Options Strategies and Applications

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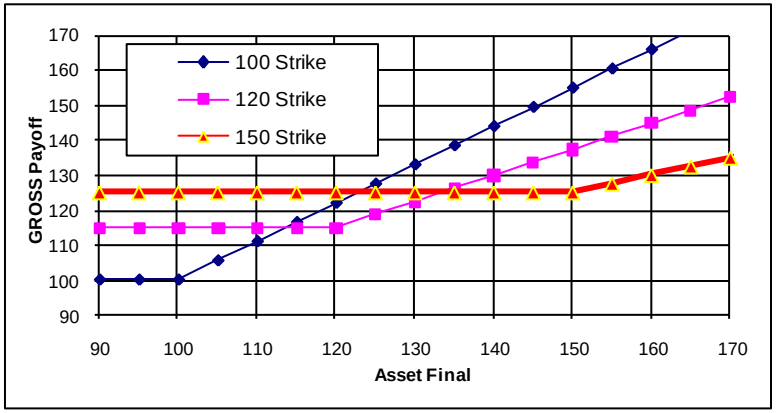


First…..Let's take a step back

1) What are markets?
2) What is finance?
3) What are financial markets?

Markets
Ownership and “fair” trade

1) Two parties each own an asset or represent the owner of an asset.
2) The parties meet in some marketplace.
3) Each party values the other party’s asset more than they value their own asset.
4) A “fair” trade occurs.
5) Wealth is created (each party feels wealthier as a result of the trade).

Finance
It's all about capital and time

1) Capital represents a "fair" trade between savers (or their representatives) and entrepreneurs.
2) Entrepreneurs are any person(s) attempting to improve the human condition more efficiently than currently.
3) Capital "pre pays" for labor, land and materials. It bridges time and builds wealth.

Financial Markets

NOT INTENDED AS CASINO

1) Banks and Investment banks had gone “hog wild” with product creation, leverage and “gambling-like” trading.
2) “Asset Based” (inflation dependent) lending served as foundation for growth.
3) Hedge funds and other “off balance sheet” structures were granted greater leverage, compounding risk.
4) Wages couldn’t and didn’t keep up. Collapse.

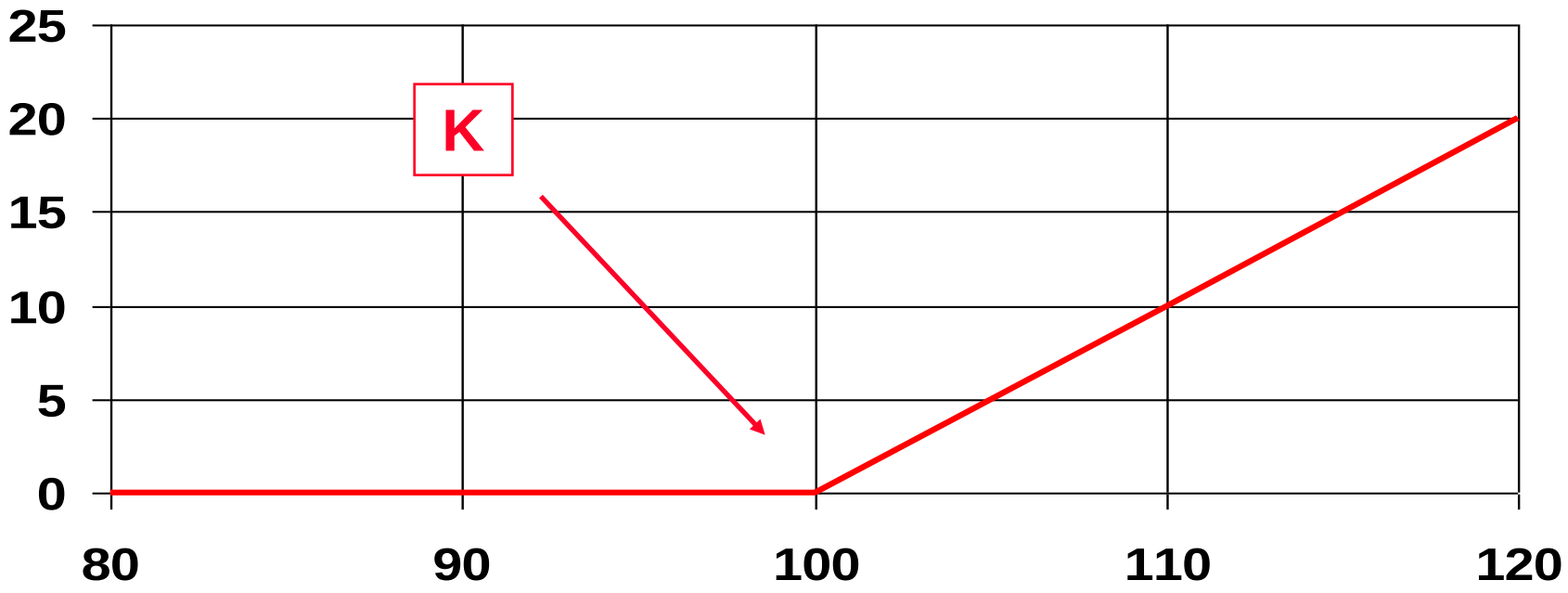
Financial Markets
Options strategies abound

1) An option trade is a “fair” trade between two parties (assuming both have a model!).
2) An option trade grants one party the right to a second trade that is not a “fair” trade.
3) One party, the option buyer, owns the right to buy an asset at a price lower than the “fair” market price (for a “call” option, a “put” is the right to sell at a higher price).

Call :

The right , but not the obligation, to BUY a certain quantity of an asset, at a certain price, on or before a certain date.

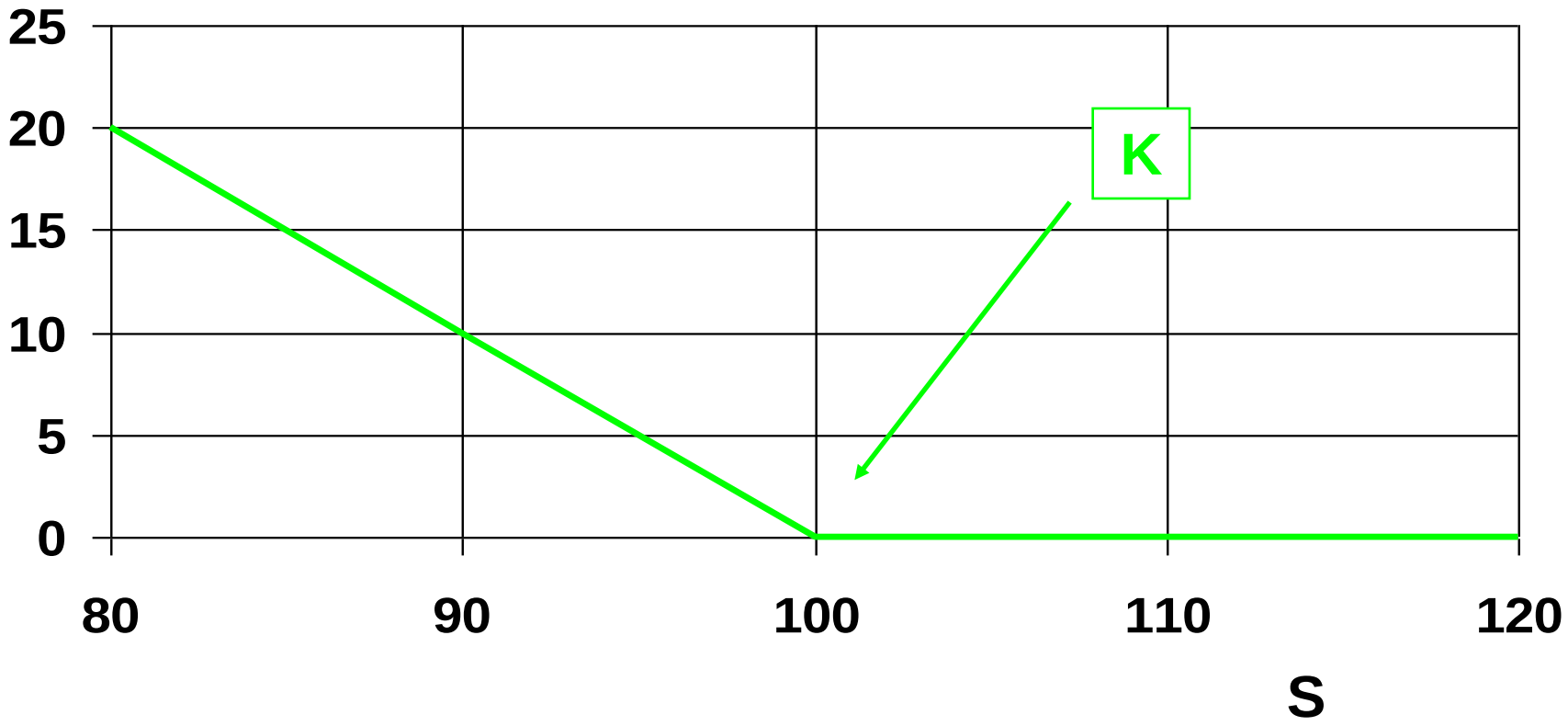
Value at maturity = Max [S - K , 0]



Put :

The right, but not the obligation, to SELL a certain quantity of an asset, at a certain price, on or before a certain date.

Value at maturity = Max [K - S , 0]



“IN THE MONEY”

Call : The market price S is above the strike price K.
Put : The market price S is below the strike price K.

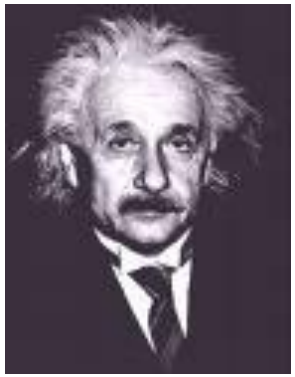
“AT THE MONEY”

S is at “or near” K [subjective].

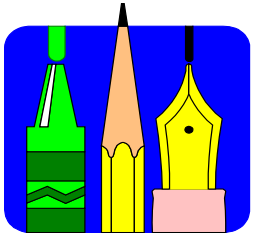
“OUT OF THE MONEY”

Call : S is below K.
Put : S is above K.

The PV
of the
expected pay-off



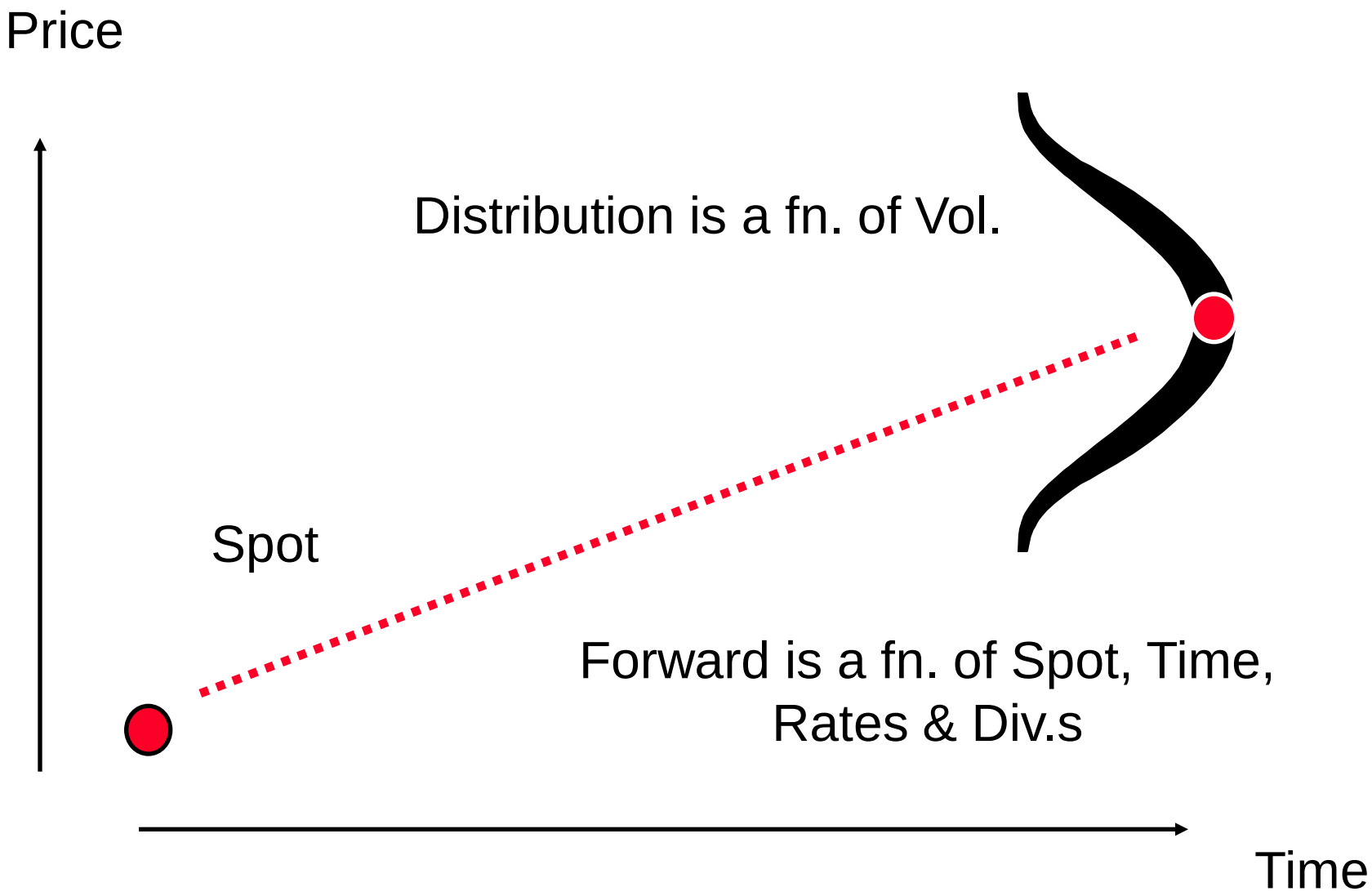
Option Inputs

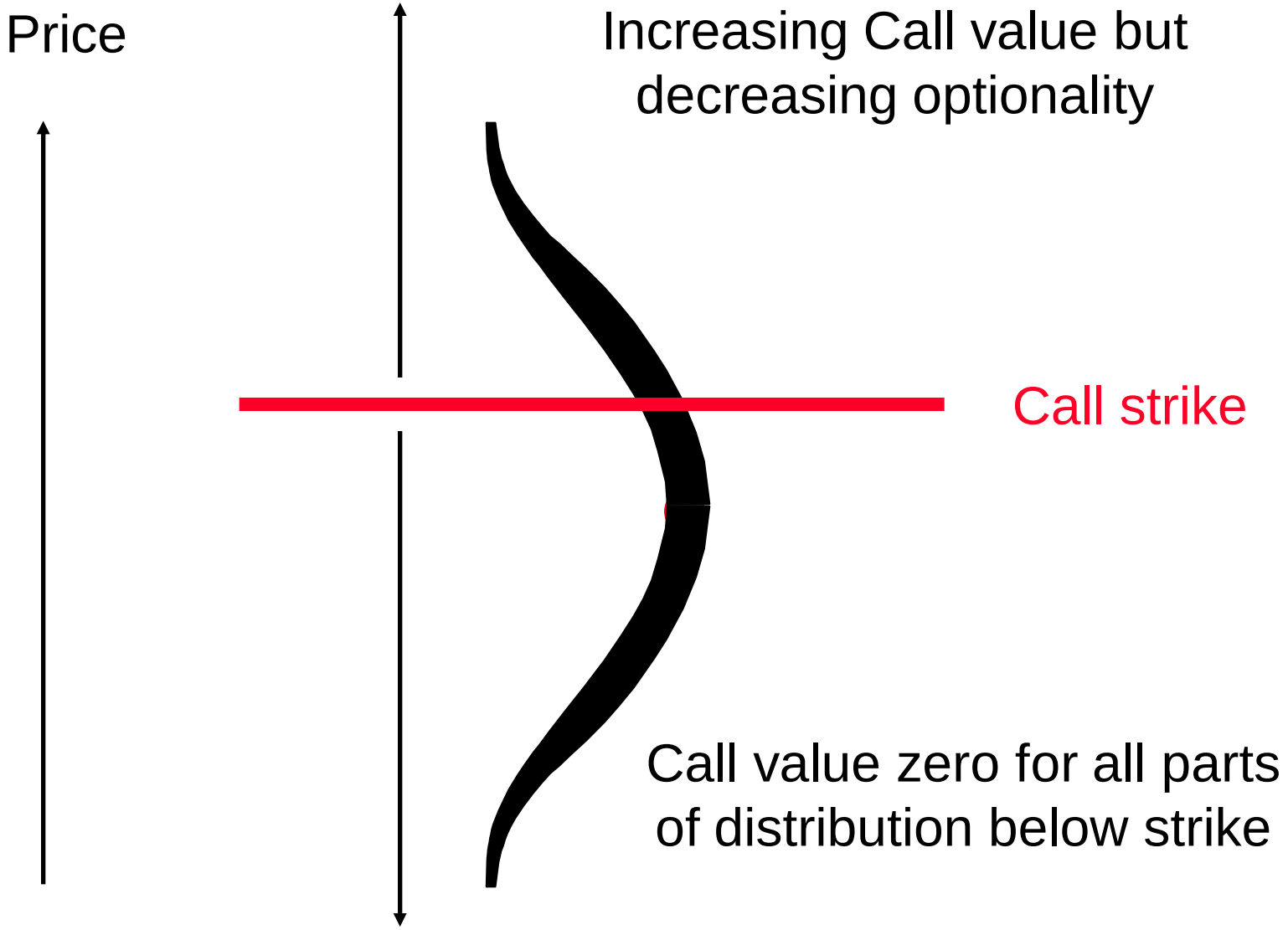


6 factors affect the value of an option :

Spot	=	S
Strike	=	K
Volatility	=	σ
Time to maturity	=	T
Interest rate	=	I
Dividend	=	d

Forward price / distribution




Price
Increasing Call value but
decreasing optionality
Call strike
Call value zero for all parts
of distribution below strike

The Black – Scholes Formula

1973

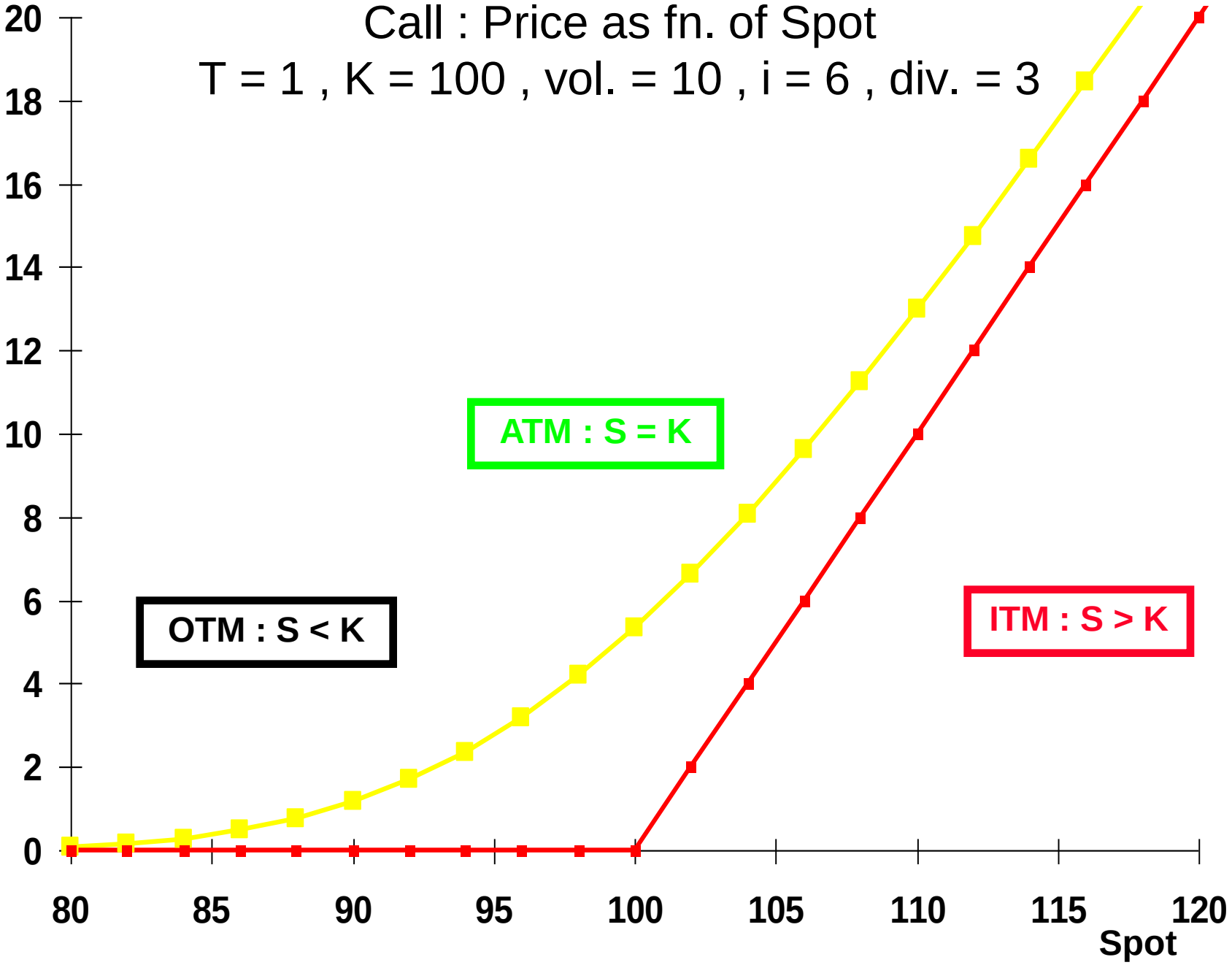
Black Scholes Formula (call):

$$c = S\,N(d_1) - K\,e^{-iT}\,N(d_2)$$

- N(x) is the cumulative probability distribution function for a standardized normal variable, i.e. the probability that the variable will be < x
- d_1 and d_2 are functions of all the option inputs
- N(d1) is the “delta” of the option.
- The formula essentially PVs the expected pay-off.

Black - Scholes Assumptions

- European option (exercisable only at maturity).
- Asset prices are log normally distributed.
- Asset is tradable freely in whole or partial units.
- Can short the asset and invest proceeds at risk free interest rate.
- Can lend and borrow at the riskless rate, which accrues continuously.
- Riskless rate & asset volatility constant.
- No taxes, transaction costs or margins.
- No jumps or discontinuities in asset price.

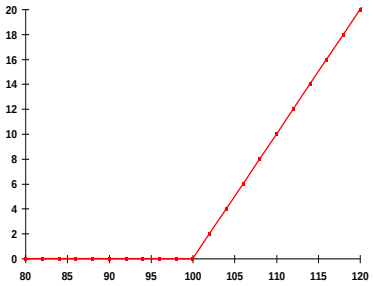

Call : Price as fn. of Spot
T = 1 , K = 100 , vol. = 10 , i = 6 , div. = 3
20
18
16
14
12
10
8
6
4
2
0
80
85
90
95
100
105
110
115
120
Spot
ATM : S = K
OTM : S < K
ITM : S > K

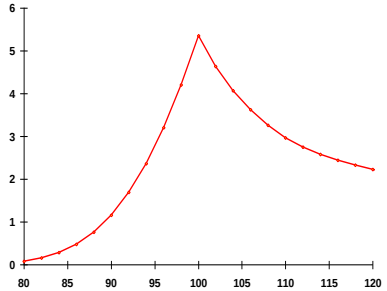
The option price at any time consists of

INTRINSIC VALUE

and

TIME VALUE.



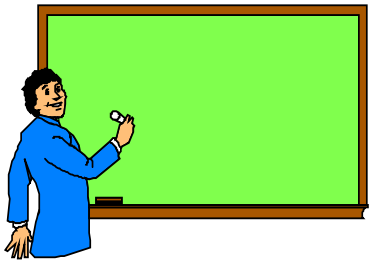


Time / Intrinsic Value

- At maturity the yellow option value curve lies on the straight, red “hockey stick”.

- The option no longer has any TIME VALUE , but consists only of INTRINSIC VALUE.

Option Strategies



A] Tailoring investment payoff profiles:

You want positive exposure to an asset - IBM

1) Buy IBM:

Spot	=	170
Target Sale Date	=	24-May-2012
Expected Price	=	187
Return on Inv.	=	[187 / 170] - 1 = 10%

But what of the RISK?

What of 140, 150, 160 outcomes for IBM?
What if your expected price is too optimistic?

2) Buy a Call Option on IBM instead:

Spot	=	170
Strike	=	170
Volatility	=	19%
Maturity	=	24-May-2012
Interest rate	=	1.5%
Dividend	=	2.5%
Price	=	$ 11.00

If at maturity IBM has risen 10 % to $ 187, the option pays off

Max [S - K , 0] = $ 17.00

Profit is [Payoff / Premium] - 1

Profit = [$17.00 / $ 11.00] - 1 = 54%

Better than owning IBM below $159
But below 170, 100% loss of Premium
Below 181, loss of some Premium in payoff

3) Buy a Call Spread on IBM instead

Spot	=	170
Strike 1	=	170
Strike 2	=	190
Volatility	=	19%
Maturity	=	24-May-2012
Interest rate	=	1.5%
Dividend	=	2.5%
Price 1	=	$ 11.00
Price 2	=	$ 4.75

If at maturity IBM has risen 10 % to $ 187, the option pays off

Max [Min(187,S) - K , 0] = $ 17.00

Profit is [Payoff / Premium] - 1

Profit = [$17.00 / ($ 11.00 - $4.75)] - 1 = 172%

Better than owning IBM below $163.75
But below 170, 100% Loss of Premium
And above 190, no additional payout

The possible return profiles which can be created using multiple calls and puts is infinite.

Many of the exotic structures (binary payoff, “cliquet” options, compound options) can be created using the basic call and put pricing and payoff structure.

Leverage is introduced with options, and leverage is powerful but also a dangerous thing.

B] Trading the volatility:

You believe that IBM will be volatile, and want to win in a volatile environment:

1) Buy 100 share Straddle on IBM:

Spot	=	170
Strike	=	170
Volatility	=	19%
Maturity	=	24-May-2012
Interest rate	=	1.5%
Dividend	=	2.5%
Forward Price	=	$ 168.30
Option Price	=	$ 2,370
Initial “delta”	=	+ 3.50%

Why is “delta” positive if Spot = Strike > Forward?

Answer:
Lognormal Distribution puts odds of being above the forward higher than being below the forward (above 170 to infinity…..below 170 to 0).

The strikes equating to Delta = 0?
Strikes = $ 171.25

Conclusion: Options are complicated!

B] Extracting Volatility Value:

24-May-2011:
IBM = $170/share
Delta = + 3.50%
Short 4 shares at $170/share.

24-Aug-2011 Assume:
IBM = $155/share
Delta = - 42.2%
Buy 46 shares at $ 155/share
Profit on hedge = 4 * (170 – 155) = $ 60.
New hedge long 42 shares at $ 155/share

B] Extracting Volatility Value cont'd:

24-Nov-2011 Assume:

IBM = $185/share

Delta = + 51%

Sell 93 shares at $ 185/share

Profit on hedge = 42 * (185 – 155) = $ 1,260

New hedge short 51 shares at $ 185/share

24-Feb-2012 Assume:

IBM = $160/share

Delta = - 48%

Buy 99 shares at $ 160/share

Profit on hedge = 51 * (185 – 160) = $ 1,275

New hedge long 48 shares at $ 160/share

B] Extracting Volatility Value cont'd:

24-May-12 Expiry Assume:

IBM = $170/share

Delta = + 0.0%

Sell 48 shares at $ 170/share

Profit on hedge = 48 * (170 – 160) = $ 480

Total cashflow from "delta hedging":

$ (60 + 1,260 + 1,275 + 480)

Total (0% reinvestment for simplicity): $ 3,075

Initial Investment: $ 2,370

Profit = $ 705

Return on Prem = [$3,075/$2,370] – 1 = 29.7%

If less volatility, less delta hedging, less profit.

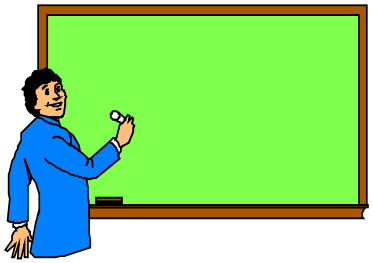
Volatility traders trade volatility:

Most of the options business is about volatility trading. Trades on implied volatility, expected volatility, trading the delta.

Shorter dated options: "gamma" trading (trading delta as shown in example).

Longer dated options: "vega" trading (much less trading underlying asset, more trading options in the implied volatility alone).

Options
Applications



Convertible Bond Arbitrage:

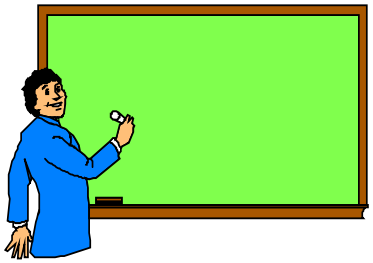
Ken Griffin (b. 10/15/1968) started trading convertible bonds while still at college, noticed "cheapness" from a volatility perspective.

Left college to form Citadel Investment Group in November 1990 (with $4.2mm AUM).

Peak $20 billion, down ~40% in 2008. Credit and Leverage issues.

http://en.wikipedia.org/wiki/Kenneth_C._Griffin

Fun with Leverage, Forward Prices and Volatility



Exchange Traded Funds:

The good: sector exposure, low fees, tight bid/offers.

The bad:

(a) Commodity ETFs…..dealing with the CONTANGO.

(b) Leveraged ETFs…..trend trading for dummies.

Futures:

Typical Futures Margin Requirement:

5% - 10% of underlying position

Example: Silver

Contract Size:	5,000 oz
Price ($) / oz:	$30
$ Value of Contract:	$150,000
Initial Margin:	$ 25,000
Volatility of Silver:	60%/yr
Day Equivalent:	4%/day

Margin covers ~ 4 day move

MARGIN PROCTECTS EXCHANGE FROM YOU

DOES NOT PROTECT YOU

Websites / Media:

www.wsj.com
www.ft.com
www.acting-man.com
www.elliottwave.com
www.financialsense.com
www.moneyandmarkets.com
www.safehaven.com
www.mises.org

Reading List:

Essays on the Great Depression – Ben Bernanke
America's Great Depression – Murray Rothbard
The Roosevelt Myth – John T. Flynn
The Bubble that Broke the World – Garet Garrett
The (Mis)behavior of Markets – Benoit Mandelbrot
The Intelligent Investor – Benjamin Graham
Conquer the Crash – Robert Prechter
Trade the Trader – Quint Tatro
The Fourth Turning – William Strauss
A History of Money and Banking
in the United States – Murray Rothbard
Dying of Money – Jens O. Parsson