

Duration and Risk

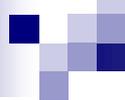
Presenters:

Tony Garcia

CFA, Vice President, Wells Fargo Institutional Securities

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Fixed Income Specialist, Bloomberg Analytics



Overview

Investment Analysis: Duration Calculation

- Duration and concepts of convexity
- Different types of duration calculations
- Portfolio duration, risk and strategies
- Application of Bloomberg analysis



Measuring and Evaluating Risk

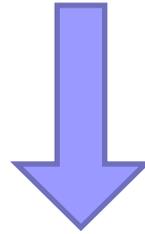
- **Interest Rate Risk**
 - Macaulay Duration
 - Modified Duration
 - Effective/OAS Duration
 - Risk vs. Duration

- **Convexity and Performance**

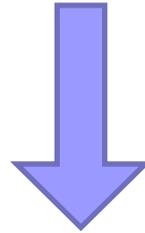
- **Credit Risk**
 - Spread Duration/Risk
 - Probability of Default



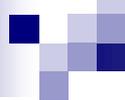
Macaulay Duration



Modified Duration



Effective/OAS Duration



Interest Rate Risk and Duration

Inverse relationship between price and yield. The price of some bonds however are more affected by changes in yield.

Interest Rate Risk:

The risk that interest rates will rise causing the yields of bonds to rise and consequently making prices fall.

Duration:

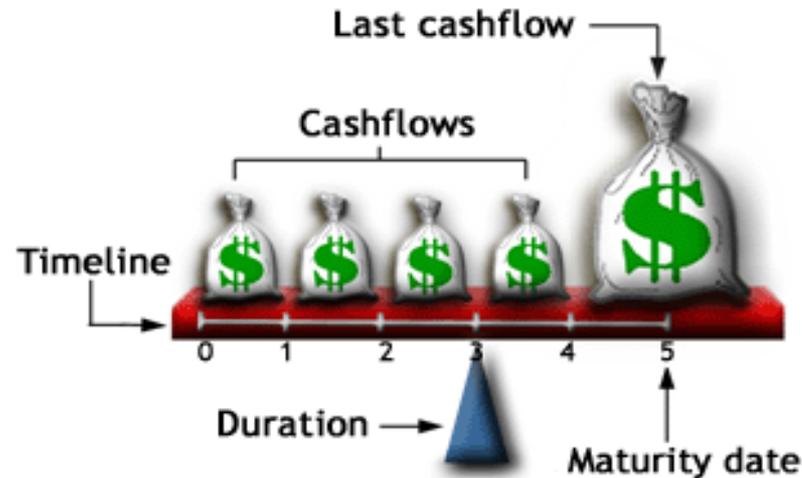
Investors can quantify how much the price of a bond will change as the yield changes through duration, The Duration is a measure of the % change in a bonds value changes in yield.

Risk/DV01:

Measures an absolute dollar movement of the bond.

Macaulay's Duration

Time in years until $\frac{1}{2}$ of the future cash flows are received. Consider a bond that pays coupons annually and matures in five years. Its cash flows consist of five annual coupon payments and the last payment includes the face value of the bond.



The moneybags represent the cash flows you receive over the five-year period. To balance the red lever at the point where total cash flows equal the amount paid for the bond, the fulcrum must be farther to the left, at a point before maturity. (Duration/100 - change in yield 0.01%)

Why should we use a Bonds Duration rather than it's maturity?

T 1 3/8 11/30/15 vs T 9 1/4 2/15/16

YA Govt YA

T 1 3/8 11/30/15 Govt (90) Feedback Yield and Spread Analysis

103-12/103-12 0.480/0.474 CBBT @ 11:45 (95) Buy (96) Sell (97) Settings

1) Yield & Spread 2) Price Discovery 3) Descriptive 4) Graphs 5) Custom 6) Yields

T 1.375 11/30/15 (912828PJ3) Risk

Price	103-12 (103.375)	Duration	3.719
Settle	02/07/12	Modified Duration	3.710
	Maturity 11/30/15	Risk	3.845
Street Convention	0.480	Convexity	0.158
Treasury Convention	0.480	DV 01 on 1MM	385
True Yield	0.480	Yield Value of a 0 3/2	0.00813

Street Convention 0.480
Treasury Convention 0.480
True Yield 0.480

Equiv 1 /Yr Compound YA
Japanese Yield (Simple) Bond Matures on a HOLIDAY
Mmkt(Act/ 360)

Current Yield

Govt YA

After Tax (Inc 35.00% CG 15.00%)
Issue Price = 99.827. Bond Purchased with Prem

T 9 1/4 02/15/16 Govt (90) Feedback Yield and Spread Analysis

135-01/135-03 0.451/0.437 CBBT @ 10:44 (95) Buy (96) Sell (97) Settings

1) Yield & Spread 2) Price Discovery 3) Descriptive 4) Graphs 5) Custom 6) Yields

T 9.25 2/15/16 (912810DV7) Risk

Price	135-01 (135.03125)	Duration	3.428
Settle	02/07/12	Modified Duration	3.420
	Maturity 02/15/16	Risk	4.770
Street Convention	0.451	Convexity	0.147
Treasury Convention	0.451	DV 01 on 1MM	477
True Yield	0.450	Yield Value of a 0 3/2	0.00655

Street Convention 0.451
Treasury Convention 0.451
True Yield 0.450

Equiv 1 /Yr Compound Invoice
Japanese Yield (Simple) Face 1,000 M
Mmkt(Act/ 360) Principal 1,350,312.50
Current Yield 6.850 Accrued (176 Days) 44,239.13
Total (USD) 1,394,551.63

After Tax (Inc 35.00% CG 15.00%) 0.293
Issue Price = 99.695. Bond Purchased with Premium.

Australia 61 2 9777 8600 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000
Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2012 Bloomberg Finance L.P.
SN 686376 PST GMT-8:00 G550-412-1 06-Feb-2012 10:45:33

Modified Duration

Macaulay duration is close but not accurate. By modifying Macaulay's duration we have a more accurate measure of the price change.

$$\text{Modified Duration} = \frac{\text{Macaulay's Duration}}{(1 + \text{Yield/Compounding Frequency})}$$

Modified Duration and Non-Bullet Securities

Small changes in price can cause large swings in duration measures

<HELP> for explanation. Corp YAS

FHLB 1.1 02/17/17 Corp 90) Feedback Yield and Spread Analysis

95) Buy 96) Sell 97) Settings

1) Yield & Spread 2) Price Discovery 3) Descriptive 4) Graphs 5) Custom 6) Yield to Call

FHLB 1.1 2/17/17 (3133783W9)

Sprd	33.92 bp vs 5y T 0 7/8 01/31/17	Maturity	0AS
Price	99.99 3 dec	Mod Duration	4.852 1.798
Yield	1.1020611 Wst	Risk	4.851 1.797
Wkout	02/17/2017 @ 100.00 Consensus	Convexity	0.263 -2.990
Settle	02/17/12	DV 01 on 1MM	485 180
		Benchmark Risk	4.893 4.932
		Risk Hedge	991 M 364 M
		Proceeds Hedge	<HELP> for explanation.

Spread	Yield Calculations	Invoice
11) G-Sprd 32.6	Street Convention 1.1020611	Face
12) I-Sprd 5.4	Equiv 1 /Yr 1.1050974	Principal
Basis N.A.	Mmkt(Act/ 360)	Accrued
14) Z-Sprd 4.5	Current Yield 1.10011	Total (USD)
15) ASW 4.4		
16) OAS 7.3		
TED -2.9		

Australia 61 2 9777 8600 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000
Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 SN 140603 PST

Msg:P. Ocheltr

FHLB 1.1 02/17/17 Corp 90) Feedback Yield and Spread Analysis

95) Buy 96) Sell 97) Settings

1) Yield & Spread 2) Price Discovery 3) Descriptive 4) Graphs 5) Custom 6) Yield to Call

FHLB 1.1 2/17/17 (3133783W9)

Sprd	33.71 bp vs 5y T 0 7/8 01/31/17	Workout	0AS
Price	100-00 3 dec	Mod Duration	0.497 1.786
Yield	1.1000000 Wst	Risk	0.497 1.786
Wkout	08/17/2012 @ 100.00 Consensus	Convexity	0.005 -2.969
Settle	02/17/12	DV 01 on 1MM	50 179
		Benchmark Risk	4.893 4.932
		Risk Hedge	102 M 362 M
		Proceeds Hedge	994 M

Spread	Yield Calculations	Invoice
11) G-Sprd 100.1	Street Convention 1.1000000	Face
12) I-Sprd 31.2	Equiv 1 /Yr 1.1030250	Principal
Basis N.A.	Mmkt(Act/ 360)	Accrued (0 Days)
14) Z-Sprd 71.0	Current Yield 1.1	Total (USD)
15) ASW 70.2		
16) OAS 6.7		
TED -69.0		

Australia 61 2 9777 8600 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000
Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2012 Bloomberg Finance L.P.

Effective Duration

Effective or OAS duration allows for better evaluation of bonds with embedded optionality such as callable bonds. Effective duration better represents the trading sensitivity of callable bonds and is not subject to the immediate wide swings observed with the modified duration of callable securities.

Effective Duration = **Change in Price of Bond
resulting from a parallel shift in
yield curve.**

Effective Duration provides a better measure of price sensitivity for non-bullet securities

<HELP> for explanation. Corp YAS

FHLB 1.1 02/17/17 Corp 90) Feedback Yield and Spread Analysis

95) Buy 96) Sell 97) Settings

1) Yield & Spread 2) Price Discovery 3) Descriptive 4) Graphs 5) Custom 6) Yield to Call

FHLB 1.1 2/17/17 (3133783W9) Risk

Sprd	33.92 bp vs 5y T 0 7s 01/31/17	Maturity	OAS
Price	99.99 3 dec 100-17+ 9:29:35	Mod Duration	4.852 1.798
Yield	1.1020611 Wst 0.7628879 Con	Risk	4.851 1.797
Wkout	02/17/2017 @ 100.00 Consensus	Convexity	0.263 -2.990
Settle	02/17/12 02/07/12	DV 01 on 1MM	485 180
		Benchmark Risk	4.893 4.932
		Risk Hedge	001 M 364 M

<HELP> for explanation. Msg:P. Ocheltre

FHLB 1.1 02/17/17 Corp 90) Feedback Yield and Spread Analysis

95) Buy 96) Sell 97) Settings

1) Yield & Spread 2) Price Discovery 3) Descriptive 4) Graphs 5) Custom 6) Yield to Call

FHLB 1.1 2/17/17 (3133783W9) Risk

Sprd	33.71 bp vs 5y T 0 7s 01/31/17	Workout	OAS
Price	100-00 3 dec 100-17+ 9:29:35	Mod Duration	0.497 1.786
Yield	1.1000000 Wst 0.7628879 Con	Risk	0.497 1.786
Wkout	08/17/2012 @ 100.00 Consensus	Convexity	0.005 2.969
Settle	02/17/12 02/07/12	DV 01 on 1MM	50 179
		Benchmark Risk	4.893 4.932
		Risk Hedge	102 M 362 M
		Proceeds Hedge	994 M

Spread	Yield Calculations	Invoice
11) G-Sprd 32.6	Street Convention 1.1020611	Face
12) I-Sprd 5.4	Equiv 1 /Yr 1.1050974	Principal
Basis N.A.	Mmkt(Act/ 360)	Accrued
14) Z-Sprd 4.5	Current Yield 1.10011	Total (USD)
15) ASW 4.4		
16) OAS 7.3		
TED -2.9		

Spread	Yield Calculations	Invoice
11) G-Sprd 100.1	Street Convention 1.1000000	Face 1,000 M
12) I-Sprd 31.2	Equiv 1 /Yr 1.1030250	Principal 1,000,000.00
Basis N.A.	Mmkt(Act/ 360) 1.0879121	Accrued (0 Days) 0.00
14) Z-Sprd 71.0	Current Yield 1.1	Total (USD) 1,000,000.00
15) ASW 70.2		
16) OAS 6.7		
TED -69.0		

Risk

Modified Duration is still not the most accurate way to quantify the price change of a bond.

Risk is a more accurate measure. Multiply the full price of the bond by the modified duration

$$\text{Risk} = \frac{\text{Modified Duration} \times \text{Full Price}}{100}$$

100

Duration is a measure of %. Risk is a measure of \$.

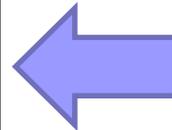
YA Govt YA

T 0 % 01/31/17 Govt 90) Feedback Yield and Spread Analysis

1) Yield & Spread 2) Price Discovery 3) Descriptive 4) Graphs 5) Custom 6) Yields

T 0.875 1/31/17 (912828SC5)

Price	100-00 (100.00)	Risk	Duration	4.903
Settle	01/31/12	Maturity	Modified Duration	4.882
		01/31/17	Risk	4.882
Street Convention	0.875	Convexity		0.266
Treasury Convention	0.875	DV 01 on 1MM		488
True Yield	0.875	Yield Value of a	0.32	0.00640
Equiv 1 /Yr Compound	0.877	Invoice		



At Par: Duration = Risk

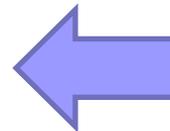
YA Govt YA

T 0 % 01/31/17 Govt 90) Feedback Yield and Spread Analysis

1) Yield & Spread 2) Price Discovery 3) Descriptive 4) Graphs 5) Custom 6) Yields

T 0.875 1/31/17 (912828SC5)

Price	97-00 (97.00)	Risk	Duration	4.901
Settle	01/31/12	Maturity	Modified Duration	4.865
		01/31/17	Risk	4.719
Street Convention	1.500	Convexity		0.264
Treasury Convention	1.500	DV 01 on 1MM		472
True Yield	1.500	Yield Value of a	0.32	0.00662
Equiv 1 /Yr Compound	1.506	Invoice		
Japanese Yield (Simple)	1.519	Face	1,000M	
Mmkt(Act/ 360)		Principal	970,000.00	
Current Yield	0.902	Accrued (0 Days)	0.00	



At a Discount: Duration > Risk

YA Govt YA

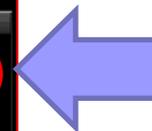
T 0 % 01/31/17 Govt 90) Feedback Yield and Spread Analysis

1) Yield & Spread 2) Price Discovery 3) Descriptive 4) Graphs 5) Custom 6) Yields

T 0.875 1/31/17 (912828SC5)

Price	103-00 (103.00)	Risk	Duration	4.905
Settle	01/31/12	Maturity	Modified Duration	4.898
		01/31/17	Risk	5.045
Street Convention	0.271	Convexity		0.267
Treasury Convention	0.271	DV 01 on 1MM		505
True Yield	0.271	Yield Value of a	0.32	0.00619
Equiv 1 /Yr Compound	0.271	Invoice		
Japanese Yield (Simple)	0.267	Face	1,000M	
Mmkt(Act/ 360)		Principal	1,030,000.00	
Current Yield	0.850	Accrued (0 Days)	0.00	
After Tax (Inc 35.00% CG 15.00%)	0.176	Total (USD)	1,030,000.00	

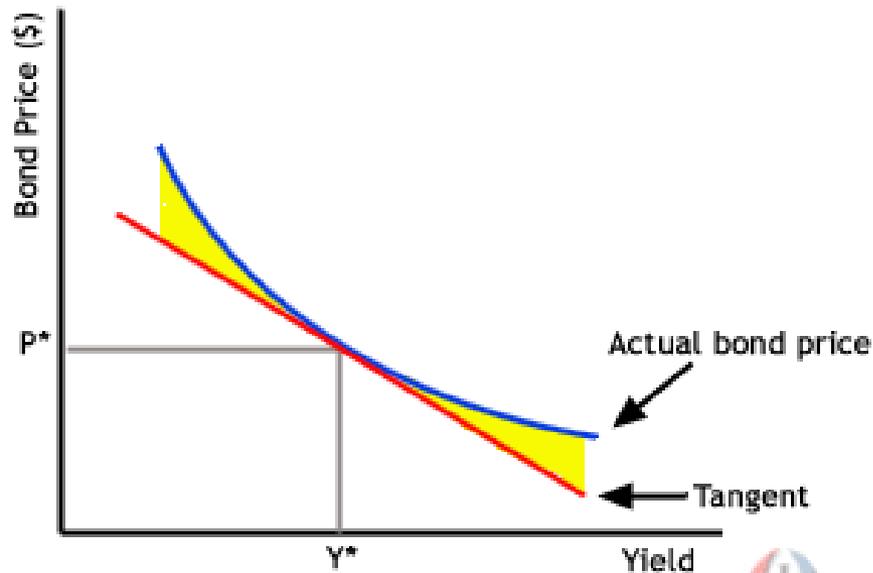
Issue Price = 99.883. Bond Purchased with Premium.



At a Premium: Duration < Risk

Convexity

Modified duration does not account for large changes in yield. If we were to use duration to estimate the price resulting from a significant change in yield, the estimate would be inaccurate. The convexity calculation, therefore, accounts for the inaccuracies of the linear duration line. Essentially, convexity shows how much a bond's price changes in response to a change in yield.

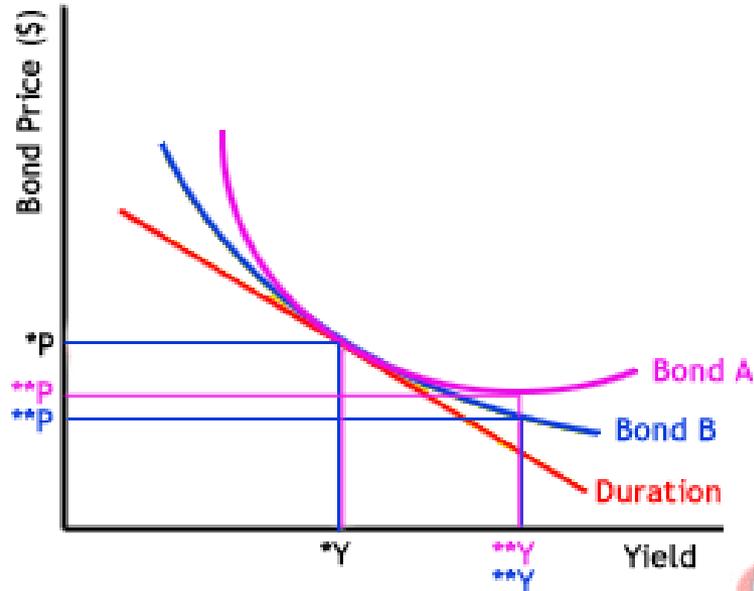


Convexity

Convexity is Good

A bond with greater convexity is less affected by a change in interest rates.

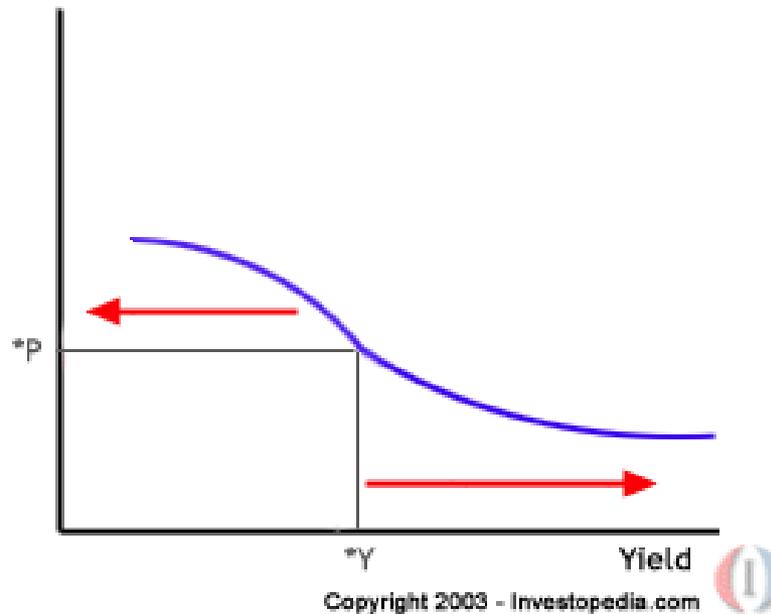
Bonds with greater convexity will have a higher price than bonds with a lower convexity, regardless of whether interest rates rise or fall.



Convexity

Callable bonds will exhibit negative convexity at certain price-yield combinations.

Negative convexity means that as yield decrease, duration will also decrease.



How does convexity effect the return of a bond?

FNMA 1.125 6/27/14 vs FFCB 1.27 1/18/17

DES		FED FARM CREDIT FFCB 1.27 01/17		99.994/100.064 (1.27/1.20)		Corp DES	
FFCB 1.27 01/18/17 Corp		99) Feedback		Page 1/11		Description: Bond	
Data not provided by Bloomberg		94) Notes (NEW)		95) Buy		96) Sell	
97) Settings							
21) Bond Description		22) Issuer Description					
Pages		Issuer Information		Identifiers			
1) Bond Info		Name FEDERAL FARM CREDIT BANK		CUSIP 31331K6Y1			
2) Addtl Info		Type Sovereign Agency		ISIN US31331K6Y14			
3) Covenants				BB Number EI9572450			
4) Guarantors		Security Information		Bond Ratings			
5) Bond Ratings		Mkt of Issue US Domestic		S&P AA+			
6) Identifiers		Country US Currency USD		Moody's Aaa			
7) Exchanges		Rank Unsecured Series		Composite AA+			
8) Inv Parties		Coupon 1.27 Type Fixed		Fitch NA			
9) Fees, Restrict		Cpn Freq S/A		Issuance & Trading			
10) Schedules		Day Cnt 30/360		Iss Price 100.00000			
11) Coupons		Maturity 01/18/2017		Amt Issued/Outstanding			
Quick Links		CALLABLE CALL 01/18/13@100.00		USD 125.000.00 (M) /			
32) ALLQ Pricing		Issue Spread		USD			
33) QRD Quote Recap		Calc Type (1) STREET CONVENTION		Min Piece/I			
34) TDH Trade Hist		Announcement Date 01/11/2012		1,000			
35) CACS Corp Action		Interest Accrual Date 01/18/2012		Par Amount			
36) CF Prospectus		1st Settle Date 01/18/2012		Book Runner			
37) CN Sec News		1st Coupon Date 07/18/2012		Reporting			
38) HDS Holders							
66) Send Bond							

Corp DES		FANNIE MAE FNMA 1 1/8 06/14		101.691/101.747 (0.41/0.38)		BVAL	
FNMA 1 1/8 06/27/14 Corp		99) Feedback		Page 1/11		Description: Bond	
94) Notes (NEW)		95) Buy		96) Sell		97) Settings	
21) Bond Description		22) Issuer Description					
Pages		Issuer Information		Identifiers			
1) Bond Info		Name FANNIE MAE		CUSIP 3135G0BJ1			
2) Addtl Info		Type Sovereign Agency		ISIN US3135G0BJ19			
3) Covenants				BB Number EI6750331			
4) Guarantors		Security Information		Bond Ratings			
5) Bond Ratings		Mkt of Issue Global		S&P AA+			
6) Identifiers		Country US Currency USD		Moody's Aaa			
7) Exchanges		Rank Unsecured Series		Fitch AAA			
8) Inv Parties		Coupon 1.125 Type Fixed		Composite AA+			
9) Fees, Restrict		Cpn Freq S/A		Issuance & Trading			
10) Schedules		Day Cnt 30/300		Iss Price 99.86000			
11) Coupons		Maturity 06/27/2014		Amt Issued/Outstanding			
Quick Links		BULLET		USD 4,000,000.00 (M) /			
32) ALLQ Pricing		Issue Spread 20.50bp vs T 1 05/15/14		USD 4,000,000.00 (M)			
33) QRD Quote Recap		Calc Type (1) STREET CONVENTION		Min Piece/Increment			
34) TDH Trade Hist		Announcement Date 05/12/2011		2,000.00 / 1,000.00			
35) CACS Corp Action		Interest Accrual Date 05/16/2011		Par Amount 1,000.00			
36) CF Prospectus		1st Settle Date 05/16/2011		Book Runner BCLY,GS,JPM			
37) CN Sec News		1st Coupon Date 06/27/2011		Reporting TRACE			
38) HDS Holders		BOOK-ENTRY.					
66) Send Bond							

The Durations of the Securities are Virtually Identical

Convexities are much different

<HELP> for explanation. Corp YAS

FFCB 1.27 01/18/17 Corp 90) Feedback Yield and Spread Analysis

99.994/100.064 1.271/1.200 BVAL @ 04:00 95) Buy 96) Sell 97) Settings

1) Yield & Spread 2) Price Discovery 3) Descriptive 4) Graphs 5) Custom 6) Yield to Call

FFCB 1.27 1/18/17 (31331K6Y1) Risk

Sprd	45.09 bp vs 5y T 0 7/8 01/31/17	Workout	0AS
Price	99.994 3 dec 100-08+ 6:18:37	Mod Duration	0.922 2.320
Yield	1.2712088 Wst 0.8202741 S/A	Risk	0.922 2.322
Wkout	01/18/2017 @ 100.00 Consensus	Convexity	0.013 -2.035
Settle	02/13/12 02/13/12	DV 01 on 1MM	92 232
		Benchmark Risk	4.862 4.902
		Risk Hedge	190 M 474 M
		Proceeds Hedge	

Spread	Yield Calculations	
11) G-Spr	45.9	Street Convention 1.2712088
12) I-Sprd	18.7	Equiv 1 /Yr 1.2752487
Basis	N.A.	Mmkt(Act/ 360)
14) Z-Sprd	18.6	Current Yield 1.270076
15) ASW	18.1	
16) OAS	23.0	
TED	-17.1	

<HELP> for explanation. Corp YAS

FNMA 1 1/8 06/27/14 Corp 90) Feedback Yield and Spread Analysis

101.691/101.747 0.408/0.384 BVAL @ 04:00 95) Buy 96) Sell 97) Settings

1) Yield & Spread 2) Price Discovery 3) Descriptive 4) Graphs 5) Custom

FNMA 1.125 6/27/14 (3135G0BJ1) Risk

Sprd	13.40 bp vs 2y T 0 1/4 01/31/14	Maturity	OAS
Price	101.691 3 dec 99-30+ 6:18:7	Mod Duration	2.340 2.342
Yield	0.4079386 Wst 0.2739413 S/A	Risk	2.383 2.385
Wkout	06/27/2014 @ 100.00 Consensus	Convexity	0.067 0.067
Settle	02/13/12 02/13/12	DV 01 on 1MM	238 239
		Benchmark Risk	1.957 1.959
		Risk Hedge	1,218 M 1,218 M
		Proceeds Hedge	1,019 M

Spread	Yield Calculations		Invoice
11) G-Spr	9.5	Street Convention 0.4079386	Face 1,000 M
12) I-Sprd	-17.2	Equiv 1 /Yr 0.4083546	Principal 1,016,910.00
Basis	N.A.	Mmkt(Act/ 360)	Accrued (46 Days) 1,437.50
14) Z-Sprd	-13.9	Current Yield 1.106293	Total (USD) 1,018,347.50
15) ASW	-13.8		
16) OAS	9.8		
TED	14.8		

Australia 61 2 9777 8600 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69
 Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Cop
 SN 140603 PST GMT-8:0

3 month returns with modest interest rate increases

<HELP> for explanation.

Corp FISA

FFCB 1.27 01/18/17 Corp 98) Actions - 99) Feedback Scenario Analysis
 99.994/100.064 1.271/1.200 BVAL @ 04:00 95) Buy 96) Sell 97) Settings

1) Load CIX 2) Save as CIX

Security	Swap Type	Risk	Settlement			OAS			Financing			
B/S	Amt (M)	Date	Price	Yield	Workout	OAS	Vol	Risk	Rate			
FFCB 1.27 01/18/17	B	1,000	02/13/12	99.994000	1.271209	W	23.5	53.3	2.30			
<Add Security #2>												
<Add Security #3>												

Scenario Results

Reinvestment Rate % 0.230

Horizon Date Multiple Horizon 05/13/12

Scenario Name	Total Return %	HPR %	Horizon Yield	Net P & L (USD)	B/E Yield
Curve Shifts(I25)					1.341
My Custom Scenarios(I25)					
+50	-5.090	-1.281	1.627	-12,817	
+75	-8.920	-2.255	1.848	-22,573	

<HELP> for explanation.

Msg: Bsave

FNMA 1 3/8 06/27/14 Corp 98) Actions - 99) Feedback Scenario Analysis
 101.691/101.747 0.408/0.384 BVAL @ 04:00 95) Buy 96) Sell 97) Settings

1) Load CIX 2) Save as CIX

Security	Swap Type	Risk	Settlement			OAS			Financing			
B/S	Amt (M)	Date	Price	Yield	Workout	OAS	Vol	Risk	Rate			
FNMA 1 3/8 06/27/14	B	1,000	02/13/12	101.691000	0.407939	W	9.7	0.0	2.39			
<Add Security #2>												
<Add Security #3>												

Scenario Results

Reinvestment Rate % 0.230

Horizon Date Multiple Horizon 05/13/12

Scenario Name	Total Return %	HPR %	Horizon Yield	Net P & L (USD)	B/E Yield
Curve Shifts(I25)					0.457
My Custom Scenarios(I25)					
+50	-3.528	-0.886	0.883	-9,021	
+75	-5.566	-1.401	1.133	-14,270	

Convexity Effects Duration and Risk as Rates Change

<HELP> for explanation. Corp YAS

FFCB 1.27 01/18/17 Corp (90) Feedback Yield and Spread Analysis

95) Buy 96) Sell 97) Settings

1) Yield & Spread 2) Price Discovery 3) Descriptive 4) Graphs 5) Custom 6) Yield to Call

FFCB 1.27 1/18/17 (31331K6Y1) Risk

Sprd	101.24 bp vs 5y T 0 7/8 01/31/17	Maturity	OAS
Price	97.454 3 dec 100-07 7:2:45	Mod Duration	4.497 4.367
Yield	1.8400000 Wst 0.8275705 S/A	Risk	4.401 4.274
Wkout	01/18/2017 @ 100.00 Consensus	Convexity	0.229 -1.380
Settle	05/13/12 05/13/12	DV 01 on 1MM	440 427
		Benchmark Risk	4.623 4.656
		Risk Hedge	952 M 918 M
		Proceeds Hedge	974 M

Spread	Yield Calculations	Invoice
11) G-Spr 101.8	Street Convention 1.8399999	Face 1,000 M
12) I-Sprd 74.5	Equiv 1 /Yr 1.8484639	Principal
Basis N.A.	Mmkt(Act/ 360)	Accrued (115 Days)
14) Z-Sprd 71.4	Current Yield 1.303175	Total (USD)
15) ASW 67.9		
16) OAS 108.1		
TED -69.4		

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Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright
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<HELP> for explanation. Corp YAS

FNMA 1 1/8 06/27/14 Corp (90) Feedback Yield and Spread Analysis

95) Buy 96) Sell 97) Settings

1) Yield & Spread 2) Price Discovery 3) Descriptive 4) Graphs 5) Custom

FNMA 1.125 6/27/14 (3135G0BJ1) Risk

Sprd	105.26 bp vs 2y T 0 1/4 01/31/14	Maturity	OAS
Price	99.572 3 dec 99-30+ 7:1:49	Mod Duration	2.080 2.082
Yield	1.3300000 Wst 0.2773716 S/A	Risk	2.080 2.082
Wkout	06/27/2014 @ 100.00 Consensus	Convexity	0.054 0.054
Settle	05/13/12 05/13/12	DV 01 on 1MM	208 208
		Benchmark Risk	1.711 1.712
		Risk Hedge	1,216 M 1,216 M
		Proceeds Hedge	1,000 M

Spread	Yield Calculations	Invoice
11) G-Spr 101.6	Street Convention 1.3300000	Face 1,000 M
12) I-Sprd 74.5	Equiv 1 /Yr 1.3344223	Principal 995,720.00
Basis N.A.	Mmkt(Act/ 360)	Accrued (136 Days) 4,250.00
14) Z-Sprd 77.3	Current Yield 1.129835	Total (USD) 999,970.00
15) ASW 74.3		
16) OAS 104.4		
TED -75.8		

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Credit Risk

- **Credit Spread Risk vs. Duration**
 - Credit/OAS duration measures
 - Bullet Securities: Credit Duration = Interest Rate Duration
 - Callable Securities: Credit Duration ~ Interest Rate Effective Duration
 - Floating Rate Securities: Credit Duration is substantial different than Interest Rate Duration

Floating Rate Example: GE Float 9/15/14

DES
 GEN ELEC CAP CRP GFloat 09/15/14 97.622/97.622 Corp DES
 TRAC
 GE Float 09/15/14 Corp 99) Feedback Page 1/11 Description: Bond
 94) Notes (NEW) 95) Buy 96) Sell 97) Settings

21) Bond Description	22) Issuer Description	Identifiers
Pages	Issuer Information	
1) Bond Info	Name GENERAL ELEC CAP CORP	CUSIP 36962GK94
2) Addtl Info	Type Diversified Finan Serv	ISIN US36962GK948
3) Covenants	Security Information	BB Number ED6155607
4) Guarantors	Mkt of Issue Global	Bond Ratings
5) Bond Ratings	Country US Currency USD	S&P AA+
6) Identifiers	Rank Sr Unsecured Series MTNA	Moody's Aa2
7) Exchanges	Coupon 0.80625 Type Floating	Composite AA
8) Inv Parties	Formula QUARTLY US LIBOR +26.00000	Fitch NA
9) Fees, Restrict	Day Cnt ACT/360 Iss Price 100.7080	
10) Schedules	Maturity 09/15/2014	
11) Coupons	BULLET	

Quick Links

- 32) ALLQ Pricing
- 33) QRD Quote Recap
- 34) TDH Trade Hist
- 35) CACS Corp Action
- 36) CF Prospectus
- 37) CN Sec News
- 38) HDS Holders
- 66) Send Bond

Australia 61 2 9777 8600 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000
 Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 SN 140603 PST

GEN ELEC CAP CRP GFloat 09/15/14 97.622/97.622 Corp DES
 TRAC
 GE Float 09/15/14 Corp 99) Feedback Page 11/11 Description: Bond
 94) Notes (NEW) 95) Buy 96) Sell 97) Settings

21) Bond Description	22) Issuer Description	Coupons
Pages	Coupons	
1) Bond Info	51) Coupons	
2) Addtl Info	Benchmark US0003M	Benchmark Freq QUARTLY
3) Covenants	Fix Frequency Quarterly	Next Coupon Date 03/15/2012
4) Guarantors	Paying Agent	Prev Coupon Date 12/15/2011
5) Bond Ratings	Pay Calendars US EN	Cap Floor
6) Identifiers	Refix Calendars EN	Return +26 Reset Days Prior 2
7) Exchanges	First Irreg Cpn Short First	Current Coupon .80625 Lockout
8) Inv Parties	Last Irreg Cpn Normal	Cpn Conv Mod-Adj Cpn Freq Quarterly
9) Fees, Restrict		
10) Schedules		
11) Coupons		



Measuring Credit Risks of a Floating Rate Bond

<HELP> for explanation. Corp **YAS**

GE Float 09/15/14 Corp 90) Feedback Yield and Spread Analysis

97.622/97.622 1.706/1.706 TRAC @ 07:47 95) Buy 96) Sell 97) Settings

1) Yield & Spread 2) Price Discovery 3) Descriptive 4) Graphs 5) Custom

GE 0 9/15/14 (36962GK94) Floater Coupon History

<p>Price 97.622000 Settle 02/15/12</p> <p>DM (bp) 120.0151000 to Wst</p> <p>Yield 1.7061510</p> <p>Workout 09/15/14 @ 100.00</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Date</th> <th>Rate</th> </tr> </thead> <tbody> <tr> <td>12/15/11</td> <td>0.80625</td> </tr> <tr> <td>03/15/12</td> <td></td> </tr> </tbody> </table>	Date	Rate	12/15/11	0.80625	03/15/12	
Date	Rate						
12/15/11	0.80625						
03/15/12							

<p>Floater Information</p> <p>Benchmark US0003M Assumed Rate 0.506</p> <p>Quoted Margin 26.00 Coupon 0.80625</p> <p>Next Pay 03/15/12 Coupon Freq 4</p> <p>Index to 03/15/12 Refix Freq 4</p> <p>OAS 0.24850</p>	<p>Risk</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>To 03/15/12</td> <td>OAS</td> </tr> <tr> <td>Mod Duration</td> <td>0.079 2.531</td> </tr> <tr> <td>Risk</td> <td>0.077 2.474</td> </tr> <tr> <td>Convexity</td> <td>0.000124 0.077054</td> </tr> <tr> <td>DV 01 on 1MM</td> <td>8 247</td> </tr> </table>	To 03/15/12	OAS	Mod Duration	0.079 2.531	Risk	0.077 2.474	Convexity	0.000124 0.077054	DV 01 on 1MM	8 247
To 03/15/12	OAS										
Mod Duration	0.079 2.531										
Risk	0.077 2.474										
Convexity	0.000124 0.077054										
DV 01 on 1MM	8 247										

<p>OAS 122 1) YASN</p> <p>Option Premium N.A.</p> <p>Discount Curve S23 USD Swaps(30/360,S/A)</p> <p>Forward Curve S23 USD Swaps(30/360,S/A)</p> <p>Curve Shift (bp) 0</p> <p>Vol Cube VCU</p> <p>Yield With Curve 09/15/14 1.7821</p>	<p>Invoice</p> <p>Face 1,000 M</p> <p>Principal 976,220.00</p> <p>Accrued (62 Days) 1,388.54</p> <p>Total (USD) 977,608.54</p>
--	--

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Example Quantifying Risk of Widening Credit Spreads

YA Corp YA

GE Float 09/15/14 Corp 90) Feedback Yield and Spread Analysis

1) Yield & Spread 2) Price Discovery 3) Descriptive 4) Graphs 5) Custom

GE 0 9/15/14 (36962GK94) Floater Coupon History

Price	Settle	Date	Rate
100.000000	02/15/12	12/15/11	0.80625
DM (bp) 26.9239145	to Wst	03/15/12	
Yield 0.7752391			
Workout 09/15/14 @ 100.00			

Floater Information

Benchmark	US0003M	Assumed Rate	0.506	To 03/15/12	OAS
Quoted Margin	26.00	Coupon	0.80625	Mod Duration	2.543
Next Pay	03/15/12	Coupon Freq	4	Risk	2.547
Index to	03/15/12	Refix Freq	4	Convexity	0.000130
OAS	27.3	Option Premium	N.A.	DV 01 on 1MM	8
Discount Curve	S23	USD Swaps(30/360,S/A)			
Forward Curve	S23	USD Swaps(30/360,S/A)			
Curve Shift (bp)	0				
Vol Cube	VCU				
Yield With Curve	09/15/14		0.8413		

Invoice

Face 1,000M

Principal 974,710.00

Accrued (62 Days) 1,388.54

Total (USD) 976,098.54

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Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 20
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YA Corp YA

GE Float 09/15/14 Corp 90) Feedback Yield and Spread Analysis

1) Yield & Spread 2) Price Discovery 3) Descriptive 4) Graphs 5) Custom

GE 0 9/15/14 (36962GK94) Floater Coupon History

Price	Settle	Date	Rate
97.471000	02/15/12	12/15/11	0.80625
DM (bp) 126.0000000	to Wst	03/15/12	
Yield 1.7659999			
Workout 09/15/14 @ 100.00			

Floater Information

Benchmark	US0003M	Assumed Rate	0.506	To 03/15/12	OAS
Quoted Margin	26.00	Coupon	0.80625	Mod Duration	2.530
Next Pay	03/15/12	Coupon Freq	4	Risk	2.470
Index to	03/15/12	Refix Freq	4	Convexity	0.000123
OAS	128.1	Option Premium	N.A.	DV 01 on 1MM	8
Discount Curve	S23	USD Swaps(30/360,S/A)			
Forward Curve	S23	USD Swaps(30/360,S/A)			
Curve Shift (bp)	0				
Vol Cube	VCU				
Yield With Curve	09/15/14		1.8408		

Invoice

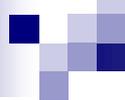
Face 1,000M

Principal 974,710.00

Accrued (62 Days) 1,388.54

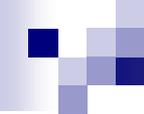
Total (USD) 976,098.54

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Summary: It's a Risky World!

- Investing is Inherently Risky**
- Effective Investment Management can be defined as Effective Risk Management**
- Identifying and Quantifying risk is critical for long term effective portfolio management**
- Duration and the Risk of Portfolio will change with Interest Rate Shifts**
- Credit Risk involves more than simple default risk**



Tony Garcia, CFA

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- **tgarcia@wellsfargo.com**

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