Understanding Opening Gaps (Part 3)

Introduction

In Part 1 of *Understanding Opening Gaps* we sought to determine whether gap size, short-term market condition and long-term market condition were useful predictors of intraday directional bias following a gap up or gap down. We saw that the size of the morning gap and varying bullish or bearish market conditions seem to directly affect the likelihood of opening gaps ending positively or negatively for the day.

In Part 2 we looked at whether these findings could be used to construct profitable "gap fading" strategies, with specific focus on down gaps. In this third study we will focus on up gaps, so at opening prices that print above the previous day's closing price.

Analysis

The instrument used in this study is the ES (E-mini S&P500 futures contract), from Jan 1st 2000 to Dec 31st 2014. As in Part 2 of *Understanding Opening Gaps* we will exclude gaps larger than 0.75% from our study, as these are more prone to continuation. We will also exclude small gaps (<0.25%) since their modest profit potential does not warrant the risk of slippage and cost of commissions inherent to real life trading. System rules:

- Instrument: ES (S&P500 ETF), from Jan 1st 2000 to Dec 31st 2014 (15 years)
- Position size: 10 contracts
- Up gaps only
- Minimum gap size: 0.25%
- Maximum gap size: 0.75%
- Enter short at the open (based on specific conditions)
- Exit at gap fill or at end of day
- No stop
- No allowance for commissions or slippage

Seasonality - Day of Week

We first look at whether specific days of the week impact the profitability of the gap-fading system.

Table 1

Up Gap (>=0.25% & <=0.75%); Go Short at the Open; Exit on Gap Fill or EOD						
Day of week	Total Trades	Winners	Losers	Win Rate (%)	Avg Win / Avg Loss Ratio	PF
Any	808	531	275	65.75	0.57	1.10
Monday	176	109	67	61.93	0.59	0.96
Tuesday	159	104	55	65.41	0.61	1.16
Wednesday	144	99	44	68.75	0.51	1.15
Thursday	158	102	56	64.56	0.66	1.19
Friday	171	117	53	68.42	0.49	1.08

As we can see in the first row of Table 1 (in yellow), systematically fading all qualifying up gaps without additional filters would have been, at best, a breakeven strategy from 2000-2014. The system's 66% win rate is high, but the average losing trade is almost twice the size of the average winning trade, resulting in a profit factor of only 1.10. Add to this commission and slippage costs and the system would undoubtedly have lost money over the period in question. Win rates and profit factors are comparable for each of the five days of the week, albeit with slightly weaker numbers for Mondays. This is because Mondays are particularly susceptible to continuation: up gaps on Monday mornings, usually the result of positive news over the weekend, are often met with more buying. Similarly, as seen in Part 2, down gaps on Mondays often attract continued short interest throughout the day. This "follow-through" nature arguably makes Monday the most challenging day of the week for gap faders.

Mean Reversion

We will now look at whether the relative size of the displacement of price from its mean (as measured by a large rise in the previous day's prices) impacts the likelihood of gap fill.

Table 2

Up Gap (>=0.25% & <=0.75%); Go Short at the Open; Exit on Gap Fill or EOD						
Condition	Total Trades	Winners	Losers	Win Rate (%)	Avg Win / Avg Loss Ratio	PF
After >0.5% rise	199	135	64	67.84	0.52	1.10
After >1.0% rise	104	71	33	68.27	0.48	1.04
After >1.5% rise	54	42	12	77.78	0.35	1.21
After >2.0% rise	23	18	5	78.26	0.50	1.82
After >2.5% rise	14	12	2	85.71	0.49	2.92
After >3.0% rise	11	10	1	90.91	2.43	24.29

The data in Table 2 shows that using our system to fade up gaps that immediately followed small to medium daily rises in prices resulted in low profit expectancy. However, when the previous day's price "pop" was large (2% or greater), then up gaps had a much greater tendency to fill. Moreover, up gaps that followed huge 3% or greater price pops had a 90% chance of filling, and fading them generated 24 times more profits than losses.

Similar results are obtained when measuring displacement from the mean using different criteria. In Table 3 we see that up gaps that followed a greater number of higher closes had an increasingly higher probability of filling.

Table 3

Up Gap (>=0.25% & <=0.75%); Go Short at the Open; Exit on Gap Fill or EOD						
Condition	Total Trades	Winners	Losers	Win Rate (%)	Avg Win / Avg Loss Ratio	PF
After exactly 1 higher close	165	98	67	59.39	0.53	0.78
After exactly 2 higher closes	97	64	33	65.98	0.68	1.33
After exactly 3 higher closes	49	34	15	69.39	0.54	1.23
After exactly 4 higher closes	26	20	6	76.92	1.04	3.48
After exactly 5 higher closes	17	13	4	76.47	1.32	4.30

Short-Term & Long-Term Market Conditions

In Part 1 of *Understanding Opening Gaps* we saw that both short-term (ST) and long-term (LT) market condition directly impact intra-day directional bias. Table 4 below shows the results of applying ST and LT conditional filters to a modified version of our system (fade qualifying up gaps that immediately follow 2 or more up days in a row):

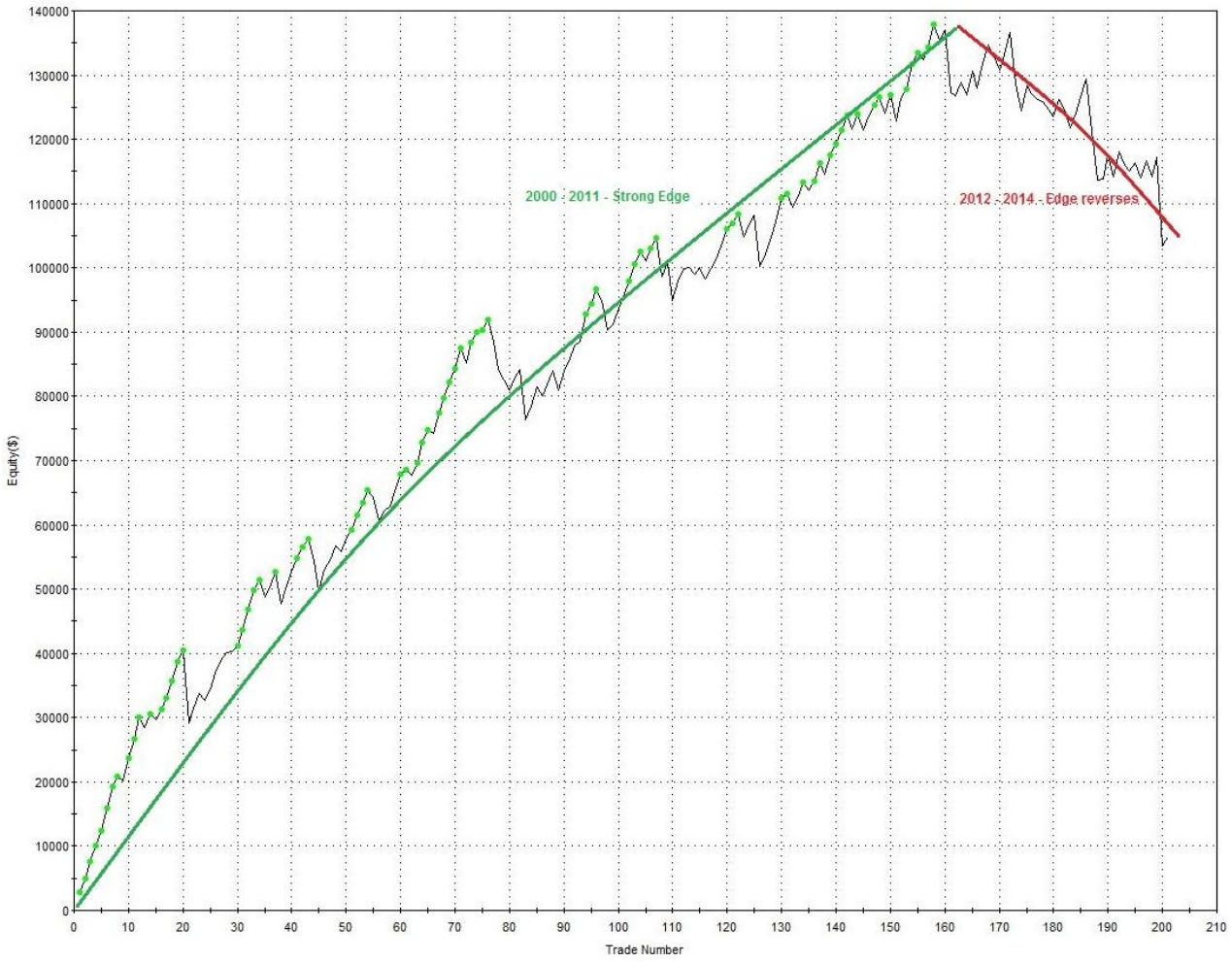
Table 4

ES closes up for at least 2 days in a row *Up Gap (>=0.25% & <=0.75%); Go Short at the Open; Exit on Gap Fill or EOD*						
Condition	Total Trades	Winners	Losers	Win Rate (%)	Avg Win / Avg Loss Ratio	PF
Today's opening price is **above** the 10 day moving average (ST mkt condition)	178	121	138	67.98	0.76	1.61
Today's opening price is **below** the 10 day moving average (ST mkt condition)	23	17	66	73.91	0.38	1.09
Today's opening price is **above** the 200 day moving average (LT mkt condition)	150	98	52	65.33	0.69	1.30
Today's opening price is **below** the 200 day moving average (LT mkt condition)	51	40	11	78.43	0.70	2.54

The first two rows show that, for the period under analysis, the profit expectancy of shorting up gaps was better when the ES was trading *above* the 10 day moving average rather than below it. This makes intuitive sense as short-side mean reversion works best when the market is short-term overbought. The last two rows show that the profit expectancy of the system was considerably better during LT *bearish* periods (price below the 200 day MA). No surprises here either, as short systems usually perform better during bear markets. So, to summarize, fading up gaps is likely to provide the best trade expectancy when the market is either short-term oversold and/or is in long-term bear market territory.

Long Bias from Government Interventionism

Below is the equity curve of our modified gap-fading system (fade qualifying up gaps that follow two or more consecutive up days) from 2000 to 2014 inclusive, with no additional market condition filters. As we can see, mean-reversion alone did a good job at giving this system a decent edge, as witnessed by the fairly consistent equity curve from 2000 to 2011. However, the edge appears to have run out of steam in mid-2011 and ended up changing direction. This is undoubtedly due to the unprecedented government intervention we experienced from 2011, including QE2 and QE3, which gave the market an "unnatural" long bias for almost half a decade. This resulted in several short systems that had performed very reliably prior to 2011 to simply stop working. It will be interesting to see whether the tapering of government interventionism in 2015/16 will witness the reassertion of the bearish edges inherent to these kinds of short-side gap fading systems.



Summary

Our findings:

- Up gaps do not appear to be more prone to filling on specific days of the week. Mondays, however, seem to be particularly prone to "continuation", so could possibly be avoided by the up-gap fading trader. See Table 1.
- The distance of prices from their mean impacts their tendency to revert back towards it. The larger the displacement, the higher the likely profit expectancy of an up-gap fading system. See Tables 2 and 3.
- During long-term bearish periods (below the 200 day MA), the market tends to discount positive news (up gaps) more so than during long-term bullish periods, so up gaps fill more easily. Moreover, when the market is short-term overbought (above the 10 day MA), fading up gaps offers better profit expectancy. See Table 4.
- Government interventionism over the past few years has greatly skewed the market to the long side, making otherwise profitable gap-trading systems (temporarily?) unprofitable.