

Credit Risk II

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- Ratings
- Spread measures
- Specific: Bloomberg quotes for Best Buy
- Model of credit migration

- The three rating agencies Moody's, Fitch and S&P assign grades to reflect “borrowers financial strength.”
- Grades from AAA to D for S&P and Fitch
- Grades from Aaa, Aa1, Aa2,...,C for Moody's.
- See en.wikipedia.org/wiki/Bond_credit_rating for further details
- Credit ratings and historical default rates are highly correlated (see next page)

Table: 1. Cumulative Historic Default Rates (in percent) Rating categories. From Wikipedia.

	Moody's		S&P	
	Municipal	Corporate	Municipal	Corporate
Aaa/AAA	0.00	0.52	0.00	0.60
Aa/AA	0.06	0.52	0.00	1.50
A/A	0.03	1.29	0.23	2.91
Baa/BBB	0.13	4.64	0.32	10.29
Ba/BB	2.65	19.12	1.74	29.93
B/B	11.86	43.34	8.48	53.72
Caa-C/CCC-C	16.58	69.18	44.81	69.19

Note: Historical default rates for highly rated bonds likely misleading: As a company moves from financially healthy (AAA say) to distressed, its credit rating will be downgraded. Therefore, almost no AAA bonds default. However, if you purchase a AAA and the issuer's financial health deteriorates you will experience a loss as the price goes down/ rating deteriorates.

Therefore: Not an arbitrage to buy AAA bonds yielding (say) 200 BPS above treasuries because their default probability is 0.6%.

Table: 2. Average Annual Default Rates by S&P Rating.

	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB
Mean	0	0	0.02	0.03	0.05	0.06	0.08	0.16	0.28
	BBB-	BB+	BB	BB-	B+	B	B-	CCC to C	
mean	0.28	0.68	0.89	1.53	2.44	7.28	9.97	22.67	

Table: 3. Average Annual Default Rates by coarse S&P Ratings.

AAA	AA	A	BBB	BB	B	CCC	D
0	0.01	0.05	0.21	0.62	3.75	16.32	100

Note: these numbers will be used in connection with the default probability estimations below.

Additional Spread Measures

- "spread to benchmark" or "nominal yield spread" is ytm over similarly dated treasury
- I-spread : I stands for "interpolated" - the reference treasury yields are interpolated to match the characteristics of the corp bond
- Z-spread (zero volatility spread - see below)

Let f_s be the forward rate with maturity s .
We can write the discount function as

$$d(t) = \frac{1}{\prod_{s=1}^t (1 + f_s)} \quad (1)$$

Now suppose we increase all the forward rates by Z

$$d^*(t, Z) = \frac{1}{\prod_{s=1}^t (1 + f_s + Z)} \quad (2)$$

The Z spread is the value of Z that solves

$$\text{mkt price} = \sum_{t=1}^T CF_t d^*(t, Z) \quad (3)$$

where CF_t are the cash flows from the corporate bond.

This gives a slightly different spread measure than the “nominal yield spread.”

Analyzing a specific bond: Best Buy, 5.5%, 3/15/21

- Bond issued by Best Buy corporation in March 2011
- Issue size : 650 M
- Issue price 99.695
- Callable. As we will see later, this means that the bond price will never exceed par...

Click numbers for transparency

BBY US Equity		96 Settings	97 Actions	98 Output	99 Feedback	Financial Analysis		
Best Buy Co Inc		Periodicity Annuals			Currency USD			
1 Key Stats	2 I/S	3 B/S	4 C/F	5 Ratios	6 Segments	7 Addl	8 ESG	9 Custom
10 Highlights	12 Summary	13 Enterprise Value	14 Multiples	15 Benchmark	16 Per Share	17 Stock Value		
In Millions	FY 2014 Est	FY 2013 Est	Current/LTM	FY 2012	FY 2011	FY 2010	FY 2009	
12 Months Ending	2014-01-31	2013-01-31	2012-03-03	2012-03-03	2011-02-26	2010-02-27	2009-02-28	
Market Cap			7,706.97	8,516.20	12,708.14	15,286.75	11,922.37	
- Cash & Equivalents			1,199.00	1,199.00	1,125.00	1,916.00	509.00	
+ Preferred & Other			0.00	0.00	690.00	644.00	513.00	
+ Total Debt			2,208.00	2,208.00	1,709.00	1,802.00	1,963.00	
Enterprise Value			8,715.97	9,525.20	13,982.14	15,816.75	13,889.37	
Revenue	50,279.94	50,220.89	51,016.00	50,705.00	50,272.00	49,694.00	45,015.00	
Growth %, YoY	0.12	-0.95	1.48	0.86	1.16	10.39	12.47	
Gross Profit	12,359.81	12,404.56	12,660.00	12,592.00	12,661.00	12,160.00	10,998.00	
Margin %	24.58	24.70	24.82	24.83	25.18	24.47	24.43	
EBITDA	3,028.33	3,080.50	3,157.00	3,295.00	3,314.00	3,213.00	2,807.00	
Margin %	6.02	6.13	6.19	6.50	6.59	6.47	6.24	
Net Income Before XO	1,162.69	1,211.33	130.00	330.00	1,366.00	1,394.00	1,033.00	
Margin %	2.31	2.41	0.25	0.65	2.72	2.81	2.29	
Adjusted EPS	3.77	3.62	3.76	3.64	3.43	3.10	2.88	
Growth %, YoY	4.11	-0.52	8.05	6.12	10.65	7.64	-7.69	
Cash from Operations	2,644.69	2,307.69	3,293.00	3,293.00	1,190.00	2,206.00	1,877.00	
Capital Expenditures	-798.67	-802.00	-766.00	-766.00	-744.00	-615.00	-1,303.00	
Free Cash Flow	1,846.02	1,505.69	2,527.00	2,527.00	446.00	1,591.00	574.00	

Navigation: << < > >> Zoom 100%

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Figure: Best Buy Key Financials

Click numbers for transparency

BBY US Equity 96 Settings 97 Actions 98 Output 99 Feedback Financial Analysis

Best Buy Co Inc

Periods 10 Annuals Currency USD

1) Key Stats 2) I/S 3) B/S 4) C/F 5) Ratios 6) Segments 7) Addl 8) ESG 9) Custom

1) Standardized 12 As Reported 13 Common Size 14 Fair Value Analysis 15 Statement Chart

In Affiliates (except Per Share)	FY 2012	FY 2011	FY 2010	FY 2009	FY 2008	FY 2007	FY 2006	FY 2005	FY 2004
12 Months Ending	2012-02-03	2011-02-26	2010-02-27	2009-02-28	2008-03-01	2007-03-03	2006-02-25	2005-02-26	2004-02-28
Assets									
+ Cash & Near Cash Items	1,199.00	1,103.00	1,826.00	498.00	1,438.00	1,205.00	681.00	470.00	245.00
+ Short-Term Investments	0.00	22.00	90.00	11.00	64.00	2,988.00	3,051.00	2,878.00	2,355.00
+ Accounts & Notes Receivable	2,339.00	2,348.00	2,620.00	1,868.00	549.00	548.00	906.00	375.00	343.00
+ Inventories	5,731.00	5,897.00	5,486.00	4,753.00	4,708.00	4,028.00	3,338.00	2,851.00	2,607.00
+ Other Current Assets	1,079.00	1,103.00	1,144.00	1,062.00	583.00	712.00	409.00	329.00	174.00
Total Current Assets	10,368.00	10,473.00	10,566.00	8,192.00	7,342.00	9,081.00	7,985.00	6,903.00	5,724.00
+ LT Investments & LT Receivables	140.00	328.00	304.00	395.00	605.00	318.00	218.00	148.00	0.00
+ Net Fixed Assets	3,471.00	3,823.00	4,070.00	4,174.00	3,306.00	2,938.00	2,712.00	2,464.00	2,244.00
+ Gross Fixed Assets	n/a	7,905.00	7,453.00	6,940.00	5,608.00	4,904.00	4,192.00	3,574.00	3,574.00
- Accumulated Depreciation	n/a	4,082.00	3,383.00	2,766.00	2,302.00	1,966.00	2,124.00	1,728.00	1,330.00
+ Other Long-Term Assets	2,097.00	3,225.00	3,342.00	3,065.00	1,905.00	1,233.00	949.00	779.00	684.00
Total Long-Term Assets	5,708.00	7,376.00	7,736.00	7,434.00	5,416.00	4,489.00	3,879.00	3,391.00	2,928.00
Total Assets	16,076.00	17,849.00	18,302.00	15,826.00	12,758.00	13,570.00	11,864.00	10,294.00	8,652.00
Liabilities & Shareholders' Equity									
+ Accounts Payable	5,435.00	4,894.00	5,276.00	4,997.00	4,297.00	3,934.00	3,294.00	2,804.00	2,535.00
+ Short-Term Borrowings	523.00	998.00	698.00	837.00	189.00	60.00	418.00	72.00	368.00
+ Other Short-Term Liabilities	2,968.00	2,771.00	3,004.00	2,601.00	2,283.00	2,307.00	2,404.00	2,063.00	1,998.00
Total Current Liabilities	8,926.00	8,663.00	8,978.00	8,435.00	6,769.00	6,301.00	6,096.00	4,939.00	4,901.00
+ Long-Term Borrowings	1,685.00	711.00	1,104.00	1,126.00	627.00	990.00	178.00	528.00	482.00
+ Other Long-Term Liabilities	1,099.00	1,183.00	1,256.00	1,109.00	838.00	443.00	373.00	398.00	347.00
Total Long-Term Liabilities	2,784.00	1,894.00	2,360.00	2,235.00	1,465.00	1,033.00	551.00	886.00	729.00
Total Liabilities	11,710.00	10,557.00	11,338.00	10,670.00	8,234.00	7,334.00	6,607.00	5,845.00	5,230.00
+ Total Preferred Equity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
+ Minority Interest	0.00	690.00	644.00	513.00	40.00	35.00	0.00	0.00	0.00
+ Share Capital & APIC	0.00	57.00	483.00	246.00	49.00	478.00	692.00	985.00	868.00
+ Retained Earnings & Other Equity	4,366.00	6,545.00	5,837.00	4,397.00	4,435.00	5,723.00	4,565.00	3,464.00	2,554.00
Total Equity	4,366.00	7,292.00	6,964.00	5,156.00	4,524.00	6,236.00	5,257.00	4,449.00	3,422.00
Total Liabilities & Equity	16,076.00	17,849.00	18,302.00	15,826.00	12,758.00	13,570.00	11,864.00	10,294.00	8,652.00

Zoom 65%

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Figure: Best Buy Balance Sheet

Click numbers for transparency

BBY US Equity		96 Settings		97 Actions		98 Output		99 Feedback		Financial Analysis	
Best Buy Co Inc						Periods 10		Annuals		Currency USD	
1) Key Stats		2) I/S		3) B/S		4) C/F		5) Ratios		6) Segments	
7) Add		8) ESG		9) Custom		10) Statement Chart		11) Standardized		12) As Reported	
13) Common Size		14) Adjustments		15) Comprehensive Income		16) Statement Chart					
In Millions (except Per Share)	FY 2014 Est	FY 2013 Est	Least 12M	FY 2012	FY 2011	FY 2010	FY 2009	FY 2008	FY 2007		
12 Months Ending	2014-01-31	2013-01-31	2012-03-03	2012-03-03	2011-02-26	2010-02-27	2009-02-28	2008-03-01	2007-03-03		
- Cost of Revenue	38,356.00	38,113.00	38,113.00	37,611.00	37,611.00	34,017.00	30,477.00	27,165.00	27,165.00		
Gross Profit	12,399.81	12,404.56	12,660.00	12,992.00	12,661.00	12,160.00	10,998.00	9,546.00	8,769.00		
- Operating Expenses			10,448.00	10,242.00	10,325.00	9,873.00	8,984.00	7,385.00	6,770.00		
Operating Income	1,997.31	2,084.13	2,212.00	2,350.00	2,336.00	2,287.00	2,014.00	2,161.00	1,999.00		
- Interest Expense			134.00	134.00	87.00	94.00	94.00	62.00	31.00		
- Foreign Exchange Losses (Gains)			0.00	0.00	0.00	0.00	0.00	0.00	0.00		
- Net Non-Operating Losses (Gains)			1,308.00	1,177.00	169.00	-3.00	213.00	-126.00	-162.00		
Pretax Income	1,897.87	1,967.24	770.00	1,039.00	2,080.00	2,196.00	1,707.00	2,225.00	2,130.00		
- Income Tax Expense			640.00	709.00	714.00	802.00	674.00	815.00	752.00		
Income Before 30 Items	1,162.69	1,211.33	130.00	330.00	1,366.00	1,394.00	1,033.00	1,410.00	1,378.00		
- Extraordinary Loss Net of Tax			108.00	308.00	0.00	0.00	0.00	0.00	0.00		
- Minority Interests			1,253.00	1,253.00	89.00	77.00	30.00	3.00	1.00		
Net Income	1,140.89	1,198.10	-1,231.00	-1,231.00	1,271.00	1,317.00	1,003.00	1,407.00	1,377.00		
- Total Cash Preferred Dividends			0.00	0.00	0.00	0.00	0.00	0.00	0.00		
- Other Adjustments			0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Net Inc Avail to Common Shareholders			-1,231.00	-1,231.00	1,271.00	1,317.00	1,003.00	1,407.00	1,377.00		
Abnormal Losses (Gains)			2,622.00	2,489.00	222.00	52.00	255.00	n/a	-20.00		
Tax Effect on Abnormal Items			n/a	n/a	-75.00	-27.00	n/a	n/a	7.00		
Normalized Income			1,420.55	1,966.00	1,424.00	1,342.00	1,211.00	1,407.00	1,364.00		
Basic EPS Before Abnormal Items			3.84	3.90	3.50	3.22	2.93	3.20	2.83		
Basic EPS Before 30 Items	3.74	3.51	-3.47	-2.89	3.14	3.16	2.43	3.20	2.86		
Basic EPS	3.74	3.51	-3.63	-3.36	3.14	3.16	2.43	3.20	2.86		
Basic Weighted Avg Shares			347.50	366.30	406.10	416.80	412.50	439.90	482.10		
Diluted EPS Before Abnormal Items	3.77	3.62	3.82	3.90	3.44	3.16	2.88	3.12	2.76		
Diluted EPS Before 30 Items			-3.49	-2.89	3.08	3.10	2.39	3.12	2.79		
Diluted EPS			-3.65	-3.36	3.08	3.10	2.39	3.12	2.79		
Diluted Weighted Avg Shares			347.50	366.30	416.50	427.50	422.90	452.90	496.20		

Figure: Best Buy Income statement

21) Bond Description		22) Issuer Description	
Pages	Issuer Information		Identifiers
1) Bond Info	Name BEST BUY CO INC	BB Number EI6043737	
2) Addtl. Info	Type Retail-Consumer Electron	CUSIP 086516AL5	
3) Covenants	Security Information		ISIN US086516AL50
4) Guarantors	Mkt of Issue US Domestic		Bond Ratings
5) Bond Ratings	Country US	Currency USD	Moody's Baa2
6) Identifiers	Rank Sr Unsecured	Series	S&P BBB- +-
7) Exchanges	Coupon 5.5	Type Fixed	Fitch BBB-
8) Inv Parties	Cpn Freq S/A		Composite BBB-
9) Fees, Restrict	Day Cnt 30/360	Iss Price 99.69500	Issuance & Trading
10) Schedules	Maturity 03/15/2021		Amt Issued/Outstanding
11) Coupons	MAKE WHOLE @30 until 12/15/20/CALLABLE CALL 12		USD 650,000.00 (M) /
Quick Links	Issue Spread 200.00bp vs T 3 5/8 02/21		USD 650,000.00 (M)
32) ALLQ Pricing	Calc Type STREET CONVENTION		Min Piece/Increment
33) QRD Quote Reca	Announcement Date 03/08/2011		2,000.00 / 1,000.00
34) TDH Trade Hist	Interest Accrual Date 03/11/2011		Par Amount 1,000.00
35) CACS Corp Action	1st Settle Date 03/11/2011		Book Runner JOINT LEADS
36) CF Prospectus	1st Coupon Date 09/15/2011		Reporting TRACE
37) CN Sec News	CALL @ MAKE-WHOLE +30BP UNTIL 12/15/20. POISON PUT @ 101%.		
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 Copyright 2012 Bloomberg Finance L.P. SN 827136 EDT GMT-4:00 6457-1682-0 10-Apr-2012 18:01:32			

Figure: Best Buy Bloomberg description

Trade Recap

Quote Recap

From 04/04/12 08:00:00 Min Size Source TRAC RPS All
 To 04/11/12 17:30:00 Price Range

Date	Time	Size(M)	Price	Yield	RPS	Sprd	Benchmark	Trd Dat	Trd Time	Act	Ind	CC
04/11	08:27:37	50	↑ 92.826	6.575	S	455.0	T 2 02/15/22	04/11	08:26:59			
04/11	08:19:12	35	↑ 92.815	6.577	S	455.0	T 2 02/15/22	04/11	08:18:58			
04/11	08:14:30	63	92.034	6.700	B	467.5	T 2 02/15/22	04/11	08:09:05			
04/11	08:14:28	63	↓ 92.034	6.700	D	467.5	T 2 02/15/22	04/11	08:09:05			
04/11	08:09:30	63	↑ 92.074	6.694	D	466.9	T 2 02/15/22	04/11	08:09:06			
04/11	08:01:56	195	92.000	6.706	D	467.7	T 2 02/15/22	04/11	07:41:57			
04/11	08:01:03	242	↑ 92.000	6.706	B	468.4	T 2 02/15/22	04/11	07:07:00			
04/11	08:00:11	195	91.960	6.712	B	468.1	T 2 02/15/22	04/11	07:43:30			
04/11	08:00:11	195	↓ 91.960	6.712	D	468.3	T 2 02/15/22	04/11	07:43:01			
04/10	17:20:05		92.977	6.551				04/10	17:20:05			OC
04/10	16:53:03	20	92.977	6.551	D	456.8	T 2 02/15/22	04/10	16:52:54			
04/10	16:52:56	20	↓ 92.977	6.551	S	456.8	T 2 02/15/22	04/10	16:52:54			
04/10	16:50:54	25	↑ 94.935	6.248	S	426.3	T 2 02/15/22	04/10	16:50:53			
04/10	16:35:47	10	↑ 94.728	6.280	S	429.9	T 2 02/15/22	04/10	16:35:00			
04/10	16:31:41	44	92.390	6.643	B	466.4	T 2 02/15/22	04/10	16:31:24			
04/10	16:31:41	44	92.390	6.643	D	466.4	T 2 02/15/22	04/10	16:31:24			
04/10	16:31:41	44	↓ 92.390	6.643	D	466.4	T 2 02/15/22	04/10	16:31:24			
04/10	16:31:21	25	↑ 93.625	6.450	S	446.9	T 2 02/15/22	04/10	16:29:25			
04/10	16:26:38	25	↑ 92.895	6.564	D	458.4	T 2 02/15/22	04/10	16:26:37			
04/10	16:11:35	10	↓ 90.800	6.897	B	491.2	T 2 02/15/22	04/10	16:10:40			

Figure: Reported trades.

BBY 5 1/2 03/15/21 Corp		90 Export to Excel		99 Feedback		TRACE Trade History				
Cusip 086516AL		95 Buy		90 Sell		97 Settings				
View Yield		Range 12/13/11		- 04/11/12		Trade Size >=250M				
Yield			Total		Dealer to Client Volume(M)			D+D		
High	Low	Last	Vol(M)	# Trds	Dlr Buy	Dlr Sell	Net	Vol(M)		
6.744	5.448	6.705	904,831	891	252,726	197,338	55,388	454,767		
98) Charts										
	Date	Yield			Total		Dealer to Client Volume(M)			D+D
		High	Low	Last	Vol(M)	# Trds	Dlr Buy	Dlr Sell	Net	Vol(M)
1)	04/10	6.705	6.277	6.705	51,295	22	17,250	16,395	855	17,650
2)	04/09	6.648	6.547	6.626	36,920	17	13,660	11,330	2,330	11,930
3)	04/05	6.635	6.392	6.392	49,600	24	5,900	25,250	-19,35	18,450
4)	04/04	6.744	5.982	6.469	56,826	33	17,950	22,000	-4,050	16,876
5)	04/03	6.065	5.916	5.974	20,348	28	2,985	10,085	-7,100	7,278
6)	04/02	6.086	5.643	5.989	9,895	8	5,300	2,000	3,300	2,595
7)	03/30	5.966	5.812	5.966	4,900	7	2,500	0	2,500	2,400
8)	03/29	5.773	5.448	5.716	22,323	31	6,415	5,865	550	10,043
9)	03/28	5.535	5.464	5.492	27,614	12	10,000	5,000	5,000	12,614
10)	03/27	5.571	5.485	5.485	6,060	5	1,000	0	1,000	5,060
11)	03/26	5.664	5.585	5.585	9,410	15	0	344	-344	9,066
12)	03/23	5.687	5.509	5.687	10,646	12	2,997	1,350	1,647	6,299
13)	03/21	5.747	5.588	5.588	1,500	3	0	600	-600	900
14)	03/20	5.789	5.500	5.500	17,994	14	0	3,808	-3,808	14,186

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Figure: YTM's



Figure: Yield and Spread analysis

A generic model of default rates for a BB bond

- We will try to figure out the per year default probability of the Best Buy bond.
- Treat it as a BB.
- This, combined with the estimated probabilities of default from Table 3 for each credit rating will give us an idea of the default probability per year.

Credit Rating Transition Probabilities

The following are estimated historical migration rates between bonds of different credit ratings (S&P):

	AAA	AA	A	BBB	BB	B	CCC	D
AAA	91.40	7.77	0.59	0.04	0.12	0.04	0.04	0.00
AA	0.62	90.07	8.34	0.67	0.09	0.14	0.04	0.04
A	0.05	1.91	91.27	5.94	0.50	0.21	0.03	0.09
BBB	0.01	0.15	3.89	90.10	4.62	0.81	0.14	0.29
BB	0.03	0.07	0.24	5.72	83.05	9.01	0.78	1.10
B	0.00	0.06	0.18	0.27	5.58	83.32	5.25	5.34
CCC	0.00	0.00	0.29	0.43	1.07	13.40	52.03	32.79
D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00

source: Standard & Poors

<http://www.standardandpoors.com/ratings/articles/en/us/?articleType=HTML&assetID=1245302234237> , Table 22

converted to condition on survival.

If P is a matrix where the i, j th element represents the probability of going from state i to state j , then

$$e \times P^t \tag{4}$$

is a vector which j th row represents the probabilities of reaching state j at date t where e is a vector with a one in its i th row where i represents the initial state.

We have used *matrix algebra* along with some basic *Markov chain* theory....

That is $P^t = P \times P \times \dots \times P$ (the matrix P multiplied t times by itself).

Using matrix algebra we find the following probabilities of hitting the respective credit ratings in years 1-9:

Table: 4. Conditional Probabilities of Future Credit States

year	1	2	3	4	5	6	7	8	9
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
A	0.00	0.01	0.01	0.02	0.02	0.03	0.04	0.04	0.05
BBB	0.06	0.10	0.13	0.15	0.17	0.18	0.19	0.19	0.19
BB	0.83	0.70	0.59	0.51	0.44	0.39	0.34	0.31	0.28
B	0.09	0.15	0.19	0.22	0.23	0.24	0.24	0.24	0.23
CCC	0.01	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03
D	0.01	0.03	0.05	0.07	0.10	0.13	0.15	0.18	0.21

Probabilities of credit ratings by year conditional on starting as a BB.

We can now combine these probabilities with our probabilities of default from Table 3 to compute the total default probabilities for each year.

Table: 4. Generic Default Probabilities for a BBB (percent)

year	1	2	3	4	5	6	7	8	9
	2.09	4.04	6.34	8.88	11.57	14.32	17.09	19.82	22.49

We can now compute the value of the Best Buy bond. For simplicity, we treat it as if it pays annual coupon.

We find that the value using $X = 50\%$ recovery is \$90.66. This is “close” to the current value of \$ 93

See spreadsheet “bestBuyPV.xls” for details.

With zero recovery, the bond is worth \$59.

We find that the value of the Best Buy bond of \$93 is consistent with a recovery rate of about 54%.

How do we do it for bonds with different credit ratings?

See “bestBuyPV.xls” sheet labelled “Default probability by year and rating.” This table gives the generic default probability per year up to 20 years for all ratings.

Example 2: Johnson & Johnson 6.95%, 2029

21) Bond Description		22) Issuer Description		
JNJ 6.95 09/29 \$ C 138.130 -5.370 JOHNSON&JOHNSON JNJ6.95 09/01/29 138.130/138.130 (3.91/3.91) TRAC @ 4/05 JNJ 6.95 09/01/29 Corp		Corp DES (3.91/3.91) TRAC @ 4/05 Page 1/11 Description: Bond		
94 Notes		95 Buy		
96 Sell		97 Settings		
Pages 1) Bond Info 2) Addtl Info 3) Covenants 4) Guarantors 5) Bond Ratings 6) Identifiers 7) Exchanges 8) Inv Parties 9) Fees, Restrict 10) Schedules 11) Coupons Quick Links 32) ALLQ Pricing 33) QRD Quote Reqa 34) TDH Trade Hist 35) CACS Corp Action 36) CF Prospectus 37) CN Sec News 38) HDS Holders 66) Send Bond	Issuer Information Name JOHNSON & JOHNSON Type Medical-Drugs Security Information Mkt of Issue US Domestic Country US Currency USD Rank Unsecured Series Coupon 6.95 Type Fixed Cpn Freq S/A Day Cnt 30/360 Iss Price 97.64000 Maturity 09/01/2029 BULLET Issue Spread 100.00bp vs T 5 ¼ 02/29 Calc Type STREET CONVENTION Announcement Date 08/30/1999 Interest Accrual Date 09/02/1999 1st Settle Date 09/02/1999 1st Coupon Date 03/01/2000 UNSEC'D. SHORT 1ST CPN.		Identifiers BB Number EC1758530 CUSIP 478160AJ3 ISIN US478160AJ37 Bond Ratings Moody's Aaa S&P AAA Fitch AAA *- Composite AAA Issuance & Trading Amt Issued/Outstanding USD 300,000.00 (M) / USD 293,000.00 (M) Min Piece/Increment 1,000.00 / 1,000.00 Par Amount 1,000.00 Book Runner CHASE,JPM Reporting TRACE	
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 827136 EDT GMT-4:00 H187-1022-0 11-Apr-2012 23:52:56				

<HELP> for explanation.
101<Go> to save benchmark

Corp **YAS**

JNJ 6.95 09/01/29 Corp

90 Feedback

Yield and Spread Analysis

95 Buy

96 Sell

97 Settings

1) Yield & Spread

2) Pricing

3) Descriptive

4) Graphs

5) Custom

JNJ 6.95 9/1/29 (478160AJ3)

Spread 190.77 bp vs T 2 02/15/22
 Price 138.130000 99-24+ 70:7
 Yield 3.944247 Mty 2.036526 Ann
 Wkout 09/01/2029 @ 100.00 Specific BenYld 6 6
 Settle 04/16/12 04/12/12

Risk

Maturity	OAS
10.946	11.436
Mod Duration	15.215
15.215	15.897
Risk	1.643
1.643	1.730
Convexity	1.522
1.522	1.590
DV 01 on 1MM	8.783
8.783	9.188
Benchmark Risk	1,732 M
1,732 M	1,730 M
Risk Hedge	1,389 M
1,389 M	
Proceeds Hedge	

Spread

Yield Calculations

11) G-Sprd	146.3	Street Convention	3.906103
12) I-Sprd	125.6	Equiv 1 /Yr	3.944247
13) Basis	-71.9	Mmkt (Act/ 360)	
14) Z-Sprd	137.4	Current Yield	5.031492
15) ASW	158.1		
16) OAS	159.3		
TED	N.A.		

Invoice

Face	1,000 M
Principal	1,381,300.00
Accrued (45 Days)	8,687.50
Total (USD)	1,389,987.50

After Tax (Inc 35.00% CG 15.00%) 2.539073

Issue Price = 97.640. 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.
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Using the spreadsheet we find that the value of the JJ bond is about 150 with 50% recovery and about 148 with zero recovery. Either way, the bond is underpriced at 138 and a YTM of 3.94.

Our simple heuristics suggest that the bond would need to have a default probability way higher than what historical transition rates would suggest.

Are corporate bonds underpriced?

- Well known that structural models have problems generating high spreads
- Credit migration model used here prices the BBB- bond “correctly” and overprices the AAA
- Is this generally true? stay tuned for homework...