

Hedging using Futures

Long & Short Hedges

- Long future hedge: when you want to purchase an asset in the future and want to lock in the price
- Short future hedge: when you want to sell an asset in the future and want to lock in the price

Basis

- Basis = Spot price (S) – Future price (F)
- Long hedge:
 F_1 : Future price when hedge is set up
 F_2 : Future price when asset is purchased
 S_2 : Spot price when asset is purchased
 b_2 : Basis when asset is purchased

Cost of asset	S_2
Gain of future	$F_2 - F_1$
Net amount paid	$S_2 - (F_2 - F_1) = F_1 + b_2$

- Short hedge:
 F_1 : Future price when hedge is set up
 F_2 : Future price when asset is purchased
 S_2 : Spot price when asset is purchased
 b_2 : Basis when asset is purchased

Price of asset	S_2
Gain of future	$F_1 - F_2$
Net amount paid	$S_2 + (F_1 - F_2) = F_1 + b_2$

Cross Hedging: When there is no future contract on the asset being hedging, choose the contract whose future price is the most correlated with the asset price

Optimal Hedge Ratio

- $h^* = \rho \frac{\sigma_S}{\sigma_F}$
 where σ_S is the standard deviation of Δ_S , the change in spot price
 σ_F is the standard deviation of Δ_F , the change in future price
 ρ is the correlation between Δ_S and Δ_F
- Similar to option delta

Why Hedge Equity Returns?

- May want to be out of the market for a while; Hedging avoids selling and repurchasing costs
- Suppose portfolio beta is 1.0, but we are confident that the portfolio will outperform the market in both good and bad times, then hedging ensures that the portfolio return is risk-free rate plus excess return over the market

Stack and Roll

- A stack hedge is a position concentrated in one specific future contract month as opposed to a string of contracts that extend out the maturity of the swap
- Reduce liquidity risk (why?)
- Change in term structure from contango and backwardation, or vice versa, can put stack and roll hedge at a great risk