

# Econ435 – Financial Markets and the Macroeconomy

## Solutions to the Extra Credit Problem Set

### Question 1 (5 points)

The efficient market hypothesis holds that stock prices reflect all available information. Its three versions differ in their interpretation of “all available information”. The weak form considers only past trading information (prices, volumes etc.); the semi-strong form adds fundamental data on the firm (dividend prospects, quality of management etc.); and the strong form adds on top of these insider information and *any* other information about the company or the stock.

Technical analysis is a technique for forecasting stock prices based on identifying patterns using past trends and applying them to the current situation on the market. If the EMH holds in any of its three forms, such information would already be included in prices and hence technical analysis would not be able to reveal any predictable moves in prices.

Fundamental analysis is a forecasting technique based on analyzing the fundamental data of the firm. This type of analysis would make sense if the EMH holds only in its weak form. However, this information would be included in prices according to the semi-strong or to the strong form of the EMH, so this analysis would also be fruitless in these cases.

### Question 2 (6 points)

(i) (1 point) The premium of the put option can be calculated using the put-call parity:

$$P = C + \frac{X}{(1 + r_f)^T} - S_0 = 3.5 + \frac{32}{(1 + 0.05)^1} - 30 = \$3.98.$$

(ii) (4 points) The payoff and the profit from such a strategy are given in the table below:

	$S_T \leq X = \$32$	$S_T > \$32$
Payoff of call holding	0	$S_T - \$32$
Payoff of put holding	$\$32 - S_T$	0
Payoff of straddle	$\$32 - S_T$	$S_T - \$32$
Profit of straddle (Payoff $- P - C$ )	$\$32 - S_T - P - C =$ $\$24.52 - S_T$	$S_T - P - C - \$32 =$ $S_T - \$39.48$

The profit and the payoff are plotted in the graph below.

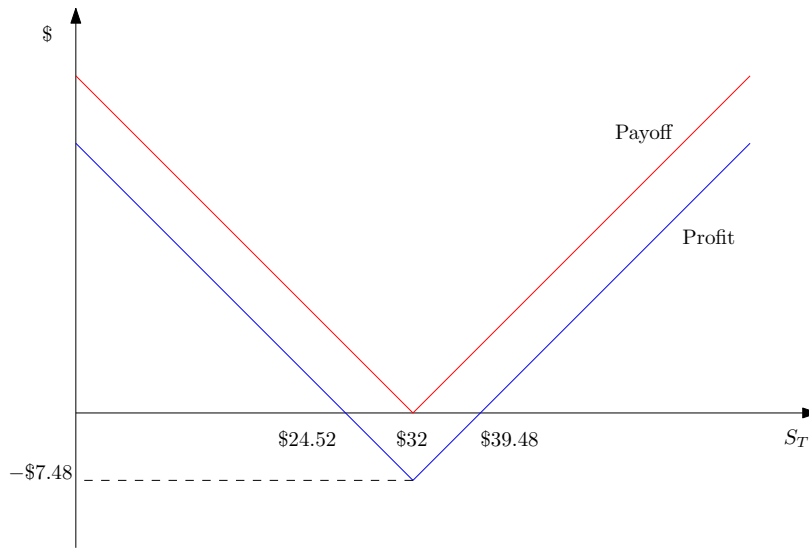


Figure 1: Payoffs and profits (per share) of the straddle.

(iii) (1 point) The straddle would not yield profit for stock prices between the two values that make it just break even (zero profit). These values are:

$$24.52 - S_T = 0 \Rightarrow S_T = \$24.52,$$

$$S_T - 39.48 = 0 \Rightarrow S_T = \$39.48.$$

Hence, if the stock price is between \$24.52 and \$39.48, the straddle would yield negative profits.

### Question 3 (4 points)

A call option is exercised when the market price is higher than the strike price. The higher the market price, the higher the chance the call will be exercised. In this case, the call option becomes more desirable, its demand rises, which means its price (premium) also rises.

In contrast, a put option is exercised when the market price is lower than the strike price. Hence, a higher market price will have the opposite effect on the put premium, driving it down (the option would be less desirable and its demand would fall).

As for the volatility of the stock price, this is a measure of the riskiness of the stock. Higher volatility means higher uncertainty as of the future stock price, which makes either type of option more risky. As the writer bears most of the risk, higher risk requires higher compensation, i.e. higher prices (premiums) for either type of options.