

	CALL	PUT
$K > S_0$	out of the money	in the money
$K < S_0$	in the money	out of the money
$K = S_0$	at the money	at the money

$K$  = The Exercise Price.

$S_0$  = Price of the underlying asset (stock) at  $t = 0$

$S_0 \neq S_T$

$t = 0$

$S_0$  Maturity  
(ST)

money

Ex:

Call ( $S_0 = 50 \$$ ,  $K = 30 \$$ ,  
 $c = 2 \$$  ( $T = 1 \text{ month}, x$ ).

$K < S_0 \Rightarrow$  call is in  
the money.

buying a call  $\rightarrow$  increase  
expectations

When Expectations are  
"correct" the in the money  
call will make large  
profits.

- 43 -

• If  $S_T = 60 \$$ .

We use the option.

$$\pi = (60 \$ - 30 \$) - 2 \$$$
$$= 28 \$$$

• If  $S_T = 70 \$$ .

$$\pi = (70 \$ - 30 \$) - 2 \$$$
$$= 38 \$$$

if  $S_T \uparrow \rightarrow \pi(\text{call}) \uparrow \uparrow$

$$\text{Profit} = \text{Option}$$
$$\text{Rate} = \text{Profitability} = \frac{28 \$}{2 \$}$$

$$= 14 = 1400\%$$
$$= 14 - 44 -$$

$$\pi = (S_T - K) - C$$

$$\pi = \left( S_T - \frac{K}{1 + R_F} \right) - C$$

$$\text{If } R_F \nearrow \rightarrow \frac{K}{1 + R_F} \searrow$$

$$\Rightarrow \pi \nearrow$$

$\Rightarrow$  Premium  $\nearrow$   
Option



We invest 2\$ to buy the call, and when expectations are correct, The fall

profitability rate equals

1400%



Invest more  
in calls

Profitability



More useful to borrow money  
in order to invest more  
in options

Borrow  
Money

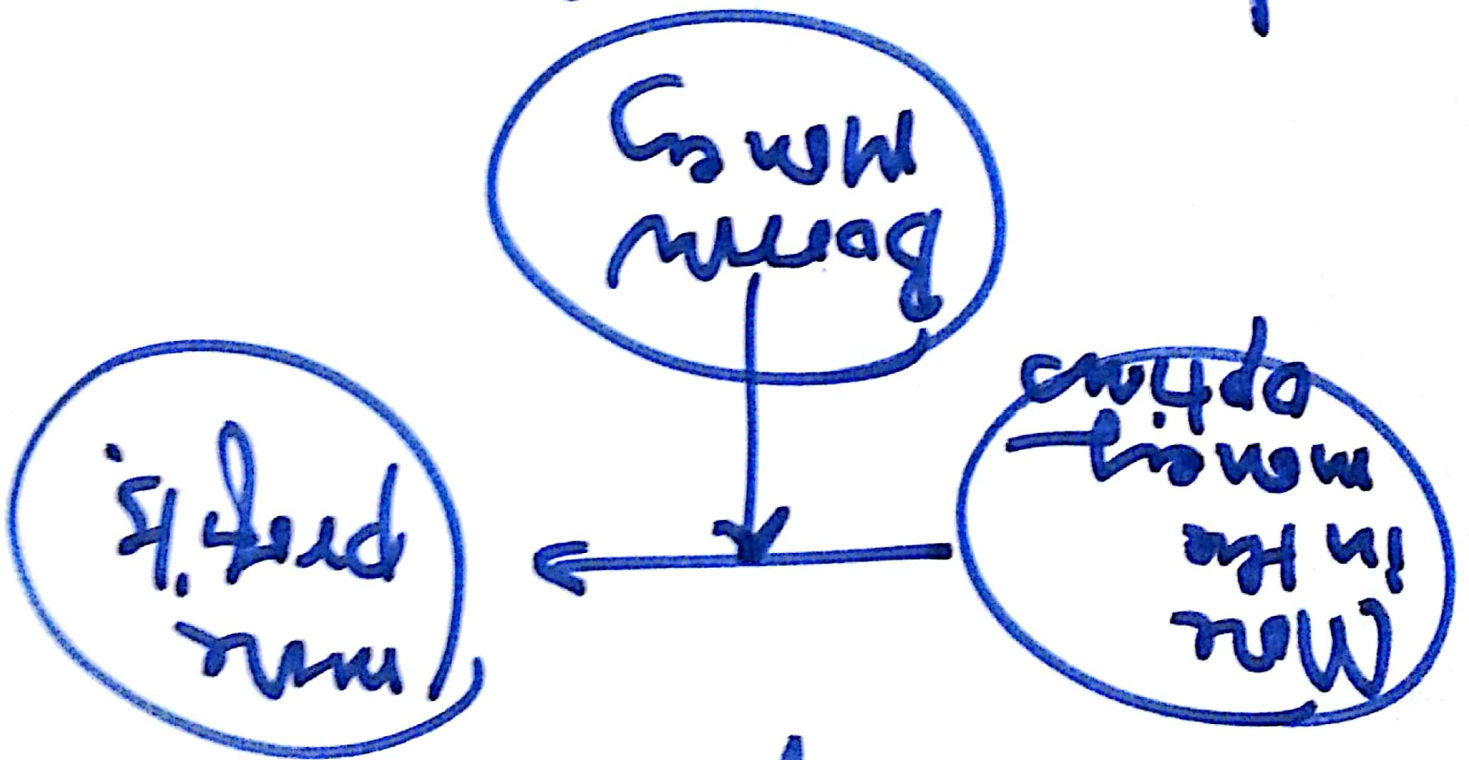
+

Profit



-45-

deeper in the money  
 $K = 30\$$   
 $G = 50\$$   
 $K < G$



With in the money things  
it is possible to make  
high leverage effect



$$S_0 = 50 \$$$

$K = 30 \$$   $K = 50 \$$   $K = 60$

call

in

at

out

$$S_T =$$

$$60 \$$$

$$50 \$$$

$$60 \$$$

# c

$$5 \$ / \text{call}$$

$$3 \$ / \text{call}$$

$$1 \$ / \text{call}$$

$\Pi$

$$25 \$$$

$$7 \$$$

$$-1 \$$$

60-30-5 60-50-3 60-60-1

buy a call  $\rightarrow$  we expect an increase

$$S_0 = 50 \$$$

increasing

$$S_T = 60 \$$$

The highest profit is obtained -47- for in the money option.

$$\text{Profit} = \frac{\pi}{\text{Invest}} = \frac{\pi}{\text{option premium}}$$

out of the money =  $\frac{-1\$}{1\$} = -100\%$

at the Money =  $\frac{7\$}{7\$} = 100\%$

in the money =  $\frac{25\$}{5\$} = 500\%$

Profitability:



# Options Traded on Listed Markets:

Asset: Stock X, 24/10/2017  
 $S_0 = 50$  : European Call

K	Dec. 2017	M 2018	1 2018	Feb 2018
<del>K=60</del> (out)	1#	1.5#	2#	2.25#
K=40 (in)	5#	5#	5#	5.5#
K=50 (at)	2#	2.25#	2.5#	3.25#

• Maturity ↑  
 • More in the money  
 → Premium ↑  
 → Higher Premium

(49)

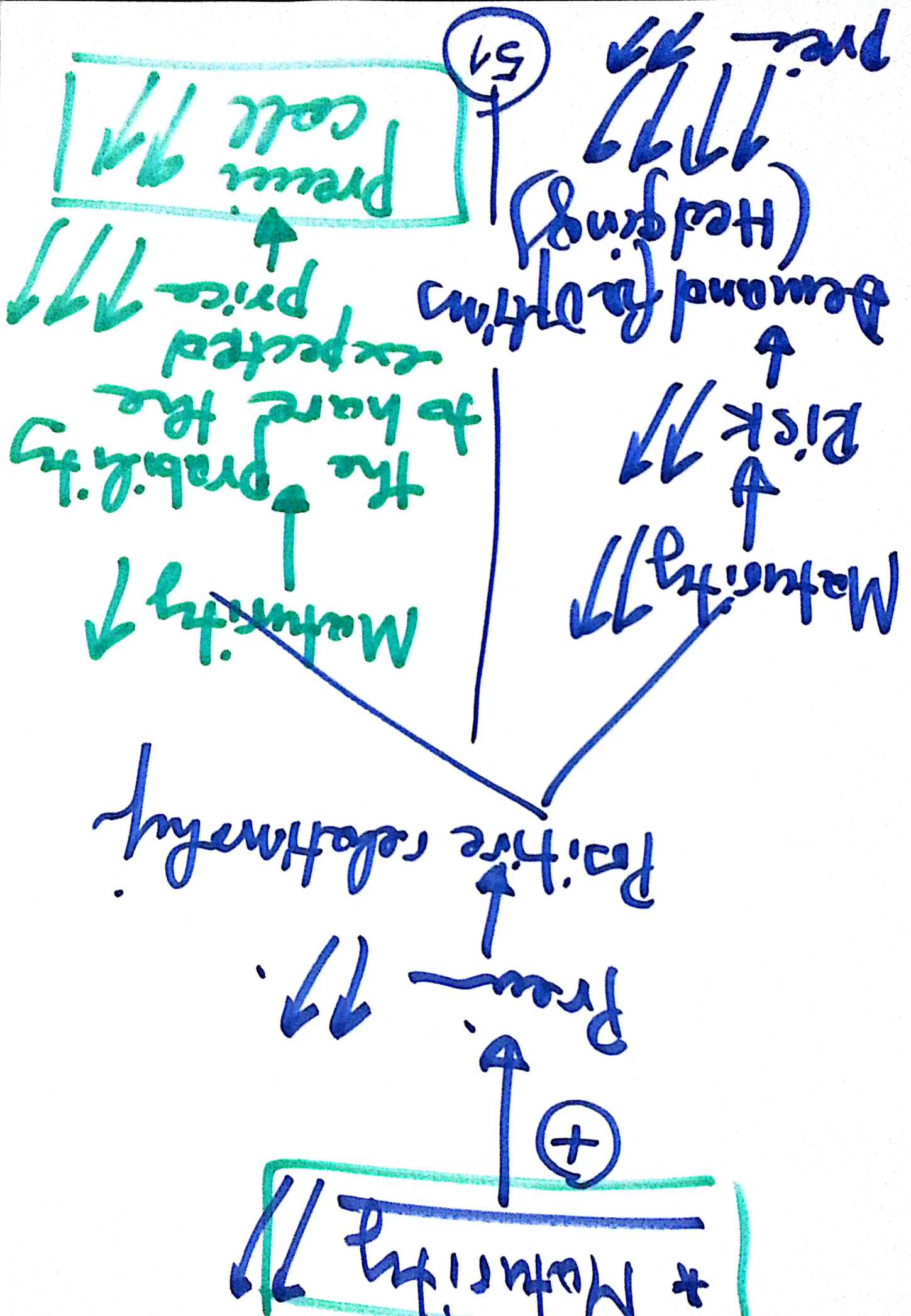


(50)

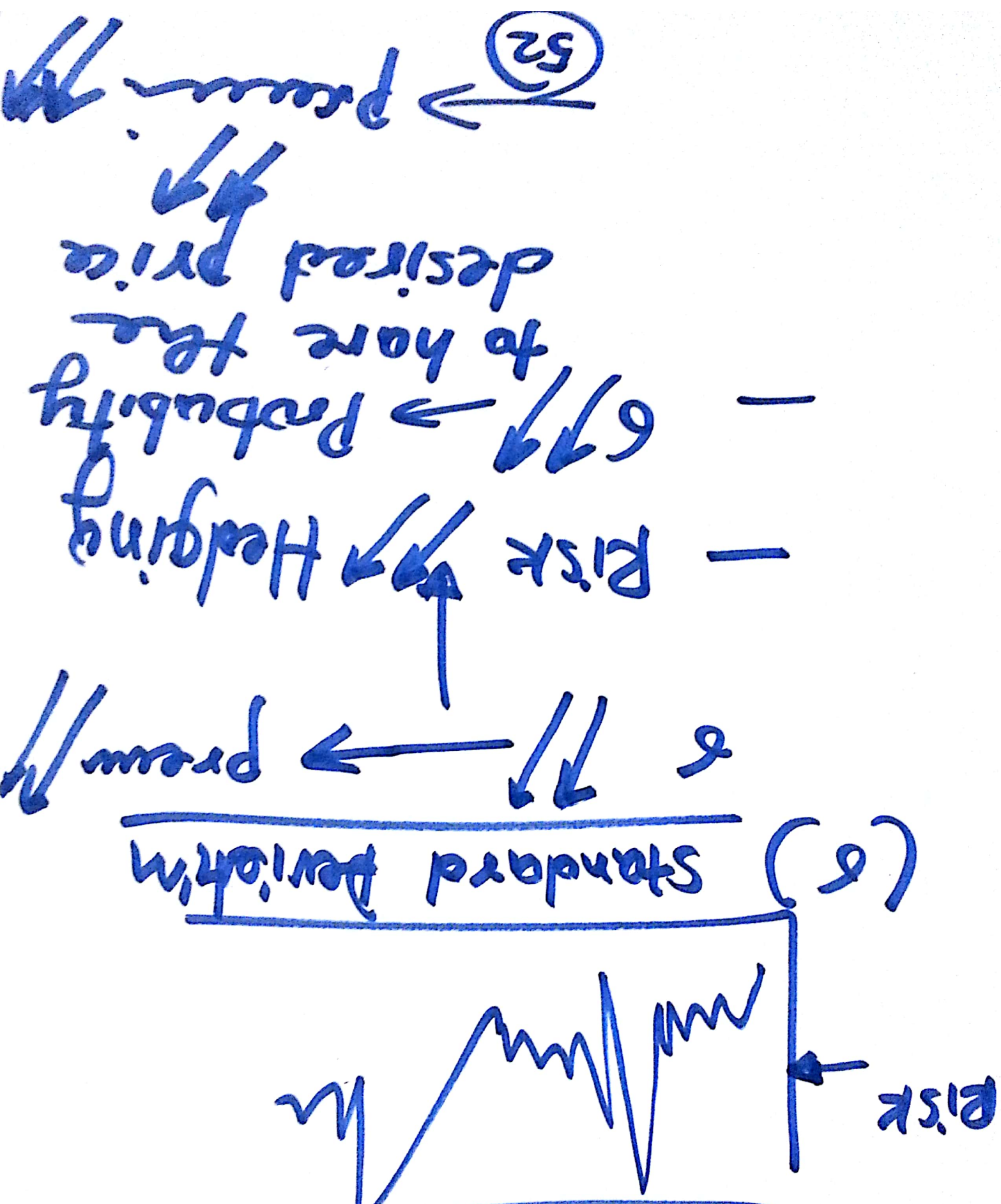
There 5 factors are affecting the premium of the option

- CALL  
PVI  
Premium
- \* S: The underlying stock price
  - \* T: Maturity
  - \* K: Strike Price
  - \* Volatility (Risk)
  - \* Risk Free Rate

Determinants of the option premium







in the  
Money  
option

Highest  
Premium

The Premium of the option  
depends on the relationship  
between  $K$  and  $S_0$   
(in, out, at)  $\rightarrow$  Premium

Exercise Price ( $K$ )  
 $S_0$



call: buying the right to  
buy at  $K$  at the  
maturity.

$-C$

$$C = 0 \quad RF = 5\%$$

$$\frac{K}{1 + RF}$$

$$50\$ \frac{1 + 5\%}{1 + 5\%} = 47.6\$$$

$$\pi = (S - K) - P$$

(SV)

To buy  
pay  $-K$

57

T



Short Notes

Assignment 1

# Derivatives

FIN 551

Oct. 2017

-0-

# Assignment 1

## Derivatives

### Theoretical Questions :

1 - Define the following Concepts

Refer to the Slides of chap 1 or Textbook, ch. 2,

2 - Future Contracts are similar to the Forward Contracts.

However, Futures are negotiated on listed Markets

(LIFFE, CBOT, CBOE...)

The Main Advantage of

Futures Contracts is liquidity.  
The High liquidity in Listed  
Markets allow investors,  
Traders, portfolio Managers  
to sell/buy futures at  
any time. Futures, given.  
Their liquidity are very  
useful for Arbitrage and  
Speculation. So, For Short  
Term investment, it is more  
useful to use 'Futures'  
to Speculate or to Hedge  
Against Risk.

Concerning the Forward  
Contracts, They are very



Flexible instruments  $\Rightarrow$   
investors, traders can fine  
their maturity dates,  
Exercise prices, size of the  
contract easily. forward  
contracts are not liquid  
because they are not  
tradable on listed markets.  
They are negotiated on  
OTC markets.

3) Strategy:

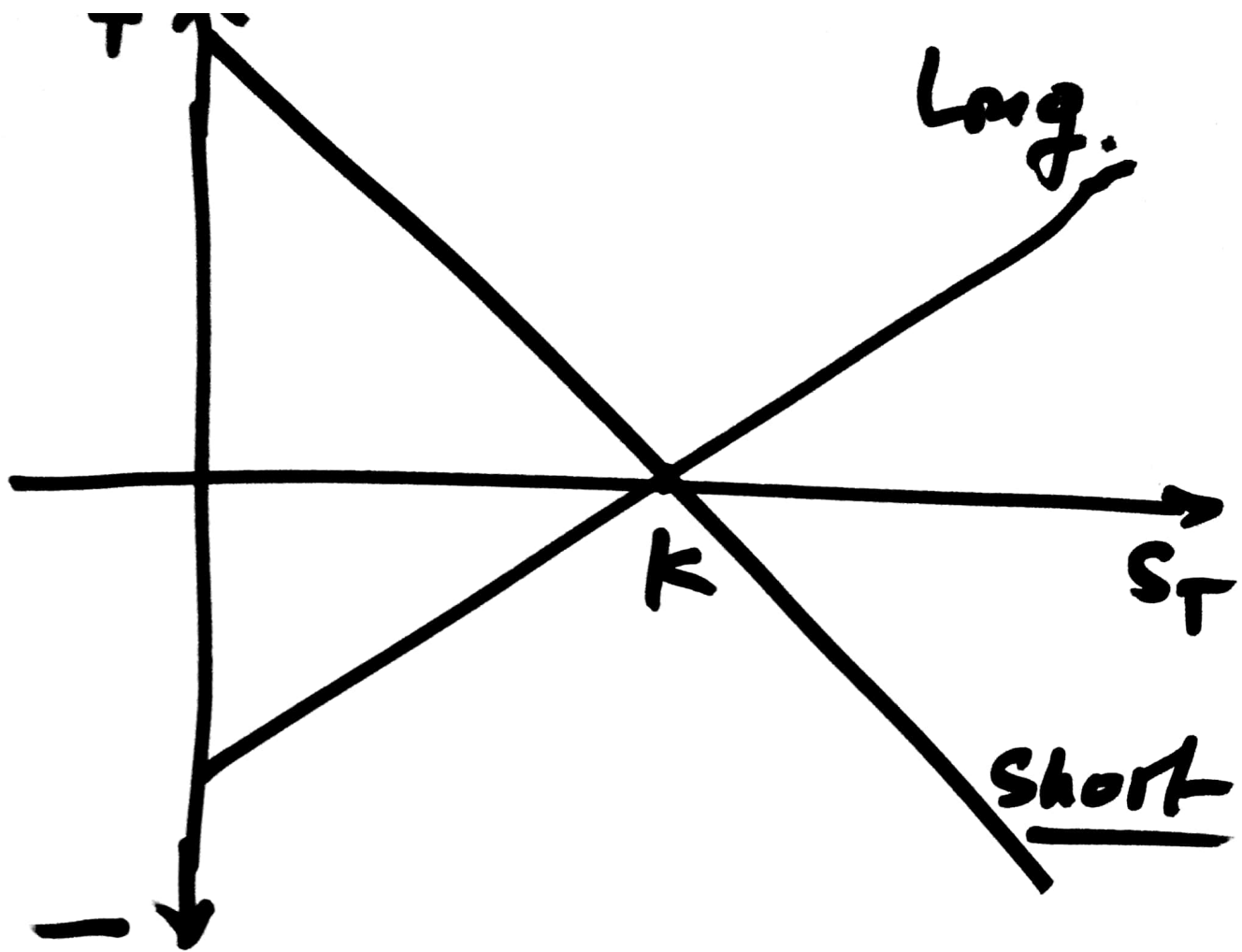
Long forward

Short<sup>+</sup> Forward

---

These 2 Trading positions  
are symmetric. Zero-game

- 3 -



This graph (Loss-Profit payoff) shows the Symmetrical aspect of These 2 Strategies.

We give the same Arguments  
 For - Long on CALL  
 - Short on CALL

- 4 -

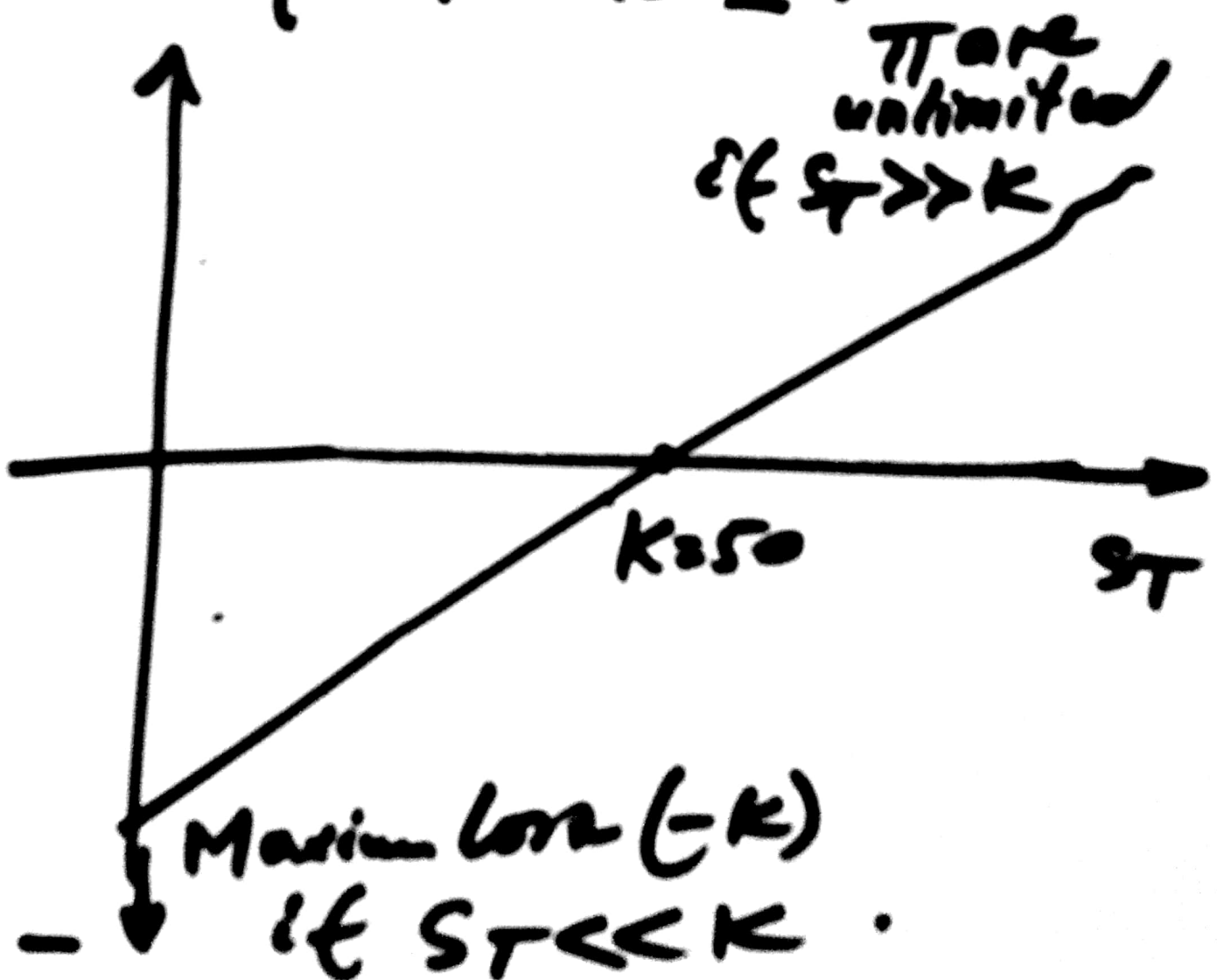
# Exercises and Problems:

a. Strategy 1.

Long - on Forward.

$K = 50$ .

Refer to Fig 1.



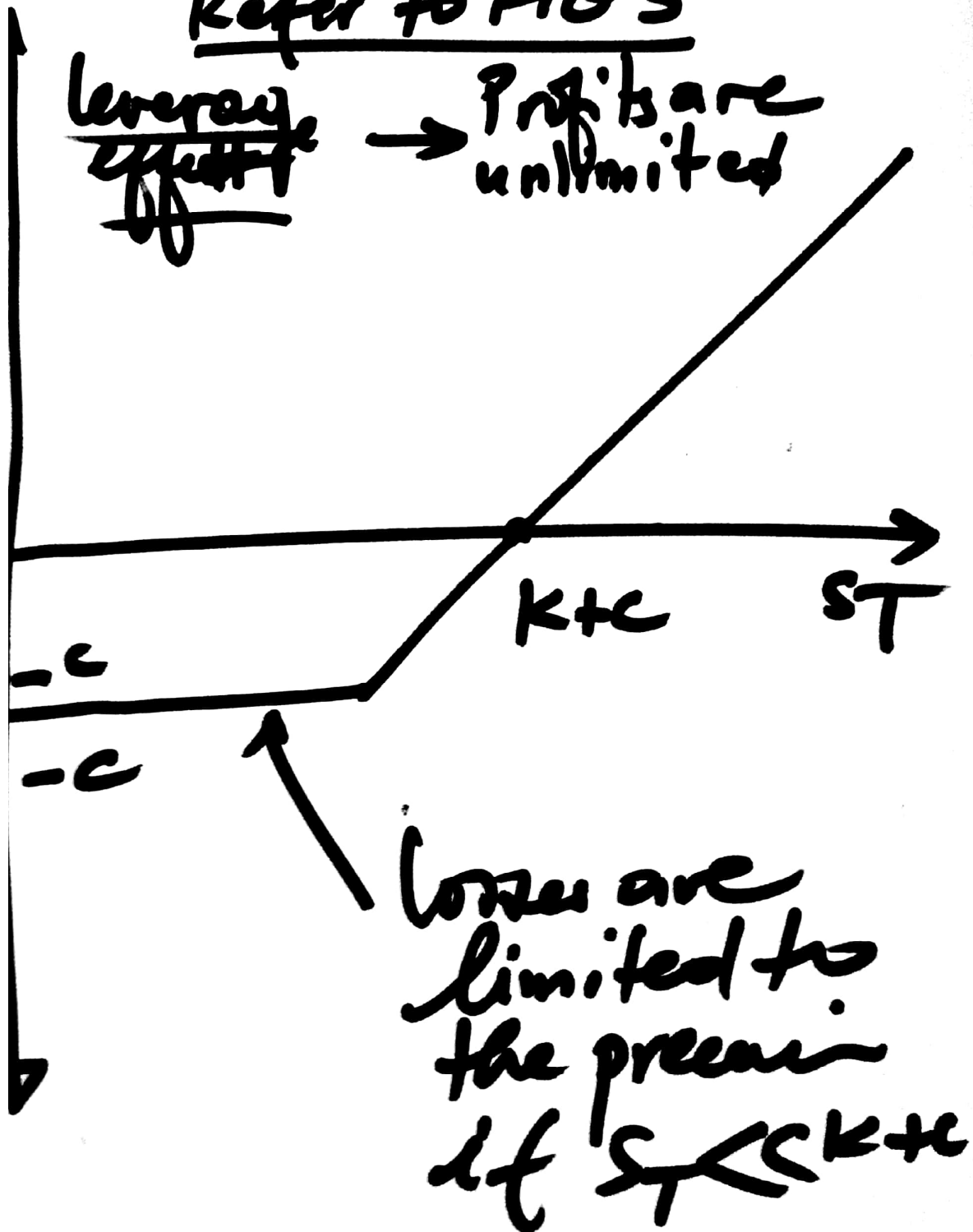
-5-



# Long Position on call

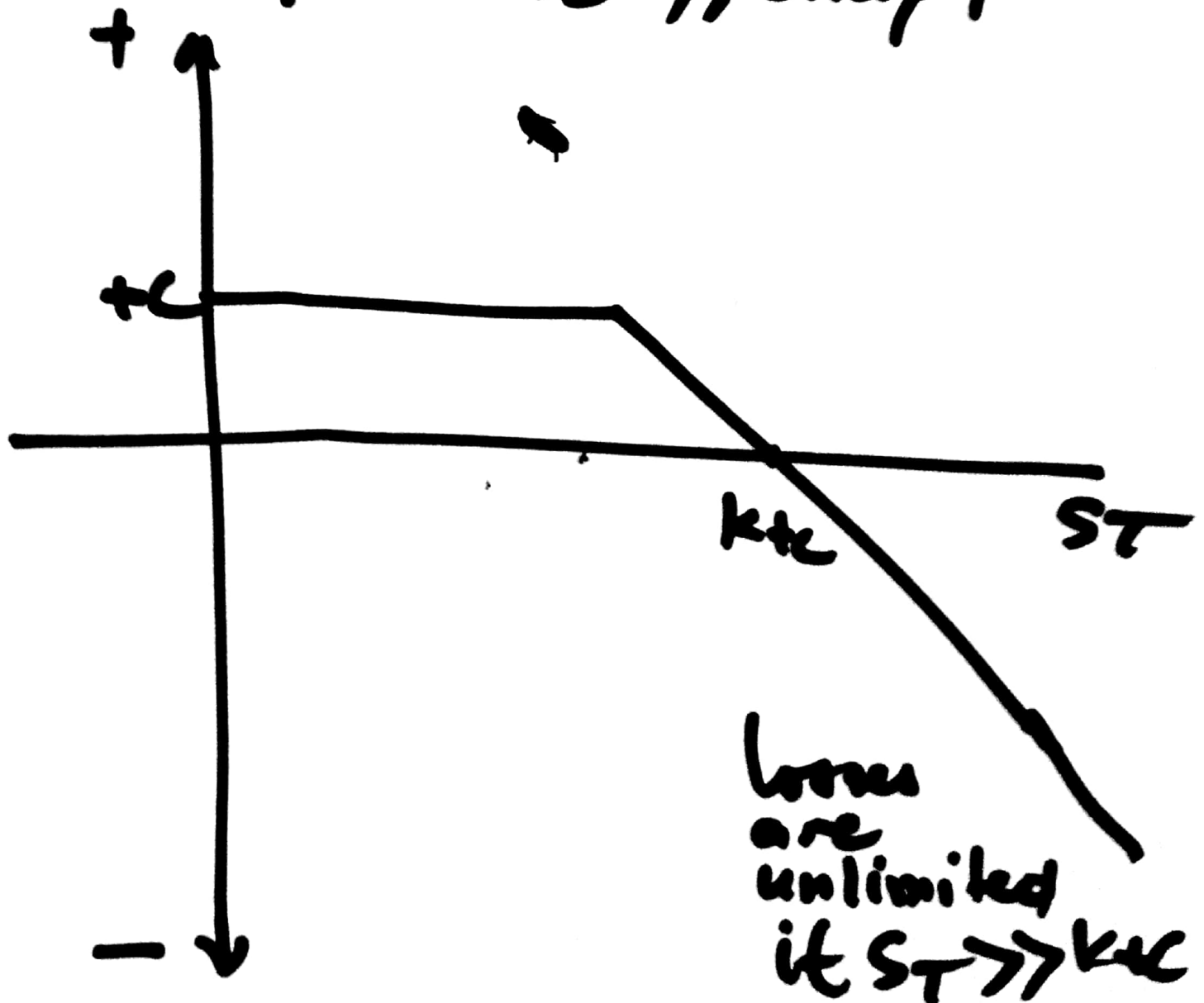
Refer to FIG 3

Leverage effect → Profits are unlimited



## C. Short position on the call

Expectation: Price decrease  
Refer to FIG 4, chap 1



$\pi = 0$ , if  $S_T \leq k+c$

$\pi_{\max} = +c$  (premiums)