Basic Option Strategies

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Outline:

- What is an Option?
- Payoff Graphs
- Basic Strategies with Options
  - ⋆ long calls/puts
  - ⋆ naked calls/puts

Outline continued

- (Slightly) More Advanced Strategies
  - ⋆ covered call writing
  - ⋆ Follow-up defensive measures
  - ⋆ ratio call writing

An Option Contract

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The stock in question is referred to as the *underlying*, the specific price in question is the *strike*, and the specific day is the *expiry* or *expiration day*.

Puts

If the terms of the contract relate to **selling** shares, then it is a *put option*. Restating...

A **put** is a contract giving the *owner* the right to *sell* 100 shares of the underlying to the *maker* at the *strike price* on the *expiration date*.

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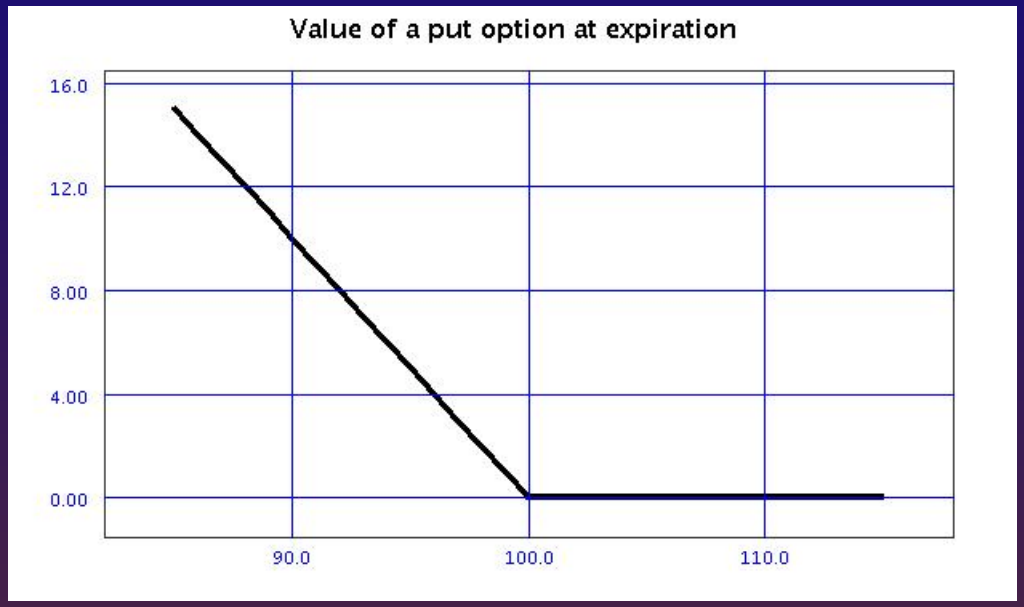
The owner is said to be *long* the put, while the maker is *short*.

Put Payoff Graph – Payoff vs Stock Price at Expiration



The option is In-The-Money (ITM) in the sloping part of the graph, (spot below strike) and Out-of-The-Money (OTM) in the flat part of the graph. Between those two, at the strike price, the option is At-The-Money (ATM).

You can see that if the stock's price at expiration exceeds the strike price (i.e. in the flat part), then the contract has zero value ("expires worthless").

Calls

If the terms of the contract relate to **buying** shares, then it is a *call option*. Restating...

A **call** is a contract giving the *owner* the right to *buy* 100 shares of the underlying from the *maker* at the *strike price* on the *expiration date*.

Calls

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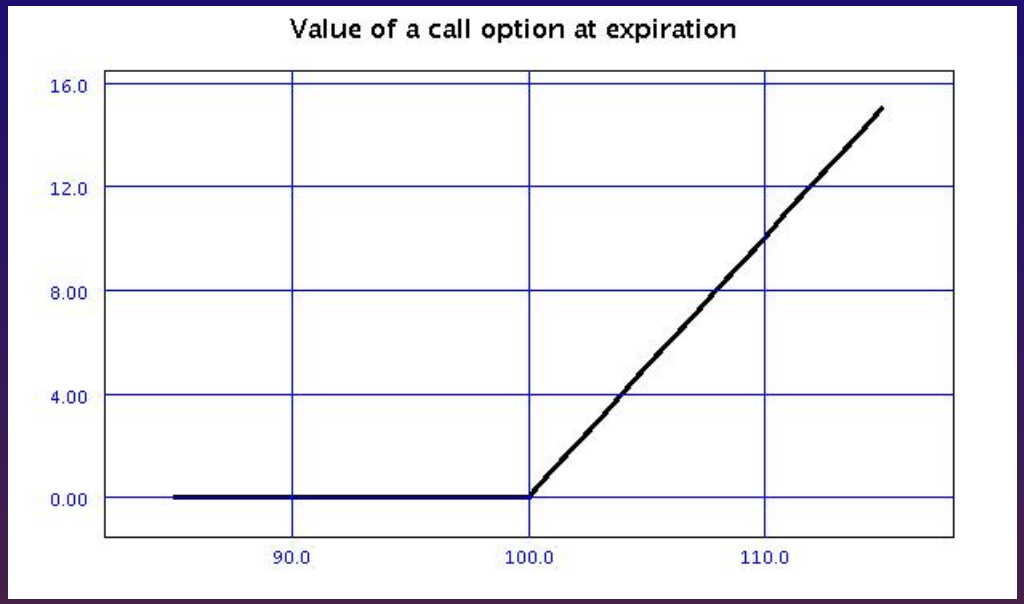
A **call** is a contract giving the *owner* the right to *buy* 100 shares of the underlying from the *maker* at the *strike price* on the *expiration date*.

The owner is said to be *long* the call, while the maker is *short*.

Call Payoff Graph – Payoff vs Stock Price at Expiration



The option is In-The-Money (ITM) in the sloping part of the graph, (spot above strike) and Out-of-The-Money (OTM) in the flat part of the graph. At the angle between those the option is At-The-Money (ATM).

If the stock's price at expiration is less than the strike price (i.e. in the flat part), then the contract expires worthless.

Silly Mnemonic

Stock price over, call's in clover.

Stock price under, put's in plunder.

Buying a Call

Ok, say we want to buy a call on MON (Monsanto) currently at $77.31.

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Regarding the former, due to time limitations, we will only say, since we have decided MON is going to rise in price, we must also have a prediction about the time frame: short term – two weeks or less, intermediate term – 1 to 3 months, or long term – buy a LEAPS.

Buying a Call, What strike?

Calls, MON 77.31 Expire at close Friday, March 16, 2012

Strike	Symbol	Last	Bid	Ask	Vol	I.value	T.value
70.00	MON120317C00070000	7.70	7.80	7.90	7	7.31	0.59
72.50	MON120317C00072500	5.61	5.65	5.80	10	4.81	0.99
75.00	MON120317C00075000	3.75	3.85	3.95	51	2.31	1.64
77.50	MON120317C00077500	2.42	2.41	2.44	171	0	2.44
80.00	MON120317C00080000	1.35	1.37	1.39	388	0	1.39
82.50	MON120317C00082500	0.71	0.71	0.73	129	0	0.73
85.00	MON120317C00085000	0.35	0.34	0.36	32	0	0.36
87.50	MON120317C00087500	0.20	0.16	0.17	25	0	0.17

Some Observations

As the strikes decrease at the top of the table, the call becomes further ITM and costs more.

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The difference between the cost of the option and the intrinsic value is the *time value* (T.value).

The "overhead" (bid/ask spread + commissions) is (b/a) \$10 for the 70 call to \$1 for the 87.50; plus a commission of \$4.99 per contract.

What strike? continued...

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An ATM call improves the chances of a payoff, but it is the most expensive in terms of time value. This aspect is important when selling options; referred to as *selling premium*.

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An ITM call is the most expensive because it has both intrinsic value and time value but it has the greatest chance of avoiding total loss.

"Temporary" Stock Ownership

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Thus holding such a call is like temporary stock ownership but with tremendous leverage.

For example:

If the stock gains 1% (77 cents) the call gains 10.5% (0.77/7.31).

Delta

Return to the table and notice that the price for the 72.50 strike is 5.80. If now the stock increases by $2.50 to 77.81, then the option will be an additional $2.50 ITM so we can estimate the new option price by looking at the cost of the 70 strike, or 7.90.

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Thus the stock price increased by 2.50 and the option price increased by (7.90-5.80)= 2.10. The percentage increase is $2.10/2.50 = 84\%$. This is an estimate of delta. (The exact Black-Scholes value is 86%).

Expectation

Mathematical expectation tells whether you will come out ahead (positive expectation) or behind (negative expectation) over the long haul.

Long Put/Call Expectations

Table Gain Expectation for Put and Call Options

for the calls: $S_0 = \$80, \tau = 20(\text{days}), \mu = 8\%, r = 1\%, \sigma = 20\%$

trade (strike p/c)	strike vs stock	price	time value	amt at risk	prob. of total loss(%)	prob. of a gain (%)	ex-pected gain	gain rate (%)
75 call	ITM	5.18	0.18	5.18	8	51	0.283	100
80 call	ATM	1.52	1.52	1.52	47	37	0.161	193
85 call	OTM	0.18	0.18	0.18	89	10	0.034	344
for the puts: $S_0 = \$80, \tau = 20(\text{days}), \mu = -4\%, r = 1\%, \sigma = 20\%$								
85 put	ITM	5.14	0.14	5.14	9	51	0.188	67
80 put	ATM	1.47	1.47	1.47	47	37	0.110	137
75 put	OTM	0.14	0.14	0.14	91	9	0.019	249

Some points for emphasis

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The reason is that to exercise a long call, for example, entails buying 100 shares of stock at the strike price (a large investment), then selling the stock later on the market (incuring a risk that the price will be lower). Further this costs two stock overhead transactions (bid/ask spread and commissions).

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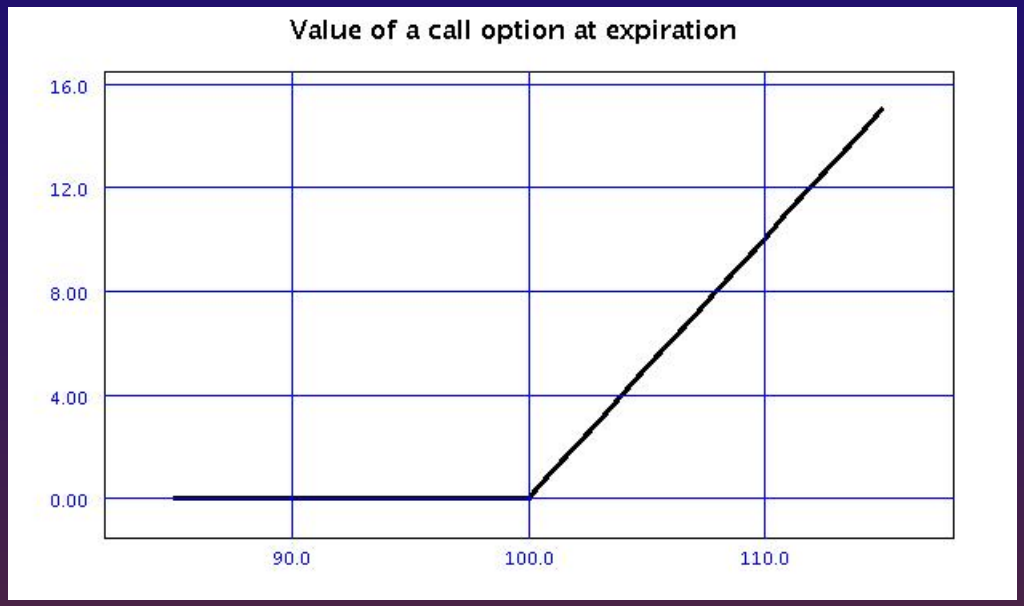
(2) Please emphatically note that the numbers in this expectation table are predicated on an 8% average growth rate for the underlying. Unless these conditions

are matched, the numbers don't apply. The higer return rates are especially sensitive to small changes in the drift rate as the gains are so small.

Short Puts and Calls

These trades are said to be *naked*. Look again at the payoff graph for the owner of a call.



The payoff for the maker is the opposite, what the owner gains comes out of the maker's pocket. In principle there is no limit as to how high a stock can rise, thus there is no limit as to how much a naked call can lose.

Margin Requirements

The margin requirements for writing naked calls are 20% of the stock price minus the call option premium. This is a general rule and will vary depending on the brokerage you are using. Each brokerage also has a minimum security or equity value requirement before naked call transactions may occur. In addition, some brokerages require a maintenance fee or "kicker" for each naked call written.

Further, federal regulations (reg T) require that you have at least 25% of the total market value of your securities in your margin account at all times. This is called the "maintenance requirement."

Short Puts and Calls continued

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One sells a naked put– so long as the price is maintained, the premium is income, if the price drops, the put is exercised (by the owner) and one has bought stock at a lower price (than when the put was sold).

Put/Call Parity and Covered Calls

It turns out there is an approved way to sell naked puts. Put/call parity (a topic for another day) asserts that

selling a call and buying the underlying

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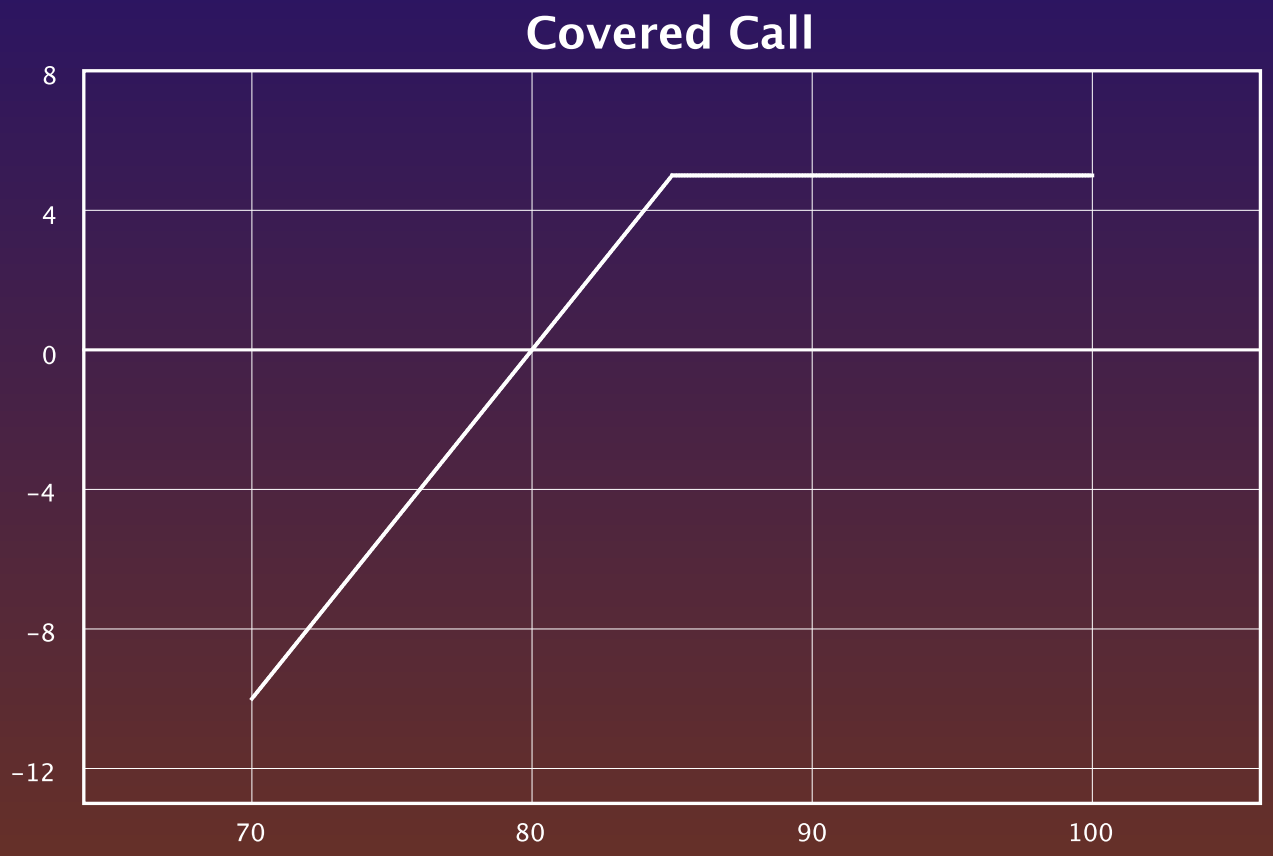
This is known as a *covered call*.

Covered Call Payoff Graph

The accompanying figure shows the payoff graph for a covered call with stock price \$80 and strike price \$85. It does not include the premium.



Covered Call Payoff Continued

At expiration, the greater the stock price exceeds 80, the greater is the payoff – up to a maximum of \$5. At that point the stock is called away to fulfill the contract.

The maximum profit of a covered call is always at the strike price.

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If the stock loses value, the trade likewise also loses via the stock ownership.

Covered Call Payoff Continued

These values are offset by the call's premium. For a \$5 OTM 2 month call the premium is about \$1 (all time value).

Thus the maximum profit is \$6 (5 from the stock, 1 from the option); the breakeven point is (80-1)=\$79.

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Greater premium is available the nearer to ATM, the 82.50 call's value is $1.70, 70% more.

Next consider the expectation of the trade.

Covered Call Expectation

Table Gain Expectation for Covered Call Trades

$S_0 = \$80.00, r = 1\%, \mu = 4\%, \sigma = 20\%$

trade	time to expir.	price	amt at risk	total loss prob(%)	gain prob (%)	ex-pected gain	gain rate (%)
82.50 call	15	0.43	79.57	0+	56	0.110	4
82.50 call	30	0.89	79.11	0+	59	0.200	3
82.50 call	45	1.27	78.73	0+	61	0.295	3
85 call	15	0.10	79.90	0+	52	0.121	4
85 call	30	0.36	79.64	0+	54	0.242	4
85 call	45	0.64	79.36	0+	56	0.337	3

Follow-up Defensive Measures

What do you do if the position moves against you?

- nothing (the option mitigated your stock loss)
- roll down (sell more time value)
  - ⋆ total roll down
  - ⋆ partial roll down

Roll Down

Consider the Monsanto trade:

long stock at 77.31, short 77.50 call for 2.44

max profit$= (.19 + 2.44) = 2.63$ w/ stock at 77.50

breakeven at $(77.31 - 2.44) = 74.87$.

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After 1 week the stock falls to \$75 (a loss of \$2.31).
What to do?

buy back the 77.50 call for 1.14 (profit 1.30)

sell 75 call for 2.19

Characteristics now: net $-2.31 + 1.30 + 2.19 = 1.18$,
max profit= 1.18, breakeven $(75.00 - 1.18) = 73.82$.

Caveat

The above analysis was carried out using Black-Scholes (with implied volatility calculated from the original Monsanto table) and, importantly, excludes overhead – bid/ask spread and commissions.

The roll down trade: sell the 75 call and buy the 77.50 call, is known as a *credit spread with calls*. It may be cheaper to put on in that form than separately.

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The new maximum profit point is $75, the strike price of the new call.

Defense Against a Rising Stock Price

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Suppose after 1 week the stock price rises to \$80 (a gain of \$2.69)

Roll-up:

buy back the 77.50 call for 3.80 (a 1.36 loss)
sell 80 call for 2.34.

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Roll-up:

buy back the 77.50 call for 3.80 (a 1.36 loss)
sell 80 call for 2.34.

Characteristics now: net $2.69 - 1.36 + 2.34 = 3.37$,
max profit$=$ 3.37, breakeven $(80.00 - 3.37) = 76.63$.

Ratio Call Writing

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For example, suppose you own 300 shares of MON (at 77.31); you sell 4 March 77.50 calls for $\$2.44 \times 4 \times 100 = \$976$.

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The upside breakeven is $77.50 + 3 \times (.19 + 3.25) = 87.82$.

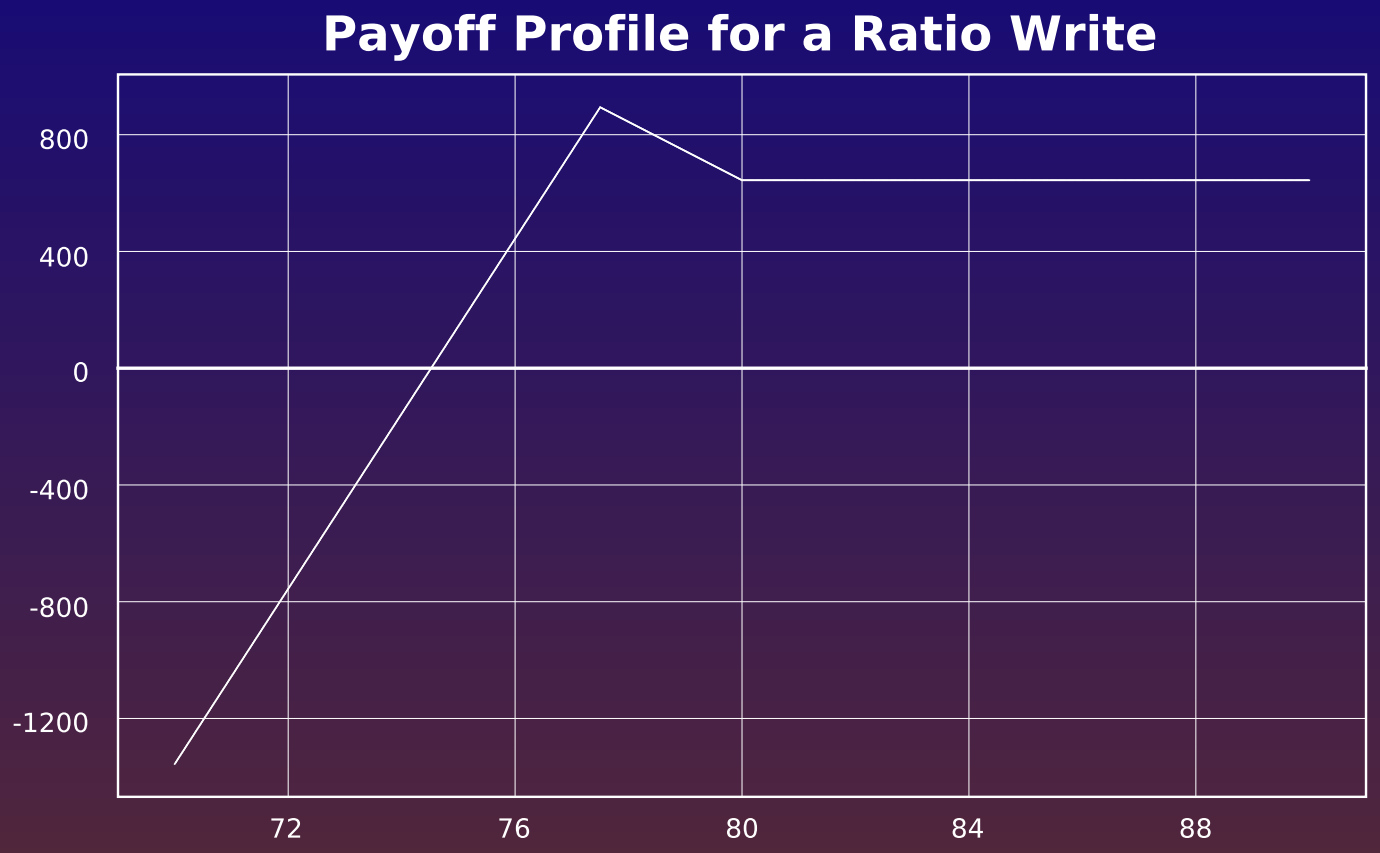
Ratio Call Writing

At this point you are 1 call naked. But by going long an 80 call, it costs you \$139 to be covered completely above \$80.

In this case the downside breakeven is 77.31-(976-139)/300=74.52.

On the upside it is all profit. See the payoff figure.

Payoff of a 3/-4/+1 Ratio Call



Ratio Call Expectations

Table Gain Expectation for Ratio Call Trades

$S_0 = \$77.31, r = 1\%, \tau =$ 33 days, $\sigma = 30\%$

equity /short /long	drift	proceeds	amt at risk	total loss prob(%)	gain prob (%)	ex-pected gain	gain rate (%)
3/-4/0	4%	10.72	221.21	0	64.3	0.40	2
3/-4/1	4%	9.05	222.88	0	67.2	0.46	2
3/-4/0	1%	10.72	221.21	0	63.5	0.19	1
3/-4/1	1%	9.05	222.88	0	66.1	0.20	1