

Problem 3.2. To plant and harvest 20,000 bushels of corn, Farmer Jayne incurs total aggregate costs totaling \$33,000. The current spot price of corn is \$1.80 per bushel. What is the profit if the spot price is \$1.90 per bushel when she harvests and sells her corn?

- (a) About \$3,000 gain
- (b) About \$3,000 loss
- (c) About \$5,000 loss
- (d) About \$5,000 gain
- (e) None of the above

irrelevant

deterministic, valued @ time T (harvest time)

$$\rightarrow: \underline{20,000 \cdot (1.90)} - 33,000 = \underline{5,000}$$



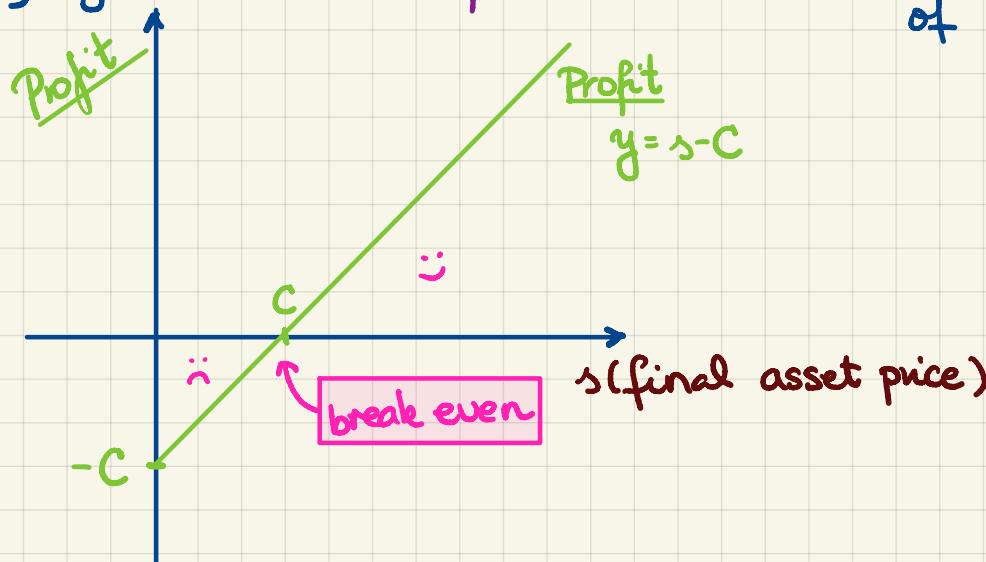
Hedging Motivation.

Example. [Producer of Goods]

- farmers producing corn, soy beans, peaches
- textile raw material
- ore mining
- factories producing "widgets"

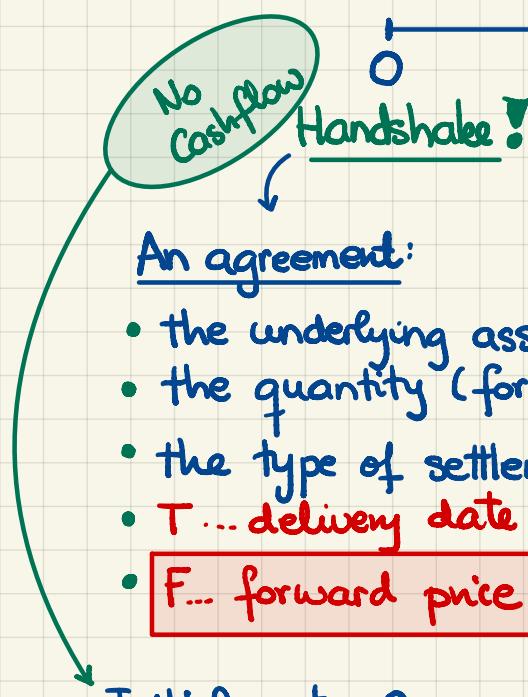
C... deterministic total aggregate fixed and variable costs of production valued @ the time of sale of the produced good, i.e., time T

If the producer sells their goods in the market, they get the market price. This is outside of their domain of influence.



Forward Contract.

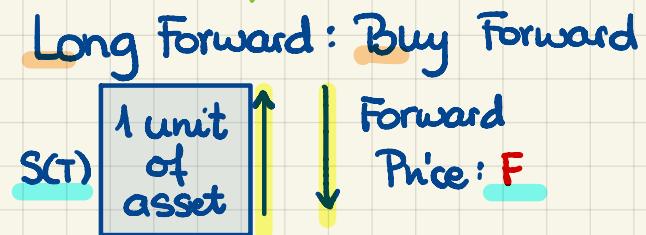
* A BINDING CONTRACT ON BOTH SIDES! *



Initial cost = 0

Payoff = Profit

Delivery date
(when the cash is
"exchanged" for the asset)



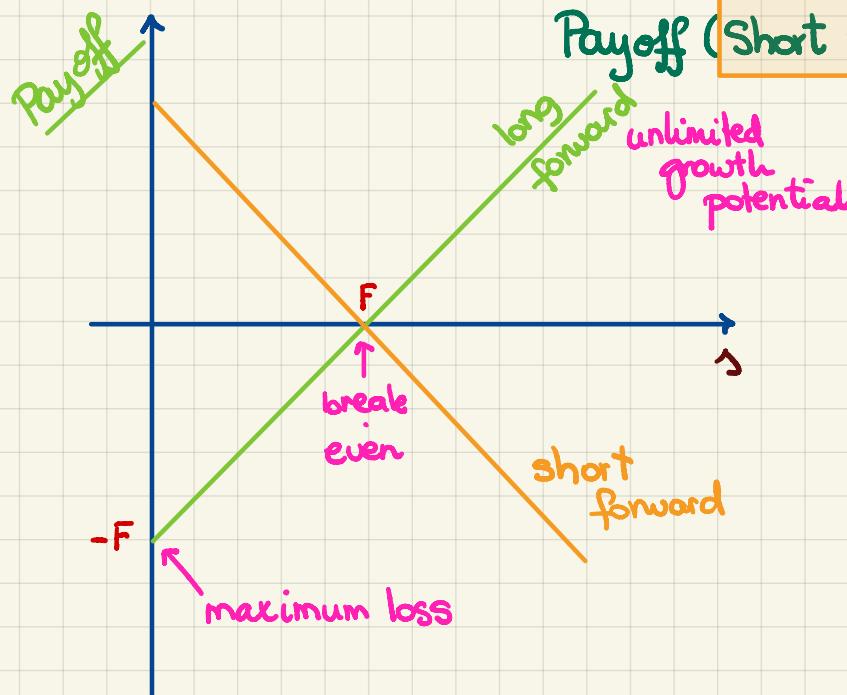
Short Forward: Selling Forward

$$\text{Payoff (Long Forward)} = [S(T) - F]$$

$$\text{Payoff (Short Forward)} = F - S(T)$$

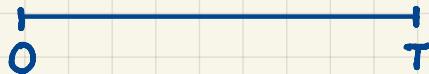
$$\text{Payoff f'ction: } v(s) = s - F$$

This is a long position w.r.t. the underlying.



Problem. [Sample SOA Problem]

Determine which of the following portfolios have the same cashflows as a shortsale of a non-dividend-paying stock.



Initial cost: $-S(0)$ Payoff: $-S(T)$

X (i) long forward and a long zero-coupon bond

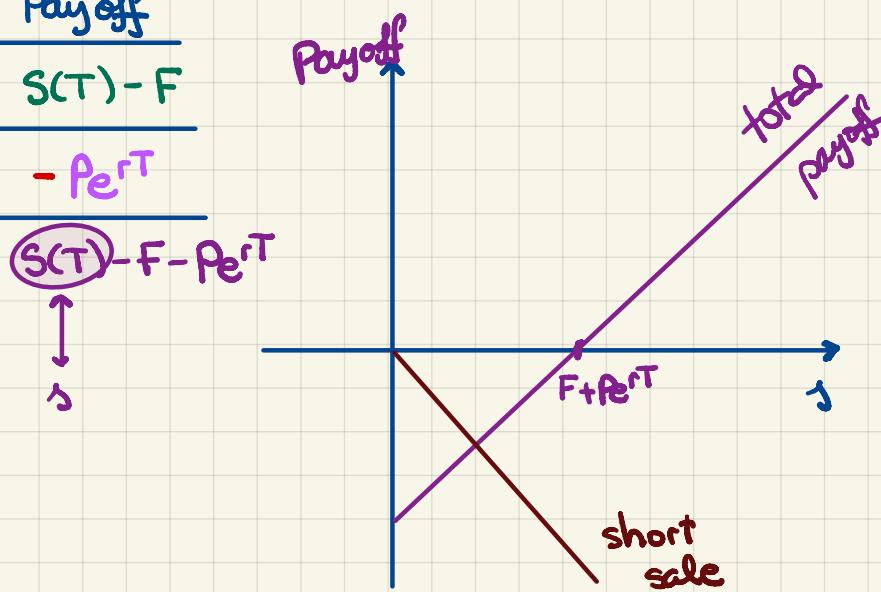
Init. Cost: Price of Bond > 0

X (ii) long forward and a short forward

Init. Cost: 0

X (iii) long forward and a short zero-coupon bond

	<u>Initial Cost</u>	<u>Payoff</u>	<u>Payoff</u>
Long forward	0	$S(T) - F$	
Short bond	$-P$	$-Pe^{rT}$	
Total	$-P$	$(S(T) - F) - Pe^{rT}$	



X (iv) short forward and a long zero-coupon bond

Init. Cost: Price of bond > 0

(v) short forward and a short zero-coupon bond

	<u>Init. Cost</u>	<u>Payoff</u>
Short Forward	0	$F - S(T)$
Short Bond	$-P$	$-Pe^{rT}$
Total	$-P$	$F - S(T) - Pe^{rT}$
Short Sale	$-S(0)$	$-S(T)$