

Concepts	Description
Yield curve strategy	
Changes in yield curve	Reasons for changes in yield curve : 1. Parallel shift 2. Slope : flatter / steeper 3. Curvature : become straight or curved
Strategy for stable curve	1. Buy & hold : - Upward sloping curve : Longer maturity → higher yield + higher return - Low turnover , low transaction costs 2. Ride the Yield curve : - Upward sloping curve : Time passes → decline yield → price increase - Long bond with high duration @ end of steep curve → time passes → decline yield → price increase → sell bonds → repeat 3. Carry trade : Borrow @ lower ST rate + Invest @ higher LT rate 4. Sell convexity : Bond with lower convexity has higher yield
Strategy for Parallel Shift	1. Adjust Portfolio Duration : Same duration → same % value change in parallel shift in curve - ↑ expected rate → reduce duration before change → minimize loss - ↓ expected rate → increase duration before change → maximise gain 2. Increase Convexity : Material if significant change in rate ; less yield - Rate increase → Decrease loss - Rate decrease → Increase gain
Strategy for Non-parallel shift	- Increase exposure to point in yield curve that rates are expected to decrease - Decrease exposure to point in yield curve that rates are expected to increase
Adjusting convexity	1. Barbell vs. Bullet : - Barbell : higher convexity, but lower yield 2. Options on Bonds : - Long call options → Increase value if rate decline → more upside → more positive convexity - Long put options → Increase value if rate increase → less downside → more positive convexity → Buy call / put → increase convexity. Premium paid reduce yield → Sell call / put → decrease convexity. Premium earned increase yield 3. Bonds with embedded options : - Callable bond = Option free bond + Short call → limited upside if rate decline → Negative convexity + Higher yield - Mortgage backed securities (MBS) : similar to callable bond → Borrowers often prepay mortgages if rate decline → Negative convexity + Higher yield - Puttable bond = Option free bond + Long put → Owner could put the bond if rate increase → Positive convexity + Lower yield → Increase holding of Callable bond and MBS / Decrease holding of Puttable bond → decrease convexity → Increase holding of Puttable bond / Decrease holding of Callable bond and MBS → increase convexity
Carry trade	Definition : borrow @ lower rate + invest @ higher rate Method : 1. Borrow @ lower ST rate + Invest @ higher LT rate - risks are : - Higher LT rate → decrease investment value - Higher ST rate → increase cost of borrowing 2. Borrow in lower interest rate currency + Invest in higher interest rate currency - risks are : - Higher investment rate → decrease investment value - Higher borrowing rate → increase cost of borrowing - Change in FX rate 3. Currency swap : Pay 2% in currency A + Receive 5% in currency B. Risk is change in FX rate
Determine optimal strategy	1. Stable yield curve : invest in LT bond (which has highest return) 2. Change in yield curve : Should invest in bond with highest new return. New return of each bond is calculated as below : $Return = -[Effective\ duration\ at\ end\ of\ year\ 1 \times (YTM\ at\ end\ of\ year\ 1 - Beginning\ YTM) + Beginning\ YTM]$
Using derivatives to implement yield curve strategy	1. Change duration with Futures - Buy bond futures → increase duration - Sell bond future → decrease duration $Number\ of\ futures\ contracts\ to\ buy = N_f = \frac{Target\ portfolio\ PVBP - Current\ portfolio\ PVBP}{PVBP\ of\ futures\ contracts}$ $PVBP\ (Price\ value\ of\ a\ basis\ point) = Value \times ModDur \times 0.0001$ 2. Change duration with Swaps - Receive fixed swap → increase duration - Pay fixed swap → decrease duration $Notional\ principal = \frac{Target\ portfolio\ PVBP - Current\ portfolio\ PVBP}{PVBP\ of\ swap}$ $PVBP\ of\ swap = PVBP\ fixed - PVBP\ floating$ 3. Change Convexity with Options - Buy call / put → increase convexity - Sell call / put → decrease convexity - To maintain duration → sell bond + buy option (to increase convexity) / or buy bond + sell option (to decrease convexity). Par value of options is : $Par\ value\ of\ option\ to\ maintain\ duration = Par\ value\ of\ bond\ sold \times \frac{PVBP\ of\ bonds}{PVBP\ of\ options}$