

Principles of Investment Accounting



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Principles of Investing Accounting

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Topics to Cover

- Understanding Investment Reports
- Separation of Accounting Duties/
Reconciliation Process
- The Concept of Asset Conversion
- Accounting Treatment of Example Securities

Investment Accounting System

- Ensures full disclosure and accountability
 - Reports are public records
- Accurately describes all investments
 - Can be used to accurately measure performance
- Promotes “clean” audits
 - Tri-Party Reconciliation System

3 | Principles of Investing Accounting

Investment Report Components

- An Inventory of all securities including:
 - CUSIP, Par Value, Market Value, Book Value, Settlement Date, Maturity Date, Coupon, Yield to Maturity
- A record of all investment activity for the period:
 - Purchases, Sales, Calls, Maturities
- A record of all income received during the period:
 - Interest Received, Realized Capital Gains

4 | Principles of Investing Accounting

The Portfolio Inventory

- Categorize investments by issuer and type
 - Issuers include:
 - US Treasuries
 - Government Agencies
 - Fannie Mae (FNMA), Freddie Mac (FHLMC), Federal Home Loan Bank (FHLB), Federal Farm Credit Bank (FFCB)
 - Various Corporations
 - Types include:
 - Callable bonds (fixed rate and step-ups),
 - Non callable bonds (or bullets),
 - Discounted Securities (Bills, Discount Notes, CP)

Components of the Inventory

- **CUSIP:** Letter and number combinations assigned to identify publicly traded securities. Each number is unique to the issue.
- **Par Value:** The value of a bond at maturity; its future value.
- **Market Value:** The estimated liquidation value of each security as of a specific date; may be greater (or less) than your purchase cost due to changing interest rates.

Components of the Inventory

- ◎ **Book Value (Cost):** The amount disbursed to purchase a security, including any accrued interest due to the seller on the settlement date.
 - The buyer will receive the entire coupon payment at the next interest payment date.
 - Book Value = Principal + Accrued Interest
 - (Principal Cost= Par Value * Purchase Price)
 - After the next interest payment is received, the accrued interest is amortized from the book value and the book value will equal the principal cost.

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Components of the Inventory

- ◎ **Settlement Date:** The date in which the securities are delivered versus payment. The statute requires "delivery vs. payment" (DVP) and the use of a qualified safekeeping agent.
- ◎ **Maturity Date:** The future date in which the par amount is paid to the investor. The par value will be paid at maturity, regardless of original purchase cost.

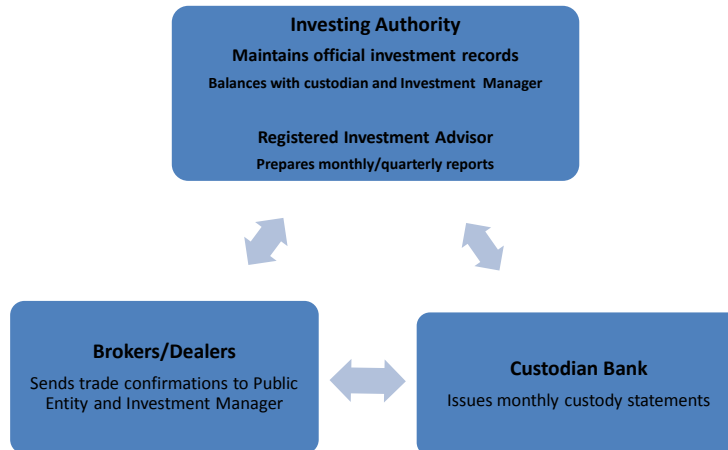
8 | Principles of Investing Accounting

Components of the Inventory

- Coupon (or Rate):** The annual percentage amount paid to an investor, based upon the par value of the bond; the rate may be fixed or variable.
- Yield to Maturity:** The rate of return anticipated on a bond if it is held to maturity.
 - If a bond was purchased at a discount, $YTM > \text{the coupon}$.
 - If a bond was purchased at a premium, $YTM < \text{the coupon}$.
 - If a bond was purchased at par (100), $YTM = \text{coupon}$.

CUSIP	Issuer	Par Value	Stated Rate	Maturity Date	Purchase Date	DTM	YTM	Market Value	Accrued Interest At Purchase	Current Principal	Book Value
Commercial Paper - Discount											
46640PUB7	JPM	615,000.00	1.170	7/11/2017	10/14/2016	101	1.194	609,603.38		609,603.38	609,603.38
63873JZF0	NATXNY	570,000.00	1.460	12/15/2017	3/23/2017	258	1.493	563,827.85		563,827.85	563,827.85
CP - Discount Totals		1,185,000.00				176	1.338	1,173,431.23	0.00	1,173,431.23	1,173,431.23
Federal Agency - Coupon (NC)											
3137EADH9	FHLMC	1,000,000.00	1.000	6/29/2017	1/23/2014	89	1.143	1,000,311.00	Received	995,200.00	995,200.00
3133EEJ50	FFCB	1,000,000.00	1.030	5/11/2018	5/11/2015	405	1.099	999,312.00		997,970.00	997,970.00
3130A6AL1	FHLB	1,025,000.00	1.150	8/14/2018	8/14/2015	500	1.185	1,025,077.90		1,023,944.25	1,023,944.25
3130A5NC9	FHLB	275,000.00	1.300	10/30/2018	6/11/2015	577	1.311	275,320.38		274,901.00	274,901.00
3136G0P54	FNMA	500,000.00	1.200	4/17/2019	9/4/2015	746	1.34	498,667.50	Received	497,533.00	497,533.00
3134G93L9	FHLMC	1,000,000.00	1.250	8/15/2019	9/15/2016	866	1.25	987,674.00	Received	1,000,000.00	1,000,000.00
313380F88	FHLB	500,000.00	1.375	9/13/2019	9/21/2015	895	1.452	498,385.50	Received	498,516.50	498,516.50
3136G0T68	FNMA	500,000.00	1.330	10/24/2019	9/21/2015	936	1.522	497,764.50	Received	496,200.00	496,200.00
3134G9AA5	FHLMC	375,000.00	1.225	10/28/2019	5/16/2016	940	1.225	371,595.00	Received	375,000.00	375,000.00
3134G9CP0	FHLMC	775,000.00	1.300	2/13/2020	5/13/2016	1,048	1.304	767,234.50		774,883.75	774,883.75
3130A8Q55	FHLB	250,000.00	1.125	7/14/2021	7/15/2016	1,565	1.269	242,183.00	Received	248,262.50	248,262.50
3135G0N82	FNMA	500,000.00	1.250	8/17/2021	8/19/2016	1,599	1.334	485,649.50		497,975.00	497,975.00
Fed. Agency (NC) Totals		7,700,000.00				737	1.257	7,649,174.78	0.00	7,680,386.00	7,680,386.00
Federal Agency - Coupon (Callable)											
313383BF7	FHLB	450,000.00	1.000	2/12/2018	1/20/2016	317	1.089	449,326.80	Received	449,190.00	449,190.00
3136G2P27	FNMA	535,000.00	1.150	9/28/2018	9/30/2015	545	1.15	533,117.87		535,000.00	535,000.00
3135G0Q30	FNMA	270,000.00	1.180	9/27/2019	1/13/2017	909	1.45	267,685.29	Received	268,069.50	268,069.50
3133EGMP7	FFCB	250,000.00	1.440	1/19/2021	7/20/2016	1,389	1.475	241,332.00	Received	249,625.00	249,625.00
3134G9X77	FHLMC	500,000.00	1.470	1/27/2021	7/27/2016	1,397	1.47	486,197.00		500,000.00	500,000.00
Fed. Agency (C) Totals		2,005,000.00				861	1.297	1,977,658.96	0.00	2,001,884.50	2,001,884.50
Treasury Securities - Coupon											
912828TH3	USTN	1,000,000.00	0.875	7/31/2019	11/9/2015	851	1.502	989,414.00	Received	977,343.75	977,343.75
912828S76	USTN	555,000.00	1.125	7/31/2021	2/21/2017	1,582	1.842	538,263.42	362.21	538,089.84	538,452.05
Treas. Securities Totals		1,555,000.00				1,111	1.623	1,527,677.42	362.21	1,515,433.59	1,515,795.80
Investment Totals		12,445,000.00				750	1.316	12,327,942.39	362.21	12,371,135.32	12,371,497.53

Separation of Accounting Duties



11 | Principles of Investing Accounting

Cash Basis Portfolio Accounting

- Public entity investment reports use cash basis portfolio accounting.
 - Purchase cost is reduced by the amount of purchased accrued interest at the next interest payment date.
 - Purchase cost remains level to the maturity or sale date.
 - Premiums are not amortized; discounts are not accreted (Exception: Premiums may be amortized over the life of the security through the application of realized income).
 - Income is reported when received (realized).
 - Realized income is shown as proceeds minus cost.

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Accrual Portfolio Accounting

- Purchase cost is adjusted daily (“adjusted book value”)
- Premiums are amortized daily over the life of the security
- Discounts accrete daily over the life of the security
- Interest accrues daily
- Capital gains/losses are based upon adjusted book value

Reconciliation Process

- The public entity’s internal record-keeping is subject to audit by the State Auditor.
- Components of the Reconciliation Process:
 - Internal Records (the official books)
 - Custodian bank – safekeeping of investment assets, purchase cost, income, trade activity
 - Investment advisor (if used) – inventory of assets and individual purchase cost, income, list of transactions
 - Additional records – broker/dealer trade confirms

Reconciliation Process

- A “pay-in” is made by the Public Entity evidencing a receipt of funds.
 - Interest Income - Coupon payments received by the custodian.
 - Capital Gains - The difference between the proceeds (maturity, sale, called bond) and the original investment cost.

Common Reconciliation Errors

Using market value rather than book value (cost)

Failing to account for purchased accrued interest

Not recognizing a discount at maturity

Not amortizing a premium paid

Not maintaining supporting documentation

Not recognizing income when received

The Concept of Asset Conversion

- An investment transaction is a conversion process.



- Cash and investments are both assets of your public entity.
- Adjustments are made between cash and investments when bond purchases, sales, maturities, and calls take place.

The Concept of Asset Conversion

- Cash account and Investment account
 - A bond purchased for \$1 million reduces cash and increases investments on the settlement date by that amount.
 - The total assets of the public entity remains the same.
- The total asset value of the public entity increases when the investment pays interest (or when capital gains are realized).



CUSIP	Issuer	Par Value	Stated Rate	Maturity Date	Purchase Date	DTM	YTM	Market Value	Accrued Interest At Purchase	Current Principal	Book Value
Commercial Paper - Discount											
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Treas. Securities Totals		1,555,000.00				1,111	1.623	1,527,677.42	362.21	1,515,433.59	1,515,795.80
Investment Totals		12,445,000.00				750	1.316	12,327,942.39	362.21	12,371,135.32	12,371,497.53

Discounted UST Description

GRAB

T 1 07/31/21 Govt Settings Page 1/11 Security Description: Bond

Buy Sell

Bond Description Issuer Description

Pages

1) Bond Info Issuer Information Identifiers

2) Addtl. Info Name US TREASURY N/B ID Number 912828S76

3) Covenants Industry US GOVT NATIONAL CUSIP 912828S76

4) Guarantors Security Information ISIN US912828S760

5) Bond Ratings Issue Date 08/01/2016 SEDOL 1 BDHC7H5

6) Identifiers Interest Accrues 07/31/2016 FLGI BBG00DG73PT8

7) Exchanges 1st Coupon Date 01/31/2017 Issuance & Trading

8) Inv Parties Maturity Date 07/31/2021 Issue Price 99.733839

9) Fees, Restrict Floater Formula N.A. Risk Factor 3.994

10) Schedules Workout Date 07/31/2021 Amount Issued 36374 (MM)

11) Coupons Coupon 1.125 Security Type USN Amount Outstanding 36374 (MM)

Cpn Frequency S/A Type FIXED Minimum Piece 100

Mty/Refund Type NORMAL Series Minimum Increment 100

Calc Type STREET CONVENTION SOMA Holdings 6.5276

Day Count ACT/ACT

Market Sector US GOVT

Country US Currency USD

TENDERS ACCEPTED: \$34000MM.

4) Send Bond

Australia 61 2 9777 6600 Brazil 5511 2395 9000 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000
Japan 81 3 3201 5500 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2017 Bloomberg Finance L.P.
200601 0716-1094-1 05-169-17 14 36 40 EDT 09/28/17

Accounting for a Discounted Purchase

- A US Treasury with an original issue date of 7/31/16 and maturing on 7/31/21 with a coupon rate of 1.125%, purchased in the secondary market on settlement date 2/21/17, at a price of 96.953 (to yield 1.842%), will affect the total cash account as follows:

538,089.84	555,000 Par Value minus a discount of \$16,910.16
+ <u>362.21</u>	Accrued interest paid at purchase = Initial Purchase Cost
= 538,452.05	Reduction in total cash offset by an increase in total investments

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Discounted UST Purchase

Yield & Spread		Yields		Graphs		Pricing		Custom		Description		
T 1 % 07/31/21 Govt												
Settings - Yield and Spread Analysis												
99 Buy 90 Sell												
T 1 % 07/31/21 (912828576)												
Price	96.953124	(96.9531243)	Risk	Duration	4.341	Modified Duration	4.301	Risk	4.173	Convexity	0.209	
Settle	02/21/17	Maturity	07/31/2021	DV	0.01 on 555M	YV	0.031	Invoice	Face	555 M	Principal	538,089.84
Street Convention	1.842	US Government Equivalent	1.842	Accrued (21 Days)	362.21	Total (USD)	538,452.05	After Tax (Inc 48.400 % CG 23.800 %)	1.061	Issue Price = 99.734. OID Bond with Market Discount.		
True Yield	1.840	Japanese Yield (Simple)	1.851									
Equiv	1.840	Mmkt (Act/36)	1.160									
Current Yield	1.160											

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Cash Flows on Discounted Purchase

GRAB

T 1 % 07/31/21 Govt Export 9) Settings Cash Flow Analysis

BBID 912828576 99 Buy 90 Sell

Cash Flows Present Values Distressed Analysis

Price 96-30+ Settlement 02/21/17 Issue 08/01/2016 Maturity 07/31/2021

Yield 1.842468 to Worst 07/31/21 @ 100.000000 Face Amt 555M

Payment Date	Interest	Principal	Total
07/31/2017	3,121.88	0.00	3,121.88
01/31/2018	3,121.88	0.00	3,121.88
07/31/2018	3,121.88	0.00	3,121.88
01/31/2019	3,121.88	0.00	3,121.88
07/31/2019	3,121.88	0.00	3,121.88
01/31/2020	3,121.88	0.00	3,121.88
07/31/2020	3,121.88	0.00	3,121.88
01/31/2021	3,121.88	0.00	3,121.88
07/31/2021	3,121.88	555,000.00	558,121.88

Australia 61 2 9777 6600 Brazil 5511 2395 8000 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000
Japan 01 3 3201 5900 Singapore 65 6212 1000 U.S. 1 212 518 2000 Copyright 2017 Bloomberg Finance L.P.
SH 208603 0716-1304-1 05-Mgr-17 18 10 29 EDT GMT-4:00

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Amortizing Accrued Interest

- At the following interest payment date (07/31/2017), cash and investments are affected as follows:

Gross interest payment received minus accrued interest paid at purchase = net interest income (the “pay-in” amount):

\$ 3,121.88	Interest received (credited by the custodian bank)
- <u>362.21</u>	Accrued interest paid at settlement date (2/21/2017)
\$ 2,759.67	Net interest income (Increase in cash offset by a decrease in investment cost)

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Recognizing Income on Discount

- All subsequent interest payments (after the amortization has taken place) are paid-in totally, as an increase in the cash account.
 - First pay-in of \$2,759.67
 - 8 pay-ins of \$3,121.88 totaling \$24,975.04
 - Plus realized gain at maturity of \$16,910.16
 - Equals total realized income of **\$44,644.87**

Premium UST Description

GRAB		
07/31/21 Govt		Settings
Page 1/11		Security Description: Bond
		Buy Sell
25 Bond Description	29 Issuer Description	
Pages	Issuer Information	Identifiers
1) Bond Info	Name US TREASURY N/B	ID Number 912828WY2
2) Addtl. Info	Industry US GOVT NATIONAL	CUSIP 912828WY2
3) Covenants	Security Information	ISIN US912828WY26
4) Guarantors	Issue Date 07/31/2014	SEDOL 1 BPFJZX4
5) Bond Ratings	Interest Accrues 07/31/2014	FIGI BBG006WS6DC1
6) Identifiers	1st Coupon Date 01/31/2015	Issuance & Trading
7) Exchanges	Maturity Date 07/31/2021	Issue Price 100.000000
8) Inv Parties	Floater Formula N.A.	Risk Factor 4.101
9) Fees, Restrict	Workout Date 07/31/2021	Amount Issued 29009 (MM)
10) Schedules	Coupon 2.250	Security Type USN
11) Coupons	Cpn Frequency S/A	Type FIXED
Quick Links	Mty/Refund Type NORMAL	Series
22) ALLQ Pricing	Calc Type STREET CONVENTION	Minimum Piece 100
31) ORD Quote Reqa	Day Count ACT/ACT	Minimum Increment 100
33) CAC Corp Action	Market Sector US GOVT	SOMA Holdings 0.032476
33) CN Sec News	Country US	Currency USD
34) HDS Holders	TENDERS ACCEPTED: \$29000MM.	
46) Send Bond		

Premium UST Purchase

Yield & Spread		Yields		Graphs		Pricing		Custom		Description	
T 2 1/2 07/31/21 Govt (912828WV2)											
Price	101.732	(101.732)		Risk		Duration	4.249		Risk		4.210
Settle	02/21/17	Maturity 07/31/2021		Risk		Modified Duration	4.289		Risk		4.289
Street Convention	1.842	Treasury Convention		Convexity		DV	01 on 555M		238		
True Yield	1.840	Equiv 1 /Yr Compound		YM		0.031		0.00729			
Japanese Yield (Simple)	1.828	Mmkt (Act/36)		Invoice		Face		555 M			
Current Yield	2.212	After Tax (Inc 43.400 % CG 23.800 %)		Principal		564,612.60		Accrued (21 Days)		724.41	
	1.043	Total (USD)		565,337.01							
Issue Price = 100,000, Bond Purchased with Premium.											

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Accounting for a Premium Purchase

- A different UST issue with the same maturity date of 7/31/21, but with a coupon rate of 2.250%, could also be purchased in the secondary market on settlement date 2/21/17, at a price of 101.732 (to yield 1.842%).

564,612.60	555,000 Par Value plus a premium of \$9,612.60
+ 724.41	Accrued interest paid at purchase = Initial Purchase Cost
= 565,337.01	Reduction in total cash offset by an increase in total investments
- The premium paid remains a part of the fixed-cost at purchase, plus any accrued interest paid.
 - Purchased accrued interest is amortized at the next interest payment date.
 - The premium is amortized at maturity.

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Cash Flows on Premium Purchase

GRAB

T 2 4 07/31/21 Govt Export Settings Cash Flow Analysis

BBID 912828W2 93 Buy 90 Sell

Cash Flows Present Values Distressed Analysis

Price 101-23% Settlement 02/21/17 Issue 07/31/2014 Maturity 07/31/2021

Yield 1.842356 to Worst 07/31/21 @ 100.000000 Face Amt 555M

Payment Date	Interest	Principal	Total
07/31/2017	6,243.75	0.00	6,243.75
01/31/2018	6,243.75	0.00	6,243.75
07/31/2018	6,243.75	0.00	6,243.75
01/31/2019	6,243.75	0.00	6,243.75
07/31/2019	6,243.75	0.00	6,243.75
01/31/2020	6,243.75	0.00	6,243.75
07/31/2020	6,243.75	0.00	6,243.75
01/31/2021	6,243.75	0.00	6,243.75
07/31/2021	6,243.75	555,000.00	561,243.75

Australia 61 2 3777 8500 Brazil 5511 2395 2000 Europe 44 20 7150 7500 Germany 49 69 3264 1310 Hong Kong 852 3377 6000 Japan 81 3 3201 8300 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2017 Bloomberg Finance L.P. SN 239001 0716-1394-1 06-18U-17 14 36 02 EDT GMT+1 00

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Recognizing Income on Premium

- First pay-in on 7/31/17 of \$5,519.34
 - (\$6243.75 less purchased accrued interest of \$724.41)
- Seven subsequent payments of \$6243.75
- Final payment of \$6243.75 on 7/31/21 less amortization of premium of \$9,612.60
 - (\$6,243.75 – 9,612.60 would mean a **negative pay-in** of \$3,368.85 at maturity)
- Equals total realized income of \$45,856.74

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Yields on Callable Bonds

- The yield to maturity of the bond is reflective of current market yields at the time of purchase.
 - When a callable bond is purchased at a discount: if the bond is called prior to maturity, the investor will realize a yield greater than the yield to maturity.
 - When a callable bond is purchased at a premium: if the bond is called prior to maturity, the investor will realize a yield less than the yield to maturity.

CUSIP	Issuer	Par Value	Stated Rate	Maturity Date	Purchase Date	DTM	YTM	Market Value	Accrued Interest At Purchase	Current Principal	Book Value
Commercial Paper - Discount											
46640PUB7	JPM	615,000.00	1.170	7/11/2017	10/14/2016	101	1.194	609,603.38		609,603.38	609,603.38
63873JZF0	NATXNY	570,000.00	1.460	12/15/2017	3/23/2017	258	1.493	563,827.85		563,827.85	563,827.85
CP - Discount Totals		1,185,000.00				176	1.338	1,173,431.23	0.00	1,173,431.23	1,173,431.23
Federal Agency - Coupon (NC)											
3137EADH9	FHLMC	1,000,000.00	1.000	6/29/2017	1/23/2014	89	1.143	1,000,311.00	Received	995,200.00	995,200.00
3133EEJ50	FFCB	1,000,000.00	1.030	5/11/2018	5/11/2015	405	1.099	999,312.00		997,970.00	997,970.00
3130A6AL1	FHLB	1,025,000.00	1.150	8/14/2018	8/14/2015	500	1.185	1,025,077.90		1,023,944.25	1,023,944.25
3130A5NC9	FHLB	275,000.00	1.300	10/30/2018	6/11/2015	577	1.311	275,320.38		274,901.00	274,901.00
3136G0P54	FNMA	500,000.00	1.200	4/17/2019	9/4/2015	746	1.34	498,667.50	Received	497,533.00	497,533.00
3134G93L9	FHLMC	1,000,000.00	1.250	8/15/2019	9/15/2016	866	1.25	987,674.00	Received	1,000,000.00	1,000,000.00
313380F88	FHLB	500,000.00	1.375	9/13/2019	9/21/2015	895	1.452	498,385.50	Received	498,516.50	498,516.50
3136G0T68	FNMA	500,000.00	1.330	10/24/2019	9/21/2015	936	1.522	497,764.50	Received	496,200.00	496,200.00
3134G9AA5	FHLMC	375,000.00	1.225	10/28/2019	5/16/2016	940	1.225	371,595.00	Received	375,000.00	375,000.00
3134G9CP0	FHLMC	775,000.00	1.300	2/13/2020	5/13/2016	1,048	1.304	767,234.50		774,883.75	774,883.75
3130A8Q55	FHLB	250,000.00	1.125	7/14/2021	7/15/2016	1,565	1.269	242,183.00	Received	248,262.50	248,262.50
3135G0N82	FNMA	500,000.00	1.250	8/17/2021	8/19/2016	1,599	1.334	485,649.50		497,975.00	497,975.00
Fed. Agency (NC) Totals		7,700,000.00				737	1.257	7,649,174.78	0.00	7,680,386.00	7,680,386.00
Federal Agency - Coupon (Callable)											
313383BF7	FHLB	450,000.00	1.000	2/12/2018	1/20/2016	317	1.089	449,326.80	Received	449,190.00	449,190.00
3136G2P27	FNMA	535,000.00	1.150	9/28/2018	9/30/2015	545	1.15	533,117.87		535,000.00	535,000.00
3135G0Q30	FNMA	270,000.00	1.180	9/27/2019	1/13/2017	909	1.45	267,685.29	Received	268,069.50	268,069.50
3133EGMP7	FFCB	250,000.00	1.440	1/19/2021	7/20/2016	1,389	1.475	241,332.00	Received	249,625.00	249,625.00
3134G9X77	FHLMC	500,000.00	1.470	1/27/2021	7/27/2016	1,397	1.47	486,197.00		500,000.00	500,000.00
Fed. Agency (C) Totals		2,005,000.00				861	1.297	1,977,658.96	0.00	2,001,884.50	2,001,884.50
Treasury Securities - Coupon											
912828TH3	USTN	1,000,000.00	0.875	7/31/2019	11/9/2015	851	1.502	989,414.00	Received	977,343.75	977,343.75
912828S76	USTN	555,000.00	1.125	7/31/2021	2/21/2017	1,582	1.842	538,263.42	362.21	538,089.84	538,452.05
Treas. Securities Totals		1,555,000.00				1,111	1.623	1,527,677.42	362.21	1,515,433.59	1,515,795.80
Investment Totals		12,445,000.00				750	1.316	12,327,942.39	362.21	12,371,135.32	12,371,497.53

Yield to Call on Discounted Purchase

GRAB
66 <GD> to message data
FHLE 1 02/12/18 Corp Settings Page 1/1 Yield and Spread Analysis

99 Buy 90 Sell

1) Yield & Spread 2) Yields 3) Graphs 4) Pricing 5) Custom 6) Description 7) Calls

Settlement Date 01/20/16 Price 99.82 Blend Full Screen

YTC (313383BF7) Date Price Yield

Date	Price	Yield	Treas Crv	Spr	Adj Dur	Risk
02/12/2018	100.00	1.089				
02/12/2018	100.00	1.089				
03/12/2016	100.00	2.248				
02/12/2018	100.00	1.089				

May be called quarterly starting 09/12/2013

Date	Price	Yield	Treas Crv	Spr	Adj Dur	Risk
03/12/16	100.0000	2.2478	0.218	2.030	0.144	0.144
06/12/16	100.0000	1.4574	0.302	1.155	0.392	0.392
09/12/16	100.0000	1.2816	0.378	0.903	0.639	0.639
12/12/16	100.0000	1.2026	0.442	0.761	0.887	0.886
03/12/17	100.0000	1.1589	0.534	0.625	1.133	1.132
06/12/17	100.0000	1.1303	0.639	0.491	1.379	1.378
09/12/17	100.0000	1.1108	0.744	0.366	1.624	1.623
12/12/17	100.0000	1.0961	0.848	0.248	1.869	1.868
02/12/18	100.0000	1.0886	0.897	0.192	2.032	2.030

Australia 61 2 9777 6600 Brazil 5511 2395 9000 Europe 44 20 7310 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000
Japan 81 3 3201 9900 Singapore 65 6312 8100 U.S. 1 212 313 2000 CN 86 101 2017 Bloomberg Finance L.P.
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Yield to Call on Premium Purchase

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66 <GD> to message data
FHLE 1 02/12/18 Corp Settings Page 1/1 Yield and Spread Analysis

99 Buy 90 Sell

1) Yield & Spread 2) Yields 3) Graphs 4) Pricing 5) Custom 6) Description 7) Calls

Settlement Date 01/20/16 Price 100.05 Blend Full Screen

YTC (313383BF7) Date Price Yield

Date	Price	Yield	Treas Crv	Spr	Adj Dur	Risk
02/12/2018	100.00	0.975				
02/12/2018	100.00	0.975				
03/12/2016	100.00	0.653				
03/12/2016	100.00	0.653				

May be called quarterly starting 09/12/2013

Date	Price	Yield	Treas Crv	Spr	Adj Dur	Risk
03/12/16	100.0000	0.6528	0.218	0.435	0.144	0.145
06/12/16	100.0000	0.8719	0.302	0.570	0.394	0.394
09/12/16	100.0000	0.9222	0.378	0.544	0.640	0.641
12/12/16	100.0000	0.9435	0.442	0.501	0.888	0.889
03/12/17	100.0000	0.9561	0.534	0.422	1.134	1.136
06/12/17	100.0000	0.9637	0.639	0.324	1.380	1.382
09/12/17	100.0000	0.9693	0.744	0.225	1.625	1.628
12/12/17	100.0000	0.9732	0.848	0.125	1.870	1.873
02/12/18	100.0000	0.9755	0.897	0.079	2.033	2.036

Australia 61 2 9777 6600 Brazil 5511 2395 9000 Europe 44 20 7310 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000
Japan 81 3 3201 9900 Singapore 65 6312 8100 U.S. 1 212 313 2000 CN 86 101 2017 Bloomberg Finance L.P.
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Summary of Checks and Balances

