Stop Loss strategy

On Day0

Write startBalance / **strike(K)** number of options (to avoid borrowing large amount of money because stock purchase price will be around strike)

 - If option ITM, buy the same amount of underlying stocks

  portfolio value = income from selling options + strike(K) * # of stocks

  bank value = income from selling options ITM: A call option on the index is said to be in-the-money when the current index stands at a level higher than the strike price (i.e. spot price > strike price).

 - If option OTM, do nothing

  bank value = income from selling options + start balance

  portfolio value = bank value

On Dayn

Sell stock if stock price drops from above strike to below strike

Buy stock if stock price goes up from below strike to above strike

No trading otherwise

Examples (Option price = $1/contract, Start Balance = 1000)

1. Stays OTM through out life of option

Strike = 2.0, numOption = 500

Price Array

[1.0, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 2.0]

Portfolio Value

[1500.0, 1500.2976485752711, 1500.5953562136583, 1500.8931229268819, 1501.1909487266641, 1501.4888336247298, 1501.7867776328055, 1502.084780762621, 1502.382843025908, 1502.6809644344003, 1502.979144999834]

2. Stays ITM through out life of option

Strike = 2.0, numOption = 500

Price Array

[3.0, 4.0, 3.0, 4.0, 3.0, 4.0, 3.0, 4.0, 3.0, 4.0]

Portfolio Value

[1500.0, 1500.099216191757, 1500.1984520712194, 1500.297707642294, 1500.396982908888, 1500.49627787491, 1500.5955925442686, 1500.6949269208735, 1500.7942810086358, 1500.8936548114666]

Note: stock holdings do not generate interests, so less interest income than Ex. 1

3. Up and Downs

Strike = 2.0, numOption = 500

Price Array

[1.0, 3.0, 1.0, 3.0, 1.0, 3.0, 1.0, 3.0, 1.0, 3.0]

Change in stock holding

[0.0, 1.0, -1.0, 1.0, -1.0, 1.0, -1.0, 1.0, -1.0, 1.0]

Portfolio Value

[1500.0, 1000.2976485752711, 500.29770763838729, 0.39698290498063216,
-499.80137070426929, -999.90054748154171, -1500.2973925139695, -2000.595100101546,
-2501.1905153392195, -3001.6868325348009]

4. Real-world example (Valeant crash, Feb 29 – Mar 24)

Strike = 65.0

Price Array

[65.80, 65.45 67.47, 64.89, 61.31, 65.66, 63.15, 66.86, 66.15, 69.55, **69.04, 33.51**, 33.54, 29.69,
26.98, 28.98, 31.89, 33.43, 31.09]

Change in stock holding

[1.0, 0.0, 0.0, -1.0, 0.0, 1.0, -1.0, 1.0, 0.0, 0.0, 0.0, -1.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0]

Portfolio Value

[1015.3846153846154, 1015.3876681905156, 1015.3907216021913, 1013.7014525428399,
1013.9026037382396, 1003.9498871562428, 975.4891632494581, 947.06733188921385,
947.05682833371486, 947.0463226939703, **947.03581496956667, 462.56373592932096**,
462.65552355396858, 462.74732939225333, 462.83915344778939, 462.93099572419163,
463.02285622507571, 463.11473495405795, 463.20663191475535]

Covered Call writing

Use all of startBalance to buy the underlying stock. Write the same amount of call options on that stock.
Bank = income from selling options + interest
Portfolio value = Bank + numer of stocks * min(Sk, K)

Examples (Start Balance = 1000)

1. Straight UP
Option price = $1/contract
Strike = 6.5
Price Array
[1.0, 3.0, 5.0, 7.0, 9.0, 11.0, 13.0, 15.0]
Portfolio Value
[2000.0, 4000.198432383514, 6000.3969041424389, 7500.5954152845879, 7500.7939658177766, 7500.99255574982, 7501.1911850885372, 7501.389853841747]

2. Straight DOWN
Option price = $10/contract
Strike = 11.0
Price Array
[20.0, 18.0, 16.0, 14.0, 12.0, 10.0, 8.0, 6.0, 4.0, 2.0, 0.0]
Portfolio Value
[1050.0, 1050.099216191757, 1050.1984520712194, 1050.297707642294, 1050.396982908888, 1000.4962778749099, 900.59559254426847, 800.69492692087, 700.79428100863583, 600.8936548114666, 500.9930483332779]

3. Up and Down
Option price = $1/contract
Strike = 2.0
Price Array
[1.0, 3.0, 1.0, 3.0, 1.0, 3.0, 1.0, 3.0]
Portfolio Value
[2000.0, 3000.198432383514, 2000.3969041424389, 3000.5954152845879, 2000.7939658177761, 3000.99255574982, 2001.1911850885369, 3001.389853841747]

CPPI

Investor sets a floor(F) on the dollar value of his or her portfolio, then structures asset allocation around that decision. The two asset classes used in CPPI are a stock and a riskless asset (generates risk-free return). M * (Portfolio value – F) will be used to buy the stock, and the residual will be put in the bank. M is the multiplier chosen by the investor.

Example (Valeant crash, Feb 29 – Mar 24)
[65.80, 65.45, 67.47, 64.89, 61.3, 65.66, 63.15, 66.86, 66.15, 69.55, 69.04, 33.51, 33.54, 29.69, 26.98, 28.98, 31.89, 33.43, 31.09]

Multiplier 5 Floor 0.8	Multiplier 2 Floor 0.8
CPPI:	CPPI:
1000.19843238351	1000.19843238351
994.87375745557	998.187645467691
1024.95007898701	1010.54052075209
981.920667762782	994.555666856456
931.751966792767	973.208433865647
978.545775296873	997.91141651439
944.43622588293	982.899668303286
986.907742317161	1004.51246351127
976.994090643122	1000.28711443817
1022.49837280492	1020.99497158294
1014.32274305884	1017.86880461058
462.827626590073	793.74100515972
462.919466579174	793.898509079266
463.011324792302	794.056044252691
463.103201233074	794.213610686196
463.195095905108	794.371208385984
463.28700881202	794.528837358259
463.37893995743	794.686497609226
463.470889344956	794.844189145093
End Balance of CPPI is	End Balance of CPPI is
463.470889344956	794.844189145093