Hedging Strategies Using Futures

Chapter 3

Long & Short Hedges

- A long futures hedge is appropriate when you know you will purchase an asset in the future and want to lock in the price
- A short futures hedge is appropriate when you know you will sell an asset in the future & want to lock in the price

Arguments in Favor of Hedging

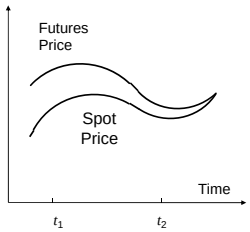
Companies should focus on the main business they are in and take steps to minimize risks arising from interest rates, exchange rates, and other market variables

Arguments against Hedging

- Shareholders are usually well diversified and can make their own hedging decisions
- It may increase risk to hedge when competitors do not
- Explaining a situation where there is a loss on the hedge and a gain on the underlying can be difficult

Convergence of Futures to Spot

(Hedge initiated at time t_1 and closed out at time t_2)



Basis Risk

- Basis is the difference between spot & futures
- Basis risk arises because of the uncertainty about the basis when the hedge is closed out

Long Hedge

- Suppose that
  - F_1: Initial Futures Price
  - F_2: Final Futures Price
  - S_2: Final Asset Price
- You hedge the future purchase of an asset by entering into a long futures contract
- Cost of Asset=$S_2 - (F_2 - F_1) = F_1$ + Basis

Short Hedge

- Suppose that
  - F_1: Initial Futures Price
  - F_2: Final Futures Price
  - S_2: Final Asset Price
- You hedge the future sale of an asset by entering into a short futures contract
- Price Realized=$S_2 + (F_1 - F_2) = F_1$ + Basis

Choice of Contract

- Choose a delivery month that is as close as possible to, but later than, the end of the life of the hedge
- When there is no futures contract on the asset being hedged, choose the contract whose futures price is most highly correlated with the asset price. There are then 2 components to basis

Optimal Hedge Ratio

Proportion of the exposure that should optimally be hedged is

$$h = \rho \frac{\sigma_S}{\sigma_F}$$

where

σ_S is the standard deviation of ΔS, the change in the spot price during the hedging period,

σ_F is the standard deviation of ΔF, the change in the futures price during the hedging period

ρ is the coefficient of correlation between ΔS and ΔF.

Tailing the Hedge

- Two way of determining the number of contracts to use for hedging are
  - Compare the exposure to be hedged with the value of the assets underlying one futures contract
  - Compare the exposure to be hedged with the value of one futures contract (=futures price time size of futures contract
- The second approach incorporates an adjustment for the daily settlement of futures

Hedging Using Index Futures

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To hedge the risk in a portfolio the number of contracts that should be shorted is

$$\beta \frac{V_A}{V_F}$$

where V_A is the current value of the portfolio, β is its beta, and V_F is the current value of one futures (=futures price times contract size)

Reasons for Hedging an Equity Portfolio

- Desire to be out of the market for a short period of time. (Hedging may be cheaper than selling the portfolio and buying it back.)
- Desire to hedge systematic risk

Example

Futures price of S&P 500 is 1,000
Size of portfolio is $5 million
Beta of portfolio is 1.5
One contract is on $250 times the index

What position in futures contracts on the S&P 500 is necessary to hedge the portfolio?

Changing Beta

- What position is necessary to reduce the beta of the portfolio to 0.75?
- What position is necessary to increase the beta of the portfolio to 2.0?

Stock Picking

- If you think you can pick stocks that will outperform the market, futures contract can be used to hedge the market risk
- If you are right, you will make money whether the market goes up or down

Rolling The Hedge Forward

- We can use a series of futures contracts to increase the life of a hedge
- Each time we switch from 1 futures contract to another we incur a type of basis risk