

**CDIAC**

**CALIFORNIA  
DEBT AND  
INVESTMENT  
ADVISORY  
COMMISSION**

# SESSION FOUR:

## ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

CDIAC/CMTA  
JANUARY 17, 2018

Hubert R White, III CFA, CTP- Investment Officer  
Office of Treasurer and Tax Collector  
City and County of San Francisco

# CA Government Code 53600.5

## Objectives

When investing, reinvesting, purchasing, acquiring, exchanging, selling, or managing public funds, the primary objective of a trustee shall be to safeguard the principal of the funds under its control. The secondary objective shall be to meet the liquidity needs of the depositor. The third objective shall be to achieve a return on the funds under its control.

# The Importance of a Cash Forecast

3

### □ Primary Objectives:

- Liquidity Management – having sufficient cash available to meet cash outflows. Matching an investment maturity to a known future cash disbursement immunizes the cash flow and reduces the liquidity risk in the portfolio. Theoretically, if all cash disbursements are matched to a portfolio security maturity, liquidity risk is mitigated.
- Managing Costs – cash forecasting can help minimize excess bank balances and increase portfolio returns. Idle cash creates cash drag on an investment portfolio. The impact of cash drag is not readily visible and can be difficult to quantify.

*No one likes surprises when it comes to cash flows, especially when they are outgoing. A cash forecast can eliminate situations of having to liquidate a portfolio holding in an unfavorable market and taking a loss.*

# Cash Flow Due Diligence Goes a Long Way

4

- When it comes to evaluating liquidity requirements, there are varying schools of thought on how to accomplish it. However in reality, we only have two choices: look back or look forward!
  
- Historical Cash Flow / Portfolio Value (proxy) Analysis
  - Gather several years of historical cash flows and look at multiple scenarios that give transparency into what has happened previously. The goal is to solve what liquidity profile would have sustained you during the timeframe in question and evaluate its usefulness for the future (History doesn't repeat itself but it sure does rhyme).
  
- Projected Cash Flow / Immunization Analysis
  - Gather information from internal and external participants as to projected cash flow needs and match portfolio assets to major liabilities. This optimizes the amount of liquidity necessary to meet obligations during the normal cyclical fluctuations of cash flow an entity experiences.

## ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## CCSF Developing a Cash Forecast – A Dynamic Process

5

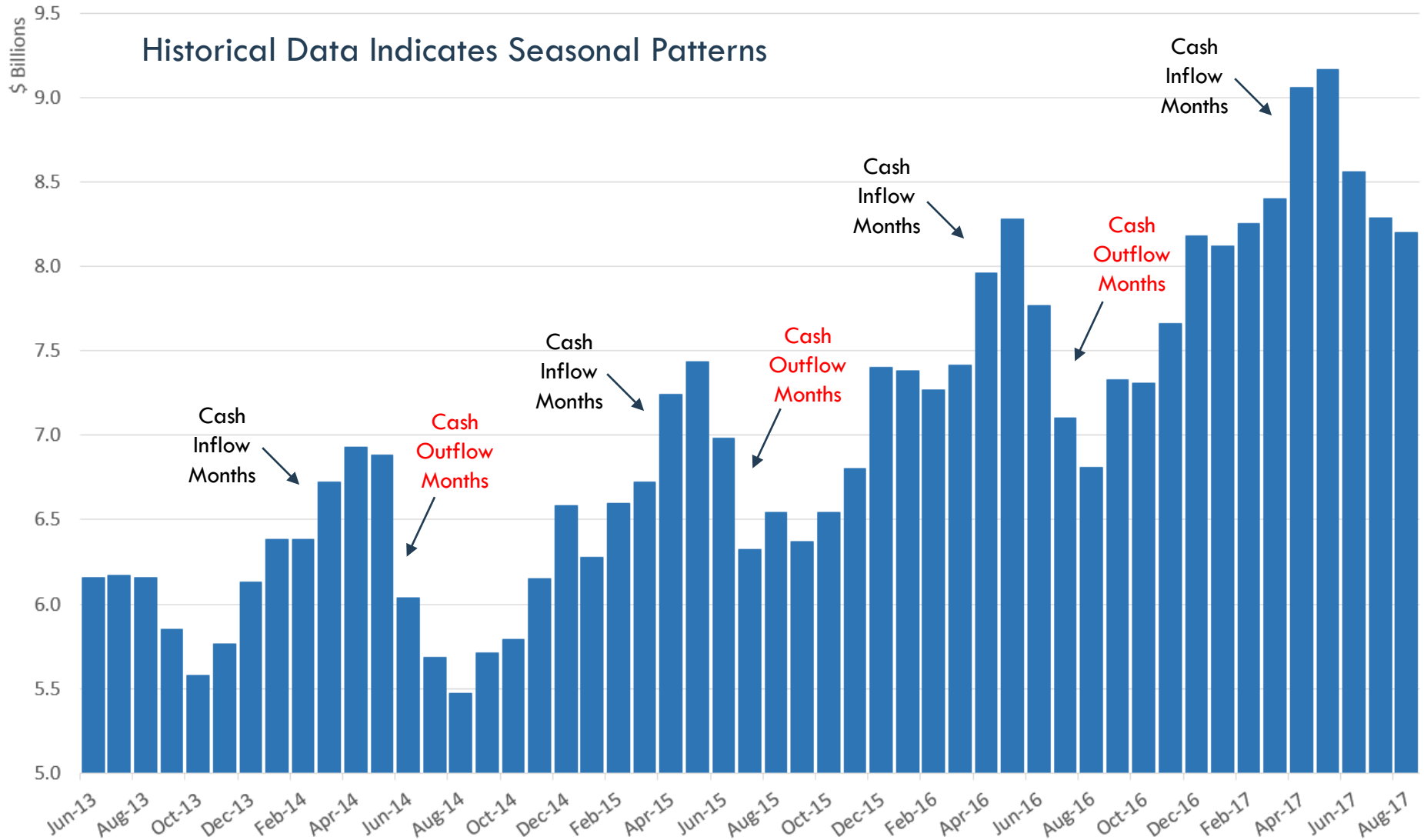
- Gather information on cash disbursements and cash receipts from the pool participants
- Examine historical data to identify trends
- Use statistical extrapolation to predict a pattern of future cash flows
- Create a model incorporating all cash disbursement, cash receipt, and portfolio information
- Update model as new information becomes available

# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## City & County of San Francisco End of Month Balances

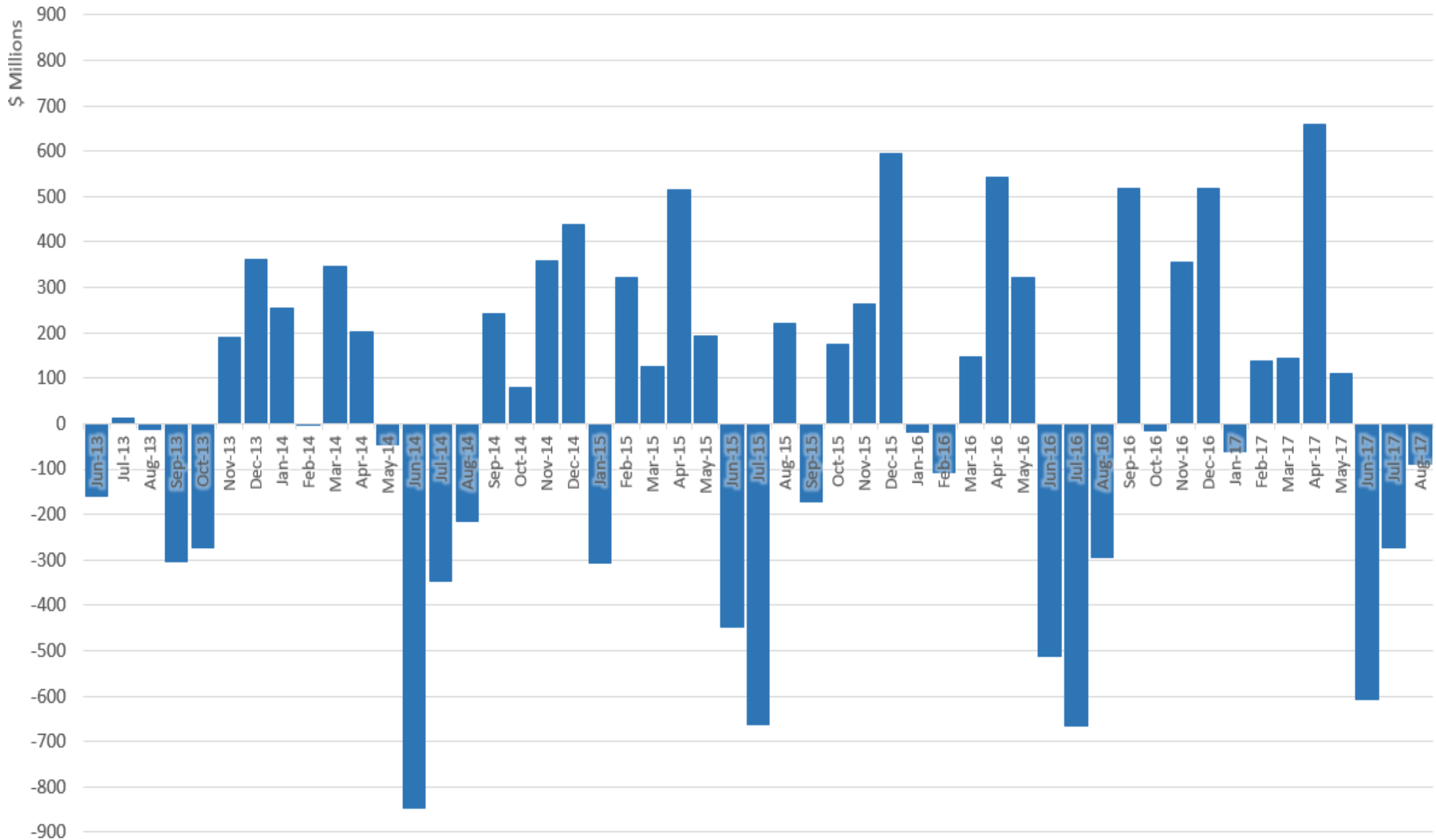
6

Historical Data Indicates Seasonal Patterns



# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## CCSF Pooled Fund – Month to Month Portfolio Change



# Daily Cash Projection

Opening Balance	\$81,121,458.25				
Sources:	\$9,690,382.36	\$414,527,695.06		CitiBank Wire Transfer Amount	1 Day Float
Sold FRGXX	\$0.00			\$404,837,312.70	\$4,353,962.01
Sold TSTXX	\$0.00			(\$287,901,851.11)	
Sold MVRXX	\$0.00			\$116,935,461.59	
Maturity 313385MN3	\$70,000,000.00				
Maturity 313385MN3	\$100,000,000.00				
Maturity 313385MN3	\$50,000,000.00				
Maturity 313385MN3	\$50,000,000.00				
Maturity 19416EX44	\$10,200,000.00				
Sold 3133EEEAN0	\$25,045,694.67				
Sold 36164LEN5	\$50,024,590.25				
Sold 36164KEA5	\$49,567,027.78				
Uses:	(\$42,609,722.38)	(\$380,511,573.49)			
Purchase FRGXX	(\$50,000,000.00)			Investment Interest	Payroll
Purchase 313385MP8	(\$99,997,222.22)			Lockbox	Payroll Taxes
Purchase 313385MP8	(\$49,998,611.11)			Incoming Wires	Paymode
Purchase 313385MP8	(\$49,998,611.11)			ACH	Retirement
Purchase 06371EQT7	(\$50,000,000.00)			Retirement	Expenditures
Purchase 06538BZB2	(\$37,907,406.67)			Bond Settlement Proceeds	Deferred Comp
Purchase	\$0.00			Revenues	Outgoing Wires
Purchase	\$0.00			Cash Pro Credits	Cash Pro Debits
Purchase	\$0.00			Other Incoming Funds	Debt Service
Purchase	\$0.00			Total	
Purchase	\$0.00				
Purchase	\$0.00				
Cash Balance		\$115,137,579.82	(\$4,862,420.18)	Cash Balance + 1 Day Float	
				\$119,491,541.83	



## ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

# Cash Forecast

9

	Cash Balance	10/4/2017	\$115,223,977.09			Money Market Balance	Overnight Target
	ECA Target Balance		(\$120,000,000.00)			\$107,169,931.51	\$300,000,000.00
			(\$4,776,022.91)				
		USES	SOURCES	Daily Net Cash Flow	Cash Balance	Cash Balance + MMKT Funds	Spendable Cash
10/5/2017	UC Regents	(\$13,000,000.00)	\$0.00	\$148,500,736.83	\$143,724,713.92	\$250,894,645.43	(\$49,105,354.57)
	Kaiser Health Premium (ACH 10032017)	(\$38,499,263.17)	\$0.00				
	Maturity 313385MP8	\$0.00	\$50,000,000.00				
	Maturity 313385MP8	\$0.00	\$50,000,000.00				
	Maturity 313385MP8	\$0.00	\$100,000,000.00				
10/6/2017	Payroll Taxes	(\$7,000,000.00)	\$0.00	\$43,000,000.00	\$186,724,713.92	\$293,894,645.43	(\$6,105,354.57)
	Bond Call 3136G4ND1	\$0.00	\$50,000,000.00				
10/7/2017		\$0.00	\$0.00	\$0.00	\$186,724,713.92	\$293,894,645.43	(\$6,105,354.57)
10/8/2017		\$0.00	\$0.00	\$0.00	\$186,724,713.92	\$293,894,645.43	(\$6,105,354.57)
10/9/2017		\$0.00	\$0.00	\$0.00	\$186,724,713.92	\$293,894,645.43	(\$6,105,354.57)
10/10/2017		\$0.00	\$0.00	\$0.00	\$186,724,713.92	\$293,894,645.43	(\$6,105,354.57)
10/11/2017		\$0.00	\$0.00	\$0.00	\$186,724,713.92	\$293,894,645.43	(\$6,105,354.57)
10/12/2017	Maturity 06538BXC2	\$0.00	\$33,000,000.00	\$33,000,000.00	\$219,724,713.92	\$326,894,645.43	\$26,894,645.43
10/13/2017		\$0.00	\$0.00	\$0.00	\$219,724,713.92	\$326,894,645.43	\$26,894,645.43
10/14/2017		\$0.00	\$0.00	\$0.00	\$219,724,713.92	\$326,894,645.43	\$26,894,645.43
10/15/2017		\$0.00	\$0.00	\$0.00	\$219,724,713.92	\$326,894,645.43	\$26,894,645.43
10/16/2017	Payroll Transfer to US Bank	(\$77,000,000.00)	\$0.00	\$23,000,000.00	\$242,724,713.92	\$349,894,645.43	\$49,894,645.43
	Maturity 06427KW29	\$0.00	\$50,000,000.00				
	Maturity 89113WH25	\$0.00	\$50,000,000.00				
10/17/2017		\$0.00	\$0.00	\$0.00	\$242,724,713.92	\$349,894,645.43	\$49,894,645.43
10/18/2017	Payroll Taxes	(\$36,000,000.00)	\$0.00	\$4,000,000.00	\$246,724,713.92	\$353,894,645.43	\$53,894,645.43
	Maturity 06538BXJ7	\$0.00	\$40,000,000.00				
10/19/2017		\$0.00	\$0.00	\$0.00	\$246,724,713.92	\$353,894,645.43	\$53,894,645.43
10/20/2017	Payroll Taxes	(\$7,000,000.00)	\$0.00	(\$7,000,000.00)	\$239,724,713.92	\$346,894,645.43	\$46,894,645.43
10/21/2017		\$0.00	\$0.00	\$0.00	\$239,724,713.92	\$346,894,645.43	\$46,894,645.43
10/22/2017		\$0.00	\$0.00	\$0.00	\$239,724,713.92	\$346,894,645.43	\$46,894,645.43
10/23/2017		\$0.00	\$0.00	\$0.00	\$239,724,713.92	\$346,894,645.43	\$46,894,645.43
10/24/2017	Maturity 47816FXQ9	\$0.00	\$60,000,000.00	\$60,000,000.00	\$299,724,713.92	\$406,894,645.43	\$106,894,645.43
10/25/2017	SF PUC Water Enterprise Debt Service	(\$155,215,481.00)	\$0.00	(\$9,860,956.00)	\$289,863,757.92	\$397,033,689.43	\$97,033,689.43

# Cash Forecasting Tools - MaxQ

10

- Provides added visibility into different time frames
- Adds process to better reflect immunization of cash outflows
- Automates the incorporation of portfolio data with cash flow data
- Allows option to incorporate income cash flows

# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## CCSF Profile Analysis – Cumulative Negative Net Cash Flow

11



**Liquidity Profile Analysis**  
**City and County of San Francisco**  
**First Cash Flow Date: Sep 30, 2014**  
**Last Cash Flow Date: Aug 31, 2017**  
**Analysis Date: Aug 31, 2017**

Institution Name	City and County of San Francisco
Portfolio Balance	\$8,348,429,496.39
Primary Liquidity	\$300,000,000.00
Secondary Liquidity	\$2,116,655,368.00
Primary Multiplier	0.20
Secondary Multiplier	0.05
Analysis Date	08/31/2017

Cumulative Neg. Scenario	12		24		36	
	Value	Date(s)	Value	Date(s)	Value	Date(s)
Cumulative Negative Net Cash Flow	(\$968,508,328.19)	06/30/17   08/31/17	(\$1,471,709,351.82)	06/30/16   08/31/16	(\$1,471,709,351.82)	06/30/16   08/31/16
<b>Required Liquidity</b>		<b>Multiplier</b>		<b>Multiplier</b>		<b>Multiplier</b>
Strategic Primary Liquidity	\$193,701,665.64	0.20x / 2.3%	\$294,341,870.36	0.20x / 3.5%	\$294,341,870.36	0.20x / 3.5%
Strategic Secondary Liquidity	\$48,425,416.41	0.05x / 0.6%	\$73,585,467.59	0.05x / 0.9%	\$73,585,467.59	0.05x / 0.9%
Strategic Total Liquidity	\$242,127,082.05	0.25x / 2.9%	\$367,927,337.96	0.25x / 4.4%	\$367,927,337.96	0.25x / 4.4%
<b>Actual Liquidity</b>		<b>Multiplier</b>		<b>Multiplier</b>		<b>Multiplier</b>
Actual Primary Liquidity	\$300,000,000.00	0.31x / 3.6%	\$300,000,000.00	0.20x / 3.6%	\$300,000,000.00	0.20x / 3.6%
Actual Secondary Liquidity	\$2,116,655,368.00	2.19x / 25.4%	\$2,116,655,368.00	1.44x / 25.4%	\$2,116,655,368.00	1.44x / 25.4%
Actual Total Liquidity	\$2,416,655,368.00	2.50x / 28.9%	\$2,416,655,368.00	1.64x / 28.9%	\$2,416,655,368.00	1.64x / 28.9%
<b>Investable Liquidity</b>		<b>% Change</b>		<b>% Change</b>		<b>% Change</b>
Investable Primary Liquidity	\$106,298,334.36	35.43%	\$5,658,129.64	1.89%	\$5,658,129.64	1.89%
Investable Secondary Liquidity	\$2,068,229,951.59	97.71%	\$2,043,069,900.41	96.52%	\$2,043,069,900.41	96.52%
Total Investable Liquidity	\$2,174,528,285.95	89.98%	\$2,048,728,030.05	84.78%	\$2,048,728,030.05	84.78%

# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## CCSF Liquidity Graph – Net Cash Flows

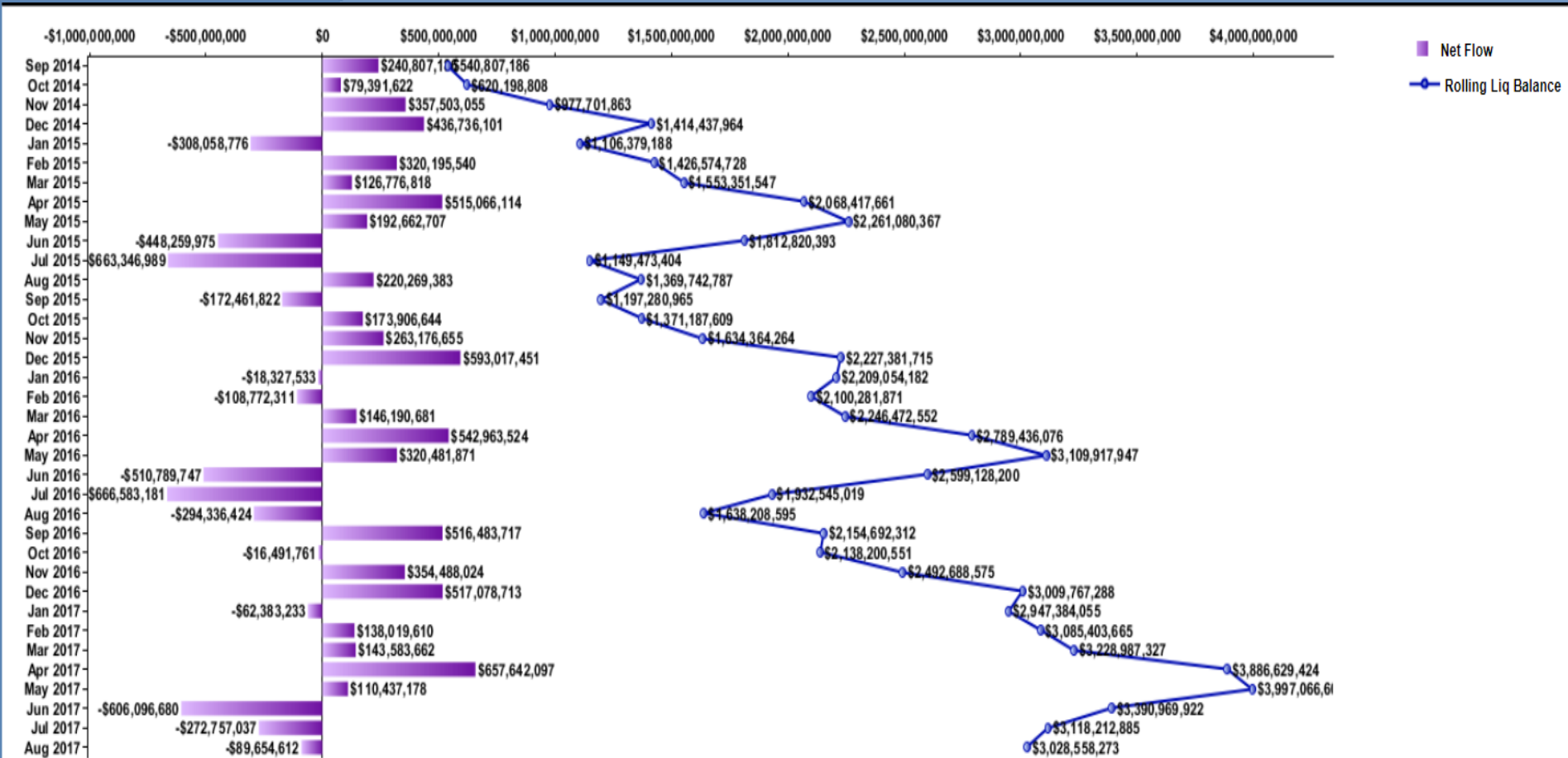
12



Liquidity Graph  
City and County of San Francisco  
Analysis Date: Aug 31, 2017

MONTHS REVIEWED	
Months	36

BALANCE DATA	
Min Balance	\$540,807,186
Max Balance	\$3,997,066,602
Max Drawdown	(\$240,807,186)



# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## CCSF Cash Flow Immunization Schedule

13



### Bond Immunization Schedule

Portfolio Bond Immunization List

Bond Description	Amount	Date of Maturity/Call	First Immunization Date	First Immunization Amount	Second Immunization Date	Second Immunization Amount	Third Immunization Date	Third Immunization Amount
3133EGBQ7 : FFBC 07/19/2018-43719	\$25,000,000.00	07/19/2018	07/23/2018	\$25,000,000.00				
78009NX50 : RY 07/24/2018-44393	\$50,000,000.00	07/24/2018	07/25/2018	\$50,000,000.00				
3130A8U50 : FHLB 07/25/2018-43791	\$22,250,000.00	07/25/2018	07/25/2018	\$22,250,000.00				
96121T3W6 : WSTP 07/26/2018-44410	\$50,000,000.00	07/26/2018	08/06/2018	\$46,000,000.00	08/08/2018	\$4,000,000.00		
3134G9Q67 : FHLMC 07/27/2018-43777	\$25,000,000.00	07/27/2018	08/06/2018	\$25,000,000.00				
3134G9Q67 : FHLMC 07/27/2018-43787	\$25,000,000.00	07/27/2018	07/27/2018	\$7,000,000.00	08/03/2018	\$12,000,000.00	08/06/2018	\$6,000,000.00
603786GJ7 : MINGEN 08/01/2018-43879	\$1,000,000.00	08/01/2018	08/03/2018	\$1,000,000.00				
96121T4D7 : WSTNY 08/09/2018-44457	\$50,000,000.00	08/09/2018	08/10/2018	\$40,000,000.00	08/20/2018	\$10,000,000.00		
3133EGFQ3 : FFBC 09/14/2018-43832	\$25,000,000.00	09/14/2018	09/17/2018	\$25,000,000.00				
3130A9C90 : FHLB 09/28/2018-43818	\$25,000,000.00	09/28/2018	10/01/2018	\$25,000,000.00				
06371EQJ9 : BMO 10/01/2018-44633	\$50,000,000.00	10/01/2018	10/01/2018	\$50,000,000.00				
459058ER0 : IBRD 10/05/2018-43427	\$25,000,000.00	10/05/2018	10/05/2018	\$7,000,000.00	10/12/2018	\$18,000,000.00		
96121T4S4 : WSTP 10/15/2018-44650	\$50,000,000.00	10/15/2018	10/15/2018	\$50,000,000.00				
912828L81 : T 10/15/2018-44848	\$50,000,000.00	10/15/2018	10/15/2018	\$50,000,000.00				
3133EGFK6 : FFBC 10/17/2018-43745	\$25,000,000.00	10/17/2018	10/17/2018	\$11,000,000.00	10/19/2018	\$7,000,000.00	10/25/2018	\$7,000,000.00
3133EGFK6 : FFBC 10/17/2018-43746	\$25,000,000.00	10/17/2018	10/17/2018	\$25,000,000.00				
06371ERP4 : BMO 10/25/2018-44665	\$45,000,000.00	10/25/2018	10/25/2018	\$45,000,000.00				
89113XJJ4 : TD 10/25/2018-44670	\$50,000,000.00	10/25/2018	10/25/2018	\$50,000,000.00				
06417GZR2 : BNS 10/25/2018-44698	\$50,000,000.00	10/25/2018	10/25/2018	\$50,000,000.00				
912828WD8 : T 10/31/2018-44873	\$50,000,000.00	10/31/2018						
13063C4V9 : CAS 11/01/2018-43856	\$50,000,000.00	11/01/2018	11/02/2018	\$7,000,000.00	11/09/2018	\$10,000,000.00	11/14/2018	\$33,000,000.00
89113XLP7 : TD 11/09/2018-44729	\$50,000,000.00	11/09/2018	11/09/2018	\$50,000,000.00				
06417GZT8 : BNS 11/09/2018-44740	\$50,000,000.00	11/09/2018	11/09/2018	\$50,000,000.00				
78009N3T1 : RY 11/20/2018-44797	\$50,000,000.00	11/20/2018	11/23/2018	\$40,000,000.00	11/26/2018	\$10,000,000.00		
89113XQJ6 : TD 12/06/2018-44821	\$50,000,000.00	12/06/2018	12/10/2018	\$50,000,000.00				
89113XQJ6 : TD 12/06/2018-44827	\$25,000,000.00	12/06/2018	12/24/2018	\$25,000,000.00				
96121T5B0 : WSTP 12/07/2018-44829	\$50,000,000.00	12/07/2018	12/14/2018	\$31,000,000.00	12/24/2018	\$19,000,000.00		
06417GC48 : BNS 12/07/2018-44831	\$50,000,000.00	12/07/2018	12/12/2018	\$19,000,000.00	12/10/2018	\$31,000,000.00		
78009N5B8 : RY 12/07/2018-44840	\$50,000,000.00	12/07/2018	12/12/2018	\$50,000,000.00				
313376BR5 : FHLB 12/14/2018-43916	\$15,000,000.00	12/14/2018	12/14/2018	\$15,000,000.00				

# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## CCSF Cash Flow Schedule by Day

14



### Cash Flow Schedules By Day

Current Liquidity	(\$23,473,805.63)
CF Start Date	12/20/2017
CF End Date	1/31/2023

Min Liquidity	(\$16,735,271,752.38)
Max Liquidity	\$1,794,134,642.54
Avg Liquidity	(\$6,029,956,311.07)
Std Dev Liquidity	\$5,835,263,016.02

Immun Min Liquidity	(\$16,929,926,878.28)
Immun Max Liquidity	\$1,565,706,647.64
Immun Avg Liquidity	(\$6,229,977,641.94)
Immun Std Dev Liquidity	\$5,837,108,312.07

### Cash Flow By Day

### Immunized Cash Flow By Day

		Total CF	Adjusted Liquidity
	Payroll Transfer to Bank	(\$77,000,000.00)	
	SFO Debt Service ACH	(\$37,000,000.00)	
05/25/2018	3134G9HC4: FHLMC 05/25/2018-43729	\$10,000,000.00	
	06417GXY9: BNSHOU 05/25/2018-44539	\$35,000,000.00	
	<b>Total Cash Flow</b>	<b>(\$69,000,000.00)</b>	<b>\$1,401,479,516.64</b>
	CCSF Payroll Tax 1	(\$36,000,000.00)	
05/30/2018	313385XL5: FHLBDN 05/30/2018-44231	\$50,000,000.00	
	<b>Total Cash Flow</b>	<b>\$14,000,000.00</b>	<b>\$1,415,479,516.64</b>
	Retiree Pension Payment	(\$83,000,000.00)	
	Pension Payment Northern Trust Pmt	\$83,000,000.00	
05/31/2018	<b>Total Cash Flow</b>	<b>\$0.00</b>	<b>\$1,415,479,516.64</b>
	CCSF Payroll Tax 2	(\$7,000,000.00)	
06/01/2018	546456CY8: LASGEN 06/01/2018-43878	\$4,500,000.00	
	<b>Total Cash Flow</b>	<b>(\$2,500,000.00)</b>	<b>\$1,412,979,516.64</b>
06/04/2018	89113W2C9: TDNY 06/04/2018-44240	\$50,000,000.00	
	<b>Total Cash Flow</b>	<b>\$50,000,000.00</b>	<b>\$1,462,979,516.64</b>
06/05/2018	UC Regents	(\$13,000,000.00)	
	<b>Total Cash Flow</b>	<b>(\$13,000,000.00)</b>	<b>\$1,449,979,516.64</b>
	3133EFCT2: FFCB 06/08/2018-43386	\$50,000,000.00	
	3133EFCT2: FFCB 06/08/2018-43387	\$25,000,000.00	
06/08/2018	06538CF89: BTMUFJ 06/08/2018-44571	\$50,000,000.00	
	<b>Total Cash Flow</b>	<b>\$125,000,000.00</b>	<b>\$1,574,979,516.64</b>
	Payroll Transfer to Bank	(\$77,000,000.00)	
06/11/2018	3133EEW48: FFCB 06/11/2018-43285	\$50,000,000.00	
	<b>Total Cash Flow</b>	<b>(\$27,000,000.00)</b>	<b>\$1,547,979,516.64</b>
	Kaiser Health Premium	(\$33,000,000.00)	
06/12/2018	78009NU46: RY 06/12/2018-44259	\$50,000,000.00	
	<b>Total Cash Flow</b>	<b>\$17,000,000.00</b>	<b>\$1,564,979,516.64</b>
	CCSF Payroll Tax 1	(\$36,000,000.00)	
06/13/2018	<b>Total Cash Flow</b>	<b>(\$36,000,000.00)</b>	<b>\$1,528,979,516.64</b>
06/14/2018	3133EFSH1: FFCB 06/14/2018-43549	\$25,000,000.00	
	<b>Total Cash Flow</b>	<b>\$25,000,000.00</b>	<b>\$1,553,979,516.64</b>

		Total CF	Adjusted Liquidity
	Payroll Transfer to Bank	(\$77,000,000.00)	
	SFO Debt Service ACH	(\$37,000,000.00)	
05/25/2018	3135GOWJ8: FNMA 05/21/2018-42898	\$25,000,000.00	
	3130A8VL4: FHLB 05/24/2018-43792	\$10,000,000.00	
	3130A8VL4: FHLB 05/24/2018-43793	\$25,000,000.00	
	3134G9HC4: FHLMC 05/25/2018-43729	\$10,000,000.00	
	06417GXY9: BNSHOU 05/25/2018-44539	\$35,000,000.00	
	<b>Total Cash Flow</b>	<b>(\$9,000,000.00)</b>	<b>\$1,278,479,516.64</b>
	CCSF Payroll Tax 1	(\$36,000,000.00)	
05/30/2018	313385XL5: FHLBDN 05/30/2018-44231	\$36,000,000.00	
	<b>Total Cash Flow</b>	<b>\$0.00</b>	<b>\$1,278,479,516.64</b>
	Retiree Pension Payment	(\$83,000,000.00)	
	Pension Payment Northern Trust Pmt	\$83,000,000.00	
05/31/2018	<b>Total Cash Flow</b>	<b>\$0.00</b>	<b>\$1,278,479,516.64</b>
	CCSF Payroll Tax 2	(\$7,000,000.00)	
06/01/2018	313385XL5: FHLBDN 05/30/2018-44231	\$2,500,000.00	
	546456CY8: LASGEN 06/01/2018-43878	\$4,500,000.00	
	<b>Total Cash Flow</b>	<b>\$0.00</b>	<b>\$1,278,479,516.64</b>
	UC Regents	(\$13,000,000.00)	
06/05/2018	89113W2C9: TDNY 06/04/2018-44240	\$13,000,000.00	
	<b>Total Cash Flow</b>	<b>\$0.00</b>	<b>\$1,278,479,516.64</b>
	Payroll Transfer to Bank	(\$77,000,000.00)	
06/11/2018	06538CF89: BTMUFJ 06/08/2018-44571	\$27,000,000.00	
	3133EEW48: FFCB 06/11/2018-43285	\$50,000,000.00	
	<b>Total Cash Flow</b>	<b>\$0.00</b>	<b>\$1,278,479,516.64</b>
	Kaiser Health Premium	(\$33,000,000.00)	
06/12/2018	78009NU46: RY 06/12/2018-44259	\$33,000,000.00	
	<b>Total Cash Flow</b>	<b>\$0.00</b>	<b>\$1,278,479,516.64</b>
	CCSF Payroll Tax 1	(\$36,000,000.00)	
06/13/2018	06538CF89: BTMUFJ 06/08/2018-44571	\$19,000,000.00	
	78009NU46: RY 06/12/2018-44259	\$17,000,000.00	
	<b>Total Cash Flow</b>	<b>\$0.00</b>	<b>\$1,278,479,516.64</b>

## ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

### Short-Term Fixed Income Market Liquidity Options

15

- Repurchase Agreements
- Money Market Funds
- US Treasury Bills
- Federal Agency Discount Notes
- Commercial Paper

# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## Repurchase Agreements

16

- Secured loan with collateral for a specified term and an agreed upon rate
- Counterparty is usually a bank or a broker-dealer
- Rate is based on the counterparty, the term of the repo, and the collateral backing it
- Deliverable versus Tri-Party
- Customizable to fit investor needs
- Illiquid, no secondary market



# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## Repurchase Agreement Outstanding Balances

17



# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## Repurchase Agreements

18

SIFMA (Securities Industry and Financial Markets Association) – [www.sifma.org](http://www.sifma.org)

### **Master Repurchase Agreement (MRA)**

*Last updated September 1, 1996*

An agreement for use when parties may enter into transactions in which one party (a “Seller”) agrees to transfer to the other (a “Buyer”) securities or other assets against the transfer of funds by the Buyer, with a simultaneous agreement by the Buyer to transfer to the Seller such securities at a date certain or on demand, against the transfer of funds by the Seller.

# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## Master Repurchase Agreement

19

# Master Repurchase Agreement

---

September 1996 Version

Dated as of \_\_\_\_\_

Between: \_\_\_\_\_

and \_\_\_\_\_

### 1. Applicability

From time to time the parties hereto may enter into transactions in which one party ("Seller") agrees to transfer to the other ("Buyer") securities or other assets ("Securities") against the transfer of funds by Buyer, with a simultaneous agreement by Buyer to transfer to Seller such Securities at a date certain or on demand, against the transfer of funds by Seller. Each such transaction shall be referred to herein as a "Transaction" and, unless otherwise agreed in writing, shall be governed by this Agreement, including any supplemental terms or conditions contained in Annex I hereto and in any other annexes identified herein or therein as applicable hereunder.

# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## Custodial Undertaking – Tri-Party Repo

20

**CUSTODIAL UNDERTAKING IN CONNECTION**

**WITH MASTER REPURCHASE AGREEMENT**

\*\*\*\*\*

BY AND AMONG

**CITY AND COUNTY OF SAN FRANCISCO**

(Buyer)

AND

**RBC CAPITAL MARKETS, LLC**

(Seller)

AND

**THE BANK OF NEW YORK MELLON**

(Custodian)

# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## BONY Custodial Undertaking Schedule I

SCHEDULE I SCHEDULE OF ELIGIBLE SECURITIES														
Custodial Undertaking in Connection with Master Repurchase Agreement dated as of _____, among _____ ("Buyer"), RBC Capital Markets, LLC ("Seller") and The Bank of New York Mellon.														
U.S. TREASURIES			Yes/No	Margin	GNMA			Yes/No	Margin	PRIVATE LABELS CMOS			Yes/No	Margin
BILLS	Yes	102%			TRUST RECEIPTS	No				≥BBB-,Baa3,BBB-	No			
BONDS	Yes	102%			GNMA I/II-SINGLE FAMILY	No				≤ CCC-,Caa3,CCC-	No			
NOTES	Yes	102%			GNMA I/II-OTHERS-FIXED RATE	No				<b>CMO TYPES:</b>				
STRIPS	Yes	102%			GNMA I/II OTHERS-ADJUST. RATE	No				RESIDUALS	No			
SYNTHETIC TREASURIES	No									INVERSE IO FLOATERS	No			
										IOETTES	No			
										INTEREST ONLY (IO)	No			
<b>AGENCY DEBENTURES</b>					<b>AGENCY MORTGAGE BACKS</b>					PRINCIPAL ONLY (PO)	No			
FAMC (Fed Agriculture Mtge Corp)	Yes	102%			TRUST RECEIPTS	No				INVERSE FLOATERS	No			
FCFAC (Farm Credit Finan. Asst.)	Yes	102%			PASS THROUGH-FIXED RATE	No				SUPER FLOATERS	No			
FFCB (Farm Credit System Banks)	Yes	102%			PASS THROUGH-ADJUST. RATE	No				COMPANION FLOATERS	No			
FmHA (Farmers Home Admin.)	Yes	102%			MBS STRIPS (IO,PO,RECOMB)	No				SEQUENTIAL AND OTHER FLOATERS	No			
FHLB (Federal Home Loan Banks)	Yes	102%								PAC & OTHER SCHEDULED FLOATERS	No			
FHLMC (Federal Home Loan Mtge)	Yes	102%			<b>AGENCY REMICS/CMOS</b>					Z BONDS	No			
FICO (Financing Corporation)	Yes	102%			<b>REMIC TYPES:</b>					COMPANION BONDS	No			
FLBB (Federal Land Bank Bonds)	Yes	102%			RESIDUALS	No				SEQUENTIAL BONDS	No			
FNMA (Federal Nat'l Mtge Corp)	Yes	102%			INVERSE IO FLOATERS	No				TAC BONDS	No			
REFCO (Resolution Funding Corp)	No				IOETTES	No				PAC & OTHER SCHEDULED BONDS	No			
SLMA (Student Loan Mtge Corp)	No				INTEREST ONLY (IO)	No								
TVA (Tennessee Valley Authority)	Yes	102%			PRINCIPAL ONLY (PO)	No								
USPS (U.S. States Postal Service)	No				INVERSE FLOATERS	No				<b>ASSET BACKED SECURITIES</b>				
AGENCY STRUCTURED NOTES	No				SUPER FLOATERS	No				ASSET BACKED SECURITIES (≥BBB-,Baa3,BBB-)	No			
					COMPANION FLOATERS	No				ASSET BACKED SECURITIES (≤ CCC-,Caa3,CCC-)	No			
					SEQUENTIAL AND OTHER FLOATERS	No								
<b>INTERNATIONAL AGENCIES</b>					PAC & OTHER SCHEDULED FLOATERS	No				<b>CORPORATES</b>				
ADDB (Asian Development Bank)	No				Z BONDS	No				CORPORATE BOND (≥BBB-,Baa3,BBB-)	No			
AFDB (African Development Bank)	No				COMPANION BONDS	No				CORPORATE BOND (≤ CCC-,Caa3, CCC-)	No			
IADB (Inter-American Dev. Bank)	Yes	102%			SEQUENTIAL BONDS	No				MEDIUM-TERM NOTE (≥AA-,Aa3,AA-)	Yes	105%		
IFCO (International Finance Corp)	Yes	102%			TAC BONDS	No				MEDIUM-TERM NOTE (≤ CCC-,Caa3,CCC-)	No			
WLDB (World Bank)	Yes	102%			PAC & OTHER SCHEDULED BONDS	No								
										<b>MONEY MARKETS</b>				
<b>FDIC Guaranteed Debt under TLGP</b>	Yes	102%			<b>MUNICIPAL BOND</b>					COMMERCIAL PAPER (DOMESTIC) (≥A1/P1/F1)	Yes	105%		
<b>GTC (Government Trust Certificate)</b>	No				MUNICIPAL BONDS (≥AA-,Aa3,AA-) **	Yes	105%			COMMERCIAL PAPER (≤A2/P2/F2)	No			
<b>SBA (Small Business Administration)</b>	No				** (EXCEPT STATE OF CALIFORNIA)					BANERS ACCEPTANCE (DOMESTIC) (≥A1/P1/F1)	Yes	105%		
<b>SVRN (Sovereign Debt)</b>	No				MUNICIPAL BONDS (CA STATE ONLY)	Yes	105%			CD (DOMESTIC OR YCD) (≥A1/P1/F1)	Yes	105%		
<b>ACRS (Agency Credit Risk Security)</b>	No				MUNICIPAL BONDS (≤ CCC-,Caa3,CCC-)	No				BANK NOTES (DOMESTIC) (≥A1/P1/F1)	Yes	105%		
<b>CASH</b>	Yes	100%												

BUYER ACKNOWLEDGES AND AGREES THAT IF A CLASS OF SECURITY CONTAINS NEW ISSUES OF SECURITIES, SUCH NEW ISSUES OF SECURITIES SHALL BE DEEMED TO BE ELIGIBLE SECURITIES.

[BUYER] \_\_\_\_\_ [SELLER] \_\_\_\_\_

ACCEPTED:  
THE BANK OF NEW YORK MELLON

By: \_\_\_\_\_ By: \_\_\_\_\_ By: \_\_\_\_\_  
Title: \_\_\_\_\_ Title: \_\_\_\_\_ Title: \_\_\_\_\_  
Date: \_\_\_\_\_ Date: \_\_\_\_\_ Date: \_\_\_\_\_

## ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## Money Market Funds – Overview

22

- Per CA Government code, a money market fund must either attain the highest ranking by not less than two NRSROs or retain an investment advisor registered or exempt from registration with the SEC with not less than 5 years experience managing money market mutual funds with AUM in excess of \$500 million.
- US Treasury and Government Money Market Funds can use amortized investment accounting and trade at a stable NAV of \$1.00

## ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

### Money Market Funds – Overview (cont.)

23

- Institutional Prime Money Market Funds have floating NAVs, can be subject to liquidity fees and redemption gates
- Provide same day liquidity
- Transactions can be executed over the telephone, online, or on a portal
- Increased transparency into holdings/risk exposures
- Prospectus/Statement of Additional Information
- Pays monthly interest

## ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## Money Market Funds – Prime Funds and Floating NAVs

24

- Offers same day liquidity with some funds offering intra-day liquidity
- Most funds have multiple NAV strike times (4 decimals) with as many three times a day
- Subject to gates and fees
- Due diligence – monitoring daily and weekly liquidity, % of fund held, and fund composition (i.e. country exposure, asset allocation)



## ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

# Money Market Funds – Last Changes to Rule 2(a)-7 by SEC

25

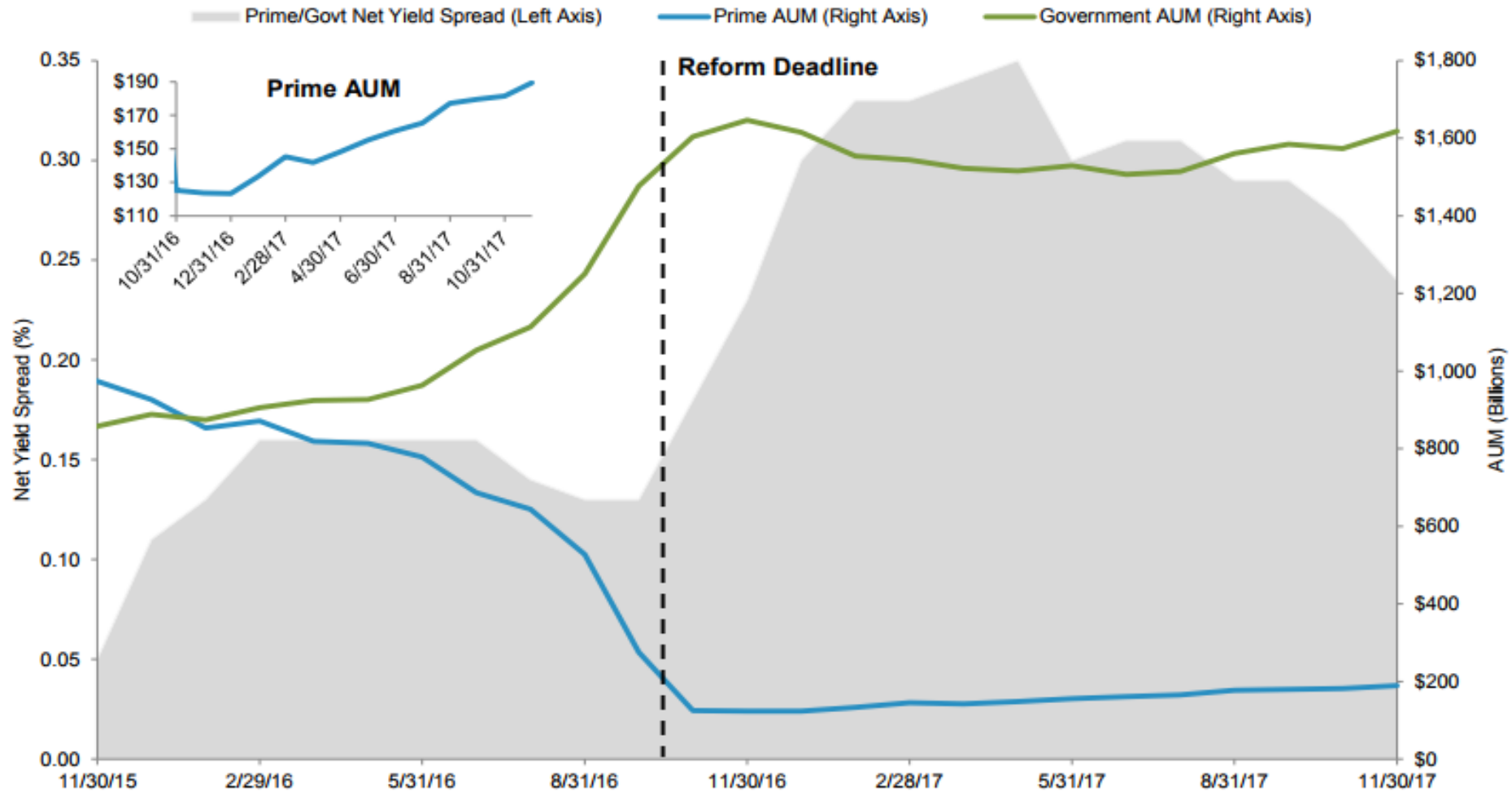
## Overview of Final SEC Rules on Money Market Mutual Funds

Fund Type	Net Asset Value (NAV)	Liquidity Fee	Redemption Gate
U.S. Treasury	Stable	No	No
Government	Stable	No	No
Retail Municipal/Tax-Exempt	Stable	Yes	Yes
Retail Prime/General Purpose	Stable	Yes	Yes
Institutional Municipal/Tax-Exempt	<b>Floating</b>	Yes	Yes
Institutional Prime/General Purpose	<b>Floating</b>	Yes	Yes

MMF Reform	Final Rule	Implementation Date
<b>Floating NAV</b>	Applicable funds will price and transact at a net asset value per share that can change or “float,” based on pricing the underlying fund holdings out to four decimal places (\$1.0000)	October 14, 2016
<b>Liquidity Fee</b>	If a fund’s weekly liquid assets were to fall below 30%, fund’s board may impose a 2% fee on redemptions  If a fund’s weekly liquid assets were to fall below 10%, redemptions will be subject to a 1% fee, unless the fund’s board determines otherwise	October 14, 2016
<b>Redemption Gate</b>	If a fund’s weekly liquid assets were to fall below 30%, fund’s board may suspend redemptions for up to 10 days	October 14, 2016
<b>Retail Fund Definition</b>	Retail funds limit shareholders to beneficial ownership by “natural persons” (individuals)  Institutional funds are open to any shareholders, including individuals, small businesses, and large corporations	October 14, 2016

# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## Money Market Funds – Institutional Prime vs. Government

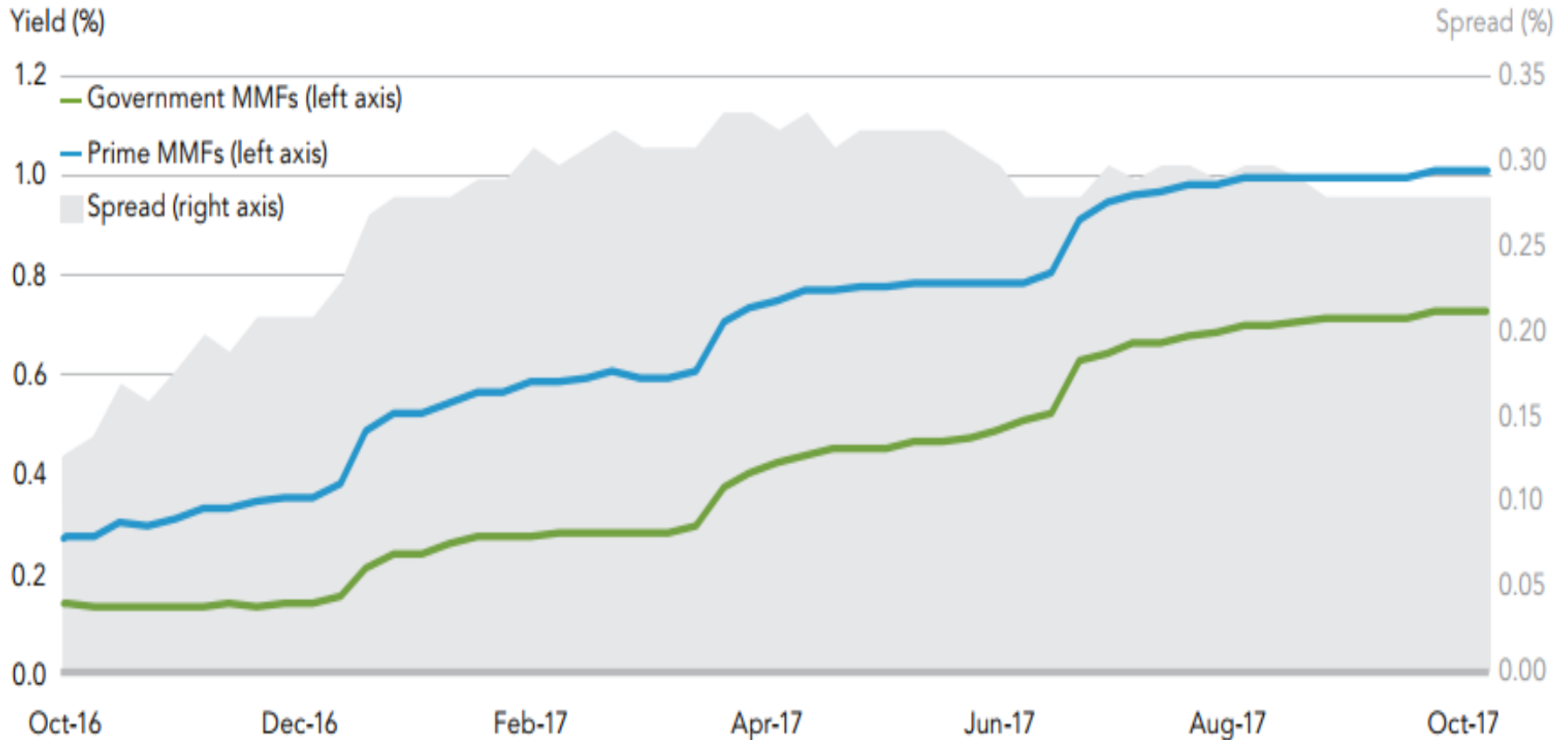


Source: iMoneyNet as of 11/30/2017.

# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## Money Market Funds – Prime vs Government Yield Spreads

27



Source: iMoneyNet, as of Sep. 30, 2017.

# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## US Treasury Bills - Overview

28

- Issued for terms of 4, 13, 26 and 52 weeks. Cash management bills are periodically issued for short periods
- Bills, except cash management bills, are auctioned on a regular schedule – 4, 13, & 26 week bills auctioned every week, 52 week bill every 4 weeks
- Bids are submitted as either competitive or noncompetitive
- Sold at a discount, determined at auction

# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## US Treasury Bills – Credit and Liquidity

29

- Guaranteed by the full faith and credit of the United States
- Highly liquid
- Bid/ask spread very tight – at or less than 1 bp
- [www.treasurydirect.gov](http://www.treasurydirect.gov)

# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## Federal Agency Discount Notes - Overview

30

- US Dollar-denominated unsecured general obligation with a maturity less than 365 days
- Federal Farm Credit Bank (FFCB), Federal Home Loan Banks (FHLB), Federal Home Loan Mortgage Corp (FHLMC), Federal National Mortgage Association (FNMA), Federal Agricultural Mortgage Corp (FAMCA), Tennessee Valley Authority (TVA), International Bank for Reconstruction and Development (IBRD), International Finance Corporation (IFC), Inter-American Development Bank (IADB)
- Not a mortgage-backed security – no collateral backing issuance
- Quoted on a discount basis (same as T-Bills)
- In the market daily with date flexibility – maturity date can be issued for any business date

## ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## Federal Agency Discount Notes – Credit and Liquidity

31

- High degree of safety – Very low degree of default risk
  
- High degree of liquidity
  
- Bid/ask spread usually very tight – 0.5 to 2 bps

# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## Federal Agency Discount Notes – Information Matrix

32

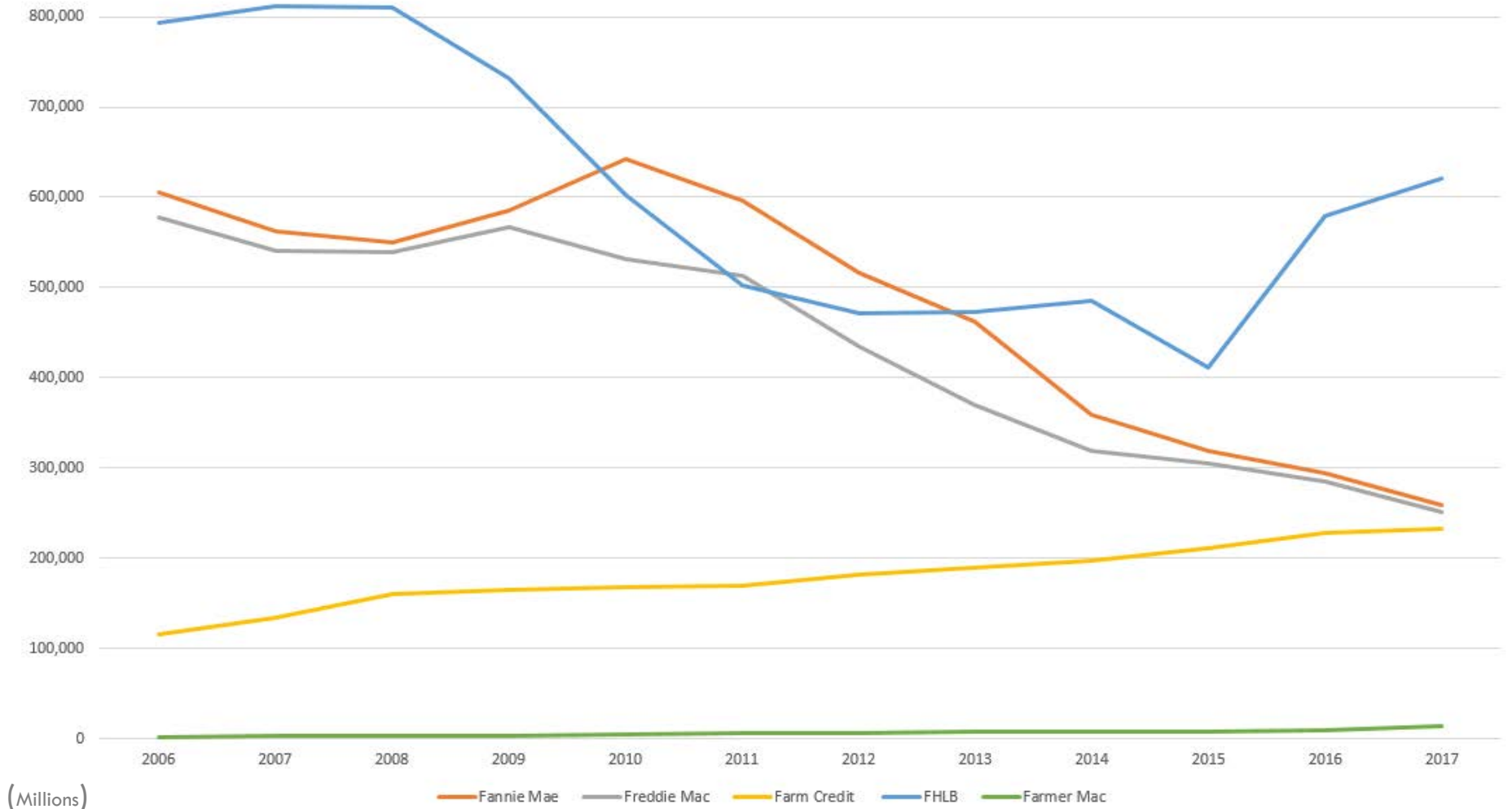
	Farm Credit	Federal Home Loan Banks	Freddie Mac	World Bank
<b>Mission</b>	Fund U.S. agriculture and rural communities	Provide liquidity to financial institutions to support housing and community development	Support liquidity and stability of U.S. mortgage markets	Provide global development project financing and expertise that improve living standards in member countries
<b>Credit Ratings</b>	Aaa / AAA / AA+ Moody's / Fitch / S&P	Aaa / AA+ Moody's / S&P	Aaa / AAA / AA+ Moody's / Fitch / S&P	Aaa / AAA Moody's / S&P
<b>Link to Government</b>	GSE – Government charter	GSE - Government charter and \$4 Billion US Treasury credit facility	GSE - Government Sponsored Enterprise	Government ownership (188 member governments. US largest member with 17% ownership)
<b>Regulator</b>	Farm Credit Administration (FCA)	Federal Housing Finance Agency (FHFA)	Federal Housing Finance Agency (FHFA)	Collective Governance System framework established by the Bratton Woods Agreements Act (22 U.S.C. §286 designating the IBRD under United States law)
<b>Total Assets YE 2015</b>	\$303 Billion	\$969 Billion	\$2 Trillion	\$343 Billion
<b>Capital Requirement</b>	7% Perm. Capital Ratio 7% Total Surplus Ratio 3.5% Core Surplus Ratio	4% Capital-to-Assets	Subject to Senior Preferred Stock Purchase Agreement (\$141 Billion available from Treasury)	N/A
<b>Capital Ratio YE 2015</b>	16% Capital-to-Assets	5.1% Capital-to-Assets	N/A	25.1% Equity-to-Loans
<b>Debt Outstanding YE2015</b>	\$243 Billion	\$905 Billion	\$418 Billion	\$ 168 Billion
<b>Debt Issued YE 2015</b>	DNs = \$190 Billion Bullets = \$24 Billion Callables= \$37 Billion Floaters = \$49 Billion	DNs = \$2 Trillion Bullets = \$140 Billion Callables = \$55 Billion Floaters = \$89 Billion Structured Notes = \$20 Billion	DNs = \$428 Billion Callables = \$127 Billion FRNs = \$24 Billion Bullets = \$6 Billion Reference Notes = \$12 Billion STACRs = \$7 Billion	DNs = \$15 Billion Bullets = \$17 Billion Callables= \$3 Billion Floaters = \$355 Million
<b>Market Access</b>	DNs - daily (window) Bullets/Callables/Floaters - daily auctions/negotiated Designated Bonds - Syndicate	DNs – daily (window) and twice weekly auctions Benchmark Bullets – syndicate/auctions TAPS and Callables daily auctions Bullets/Callables/Floaters/Structured Notes – daily negotiated	DNs - daily (window) and weekly auctions Callables, Floaters, Bullets - daily negotiated Reference Notes - Syndicate/ Auctions (dates pre-determined) STACRs - Syndicate	DNs - daily (window) Benchmark Bullets - syndicate Bullets/Callables/Floaters/Structured Notes – daily negotiated
<b>Contact</b>	Regina Gill rgill@farmcreditfunding.com	Denise de Bombelles debombelles@fhfb-of.com	debt_securities@freddiemac.com	Investor Relations debtsecurities@worldbank.org
<b>Website</b>	www.farmcreditfunding.com	www.fhfb-of.com	www.freddiemac.com	www.worldbank.org/debtsecurities



# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## Federal Agency Debt Outstanding

33



# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## Commercial Paper - Overview

34

- Short-term unsecured promissory note
- Issuing corporation must be organized and operating in the US, have assets in excess of \$500 million, and debt other than CP rated “A”
- Asset backed commercial paper must be organized as a special purpose corporation, trust, or LLC within the US, have program wide credit enhancements, and has CP rated “A-1” or higher by a NRSRO
- Maturities range from 1 day to a max of 270 days
- Minimum ratings must be the highest letter and number by an NRSRO
- Sold both at a discount or as interest bearing
- Offered direct or through a broker/dealer

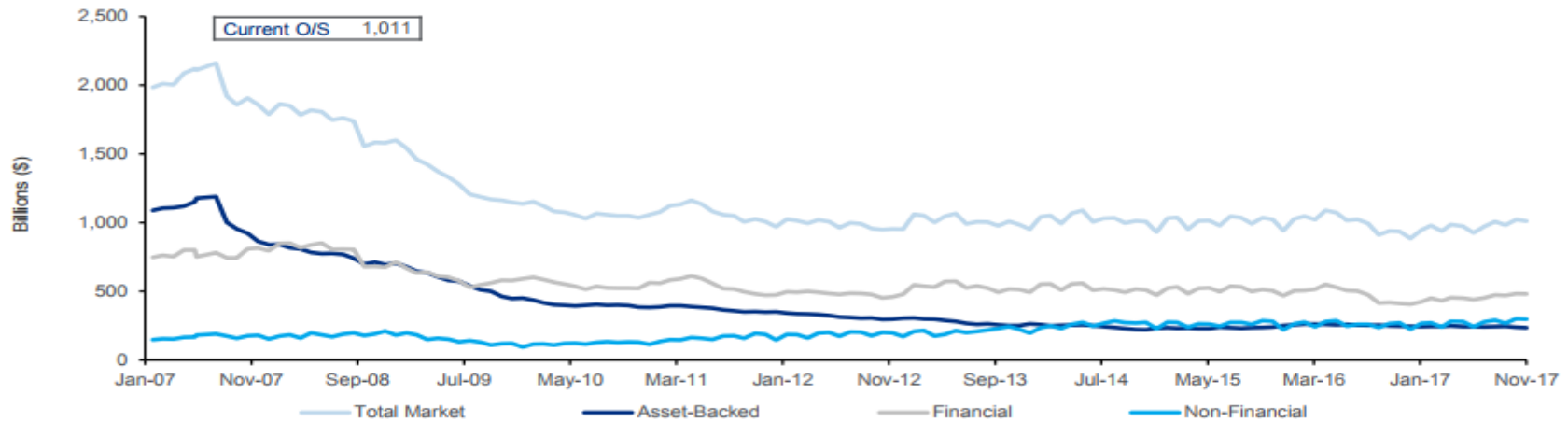
# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## Commercial Paper – Market Outstandings

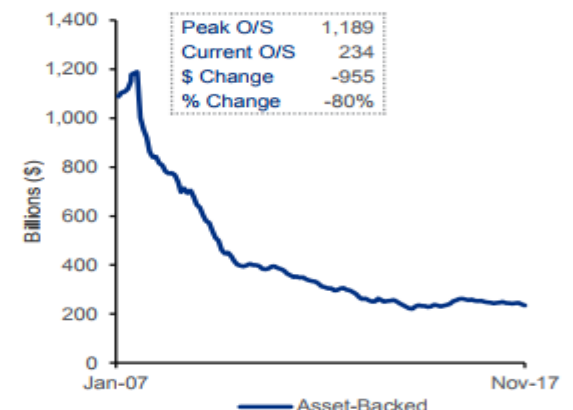
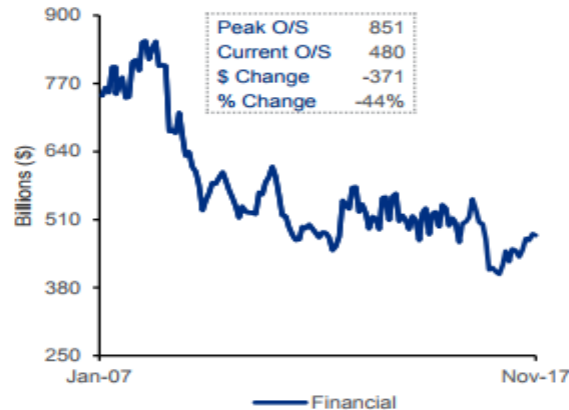
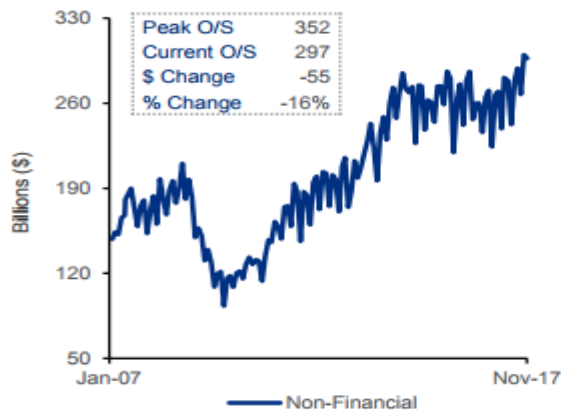
35

### Historical USCP Market Outstandings

Commercial Paper Outstandings



Outstandings by Sector

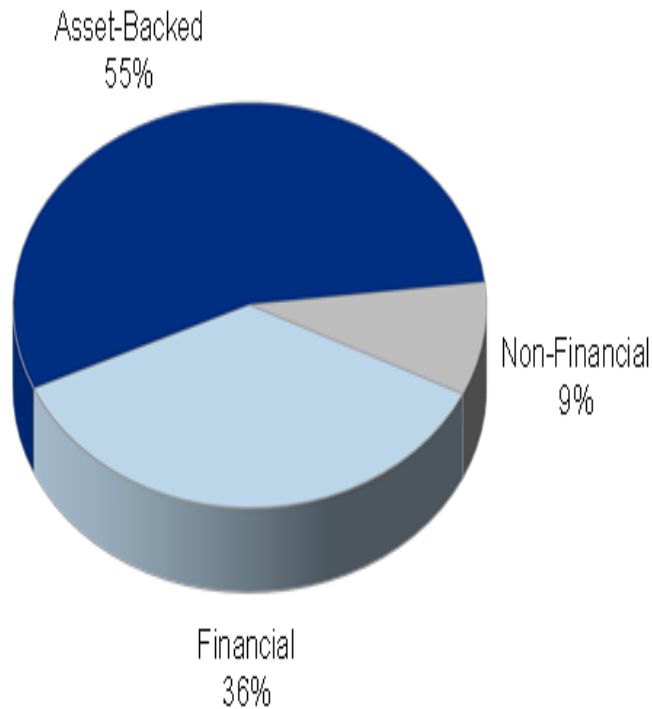


# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

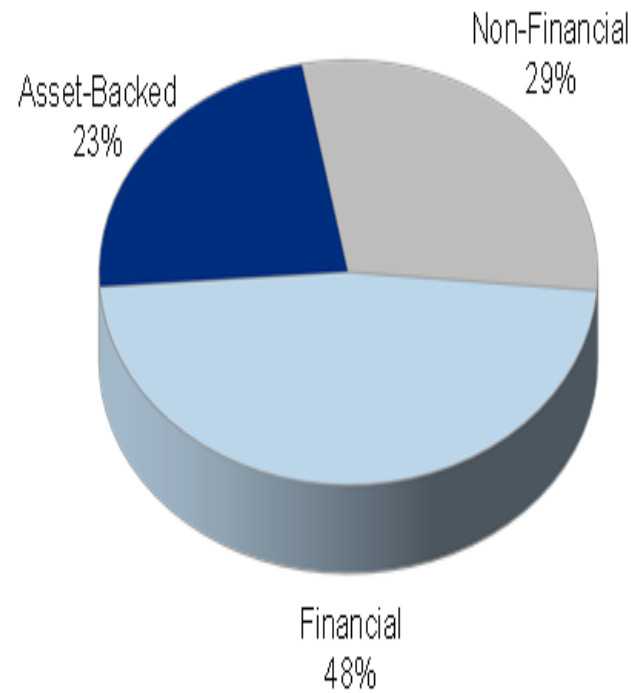
## Commercial Paper – Market Breakdown

36

July 2007



November 2017



# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## Asset-Backed Commercial Paper - Overview

37

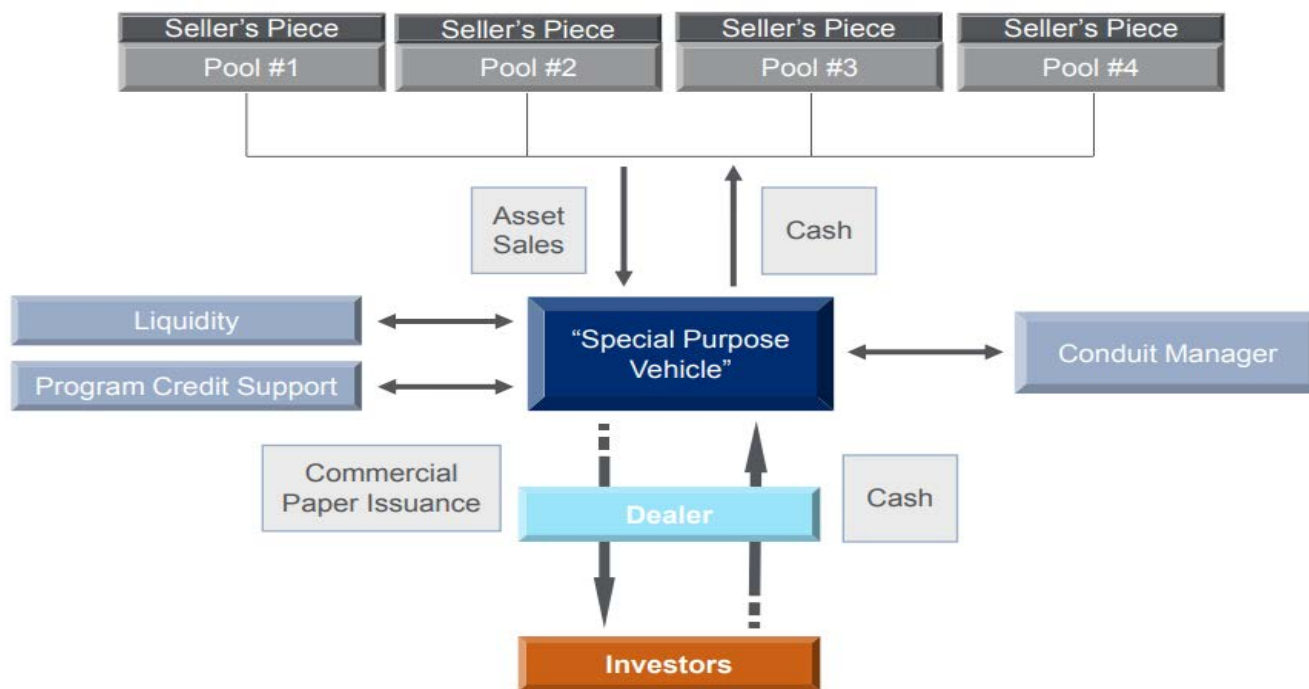
- Collateralized by a variety of asset classes, such as credit card receivables, student loan payments, auto loans, and other financial assets
- Special Purpose vehicle (SPV) is created by a sponsor, usually a bank or other financial institution
- Have different levels of credit enhancement and liquidity facilities designed to protect investors
- Can provide a diversification benefit
- Yields can be higher than regular commercial paper, bid/ask spreads 1 to 5 bps
- Evaluation should consider (1) quality and experience of sponsor, (2) performance of the underlying assets and underlying credit enhancements, (3) soundness of the legal structure
- Pool Reports are key



# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## Asset-Backed Commercial Paper - Overview

38



*Multi-seller programs comprised 78% of ABCP market as of 3Q2017*

# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## Electronic Trading – Overview

39

- Extremely efficient for transacting liquid fixed income instruments such as US Treasuries, Federal Agency paper, commercial paper, municipal commercial paper, and corporate notes
- Examples of available platforms: Bloomberg FIT and BOOM, TradeWeb, and Market Access
- Increased market transparency
- Ease of best execution

# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## Electronic Trading – BOOM on Bloomberg

40

Discount Notes 97) Trading Access 91) Searches 92) Settings Money Market Offerings

93) Refine Search DEFAULT Prim & Sec Group by None 88) Sellback 89) Chart

Table RateRun

AskSz (M)	Issuer	Maturity	SD	Dsc/Cpn	AskYld	Dlr	Pgm	Ticker	DTM	Time
10,000	IADB DISCOUNT	12/26/17		1.260	1.260	TD	AGD	IADN	4	18:49
34,715	FHLB DISC CORP	12/26/17		1.250	1.250	WFS	AGD	FHDN	4	08:33
313,134	FHLB DISC CORP	12/26/17		1.250	1.250	JEFF	AGD	FHDN	4	08:36
313,134	FHLB DISC CORP	12/26/17		1.250	1.250	WLMS	AGD	FHDN	4	08:36
313,134	FHLB DISC CORP	12/26/17		1.250	1.250	TD	AGD	FHDN	4	08:36
313,134	FHLB DISC CORP	12/26/17		1.250	1.250	BMO	AGD	FHDN	4	08:36
313,134	FHLB DISC CORP	12/26/17		1.250	1.250	PIPJ	AGD	FHDN	4	08:36
313,134	FHLB DISC CORP	12/26/17		1.250	1.250	WFS	AGD	FHDN	4	08:36
313,134	FHLB DISC CORP	12/26/17		1.250	1.250	CF	AGD	FHDN	4	08:36
313,134	FHLB DISC CORP	12/26/17		1.250	1.250	APSC	AGD	FHDN	4	08:36
1,000,000	FHLB DISC CORP	12/26/17		1.250	1.250	UBS	AGD	FHDN	4	07:22
313,134	FHLB DISC CORP	12/26/17		1.250	1.250	CITI	AGD	FHDN	4	08:36
313,134	FHLB DISC CORP	12/26/17		1.250	1.250	BARC	AGD	FHDN	4	08:37
313,134	FHLB DISC CORP	12/26/17		1.250	1.250	RBSM	AGD	FHDN	4	08:36
750,000	FREDDIE DISCOUNT	12/26/17		1.200	1.200	RBSM	AGD	FMCDN	4	05:50
100,000	IBRD DISCOUNT NT	12/26/17 - 12/29/17		1.050	1.050	JEFF	AGD	WBDN	4 - 7	05:39
100,000	IBRD DISCOUNT NT	12/26/17 - 12/29/17		1.050	1.050	WFS	AGD	WBDN	4 - 7	06:08
100,000	IBRD DISCOUNT NT	12/26/17 - 12/29/17		1.050	1.050	TD	AGD	WBDN	4 - 7	06:19
100,000	IBRD DISCOUNT NT	12/26/17		1.050	1.050	UBS	AGD	WBDN	4	05:44
313,134	FHLB DISC CORP	12/26/17		1.250	0.000	RBC	AGD	FHDN	4	08:39
414,665	FHLB DISC CORP	12/27/17 - 12/29/17		1.200	1.200	TD	AGD	FHDN	5 - 7	08:18
414,665	FHLB DISC CORP	12/27/17 - 12/29/17		1.200	1.200	BMO	AGD	FHDN	5 - 7	08:18



# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## Electronic Trading – FIT on Bloomberg

41

United States BGM 1) Actions 3) Settings Fixed Income Trading

08:31

4) Actives	5) Bills	6) Notes	7) TIPS	8) Strips	9) Sprds	10) Curves	11) FRN	12) Bfly	13) WI
31) 12/14/17	/				54) 04/19/18	1.368 / 1.365		1.390	-0.003
32) 12/21/17	/				55) 04/26/18	1.369 / 1.347		1.372	-0.003
33) 12/28/17	1.200 / 1.184		1.200	+0.006	56) 05/03/18	1.418 / 1.413		1.439	--
34) CMB 1/2	1.130 / 1.125		1.141	-0.005	57) 05/10/18	1.415 / 1.410		1.437	-0.015
35) 01/04/18	1.109 / 1.092		1.108	-0.024	58) 05/17/18	1.422 / 1.410		1.438	-0.005
36) 01/11/18	1.142 / 1.119		1.135	-0.025	59) 05/24/18	1.435 / 1.414		1.442	+0.001
37) CMB 1/18	1.155 / 1.148		1.164	-0.002	60) 05/31/18	1.438 / 1.425		1.454	-0.002
38) WI 1MTH	1.235 / 1.230		1.248	+0.005	61) 06/07/18	1.445 / 1.438		1.467	+0.008
39) 1M ROLL	-8.000 / 7.000				62) 06/14/18	1.465 / 1.455		1.485	-0.010
40) 01/25/18	1.163 / 1.137		1.154	-0.021	63) 06/21/18	1.503 / 1.495		1.527	--
41) 02/01/18	1.193 / 1.177		1.195	-0.013	64) WI 6MTH	1.525 / 1.515		1.548	--
42) 02/08/18	1.196 / 1.190		1.208	--	65) 6M ROLL	-3.000 / 1.500			
43) 02/15/18	1.245 / 1.231		1.251	-0.001	66) 07/19/18	1.530 / 1.506		1.539	+0.004
44) 02/22/18	1.246 / 1.227		1.247	-0.006	67) 08/16/18	1.591 / 1.571		1.607	+0.010
45) 03/01/18	1.266 / 1.253		1.273	-0.006	68) 09/13/18	1.625 / 1.615		1.653	+0.002
46) 03/08/18	1.307 / 1.291		1.313	-0.009	69) 10/11/18	1.640 / 1.637		1.677	+0.010
47) 03/15/18	1.305 / 1.302		1.324	-0.015	70) 11/08/18	1.670 / 1.660		1.702	+0.012
48) 03/22/18	1.320 / 1.315		1.337	-0.002	71) 12/06/18	1.680 / 1.672		1.716	+0.010
49) WI 3MTH	1.390 / 1.380		1.404	-0.005	72) WI 12MTH	/			
50) 3M ROLL	-7.500 / 6.500				73) 12M ROLL	/			
51) 03/29/18	1.342 / 1.328		1.351	--					
52) 04/05/18	1.333 / 1.330		1.353	-0.003					
53) 04/12/18	1.342 / 1.340		1.364	+0.008					

# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## Electronic Trading – FIT on Bloomberg

42

10) Flip

Side	Security	Quantity	Settle	Date
Sell	B 0 03/22/18 912796NX3 DV01	M Reg	12/26/17	
		Discount / Yield	1.320 /	1.343
		Principal	\$	
		Accrued ( Days )		
		Net	\$	

Broker	Bid Px↑	Ask Px	BYld	AYld	BSz	ASz	Time
CBBT	1.320	1.313	1.343	1.335			08:32
WFSC	1.310	1.280	.000	.000	35	35	08:32
RBS	1.319	1.301	1.342	1.323	5	5	08:32
LOOP	1.320	1.310	1.343	1.332	100	100	08:32
DIWA	1.320	1.313	1.343	1.335	1	1	08:32
JFF	1.320	1.300	1.343	1.322	10	10	08:19
DB	1.320	1.310	99.685	99.687	2.5	2.5	08:18

FIT Inquiry Ticket

10) None

Select Dealers

APSC	BARC	BMO
BNS	CITI	DB
DIWA	JEFF	LOOP
MS	RBC	RBSM
TD	WFS	

Options

2) Add Notes

5) Order Ticket

9) Stage to TSOX

Entity

1) Submit

Close

More Options

# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## Electronic Trading – FIT on Bloomberg

43

							Page 1/1 Activity Panel	
X	B 0 03/22/18			1:10	Detail	Pass		
	Sell	Dealer	Quantity	Yield	Price		Status	
Cusip	912796NX3	RBSM	50,000,000	1.353	1.33000	Hit	Firm 0:05	
Settle	12/26/17	JEFF	50,000,000	1.343	1.32000	Hit	Subject	
CBBT Px	1.320/1.315	DB	50,000,000	1.358	1.33500	Hit	Firm 0:03	
CBBT Yld	1.343/1.337	DIWA	50,000,000	1.343	1.32000	Hit	Subject	
		LOOP	50,000,000	1.343	1.32031	Hit	Subject	

## ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

### FINRA – Financial Industry Regulatory Authority

44

- [www.finra.org](http://www.finra.org)
- Dedicated to investor protection and market integrity through effective regulation of broker-dealers
- A not-for-profit authorized by Congress
- Great resource for market and broker-dealer information
- Has authority to fine, suspend, or bar brokers for rule infractions

### FINRA Mission

- Writing and enforcing rules governing the activities of 3,700 broker-dealers with 634,000 brokers
- Examining firms for compliance with those rules
- Fostering market transparency
- Educating investors

# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## FINRA – [www.finra.org](http://www.finra.org), Tools & Calculators, Market Data

46

Last Updated: 12/27/2017

### Market Data

Search:

Welcome to FINRA's Market Data Center. This comprehensive tool is designed to assist investors with market and investment research, both through the market data information provided as well as through the FINRA Investor Education material and tools.

#### Market Data Center Overview Guide

#### Market Indices

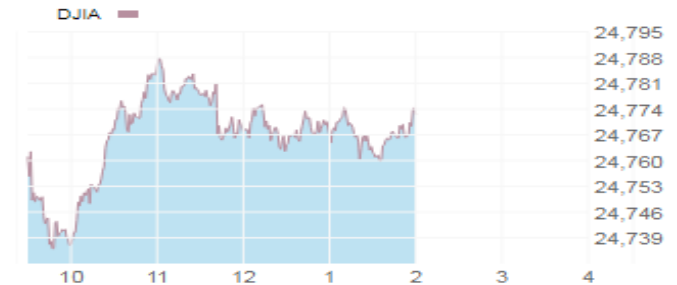
DJIA	24,773.50	27.29	0.11%
NASDAQ	6,938.21	1.96	0.03%
S&P 500	2,681.73	1.23	0.05%

#### FINRA-Bloomberg Active US Corporate Bond Indices

Investment Grade Index(NBBI...)	205.98	0.15	0.07%
High Yield Index(NBBH), Total...	367.19	0.19	0.05%

Data as of 12/27/2017 2:00:45 PM

\* End of day data for previous business day



#### FINRA TRACE Bond Market Activity

View: [Corporate](#) | [Agency](#) | [Structured Products](#) |

	All Issues	Investment Grade	High Yield	Convertible
Total Issues Traded	6226	4572	1487	167
Advances	2947	2229	643	75
Declines	2937	2180	672	85
Unchanged	93	35	53	5
52 Week High	128	37	76	15
52 Week Low	275	213	58	4
Dollar Volume*	4671	3485	998	187

[More FINRA TRACE Bond Market Information](#)

\*Par value in millions

#### Quick Search

##### Debt / Asset Class

- Treasury/Agency
- Corporate
- BTDS144A
- Municipal
- Securitized Products

##### Show Results As

- Bonds
- Trades

##### Issuer Name

##### Symbol / CUSIP

# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

FINRA – [www.finra.org](http://www.finra.org), Tools & Calculators, Market Data

47

Last Updated: 12/27/2017

## Bond Detail

Lookup Symbol:

### FEDERAL HOME LN BKS

[+ ADD TO WATCHLIST](#)

Coupon Rate  
**2.375%**

Maturity Date  
**12/13/2019**

Symbol  
FHLN4085808

CUSIP  
3130A0JR2

Next Call Date  
—

Callable  
—

Last Trade Price  
\$100.80

Last Trade Yield  
1.957%

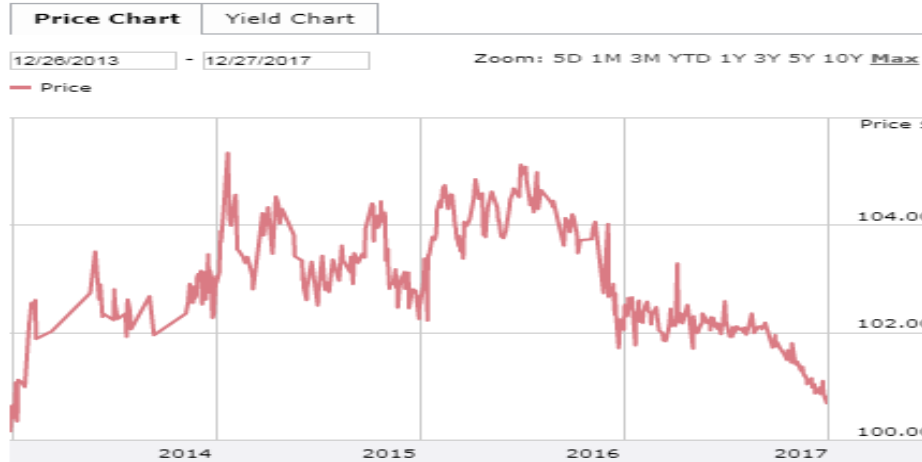
Last Trade Date  
12/27/2017

US Treasury  
Yield  
—

[Trade History](#)

[Prospectus](#)

### Price/Yield Chart



### Classification Elements

Bond Type	US Agency Debenture
Debt Type	Unsecured Bond
Industry Group	Government
Industry Sub Group	U.S. Agencies
Sub-Product Asset	AGCY
Sub-Product Asset Type	Agency Debt Bond
State	—
Use of Proceeds	—
Security Code	—

### Special Characteristics

Medium Term Note	No
------------------	----

### Issue Elements

Offering Date	12/26/2013
Dated Date	12/30/2013
First Coupon Date	06/13/2014
Original Offering*	\$20,000.00
Amount Outstanding**	\$2,081,805.00
Series	—
Issue Description	—
Project Name	—
Payment Frequency	Semi-Annual

### Credit and Rating Elements

Moody's® Rating	Aaa (04/20/2016)
Standard & Poor's Rating	AA+ (12/26/2013)
Fitch Rating	—
TRACE Grade	Investment Grade

# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## FINRA – [www.finra.org](http://www.finra.org), Tools & Calculators, Market Data

48

Last Updated: 12/27/2017

### Bond Trade Activity Search Results

From  to   [Glossary of Terms](#)

Issue: FHLN4085808		Description: FEDERAL HOME LN BKS				Coupon Rate: 2.375				Maturity Date: 12/13/2019						
Execution			Status	Quantity	Price	Yield	Remuneration	ATS	Modifier	2nd Modifier	Special	As-Of	Side	Reporting Party Type	Contra Party Type	
Date	Time	Settlement														
12/27/2017	12:39:12	12/28/2017	T	5000000	100.835	1.938		M		-	-	-	-	S	D	C
12/27/2017	12:39:06	12/28/2017	T	30000	100.808	1.952			Y	-	-	-	-	S	D	D
12/27/2017	12:39:06	12/28/2017	T	30000	100.958	1.874		M		-	-	-	-	S	D	C
12/27/2017	12:38:12	12/28/2017	T	5000000	100.801	1.956				-	-	-	-	S	D	D
12/27/2017	11:54:11	12/28/2017	T	1235000	100.908	1.9		M		-	-	-	-	S	D	C
12/27/2017	11:53:40	12/28/2017	T	1235000	100.799	1.957				-	-	-	-	S	D	D
12/27/2017	10:00:12	12/27/2017	T	100000	100.800	1.957				-	-	-	-	S	D	D
12/26/2017	15:02:53	12/27/2017	T	145000	100.749	1.983			Y	-	-	-	-	S	D	D
12/26/2017	15:02:53	12/27/2017	T	145000	100.699	2.009		N		-	-	-	-	B	D	C
12/26/2017	15:02:53	12/27/2017	T	145000	100.699	2.009				-	-	-	-	S	D	D
12/26/2017	14:51:24	12/27/2017	T	500000	100.852	1.93		M		-	-	-	-	S	D	C
12/26/2017	14:47:07	12/27/2017	T	500000	100.786	1.964				-	-	-	-	S	D	D
12/26/2017	12:43:04	12/27/2017	T	5MM+	100.777	1.969		M		-	-	-	-	S	D	C
12/26/2017	12:34:17	12/27/2017	T	500000	100.786	1.964		M		-	-	-	-	S	D	C
12/26/2017	12:02:51	12/27/2017	T	525000	100.758	1.979				-	-	-	-	S	D	D
12/26/2017	11:55:25	12/27/2017	T	200000	100.782	1.966				-	-	-	-	S	D	D
12/26/2017	11:55:08	12/27/2017	T	200000	100.835	1.939		M		-	-	-	-	S	D	C
12/26/2017	11:50:59	12/27/2017	T	700000	100.777	1.969		M		-	-	-	-	S	D	C
12/26/2017	11:40:13	12/27/2017	T	1325000	100.777	1.969		M		-	-	-	-	S	D	C
12/26/2017	10:21:29	12/27/2017	T	5MM+	100.860	1.926		M		-	-	-	-	S	D	C



# ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

## FINRA – Price Transparency

49

### Bond Trade Activity Search Results

From  to   [Glossary of Terms](#)

Execution			Issue: UBS4154104 Description: UBS AG STAMFORD BRH MEDIUM TERM SR DEP N Coupon Rate: 2.375 Maturity Date: 08/14/2019												
Date	Time	Settlement	Status	Quantity	Price	Yield	Remuneration	ATS	Modifier	2nd Modifier	Special	As-Of	Side	Reporting Party Type	Contra Party Type
11/13/2017	16:36:00	11/15/2017	T	1150000	100.463	2.103	M		-	-	-	-	B	D	C
11/13/2017	13:48:32	11/15/2017	T	2000000	100.590	2.029	M		-	-	-	-	S	D	C
11/13/2017	13:40:37	11/15/2017	T	2000000	100.504	2.079			-	-	-	-	S	D	D
11/13/2017	13:29:17	11/15/2017	T	351000	100.418	2.129			-	-	-	-	S	D	D
11/13/2017	13:15:19	11/15/2017	T	250000	100.393	2.144	N		-	-	-	-	S	D	A
11/10/2017	16:00:46	11/14/2017	T	250000	100.535	2.061	M		-	-	-	-	S	D	C
11/10/2017	15:00:50	11/14/2017	T	300000	100.503	2.08	N		-	-	-	-	S	D	C
11/10/2017	12:01:38	11/14/2017	T	250000	100.489	2.088			-	-	-	-	S	D	D
11/10/2017	09:21:12	11/14/2017	T	5000000	100.947	1.822	M		-	-	-	-	S	D	C
11/10/2017	09:02:00	11/14/2017	T	5000000	100.507	2.078			-	-	-	-	S	D	D
11/10/2017	09:01:00	11/14/2017	T	5000000	100.527	2.066			-	-	-	-	S	D	D
11/9/2017	13:41:51	11/13/2017	T	700000	100.620	2.012	M		-	-	-	-	S	D	C
11/9/2017	13:41:00	11/13/2017	T	700000	100.569	2.042			-	-	-	-	S	D	D
11/9/2017	13:09:33	11/13/2017	T	5000000	100.528	2.066			-	-	-	-	S	D	D
11/9/2017	12:04:00	11/13/2017	T	5MM+	100.554	2.051	M		-	-	-	-	B	D	C
11/8/2017	15:47:24	11/10/2017	T	1200000	100.566	2.045	M		-	-	-	-	S	D	C
11/8/2017	15:01:43	11/13/2017	T	300000	100.547	2.055	M		-	-	-	-	B	D	C
11/8/2017	14:41:39	11/10/2017	T	100000	100.568	2.044	M	Z	-	-	-	-	S	D	C
11/7/2017	12:06:19	11/9/2017	T	5MM+	100.592	2.031	M		-	-	-	-	S	D	C
11/7/2017	10:55:46	11/9/2017	T	350000	100.579	2.038	N		-	-	-	-	B	D	C