MONEY AND FINANCIAL MARKETS

TOPIC-3, CH-9 Ref: Baye and Jansen

Valuing Risky financial assets

Under this topic, we will look at different types of risks associated with financial (FA) assets and how they affect the 'P' and 'i' of F.A.

① Default Risk

- The risk that the borrower will default on debt payments.
- is associated with the creditworthiness of the borrower,
- Extra 'i' must be paid to creditworthy borrowers this giving rise to default risk premium.

Eg: 2 types of bonds [Rating A + B]

(a) T-Bill (A), $i = 5\% \Rightarrow P_{TB} = \frac{FV + i}{1+i} = \frac{1000+50}{1+0.05} = \frac{\$1050}{1.05} = \$1000.$

(b) Bond with Rating B such that

Expected return = $\underbrace{0.9}_{\text{Prob. of payment}} \times \underbrace{\$1050}_{\text{Return}} + \underbrace{0.1}_{\text{Prob of default}} \times \$0 = \$945$

then $P_B = \frac{\$945}{1.05} = \$900$

Thus, poor rated Bonds are priced less and offer higher 'i'.

Now, $i_A = \frac{1050}{1000} - 1 = 0.05$ or 5%

$i_B = \frac{1050}{900} - 1 = 16.7\%$

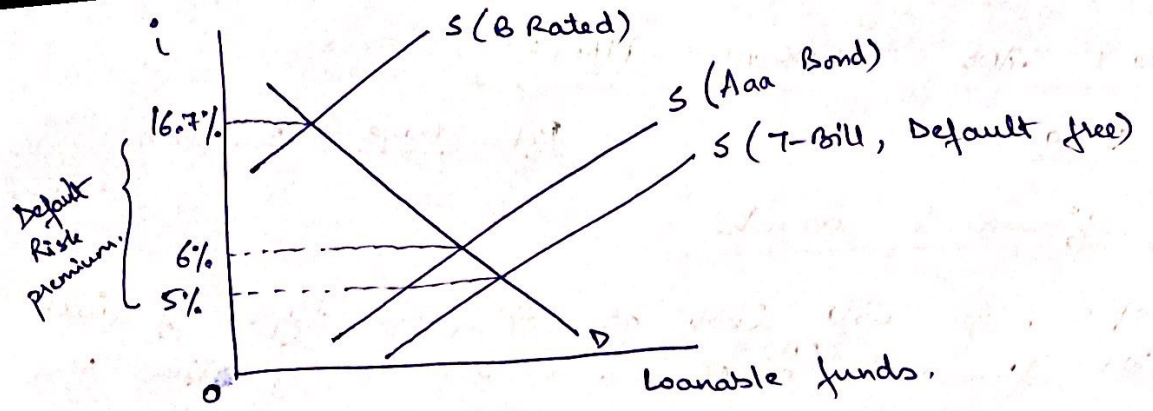
Default risk premium = (16.7 − 5) = 11.7%.

Similarly, the Default Risk Premium will be lower on loans issued to borrowers less likely to default:

For Eg: If a Co. has only 1% chance of default, then

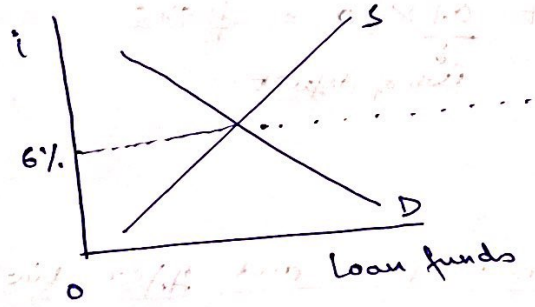
Exp. Return = $0.99 \times 1050 + 0.01 \times 0 = \$1039.50$

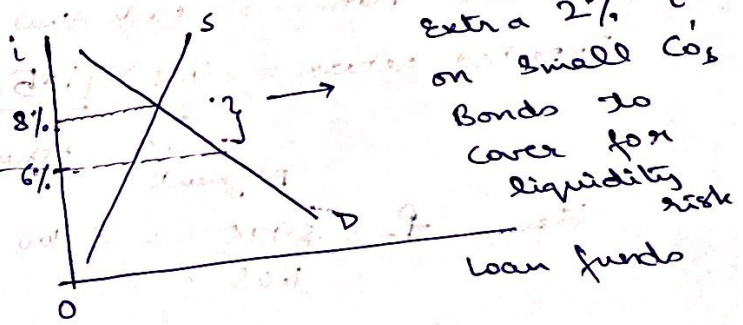
$P_B = \frac{1039.5}{1.05} = \$990$ (>$900 above) and $i' = \frac{1039.5}{990} - 1 = 6\%$ (< 16.7%)



(2) LIQUIDITY RISK

- It is concerned with how easily bonds are convertible into money.
- It is the risk related to the price that an investor will receive if a bond is liquidated prior to maturity.
- Eg: it is more difficult for buyers & sellers to get together and agree on a price for a small Co.





For relatively less liquid Bonds

⇓

lenders are less willing -to SS -to them

⇓

SS shifts -to the left

⇓

'i' is higher (-to cover for liquidity risk)

(3) INTEREST RATE RISK & CALL RISK

- Variability in 'i' → Bond prices fluctuate which leads to int. rate risk. In particular for "callable bonds"
- Callable bonds can be called in by the issuer prior to maturity when overall 'i' falls and they were issued with a high coupon rate making it profitable to reissue with a lower coupon rate.

Eg: FV = $1000, t = 1 yr, i = 8%. Assⁿ: • No Default risk • Non-callable bond.

then $P_B = \frac{1080}{1.08} = \$1000$

Now, if 'i' falls from 8% to 4%. The investor still gets 8% return as the bond is non-callable. But, if someone now wishes to buy this bond, he will be willing to pay

$$P_B = \frac{1000 + 80}{1.04} = \$1038$$

Thus, a decline in 'i' causes the value of bond to increase by $38 (app.)

Similarly, if 'i' rises to 12% from 8%, P_B falls from $1000 to $964.29 (a loss of $35. app.)

Thus, interest rate risk causes the value of the bond to change with change in 'i' resulting in profit / loss.

Capital Gains and interest income on a Bond

↓

change in the price relative to purchase price.

Eg: After 'i' fell to 4% → P_B rised to $1038.46.
This is the capital gain created due to fall in 'i'.
and this gain is over and above the 8% yield.

Thus,

$$\text{Total return} = \underbrace{8\%}_{\text{coupon 'i'}} + \underbrace{3.8\% \left(\frac{38}{1000}\right)}_{\text{capital gain}} = 11.8\%$$

BUT, what if the Bond has a call feature?

- **When 'i' falls**, the $1000 (FV) received by the investor does not allow him to buy another bond (P=$1038) and even after paying extra $38, investor gets only 4% yield. So, not good for the investor.
  On the other hand, this situation is good for the firm who can call in bonds ($1000), pay less, reissue at a higher price (=$1038) and pay less yield (=4%)
- **when 'i' rises**, the investor is better off and the firm is worse off.

Thus, bonds are called in by the issuer only when it is to the investor's disadvantage. Due to this, callable bonds are issued at a lower price and pay higher 'i' than non-callable bonds. The difference between these 2 'i' is the **call premium**.

(4) INFLATION RISK & INFLATION (π) PREMIUM

- Here we look at the impact of π on real int. receipts.
- π premium is to cover for the expectation of π.
- Fisher's Eq^n

$$r = i - \pi^e$$

(r: real, i: nominal, π^e: expected π.)

- If the actual $\pi > \pi^e \rightarrow r < r^e$

(r: ex-post 'r', r^e: ex-ante 'r')

Eg: If $\pi^e = 2\%$ & $i = 7\%$

then ex-ante $r = 5\%$.

But if π (actual) $= 0\%$, then expost $r = 7\%$.

The borrower has to pay more than intended. Thus, borrowers are worse off with decrease in expected π and better off with unexpected increase in π.

(5) TAX RISK

- refers to the risk of changes in the tax treatment of income.

Eg: ① Municipal Bond pays 6% (exempt from tax)

② Corporate Bond pays 9% (taxed @ 38%)

s.t after tax yield $= 0.09(1 - 0.38) = 5.58\%$ ($< 6\%$)

Minimizing financial risk

- 3 ways
  1) Diversification
  2) futures mkt.
  3) Options mkt.

- financial risk can never be completely eliminated.
- Given a choice between 2 Investments, choosing one with lower variance minimizes the risk for a given level of return.
- Diversification means spreading your Investment dollars over two or more assets to minimize the risk.