QUESTION

Calculate the initial premium and the trading strategy for the asset/bond replicating portfolio for a European call option on the following data:

Strike \$50; Maturity 1 year, two intervals;
Continuously compounded annual risk-free rate 5%;
Volatility 30%; Current price \$50.

What do you deduce about the way the premium behaves with the volatility for a call option?

ANSWER

$k = 50,\ r = 0.05,\ \sigma = 0.3$ (higher than question 3), $S_0 = 50$ (different from question 1),

$U =$ same as question 1$= 1.23941$,

$D =$ same as question 1$= 0.81088$

<u>Eurocall</u> Summary:

$C_2^+ = 26.80686$
$S_2^+ = 76.80686$

$C_1^+ = 13.20524$
$\phi_1^+ = 1$
$\psi_1^+ = -48.7653$
$S_1^+ = 61.9705$

$C_0 = 6.504431$
$\phi_0 = 0.610595$
$\psi_0 = -24.0253$
$S_0 = 50$

$C_2^0 = 0.250639$
$S_2^0 = 50.25064$

$C_1^- = 0.122325$
$\phi_1^- = 0.014426$
$\psi_1^- = -0.46256$
$S_1^- = 40.544$

$C_2^- = 0$
$S_2^- = 32.87632$

C_0 increases with σ increasing. Logic: more volatility=more risk=more insurance needed=higher premiums.