individual days: for example, Monday-to-Monday, Tuesday-to-Tuesday, Wednesday-to-Wednesday, or Friday-to-Friday?
- Given that Treasury conducts auctions on most business days, totaling upwards of 270+ auctions annually, where in the current calendar would a 2-month best fit? Considerations could include:
  - Day of week and time of day, as well as market holidays.
  - Length of time between auction and settlement.
  - Proximity to other Treasury auctions or Federal Reserve operations, given competing demands on market resources.
- How frequently should Treasury issue a 2-month (weekly, bi-weekly, monthly, etc.)?
- At its introduction, how large of a 2-month bill program would be advisable?
- To what extent might the 2-month cannibalize existing demand for 1- and 3-month Treasury bills?

Committee Discussion

Treasury Borrowing Advisory Committee Meeting

November 3, 2015

TBAC Charge

As prudent debt managers, Treasury regularly considers ways to manage its debt portfolio effectively

We would like the Committee's views on the practicality and potential considerations of applying an **Asset-Liability Management framework** to Treasury's debt issuance strategy

What approaches could Treasury consider to minimize cost and optimize the composition of net new issuance to finance various assets and liabilities, such as student loans or entitlement benefits?

ALM

Executive Summary

- Asset Liability Management (“ALM”) is an application of Enterprise Risk Management that utilizes simplifying assumptions to identify, manage and measure risks in the context of sound financial management principles
- Sovereign governments present unique ALM challenges given balance sheet components that are more difficult to model, including non-financial assets and contingent assets and liabilities
- A holistic use of ALM is unworkable for the U.S. because of the size and complexity of the balance sheet and the economy
- Decisions of whether and how to proceed with a broad application of ALM should be informed by the extent to which the U.S. is exposed to rollover risk
- The student loan portfolio lends itself to an ALM framework and provides some practical insight into the relevance of ALM to the Treasury

What is Enterprise Risk Management?

- Enterprise Risk Management (ERM) is a framework where risks are identified, monitored and managed **subject to an entity's risk appetite** to provide for the achievement of its objectives
- Risks include interest rate risk, credit risk, currency risk, operational risk, reputational risk and many others
- Identification of risks informs the decision to monitor or mitigate their potential impacts, which depends on the entity's risk appetite as well as market conditions
- ERM can preserve or enhance enterprise valuation by providing a **framework to assess risk and return trade-offs**, including the cost of any desired risk reduction

ALM

What is Asset Liability Management?

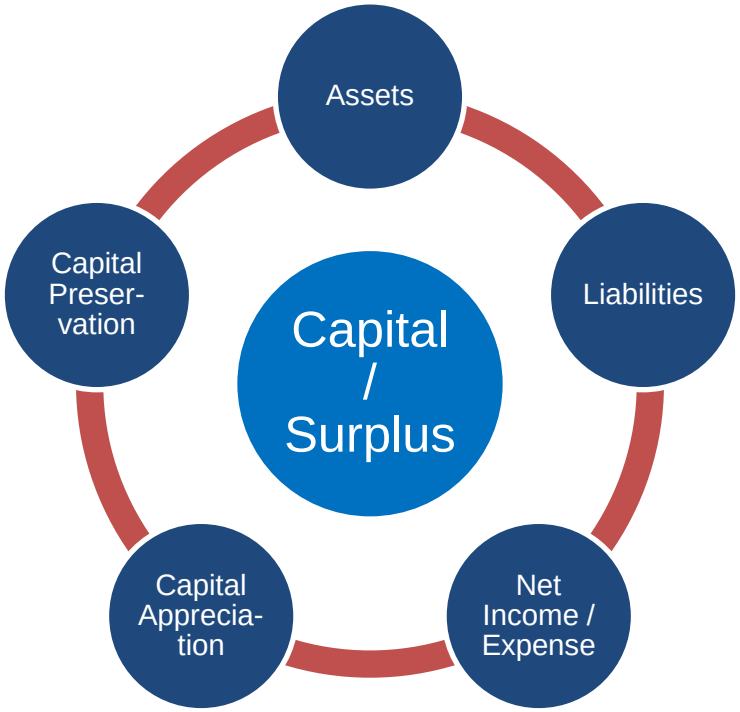
ALM is a practical application of ERM for entities that want to reduce unnecessary balance sheet sensitivity to any set of variables

From Society of Actuaries:

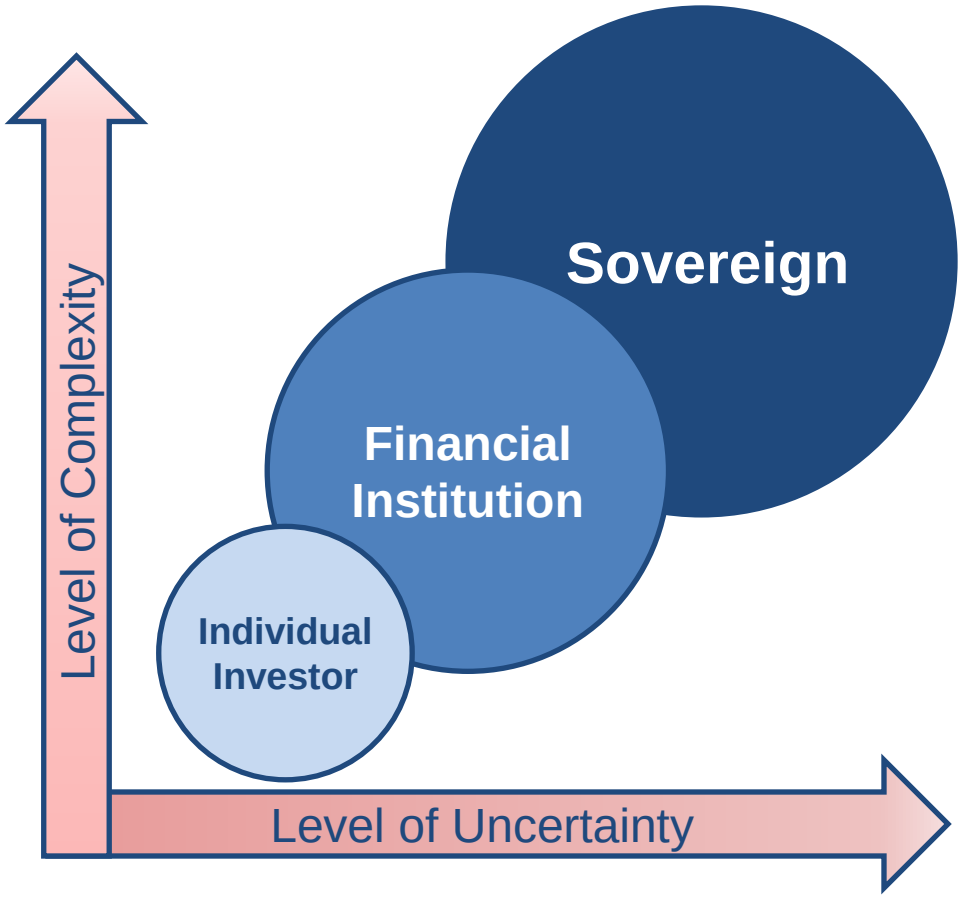
- ALM is the practice of managing a business so that decisions and actions taken with respect to assets and liabilities are **coordinated**
- ALM can be defined as the **ongoing process** of formulating, implementing, monitoring and revising strategies related to assets and liabilities **to achieve an organization's financial objectives given its risk tolerances and other constraints**
- ALM is relevant to, and critical for, the sound management of the finances of **any organization that invests to meet its future cash flow needs and capital requirements**

How Is ALM Implemented?

Theoretical considerations are similar…



…but practical applications are very different



What Risks Can ALM Address?

ALM

Risk	Consideration for Corporation	Consideration for Sovereign
Interest Rate	Duration and cash flow mismatches can lead to the need to increase liability reserves, reducing the company's equity position	Minimizing long-run financial costs related to government debt
Liquidity & Rollover	Appropriate levels of liquid assets relative to short-term liabilities or products with demand deposit features ensures avoidance of a "run on the bank"	Maintaining a liquid local currency maturity curve allows for balancing rollover risk and funding costs
Capital Sufficiency	Reduces equity volatility at regulated entities, allowing for more timely and consistent return of profits to equity investors	Sovereign net worth is improved by managing debt issuance to minimize both cost and debt servicing volatility on behalf of taxpayers
Inter-temporal Consumption Trade-offs	Framework creates a roadmap to achieve financial objectives with the risk constraints	Managing intergenerational risk includes analyzing the impact of financing current consumption with long-term debt, which may be positive for current taxpayers but could negatively impact future generations

How Can Debt Issuance Choices Address Sovereign Risks?

ALM

Debt Issuance Characteristics	Benefit
Nominal vs. inflation-protected bonds	Better match expenditures with costs and hedge inflation risk
Maturity of debt instruments issued	Manage and balance current vs. future interest costs
Currency of debt issuance (local vs. foreign currency)	Match the currency of expected flows
Transparency/communication with credit rating agencies	Manage the trade-off of debt rollover risk vs. higher cost certainty to maintain its credit rating

Balance Sheet Complexity Makes ALM Challenging for Sovereigns

ALM

The use of ALM to inform the management of sovereign balance sheet risk is more complex than other financial institutions for several reasons:

- Assets include non-financial assets such as land, as well as broad taxing powers
- Liabilities must include contingent liabilities such as entitlement programs and credit guarantees
- Balance sheet is carried at book value and/or replacement cost, rather than market as preferred by an ALM framework

The application of ALM to a sovereign is therefore more conceptual than quantitative

- Conceptual sovereign balance sheet could contain:
  - Assets:
    - Present value of future tax revenues
    - Inventories, property, plant & equipment, infrastructure assets
    - Non-financial assets (e.g. land)
    - Cash, monetary assets, debt & equity securities
  - Liabilities:
    - Present value of future government expenditures
    - Loan and insurance guarantees, environmental liabilities
    - Federal employee and veteran benefits payable
    - Federal debt
  - Net Worth:
    - Difference between current and future assets and liabilities

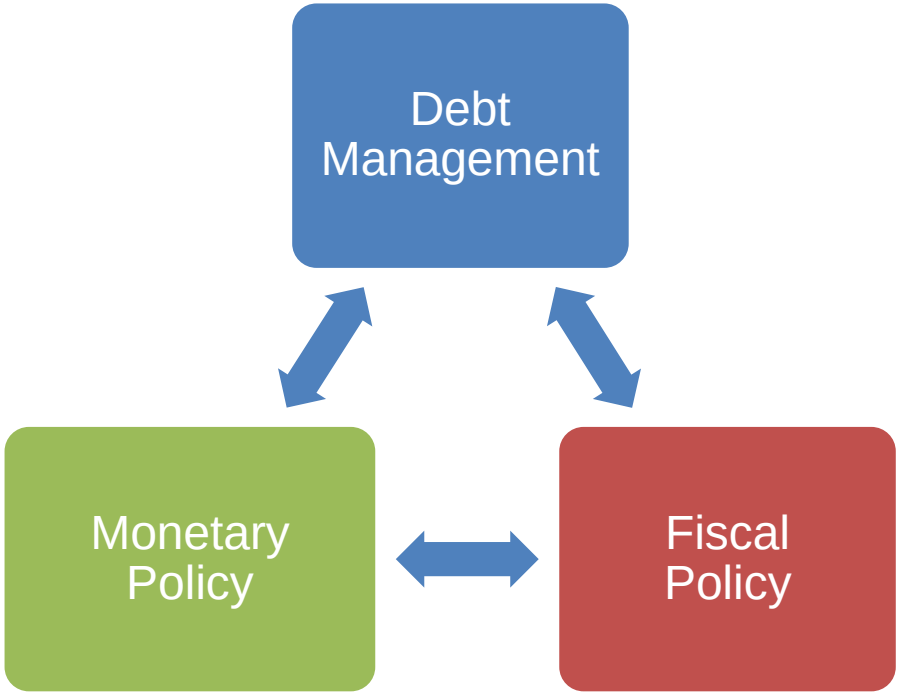
Interdependent Policymaking by Independent Entities Is a Complicating Factor in the U.S.

ALM

Independent fiscal, monetary and debt management policymakers decentralize balance sheet management and require coordination

This independence enhances policy credibility and improves implementation

- Debt Management and Monetary Policy
  - Issuance choices between fixed/floating and nominal/indexed debt is informed by the central bank's price stability mandate
  - Lack of policy independence could raise concerns regarding debt monetization
  - At the zero interest rate bound, quantitative easing in the form of debt buybacks may run counter to the desire to lengthen the debt maturity profile
- Debt Management and Fiscal Policy
  - Fiscal policymakers and government debt managers share common interest in sustainable debt strategy
  - Coordination is required in preparing government budget and fiscal projections
  - Independence is necessitated by the fact that fiscal excesses could temporarily be masked by a high risk short-term financing scheme



What Makes the U.S. Unique Among Sovereigns?

ALM

A comprehensive sovereign ALM solution for the U.S. is more complex than for other sovereigns:

- Unparalleled depth and breadth of Treasury market and role as a “flight to quality” instrument
- Interdependent policymaking structure limits direct Treasury control
- Size and complexity of the U.S. balance sheet
- USD is the global reserve currency; therefore the U.S. holds limited foreign currency reserves

While ALM principles can mitigate rollover risk, the considerable debate over the existence of that risk for the U.S. must inform any decision of whether and how to proceed with a broad application of ALM

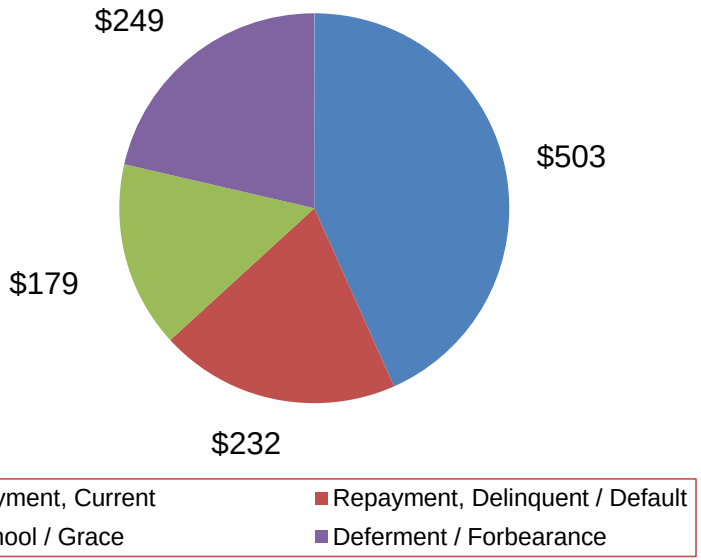
- Negative T-bill yields demonstrate strong demand for short-term Treasuries despite elements of theoretical rollover risk

Application of ALM Framework to Student Loans

Why Consider ALM for Student Loans?

- The portfolio, at $1.2 trillion today and growing by $90 billion annually, is a large enough asset to affect the Treasury debt financing decision
- Characteristics of outstanding loans and repayment history are observable and can be tracked and modelled
- Student loans are subject to measurable and potentially hedgeable market risks

Student Loan Portfolio Status
($ Billions)



Source: Department of Education and presenter's calculations to combine FFEL and Direct Loan portfolios

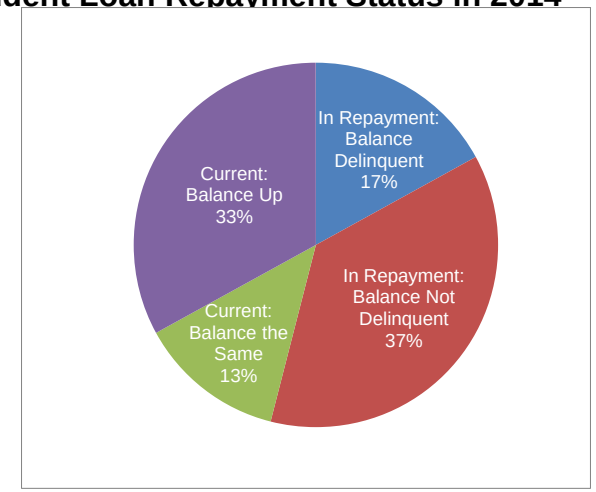
What Risks Might ALM Address?

Risk	Description
Interest Rate	Present value of fixed rate student loans, if not financed by matching liabilities, is exposed to changes in interest rates
Cash Flow Timing	Current and projected cash flows are affected by idiosyncratic factors including prepayments, forbearance/deferment and income-based payment programs
Credit	Defaults and loss-given-default are impacted by cyclical economic factors, policy outcomes, potential for adverse selection and other borrower-specific risks

Student Loan Portfolio Characteristics

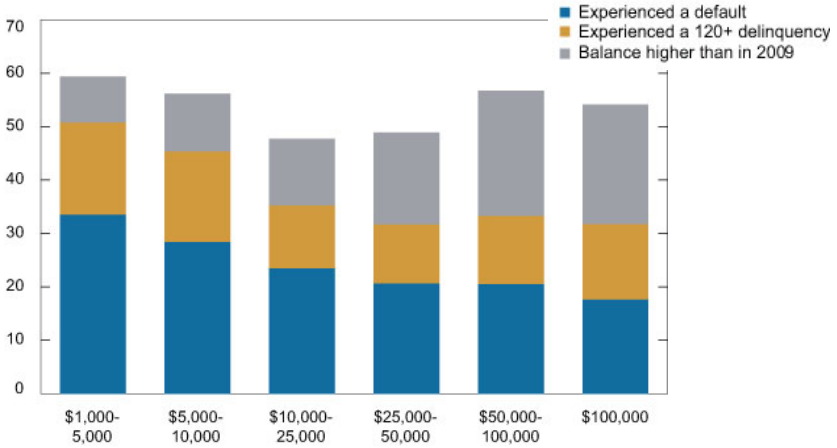
- Highly complex prepayment optionality
  - Within repayment status, borrowers can prepay, remain current, or fall into delinquency/default.
  - Borrowers can move in/out of repayment and from in-school, repayment, deferment and forbearance status
  - Repayment formulas often take borrower income as an input when determining repayment requirements
- Based on origination cohort data and the growth of the portfolio the tenor of the portfolio is estimated to have:
  - 76 month WALA
  - 101 month WAM (vs. 70 month WAM of Treasury debt)
- Borrowers struggle to remain current despite flexibility afforded them
- Limited publicly available data complicates analysis

Student Loan Repayment Status in 2014



Source: Federal Reserve Bank of New York Consumer Credit Panel/Equifax

2009 Cohort: Troubled Borrowers by School-Leaving Balance (% as of 2014:Q4)

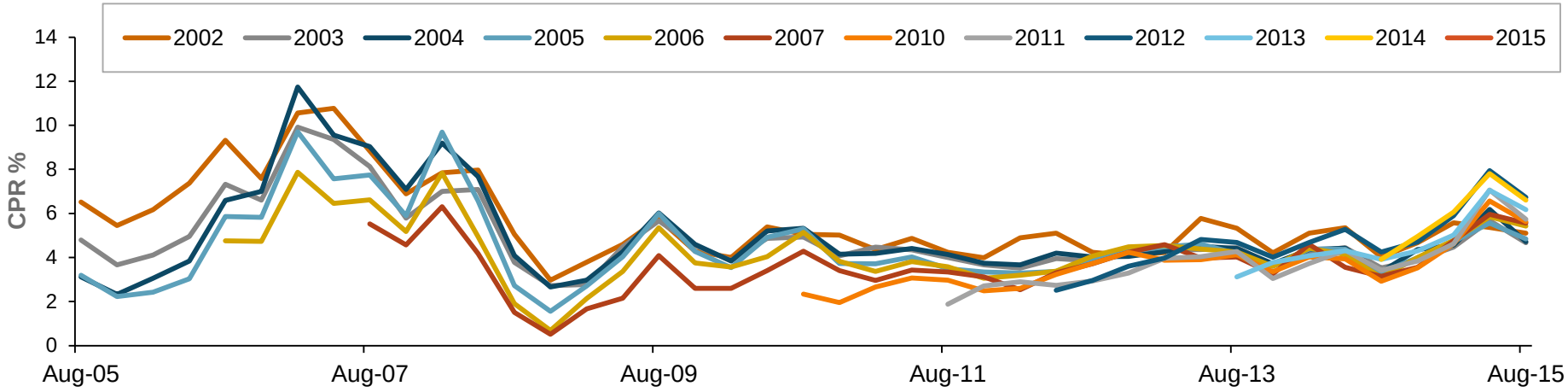


Source: Bank of New York Consumer Credit Panel/Equifax

Interest Rate and Cash Flow Timing Risk Can Be Hedged

- Initial interest rate hedging decision is relatively straightforward
  - Projected cash flows can be “matched” to a subset of regular Treasury issuance
- Ongoing cash flow hedging is more challenging and less precise
  - Actual cash flows will differ from projections due to borrower behavior and policy changes
  - Any current or anticipated deviation from projected cash flows would require an adjustment of the matched liabilities

Prepayment Rate by Cohort Year



Source: Investor reports, Nomura

Would Matched Issuance Be Predictable?

- The size and variability of required issuance should not undermine the regularity and predictability of the Treasury debt calendar
  - A 2% CPR prepayment decrease for the portfolio's life would extend duration by $16.5 billion 10-year Treasury equivalents or less than 1 month of 10-year issuance
  - Cash flow forecast changes are likely to be gradual and impact multiple points on the Treasury curve, thereby spreading out any effect on issuance
- Transparent disclosure of the matched asset and liability portfolio and relevant debt management policy would enhance the predictability of Treasury issuance

Change in Dollar-Duration for a 2% Prepayment Decrease in CPR	
1. Duration at 7% CPR	7.905
2. Duration at 5% CPR	8.038
3. Change in Duration = (2) - (1)	0.133
4. Size of Student Loan Portfolio ($billion)	$1,100.00
5. Change in Dollar-Duration of Student Loan Portfolio = (3) x (4)	$146.30
6. Size of a 10-Year U.S. Treasury Portfolio with Same Dollar-Duration = (5) / (6) ($billion)	$16.53

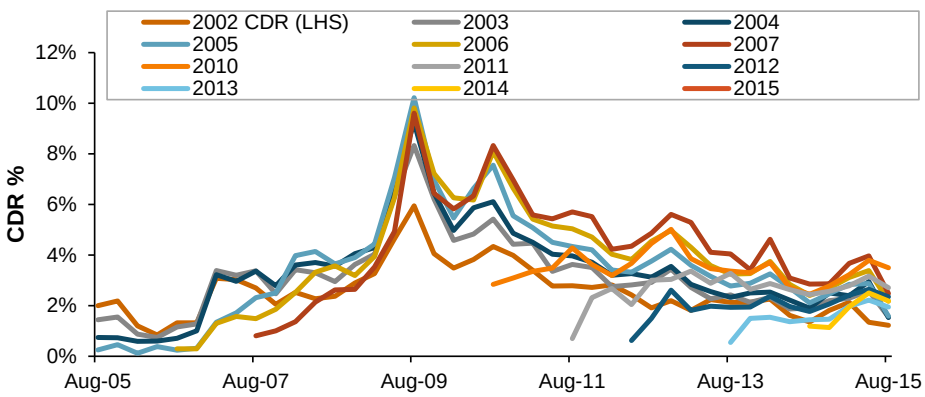
Source: Presenter's Calculations

What Form Could Matched Issuance Take?

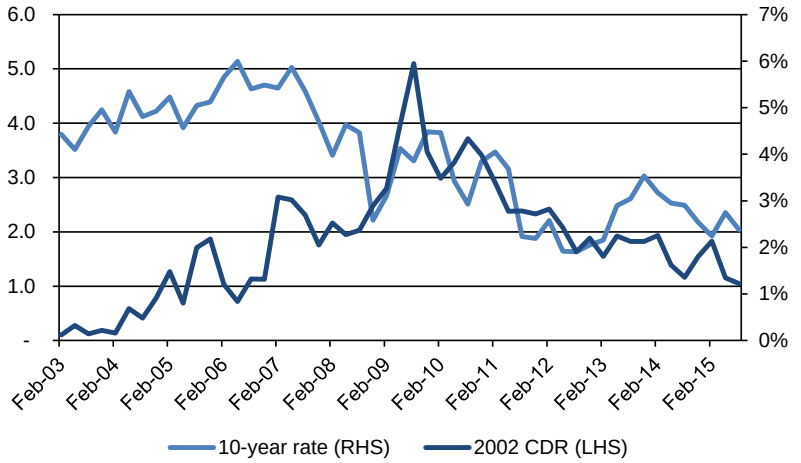
- Given that student loan cash flow variability is not strongly correlated with interest rates, Treasury debt issuance with embedded optionality (e.g. callables/putables) would not produce an efficient match
- A better approach would be to create a matched Treasury portfolio to balance against the current cash flow profile of the student loans and reassess on an ongoing basis

Funding Method	Description	Comments
Matched Treasury Portfolio	Issuance of Treasury debt at different maturities in response to cash flow assumption changes would deliver a durable asset-liability match.	To the extent that borrower and policy behavior is uncorrelated with interest rate changes, this strategy has no expected cost; segregation of matched vs strategic liability portfolios has been used with success by other sovereigns within an ALM framework.

Default Rate by Cohort Year



2002 cohort default rate vs. 10-year Treasury yield



Source: Bloomberg, Investor reports, Nomura

Another Choice: Student Loan Pass-throughs

Funding Method	Description	Comments
Pass-throughs	Pass-through issuance similar to the Agency MBS market could completely hedge interest rate and cash flow timing risk, while retaining credit risk on the sovereign balance sheet	Investors' appetite for such bonds would depend on factors including the size and regularity of issuance, explicit credit guarantee, and convexity risk to the extent prepayments correlate with changes in market interest rates

Program Cost Estimate: GNMA 30-year Option Adjusted Spread	Comments
▪ GNMA 30-year OAS has averaged 0.36% since 2012 ▪ Total outstanding GNMA MBS amount at $1.39tn is similar to the federal student loan portfolio but is tightly linked to the much larger conventional MBS market ▪ Gross spread of student loan pass-through would be similar to OAS if the correlation between prepayments and rates is small	▪ The varying coupons of the programs would require different tranches, diminishing the benefit of liquidity ▪ The market's desire for par priced securities would require Treasury to hold Interest only strips, adding complexity to Treasury's balance sheet ▪ The market charges a premium for cash flow uncertainty, increasing the cost. Treasury would be better off absorbing the cost of optionality and matching changes in cash flows via adjusting auction size.

G2SF CC Treasury OAS

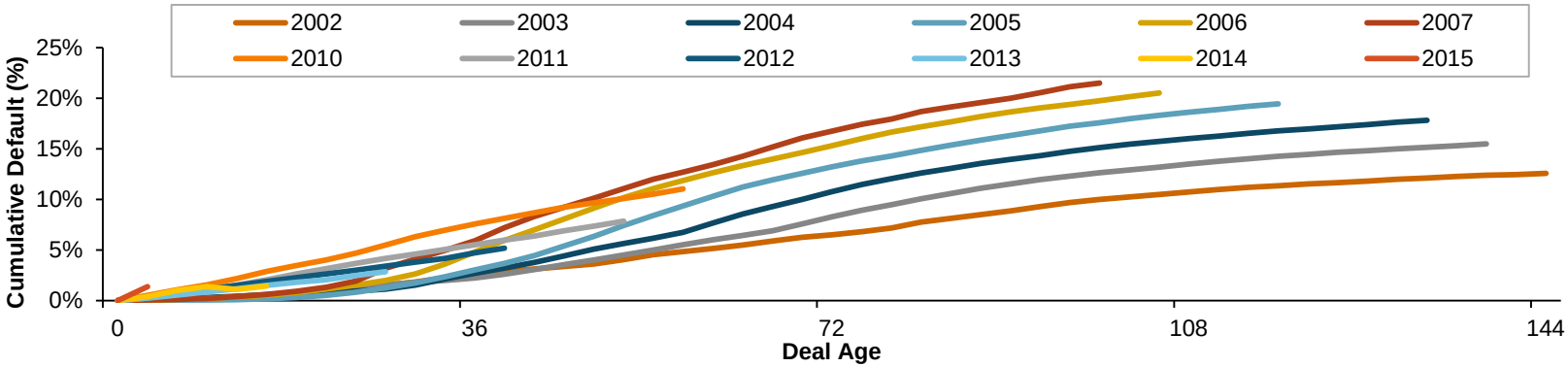
G2SF CC Treasury ZV Spread

Source: Barclays Index Data

Credit Risk Can, But Should Not, Be Hedged

- Uncertainty surrounding student loan credit loss is high
- As expected, the cost of hedging credit risk is also high
  - Buyers of student loan credit risk would require compensation for expected defaults, default correlation with other market risks, and the asset's lower credit ratings and inferior liquidity compared to U.S. Treasuries
- Selling credit risk in a secondary market would conflict with the student loan program's policy objectives
- Cost of hedging credit risk in the market can be approximated by the difference between FCRA and fair-value accounting for the student loan subsidy
  - This yields an estimate of $279 billion over 10 years, excluding expected credit losses

Cumulative Default Rate by Cohort Year



Source: Bloomberg, Investor reports, Nomura

Summary Recommendations

- Application of ALM to the student loan portfolio is a practical first step towards any broader potential applications of ALM to the U.S. balance sheet
- Liabilities that fund the student loan portfolio can be segregated from general Treasury liabilities and actively managed to hedge interest rate risk and cash flow mismatches as they develop
- Segregating would make liability management consequences of student loan policy clear and transparent, informing policymakers of the cost to tax payers of cash flow modifications
- Cash flow volatility has no reliable correlation with interest rates, thus management of the matched Treasury portfolio is expected to deliver most of the possible ALM benefit at minimal cost
- Liabilities issued to hedge the student loan portfolio would have a longer WAM than the current Treasury average
- Credit risk hedging is cost prohibitive and counterproductive to the program's policy objectives

ALM for U.S.
Conclusion & Questions

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