



SESSION TWO:

ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

CDIAC

**CALIFORNIA
DEBT AND
INVESTMENT
ADVISORY
COMMISSION**

CDIAC/CMTA
JANUARY 15, 2020

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

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□ 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.

Higher degree of portfolio cashflow certainty can translate into longer portfolio average maturity and portfolio durations.



Cash Flow Due Diligence Goes a Long Way

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- 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.



CCSF Developing a Cash Forecast – A Dynamic Process

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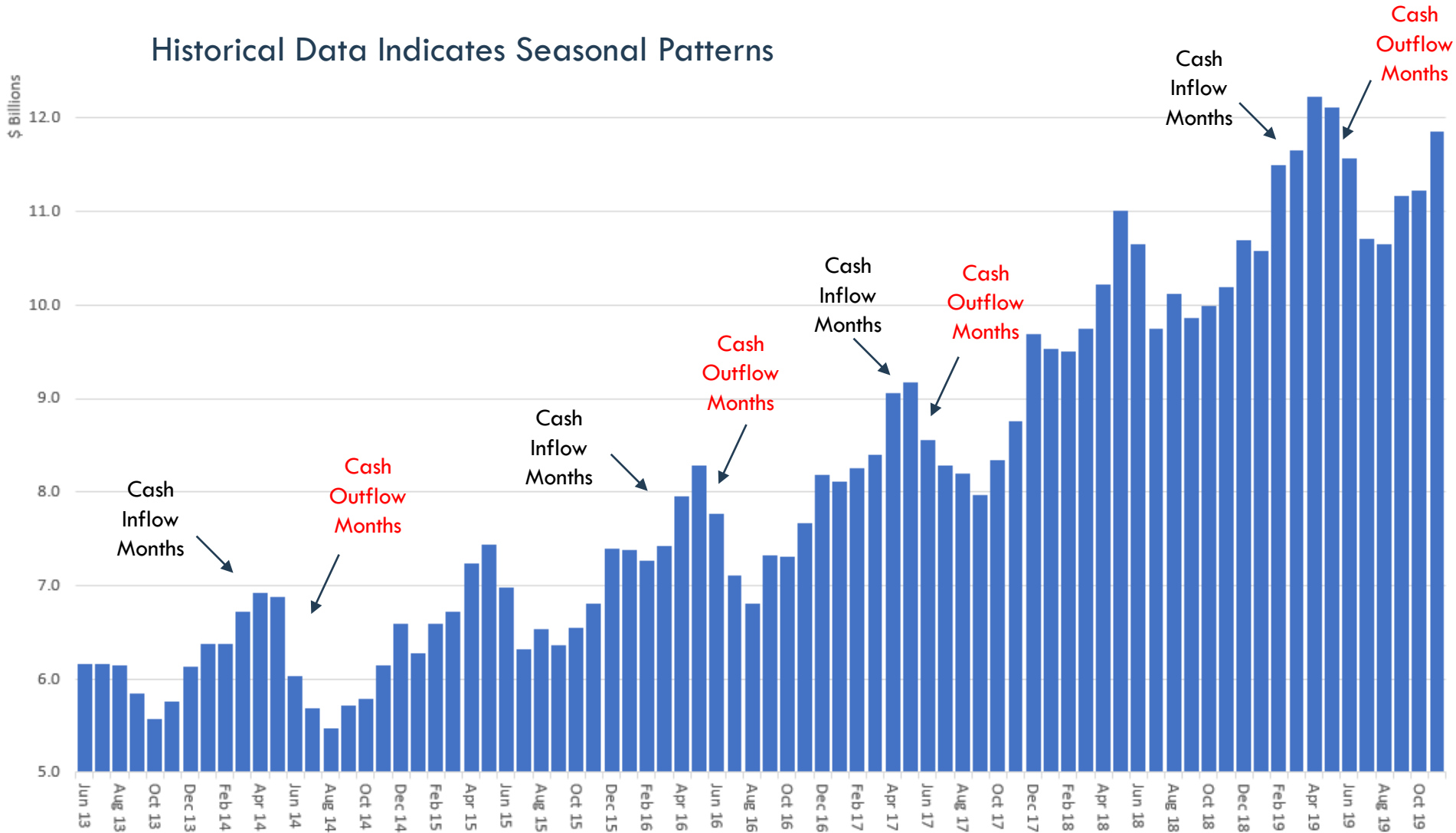
- Gather information on future cash disbursements and cash receipts from the pool participants
- Examine historical data to identify seasonality/trends
- Use statistical extrapolation to predict a pattern of future cash flows (i.e. Moving Average, Exponential Smoothing)
- Create a model incorporating 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

Historical Data Indicates Seasonal Patterns

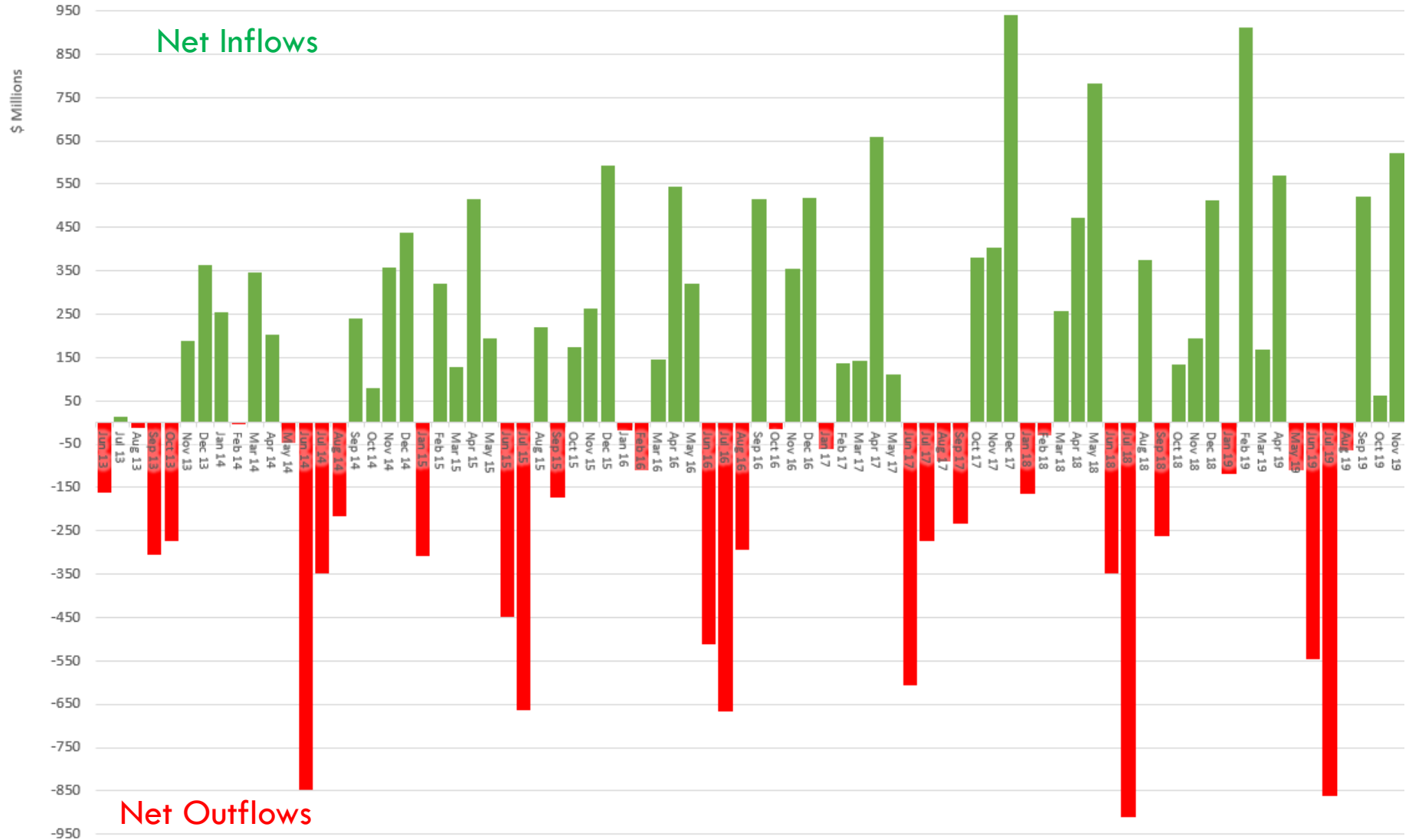




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CCSF Pooled Fund – Month to Month Portfolio Change

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CCSF TTX Historic Revenues – 6 Month Moving Average

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	A	B	C	D	E	F	G	H	I	J	K
1		Property Taxes					De-seasonalized			2019 de-seasonalized	2019 re-seasonalized
2	Month	Year 2016	Year 2017	Year 2018	Month Average	Seasonal Index	Year 2016	Year 2017	Year 2018	Forecast (6m MA)	Forecast
3	January	\$72,684,698	\$139,888,490	\$65,241,751	\$92,604,980	0.33	\$217,338,964.10	\$418,289,136	\$195,083,352.73	\$288,332,167.98	\$96,426,964.40
4	February	\$81,977,743	\$92,863,543	\$65,760,714	\$80,200,667	0.29	\$283,039,417.64	\$320,624,137	\$227,047,897.55	\$281,920,764.79	\$81,653,743.48
5	March	\$267,360,052	\$329,046,467	\$288,168,178	\$294,858,232	1.06	\$251,080,047.74	\$309,010,273	\$270,621,131.87	\$278,030,423.02	\$296,057,886.83
6	April	\$616,335,031	\$668,966,963	\$611,342,351	\$632,214,782	2.28	\$269,948,643.88	\$293,000,909	\$267,761,899.45	\$283,860,044.29	\$648,096,936.82
7	May	\$23,785,049	\$43,021,205	\$72,753,363	\$46,519,872	0.17	\$141,577,578.30	\$256,078,431	\$433,055,443.65	\$284,344,747.79	\$47,769,949.45
8	June	\$104,112,396	\$92,182,589	\$35,551,934	\$77,282,306	0.28	\$373,036,484.95	\$330,291,784	\$127,383,183.96	\$282,874,609.96	\$78,948,721.10
9	July	\$43,886,114	\$56,998,552	\$65,426,587	\$55,437,084	0.20	\$219,207,641.39	\$284,703,224	\$326,800,587.10	\$283,227,126.31	\$56,703,032.22
10	August	\$110,823,880	\$103,742,309	\$124,653,628	\$113,073,272	0.41	\$271,395,306.87	\$254,053,330	\$305,262,815.41	\$282,376,286.03	\$115,307,946.91
11	September	\$44,495,383	\$37,857,479	\$34,060,728	\$38,804,530	0.14	\$317,512,966.00	\$270,145,791	\$243,052,695.41	\$282,452,206.23	\$39,582,065.75
12	October	\$196,593,074	\$299,028,192	\$253,284,692	\$249,635,319	0.90	\$218,067,590.89	\$331,692,038	\$280,951,823.32	\$283,189,170.10	\$255,301,712.86
13	November	\$473,153,696	\$563,487,381	\$565,361,004	\$534,000,694	1.93	\$245,351,862.36	\$292,194,015	\$293,165,574.76	\$283,077,357.74	\$545,906,180.52
14	December	\$786,574,456	\$1,048,391,130	\$936,780,115	\$923,915,234	3.34	\$235,741,831.81	\$314,210,109	\$280,759,511.87	\$282,866,126.06	\$943,809,028.35
15					\$276,903,818					\$288,332,167.98	

Column E = Monthly Average of Years 2016,2017,2018
 Column F = Seasonal Index = Monthly AVG/E15
 Column I = 6 Month Moving Average
 Column K= Re-seasonalized Forecast = Seasonal Index * De-seasonalized Forecast

\$281,920,764.79
\$278,030,423.02
\$283,860,044.29
\$284,344,747.79
\$282,874,609.96
\$283,227,126.31
\$282,376,286.03
\$282,452,206.23
\$283,189,170.10
\$283,077,357.74
\$282,866,126.06



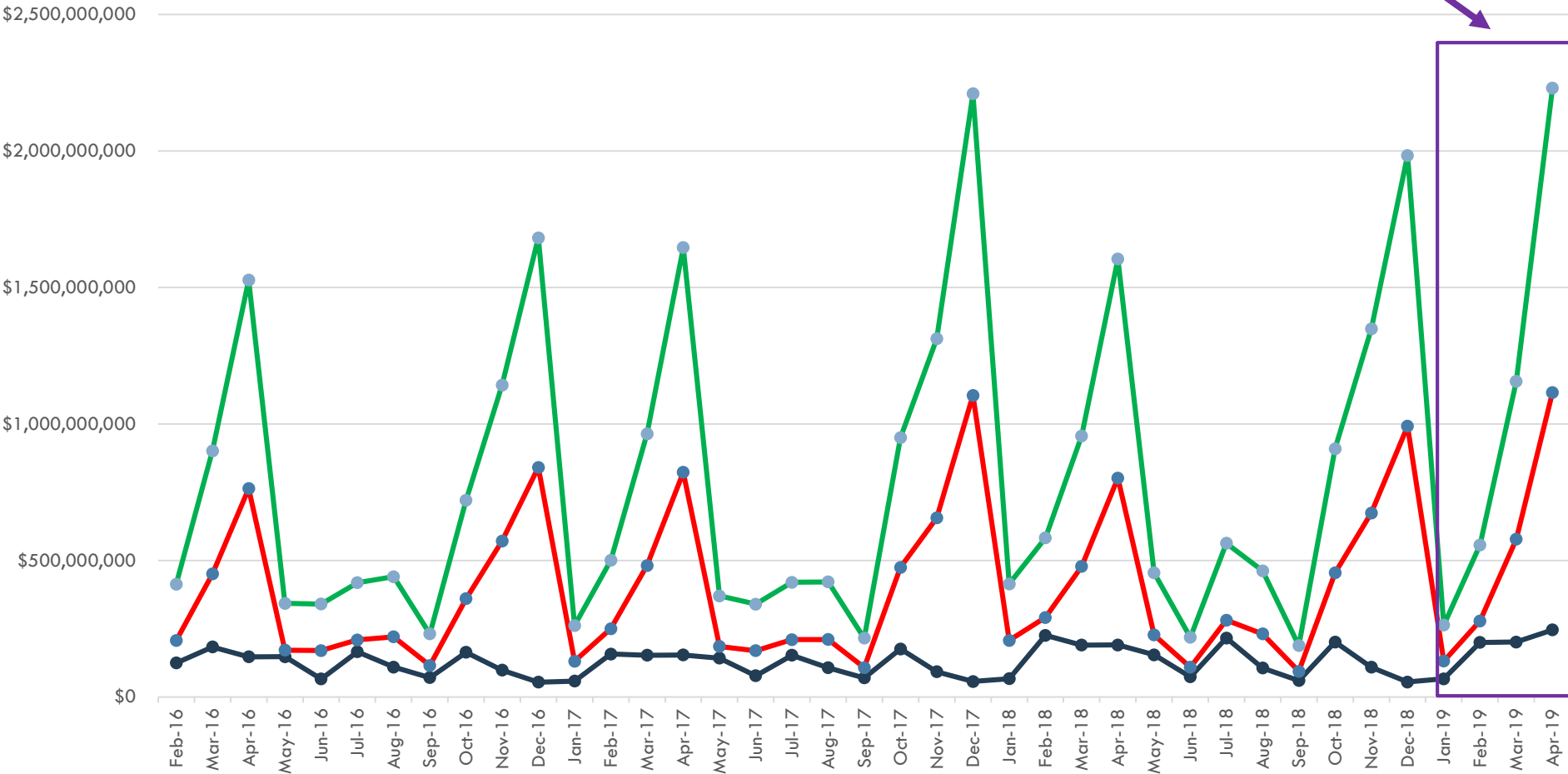
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CCSF TTX Historic Revenues – Developing a Forecast

TTX Revenues

Forecasted Revenues

Business Taxes Property Taxes Totals





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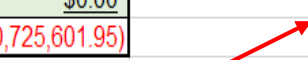
Daily Cash Projection

Information from Custody Bank

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Opening Balance	\$140,426,680.63			CitiBank Wire Transfer Amount		
					\$0.00	
Sources:	\$121,326,140.48	\$121,326,140.48			(\$100,725,601.95)	One Day Float
Maturity	\$0.00		Investment Interest		\$0.00	\$2,610,884.00
Maturity	\$0.00				(\$100,725,601.95)	
Maturity	\$0.00					
Maturity	\$0.00					
Maturity	\$0.00					
Maturity	\$0.00					
Maturity	\$0.00					
Maturity	\$0.00					
Maturity	\$0.00					
Uses:	(\$30,023,388.94)	(\$130,748,990.89)		Sources (credits)		Uses (debits)
Purchase 3134GUB33	(\$50,000,000.00)		CP Issuance	\$0.00	Payroll	\$0.00
Purchase 9128284T4	(\$50,725,601.95)		Lockbox	\$0.00	Payroll Taxes	\$0.00
Purchase	\$0.00		Incoming Wires	\$0.00	Paymode	(\$19,346,702.73)
Purchase	\$0.00		ACH	\$0.00	Retirement	\$0.00
Purchase	\$0.00		Retirement	\$0.00	Expenditures	\$0.00
Purchase	\$0.00		Sold MMKT	\$110,000,000.00	Purchase MMKT	\$0.00
Purchase	\$0.00		Bond Issue Proceeds	\$0.00	Deferred Comp	\$0.00
Purchase	\$0.00		Revenues	\$0.00	Outgoing Wires	\$0.00
Purchase	\$0.00		Cash Pro Credits	\$11,326,140.48	Cash Pro Debits	(\$10,676,686.21)
Purchase	\$0.00		Other Incoming Funds	\$0.00	Debt Service	\$0.00
Purchase	\$0.00		Total	\$121,326,140.48	Total	(\$30,023,388.94)
Purchase	\$0.00					
Purchase	\$0.00					
		\$130,000,000.00	Bank Target Balance			
					Cash Bal + 1 Day Float	
Cash Balance		\$131,003,830.22	\$1,003,830.22		\$133,614,714.22	

Bank Information





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Cash Forecast

	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	UIC 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 Model Enhancements

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- Ability to gain added visibility into user specified time frames
- Ability to better reflect immunization of cash outflows
- Automates the incorporation of portfolio data with cash flow data
- Ability to filter cash flow data to see net negative outflows greater than specified amount
- Allows option to incorporate income cash flows
- Allows graphic depiction of various time frames/and specific cash inflow/outflow data



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

CCSF Profile Analysis – Rolling Liquidity Evaluation



**Liquidity Profile Analysis
CCSF**
First Cash Flow Date: Dec 31, 2016
Last Cash Flow Date: Nov 30, 2019
Analysis Date: Nov 30, 2019

Institution Name	CCSF
Portfolio Balance	\$11,849,183,424.81
Primary Liquidity	\$300,000,000.00
Book Liquidity	\$7,865,129,000.00
Liquidity Buffer	1.00
Book Liquidity Buffer	1.00
Analysis Date	11/30/2019

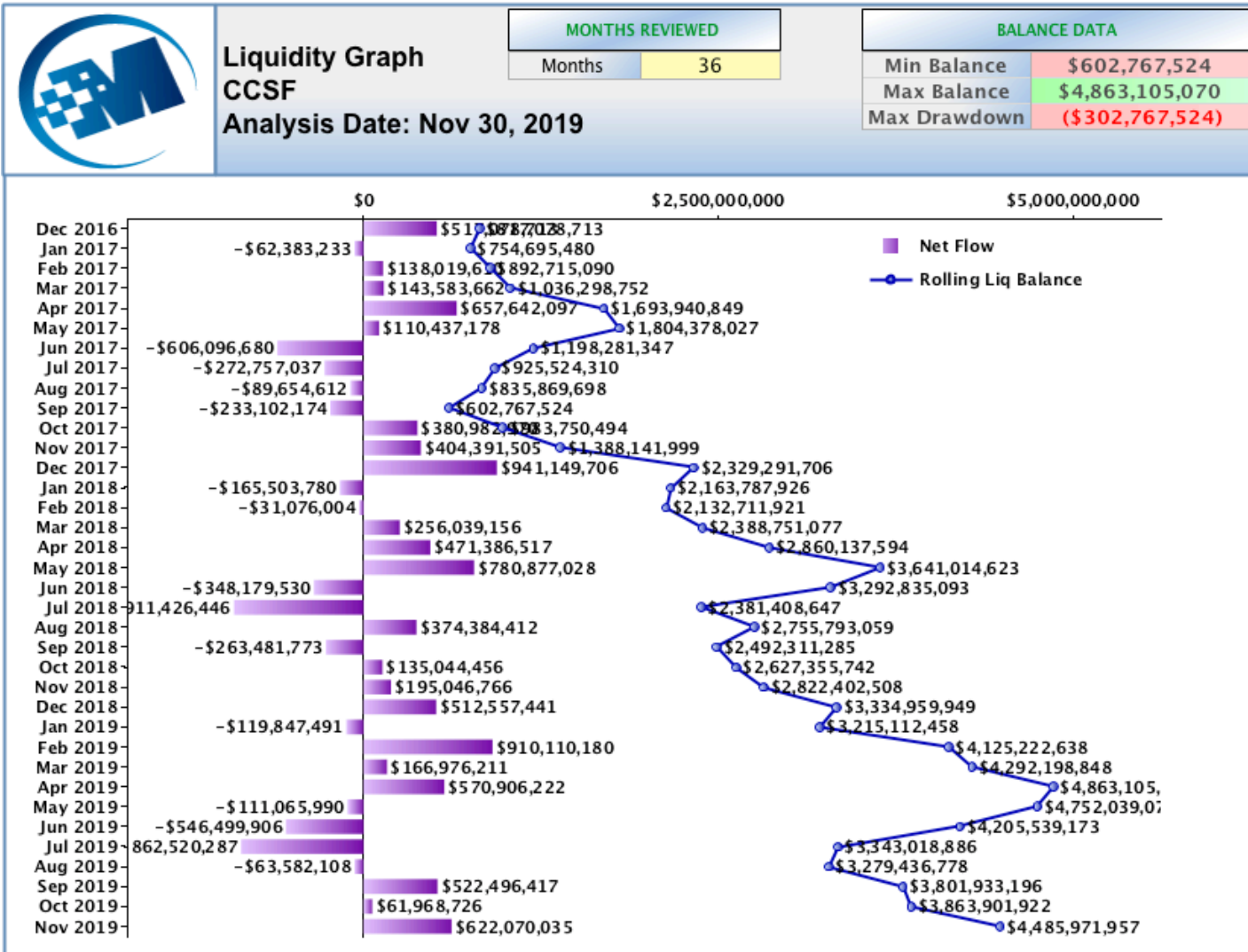
Rolling Liquidity Evaluation

	36	
	Value	Date
Minimum Balance	\$602,767,524.05	
Maximum Balance	\$4,863,105,069.84	
Maximum Drawdown	\$302,767,524.05	9/30/17
Required Liquidity		<i>Multiplier</i>
Strategic Primary Liquidity	\$302,767,524.05	1.00x / 2.6%
Strategic Book Liquidity	\$302,767,524.05	1.00x / 2.6%
Strategic Total Liquidity	\$605,535,048.10	2.00x / 5.1%
Actual Liquidity		<i>Multiplier</i>
Actual Primary Liquidity	\$300,000,000.00	0.99x / 2.5%
Actual Book Liquidity	\$7,865,129,000.00	25.98x / 66.4%
Actual Total Liquidity	\$8,165,129,000.00	26.97x / 68.9%
Investable Liquidity		<i>% Change</i>
Investable Primary Liquidity	(\$2,767,524.05)	N/A
Investable Book Liquidity	\$7,562,361,475.95	96.15%
Total Investable Liquidity	\$7,559,593,951.90	92.58%



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

CCSF Liquidity Graph – Rolling Liquidity Profile





ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

CCSF Cash Flow Immunization Schedule



Bond Immunization Schedule

- Bond Purposely Not Immunized
- Immunization amount applied is equal to total available bond proceeds
- Immunization date has excess inflows over desired excess liquidity amount
- Immunization amount applied is under total available bond proceeds
- Immunization amount applied exceeds total available bond proceeds
- Bond has an immunization amount actively being applied

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	Not Immunized
89233GD11 : TOYCC 04/01/2020-46318	\$50,000,000.00	04/01/2020	04/01/2020	\$36,000,000.00	04/13/2020	\$14,000,000.00			
912796TM1 : B 04/02/2020-46229	\$50,000,000.00	04/02/2020	04/03/2020	\$13,000,000.00	04/06/2020	\$37,000,000.00			
3134GBETS : FHLMC 04/13/2020-45262	\$10,000,000.00	04/13/2020	04/13/2020	\$10,000,000.00					
06370RYS2 : BMOCHG 04/13/2020-45979	\$65,000,000.00	04/13/2020	04/13/2020	\$65,000,000.00					
3133EJG37 : FFCB 04/15/2020-45524	\$25,000,000.00	04/15/2020	04/15/2020	\$25,000,000.00					
459052VQ6 : IBRDDN 04/15/2020-46379	\$75,000,000.00	04/15/2020	04/15/2020	\$11,000,000.00	04/30/2020	\$64,000,000.00			
3136G4BL6 : FNMA 04/17/2020-43827	\$15,000,000.00	04/17/2020	04/17/2020	\$7,000,000.00	04/24/2020	\$8,000,000.00			
459058FZ1 : IBRD 04/21/2020-44040	\$50,000,000.00	04/21/2020	04/24/2020	\$50,000,000.00					
3137EAEM7 : FHLMC 04/23/2020-45182	\$35,000,000.00	04/23/2020	04/24/2020	\$35,000,000.00					
89114N4G7 : TDNY 04/24/2020-46212	\$40,000,000.00	04/24/2020	04/24/2020	\$40,000,000.00					
65602VSV9 : NORNY 04/24/2020-46278	\$70,500,000.00	04/24/2020	04/24/2020	\$20,500,000.00	04/29/2020	\$50,000,000.00			
06417MCD5 : BNSHOU 04/27/2020-46213	\$100,000,000.00	04/27/2020	04/27/2020	\$100,000,000.00					
65602VTE6 : NORNY 04/28/2020-46267	\$50,000,000.00	04/28/2020	04/30/2020	\$50,000,000.00					
65602VTLO : NORNY 04/30/2020-46277	\$75,000,000.00	04/30/2020	05/06/2020	\$75,000,000.00					
977100CW4 : WISGEN 05/01/2020-43804	\$18,000,000.00	05/01/2020	05/01/2020	\$7,000,000.00	05/11/2020	\$11,000,000.00			
78012UQY4 : RY 05/11/2020-46209	\$100,000,000.00	05/11/2020	05/11/2020	\$89,000,000.00	05/13/2020	\$1,000,000.00	05/15/2020	\$10,000,000.00	
4581XOCX4 : IADB 05/12/2020-44083	\$25,000,000.00	05/12/2020	05/13/2020	\$25,000,000.00					
4581XOCX4 : IADB 05/12/2020-45255	\$10,000,000.00	05/12/2020	05/13/2020	\$10,000,000.00					
89114NCH6 : TDNY 05/13/2020-46347	\$50,000,000.00	05/13/2020	05/29/2020	\$50,000,000.00					
3134GBPB2 : FHLMC 05/22/2020-44203	\$15,750,000.00	05/22/2020	05/22/2020	\$15,750,000.00					
89233GEN2 : TOYCC 05/22/2020-46319	\$50,000,000.00	05/22/2020	05/22/2020	\$50,000,000.00					
89233GEN2 : TOYCC 05/22/2020-46331	\$65,000,000.00	05/22/2020	05/22/2020	\$65,000,000.00					
89233GET9 : TOYCC 05/27/2020-46332	\$40,000,000.00	05/27/2020	05/27/2020	\$40,000,000.00					
PP9N4D668 : SFFCRU 06/04/2020-46337	\$10,000,000.00	06/04/2020							Yes
62479LF59 : MUFGBK 06/05/2020-46215	\$25,000,000.00	06/05/2020	06/05/2020	\$25,000,000.00					
PP9J7XBG2 : BKSANF 06/08/2020-46363	\$5,000,000.00	06/08/2020							Yes
459052XW1 : IBRDDN 06/08/2020-46365	\$100,000,000.00	06/08/2020	06/08/2020	\$100,000,000.00					
62479LFA8 : MUFGBK 06/10/2020-46378	\$40,000,000.00	06/10/2020	06/10/2020	\$40,000,000.00					
3133EHNK5 : FFCB 06/15/2020-44260	\$25,000,000.00	06/15/2020	06/15/2020	\$25,000,000.00					



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

CCSF Cash Flow Schedule by Day

Cash Flow Schedules By Day

Projected EOD Bank Balance	\$135,022,791.37
EC Bank Balance Target	\$135,000,000.00
Net Bank Balance Available	\$22,791.37
Portfolio MMKT Holdings	\$817,596,323.73
Intra-Day MMKT Transactions	(\$124,000,000.00)
Target Liquidity	\$300,000,000.00
Spendable Cash Non-Immunized	\$393,619,115.10

CF Start Date	1/6/2020
CF End Date	12/31/2024

- Include MMKT Holdings
- Include Target Liquidity

Portfolio MMKT Holdings	\$817,596,323.73
MMKT Holdings Immunized	\$0.00
Portfolio MMKT Actual	\$817,596,323.73
Intra-Day MMKT Transactions	(\$124,000,000.00)
Target Liquidity	\$300,000,000.00
Spendable Cash Immunized	\$393,619,115.10

Min Liquidity	(\$17,952,157,053.78)
Max Liquidity	\$1,838,671,311.27
Avg Liquidity	(\$6,419,712,609.56)
Immun Min Liquidity	(\$17,952,157,053.78)
Immun Max Liquidity	\$1,738,671,311.27
Immun Avg Liquidity	(\$6,437,143,308.11)
Negative Net Outflow Filter Amount	(\$10,000,000.00)

Activate Filter

Cash Flow By Day

Immunized Cash Flow By Day

		Total CF	Adjusted Liquidity
01/06/2020	Payroll Transfer to Bank	(\$86,000,000.00)	
	63873NE49 : NATXNY 01/06/2020-45754	\$50,000,000.00	
	78012UNB7 : RY 01/06/2020-45969	\$25,000,000.00	
	Total Cash Flow	(\$11,000,000.00)	\$382,619,115.10
01/07/2020	3134GUGC8 : FHLMC 10/07/2021-46241	\$33,680,000.00	
	Total Cash Flow	\$33,680,000.00	\$416,299,115.10
01/08/2020	CCSF Payroll Tax 1	(\$36,000,000.00)	
	78012UNC5 : RY 01/08/2020-45970	\$25,000,000.00	
	Total Cash Flow	(\$11,000,000.00)	\$405,299,115.10
01/10/2020	CCSF Payroll Tax 2	(\$7,000,000.00)	
	89236TEJ0 : TOYOTA 01/10/2020-44945	\$20,000,000.00	
	Total Cash Flow	\$13,000,000.00	\$418,299,115.10
01/15/2020	OCII Debt Service	(\$98,260,904.00)	
	Total Cash Flow	(\$98,260,904.00)	\$320,038,211.10
01/17/2020	Payroll Transfer to Bank	(\$86,000,000.00)	
	OCII Debt Service	(\$19,749,925.85)	
	3136G4KQ5 : FNMA 01/17/2020-44790	\$1,000,000.00	
	3136G4KQ5 : FNMA 01/17/2020-44791	\$31,295,000.00	
	89114MB30 : TDNY 01/17/2020-45966	\$50,000,000.00	
	459052RX6 : IBRDDN 01/17/2020-46004	\$20,000,000.00	
89114NDX0 : TDNY 01/17/2020-46371	\$40,000,000.00		
	Total Cash Flow	\$36,545,074.15	\$356,583,285.25
01/22/2020	CCSF Payroll Tax 1	(\$36,000,000.00)	
	459052SC1 : IBRDDN 01/22/2020-46005	\$40,000,000.00	
	Total Cash Flow	\$4,000,000.00	\$360,583,285.25
01/24/2020	CCSF Payroll Tax 2	(\$7,000,000.00)	
	SFO Debt Service ACH	(\$44,000,000.00)	
	3133EJLU1 : FFCB 01/24/2020-45167	\$25,000,000.00	
	3133EJLU1 : FFCB 01/24/2020-45169	\$25,000,000.00	
	65602VRW8 : NORNY 01/24/2020-46220	\$50,000,000.00	
	Total Cash Flow	\$49,000,000.00	\$409,583,285.25

		Total CF	Adjusted Liquidity
01/06/2020	Payroll Transfer to Bank	(\$86,000,000.00)	
	63873NE49 : NATXNY 01/06/2020-45754	\$50,000,000.00	
	78012UNB7 : RY 01/06/2020-45969	\$24,000,000.00	
	Total Cash Flow	(\$12,000,000.00)	\$381,619,115.10
01/15/2020	OCII Debt Service	(\$98,260,904.00)	
	3134GUGC8 : FHLMC 10/07/2021-46241	\$33,680,000.00	
	Total Cash Flow	(\$64,580,904.00)	\$320,038,211.10
05/29/2020	CCSF Payroll Tax 2	(\$7,000,000.00)	
	Retiree Pension Payment	(\$95,000,000.00)	
	SFO Projected Capital Expenditures	(\$115,521,666.17)	
	Pension Payment Northern Trust Pmt	\$95,000,000.00	
	89114NCH6 : TDNY 05/13/2020-46347	\$50,000,000.00	
	Total Cash Flow	(\$72,521,666.17)	\$1,282,469,368.03
06/05/2020	Kaiser Health Premium	(\$37,000,000.00)	
	62479LF59 : MUFGBK 06/05/2020-46215	\$25,000,000.00	
	Total Cash Flow	(\$12,000,000.00)	\$1,280,469,368.03
06/22/2020	Payroll Transfer to Bank	(\$86,000,000.00)	
	3134GBST0 : FHLMC 06/22/2020-44241	\$14,675,000.00	
89114NB20 : TDNY 06/22/2020-46299	\$60,000,000.00		
	Total Cash Flow	(\$11,325,000.00)	\$1,291,449,784.03
06/24/2020	CCSF Payroll Tax 1	(\$36,000,000.00)	
	SFO Debt Service ACH	(\$44,000,000.00)	
	Total Cash Flow	(\$80,000,000.00)	\$1,221,449,784.03
06/25/2020	OCII Debt Service	(\$89,359,445.09)	
	Total Cash Flow	(\$89,359,445.09)	\$1,132,090,338.94
07/01/2020	SFRS Prepayment	(\$706,102,000.00)	
	3134GBTX0 : FHLMC 06/29/2020-44266	\$50,000,000.00	
	912828XY1 : T 06/30/2020-45948	\$50,000,000.00	
	62479LG17 : MUFGBK 07/01/2020-46254	\$75,000,000.00	
	62479LG17 : MUFGBK 07/01/2020-46266	\$60,000,000.00	



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

Short-Term Fixed Income Market Liquidity Options

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- Repurchase Agreements
- Money Market Funds
- US Treasury Bills
- Federal Agency Discount Notes
- Commercial Paper
- Certificates of Deposit/Yankee CDs



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

Repurchase Agreements

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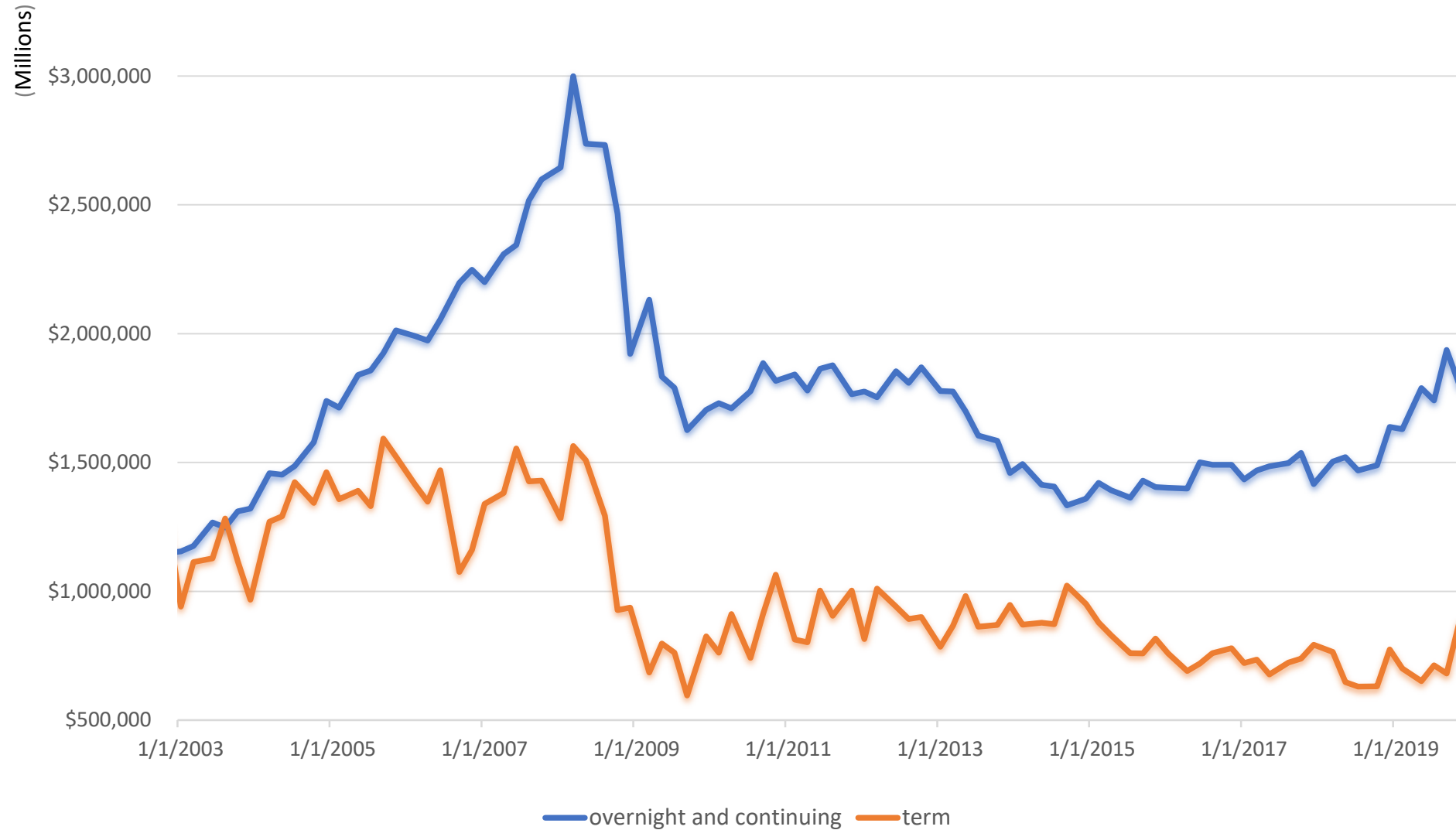
- Secured loan with collateral for a specified term and an agreed upon rate
- Counterparty is usually a bank or a broker-dealer
- Rate is based on the counterparty, the term of the repo, and the collateral backing it
- Deliverable versus Tri-Party
- Customizable to fit investor needs
- Illiquid, no secondary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



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

Repurchase Agreement Outstanding Balances

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ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

Repurchase Agreements

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SIFMA (Securities Industry and Financial Markets Association) – 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

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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

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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.

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

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

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- 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.)

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- 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
- Different Share Classes/Expense Ratios
- Pays monthly interest



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

Money Market Funds – Prime Funds and Floating NAVs

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- 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



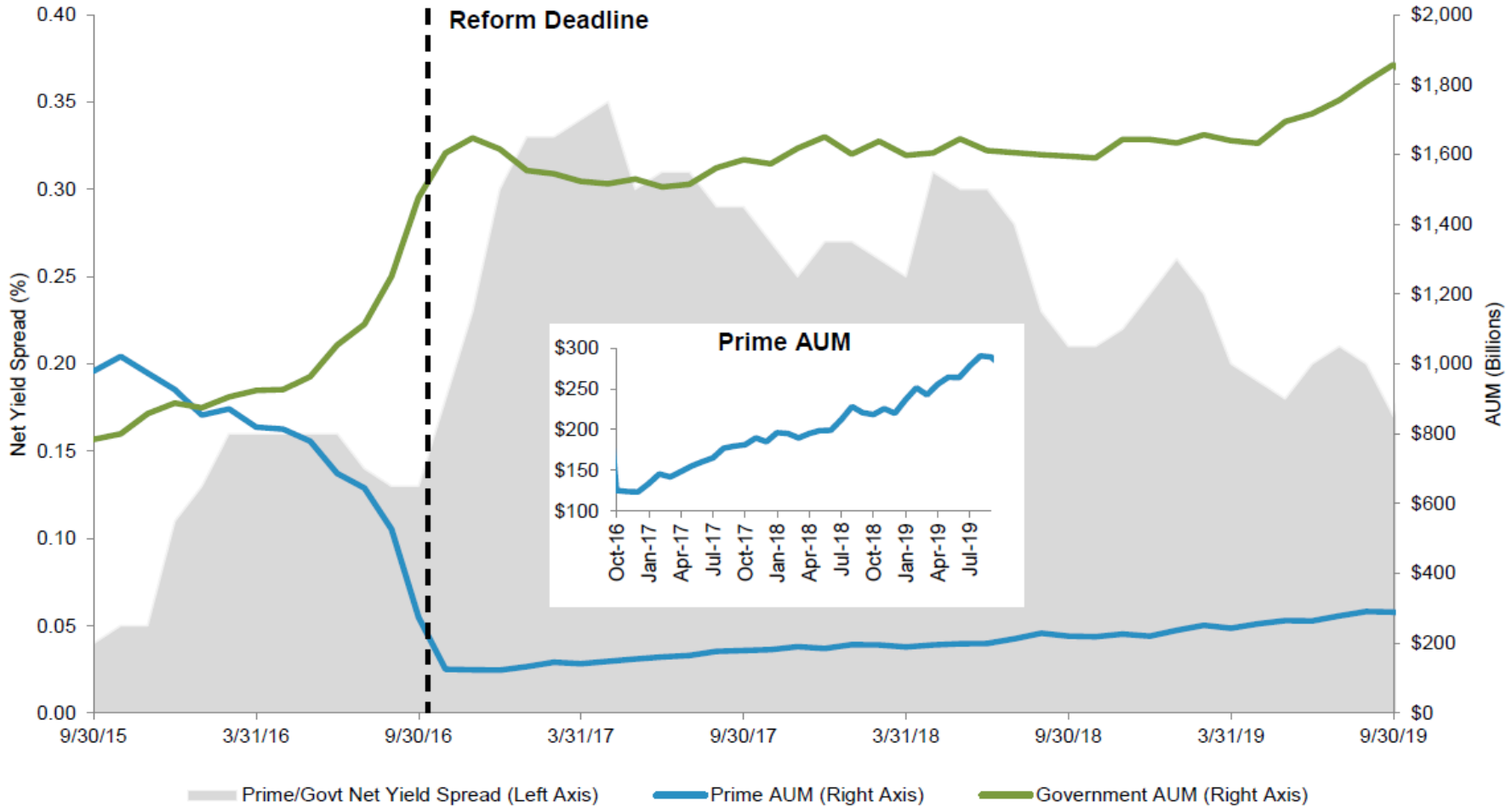
Fund Type	Net Asset Value (NAV)	Liquidity Fee	Redemption Gate
U.S. Treasury	Stable	No	No
Government	Stable	No	No
Retail Municipal/Tax-Exempt	Stable	Yes	Yes
Retail Prime/General Purpose	Stable	Yes	Yes
Institutional Municipal/Tax-Exempt	Floating	Yes	Yes
Institutional Prime/General Purpose	Floating	Yes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

MMF Reform	Final Rule	Compliance Date*
Floating NAV	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
Liquidity Fee	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
Redemption Gate	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
Retail Fund Definition	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



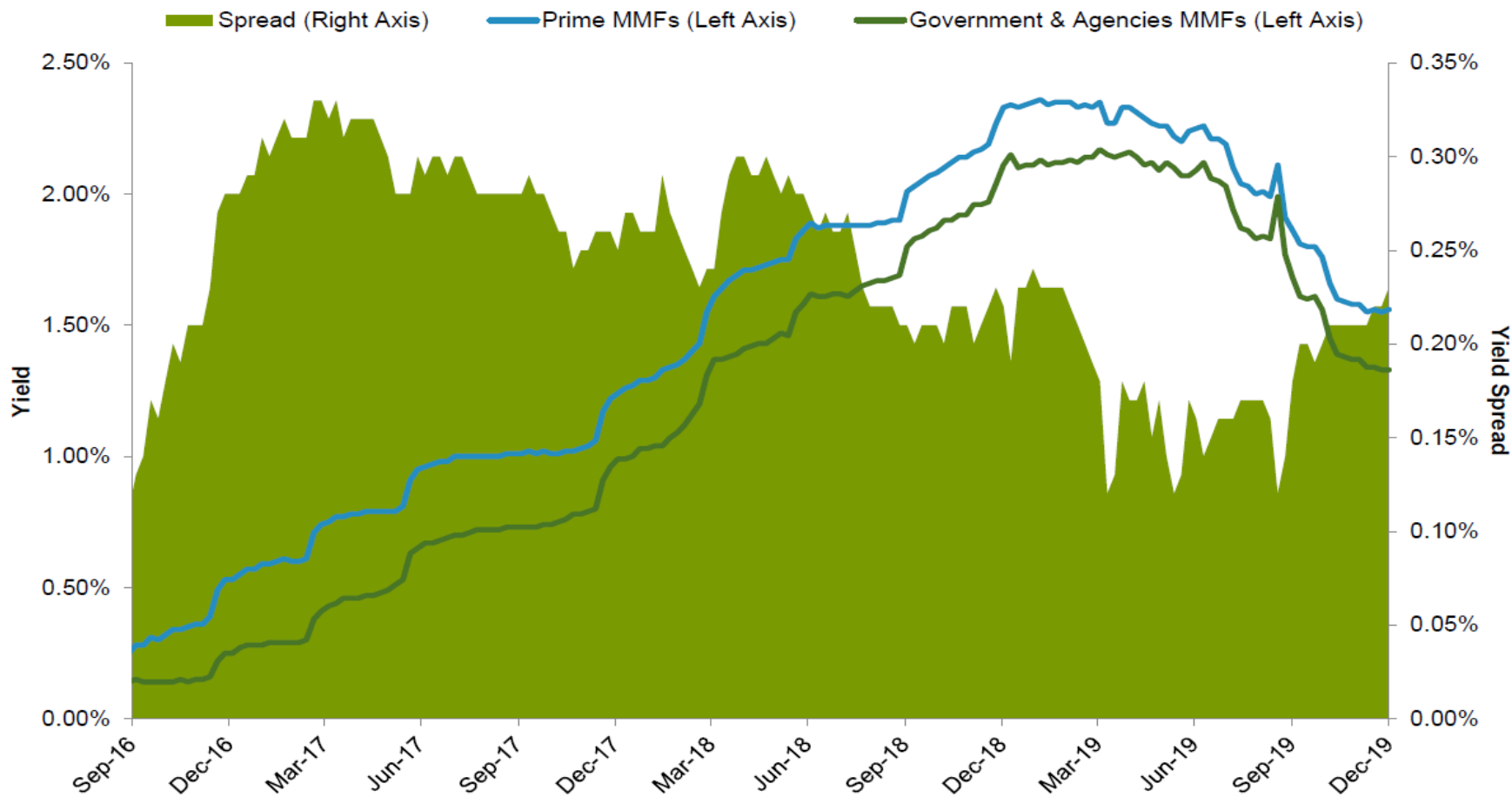


ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

Money Market Funds – Institutional Prime vs. Government Yield Spread Difference

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Yield Spread as of December 31, 2019





US Treasury Bills - Overview

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- Issued for terms of 4, 8, 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, 8, 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 rate, Act/360 basis



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US Treasury Bills – Credit and Liquidity

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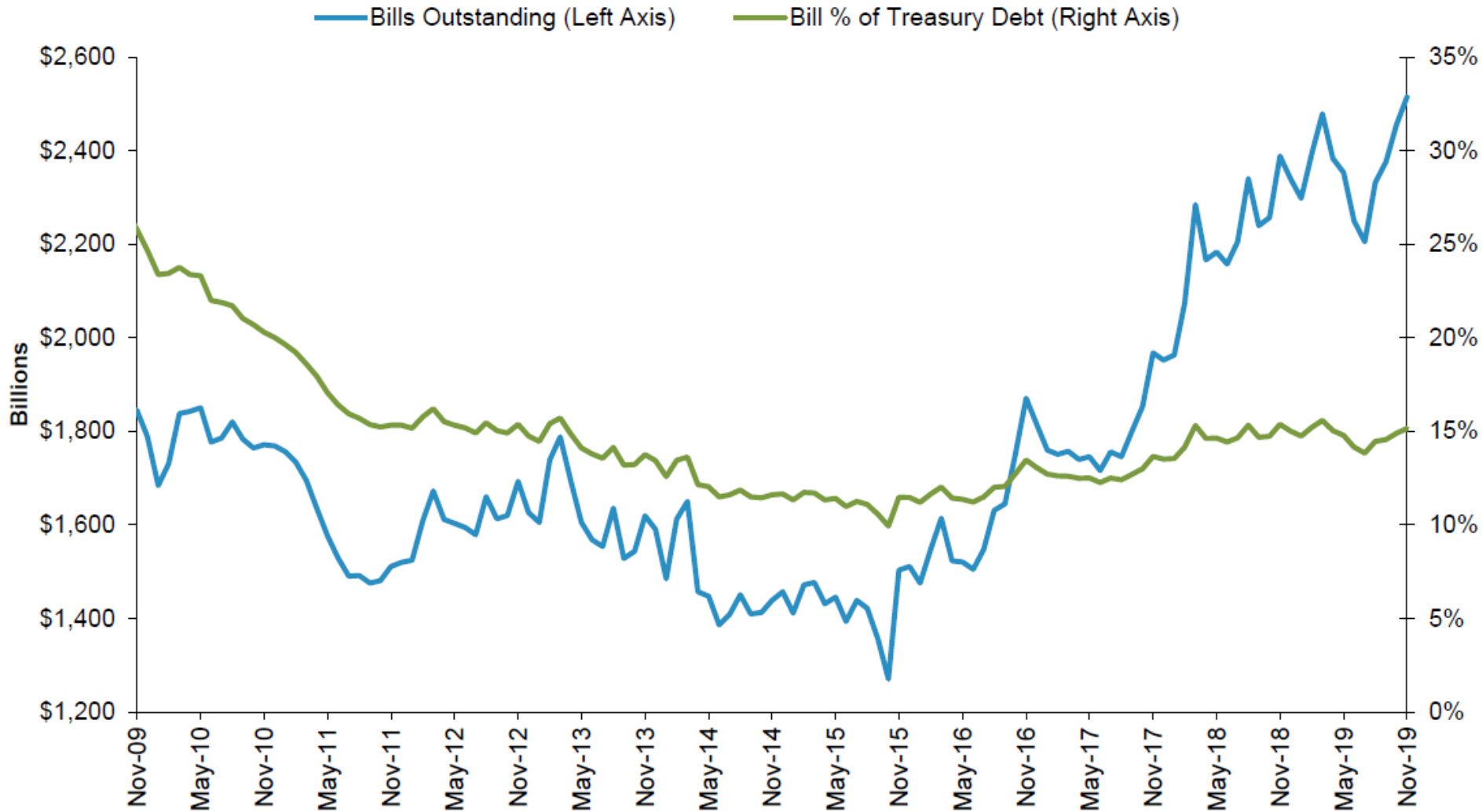
- Guaranteed by the full faith and credit of the United States
- Highly liquid
- Bid/ask spread very tight – at or less than 1 basis point
- www.treasurydirect.gov



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

US Treasury Bills – Amount Outstanding

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ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

Federal Agency Discount Notes - Overview

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- 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/Act/360 (same as T-Bills)
- In the market daily with date flexibility
- Open for reverse inquiry



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

Federal Agency Discount Notes – Credit and Liquidity



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- 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

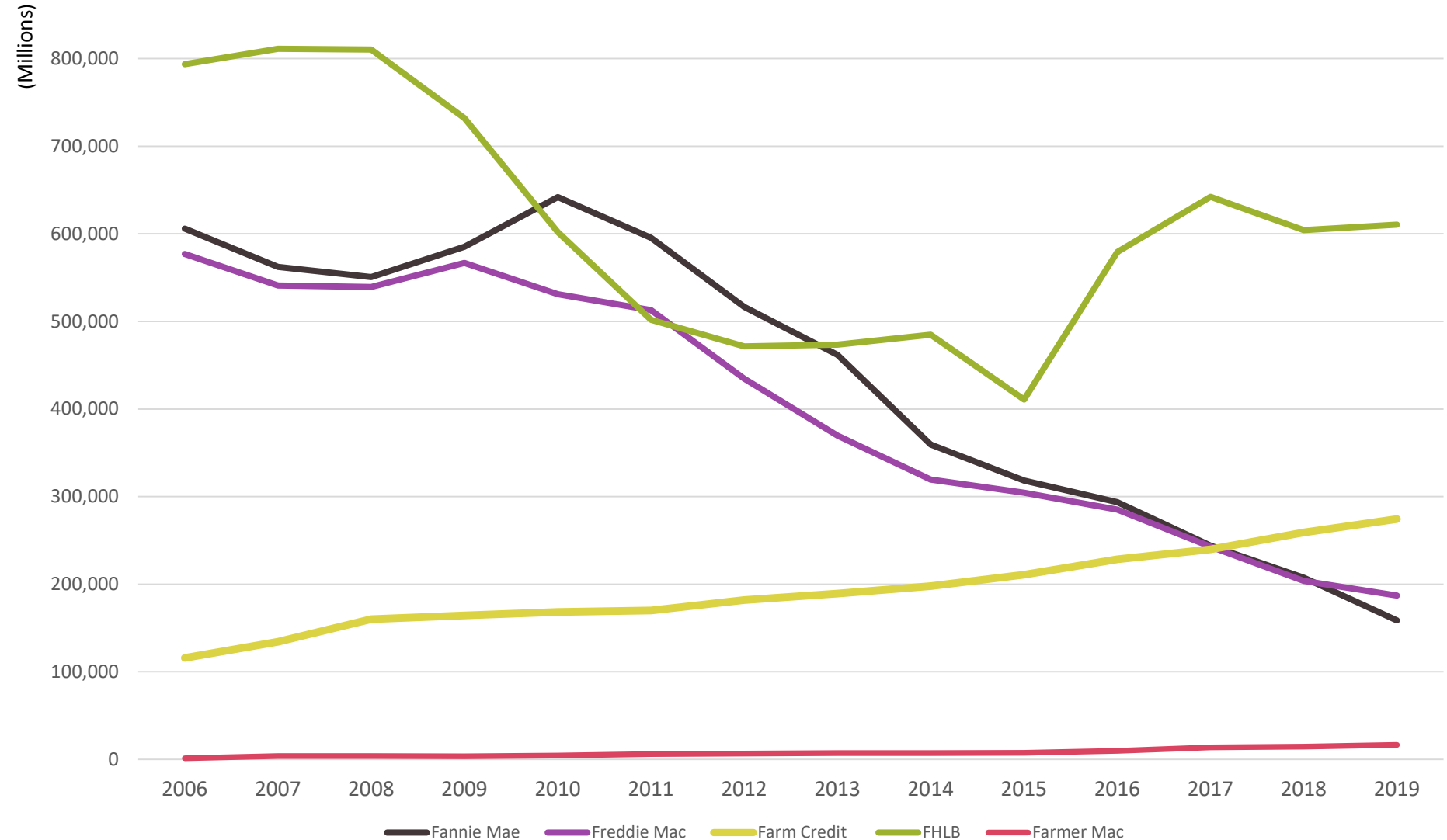
	Farm Credit	Federal Home Loan Banks	Freddie Mac	World Bank
Mission	Fund U.S. agriculture and rural communities	Provide liquidity to financial institutions to support housing and community development	Support liquidity and stability of U.S. mortgage markets	Provide global development project financing and expertise that improve living standards in member countries
Credit Ratings	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
Link to Government	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)
Regulator	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)
Total Assets YE 2015	\$303 Billion	\$969 Billion	\$2 Trillion	\$343 Billion
Capital Requirement	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
Capital Ratio YE 2015	16% Capital-to-Assets	5.1% Capital-to-Assets	N/A	25.1% Equity-to-Loans
Debt Outstanding YE2015	\$243 Billion	\$905 Billion	\$418 Billion	\$ 168 Billion
Debt Issued YE 2015	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
Market Access	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
Contact	Regina Gill rgill@farmcreditfunding.com	Denise de Bombelles debombelles@fhfb-of.com	debt_securities@freddiemac.com	Investor Relations debtsecurities@worldbank.org
Website	www.farmcreditfunding.com	www.fhfb-of.com	www.freddiemac.com	www.worldbank.org/debtsecurities



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Federal Agency Debt Outstanding

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ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

Commercial Paper - Overview

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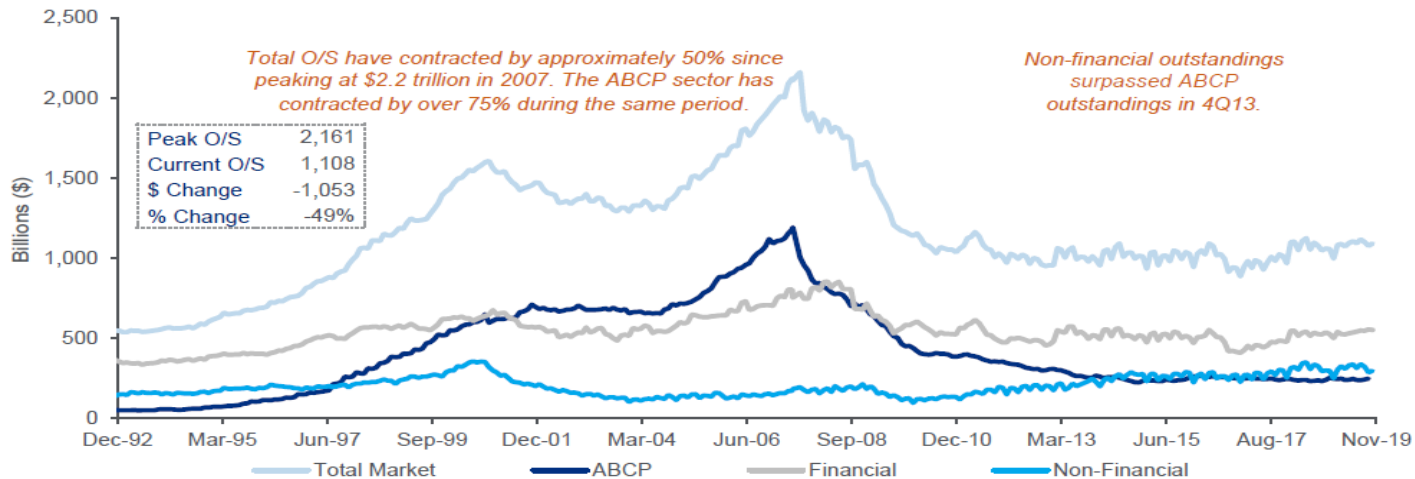
- ❑ Short-term unsecured promissory note
- ❑ Issuing corporation must be organized and operating in the US, have assets in excess of \$500 million, and debt other than CP rated “A”
- ❑ Asset backed commercial paper must be organized as a special purpose corporation, trust, or LLC within the US, have 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
- ❑ 3(a)3 versus 4(2) 144a
- ❑ Issued direct or by Authorized Program Dealers



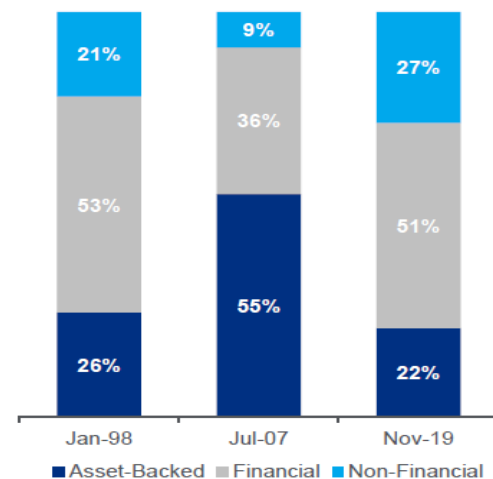
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Commercial Paper – Historical US Market Outstandings

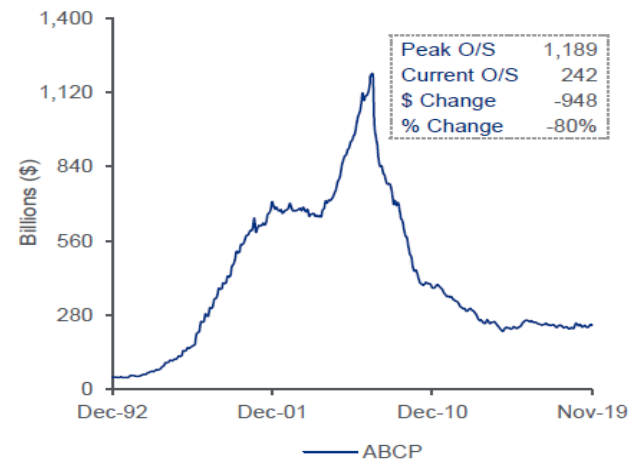
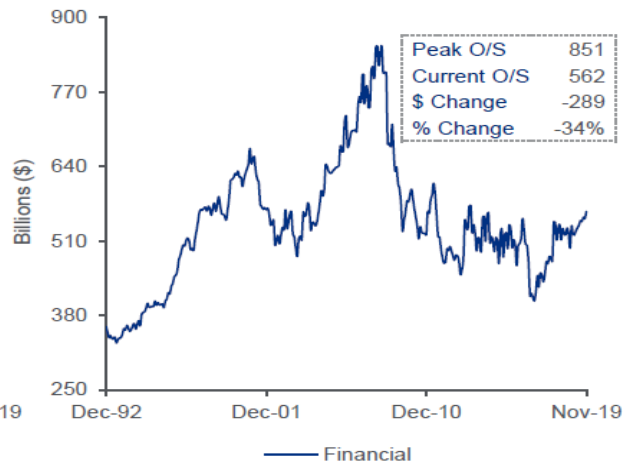
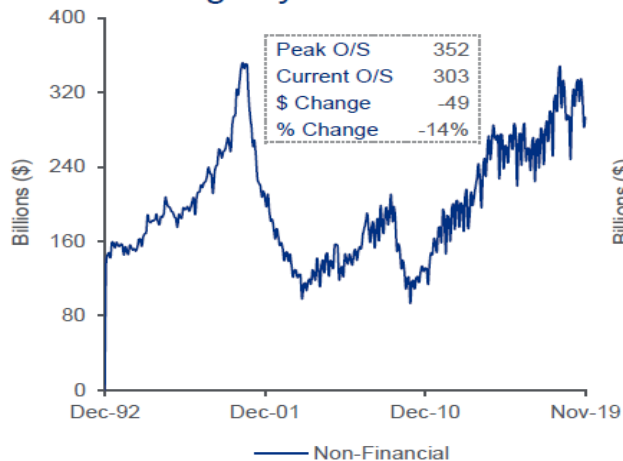
Commercial Paper Outstandings



Market Breakdown



Outstandings by Sector

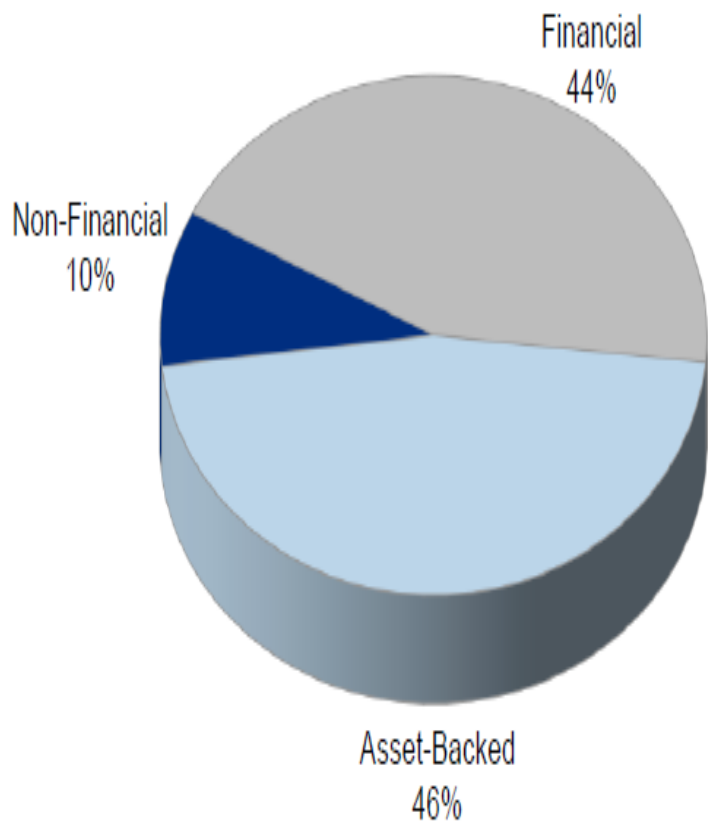




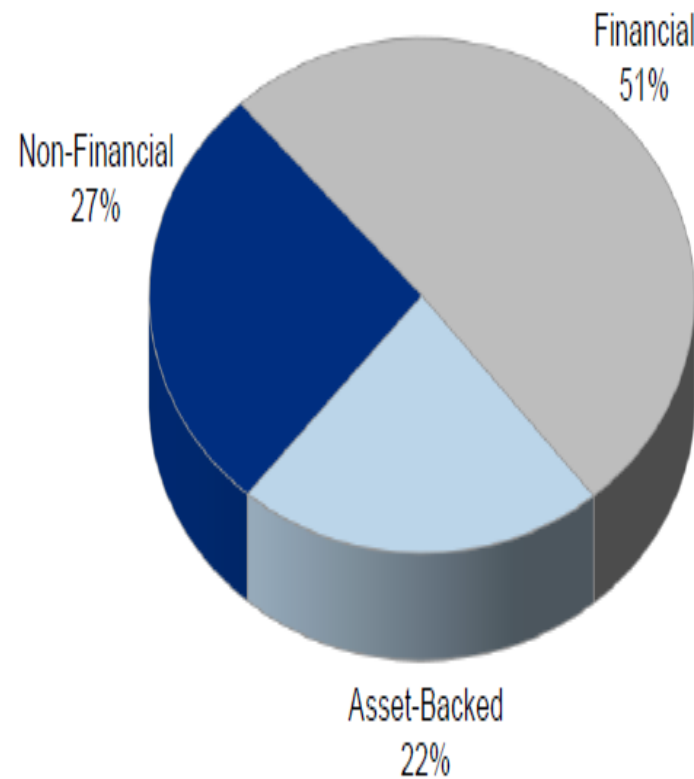
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Commercial Paper – US Market Breakdown

November 2007



November 2019





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Asset-Backed Commercial Paper - Overview

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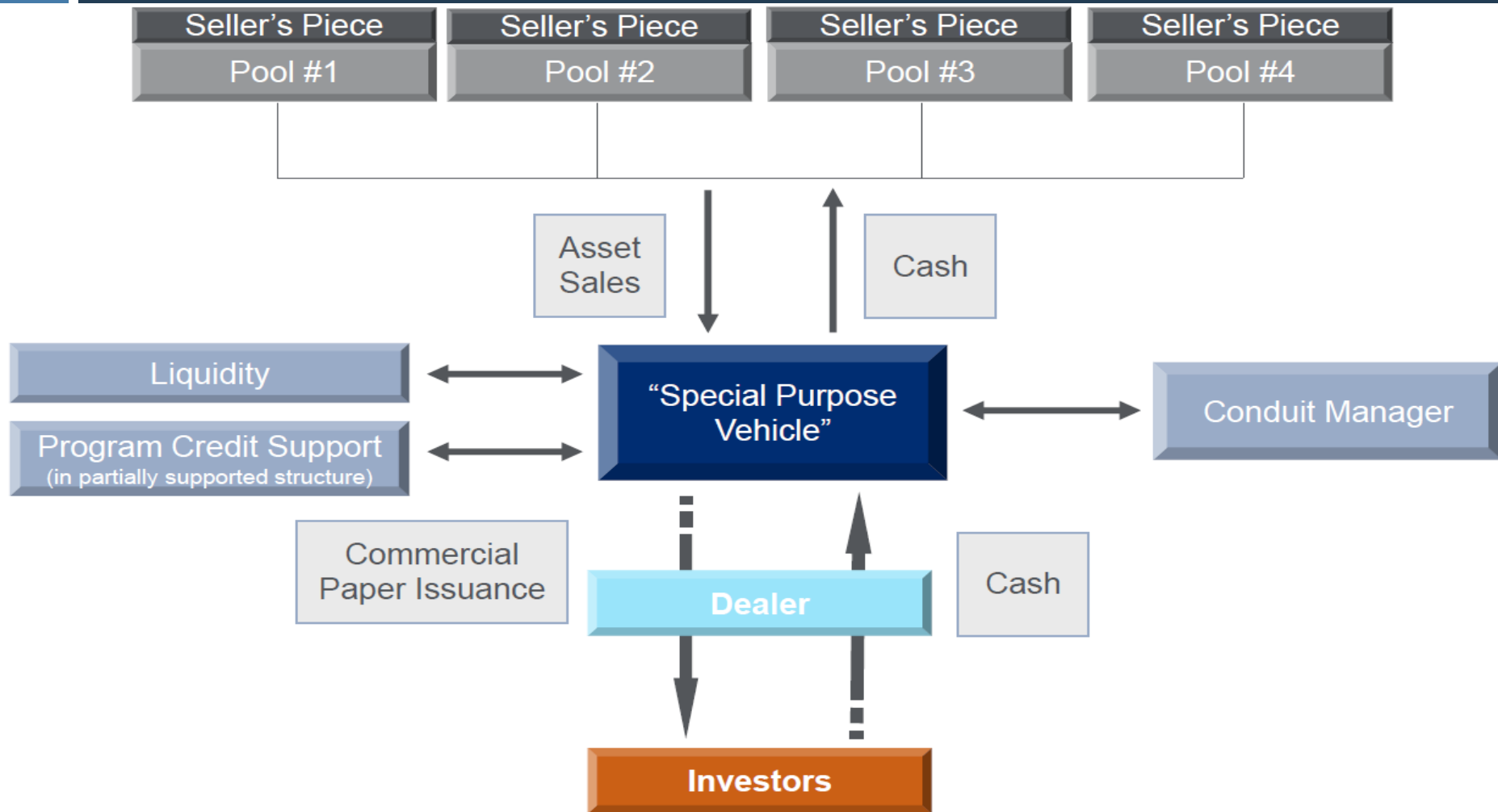
- Collateralized by a variety of asset classes, such as credit card receivables, student loan payments, auto loans, and other financial assets
- Special Purpose vehicle (SPV) is created by a sponsor, usually a bank or other financial institution
- Have different levels of credit enhancement and liquidity 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

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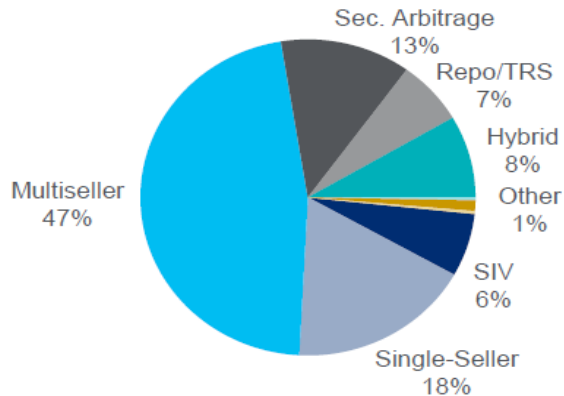


Multi-seller programs comprised 82% of ABCP market as of 3Q2019

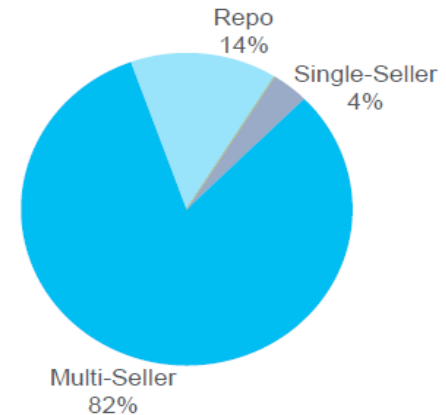


ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY US ABCP MARKET BREAKDOWN

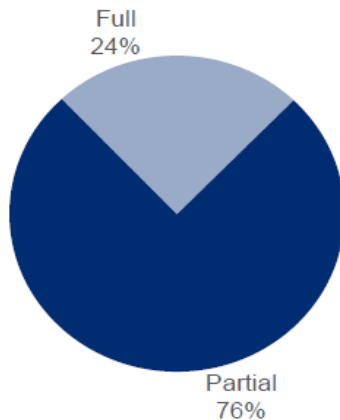
2007 U.S. ABCP Outstandings by Program Type



2019 U.S. ABCP Outstandings by Program Type

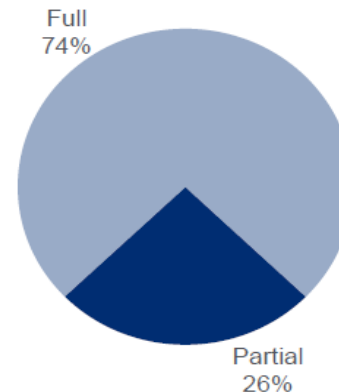


2007 U.S. ABCP Outstandings by Support Type



Total ABCP Market
\$1,073.9bn

2019 U.S. ABCP Outstandings by Support Type



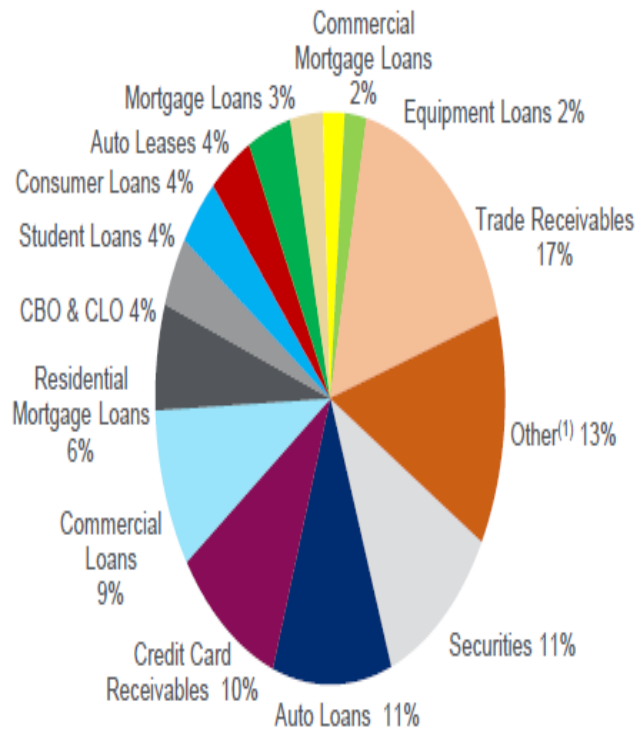
Total ABCP Market
\$242.1bn



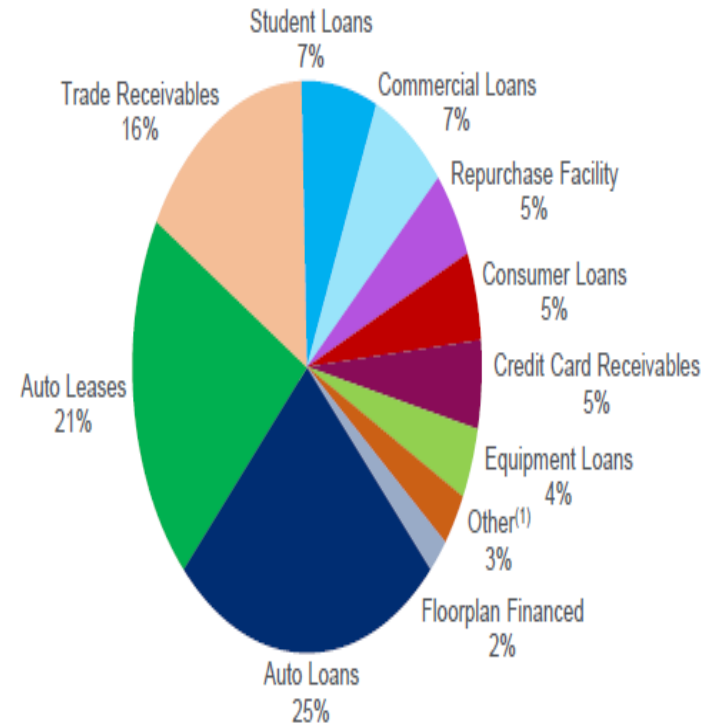
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US ABCP – ASSET BREAKDOWN

2007 U.S. ABCP Outstandings by Asset Type



2019 U.S. ABCP Outstandings by Asset Type





ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

Negotiable Certificates of Deposit/Yankee CDs

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- Certificate of Deposit with a minimum face value of \$100,000 by Banks
- Cannot be cashed in before maturity but are traded in the highly liquid secondary market
- Issued with maturities ranging from 2 weeks to 5 years
- Flexible maturity dates/reverse inquiry
- Issued at par in both fixed and floating rate structures
- A Yankee CD is a negotiable CD issued by a domestic branch of a foreign bank



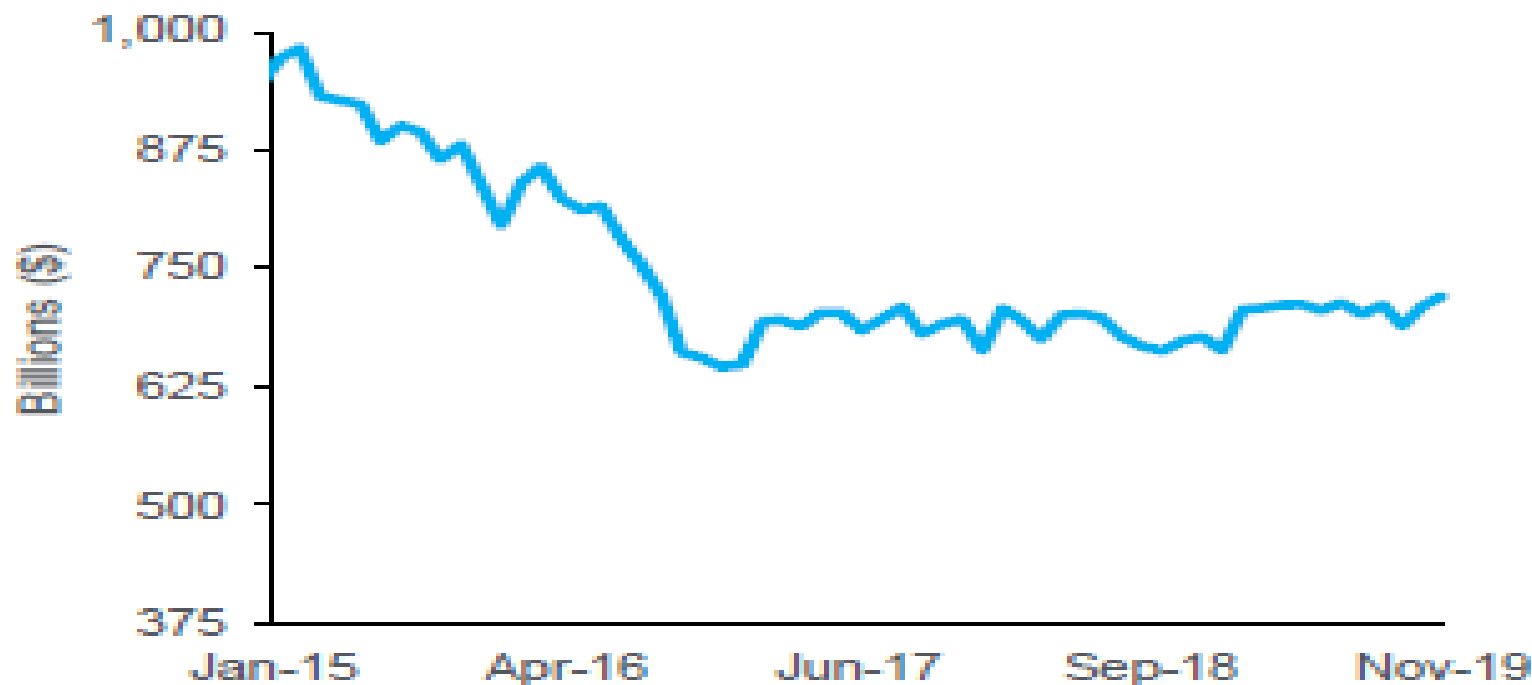
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Negotiable Certificates of Deposit/Yankee CDs

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Bank/Financial YCD Outstandings

After multiple years of remaining range bound, in Nov '19, bank/financial YCD outstandings reached their highest level since Jul '16, although they remain below their pre-MMF reform levels.





ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

Electronic Trading – Overview

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- 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 – Agency Discount Notes on BOOM

47

Discount Notes Trading Access 97) Searches 98) Export 99) 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
100,000	FREDDIE DISCOUNT	12/20/19	1	1.460	1.460	DIWA	AGD	FMCDN	2	07:56
200,000	FREDDIE DISCOUNT	12/20/19	1	1.460	1.460	TDS	AGD	FMCDN	2	07:23
100,000	FREDDIE DISCOUNT	12/20/19	1	1.460	1.460	APSC	AGD	FMCDN	2	07:28
250,000	FREDDIE DISCOUNT	12/20/19	1	1.460	1.460	WFS	AGD	FMCDN	2	10:16
12,000	FHLB DISC CORP	12/20/19		1.430	1.430	TDS	AGD	FHDN	2	19:27
250,000	FNMA DISCOUNT	12/20/19	1	1.430	1.430	CF	AGD	FNDN	2	10:35
249,999	FNMA DISCOUNT	12/20/19	1	1.430	1.430	TRIB	AGD	FNDN	2	10:35
800,000	FNMA DISCOUNT	12/20/19	1	1.430	1.430	WLMS	AGD	FNDN	2	10:35
500,000	FNMA DISCOUNT	12/20/19	1	1.430	1.430	PIPJ	AGD	FNDN	2	10:35
500,000	FNMA DISCOUNT	12/20/19	1	1.430	1.430	DIWA	AGD	FNDN	2	10:35
500,000	FNMA DISCOUNT	12/20/19	1	1.430	1.430	WFS	AGD	FNDN	2	10:35
100,000	FNMA DISCOUNT	12/20/19	1	1.430	1.430	SNC	AGD	FNDN	2	10:35
500,000	FNMA DISCOUNT	12/20/19	1	1.430	1.430	JPM	AGD	FNDN	2	10:35
100,000	FNMA DISCOUNT	12/20/19	1	1.430	1.430	LOOP	AGD	FNDN	2	10:35
500,000	FNMA DISCOUNT	12/20/19	1	1.430	1.430	MFG	AGD	FNDN	2	10:35
850,000	FNMA DISCOUNT	12/20/19	1	1.430	1.430	JEFF	AGD	FNDN	2	10:35
13,256	FHLB DISC CORP	12/26/19		1.500	1.501	TDS	AGD	FHDN	8	19:27
42,000	FHLB DISC CORP	12/27/19		1.500	1.501	JPM	AGD	FHDN	9	11:04
25,000	FHLB DISC CORP	01/13/20		1.540	1.542	JPM	AGD	FHDN	26	09:11
250,000	FNMA DISCOUNT	01/23/20	1	1.520	1.522	CF	AGD	FNDN	36	11:00
249,999	FNMA DISCOUNT	01/23/20	1	1.520	1.522	TRIB	AGD	FNDN	36	11:00
500,000	FNMA DISCOUNT	01/23/20	1	1.520	1.522	PIPJ	AGD	FNDN	36	11:00
500,000	FNMA DISCOUNT	01/23/20	1	1.520	1.522	DIWA	AGD	FNDN	36	11:00



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

Electronic Trading – Negotiable CDs on BOOM

48

CD Trading Access 97) Searches 98) Export 99) Settings Money Market Offerings

93) Refine Search CD APPROVED ISSUERS Prim & Sec Group by None 85) Deposits 89) Chart

Table RateRun

AskSz (M)	Issuer	SD	ON	TN	1W	1M	2M	3M	4M	5M	6M	9M	1Y	Dlr
500,000	NATIXIS NY				1.560		1.870	1.940	1.890	1.930	1.940	1.950	1.960	RBC
500,000	NORINCHUKIN NY					1.850		1.950						RBC
500,000	NORINCHUKIN NY					1.850		1.950						UBS
500,000	NORINCHUKIN NY					1.850	1.950							CG
500,000	BANK OF MONT CHI				1.850	1.850	1.850	1.800	1.800	1.000	1.800	1.800	1.800	UBS
500,000	NATIXIS NY						1.870	1.940*			1.940	1.950	1.960	CG
270	MUFG BANK LTD/NY						1.890							WFS
25,000	TORONTO DOMIN NY						1.940							RBC
500,000	BANK NOVA SC HOU							1.880	1.900					RBC
400,000	BANK NOVA SC HOU							1.880*						CG
500,000	BANK OF MONT CHI	1						1.890*						CG
25,000	TORONTO DOMIN NY							1.940						RBC
100,000	ROYAL BK CAN NY										1.870	1.870	1.870	RBC
500,000	BANK NOVA SC HOU										1.890			CG
500,000	WESTPAC BANK NY	1										1.910	1.910	UBS
300	NATIXIS NY											2.020		RBC
500,000	WESTPAC BANK NY	1										1.910	1.910	RBC



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

Electronic Trading – Buying a Negotiable CD on BOOM

Customer Order Ticket



NORINCHUKIN BANK NY (NORNY) YCD A-1 P-1

Side	Security	Quantity	Yield	Maturity	Settlement
Buy	NORNY YCD 03/11/20	25,000	1.950	03/11/20	12/19/19
		- M	-	DTM 93	Cash

Enter Quantity, yield level if bidding, maturity date, and settlement date

Price	0.00	Dated Date	12/19/19
Principal	0.00	Posted Quantity	500,000 (M)
Accrued	0.00	DTC Cusip	
Net	0.00	Min Piece/Inc	100 / 1

Scales

33 - 54 (01/21 - 02/11) @ 1.850	62 - 83 (02/19 - 03/11) @ 1.950
-----------------------------------	-----------------------------------

- Options
- 2) Add Notes
 - 3) Allocate

Account

1) Submit

Cancel



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

Electronic Trading – Buying a Negotiable CD on BOOM

50

Order received. 000194 11:39:54

31) Settings

Page 1/1 Activity Panel

X NORNY YCD 03/11/20 6:50 Detail Pass

	Buy	Dealer	Price	Yield	Status
Quantity	25,000,000	CG	0.000	1.950	Sent Ack
BBID	PP9FCOL6				
Settle	12/19/19				
Type	Primary				
Currency	USD				



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

Electronic Trading – Buying a Negotiable CD on BOOM

51

Order accepted 000194 11:44:59 Run BLOT to view.

31) Settings

Page 1/1 Activity Panel

X		NORNY YCD 03/11/20			Detail	Pass
	Buy	Dealer	Price	Yield	Status	
Quantity	25,000,000	CG	0.000	1.950	Accepted	
BBID	PP9FCOL6					
Settle	12/19/19					
Type	Primary					
Currency	USD					



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

Electronic Trading – Buying a Negotiable CD on BOOM

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BLOOMBERG

NORNY YCD 1.95 03/11/20 Data Unavailable

1) Transactions 2) Blotter 3) Allocate 5) Actions Trade Detail

Refresh



Currency	USD	Broker	SMBA	Status	Accepted
Buy/Sell	Buy	Issuer	NORINCHUKIN BANK NY	DTC Cusip	PP9FCOL6
Issue	NORNY	Broker Name	Citigroup Global'	Type	US CD
Audit Trail					
Quantity	25,000,000	Coupon	1.95	Proceed	\$ 0.00
Yield	1.95000	Price		Interest	.00
Settlement	12/19/2019	I/D	I	Dated Date	12/19/19
Maturity	03/11/2020	Reg Type		Ratings	A-1 P-1
Entry/Exec Time	08:39:54 / 08:44:59	Seq No	194		
Trade Date	12/19/2019				
User Name	HUBIE WHITE	Login	HRWHITE		
Customer	CITY AND COUNTY OF SAN FRANCISCO	Account			
Term Cust	CITY AND COUNTY OF SAN FRANCISCO	Serial No	843741 - 3		

30) Dealer Notes 31) Customer Notes 35) Miscellaneous



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

Electronic Trading – FIT on Bloomberg – T-Bills

53

United States BGM 1) Action 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

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



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

Electronic Trading – Buying a US Treasury on FIT

54

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

12:32

4) Actives 5) Bills 6) Notes 7) TIPS 8) Strips 9) Sprds 10) Curves 11) FRN 12) Bfly

21) T/0-1 22) T/1-2 23) T/2-4 24) T/4-7 25) T/7-10 26) T/10-30

31) 2 3/8 321	99-19 3/4 / 99-20+	2.558	- 02+	54) 2 1/8 921	98-29 3/4 / 98-30+	2.547	- 03+
32) 2 1/4 321	99-11 1/4 / 99-12 1/4	2.557	- 02+	55) 1 1/8 921	96-16 1/4 / 96-17	2.525	- 02 3/4
33) 1 1/4 321	97-12+ / 97-13 1/4	2.537	- 02+	56) 2 7/8 021	100-25 1/4 / 100-26	2.551	- 03 3/4
34) 2 3/8 421	99-19 1/4 / 99-20	2.558	- 02 3/4	57) 2 021	98-19 / 98-19 3/4	2.541	- 03+
35) 2 1/4 421	99-11 / 99-11 3/4	2.553	- 03	58) 1 1/4 021	96-21 1/4 / 96-22 1/4	2.544	- 03
36) 1 3/8 421	97-16 3/4 / 97-17+	2.550	- 02+	59) 8 N21	114-01 3/4 / 114-06+	2.521	- 04 1/4
37) 8 1/8 521	111-24 / 111-27 1/4	2.546	- 04 1/4	60) 2 N21	98-19 / 98-20 1/4	2.527	- 03 3/4
38) 3 1/8 521	101-06 1/4 / 101-07 3/4	2.539	- 02 3/4	61) 2 7/8 N21	100-26 1/4 / 100-26 3/4	2.552	- 04
39) 2 5/8 521	100-04 1/4 / 100-05	2.551	- 02 3/4	62) 1 7/8 N21	98-07 1/4 / 98-08 1/4	2.536	- 03+
40) 2 521	98-25 1/4 / 98-26	2.548	- 03	63) 1 3/4 N21	97-28+ / 97-29 1/4	2.542	- 03+
41) 1 3/8 521	97-14 / 97-14 3/4	2.547	- 02 1/4	64) 2 5/8 D21	100-07 / 100-07+	2.536	- 03 3/4
42) 2 5/8 621	100-04 3/4 / 100-05+	2.546	- 03 1/4	65) 2 1/8 D21	98-27 1/4 / 98-28 1/4	2.537	- 03 3/4
43) 2 1/8 621	99-01 / 99-02	2.542	- 02 3/4	66) 2 D21	98-17 / 98-18	2.530	- 03 3/4
44) 1 1/8 621	96-26+ / 96-27 1/4	2.527	- 02 3/4	67) 2 1/2 122	99-27+ / 99-28	2.545	- 04
45) 2 5/8 721	100-05 / 100-05 3/4	2.546	- 03	68) 1 1/2 122	97-02 3/4 / 97-03 3/4	2.533	- 03 3/4
46) 2 1/4 721	99-09+ / 99-10+	2.539	- 03	69) 1 7/8 122	98-03 3/4 / 98-04+	2.541	- 03+
47) 1 1/8 721	96-21 3/4 / 96-22+	2.543	- 02+	70) 2 222	98-14 3/4 / 98-16 1/4	2.527	- 03+
48) 8 1/8 821	113-01 1/4 / 113-05	2.557	- 04 3/4	71) 2 1/2 222	99-28 1/4 / 99-28+	2.538	- 04
49) 2 1/8 821	98-31 / 99-00	2.548	- 03+	72) 1 3/4 222	97-23 / 97-24	2.536	- 04
50) 2 3/4 821	100-14+ / 100-15 1/4	2.548	- 03 1/4	73) 1 7/8 222	98-02 / 98-03	2.541	- 03 3/4
51) 2 821	98-21 / 98-22	2.547	- 02 3/4	74) 1 3/4 322	97-21+ / 97-22+	2.531	- 03 3/4
52) 1 1/8 821	96-17 3/4 / 96-18+	2.553	- 03 1/4	75) 1 7/8 322	98-01 3/4 / 98-02+	2.528	- 04
53) 2 3/8 021	100-15 1/4 / 100-16	2.545	- 02 3/4	76) 1 3/4 322	97-10 1/4 / 97-11	2.537	- 04



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

Electronic Trading – Buying a US Treasury on FIT

55

FIT Inquiry Ticket

10) Flip

16) None

Side	Security	Quantity	Settle	Date
Buy	T 2 1/2 02/15/22 9128286C9 DV01	25,000 M	Reg	03/04/19
		Price / Yield	99-28+ /	2.538
	7,065	Principal	\$	24,972,656.25
		Accrued (17 Days)		29,350.83
		Net	\$	25,002,007.08

Select Dealers

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

Broker	Bid Px	Ask Px	↑	BYld	AYld	BSz	ASz	Time
DIWA		99-28+			2.538		414.4	12:38
CG	99-28 1/4	99-28+		2.541	2.538	350	350	12:37
DB	99-28 1/4	99-28+		2.541	2.538	250	250	12:06
RBS	99-28 1/4	99-28+		2.541	2.538	200	200	12:38
BART	99-28 1/4	99-28+		2.541	2.538	200	200	12:29
WFSC	99-28 1/4	99-28+		2.541	2.538	177	177	12:37
MS	99-28 1/4	99-28+		2.542	2.539	175	175	12:37

Options

- 2) Add Notes
- 5) Order Ticket
- 9) Stage to TSOX

Entity

1) Submit Close More Options



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

Electronic Trading – Buying a US Treasury on FIT

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Page 1/1 Activity Panel

X	T 2 ½ 02/15/22				1:17	Detail	Pass
	Buy	Dealer	Quantity	Yield	Price		Status
Cusip	9128286C9	DB	25,000,000	2.537	99-28 ⁵ / ₈	Lift	Firm 0:01
Settle	03/04/19	CITI	25,000,000	2.540	99-28 ³ / ₈	Lift	Firm 0:01
CBBT Px	99-28 ¹ / ₄ /99-28+	RBSM	25,000,000	2.538	99-28+	Lift	Firm 0:04
CBBT Yld	2.541/2.538	MS	25,000,000	2.538	99-28+	Lift	Firm 0:02
		DIWA	25,000,000	--	--		Sent Ack



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

FINRA – Financial Industry Regulatory Authority

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- 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



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

FINRA – Financial Industry Regulatory Authority

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, Tools & Calculators, Market Data



Last Updated: 03/05/2019

Market Data

Search:

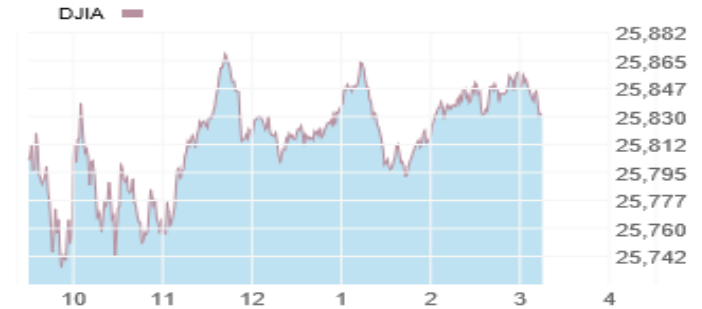
Welcome to FINRA's Market Data Center. This comprehensive tool is designed to assist investors with market and investment research, both through the market data information provided as well as through the FINRA Investor Education material and tools.

Enter Cusip

[Market Data Center Overview Guide](#)

Market Indices

DJIA	25,833.32	13.67	0.05%
NASDAQ	7,587.56	10.00	0.13%
S&P 500	2,792.49	-0.32	-0.01%



Data as of 03/05/2019 3:15:03 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	8559	6430	1960	169
Advances	4655	3656	930	69
Declines	3418	2521	806	91
Unchanged	108	59	45	4
52 Week High	321	201	115	5
52 Week Low	77	46	29	2
Dollar Volume*	28503	20911	6899	692

[More FINRA TRACE Bond Market Information](#)

*Par value in millions

Quick Search

Debt / Asset Class

- Treasury/Agency
- Corporate
- Municipal
- Securitized Products

Show Results As

- Bonds Trades

Issuer Name

Symbol / CUSIP



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY FINRA – www.finra.org, Tools & Calculators, Market Data

Last Updated: 03/05/2019

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 \$99.91	Last Trade Yield 2.490%	Last Trade Date 03/05/2019	US Treasury Yield —
		Trade History		Prospectus	

Click here for Trade History

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*	\$2,413,425.00
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)
TRACE Grade	Investment Grade
Default	—



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY FINRA – www.finra.org, Tools & Calculators, Market Data

Last Updated: 03/05/2019

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															
Date	Time	Settlement	Status	Quantity	Price	Yield	Remuneration	ATS	Modifier	2nd Modifier	Special	As-Of	Side	Reporting Party Type	Contra Party Type
3/5/2019	15:18:15	3/6/2019	T	500000	99.910	2.492		Y	-	-	-	-	S	D	D
3/5/2019	15:18:15	3/6/2019	T	500000	99.911	2.49	M		-	-	-	-	S	D	C
3/5/2019	12:02:50	3/6/2019	T	50000	99.894	2.513	M		-	-	-	-	S	D	C
3/5/2019	12:02:50	3/6/2019	T	50000	99.874	2.539		Y	-	-	-	-	S	D	D
3/5/2019	11:56:56	3/6/2019	T	100000	99.869	2.545		Y	-	-	-	-	S	D	T
3/5/2019	11:56:46	3/6/2019	T	100000	99.869	2.545		Y	-	-	-	-	S	T	D
3/5/2019	11:56:46	3/6/2019	T	100000	99.874	2.539	M		-	-	-	-	S	D	C
3/5/2019	11:54:49	3/6/2019	T	20000	99.873	2.54		Y	-	-	-	-	S	D	D
3/5/2019	11:54:49	3/6/2019	T	20000	99.963	2.421	M		-	-	-	-	S	D	C
3/5/2019	11:10:24	3/6/2019	T	75000	99.870	2.544		Y	-	-	-	-	S	D	T
3/5/2019	11:10:14	3/6/2019	T	75000	99.870	2.544		Y	-	-	-	-	S	T	D
3/5/2019	11:10:14	3/6/2019	T	75000	99.870	2.544	N		-	-	-	-	S	D	C
3/5/2019	11:05:07	3/6/2019	T	30000	99.870	2.544		Y	-	-	-	-	S	D	D
3/5/2019	11:05:07	3/6/2019	T	30000	99.970	2.412	M		-	-	-	-	S	D	C
3/5/2019	11:05:07	3/6/2019	T	30000	99.870	2.544			-	-	-	-	S	D	D
3/5/2019	10:08:31	3/6/2019	T	100000	99.870	2.544		Y	-	-	-	-	S	D	T
3/5/2019	10:08:31	3/6/2019	T	100000	99.920	2.478	M		-	-	-	-	S	D	C
3/5/2019	10:08:31	3/6/2019	T	100000	99.870	2.544			-	-	-	-	S	D	D
3/5/2019	10:08:19	3/6/2019	T	100000	99.870	2.544		Y	-	-	-	-	S	T	D
3/4/2019	13:58:18	3/5/2019	T	160000	100.009	2.361	M		-	-	-	-	S	D	C



ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY

FINRA – Price Transparency

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Bond Trade Activity Search Results

From to [Glossary of Terms](#)

Issue: **UBS4154104** Description: **UBS AG STAMFORD BRH MEDIUM TERM SR DEP N** Coupon Rate: **2.375** Maturity Date: **08/14/2019**

Execution																
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	





ACCESSING AND ADJUSTING PORTFOLIO LIQUIDITY FINRA – Price Transparency

Last Updated: 03/06/2019

Bond Trade Activity Search Results

From to [Glossary of Terms](#)

Issue: FHLN4465601			Description: FEDERAL HOME LN BKS				Coupon Rate: 1.375				Maturity Date: 03/18/2019					
Execution																
Date	Time	Settlement	Status	Quantity	Price	Yield	Remuneration	ATS	Modifier	2nd Modifier	Special	As-Of	Side	Reporting Party Type	Contra Party Type	
3/6/2019	09:29:03	3/7/2019	T	225000	99.965	2.505		M		-	-	-	-	B	D	C
3/6/2019	09:11:21	3/7/2019	T	225000	99.965	2.505				-	-	-	-	S	D	D
3/6/2019	09:09:30	3/7/2019	Cancel	225000	99.965	2.505		M		-	-	-	-	B	D	C
3/6/2019	09:09:30	3/7/2019	Cancel	225000	99.965	2.505		M		-	-	-	-	B	D	C
3/4/2019	13:33:45	3/6/2019	T	300000	99.966	2.381		M		-	-	-	-	B	D	C
3/4/2019	12:24:11	3/4/2019	T	1000000	99.961	2.364		M		-	-	-	-	B	D	C
3/1/2019	12:48:07	3/4/2019	T	2540000	99.960	2.402		M		-	-	-	-	S	D	C
2/28/2019	10:25:03	2/28/2019	T	750000	99.955	2.178		M		-	-	-	-	B	D	C
2/27/2019	16:28:07	2/28/2019	T	5MM+	99.955	2.173		M		-	-	-	-	B	D	C
2/27/2019	16:24:29	2/28/2019	T	400000	99.950	2.262		N		-	-	-	-	S	D	C
2/27/2019	16:24:29	2/28/2019	T	95000	99.950	2.262		N		-	-	-	-	S	D	C
2/27/2019	16:24:29	2/28/2019	T	30000	99.950	2.262		N		-	-	-	-	S	D	C
2/27/2019	16:23:23	2/28/2019	T	525000	99.950	2.262				-	-	-	-	S	D	D
2/27/2019	15:22:25	2/28/2019	T	1740000	99.957	2.137		M		-	-	-	-	B	D	C
2/27/2019	12:40:00	2/28/2019	T	250000	99.956	2.155				-	-	-	-	S	D	D
2/27/2019	12:40:00	2/28/2019	T	250000	100.073	0.061		M		-	-	-	-	S	D	C
2/27/2019	12:40:00	2/28/2019	T	250000	99.956	2.155			Y	-	-	-	-	S	D	D
2/26/2019	15:40:08	2/27/2019	T	300000	99.954	2.151			Y	-	-	-	-	S	D	D
2/26/2019	15:40:08	2/27/2019	T	300000	99.954	2.151		N		-	-	-	-	S	D	C
2/26/2019	14:31:58	2/28/2019	T	5MM+	99.957	2.137		M		-	-	-	-	B	D	C