AFRAID to TRADE
overcoming stock market fears with Corey Rosenbloom

Gap Study Research - SPY 2009

From time to time, I like to update my research on gaps - in terms of percentage of gaps filled, average size of gaps, stop-loss strategies, etc.

The following report comprises data compiled with Microsoft Excel (unless otherwise noted) addressing overnight gaps in the SPY (S&P 500 ETF).

Gap trading can be a profitable endeavor, particularly because we can know the odds (derived from the past) of the likelihood of a gap occurring currently to fill. The following study addresses those probabilities.

All data are from January 2, 2009 to December 31, 2009 and represent 247 total trading days in the SPY.

Gap Size	Number	%DayswGap
$ 0.10	223	90.28%
$ 0.15	214	86.64%
$ 0.20	197	79.76%
$ 0.25	184	74.49%
$ 0.30	172	69.64%
$ 0.35	162	65.59%
$ 0.40	151	61.13%
$ 0.45	140	56.68%
$ 0.50	127	51.42%
$ 0.55	119	48.18%
$ 0.60	110	44.53%
$ 0.65	102	41.30%
$ 0.70	96	38.87%
$ 0.75	90	36.44%
$ 0.80	77	31.17%
$ 0.85	64	25.91%
$ 9.00	58	23.48%
$ 9.50	53	21.46%
$ 1.00	43	17.41%

Depending on how you define a "gap," the following table reflects the number of gaps - by size - that occurred:

To interpret this graph, the "**Gap Size**" reflects the size - in cents - of the overnight gap.

"**Number**" refers to the number of days that return at least that size gap or smaller.

"**%DayswGap**" refers to the Percentage of days - out of 274 - in the year that formed that size gap or smaller.

Thus, there were 151 days - or 61.13% of days - that showed a gap of at least 30 cents in the SPY.

There were 96 days - or 38.87% of days - that showed a gap of at least 70 cents in the SPY.

Only 17% of days saw a gap of at least $1.00 in the SPY.

Logically, as the size of the gap increases, fewer days will have that size of gap (meaning larger gaps are less common than smaller gaps).

The following chart reflects the percentage of gaps that filled, as a function of gap size:

Gap Size	Number	% Filled
$ 0.10	223	67.71%
$ 0.15	214	66.36%
$ 0.20	197	64.47%
$ 0.25	184	64.13%
$ 0.30	172	62.21%
$ 0.35	162	59.88%
$ 0.40	151	59.60%
$ 0.45	140	57.86%
$ 0.50	127	54.33%
$ 0.55	119	51.26%
$ 0.60	110	50.00%
$ 0.65	102	48.04%
$ 0.70	96	47.92%
$ 0.75	90	48.89%
$ 0.80	77	49.35%
$ 0.85	64	46.88%
$ 9.00	58	41.38%
$ 9.50	53	41.51%
$ 1.00	43	34.88%

"Gap Fill" is defined as "price opening up or down by a certain amount (size) and then by the end of the day, the high (of a down-gap day) was equal or greater than the close of yesterday, or the low (of an up gap day) was equal or less than yesterday's close.

A gap was considered unfilled if the intraday high of a down-gap day did not equal or exceed yesterday's close, or if the intraday low of an up-gap day did not equal or exceed yesterday's close.

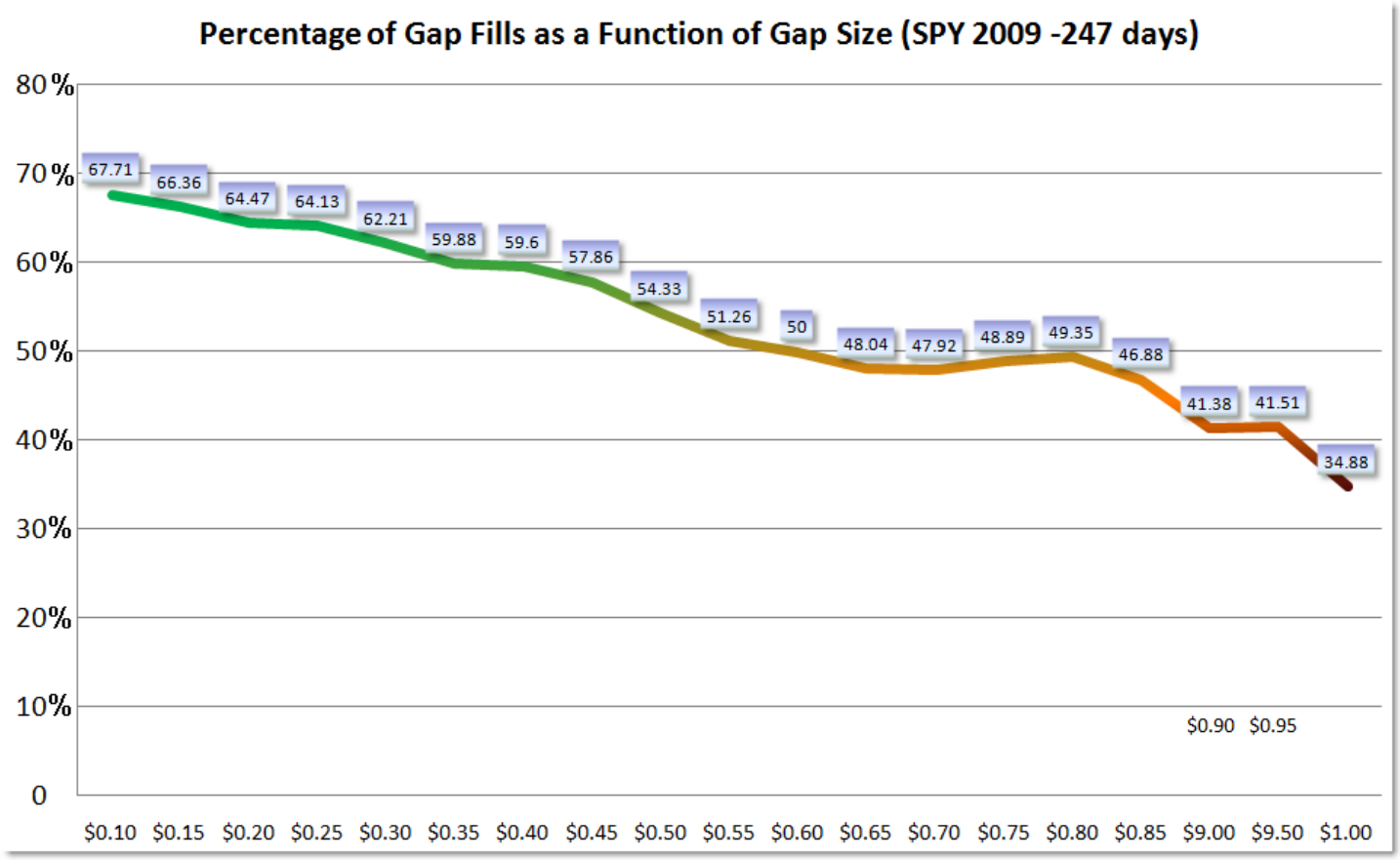
No stops were used - this is a pure price analysis that answers the question "Did the gap fill intraday or not?"

If yes, then the gap would be considered "Filled Intraday" and if no, then the gap was "Unfilled Intraday."

As you can see, gap size is inversely correlated with the percentage of success in filling a gap, meaning the larger the gap, the smaller the number of gaps filled; also the smaller the gap, the larger the percentage of gaps filled.

While this is logical, it's good to have the exact statistics to reference when you are confronted each morning with a gap of a particular size. The 50% point in 2009 was a 60 cent gap - meaning we can observe an 'edge' on gaps less than 60 cents to fill... albeit a small edge. It is better to know that 59% of all gaps that were 40 cents or less filled intraday... and

that 34.88% of all gaps greater than $1.00 filled (do not expect a fill from a large gap). The number of gaps in the chart reflects the TOTAL number of gaps in 2009 as seen in the prior chart (and not the number of gaps filled).



The chart above is the key of the report, which reflects the percentage of gaps - as a function of size - that filled intraday.

The point where the odds drop to 'random' include from 55 cents to 80 cents (percentage-wise) and the odds sharply drop-off at 85 cents to have a 'counter-edge' of filling (less than 50%).

In fact, the whole zone from 55 to 80 cents shows a probability of fill from 51% to 49% - essentially random.

The percentage successively declines as the size of the gap increases - while 67% (or 2 of every 3) gaps of 10 cents or less fill, odds drop off to 55% of a gap of 40 cents filling.

Roughly 1 in 3 (34%) of gaps of $1.00 filled, which is not to say that gaps of $1.00 do not fill, but the probabilities are reduced.

Gap Optimization Function

Next, using TradeStation (with data interpreted in Excel), I conducted an "Optimization" function to answer the following question:

"What is the optimal range of minimum and maximum gap size?"

This was done by a custom strategy that tests gaps as a parameter of size, meaning you input the minimum value (10 cents... 30 cents, etc) that the system will count as a "gap" to trade and then the maximum ($1.00... $1.20... etc) that the system will fade.

The system will ONLY initiate a gap fade if the gap in question is equal to or greater than the minimum, or equal to or less than the maximum.

For example, if your parameters are "The minimum gap is 30 cents but the maximum gap is 80 cents" then the strategy would NOT execute a gap fade if the morning gap was 20 cents (less than the minimum) or 90 cents (greater than the maximum).

I used an optimization function (cross-testing) that ranged from a minimum gap of 10 cents to 60 cents for the trade to be entered and then cross-tested those 11 variables - in 5 cent increments - with a maximum gap that ranged from 60 cents to $1.30 - also in 5-cent increments (15 variables). This resulted in 165 system/strategy tests that answered the question:

"What is the range of values, or best area in the optimization grid that produces the highest pure net profit (without using stops?"

The grid below reflects the answer to that question, labeled in dollars under the following parameters:

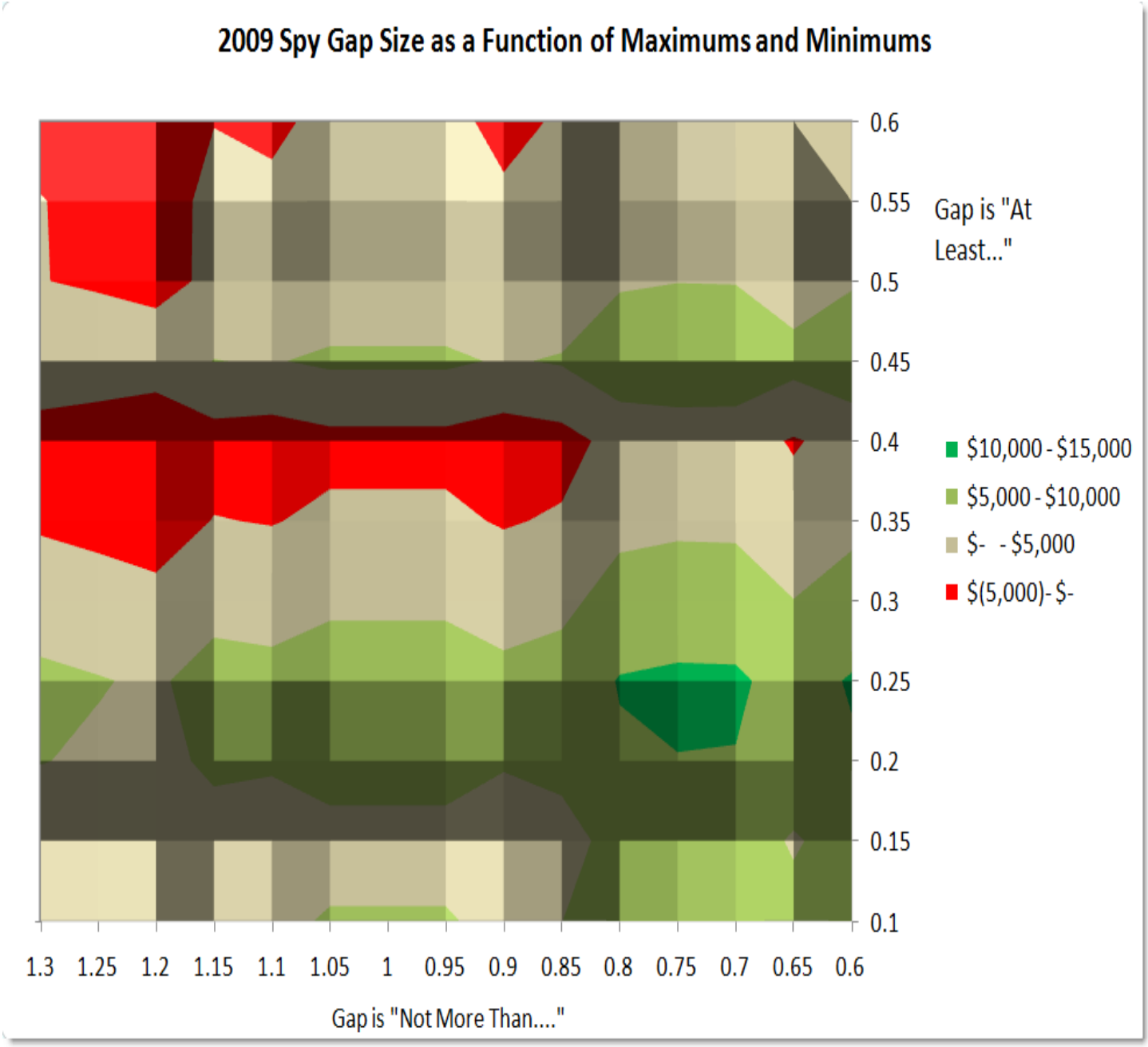
SPY ETF with 1,000 shares per trade.
Enter a "gap fade" position (long or short) IF the current gap is greater than the minimum value, but less than the maximum value (if not, then no trade is taken)
Exit the position with a profit if at any time during the day, today's price - after a gap - equals yesterday's close
Exit the position with a loss (or small profit) at the end of day if the gap does not fill at any time intraday (defined as today's low equals yesterday's close on an up-gap, or today's high equals yesterday's close on a down gap)

Again, no stops, no commissions, and no slippage were factored in to reveal 'pure price' data.

In summary, the best/optimal values for profit from the gap-fade strategy came with the following parameters:

The gap is AT LEAST 20 or 25 cents
The gap is NOT GREATER THAN 70 to 80 cents

This strategy entered at the CLOSE of the first bar (5-min) instead of entering exactly at the open - results will be slightly different if using the exactly open as an entry instead of entering at the close of the first bar (in this case, 5-min).



The "Pocket of Profitability" occurs on the bottom right side of the chart, with both small minimums (20 to 25 cents) and small maximums (70 to 80 cents).

The results fared poorest when the minimum gap and the maximum gap were large - such as the 60 cent minimum and $1.30 cent maximum.

The table on the next page shows exact values.

But NOT Greater Than...	Gap is AT LEAST... $0.10	$0.15	$0.20	$0.25	$0.30	$0.35	$0.40	$0.45	$0.50	$0.55	$0.60
$ 0.60	$ 8,190	$6,640	$9,510	$10,340	$7,100	$ 3,750	$ 1,640	$8,680	$ 4,490	$ 4,450	$ -
$ 0.65	$ 6,170	$4,620	$7,490	$ 8,320	$5,080	$ 1,730	$ (380)	$6,660	$ 2,470	$ 2,430	$ 1,490
$ 0.70	$ 8,510	$6,960	$9,830	$10,660	$7,420	$ 4,070	$ 1,960	$9,000	$ 4,810	$ 4,770	$ 3,830
$ 0.75	$ 8,590	$7,040	$9,910	$10,740	$7,500	$ 4,150	$ 2,040	$9,080	$ 4,890	$ 4,850	$ 3,910
$ 0.80	$ 8,100	$6,550	$9,420	$10,250	$7,010	$ 3,660	$ 1,550	$8,590	$ 4,400	$ 4,360	$ 3,420
$ 0.85	$ 4,930	$3,380	$6,250	$ 7,080	$3,840	$ 490	$(1,620)	$5,420	$ 1,230	$ 1,190	$ 250
$ 0.90	$ 4,080	$2,530	$5,400	$ 6,230	$2,990	$ (360)	$(2,470)	$4,570	$ 380	$ 340	$ (600)
$ 0.95	$ 5,280	$3,730	$6,600	$ 7,430	$4,190	$ 840	$(1,270)	$5,770	$ 1,580	$ 1,540	$ 600
$ 1.00	$ 5,280	$3,730	$6,600	$ 7,430	$4,190	$ 840	$(1,270)	$5,770	$ 1,580	$ 1,540	$ 600
$ 1.05	$ 5,280	$3,730	$6,600	$ 7,430	$4,190	$ 840	$(1,270)	$5,770	$ 1,580	$ 1,540	$ 600
$ 1.10	$ 4,230	$2,680	$5,550	$ 6,380	$3,140	$ (210)	$(2,320)	$4,720	$ 530	$ 490	$ (450)
$ 1.15	$ 4,600	$3,050	$5,920	$ 6,750	$3,510	$ 160	$(1,950)	$5,090	$ 900	$ 860	$ (80)
$ 1.20	$ 2,270	$ 720	$3,590	$ 4,420	$1,180	$(2,170)	$(4,280)	$2,760	$(1,430)	$(1,470)	$(2,410)
$ 1.25	$ 3,090	$1,540	$4,410	$ 5,240	$2,000	$(1,350)	$(3,460)	$3,580	$ (610)	$ (650)	$(1,590)
$ 1.30	$ 3,830	$2,280	$5,150	$ 5,980	$2,740	$ (610)	$(2,720)	$4,320	$ 130	$ 90	$ (850)

As seen in the chart above, there were two "pockets" of values that returned consistent profits, which is exactly what an optimization matrix should show - the goal is not to arrive at a fixed variable (such as "25 cents and 75 cents") but to look for pockets as shown above.

The successful pockets occurred at the "At least 20 to 25 cents" and then "at least 45 cents" when combined with "But Not Greater than 60 cents to 80 cents."

My thinking on this result is that the gaps of 10 or 15 cents - while highly accurate - do not give enough profit to be 'worth it' like a gap of 20 or 25 cents would be over time.

We also see consistently that profits "drop off" as the size of the maximum gap increases, which tells us what we already know - that probability of a successful gap fill "drops off" as the size of the gap increases... and so do profits.

The worst returns - even negative returns - came at the bottom (and right side) portion of the grid, indicating that smaller gaps tend to produce the best results.

I am unsure specifically as to why the gap value of 40 cents performed so poorly in the study but 45 cents did not. Other than this anomaly, everything else in the chart would be as expected.

Number of Trades Taken as a Function of Minimum and Maximum Gap Sizes

	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60
0.60	126	114	95	86	67	56	41	33	20	10	-
0.65	135	123	104	95	76	65	50	42	29	19	4
0.70	139	127	108	99	80	69	54	46	33	23	8
0.75	152	140	121	112	93	82	67	59	46	36	21
0.80	157	145	126	117	98	87	72	64	51	41	26
0.85	163	151	132	123	104	93	78	70	57	47	32
0.90	176	164	145	136	117	106	91	83	70	60	45
0.95	181	169	150	141	122	111	96	88	75	65	50
1.00	190	178	159	150	131	120	105	97	84	74	59
1.05	190	178	159	150	131	120	105	97	84	74	59
1.10	192	180	161	152	133	122	107	99	86	76	61
1.15	196	184	165	156	137	126	111	103	90	80	65
1.20	200	188	169	160	141	130	115	107	94	84	69
1.25	203	191	172	163	144	133	118	110	97	87	72
1.30	205	193	174	165	146	135	120	112	99	89	74

For reference, this grid represents the TOTAL NUMBER OF TRADES TAKEN in the strategy as a factor of minimum and maximum gap size (identical to the chart above, only this time with total number of trades taken instead of profit).

The top row reflects the "Minimum Size" and the left column reflects the "Maximum Size."

As you would expect, more trades are taken (more gap-fills are attempted) when the minimum size ("gap is at least...") is small and the maximum size ("gap is NOT greater than...") is large - peaking at 205 trades (out of 247 days).

There were only four trades taken when the minimum size was at least 60 cents and the maximum size was at least 65 cents... logically.

(Reference: "Gap is AT LEAST..." is at the top of the chart/horizontal axis.
"Gap is NOT GREATER THAN..." is at the left side of the chart/vertical axis.)

This chart reflects one of the main reasons the win-rate (and perhaps profit) is higher than would be reported in the Excel chart. In the Excel percentage grid, a gap was considered filled ONLY if the gap was filled at any point during the day. However, in the TradeStation (and real-world) testing, we have situations like this, where a gap is NOT filled, a trade to short (fill) the gap is triggered, and the gap does NOT fill, but returns back to the testing as a profitable (winning) trade.

In this case, (July 1, 2009), price gapped up roughly 40 cents, the trade to short the gap was taken at the close of the first bar (almost $92.50) though price did not return to the $92.00 level to fill the gap. In the real world, this would certainly have been a trade that was stopped out, but due to pure price testing, the result for the study is a profitable trade in that the close of the day - which signaled the exit without stops in the event the gap was not filled - was an exit and could result in a profit if the gap was partially filled (as seen above).

Keep this in mind when analyzing the data.

These two examples from July 8th and 9th show to back-to-back successful gap fills, and reflects how the TradeStation testing program recorded a gap from entry to exit.

Entry occurred at the close of the first 5-min bar after a gap occurred (of specified size) and exited at the price level of yesterday's close when that price was triggered.

Unfortunately, there were some cases during the year where the price came within 2 to 5 cents of a successful fill, but those were not counted as successful official fills because the gap had to be filled officially to count as a 'fill.'

This would be a slight difference in the real world, where you would (almost certainly) choose to exit a position if price came within a few points of hitting your target and began to reverse - you would not let a profit turn into a loss like the computer simulator would, which had to follow strict parameters.

This chart from July 20th reflects one of those "failed" gap fill situations that you probably would have exited with a profit in real-time trading after the gap filled but fell about 7 cents shy of a complete (official) fill.

July 17th and 21st show two successful gap fills.

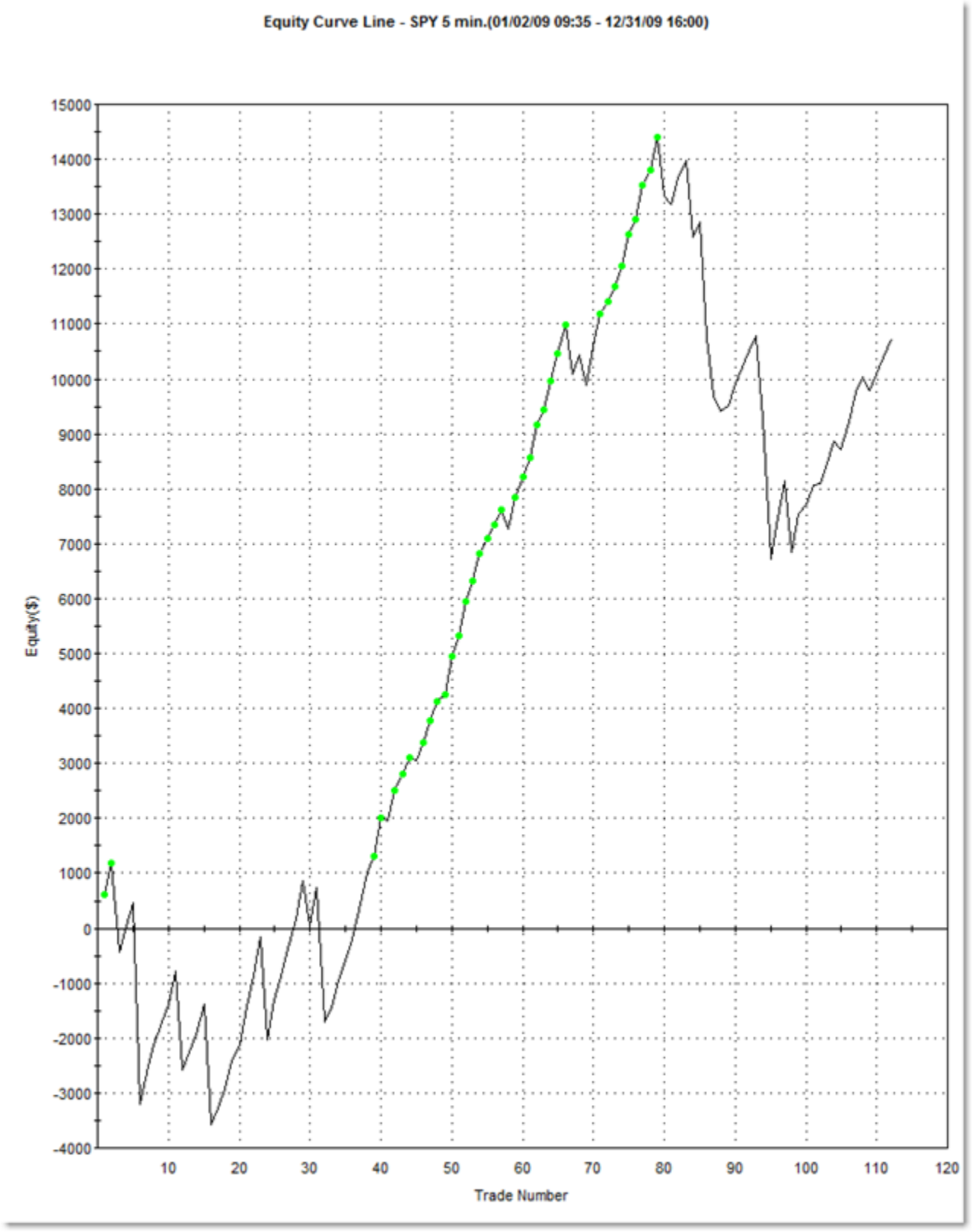
Notice that during an unsuccessful (official) gap fill, the program exited the position at the close of the session.

TradeStation Performance Summary Collapse

All Trades

Total Net Profit	$10,740.00	Profit Factor	1.38
Gross Profit	$38,880.00	Gross Loss	($28,140.00)
Roll Over Credit	$0.00		
Open Position Profit/Loss	$0.00		
Select Total Net Profit	$10,740.00	Select Profit Factor	1.38
Select Gross Profit	$38,880.00	Select Gross Loss	($28,140.00)
Total Number of Trades	112	Percent Profitable	79.46%
Winning Trades	89	Losing Trades	23
Even Trades	0		
Avg. Trade Net Profit	$95.89	Ratio Avg. Win:Avg. Loss	0.36
Avg. Winning Trade	$436.85	Avg. Losing Trade	($1,223.48)
Largest Winning Trade	$730.00	Largest Losing Trade	($3,670.00)
Largest Winner as % of Gross Profit	1.88%	Largest Loser as % of Gross Loss	13.04%
Net Profit as % of Largest Loss	292.64%		
Slct. Net Profit as % of Largest Loss	292.64%	Adj. Net Profit as % of Largest Loss	20.47%
Max. Consecutive Winning Trades	12	Max. Consecutive Losing Trades	3
Avg. Bars in Winning Trades	22.63	Avg. Bars in Losing Trades	76.52
Avg. Bars in Total Trades	33.70		
Max. Shares/Contracts Held	1000		
Total Commission	$0.00	Total Slippage	$0.00
Return on Initial Capital	10.74%	Annual Rate of Return	10.26%
Buy and Hold Return	20.66%	Return on Account	140.03%
Avg. Monthly Return	$895.00	Std. Deviation of Monthly Return	$3,157.44
Return Retracement Ratio	0.90	RINA Index	512.33
Sharpe Ratio	n/a	K-Ratio	n/a
Trading Period	11 Mths, 28 Dys, 2 Hrs, 15 Mins	Percent of Time in the Market	3.53%
Time in the Market	12 Dys, 20 Hrs	Longest Flat Period	18 Dys, 17 Hrs, 35 Mins
Max. Equity Run-up	$20,120.00		
Date of Max. E. Run-up	09/16/09 09:55	Max. E. Run-up as % of Initial Capital	20.12%

The following summary - from TradeStation - reflects the pure research of fading a gap that was at least 25 cents but not more than 75 cents (these were the optimal value ranges) WITHOUT using stops (pure price data) or factoring in commissions or slippage (which would exist in the real world). Notice that, while the strategy was profitable, the average losing trade of $1,200 and especially the largest losing trade of $3,600 is grossly unacceptable and reflects the decision not to use stops (even though not using stops resulted in a win rate percentage of 79.50%. This would be your benchmark chart to compare the effectiveness of any stop-loss strategy as defined in the report.



This is the equity curve graph from the same study - fading a SPY gap of 25 cents but not more than 75 cents - no stops. 1,000 shares per trade.

The profile shows frequent small incremental gains that are peppered with very large losses.

TradeStationChart Settings	
Symbol	SPY
Description	S&P Dep Receipts
Interval	5 min.
Start Date/Time	1/2/2009 9:35:00 AM
End Date/Time	12/31/2009 4:00:00 PM

TradeStation Strategies Applied

Gap Fade Corey2(On)

TradeStation Strategy Inputs

Description	Value
Gap Fade Corey2 - iContracts	1000
Gap Fade Corey2 - iExitEODOn	true
Gap Fade Corey2 - iGAPSizeMin	0.25
Gap Fade Corey2 - iGAPSizeMax	0.75

TradeStation Strategy Settings

Costs/Capitalization

Initial Capital	$100,000.00
Commission	$0.00 per Trade
Slippage	$0.00 per Trade
Interest Rate	2.00%

Back-testing Resolution

Look-Inside-Bar Back-Testing	Disabled
MaxBarsBack	50

Position Limits

Disabled: No entry orders allowed in the same direction as the currently held position.

Max. shares/contracts per pos.	65000

This reflects the data verification/summary of the study.

Adding a FIXED Stop from Entry: $0.25 min; $0.75 max Gap

	Gap Fade Corey2: StopLoss	All: Net Profit	All: % Profitable	All: Gross Loss	All: Gross Profit	All: Total Trades	All: Winning Trades	All: Losing Trades	All: Max Losing Trade	All: Avg Winning Trade	All: Avg Losing Trade	All: Win/Loss Ratio	All: Avg Trade
1	1.00	9,810	73.21	-25,690.00	35,500.00	112	82	30	-1,000.00	432.93	-856.33	0.51	87.59
2	0.95	11,010	73.21	-24,490.00	35,500.00	112	82	30	-950.00	432.93	-816.33	0.53	98.30
3	0.90	11,010	72.32	-24,190.00	35,200.00	112	81	31	-900.00	434.57	-780.32	0.56	98.30
4	0.85	8,380	69.64	-25,490.00	33,870.00	112	78	34	-850.00	434.23	-749.71	0.58	74.82
5	0.80	7,520	68.75	-25,670.00	33,190.00	112	77	35	-800.00	431.04	-733.43	0.59	67.14
6	0.75	8,200	67.86	-24,870.00	33,070.00	112	76	36	-750.00	435.13	-690.83	0.63	73.21
7	0.70	9,800	67.86	-23,270.00	33,070.00	112	76	36	-700.00	435.13	-646.39	0.67	87.50
8	0.65	9,440	66.07	-22,970.00	32,410.00	112	74	38	-650.00	437.97	-604.47	0.72	84.29
9	0.60	7,670	63.39	-23,070.00	30,740.00	112	71	41	-600.00	432.96	-562.68	0.77	68.48
10	0.55	9,520	63.39	-21,220.00	30,740.00	112	71	41	-550.00	432.96	-517.56	0.84	85.00
11	0.50	9,710	61.61	-20,510.00	30,220.00	112	69	43	-500.00	437.97	-476.98	0.92	86.70
12	0.45	7,990	58.04	-20,310.00	28,300.00	112	65	47	-450.00	435.38	-432.13	1.01	71.34
13	0.40	8,250	56.25	-19,180.00	27,430.00	112	63	49	-400.00	435.40	-391.43	1.11	73.66
14	0.35	8,680	53.57	-17,880.00	26,560.00	112	60	52	-350.00	442.67	-343.85	1.29	77.50
15	0.30	6,920	48.21	-17,180.00	24,100.00	112	54	58	-300.00	446.30	-296.21	1.51	61.79
16	0.25	6,250	43.75	-15,750.00	22,000.00	112	49	63	-250.00	448.98	-250.00	1.80	55.80
17	0.20	5,600	38.39	-13,800.00	19,400.00	112	43	69	-200.00	451.16	-200.00	2.26	50.00
18	0.15	5,850	33.04	-11,250.00	17,100.00	112	37	75	-150.00	462.16	-150.00	3.08	52.23
19	0.10	5,210	25.00	-8,400.00	13,610.00	112	28	84	-100.00	486.07	-100.00	4.86	46.52

Adding a Fixed Stop-Loss Function - Optimized Values taking the "optimum" value of "Fade a Gap at least 25 cents but not more than 75 cents."

Using a FIXED stop-loss degraded net performance across all variables.

Compare what you see above in the net profit and percent profitable to that of using NO Stops (min. 25 and max. 75),

Net Profit: $10,740

% Winning Trades: 79.50%

Under all combinations of stop-loss methodology - excluding 90 and 95 cents - net profit decreased.

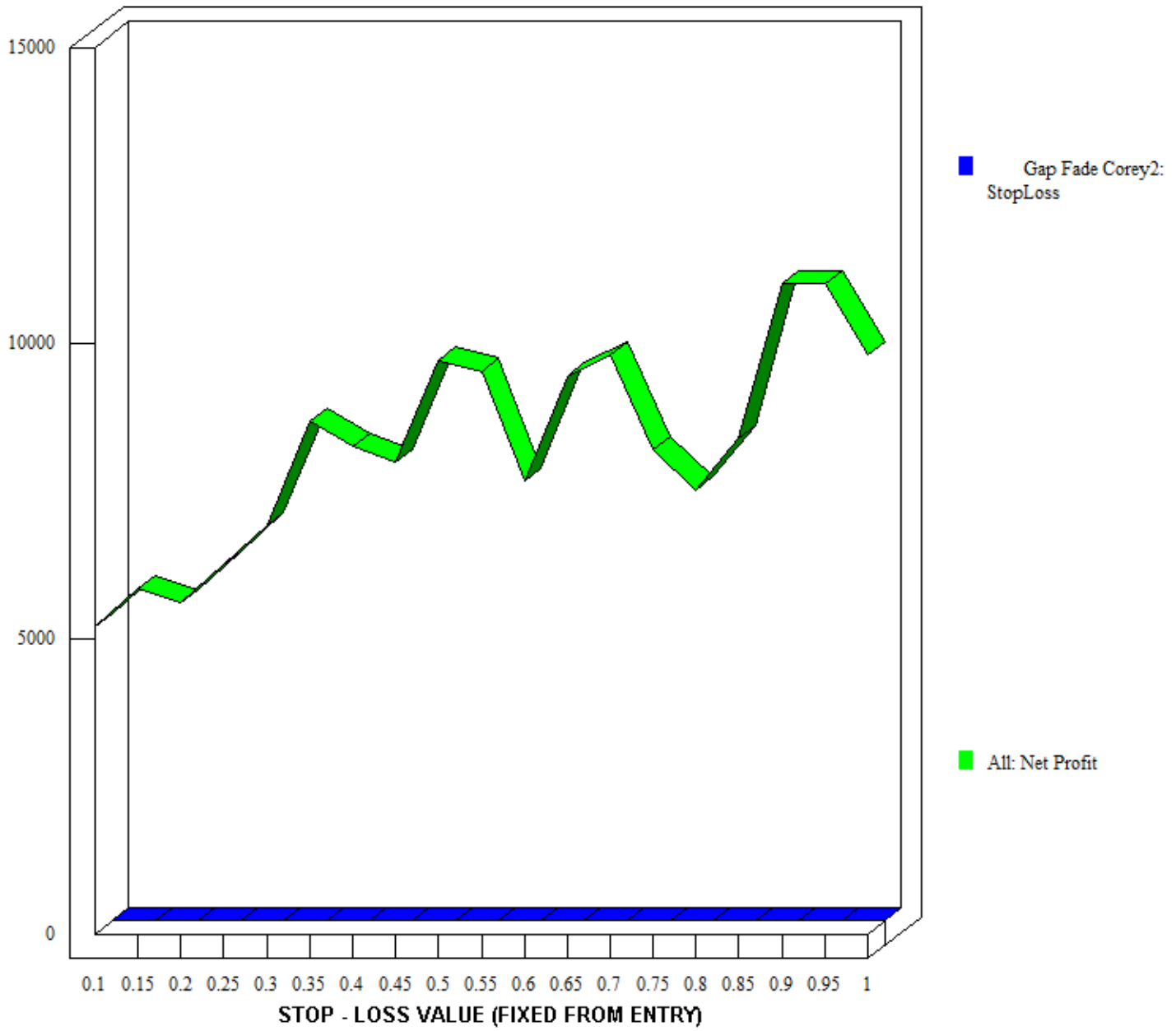
The % Winning Trades decreased across ALL variables, with the highest coming from a stop of 90 cents or greater at 73%. This is tantamount to using no stop at all.

Using a 10 cent (tight) stop decreased the win rate to 25% and cut the net profit in half to $5,210.

Using a 25 cent (moderate) stop decreased the win rate to 43.75% and cut the net profit to $6,250.

The good news is that under all parameters - as we would expect - the average losing trade was cut from $1,223 (no stops) to the variables you see in the "All: Avg Losing Trade" column - which roughly equaled what the stop-loss value was (ie, a 10 cent stop yielded an average losing trade of $100 while a 25 cent stop yielded an average losing trade of $250).

While it's absolutely psychologically comforting and essential to decrease your average losing trade, research shows that this has an overall degrading effect on % win rate and net profit in the long-run - if applied mechanically.



Net profit increased as the size of the fixed stop-loss increased, suggesting that - as illogical as it may sound - ANY stop loss strategy degraded net profit (as explained later).

It was almost a linear relationship in that net profits increased as the stop-loss increased.

(chart from TradeStation)

Adding a TRAILING Stop from Entry: $0.25 min; $0.75 max

Dollar Trailing: Amount	All: Net Profit	All: % Profitable	All: Gross Loss	All: Gross Profit	All: Total Trades	All: Winning Trades	All: Losing Trades	All: Max Losing Trade	All: Avg Winning Trade	All: Avg Losing Trade	All: Win/Loss Ratio	All: Avg Trade
1.00	10,350	70.54	-23,930.00	34,280.00	112	79	33	-990.00	433.92	-725.15	0.60	92.41
0.95	8,980	67.86	-24,290.00	33,270.00	112	76	36	-940.00	437.76	-674.72	0.65	80.18
0.90	10,630	67.86	-22,640.00	33,270.00	112	76	36	-890.00	437.76	-628.89	0.70	94.91
0.85	6,890	64.29	-23,810.00	30,700.00	112	72	40	-850.00	426.39	-595.25	0.72	61.52
0.80	7,870	63.39	-22,710.00	30,580.00	112	71	41	-800.00	430.70	-553.90	0.78	70.27
0.75	7,270	60.71	-22,510.00	29,780.00	112	68	44	-750.00	437.94	-511.59	0.86	64.91
0.70	7,360	58.93	-21,510.00	28,870.00	112	66	46	-700.00	437.42	-467.61	0.94	65.71
0.65	8,440	58.04	-19,930.00	28,370.00	112	65	47	-650.00	436.46	-424.04	1.03	75.36
0.60	9,600	57.14	-18,170.00	27,770.00	112	64	48	-600.00	433.91	-378.54	1.15	85.71
0.55	10,950	58.93	-16,150.00	27,100.00	112	66	46	-550.00	410.61	-351.09	1.17	97.77
0.50	6,710	52.68	-16,860.00	23,570.00	112	59	52	-500.00	399.49	-324.23	1.23	59.91
0.45	5,800	49.11	-15,610.00	21,410.00	112	55	57	-450.00	389.27	-273.86	1.42	51.79
0.40	6,470	47.32	-14,240.00	20,710.00	112	53	59	-400.00	390.75	-241.36	1.62	57.77
0.35	4,250	44.64	-12,750.00	17,000.00	112	50	62	-350.00	340.00	-205.65	1.65	37.95
0.30	4,830	41.96	-10,350.00	15,180.00	112	47	64	-300.00	322.98	-161.72	2.00	43.13
0.25	4,550	47.32	-8,880.00	13,430.00	112	53	56	-250.00	253.40	-158.57	1.60	40.63
0.20	2,810	40.18	-7,730.00	10,540.00	112	45	66	-200.00	234.22	-117.12	2.00	25.09
0.15	4,230	43.75	-5,330.00	9,560.00	112	49	63	-150.00	195.10	-84.60	2.31	37.77
0.10	5,660	47.32	-3,670.00	9,330.00	112	53	56	-100.00	176.04	-65.54	2.69	50.54

Instead of using a fixed stop from entry, we use a Trailing Stop from entry using the following values in an optimization grid (10 cents to $1.00). Comparing to our benchmark:

Net Profit: $10,740

% Winning Trades: 79.50%

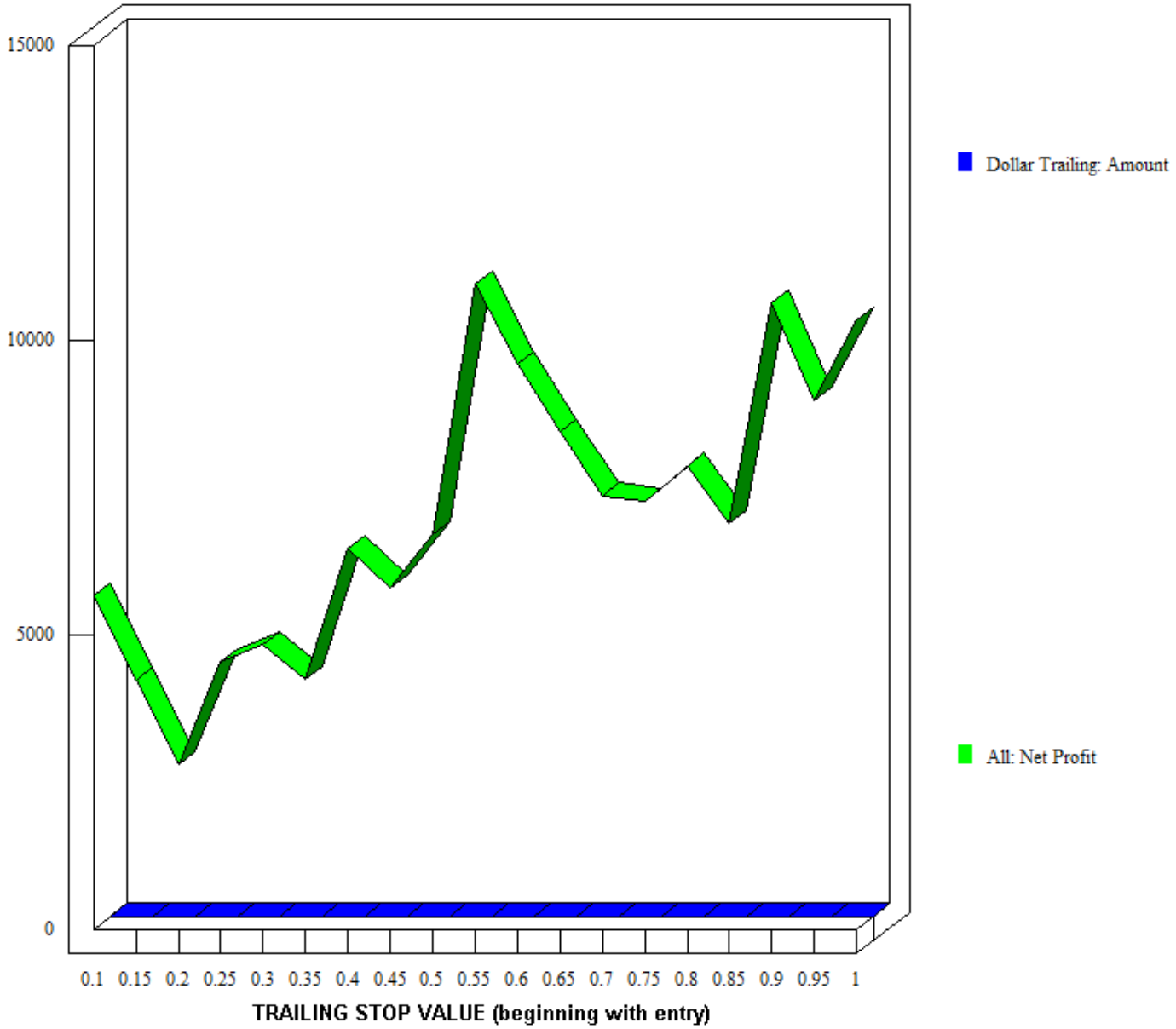
The Trailing Stop degraded both net profit in all combinations with the exception of a 55 cent trailing stop (which only increased performance by $200) and also degraded the %Win Rate (winning trades) across ALL combinations (the closest was a trailing stop of $1.00 at 70.54%, ***which essentially is no stop at all*** - it yielded a return of $10,300.

The benefit of the trailing stop was that it did successfully decrease the Average Losing Trade across ALL Variables.

In almost ALL variables (with the exception of a reduced average losing trade), we see that a trailing stop did the following when compared to an exact fixed stop:

Decreased Overall Net Profit (except for $1.00, 65c, and 60c)
Decreased %Win (%Profitable) - (except for 10c - 25c)
Decreased Average Winning Trade (for all variables under 55 cents ... which is usually the desired range for stops)
Decreased Average Losing Trade (for all variables - a good thing)

Research shows that trailing stops - when used in the conditions most gap-fade traders would use them for (values under 50 cents) returned a worse performance in Net Profit, decreased Win Rate (except for the 10c to 25c area), decreased the average winning trade (where it mattered), to get the benefit of a decreased average losing trade.



The chart above is a visual representation of the Net Profit factor when using a Trailing Stop (optimization study of increasing values).

Net profit rose as the size of the trailing stop was increased, with the exception of the 50 cent to 65 cent region - which is often too large for most traders to use comfortably for most gap fades.

Unlike the fixed stop research, we saw the largest values - a 'pocket spike' at the 55 to 65 cent trailing stop-loss level, which is very encouraging.

Using a stop is a balance (trade-off) between accuracy, average win, average loss, time in trade, and how these factors combine to affect net profit.

Stops decrease accuracy, (often) decrease average $ win, decrease $ loss, decrease time in trade, etc.

FIXED STOP
From Entry

Gap Fade Corey2: StopLoss	All: Net Profit	All: % Profitable	All: Avg Winning Trade	All: Avg Losing Trade
1.00	9,810	73.21	432.93	-856.33
0.95	11,010	73.21	432.93	-816.33
0.90	11,010	72.32	434.57	-780.32
0.85	8,380	69.64	434.23	-749.71
0.80	7,520	68.75	431.04	-733.43
0.75	8,200	67.86	435.13	-690.83
0.70	9,800	67.86	435.13	-646.39
0.65	9,440	66.07	437.97	-604.47
0.60	7,670	63.39	432.96	-562.68
0.55	9,520	63.39	432.96	-517.56
0.50	9,710	61.61	437.97	-476.98
0.45	7,990	58.04	435.38	-432.13
0.40	8,250	56.25	435.40	-391.43
0.35	8,680	53.57	442.67	-343.85
0.30	6,920	48.21	446.30	-296.21
0.25	6,250	43.75	448.98	-250.00
0.20	5,600	38.39	451.16	-200.00
0.15	5,850	33.04	462.16	-150.00
0.10	5,210	25.00	486.07	-100.00

TRAILING STOP
From Entry

Dollar Trailing: Amount	All: Net Profit	All: % Profitable	All: Avg Winning Trade	All: Avg Losing Trade
1.00	10,350	70.54	433.92	-725.15
0.95	8,980	67.86	437.76	-674.72
0.90	10,630	67.86	437.76	-628.89
0.85	6,890	64.29	426.39	-595.25
0.80	7,870	63.39	430.70	-553.90
0.75	7,270	60.71	437.94	-511.59
0.70	7,360	58.93	437.42	-467.61
0.65	8,440	58.04	436.46	-424.04
0.60	9,600	57.14	433.91	-378.54
0.55	10,950	58.93	410.61	-351.09
0.50	6,710	52.68	399.49	-324.23
0.45	5,800	49.11	389.27	-273.86
0.40	6,470	47.32	390.75	-241.36
0.35	4,250	44.64	340.00	-205.65
0.30	4,830	41.96	322.98	-161.72
0.25	4,550	47.32	253.40	-158.57
0.20	2,810	40.18	234.22	-117.12
0.15	4,230	43.75	195.10	-84.60
0.10	5,660	47.32	176.04	-65.54

The following grid shows a direct comparison of the main factors to watch in any study - as comparing the Fixed Stop method with a Trailing Stop method - both from entry (in a gap with a minimum 25 cents but maximum 75 cents).

I highlighted the three "Net Profit" areas where the trailing stop method improved net performance by a factor greater than $500.

This suggests that a Trailing Stop in the 55 to 65 cent region was an effective use of a stop, which provided a trade-off between the massive losses ($1,200 on average) by not using a stop. This would suggest that a moderate to aggressive trailing stop method is superior to using no stop at all.

Notice that the fixed stops of 50 and 55 cents also returned profits close to the "no stop" parameter, though in both cases (the fixed and the trailing stops of 50 to 60 cents), the Win Rate was Reduced from the 79% "No Stop" study though the Average Losing Trade was cut significantly from an unbearable $1,200 to a tolerable and reasonable $500 area with fixed stops and $350 area with trailing stops.

Stop Loss Quick Summary

Comparing with our Benchmark of "No Stops," we see the following important variables:

Net Profit: $10,740
% Winning Trades: 79.50%
Average Winning Trade: $436
Average Losing Trade: $1,223

For the 50 to 55 cent FIXED stop, we see the following (averaged between 50 and 55 cents):

Net Profit: $9,615
% Winning Trades: 62.50%
Average Winning Trade: $435
Average Losing Trade: $498

For the 55 to 60 cent TRAILING stop, we see the following (averaged between 55 and 60 cents):

Net Profit: $10,275
% Winning Trades: 58.01%
Average Winning Trade: $421.50
Average Losing Trade: $364

In Summary, stop-losses degrade all variables except for average losing trade, which is improved.

In general, Fixed Stops outperformed Trailing Stops across all variables except where noted (ave. loss).

Stops Decreased the average win rate and net profitability across (almost) ALL variables except average loss. The Average Win was not affected by fixed stops, but degraded slightly ($25) by trailing stops.

Trailing stops reduced the Average Losing Trade better than Fixed Stops.

There was no combination of stop-loss methods that increased the average win rate (% Win)
The only combination of stops to increase net profit above No Stops was a 90 or 95 cent Fixed Stop (unreasonable).
Using ANY stop-loss method decreased the average losing trade.

Conclusion

For 2009 trading the SPY, it tested best to fade a gap that was **AT LEAST 25 cents but NOT MORE THAN 75 cents**.
It generally tested best to use a **fixed stop strategy** from entry with the stop being **50 to 55 cents**.
Trailing Stops generally degraded performance except for the **55 to 60 range** - similar to that of the fixed stops.
The larger the gap, the less the chance it has of filling (gap size is inversely correlated with odds of filling).
Odds of a successful fill dropped to the 50% (random - no edge) range and under at a gap size of 55 to 60 cents.