Hedging Strategies Using Futures

Chapter 4

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

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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
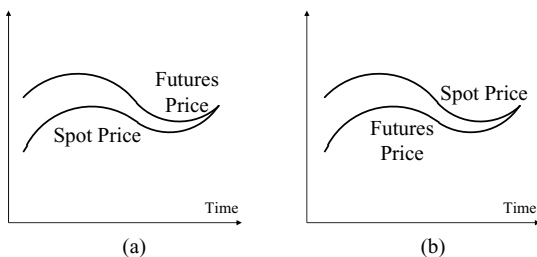

Arguments against Hedging

- 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

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Convergence of Futures to Spot

(a)   (b)

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.

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

$$\beta \frac{P}{A}$$

- where P is the value of the portfolio, β is its beta, and A is the value of the assets underlying one futures contract

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 (Appropriate when you feel that you have picked stocks that will outperform the market.)

Example

Value of S&P 500 is 1,000

Value of Portfolio is $5 million

Beta of portfolio is 1.5

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

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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?

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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

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