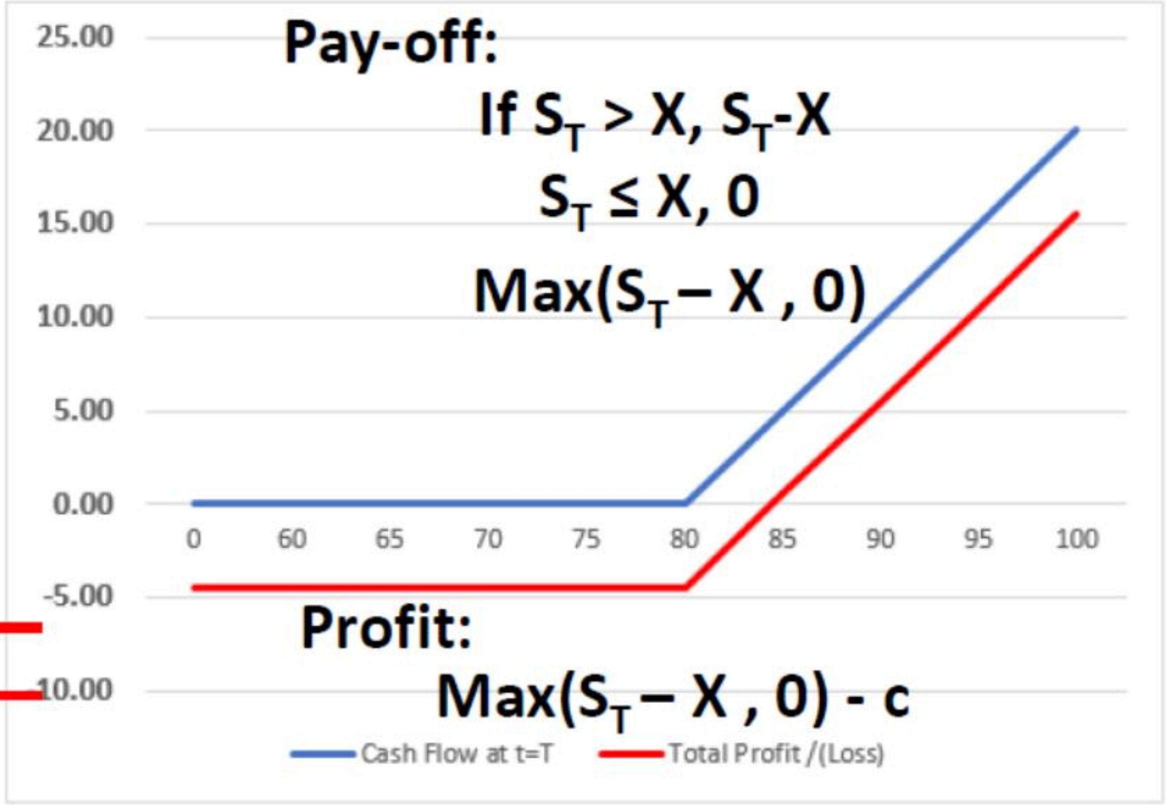
Options Strategies and Swaps

Agenda

- **Overview of Derivative Markets**
- **Call Option**
- **Put Option**
- **Properties of Options**
- **Revision**
- **Factors affecting option Pricing**
- **Put-Call Parity**
- **Binomial Option Pricing Model**
- **Option Strategies**
- **Swaps**
- **Forward Rate Agreement**
- **CDS**

Pay-off & Profit (Loss) for Call Option Holder

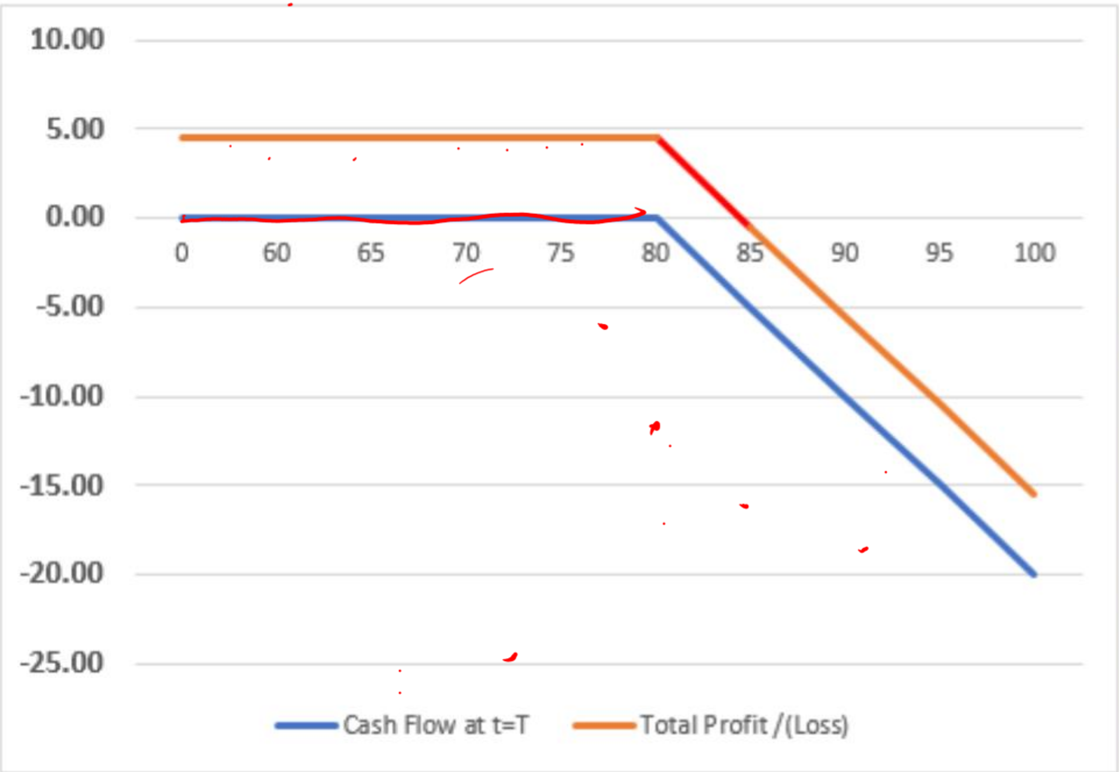
1	Call Price on January 1				4.50
2	Exercise Price (X)				80.00
4	Stock Price on April 15	Cash Flow at t=0	Will Call Buyer exercise Call Option?	Cash Flow at t=T	Total Profit /(Loss)
5	0	-4.50	No	0.00	-4.50
6	60	-4.50	No	0.00	-4.50
7 OTM	65	-4.50	No	0.00	-4.50
8	70	-4.50	No	0.00	-4.50
9	75	-4.50	No	0.00	-4.50
10 ATM	80	-4.50	Indifferent	0.00	-4.50
11	85	-4.50	Yes	5.00	0.50
12 ITM	90	-4.50	Yes	10.00	5.50
13	95	-4.50	Yes	15.00	10.50
14	100	-4.50	Yes	20.00	15.50



Pay-off & Profit (Loss) for Call Option Seller

Call Price on January 1				4.50
Exercise Price (X)				80.00

Stock Price on April 15	Cash Flow at t=0	Will Call Buyer exercise Call Option?	Cash Flow at t=T	Total Profit /(Loss)
0	4.50	No	0.00	4.50
60	4.50	No	0.00	4.50
65	4.50	No	0.00	4.50
70	4.50	No	0.00	4.50
75	4.50	No	0.00	4.50
80	4.50	Indifferent	0.00	4.50
85	4.50	Yes	-5.00	-0.50
90	4.50	Yes	-10.00	-5.50
95	4.50	Yes	-15.00	-10.50
100	4.50	Yes	-20.00	-15.50



Profit/(Loss) for Put Option Holder

- Algorooms.com, opstra, Zerodha Black Scholes

Put Price on January 1		5.20
Put Exercise Price(X)		75.00

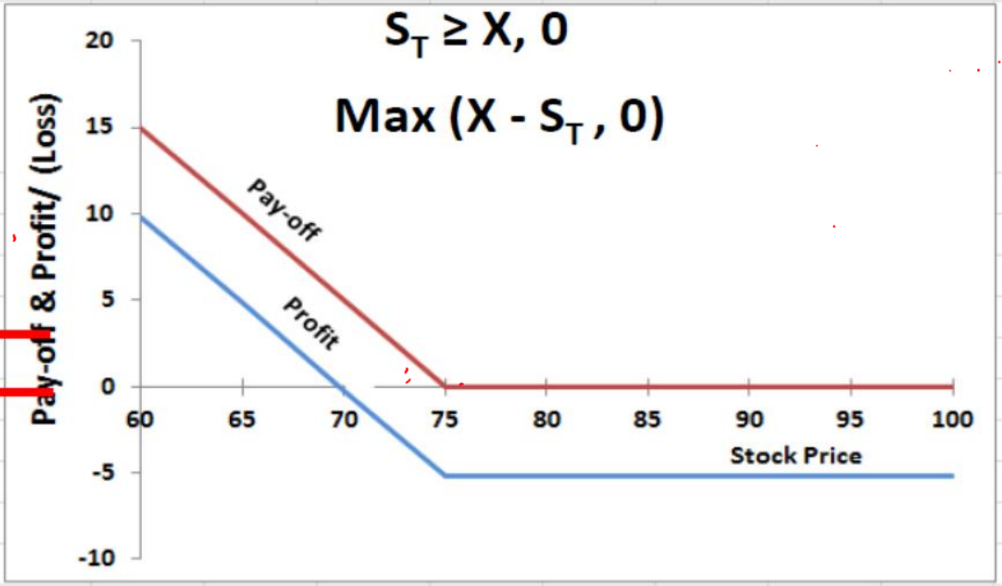
	Stock Price on April 15	Cash Flow at t=0	Will Put Buyer exercise the Put?	Cash Flow at t=T	Total Profit/ (Loss)
	0	-5.20	Yes	75.00	69.80
ITM	60	-5.20	Yes	15.00	9.80
	65	-5.20	Yes	10.00	4.80
	70	-5.20	Yes	5.00	-0.20
ATM	75	-5.20	Indifferent	0.00	-5.20
	80	-5.20	No	0.00	-5.20
	85	-5.20	No	0.00	-5.20
	90	-5.20	No	0.00	-5.20
OTM	95	-5.20	No	0.00	-5.20
	100	-5.20	No	0.00	-5.20

Pay-off:

If $S_T < X$, $X - S_T$

$S_T \geq X$, 0

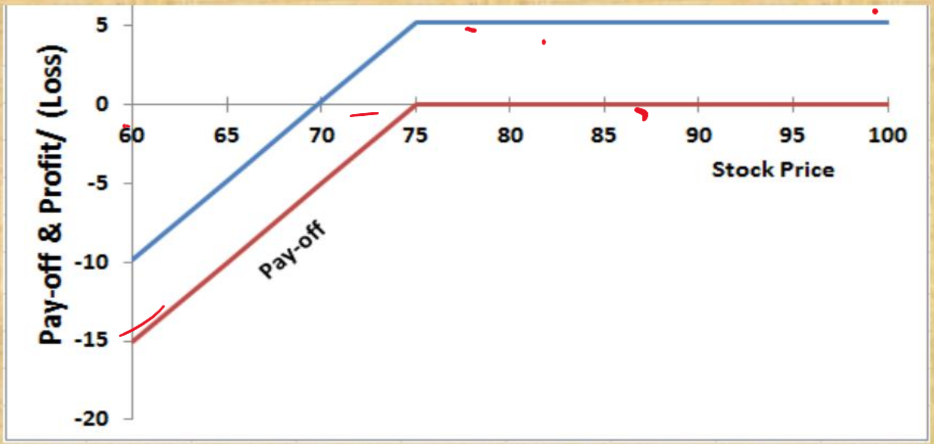
Max $(X - S_T, 0)$



- When you **Buy a Put Option**, you Buy the right to sell the stock in the future for a pre-determined price, for which you pay the Put premium today.

Profit/(Loss) for Put Option Writer

Stock Price on April 15	Cash Flow at t=0	Will Put Buyer exercise the Put?	Cash Flow at t=T	Total Profit/ (Loss)
0	5.20	Yes	-75.00	-69.80
60	5.20	Yes	-15.00	-9.80
65	5.20	Yes	-10.00	-4.80
70	5.20	Yes	-5.00	0.20
75	5.20	Indifferent	0.00	5.20
80	5.20	No	0.00	5.20
85	5.20	No	0.00	5.20
90	5.20	No	0.00	5.20
95	5.20	No	0.00	5.20
100	5.20	No	0.00	5.20



Derivatives in India

Bharat Forge rallied although huge writing was seen on the put fresh new sell positions were created on the put side whereas call writers reduced their position depicting the conviction of the bulls. So, for a short-term, Bharat Forge can be bought with a target of 1220.

Adjustments for Corporate Actions (Stock Options)

- Corporate actions like dividends, bonus shares or stock splits change the value of underlying stock and hence options of these stock would also change in value.

• Adjustment for Dividends: Exchange traded options do not provide for adjustment for dividends.

• For dividends upto10% of the market value of underlying stock, no adjustment is made to no. of share or exercise price is made.

• For extra-ordinary dividends (above 10%), amount of dividend is reduced from the all the exercise prices on the stock (w.e.f. ex-dividend date).

Adjustments for Corporate Actions (Bonus Shares)

- Adjustment for Bonus Shares (Stock Dividend) : Bonus shares do not change the aggregate value of shares but affects the stock price.
- For an ‘a:b’ bonus issue. No. of shares increase to (1+ a/b)of its previous value and Exercise price goes down by 1/ (1+ a/b)of its previous value.
- No. of Shares in 1 Options Contract 500 (1+Bonus ratio)
- 500*(1+2/5) =700
- Exercise Price 140 = 1/(1+Bonus ratio)
- 140* 1/(1+2/5) = 100

Closure of Options

For Buyer of an Option:

✓By Exercising the Option

✓By letting the Option to expire

- For Seller of an Option:

✓By entering an offsetting trade

•An *obligation* to sell/buy stands nullified by a *right* to buy/sell and not by creating another obligation to buy/sell.

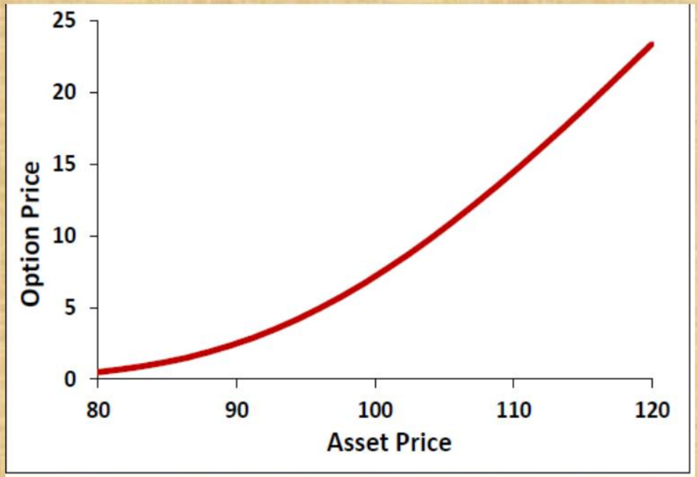
If Means To Nullify Sold Call Obligation to Sell → Buy Call
Sold Put Obligation to → Buy Put

Factors Affecting Option Prices

The following factors have a bearing on the price of a Stock Option:

1. Current Stock Price (S0)
2. Strike Price (X)
3. Time to expiration (t)
4. Volatility of the Stock Price
5. Risk-free interest rate (rf)
6. Dividends expected during the life of the option.

Stock Prices



Call Option:

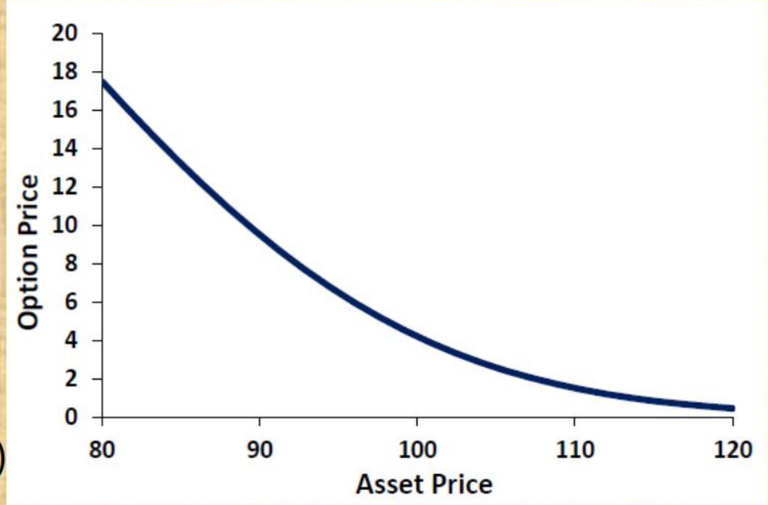
- Call option is exercised, if Stock Price(S) > Exercise Price(X).
- Hence, call option becomes more valuable, if the Stock Price (S) increases.

Exercise/Strike Price

Call Option:

- Again, call option is exercised, if Stock Price(S) > Exercise Price(X).
- So, for higher exercise prices, call option would become cheaper.

PUT Options



- Put Option:
- Put Option is exercised, if Exercise Price (X) > Stock Price (S)
- Put option becomes more valuable, if Stock Price (S) decreases.

PUT Option

Put Option:

- Put Option is exercised, if **Exercise Price (X) > Stock Price (S).**

- Put option becomes more expensive for higher Exercise prices(X).

Time to Expiration

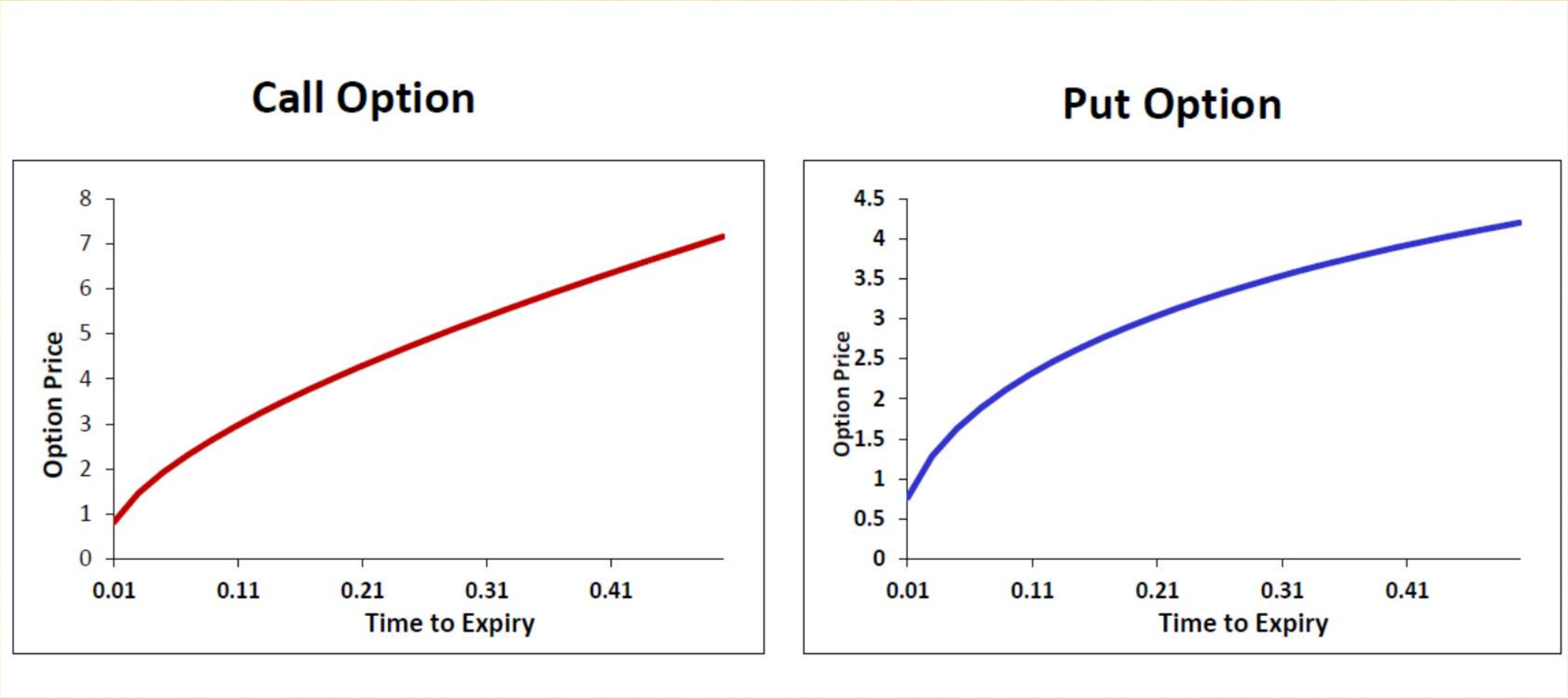
Consider two American Call/Put options which differ only in their time to expiration.

- Owner of the longer-life option not only has all the exercise opportunities as the shorter-life options, but also more.
- Hence, longer life American Options would be worth more than the shorter-life Options.

- Usually, European Call & put options also become more valuable as time to expiration increases.

- However, events in the intervening period, may reduce the value of a long-life option, thereby making it less valuable than a short-life option.

Time to Expiration



Volatility

Volatility means uncertainty about the prices of the underlying asset.

- Call option holder benefits from price increases but has a limited downside in case the stock price falls.
- Put option holder benefits from decreases in stock prices but have limited downside in case the prices increase.
- Hence, price of both, call & put options increases with increase in Volatility of the underlying asset.

Risk-free Interest Rate

- Impact on Call Options:

–By paying the Call premium now, a trader saves ‘X’ till maturity. So higher the interest rate, higher will be his savings.

–Hence, as rf increases, Call will become more attractive.

- Impact on Put Options:

–When a trader sells the underlying asset (on exercise of put option) he receives ‘X’ in the future.

–So, the present value of ‘X’ would reduce, as interest rates increase.

–Hence, as rfincreases, Put will become less attractive.

Dividends

Dividends decrease the stock prices on ex-dividend date.

- Hence, call price decreases with dividends, and put price increases with dividends.

Summary

Impact of each factor on Option Price *(keeping all other factors fixed)*

Factors	Call Option	Put Option
Stock Price ↑	↑	↓
Strike Price ↑	↓	↑
Time to Expiration ↑ *(American Options)*	↑	↑
Volatility ↑	↑	↑
Risk-free Interest Rate ↑	↑	↓
Dividends ↑	↓	↑

Put –Call Parity

Prices of European Put and Call options on the same underlying with identical exercise price and expiration dates have a special relationship.

- Consider the following portfolios:

✓Portfolio A: One European Call Option and cash of Xe^{-rT}

$(CE + Xe^{-rT})$

✓Portfolio B: One European Put Option and One Share

(PE+ S0)

What is the worth of each portfolio on expiration?

Put –Call Parity

Consider the stock of Reliable Industries which is currently trading at Rs.750/-,while the 3-month European call option on it is trading at Rs.67.50 for exercise price of Rs.745/-.If the risk-free interest rate is 6% pa , what should be the price of a put option on the same stock with the same exercise price and expiration date?

S0 =Rs. 750/- CE = Rs. 67.50 ; X = Rs. 745/-; rf= 6% pa;
PE = ?
CE + Xe-rT= PE +S0

67.50 + 745e-(0.06)3/12 = PE +750

PE= 67.50 + 733.91 –750.00 = Rs. 51.41

Uses of Put –Call Parity

To check for arbitrage opportunities resulting from relative mispricing of Call and Put options.

- If CE + Xe^{-rT} > PE+S0, then Portfolio ‘A’ is overvalued relative to Portfolio ‘B’. Hence, sell the securities in Portfolio ‘A’ and buy securities in Portfolio ‘B’, and make arbitrage profits.

- If CE + Xe^{-rT} < PE+S0, then Portfolio ‘B’ is overvalued relative to Portfolio ‘A’. Hence, sell the securities in Portfolio ‘B’ and buy securities in Portfolio ‘A’, and make arbitrage profits.

Uses of Put –Call Parity

Consider a dividend paying stock trading at Rs.50/-..An ATM1-month European call is available for Rs.3.50. If an ATM put option on the stock is trading at Rs.2.70, is there any arbitrage opportunity? (Assuming risk-free interest rate as 2% p.a). Assume strike price and stock price now as same.

Put –Call Parity

$S_O = X =$ Rs. 50/- ; $C_E =$ Rs. 3.50; $P_E = 2.70$; $r_f = 2\%$ pa (cc) ; $t = 1/12$ yrs

- Portfolio A: $C_E + Xe^{-rT} = 3.50 + 50e^{-(0.02)1/12} = 3.50 + 49.92 = \mathbf{53.42}$
- Portfolio B: $P_E + S_O = 2.70 + 50 = \mathbf{52.70}$
- Portfolio A > Portfolio B.

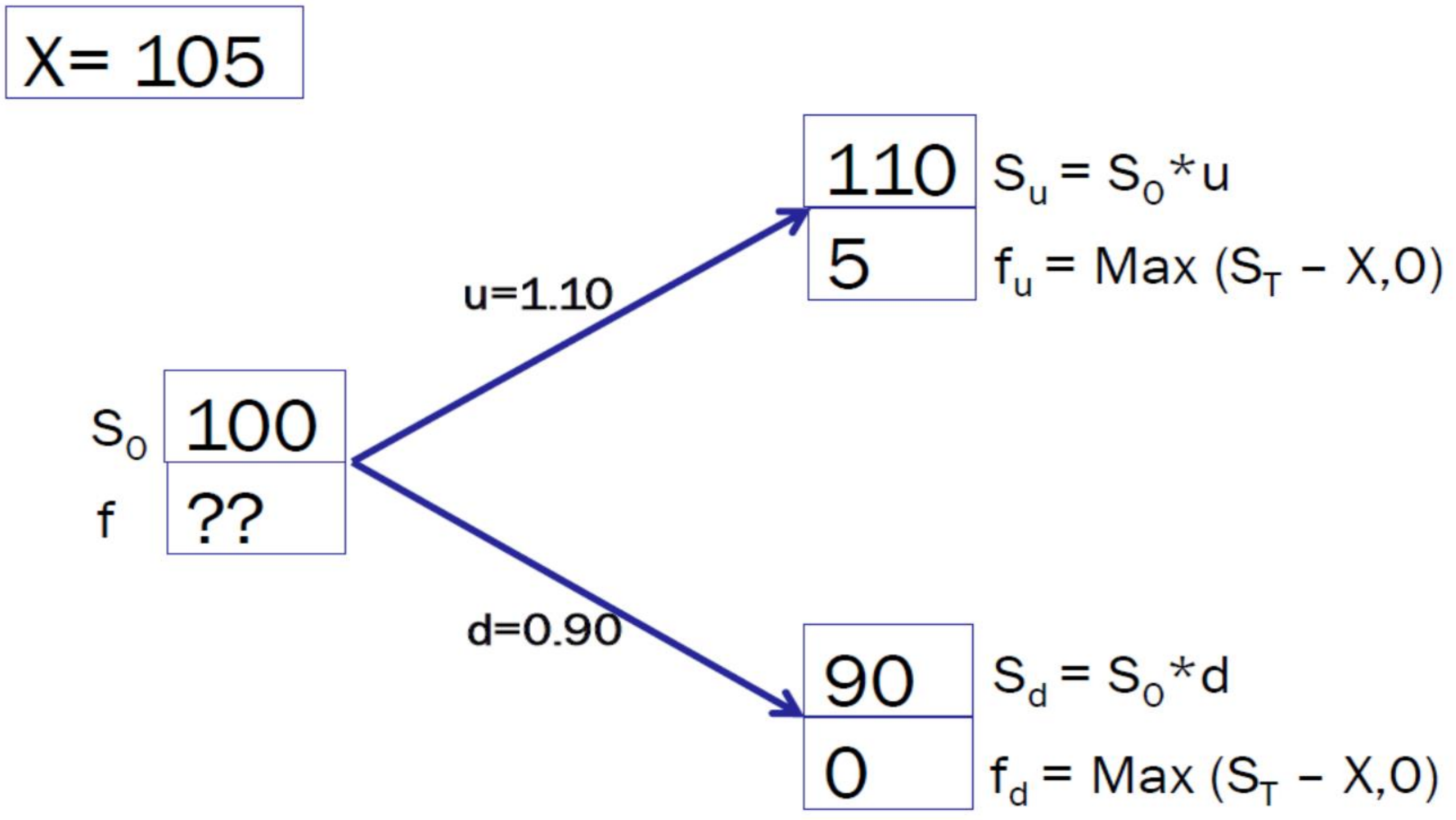
➢ **Today:** Buy Put, Buy Stock, Sell Call and sell Bond (Borrow)

Cash Flow (at t=0) : - 2.70 - 50.00 + 3.50 + 49.92 = 0.72

➢ **After 1-month:**

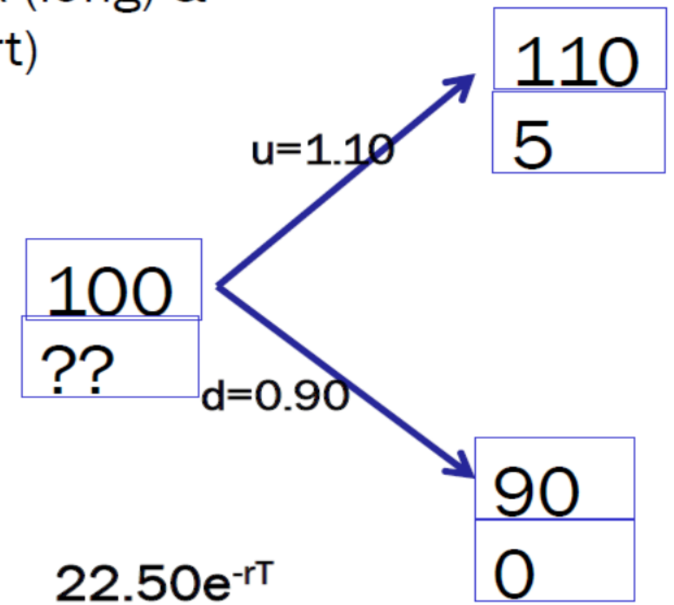
If $S_T < X$	If $S_T > X$
1. Put : ITM : Sell the stock for X =50 2. Call : OTM : No action 3. Stock: Deliver the Put option. 4. Borrowings: Repay with interest $49.92e^{(0.02)1/12} = 50$ **Net Cash Flow = 50 - 50 = Nil**	1. Put : OTM : No action 2. Call : ITM : Sell stock at X =50 3. Stock: Deliver under Call option. 4. Borrowings: Repay with interest $49.92e^{(0.02)1/12} = 50$ **Net Cash Flow = 50 - 50 = Nil**

Binomial Option Pricing Model



Binomial Option Pricing Model

Construct a risk-less portfolio
of Δ Stock (long) &
1 call(short)



$\Delta 110 - 5$

Value of Portfolio
$(0.25*110) - 5$
$= 22.50$

$\Delta 110 - 5 = \Delta 90$
$\Delta = 5/20 = 0.25$

$\Delta 90 - 0$

$(0.25*90) - 0$
$= 22.50$

Value of Portfolio today

$22.50e^{-rT}$
$= 21.62$

Value of Δ stock $=(0.25*100) = 25$ - Value of Option f

$25 - f = 21.62$ or $f = 3.38$

$r_f = 8\%$
$T = 0.5$ years

Binomial Option Pricing Model

$$S * e^{rt} = S_{u*}\mathrm{p} + S_{d*}(1 - \mathrm{p})$$

$$p = \frac{S * e^{rt} - Sd}{Su \;\; - sd}$$

Where, S= current Stock price
r = risk free rate
t= time period
su= when stock price moves up
p = probability
Sd = when stock price moves down

Binomial Option Pricing Model

To find the price of Call option, using the above formula:

$$p = \frac{e^{rT} - d}{u - d} = \frac{e^{0.08*0.5} - 0.90}{1.10 - 0.90} = 0.70405$$

$$f = e^{-rT}\{pf_u + (1-p)f_d\}$$

$$f = e^{-0.08*0.5}\{0.70405*5 + (1-0.70405)*0\}$$

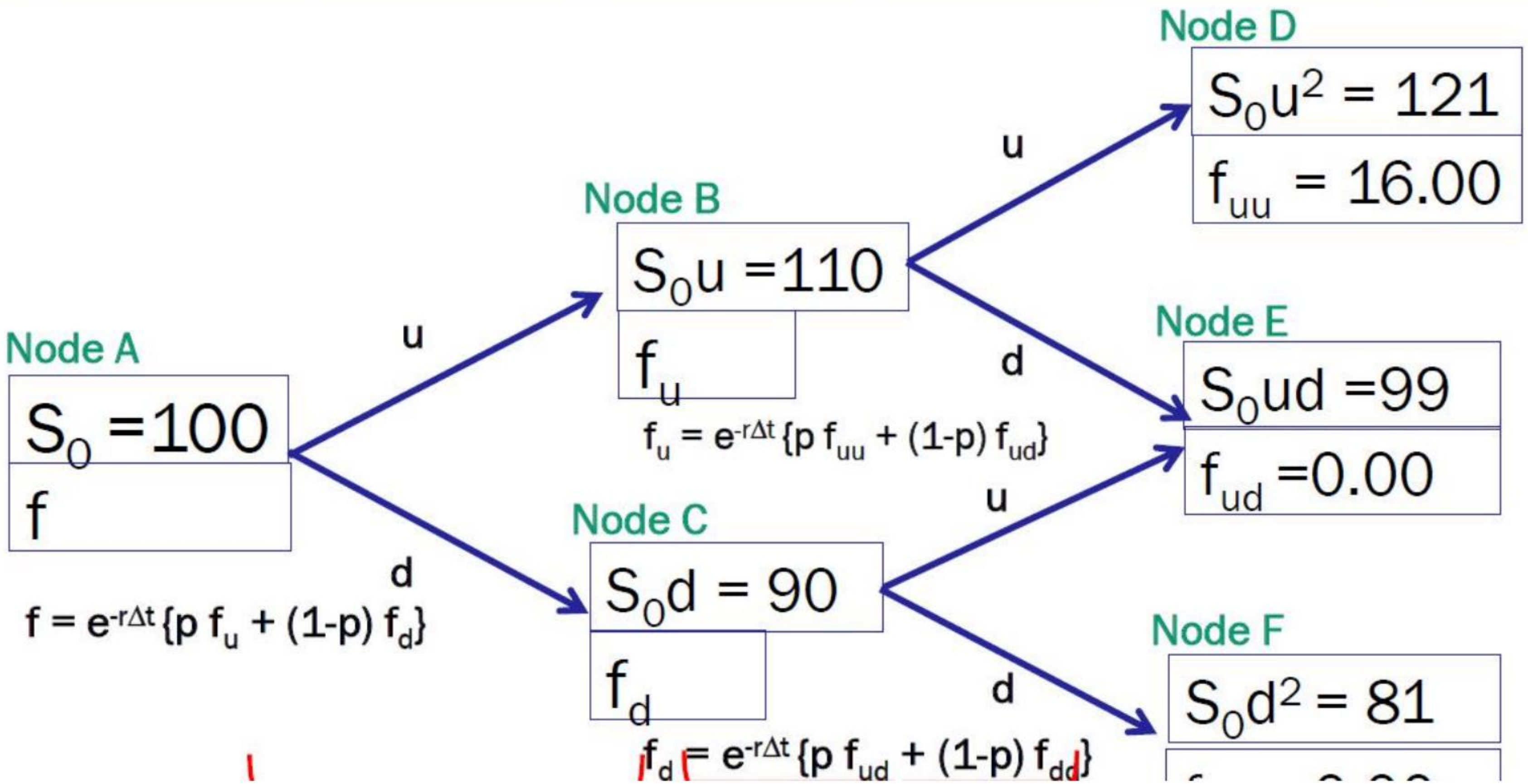
f = 3.38224 = **Rs.3.38**

Binomial Option Pricing Model

S_0= Rs280/-; X =Rs. 285/-; T =3/12 years; u =1.05 ; d = 0.95; rf=8%, Find the value of Call option, using 1 stage Binomial Pricing model.

2 Stage European Call Option

S_0 = Rs 100/- ; X =Rs. 105/- ; T = 0.5 years (Δt =0.25); u = 1.10 ; d = 0.90; r_f=8%, Find the value of Call option, using 2 stage Binomial Pricing model.



2 Stage European Call Option

$$p = \frac{e^{0.08*0.25} - 0.90}{1.10 - 0.90} = \frac{1.0202 - 0.90}{1.10 - 0.90} = 0.60101$$

Node B

$f_u = e^{-r\Delta t}\{p\, f_{uu} + (1-p)\, f_{ud}\}$

$f_u = e^{-0.08*0.25}\{0.60101*16 + (1-0.60101)*0\}$

$f_u = 9.42575 = 9.43$

Node C

$f_d = e^{-r\Delta t}\{p\, f_{ud} + (1-p)\, f_{dd}\}$

$f_d = e^{-0.08*0.25}\{0.60101*0 + (1-0.60101)*0\}$

$f_d = 0.00$

Node A

$f = e^{-r\Delta t}\{p\, f_u + (1-p)\, f_d\}$

$f = e^{-0.08*0.25}\{0.60101*9.43 + (1-0.60101)*0\}$

$f = 5.55530 = 5.55$

2 Stage European PUT Option

$$p = \frac{e^{0.08*0.25} - 0.90}{1.10 - 0.90} = \frac{1.0202 - 0.90}{1.10 - 0.90} = 0.60101$$

Node B

$f_u = e^{-r\Delta t}\{p\, f_{uu} + (1-p)\, f_{ud}\}$

$f_u = e^{-0.08*0.25}\{0.60101*0 + (1-0.60101)*6\}$

$f_u = 2.34654 = 2.35$

Node C

$f_d = e^{-r\Delta t}\{p\, f_{ud} + (1-p)\, f_{dd}\}$

$f_d = e^{-0.08*0.25}\{0.60101*6 + (1-0.60101)*24\}$

$f_d = 12.92080 = 12.92$

Node A

$f = e^{-r\Delta t}\{p\, f_u + (1-p)\, f_d\}$

$f = e^{-0.08*0.25}\{0.60101*2.35 + (1-0.60101)*12.92\}$

$f = 6.43728 = 6.44$

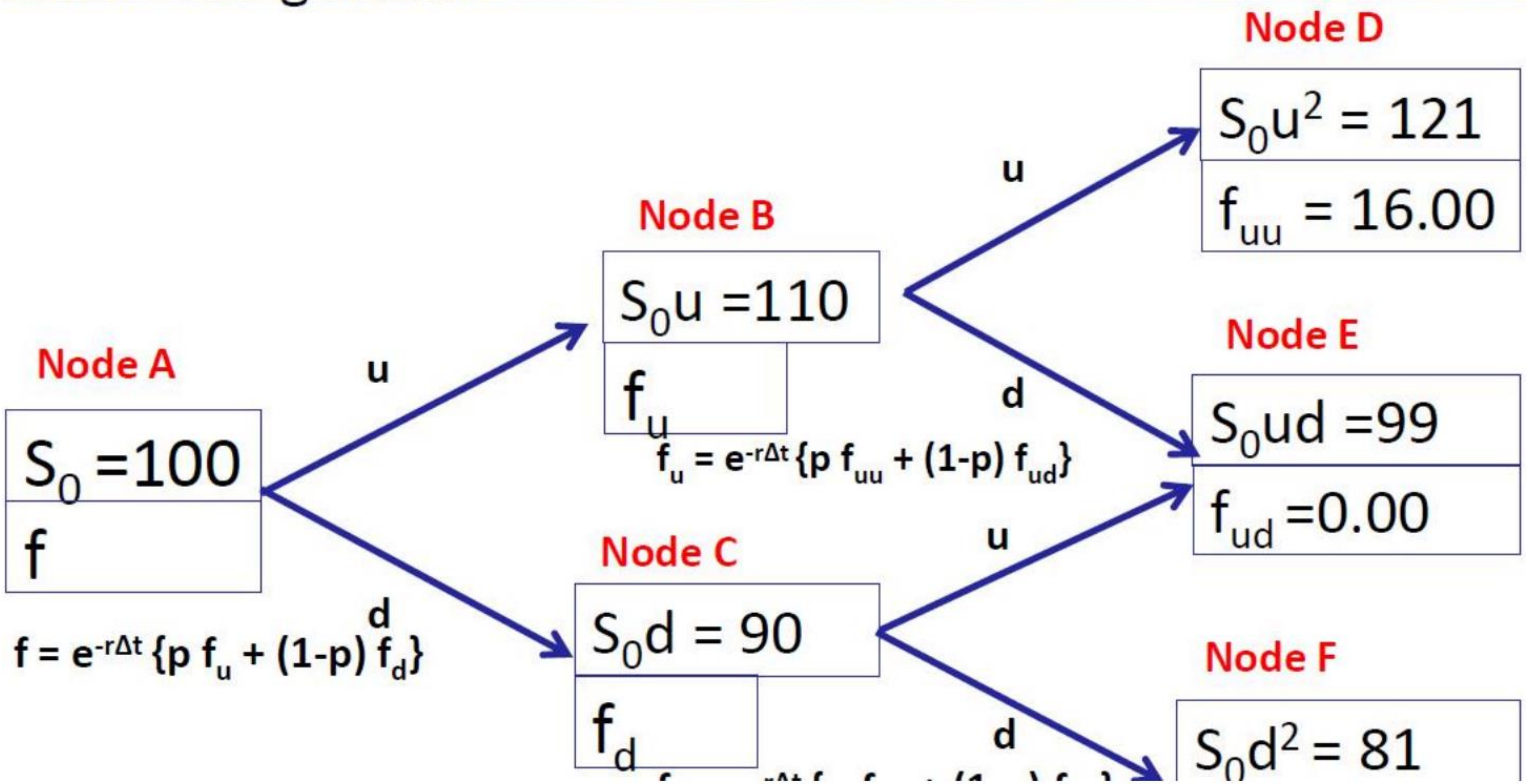
$$f = e^{-2r\Delta t}\{p^2 f_{uu} + 2p(1-p)\, f_{ud} + (1-p)^2 f_{dd}\}$$

$f = e^{-2*0.08*0.25}\{(0.60101)^2*0 + 2(0.60101)(1-0.60101)*6 + (1-0.60101)^2*24\}$

$f = 6.43555 = 6.44$

2 Stage American Call Option

S_0 = Rs 100/- ; X =Rs. 105/- ; T = 0.5 years (Δt =0.25); u = 1.10 ; d = 0.90; r_f=8%, Find the value of American Call option, using 2 stage Binomial Pricing model.



2 Stage American Call Option

Node B

$f_u = e^{-r\Delta t}\{p\, f_{uu} + (1-p)\, f_{ud}\}$ $f_u = e^{-0.08*0.25}\{0.60101*16 + (1-0.60101)*0\}$

$f_u = 9.42575 = 9.43$

$f_u = Max(S_t - X,0)$ $f_u = Max(110 - 105,0) = 5$

Node C

$f_d = e^{-r\Delta t}\{p\, f_{ud} + (1-p)\, f_{dd}\}$ $f_d = e^{-0.08*0.25}\{0.60101*0 + (1-0.60101)*0\}$

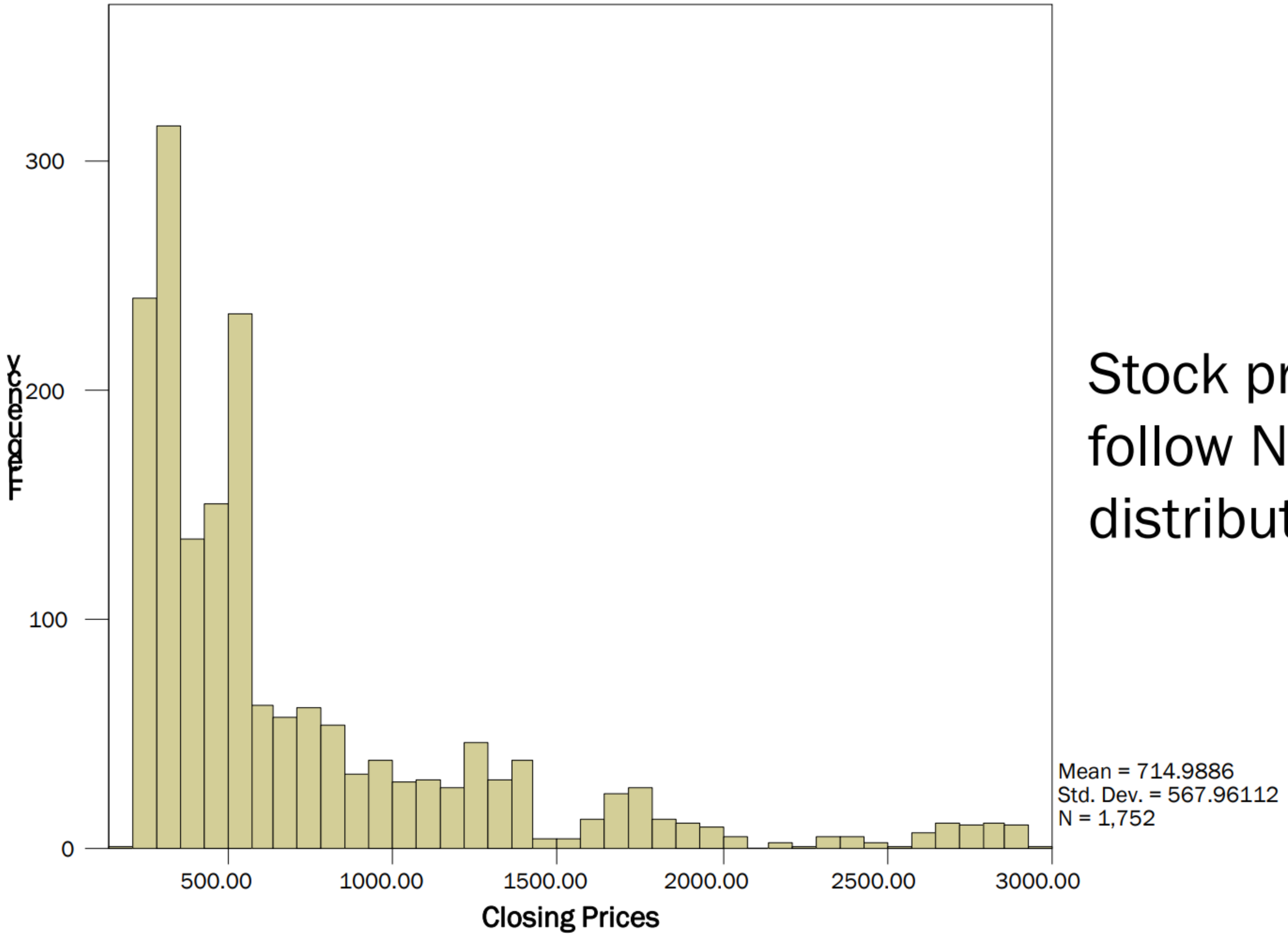
$f_d = 0.00$

$f_d = Max(S_t - X,0)$ $f_u = Max(90 – 105,0) = 0$

Node A

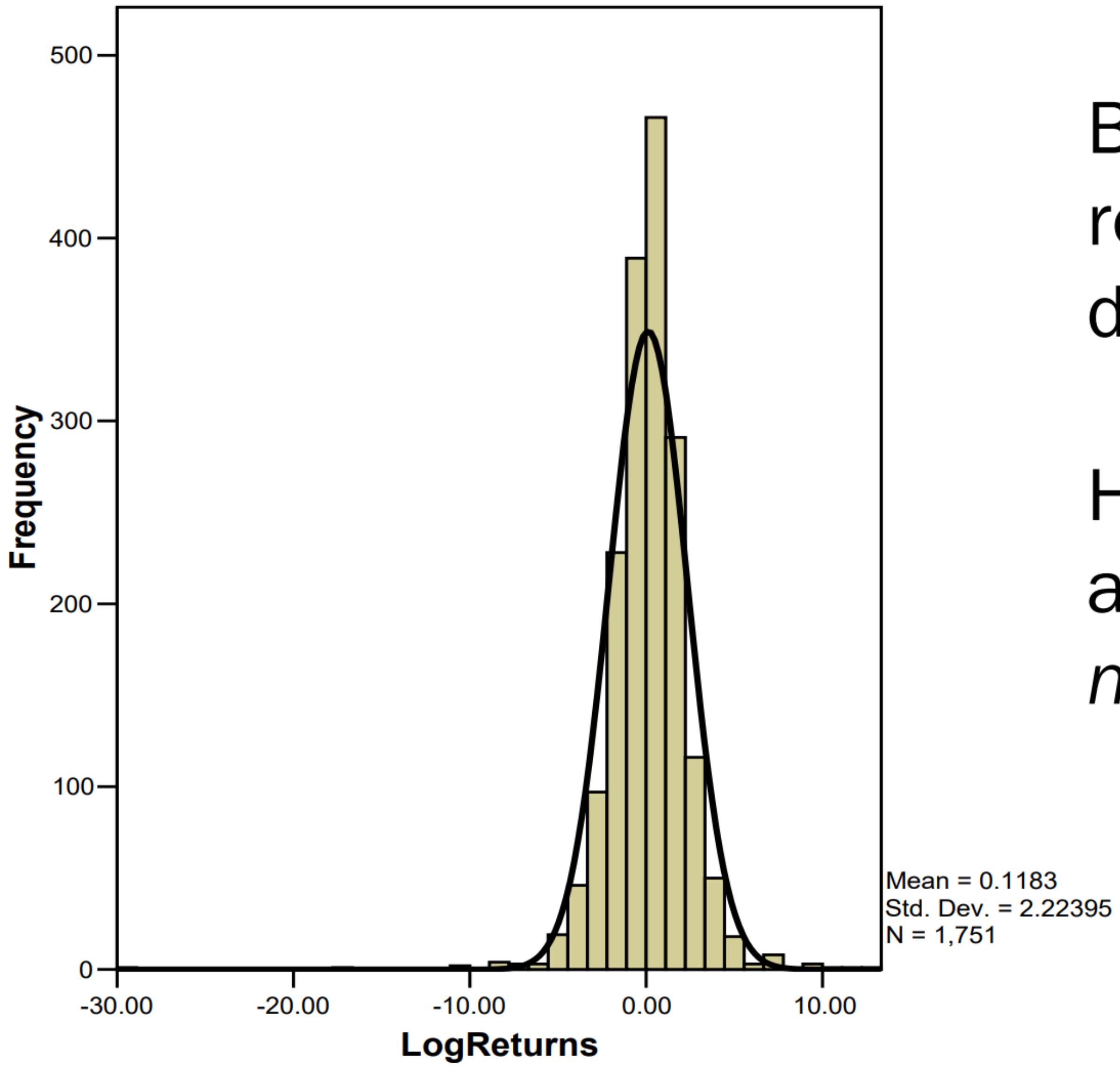
$f = e^{-r\Delta t}\{p\, f_u + (1-p)\, f_d\}$ $f = e^{-0.08*0.25}\{0.60101*9.43 + (1-0.60101)*0\}$

$f = 5.55530 = 5.55$



Stock prices do not follow Normal distribution.

Log Normal Stock Returns



But Log of Stock returns are normally distributed.

Hence, Stock returns are said to be *log normally distributed*.

The 'Noble' Formula

The Black-Scholes-Merton formula for pricing European Calls & Puts:

$$c = S_0 N(d_1) - Xe^{-r_f T} N(d_2)$$

$$p = Xe^{-r_f T} N(-d_2) - S_0 N(-d_1)$$

where,

$$d_1 = \frac{\ln\left(\frac{S_0}{X}\right) + \left(r_f + \frac{\sigma^2}{2}\right)T}{\sigma\sqrt{T}}$$

$$d_2 = d_1 - \sigma\sqrt{T}$$

c = European CALL price

p = European PUT price

S_0 = Stock Price

X = Exercise Price

r_f = Risk-Free Interest Rate (cc)

σ = annualised volatility (Std. Dev.)

T = Time to expiration

$N(d_1), N(d_2)$ = Normal Cumulative Probabilities

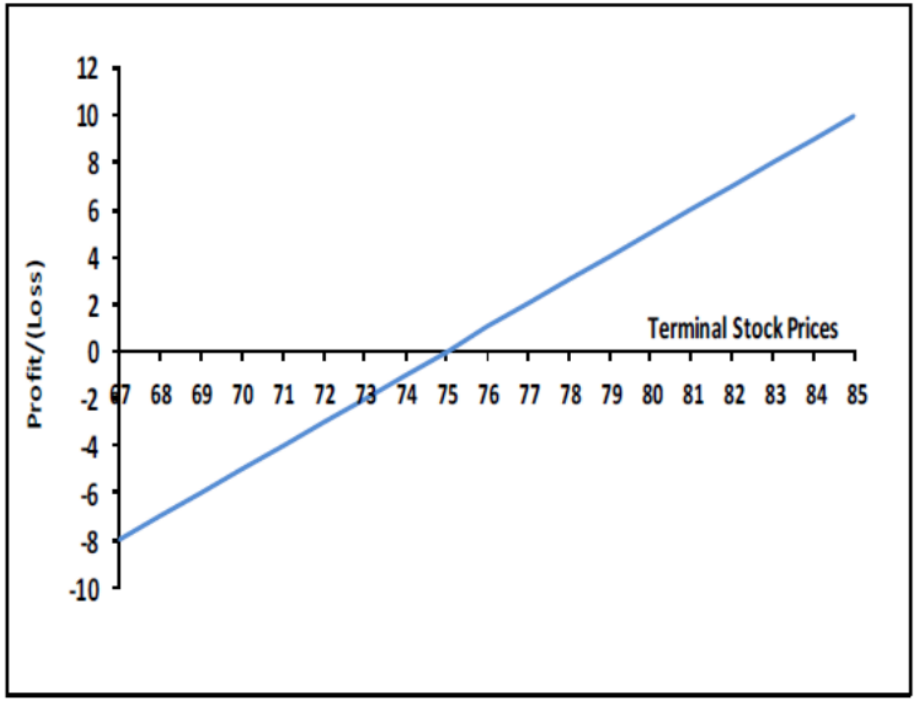
Trading Strategies using Options

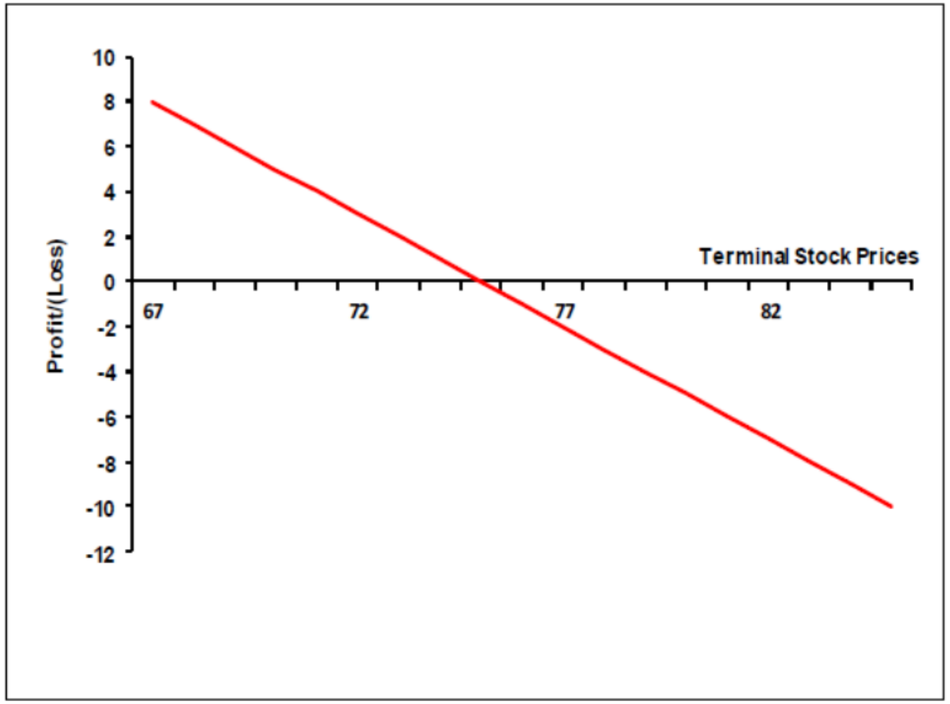
Several strategies involving Options and their underlying assets lead to unusual payoff patterns.

Various Strategies:

- Covered Call & Protective Put
- Spreads : Bullish; Bearish; Butterfly; Calendar
- Combinations : Straddles; Strangles; Strips; Straps.
- Others: Collars; Synthetic Stocks

Stock –Long & Short





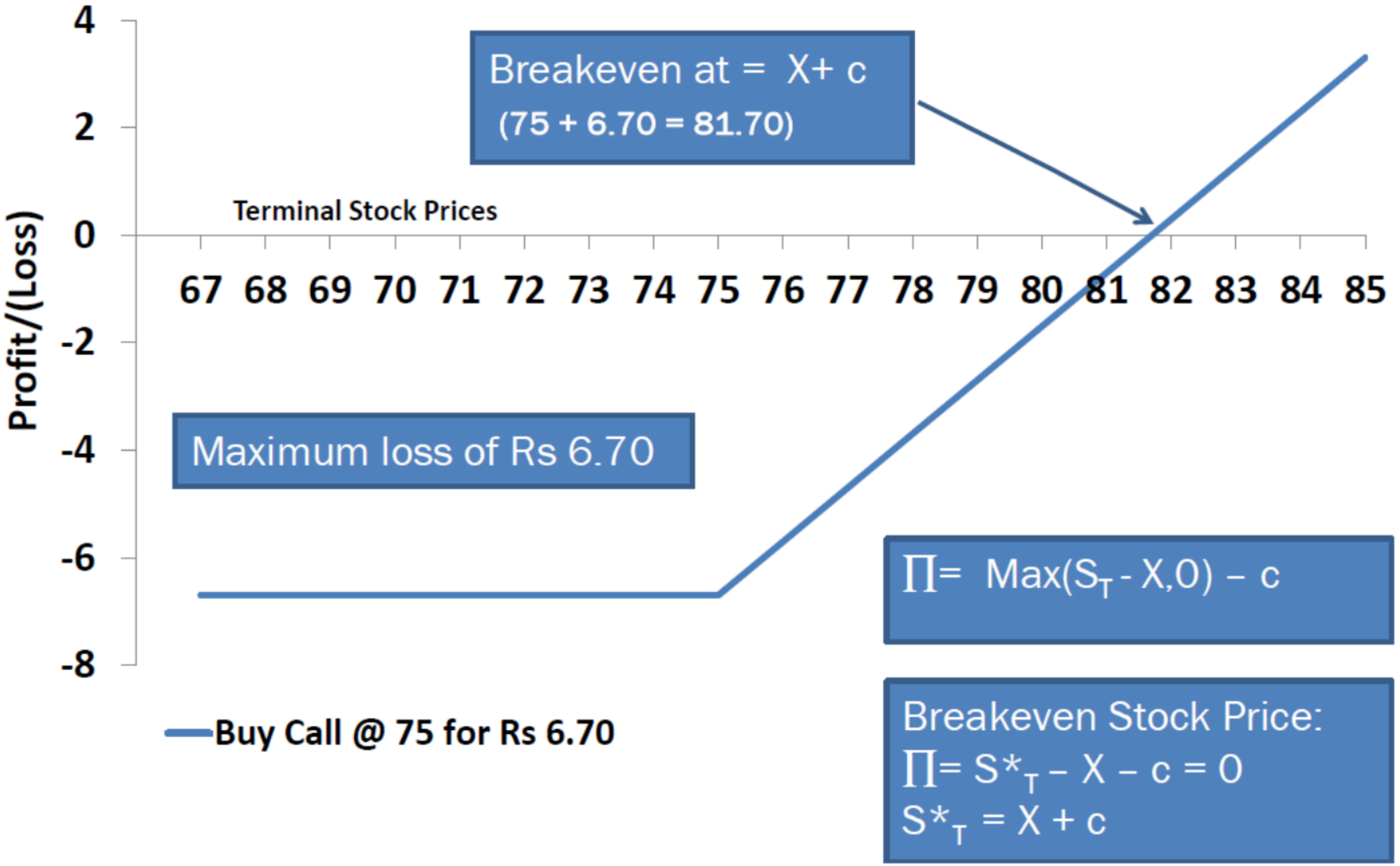
Buyer of Stock is Bullish on the stock.

$\Pi = N_S(S_T - S_0)$

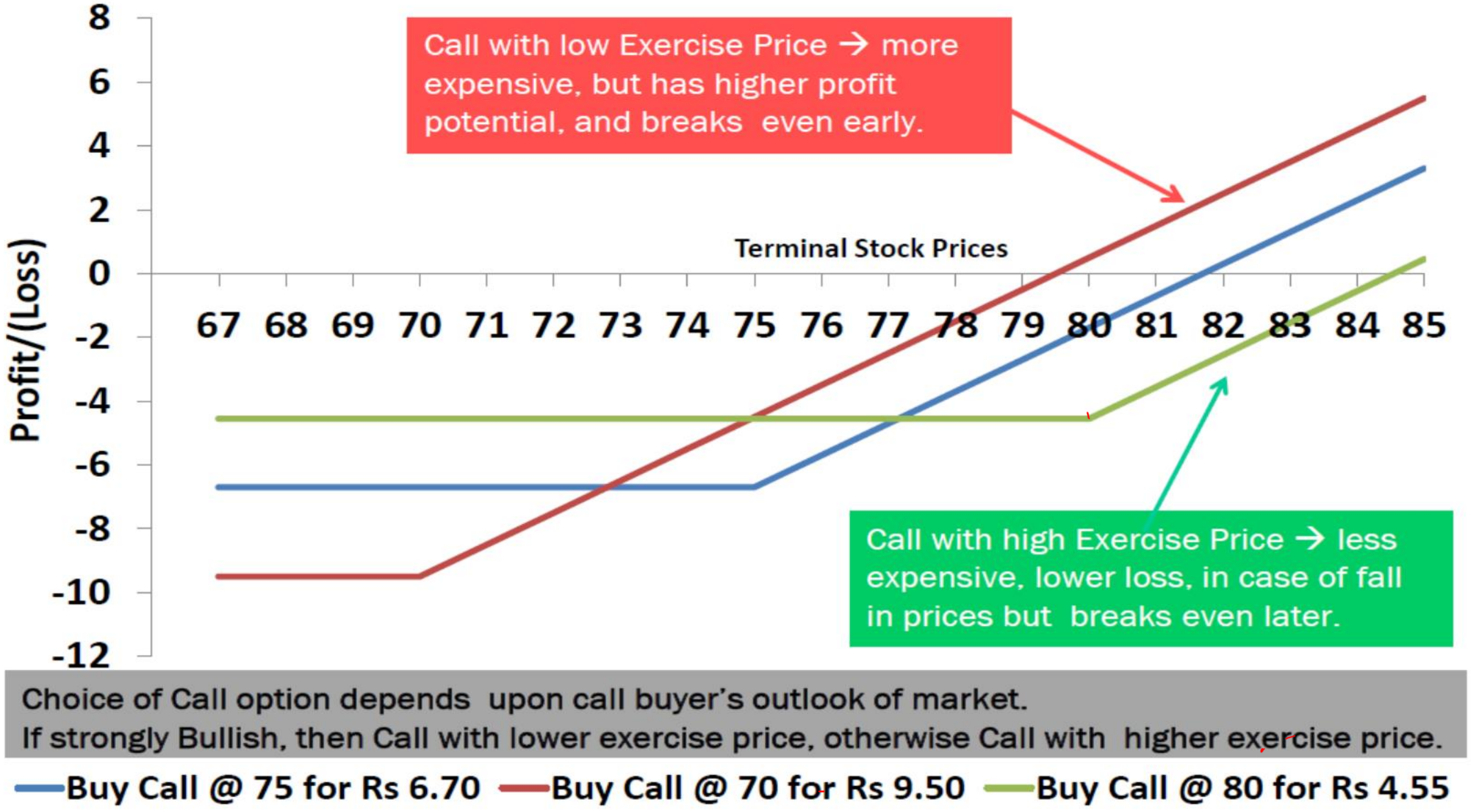
Short seller of Stock is Bearish on the stock.

$\Pi = -N_S(S_T - S_0)$

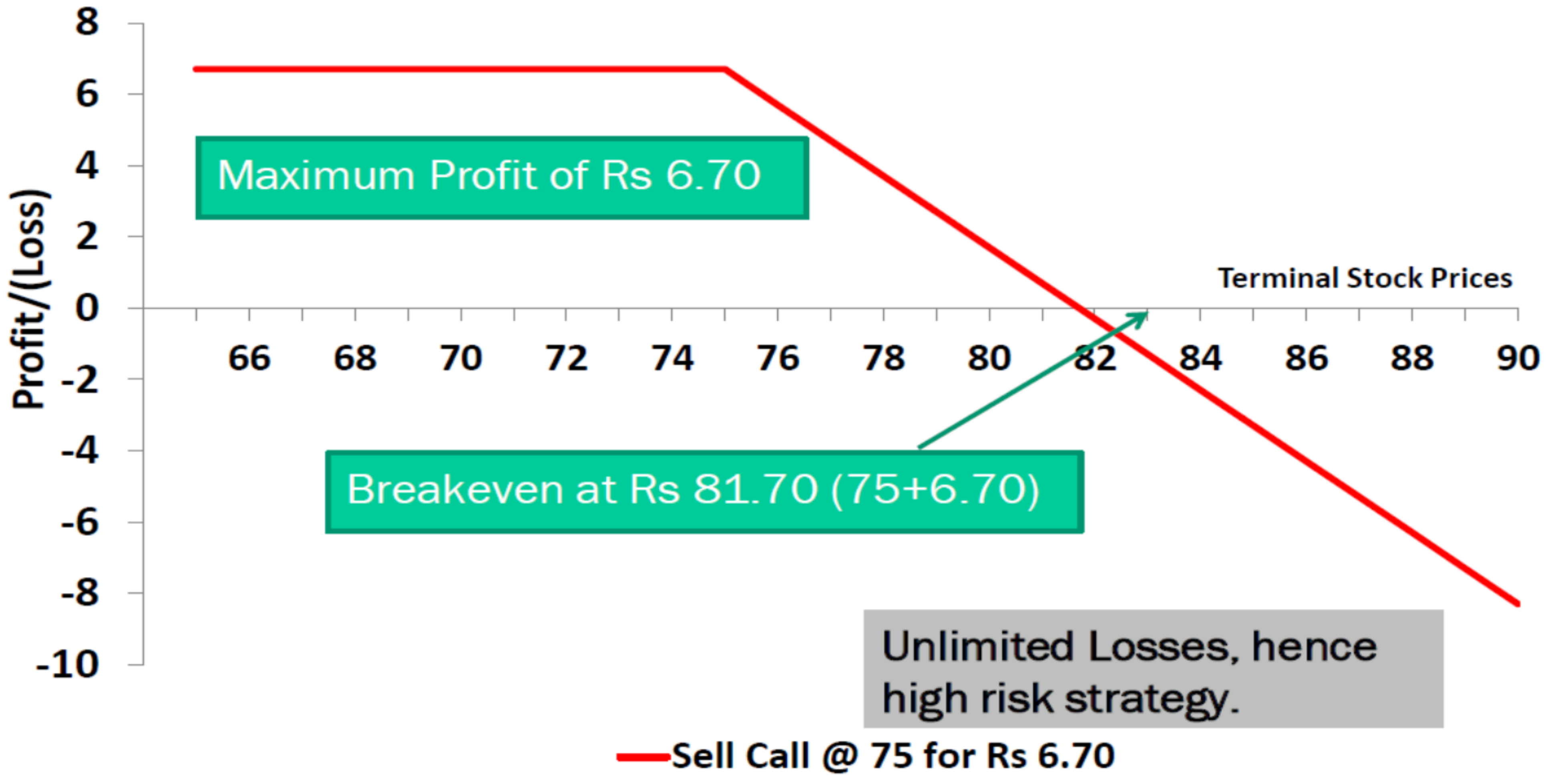
Long on Call Option (Buy Call Option)



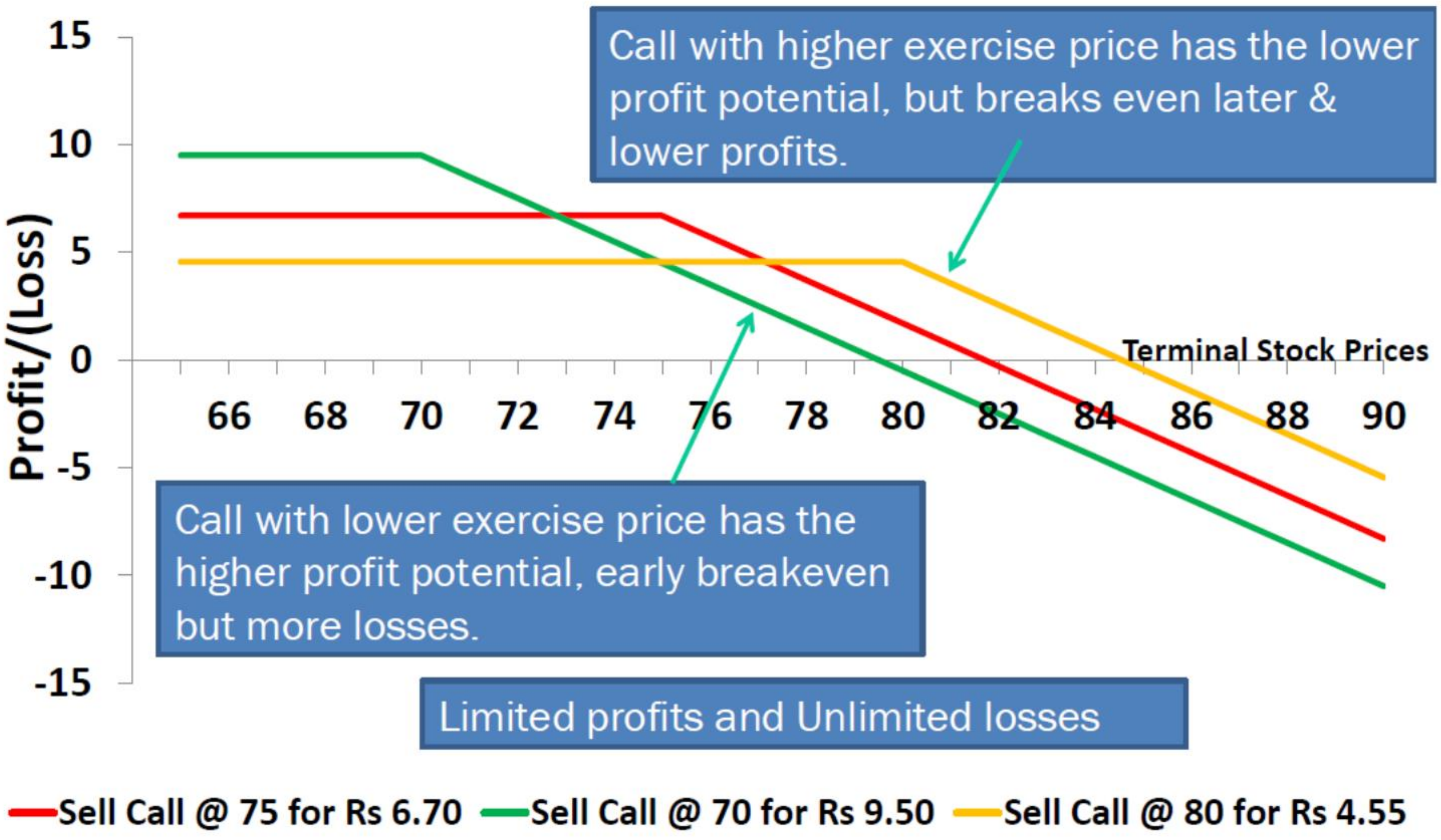
Long on Call Option (Choice of Exercise Price)



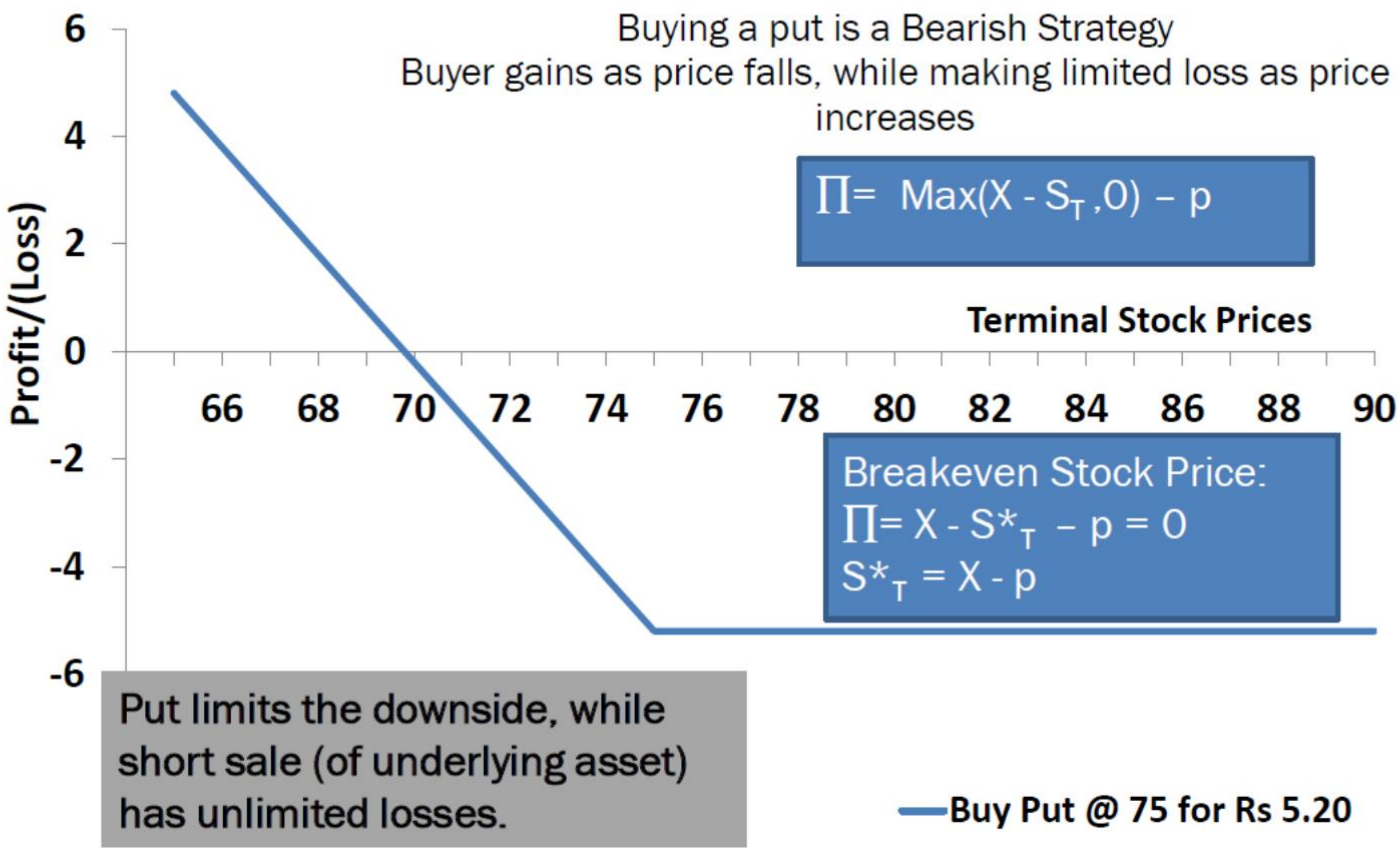
Short on Call Option (Sell Call Option)



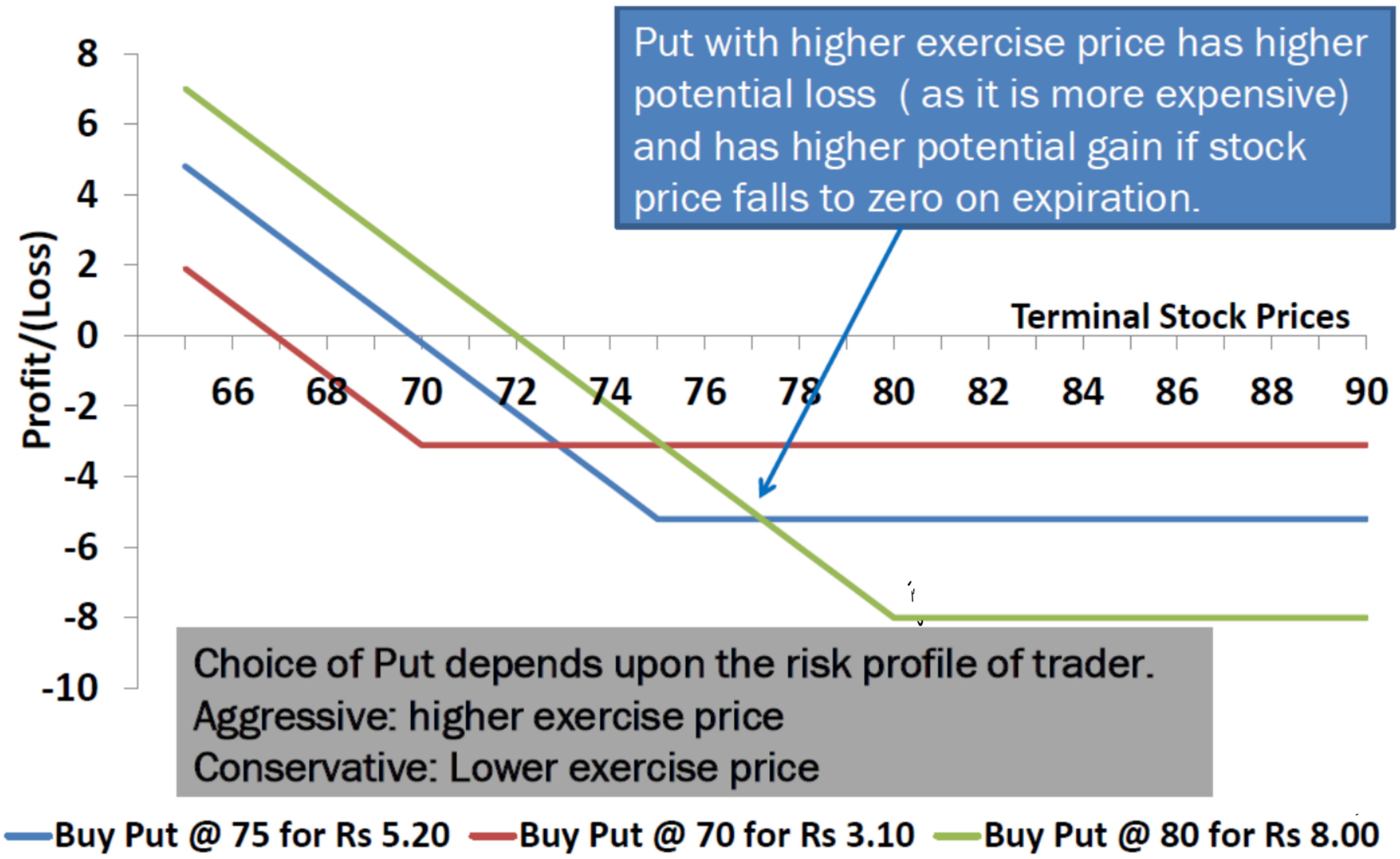
Short on Call Option (Choice of Exercise Price)



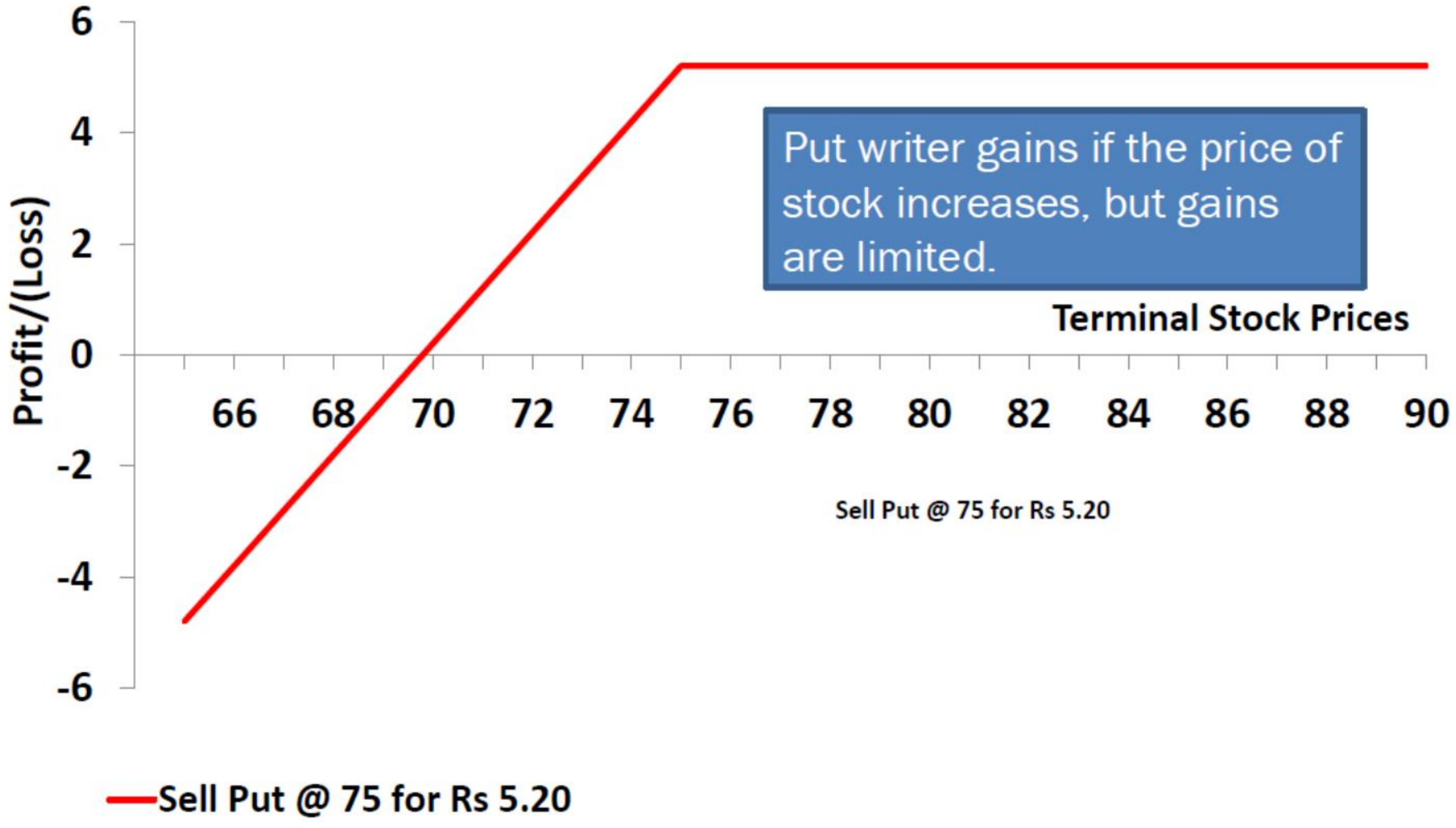
Long on Put Option (Buy Put Option)



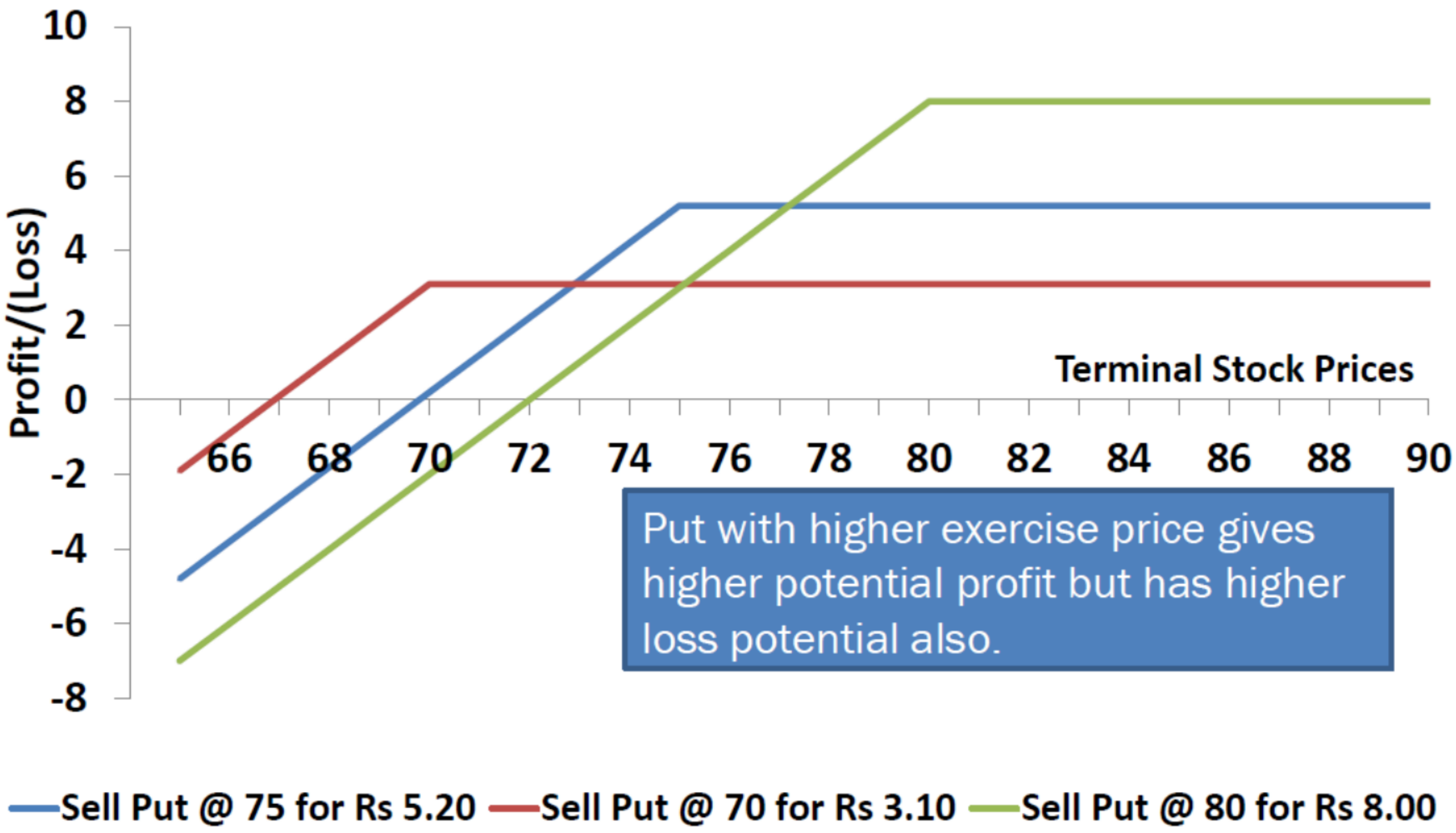
Long on Put Option (Choice of Exercise Price)



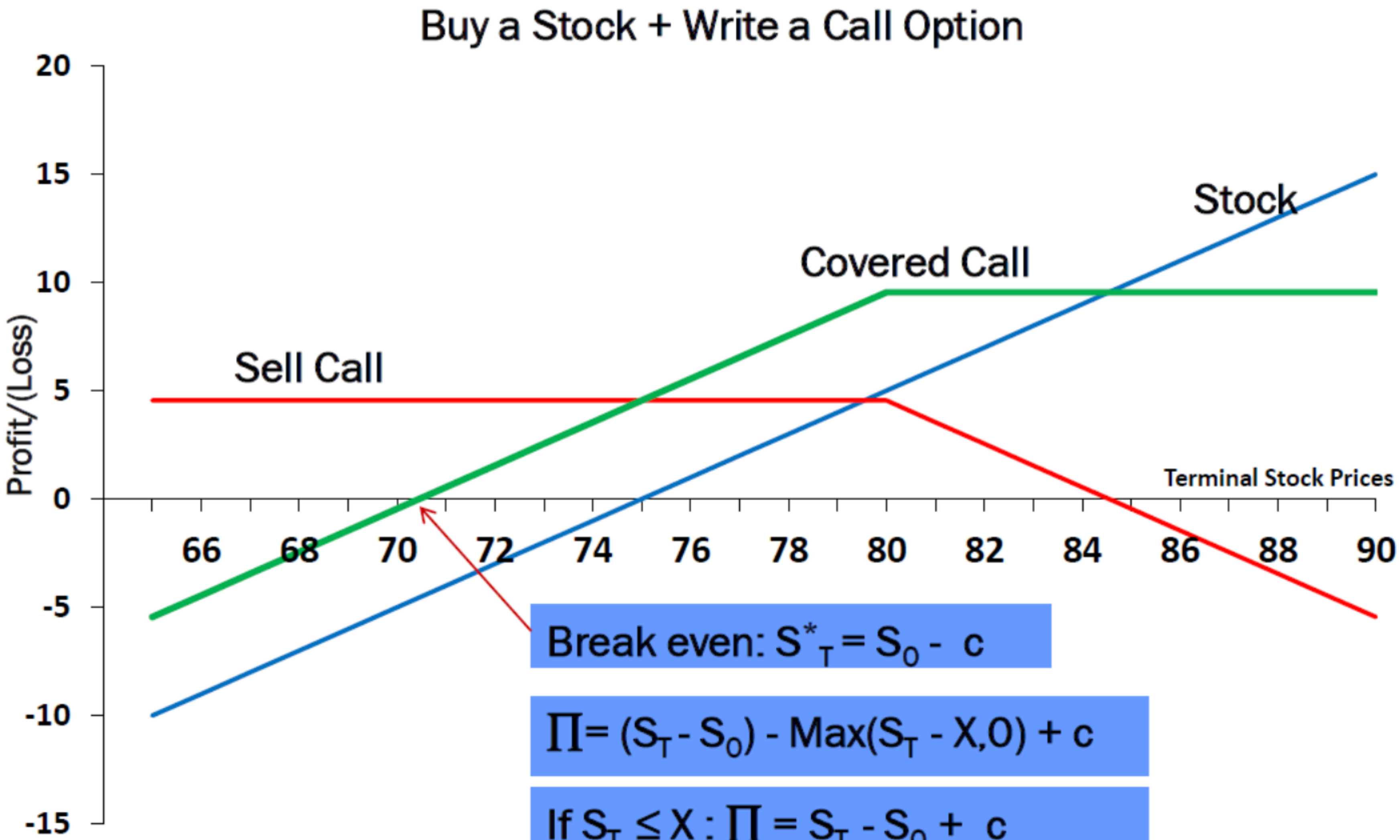
Short on Put Option (Sell a Put Option)



Short on Put Option (Choice of Exercise Price)



Writing a Covered Call

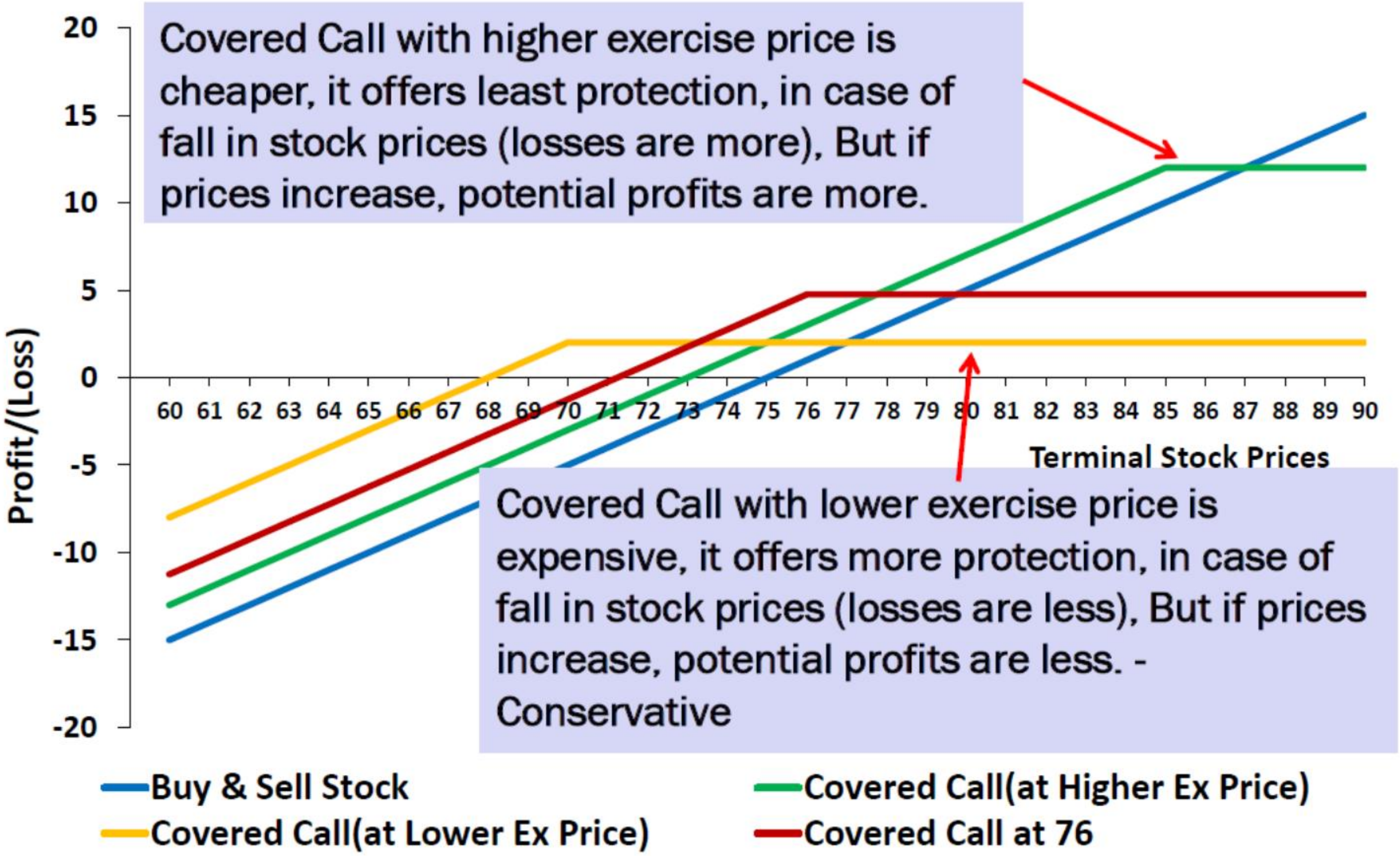


Break even: $S^*_T = S_0 - c$

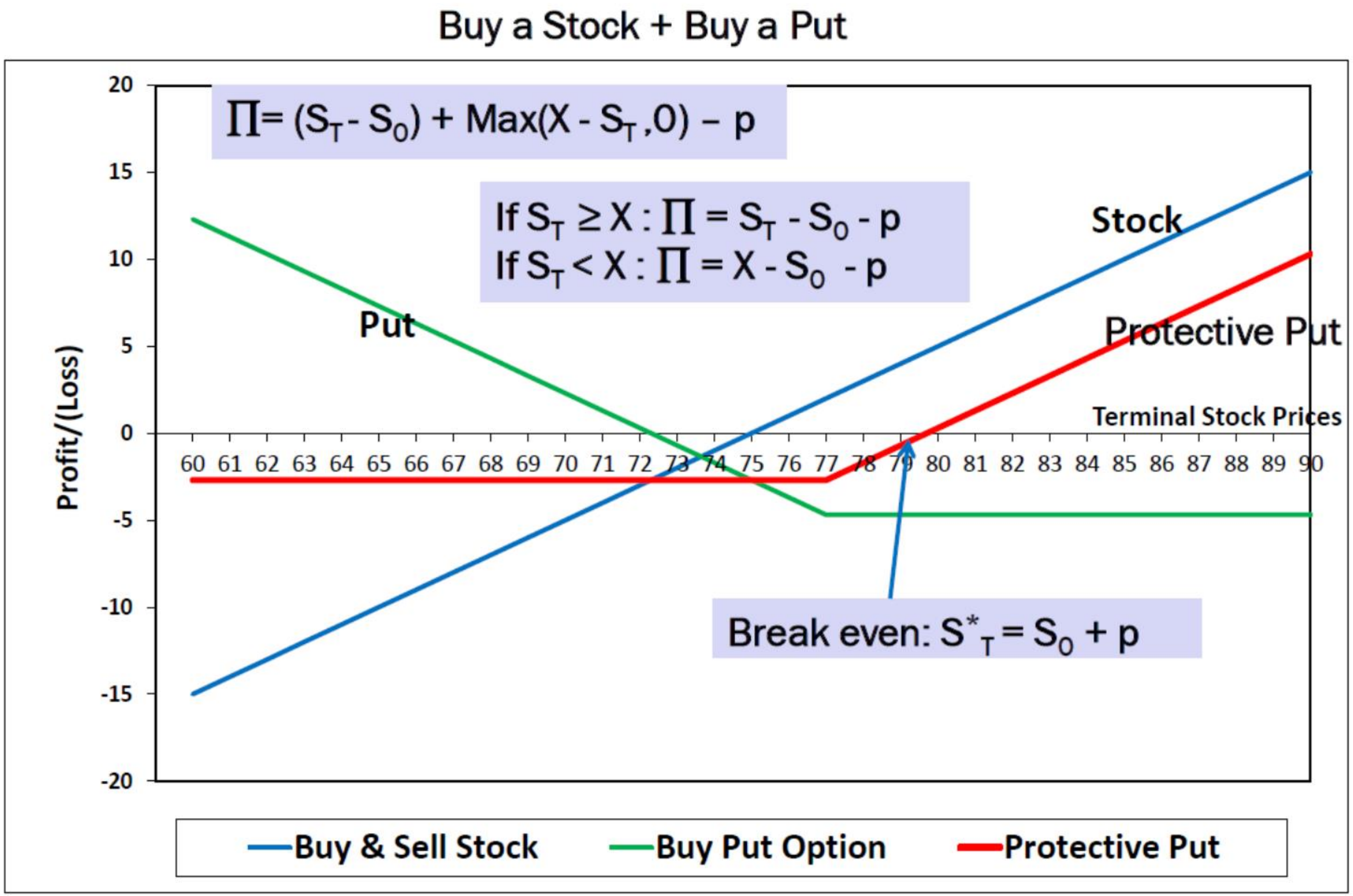
$\Pi = (S_T - S_0) - Max(S_T - X, 0) + c$

If $S_T \leq X : \Pi = S_T - S_0 + c$
If $S_T > X : \Pi = X - S_0 + c$

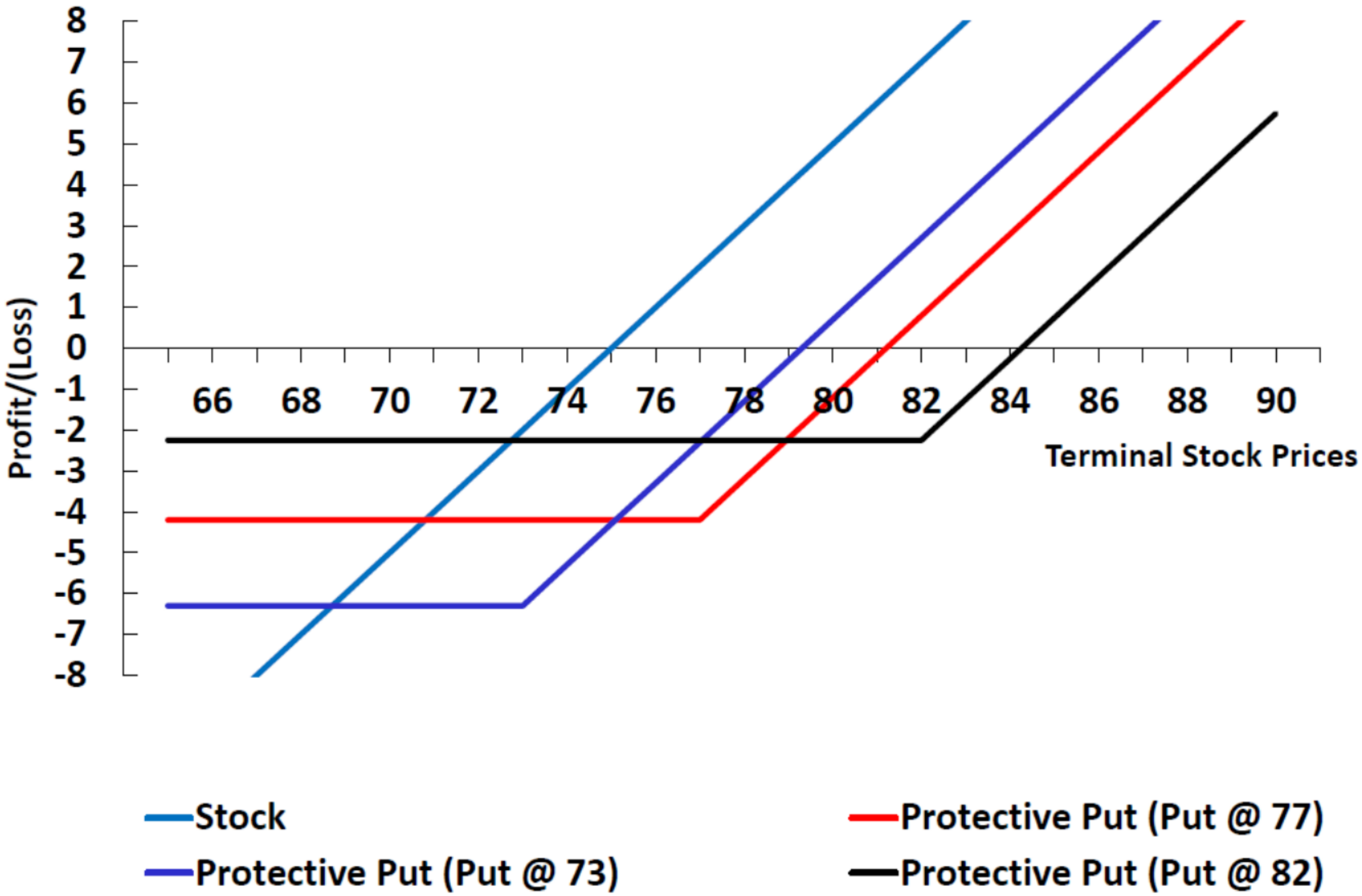
Covered Call -Choice of Exercise price



Protective Put



Protective Put- with different Exercise Prices

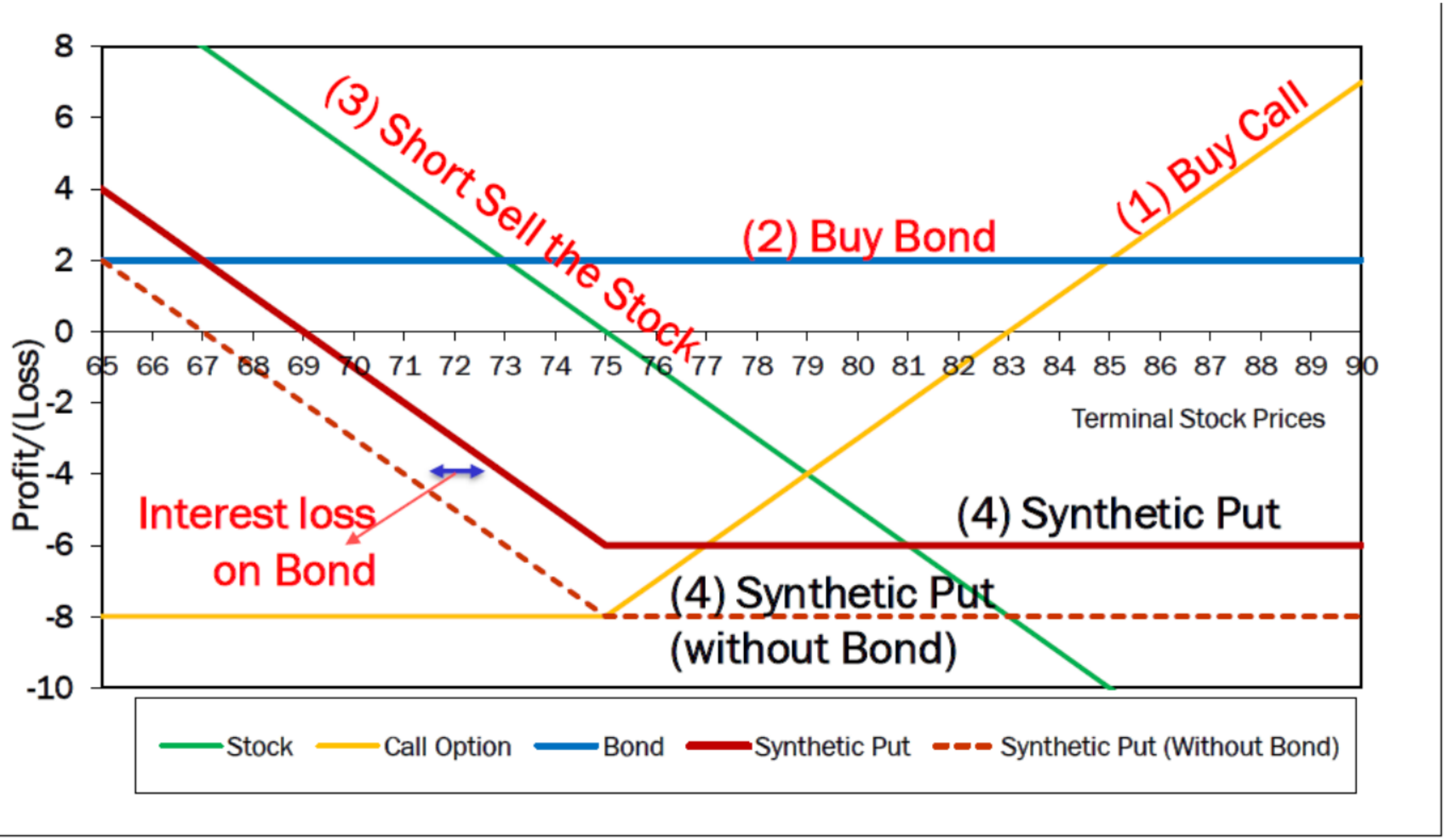


Synthetic Options

Using the Put Call Parity, we may create synthetic Options.

•Synthetic Put = $c + Xe^{-rT} - S_0$ (Buy Call, Buy Bond & Sell Short the stock)

But traders simply Buy Call & Short sell the stock.



Why create Synthetic Put

By creating a Synthetic put, we may take advantage of any mispricing in Puts & Calls.

Staddle Strategy

Not sure about movement of stock.

Buy 1 call and 1 put with same exercise price.

Strike price	Call	Put
1000	60	20
1100	40	30
1200	30	40

(3) Cost of Strategy = 1 Call = 40

1 put = 30

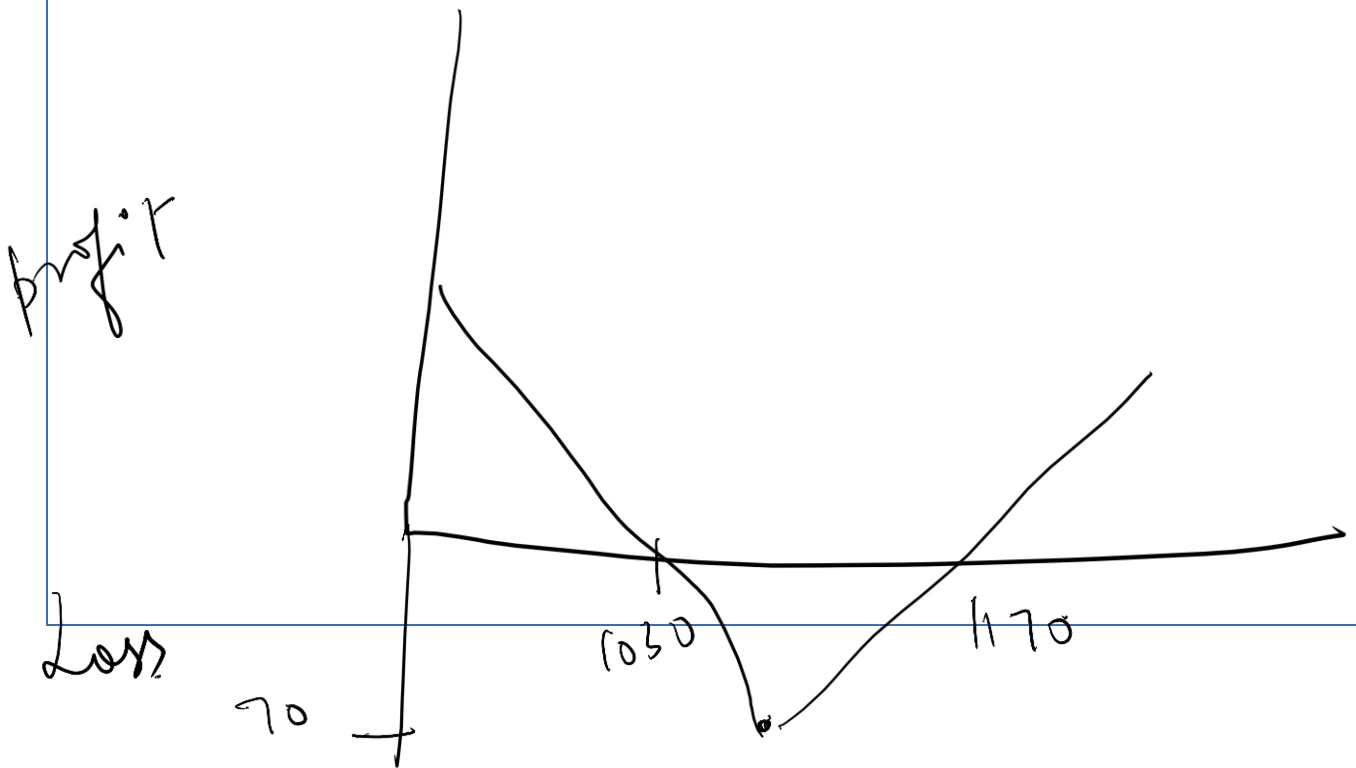
70

(4) Break-even point

Strike-price = 1100

Staddle Strategy

- Lower (if price moves down)- 1100- 70 = 1030
- If price moves up = 1100+ 70 = 1170



Strangle

- Uncertain about future price movement. But want to have minimum cost.

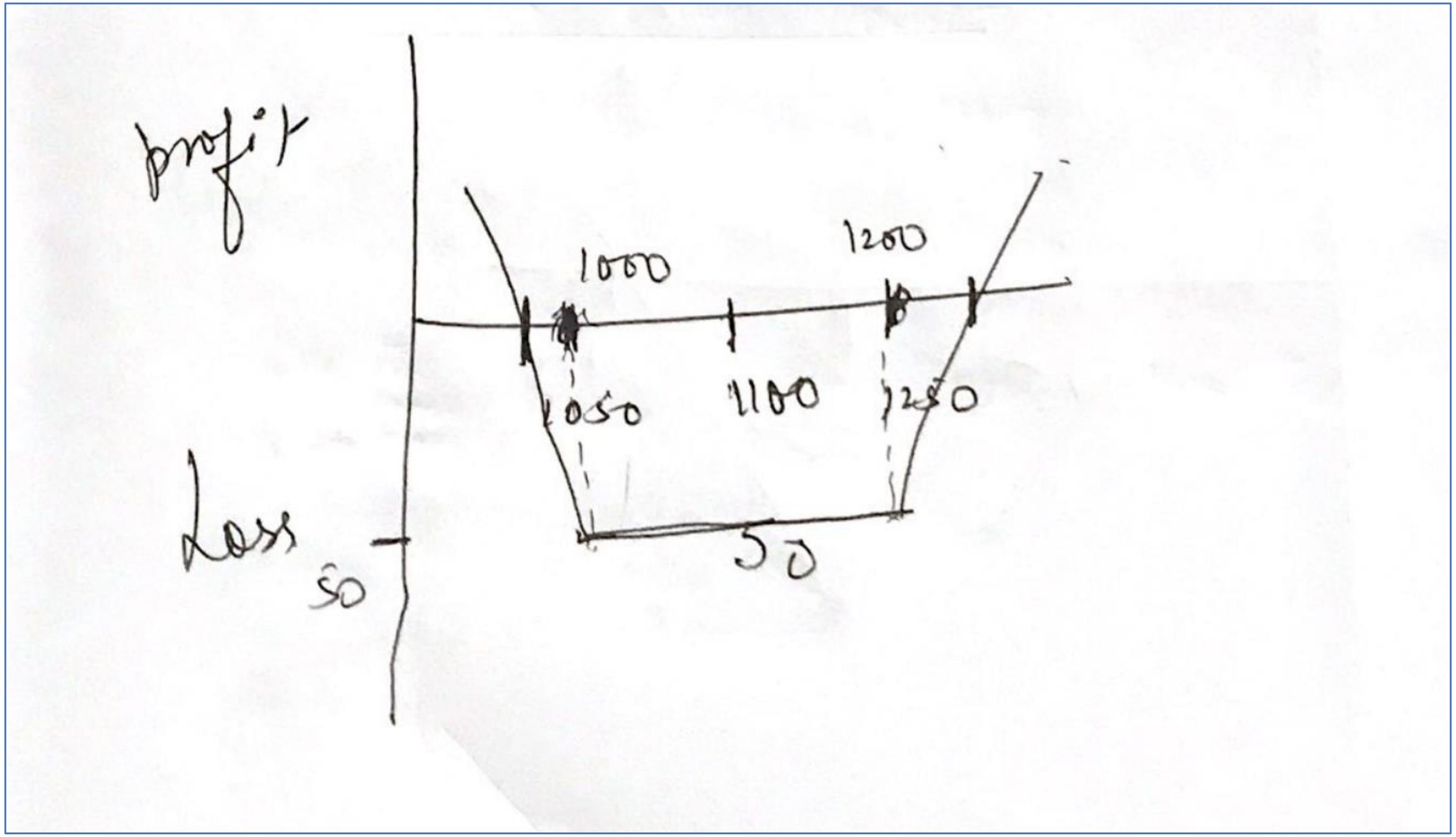
Strike price	Call	Put
1000	60	40 20
1100	40	30
1200	30	20 40

Strategy Cost = 30 + 20 = 50

Break-even point = 1250 ↑.

Lower = 1050 ↓

Payoff



A very Good article on derivative trading strategies

daunting too.

In an effort to clarify the risks involved and simplify things, at *bl.portfolio* we have been running a derivatives series. Through this, we have been explaining the brass tacks of options trading and have also been covering various option strategies.

In the Big Story published on Feb 26 (https://tinyurl.com/Optionstradefeb26) and May 7, 2023 (https://tinyurl.com/Optionstradingmay7), we covered a few single and multi-legged ideas. As an extension, in this Big Story, we will discuss four more three-legged strategies that are based on put spread i.e., bull/bear put spread. The strategies involve taking trades in all three ATM (at-the-money), OTM (out-of-the-money) and ITM (in-the-money) options.

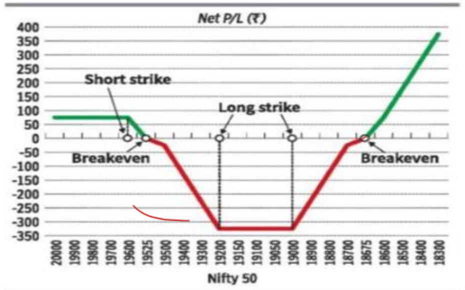
To know what an ATM/OTM/ITM option is, refer https://tinyurl.com/atm-otm-itm

Before going further, we will briefly discuss the base strategies – bull put spread and bear put spread. **Bull put spread** is implemented by selling (also referred to as shorting) ATM put and simultaneously buying equal number of OTM put of the same underlying and expiry. **Bear put spread** is executed by buying ATM put and parallelly shorting the same number of OTM put. In both cases, instead of ATM options, it can also be slightly ITM or OTM options. The idea is to spread the strikes of the buy and sell leg of the trade.

The first two strategies discussed below are based on bull put spread whereas the following two will be based on bear put spread. Find the pay-off graph for each strategy under the respective heading. Example given in the illustration is considered for the same.

BULL PUT LADDER

In this strategy, an ATM put (higher strike) is sold and simultaneously an OTM put (middle strike) is bought. In addition to this, another OTM put (lower strike), with strike price lower than the middle strike OTM put is bought. The underlying and the expiry date are the same for all three options.



sharply, you can make money. More the profit depending on how deep the asset price falls below the lower breakeven price. Hence, choosing the strikes is important.

If the middle and lower strike are far below the higher strike, the price should fall more for your trade to turn profitable. Yet, in this case, the net premium you receive at initiation of this strategy will be higher as farther middle and lower strike means lesser outgo in the form of premium.

Maximum profit

- Theoretically unlimited below the lower breakeven price. But if the security stays above the higher strike price, the maximum reward is limited to the net premium received.

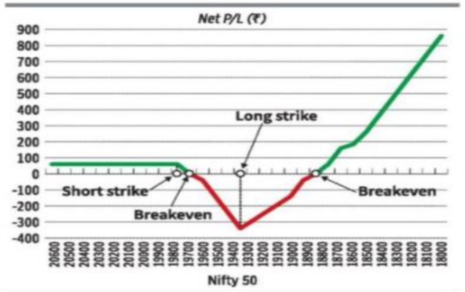
Maximum loss

- Higher strike – Middle strike – Net premium received

Breakeven points

- Upper breakeven = Higher strike – Net premium received
- Lower breakeven = Lower strike + Middle strike – Higher strike + Net premium received

RATIO PUT BACKSPREAD



Similar to bull put ladder, there are three legs in this strategy i.e., one short put and two long puts. Here's the difference — while the short position is created on an ATM option, the two long OTM puts are of the same strike rather than two different strikes as in bull put ladder.

Other similarities of ratio put backspread with bull put ladder are that it is bullish at the time of initiation but becomes bearish at some point and this strategy is generally set up for net credit. The net credit and risk will be higher if the distance between long and short strikes is larger and vice versa.

This trade can be profitable on two occasions. One, the

premium received.

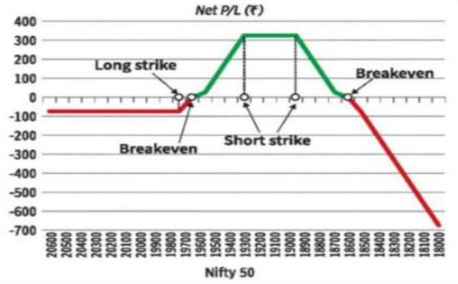
Maximum loss

- Higher strike – Lower strike – Net premium received

Breakeven points

- Upper breakeven = Higher strike – Net premium received
- Lower breakeven = Lower strike – difference between higher and lower strike + Net premium received

BEAR PUT LADDER



Like a bear put spread, an ATM put (higher strike) is bought and at the same time, an OTM put (middle strike) of the same underlying and expiry, is sold. In addition to these two legs, one more OTM put (lower strike), with strike price lower than the middle strike is short simultaneously to turn the strategy into a bear put ladder. As mentioned earlier, this is called a ladder because of the three different strike prices.

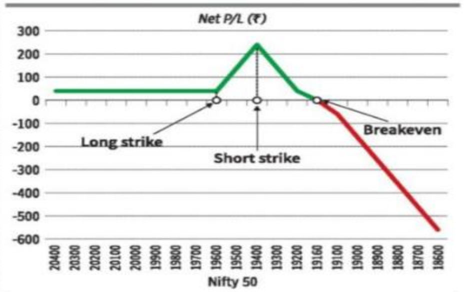
Usually, it will be a net debit strategy. Bear put ladder works best when the underlying security sees a moderate decline in price.

The additional OTM put is short so that the cost of the long side (ATM put) is brought down to the extent of the premium received. This will also move the upper breakeven a little higher i.e., nearer to the ATM long put. Consequently, the trade can enter the profit zone quicker than in bear put spread.

However, note that the losses can be huge if the price of the security tumbles. Because, out of the three legs, one long put, and one short put will cancel out each other but the additional put sold will be exposed to the risk of a sharp fall in price.

WHEN TO IMPLEMENT: Suppose the underlying security is now facing a resistance and is likely to see a decline. However, the fall might be limited because there is a strong support. Remember to match this support level to

RATIO PUT SPREAD



An ATM put (higher strike) is bought and an OTM put (lower strike) is sold. For ratio put spread, instead of selling one lot of OTM put, two lots are short. Like we explained earlier, this strategy can be a 1:2 or 2:3 ratio put spread.

That said, ratio put spread is a neutral to mild bearish strategy and traders can get the most out of it if the underlying sees a minor decline. So, the short leg of this strategy is usually matched with the nearest strong support so that the downside is possibly limited.

But note that because of the one additional short put, the strategy exposes traders to the risk of a significant fall in price and thus, the risk is theoretically unlimited. Hence the use of stop-loss is imperative.

Typically positioned as a net credit strategy, it can be implemented for net debit as well.

WHEN TO IMPLEMENT: It is best suited when the probability is high for the security to decline towards the support and stay around that level until the expiration of the contract. The strike price of the put that you short should be closer to the support level.

That said, be wary of the potential for huge loss if the underlying witnesses a deeper fall. The magnitude of loss is directly proportional to the extent of fall. Therefore, having a stop-loss is crucial.

Maximum profit

- Higher strike – Lower strike + Net premium received
- The above is when the underlying declines. But in case the price rallies, the maximum reward will be limited to the net premium received

Maximum loss

- Theoretically unlimited below the lower breakeven price

Breakeven point

- Lower strike – Difference between both strikes – Net premium received

Swaps

- ❖ **Literal meaning : "to exchange".**
- ❖ **Swap** is a transaction which transforms one stream of future cash flows into another stream of future cash flows with different features.
- ❖ Does not involve legal swapping of actual debt but an agreement is made to meet certain cash flows.
- ❖ **Basic types:**

✓ Interest rate Swap
✓ Fixed to Floating Rate or
✓ Floating to Fixed Rate
✓ Basis Swap

Interest Rate Swaps

Why do these spreads exist in fixed and floating rates????

Why some companies need fixed and some need floating.

Swaps

Company A and B have been offered the following rates per annum on a 20 Mn 5-year loan.

Company	Fixed Rate	Floating rate
Company A	5%	LIBOR +0.1%
Company B	6.4%	LIBOR +0.6%
Differential	1.4%	0.5%
A require loan at floating. Company B require at Fixed rate. Commission is 0.1%		

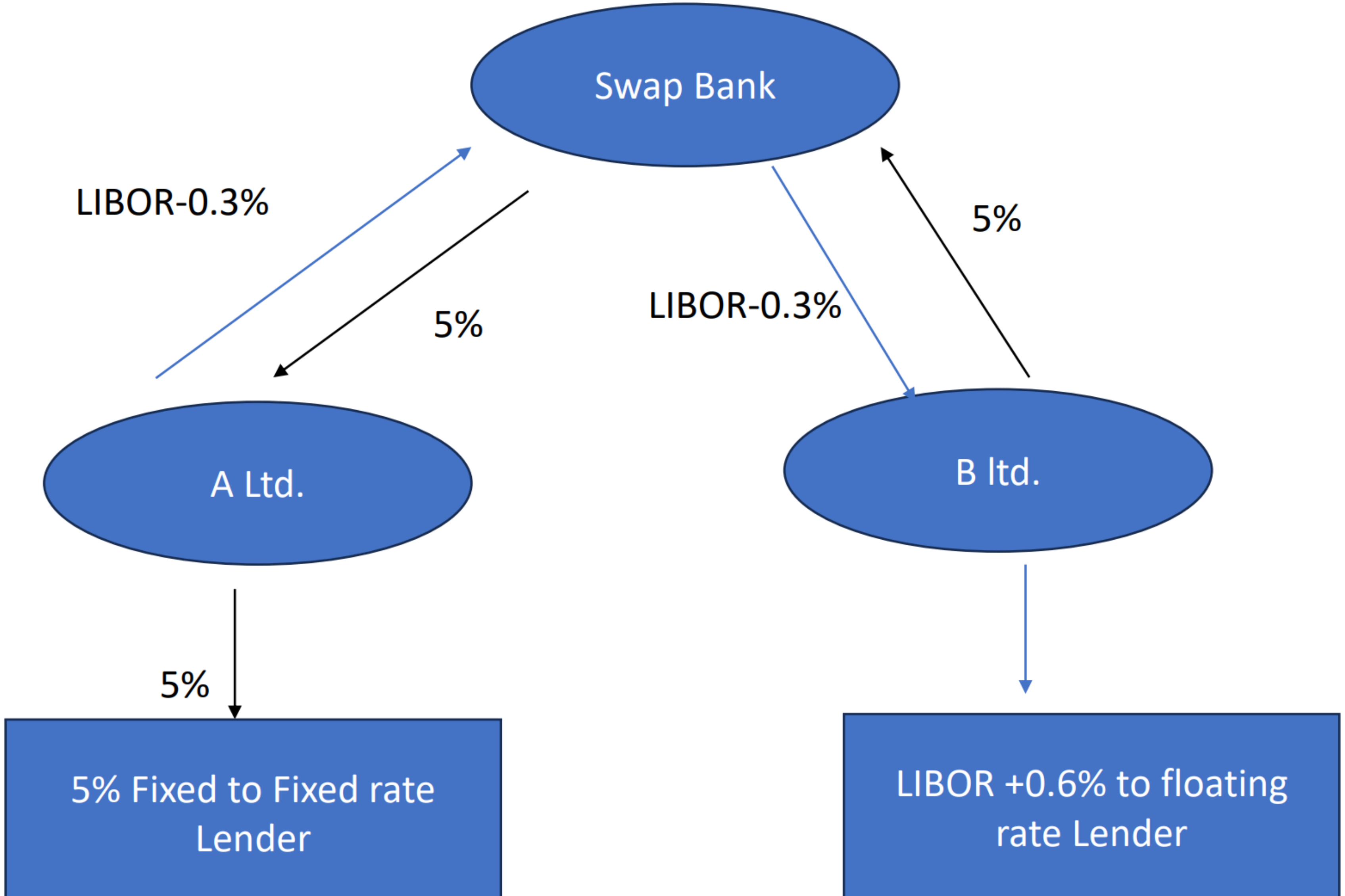
According to comparative advance(Swapping) = LIBOR+ 0.6%+5% = LIBOR +5.6

If they would have taken according to their Will = LIBOR +6.4+0.1 = LIBOR +6.5

Interest Rate Swaps

- Fixed rate differential = 1.4%
- Floating rate = 0.5%
- Saving through swap = 0.9%(1.4%-0.5%)
- Commission to swap bank = 0.1%
- Net saving through swap = 0.8% (It needs to be equally distributed between both the parties)
- A saving = 0.4%
- B saving = 0.4%
- Hence floating rate that A will be willing to pay = LIBOR-0.3%

Swaps


Swap Bank
LIBOR-0.3%
5%
LIBOR-0.3%
5%
A Ltd.
B ltd.
5%
5% Fixed to Fixed rate Lender
LIBOR +0.6% to floating rate Lender

Forward Rate Agreements

- When an FRA is traded, the buyer is borrowing a specified notional sum at a fixed rate of interest for a specified period which is to commence at an agreed date in the future.

- Buyer (or the borrower) would benefit, if the interest rate rises between the date on which FRA is traded and the date on which it comes into effect.

- If the interest rate falls, the buyer must pay the difference between the rate at which FRA was traded and the actual rate, as a %age of the notional sum.

- The counterparty (the Seller of FRA), being the lender of notional amount, will gain if the interest rate falls.

Forward Rate Agreements

- ❖ In FRA trading only the payment that arises as a result of the difference in interest rate.

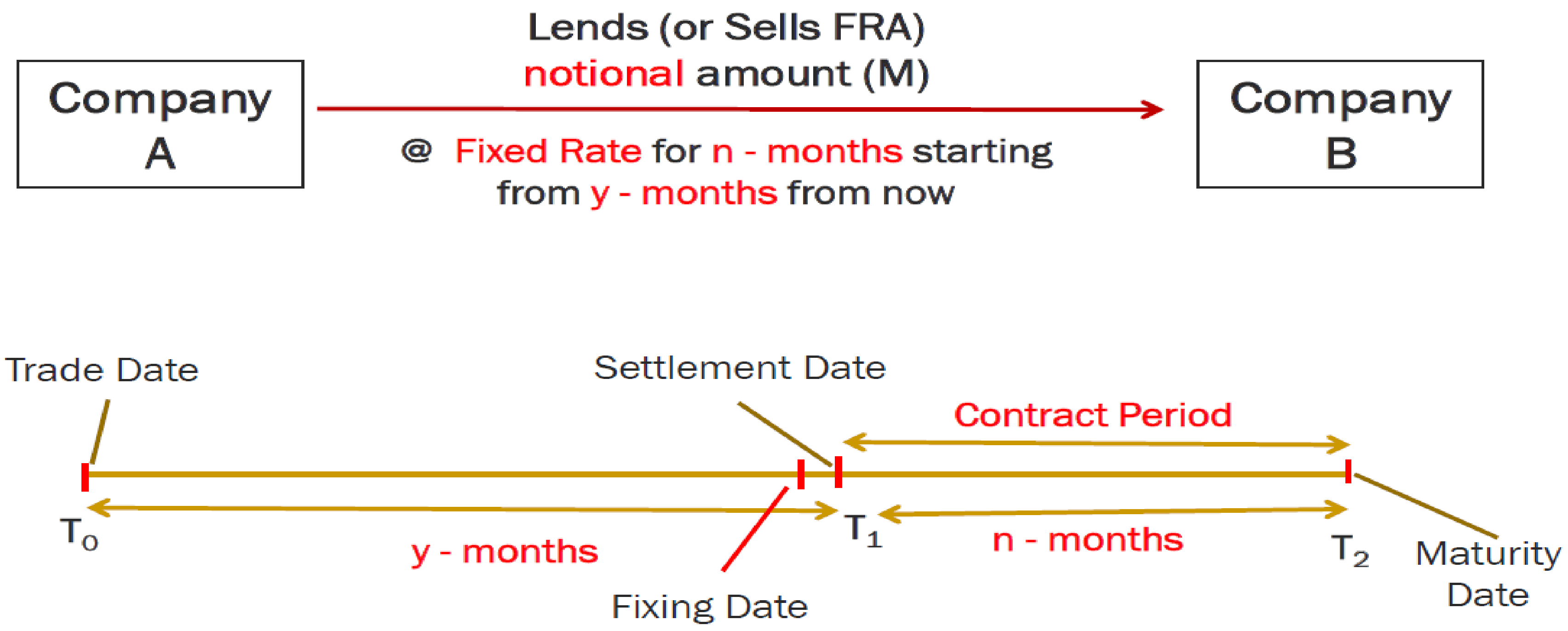
- ❖ There is no exchange of cash at the time of trade.

- ❖ The cash payment that does arise is the difference between the Interest rates at which FRA is traded and the actual rate prevailing when FRA is settled, as a percentage of the notional amount.

- ❖ FRA traded today and which starts 3-months from now and lasts for the next 3-months is refereed to as 3*6

- ❖ 1*4 FRA –is 3-month loan starting 1 month from now.

Forward Rate Agreements



- Settlement Date: date on which the notional loan becomes effective.
- Fixing Date: Date on which the reference rate is determined
- Reference Rate : Rate that is used for calculation of the settlement amount on the Fixing Date.

Forward Rate Agreements

It is used for two purposes 1) Hedge 2) Arbitrage

+ Suppose A Ltd. wants to borrow 60,00,000 after 3 months for next 6 months "3/9 FRA".

+ He has an option to borrow from following banks

BANK A – ROI = 10% for 1 year (This is current rate)

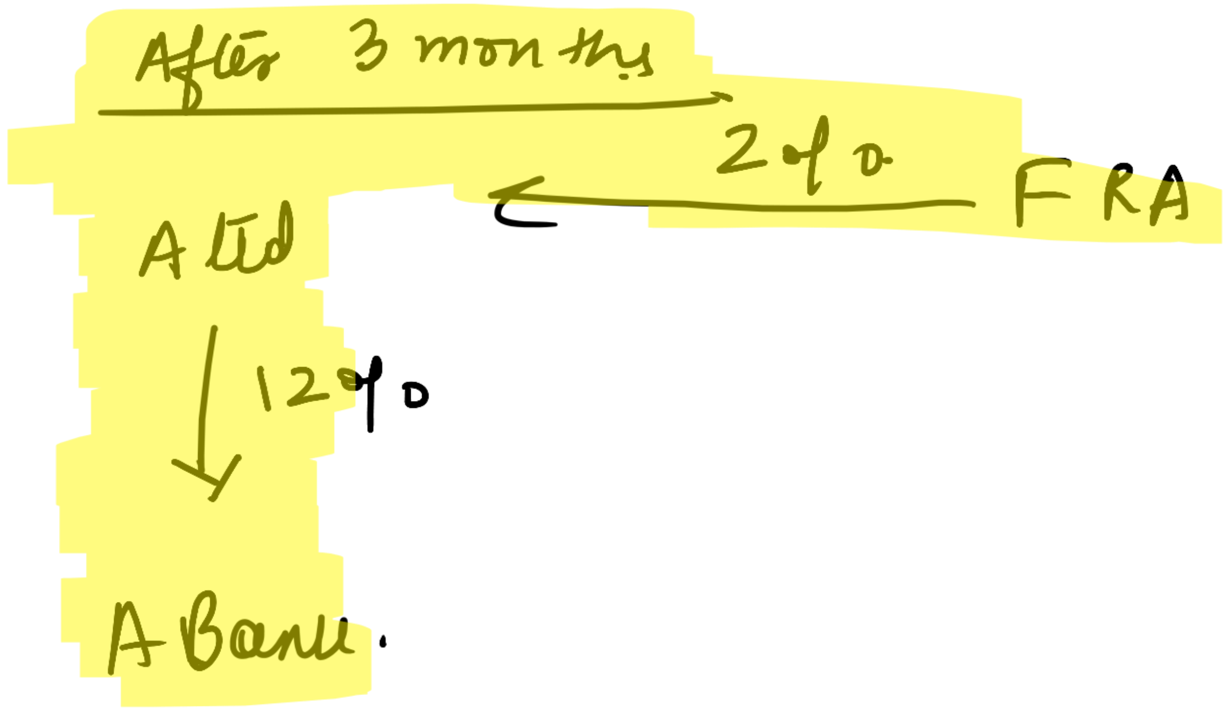
FRA → ROI = 10% After 3 months.

Forward Rate Agreements

FRA Committed A ltd 10% after 3 months.

↳ If after 3 months rates increase by 12%

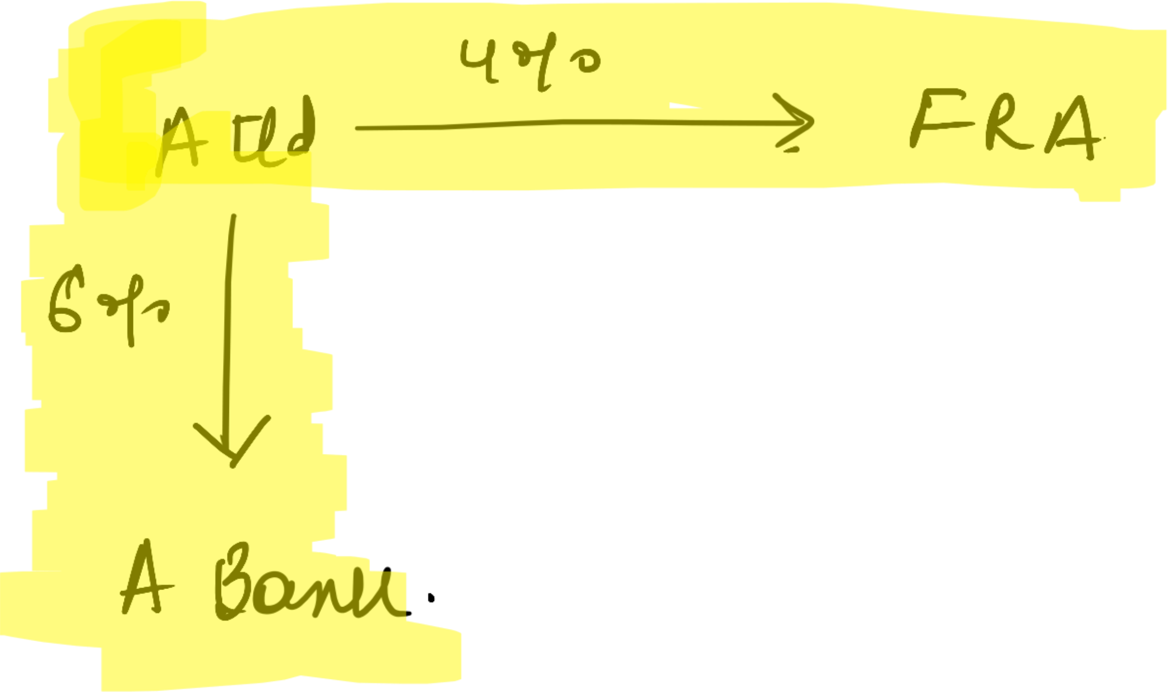
Situation 1



Forward Rate Agreements

If after 3 months A Bank is charging 6% then.

Situation 2



Forward Rate Agreements

Situation-1

$$\frac{60,00000 \times .02 \times \frac{6}{12}}{\left(1 + \frac{.12}{2}\right)}$$

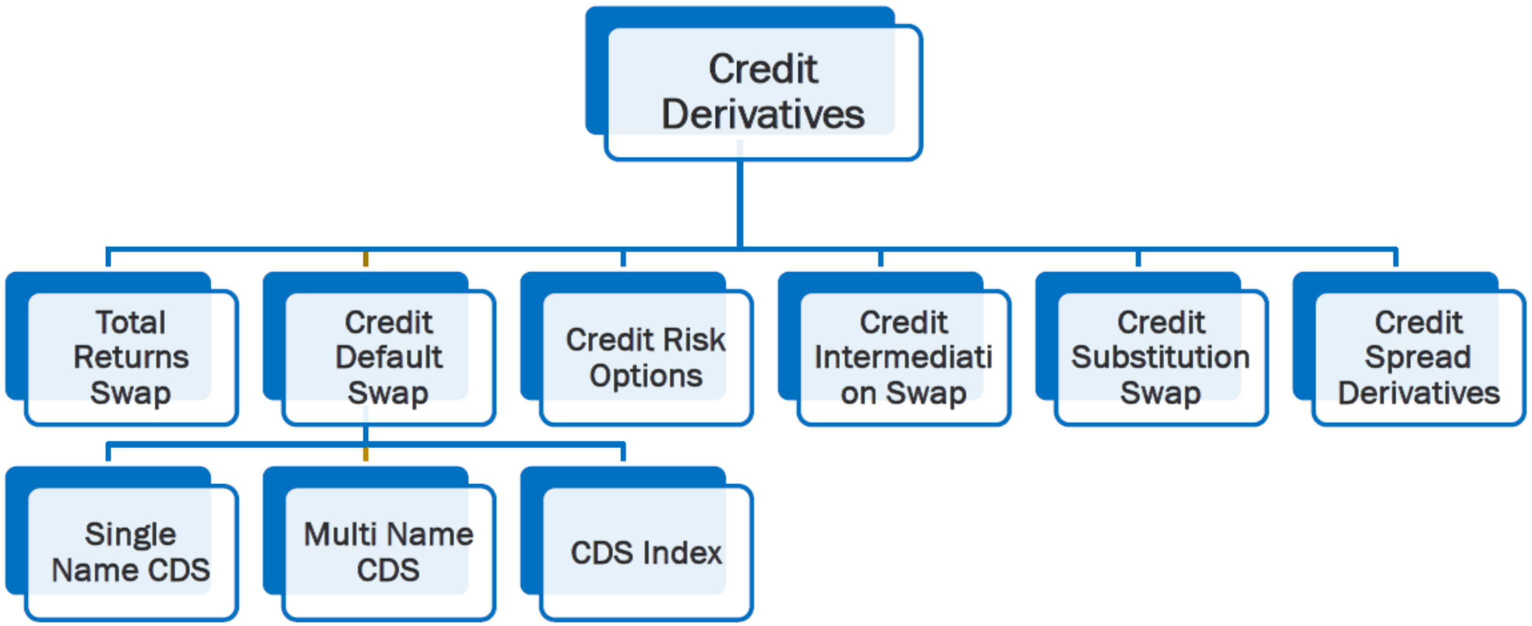
$= 56,603.77$ FRA pay to Atul at the Beginning of 3 months

Forward Rate Agreements

Situation 2 = $\dfrac{60,00,000 \times (.10 - .06) \times \frac{6}{12}}{\left(1 + \frac{0.6}{2}\right)}$

$= 1,16,504.854$ → Atd has to pay FRA

CDS


Credit Derivatives
Total Returns Swap
Credit Default Swap
Credit Risk Options
Credit Intermediation Swap
Credit Substitution Swap
Credit Spread Derivatives
Single Name CDS
Multi Name CDS
CDS Index

CDS

- Most popular Credit Derivative is a Credit Default Swap.

- It is a contract that provides insurance to the Protection Buyer, against the risk of default by a borrower company (Reference entity), by the Insurance protection seller.

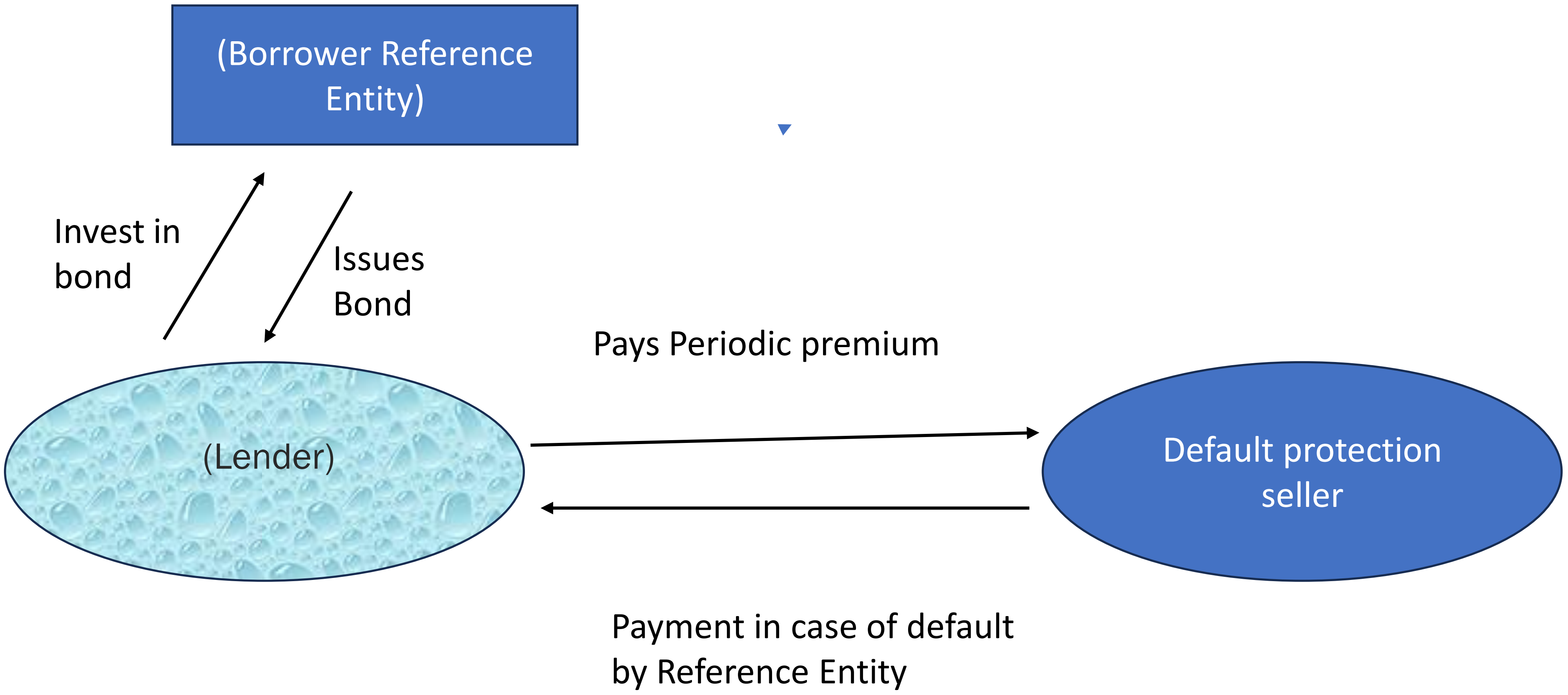
- The Insurance buyer obtains the right to sell the bonds issued by the Reference entity for their face value in case of default (Credit event).

- The total face value of the bonds that can be sold is known as the Credit Default Swap's notional principal.

- The buyer of CDS makes periodic payments (usually in arrears every quarter) to the seller until the end of the life of CDS or until the credit event occurs.

- The settlement in the event of default involves either physical delivery of bonds or cash payment.

CDS


(Borrower Reference Entity)
Invest in bond
Issues Bond
Pays Periodic premium
(Lender)
Default protection seller
Payment in case of default by Reference Entity

Let’s understand the concept of credit spread…

- Normally, it is the difference between the Yield of bonds of the Government of India or sovereign bonds and the Yield on corporate bonds of same maturity.

- Basically, credit spread is the difference in yield between two bonds of similar maturity but of different credit quality.

- We can have credit spread between AAA bonds and A bond; AAA bond and BBB bonds.