ECON 233 Finance 1- Week 5

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Why do all investors hold the Market Portfolio as their ORP?

- Why is the ORP the market portfolio?
- Let's have some clarity on a few things first - All investors face the same Markowitz optimization problem. So everyone has the same ORP.
- So the weights w_1, w_2, w_3 are the same for every single person. Hence ORP's weights on assets 1, 2, 3 are also w_1, w_2, w_3.
- I need to show that these are the same weights in the market portfolio.
- What are the weights on the market portfolio? It is the market capitalization.

Why do all investors hold the Market Portfolio as their ORP?

- The ORP must be the market portfolio ($w_{i,P} = w_{i,M}$)
  - If asset i had a weight in ORP such that $w_{i,P} < w_{i,M}$, there'd be excess supply and its price would fall, thus increasing its expected return => demand would increase until $w_{i,P} = w_{i,M}$
  - Vice versa if $w_{i,P} > w_{i,M}$



Why does only systematic Risk matter? Price adjustment to make only systematic risk affect the expected risk premium

- β captures the marginal contribution of an asset to the systematic risk.
- $E(r_i) - r_f = \beta_i[E(r_M) - r_f]$
- There is no compensation for idiosyncratic risk - you only get compensated for the systematic risk.
- High β means high systematic risk.
- Expected return compensates investors only for that marginal, non-diversifiable risk.
- In equilibrium, prices adjust so that assets with high correlation with the market get compensated more for holding risk that cannot be diversified away.
- Example.

Why do bond prices converge to par as the time to maturity gets shorter?

- $P = \frac{C}{r}\left[1 - \frac{1}{(1+r)^N}\right] + \frac{F}{(1+r)^N}$
- When $N = 0$, $P = F$ no matter what the market yield is.
- As N grows larger, the greater is the effect of the first term and r and P deviates from F.
- Intuitively think about why Price is different from r? It is due to the uncertainty behind r.
- The coupon rate is fixed at the time of issuance. If cr is same as r then $P = F$ always.
- If yield $>$ coupon rate, bond sells at a discount. But over time more coupons are paid and the discount shrinks. (and vice versa)
- When maturity nears there is lesser cashflows to discount! and the effect of a premium or discount erodes away.

Why do bond prices converge to par?

- Bond price is the sum of the PV of the expected coupons and the PV of the par (face) value
  - $P = \sum_{n=1}^{N} \frac{C}{(1+r)^n} + \frac{F}{(1+r)^N}$
- As time passes,
  - there are fewer coupons left and their PV thus decreases from positive towards zero
  - the par value is discounted over a shorter period and its PV thus increases from below par towards par
- The bond price thus approaches the sum of 0 and the par value, i.e., the par value, over time



Factors affecting YTM

Real interest rate	(quoted TIPS rate)
+ Inflation premium	
= Nominal risk-free interest rate	(quoted T-bill rate)
+ Default risk premium	
+ Taxability premium	
+ Liquidity premium	
+ Callability premium	
+ Interest rate risk premium	
= YTM	(any quoted rate)

Why are long-term bonds more sensitive to changes in interest rates than short-term bonds?

- What determines the price of a bond?
- Present value of its future cash flows, discounted by the market interest rate.
- Short term bonds have fewer number of cash flow periods and hence **fewer discounting** objectes and is less sensitive.
- You are hedged against interest rate fluctuations in the future.
- Long term bonds have a long stream of cash flows that need to be disounted. Farther into the future - discounted more heavily.
- more sensitive to interest rate changes becasue it affects a long stream of future cash flows.

Callable Bonds - Coupons and YTM

- A Callable bonds allows the issuer of the bond to repurchase the bond before maturity at a fixed price, often close to the face value.
- If interest rates fall and the price of bonds rise, an investor cannot enjoy these gains. - good for issuer and bad for investor.
- Investors must be compensated for this risk. They must be given a higher YTM for a callable bond or a higher coupon rate or a combination of both, compared to a straight bond.

BBB and AAA bonds

- AAA rated bonds are deemed to be safer than BBB rated bonds which have a higher risk of default.
- Can you name a famous AAA rated bond that was notoriously risky?
- As BBB bonds are riskier they demand a higher rate of return to compensate for the risk.