

Fixed Income Securities Analysis & Valuation

1. Fixed income securities are debt obligations include bonds, mortgage-backed securities, asset-backed securities and bank loans.
2. It is difficult to construct bond market indexes because bonds tend to trade infrequently making price information difficult to obtain.
3. According to bond theory, when the required rate of return is less than the coupon rate, bonds are available at premium. i.e. value of the bond is greater than its par value.
4. In case of Treasury Inflation-Protected Securities (TIPS), the interest is paid every six months and the principal amount at the time of maturity. These are normally offered in 5-year, 10-year and 20-year maturities.
5. Bond indenture: a contract between the issuer and the bond holder, and it specifies the provisions relating to the issue.
6. Covenant: agreed terms and conditions between a borrower and a lender. Affirmative covenants (promise of the borrower to meet certain obligations like paying interest, principles, taxes etc.) and negative covenants (restrictions to the borrowers from taking certain actions)
7. Clean price: Price of the bond without the accrued interest.
8. Senior bond holders have to be paid before subordinate bond holders.
9. Indexed bonds: the principal and coupon payments are linked to the market index like inflation and price index.
10. General Obligation Debt is a municipal security secured by the taxing and borrowing power of the municipality issuing it. In fact, they are backed by the credit and taxing power of the issuing jurisdiction rather than the revenue it receives from a given project in hand. This is the feature which influences the investor to invest in these securities.
11. Revenue bonds are the securities issued for financing an entity or for general public purpose. The securities issued for entity financing are backed up with the revenues generated from the completed projects. The tax and revenue resources back up the securities issued for financing general public purpose.
12. Single Monthly Mortality (SMM) = (Prepayment in month)/(Mortgage balance in month - scheduled principal payment in month)
13. Conditional Prepayment Rate (CPR) = $1 - (1 - SMM)^2$
14. Relation between SMM and ABS (Asset Backed Security)
 $SMM = ABS / [1 + ABS (n - 1)]$; ABS is in decimal for, n = no of months.
15. Asset Backed securities: The cash flows produced by the underlying assets in asset backed securities can be allocated to investors in different ways. Cash flows can be directly passed through to investors after administrative fees are subtracted, thus creating a pass-through security; alternatively, cash flows can be carved up according to specified rules and market demand, thus creating “structured securities”.
16. Loan-to-Value (LTV) ratio indicates the % of down payment required by the lenders and will be quoted high in the times of lower interest rates. For example: a LTV ratio of 85% means, the borrower has to make a down payment of 15% of the value of the property.
17. Mortgage-Backed Securities
 - a. The avg. life of mortgage pass-through depends on the prepayment experience of underlying mortgages.
 - b. The returns to the investors of interest only (IO) and principal only (PO) securities move in opposite direction.
18. Deferred coupon bonds: generally issued at a discount price and are used for financing leveraged buyouts. It is a debt instrument that pays no interest until a date specified in the future.

19. Prepayment tranching or time tranching: If the senior tranche is split up into different tranches each with different exposure to prepayment risk in a pay-through structure, prepayment risk is redistributed among the components of senior tranches.
20. Default risk, credit spread risk and downgrade risk are form of credit risk.
21. The greater the expected yield volatility, the greater will be the value of an option.
22. A rating transition matrix can be used to estimate the downgrade risk.
23. Step-up (Step Down) notes: each subsequent coupon rate is higher (or lower) than the previous one.
24. Dual currency bond: the interest is paid in one currency, while the principal is made in another currency.
25. Collar: a floater can have both a cap and a floor.
26. An interest rate cap is a derivative in which the buyer receives payments at the end of each period in which the interest rate exceeds the agreed strike price. An example of a cap would be an agreement to receive a payment for each month the LIBOR rate exceeds 2.5%

$$\text{Payoff} = \text{notional amt} \times (\text{reference rate} - \text{Cap rate}) / 4$$
27. An interest rate floor is a series of European put options or floorlets on a specified reference rate, usually LIBOR. The buyer of the floor receives money if on the maturity of any of the floorlets; the reference rate fixed is below the agreed strike price of the floor.

$$\text{Payoff} = \text{notional amt} \times (\text{Floor rate} - \text{reference rate}) / 4$$
28. Coupon rate of a de-leveraged floaters = $b \times (\text{reference rate}) + \text{Quoted margin}$.
29. Coupon rate of Inverse floater = $K - (L \times \text{Reference rate})$
30. Coupon rate of dual indexed floaters = $\text{reference rate 1} - \text{reference rate 2} + \text{Quoted margin}$
31. Ratchet Bonds: it can be adjusted southward only and once it is adjusted down, it cannot be readjusted northward if the reference rate increases afterward.
32. Factorization Bills: Factors, who are generally banks or FIs, purchase the bills from the creditors with or without recourse facility and collect the dues from the debtors.
33. Sinking fund provisions is a pool of funds set aside to repay the debt.
34. Risk premium includes the risk associated with a particular bond depending on the likelihood of default, either partially or fully. It depends on the issuer's financial position and fundamentals.
35. The purchaser of a callable bond effectively enters into two transactions:
36. Purchase of a non-callable bond for which they pay some price.
37. Sale of a call option to the issuer for which they receive the option price from him.
38. Price of a callable bond = $\text{price of non-callable bond} - \text{price of the call option}$.
39. Option Adjusted Spread: It is a measure of the yield spread (expressed in basis points) which can be used to convert differences between the values and the prices. It is the spread that will make the theoretical value equal to the market price.
40. Approximate % price change for a 100 basis point change in yield

$$= \frac{\text{Price if yield declines} - \text{Price if yield rises}}{2 \times (\text{initial price}) \times (\text{change in yield in decimal})}$$
41. Measure of yield on T-bill = $(1-p) (360/Nsm)$
42. Value of a zero coupon bond = $M/(1 + r).n$; where M = Maturity value,
43. Bond-equivalent yield is a method where semi-annual yield is doubled to get annual yield.
44. YTM is an interest rate that equates the bond's PV with its price.
45. Intermarket spread is the yield spread between the yields offered in two sectors of the bond market having same maturity. The most common intermarket spread calculated by the market participants is the yield spread between non-treasury and treasury securities having same maturity.
46. Credit spread also k/a quality spread is a fundamental tool in fixed income analysis and valuation.
47. There are two important term structure theories related to the shapes of the yield curve. First is the Expectations theory and the second is the Market Segmentations Theory. The expectations theory has several forms like pure expectations theory, liquidity theory and preferred habitat theory.

48. The segmented markets theory of a term structure suggests that investors have strong preferences for bonds of a specified maturity.
49. Yield curve shows the relation between the yield and maturity of the bond. Shape of yield curve is upward sloping.
50. The modified duration is a measure of the sensitivity of a bond's price to interest rate change.
51. Approximate duration = $\frac{P2 - P1}{2 \cdot P0 (\Delta y)}$
52. Approximate convexity of bond = $\frac{P1 + P2 - 2 P0}{P0 \cdot y^2}$
53. Relationships among duration, modified duration and effective durations:
54. Duration is a generic concept that indicates a bond's response to a change in interest rates.
55. Modified duration is a measure of duration in which it is assumed that the cash flows do not change with change in the yield.
56. Effective duration measures the sensitivity of duration of a bond's price considering that the expected cash flows change on account of changes in the yield due to the option available with it.
57. Value of convertible bond = Straight Value + Value of the call option on the stock – Value of the call option on the bond.
58. Factors considered in credit rating are Character, Capacity, Collateral and Covenant
59. Asset backed securities: financial assets or bonds pooled together and offered to the investors for receiving the inflow of funds from these underlying assets.
60. Credit card receivable is an example of non-amortising assets as there is no particular fixed pattern of payment of interest and repayment of principal.
61. If the value of collateral is greater than the value of the liability, then the deal is said to be overcollateralized. The extent to which the collateral is overvalued can be used to absorb future losses and hence 'overcollateralization' represents a form of internal credit enhancement.
62. Mortgage backed securities: type of asset backed securities that are secured by a pool of mortgage loans.
63. Mortgage: a pledge of property to secure a debt payment.
64. Pledged-Account Mortgage (PAM): the repayments resemble traditional mortgages from the lender's point of view and resemble Graduated Payment Mortgages (GPM) from the borrower's point of view.
65. Buy Down Loans: it is the seller of the property and not the buyer / borrower who places cash in a segregated account so that additional amounts required may be drawn and paid along with the mortgage payments made by the borrower.
66. Securitization: conversion of illiquid assets to liquid assets by converting longer duration cash flows in to shorter duration ones.
67. Though pass-through MBS is totally severed from the balance sheet as it is issued by the SPV, it is still serviced by the originator.
68. Collateralized Mortgage Obligations (CMO): bonds or debt obligations issued by mortgage originators by offering whole loan mortgages or mortgage pass-through securities as collateral.
69. Sequential-Pay tranche: most basic class within CMO structure, which is also k/a Plain Vanilla or Clean Pay class. While the first class principal is being paid, the other class holders receive monthly interest payments at the coupon rate on their principal.
70. Pass-through structure: each certificate holder will be allotted a proportion of the cash flow from the underlying pool of loans or receivables on a pro rate basis.
71. Pay-through structure: while a senior tranche can be split into different tranches, a subordinated tranche cannot be done so.
72. Longer the maturity period of the bond, greater would be the price sensitivity to change in the interest rate of the bond.
73. Higher the coupon rate, lower is the degree of sensitivity to changes in interest rates and vice-versa.

74. The bond with a lower yield is more volatile in terms of both % price change and absolute price change.
75. Risk premium: the difference between the investor's expected rate of return and the actual rate of return.
76. If the expected yield volatility increases the price of the call option will also increase. Hence, the price of the callable bond will decrease.
77. A decrease in expected yield volatility would result in a decline in the price of the embedded put option. Therefore, the price of a puttable bond would also decrease.
78. Credit spread is the yield spread between non-treasury securities and treasury securities.
79. Forward rates represent expected future spot rates.
80. If an investor holds a long bond position, he would incur loss if the interest rates increase and an investor who holds a short bond position would incur loss if the interest rates decrease.
81. The price yield relationship of an option free bond is referred to as positive convexity.
82. Modified duration is used to determine the % change in the bond's prices, for a 100 basis point (1%) change in the yield.
83. Option adjusted spread (OAS) adjusts the cash flows for the option to the benchmark interest rates. It is named so as it is arrived after adjusting option risk.
84. Hard put: if convertible bond is redeemable by the issuer only for cash.
85. Theoretical or intrinsic value of a preferred stock is a present value of the future dividends of perpetuity, discounted at a rate equivalent to the required rate of return or the rate realized on identical securities without the conversion clause.
86. Conversion premium ratio: tells about the magnitude of appreciation in the price that the stock should experience so that a parity price relationship is reached between the convertible bond and the underlying share.
87. Binomial model is an option valuation method developed by Cox, Ross, Rubinstein and Sharpe in 1979. It is based on assumption that probability of each possible price follows a binomial distribution and that prices can either move to higher level or lower level with time until the option expires (over any short time period)
88. Monte-Carlo method is used to value securities in which cash flows are interest rate dependent.
89. A Cash-flow yield is the discount rate that makes the price of a mortgage-backed or asset-backed security equal to the PV of its cash flows. It is equivalent to the YTM measure.
90. Zero-volatility spread is also k/a Z-spread or static spread.
91. Measure of bond equivalent yield = $2 [(1 + im)^6 - 1]$
92. The PV of a given interest rate path can thought of as the theoretical value of a security if that path was actually realized.
93. Under traditional valuation method, the recovery of premium is called break-even period which emphasises that the conversion right should be exercised after this period. Whereas the payback period is the concept used in capital budgeting. It indicates the period in which the additional amount paid as premium is recovered. In essence, both try to arrive at the same period, albeit through different approaches.
94. Economic risk: ability and the willingness of the govt to satisfy its obligation.
95. In determining the appropriate P/E ratio of a firm, the factors to be considered are growth rate, stability of earnings, size of the company, quality of management and dividend pay-out ratio.
96. Financial leverage under financial analysis forms crucial part of credit risk analysis.
97. There are two type of ratings – Shadow rating and Formal rating.
98. Regulatory requirements for Credit Ratings:
 - a. Compulsory credit rating is required if conversion is made for FCDs after 18 months.
 - b. In case of NCD/PCD, credit rating is compulsory where maturity exceeds 18 months.
 - c. Before the NCDs or non-convertible portion of PCDs are rolled over, fresh credit rating shall be obtained within a period of 6 months prior to the date of redemption.

- 99.** Repurchase agreement is a contract wherein the seller of a security agrees to buyback the same security from the purchaser at a specified price and time. Therefore, a dealer can use repurchase agreement or 'repo' market to obtain finance by pledging the purchased security as collateral to the loan.
- 100.** Scenario Analysis: Process of evaluating a strategy under several circumstances.
- 101.** Reverse repo is an agreement where a buyer purchases securities with an agreement to resell them at a specified price (which is higher than the buying price) on a specified date.
- 102.** Convexity ensures that the two bond portfolio k/a as 'maturity barbell' will outperform the one bond portfolio k/a 'bullet', even when the single bond is callable.
- 103.** Return enhancement can be explained using valuation model, options overwriting and minimization of the value of the bond portfolio.
- 104.** The yield curve strategies:
 - a. Bullet strategy: the portfolio consists of bonds that are based on a single maturity.
 - b. Barbell strategy: the bonds in portfolio can have either very short or very long maturities.
 - c. Ladder strategy: Involves maturity spacing or laddering or staggered maturities which imply spacing the maturities in a fixed income portfolio.
- 105.** Interest rate immunization refers to the process of offsetting price risk and reinvestment risk.