

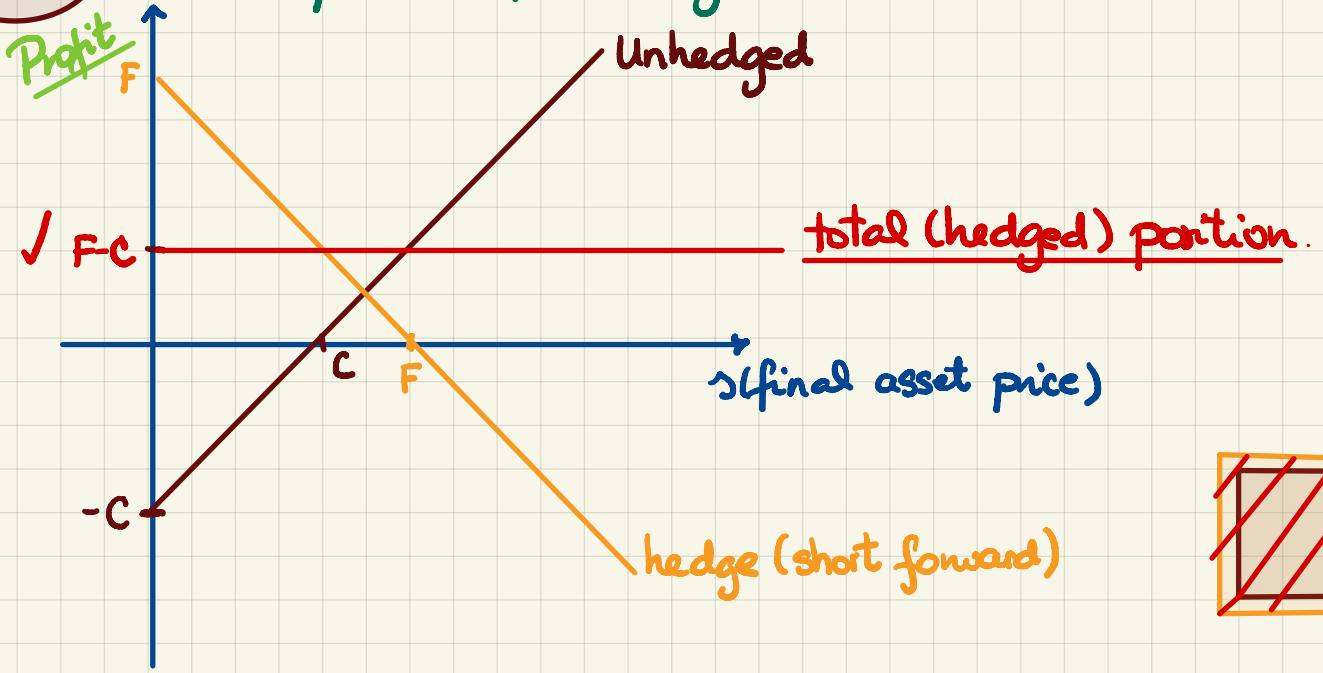
M339D : September 18<sup>th</sup>, 2024.

## Hedging Using Forward Contracts.

Focus on a producer of goods.

C... total aggregate cost of production valued @ time  $\cdot T$

$S(T)$ ... market price of the good @ time  $\cdot T$



Algebraically:

$$\text{Profit (Unhedged)} + \text{Profit (Hedge)} = \text{Profit (Total Hedged)}$$

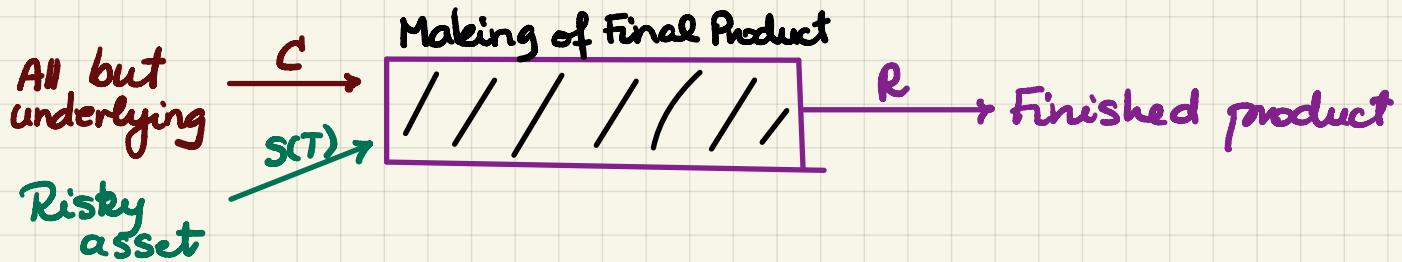
$$\cancel{S(T)} - C + F - \cancel{S(T)} = F - C$$

## User/Buyer of Goods (to use as raw material)

*All but underlying* C... the total aggregate costs of production of some final product without the underlying asset valued @ time·T when the underlying asset is needed & purchased

R... "revenue" ... the price @ which the user of goods can sell the final product valued @ time·T

$S(T)$ ... the market price @ time·T of the underlying asset



The Bottom Line @ time·T:

$$R - C - S(T)$$

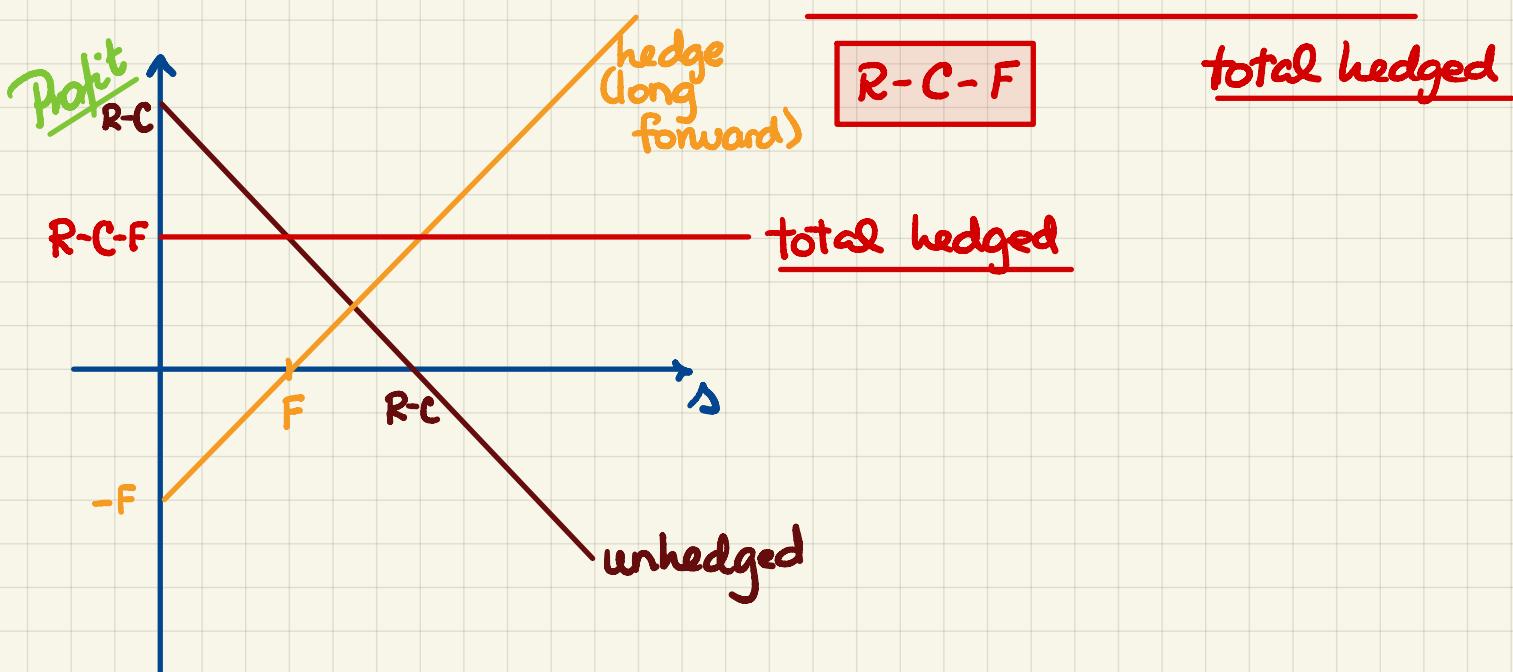
unhedged

The appropriate hedge is the

LONG FORWARD (BUY FORWARD)

$$S(T) - F$$

hedge



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Problem Set #4

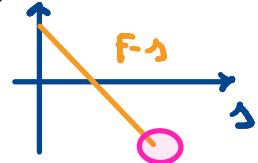
Forward contracts.

**Problem 4.1.** (5 points) A soy-bean farmer shorts forward contracts on soy in an amount matching his crop volume and with delivery at harvest time. Then, he is considered:

- (a) an arbitrageur.
- (b) a broker.
- (c) a speculator.
- (d) a hedger.
- (e) None of the above.

**Problem 4.2.** Derivative securities can reduce the risk of both the buyer and the writer of the security. *True or false?*

**Problem 4.3.** A short forward contract has an unlimited loss potential. *True or false?*



**Problem 4.4.** A farmer produces one million bushels of corn. The total cost of production is \$1.3 million. The farmer entered a forward contract to hedge at a forward price of \$2.50 per bushel on one million bushels. What is the farmer's profit?

→ :

$$(2.5 - 1.3) \cdot 10^6 = 1.2 \cdot 10^6$$

□

**Problem 4.5.** Assume that farmer Brown is uncertain about his crop yield. Based on past experience, he thinks the following is a good model:

- 100,000 bushels with probability 1/4;
- 80,000 bushels with probability 3/4.

How many forward contracts do you think farmer Brow should short to hedge against fluctuations in corn prices at harvest time? Explain your way of thinking ...

Idea #1. The Expectation:  $\frac{1}{4}(100\,000) + \frac{3}{4}(80\,000) = 85\,000$

Idea #2. The mode/The subhedge 80,000

Idea #3. The superhedge 100,000

Idea #4. The "median" 90,000

**Problem 4.6.** Pancakes, Inc. produces chocolate chip pancakes. It longed a forward contract on 100 lbs of chocolate chips at \$3.00 per pound. Total fixed revenue is \$2,000 for the pancakes produced with the above chocolate chips. Other costs total \$1200. Find the company's profit.

- (a) 2,000
- (b) 1,700
- (c) 800
- (d) 500
- (e) None of the above.

$$R - C - F = 2000 - 1200 - 100 \cdot 3 = 500$$



**Problem 4.7.** The Extra-Healty Cereal (EHC) company longed 20,000 forward contracts on corn at \$2.80 per bushel. The revenue from cereal made with the above corn is \$200,000 while the other (non-corn) aggregate fixed and variable costs amount to \$120,000. What is the EHC's profit?

→:  $200,000 - 20,000 \cdot 2.8 - 120,000 = 24,000$



Q: What if I add: "The price of corn @ time T is \$2.50 in the market."?

Inspiration.

Buyer/User of Goods.

