

SEVEN TRADING SYSTEMS FOR THE S&P FUTURES



GAP STRATEGIES TO DAY
TRADE THE OPENING BELL

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DAVID BEAN HAS BEEN TRADING THE FINANCIAL MARKETS SINCE 1995. HE STARTED WITH STOCKS BUT QUICKLY MOVED ON TO FUTURES IN 1996 AND BEGAN DEVELOPING AUTOMATED TRADING SYSTEMS IN 1997.

HE IS THE OWNER OF CAPSTONE TRADING SYSTEMS, AND SPECIALIZES IN THE RESEARCH AND DEVELOPMENT OF TRADING SYSTEMS.

THIS BOOK INCLUDES:

- HOW TO TRADE THE OPEN
- FOUR DIFFERENT GAP PATTERNS
- DESIGN OF 7 DIFFERENT GAP STRATEGIES
- FULLY DISCLOSED TRADING SYSTEMS
- HOW TO EXIT A TRADE
- THE ART AND SCIENCE OF TRADING
- THE SECRET OF OPTIMIZATION
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SEVEN TRADING SYSTEMS FOR THE S&P FUTURES

**Gap Strategies to Day Trade
The Opening Bell**

Written by
David Bean

SEVEN TRADING SYSTEMS FOR THE S&P FUTURES

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1. Introduction

“The test of a first-rate intelligence is the ability to hold two opposed ideas in mind at the same time and still retain the ability to function.”

- F. Scott Fitzgerald

The truth about the opening bell is that there are numerous opportunities that occur at 9:30 am New York time. The US markets have been closed for 17 ½ hours as the start of a new session begins with a massive increase in liquidity. During the night, weekends, and holidays, the global economy doesn't stop as there is a constant flow of news from around the world.

Global markets trade and our own US stock index futures and financial futures trade continuously from 6pm EST on Sunday until 5pm EST on Friday. Markets and traders are constantly making adjustments to the constant perception and valuation changes in the markets. These opportunities exist because of the change in volume that occurs during the day session. The night session can be trades on the futures to adjust positions but the volume is much smaller at night.

The volume picks up dramatically at the day session open (Opening Bell) and any change in market equilibrium can create tradeable price moves as the markets adjust and the larger volume

traders “catch up”. This can include price reversals or continuations in the market, depending on the scenario.

The quote at the beginning of this chapter represents the approach taken in this book as we discuss and examine trading the daily open of the market and look at different Gap strategies.

We discuss basic price action and define a Gap Open for those new to trading and then approach a set of scenarios that include price patterns relationships between the market’s open compared to previous day’s prices.

It’s easy to argue both sides (hold opposing views from the quote above) of the market when you don’t have a position in the market. We watch the media take opposing views each day as entertainment and information are their bottom line.

As traders, we have to sort through opposing views and have a specific plan of action. We look at different strategies and scenarios and then make decisions based on a specific set of rules. Research can give us the best chance to make money in the market and become profitable traders.

The purpose of this book is to provide the research and strategies for a trading plan with a specific set of rules that can be easily implemented and even automated to trade the open based on “Gaps”.

Studying the Open, and specifically Gaps, can be a good place for new traders to start. Strategies based on the Open are easy to understand and implement into live trading. Gap strategies are not just for beginners or a “lesser” approach to the markets. Gap trading is used by many experienced traders as a main trading strategy.

The first strategy is basic enough to be manually traded with some basic quotes and a spreadsheet to calculate the daily trend (100 day moving average of the S&P). The rules are easy to remember and can be traded in the first few minutes of the trading day. A smart phone application (the technology around smart phones is changing rapidly and more trading applications are anticipated to be available in the future) could be sufficient enough to trade this strategy for those on the go and those who are un-able to constantly monitor the market.

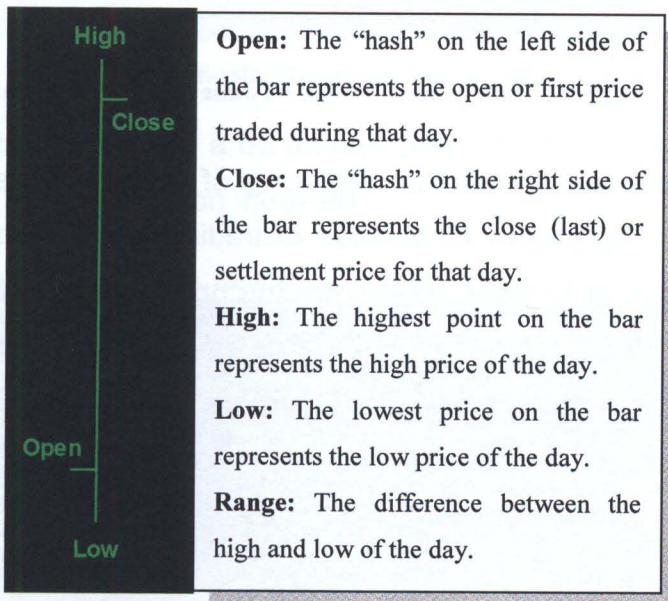
In the following pages, seven strategies for trading the market open around Gaps will be revealed. These strategies are written and tested in Tradestation and the exact code and workspace setup will be fully disclosed. This book provides these seven trading systems that are ready to trade as well as an educational foundation and resource for further research and development of gap strategies and trading systems.

2. Basic Price Action

This purpose of this section is to introduce basic price action in the markets and how to look at the details of a chart. We will take a look at daily bars and the four major price points as well as intra-day bars to see what is going on inside of that daily bar.

Daily Bars

The first picture below represents a daily bar. It represents prices for one day of trading.



Intra-day Bars

The chart below represents the intra-day price action on 15 minute bars for the same trading day as the daily chart.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.



Figure 1 June E-mini Russell on June 21, 2010 - 15 min

The vertical red line is the beginning of the day session. Each green bar represents 15 minutes of trading and this intra-day bar chart allows us to more clearly see the price action during the day. Intra-day traders typically look at intra-day charts that vary in interval from 1 minute to 60 minute charts.

The following example is a one minute chart of the E-mini Russell on the same day.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.



Figure 2 June E-mini Russell on June 21, 2010 - 1 min

Now let's take a look at a 60 minute chart of Google on the same day to see the price action intra-day.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.



Figure 3 Google on June 17-21, 2010 - 60 min

Typically, when looking at a lower timeframe (1 minute charts) we see more potential opportunities because there seem to be more turning points. One caution when looking for opportunities on lower timeframes is that there is the potential for more “noise” and “random” price action so significance of each observation is critical as over-trading can create losses quickly as transaction costs (slippage and commission) add up. Typically when the average time in the market for a trade decreases, so does the average profit per trade.

One key concept is to design a strategy based on a 5 to 15 minute charts (or higher) but test the strategy on a 1 minute chart. Use a subset data series (data2, data3, etc.) of the larger timeframe (5 minute, 15 minute, 60 minute, and daily, etc) for the strategy patterns, concepts, and rules and a 1 minute chart on data1 for accurately testing the results. There can be intra-bar price swings that affect the results so the lower the time frame a strategy is tested on, the more accurate the results.

Now that we understand basic price action, we can begin to look at strategies to capitalize on what we know about market action.

Defining the Gap

One of the greatest opportunities for trading can happen when the market has a “Gap Open”. What is a Gap Open? There are four different scenarios we will use to define a Gap Open. The four scenarios are:

- 1.) Market opens above the previous day's close but below the previous day's high.
- 2.) Market opens below the previous day's close but above the previous day's low.
- 3.) Market opens above the previous day's high.
- 4.) Market opens below the previous day's low.

Let's take a look at the chart patterns for a visual on all four scenarios.

Scenario I

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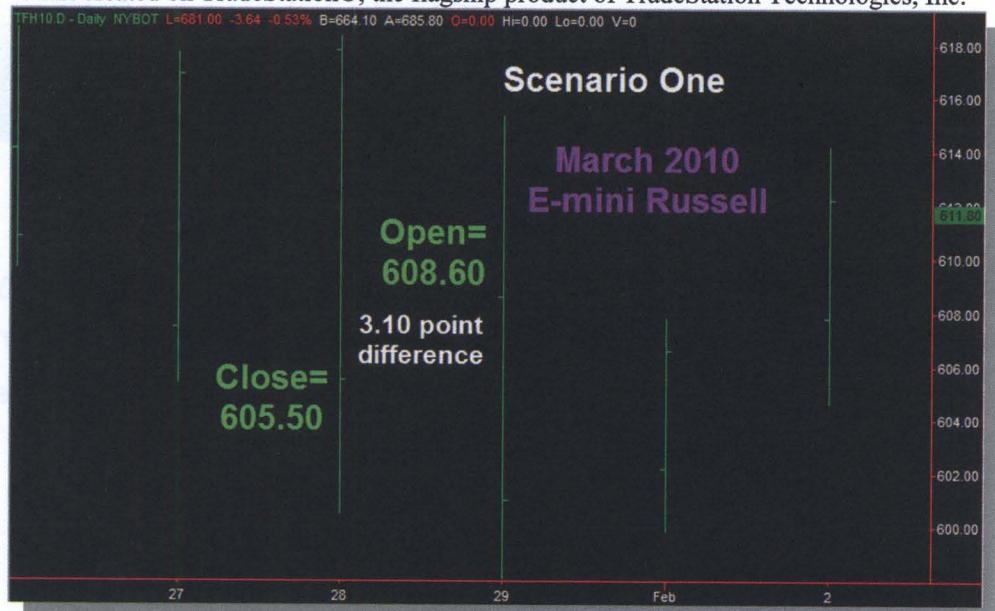


Figure 4 Daily chart of E-mini Russell and Scenario One

The Figure 4 chart above shows the March 2010 E-mini Russell on January 27 – February 2, 2010 with a Gap Open that is up from the previous day's close but below the previous day's high.

Scenario II

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.

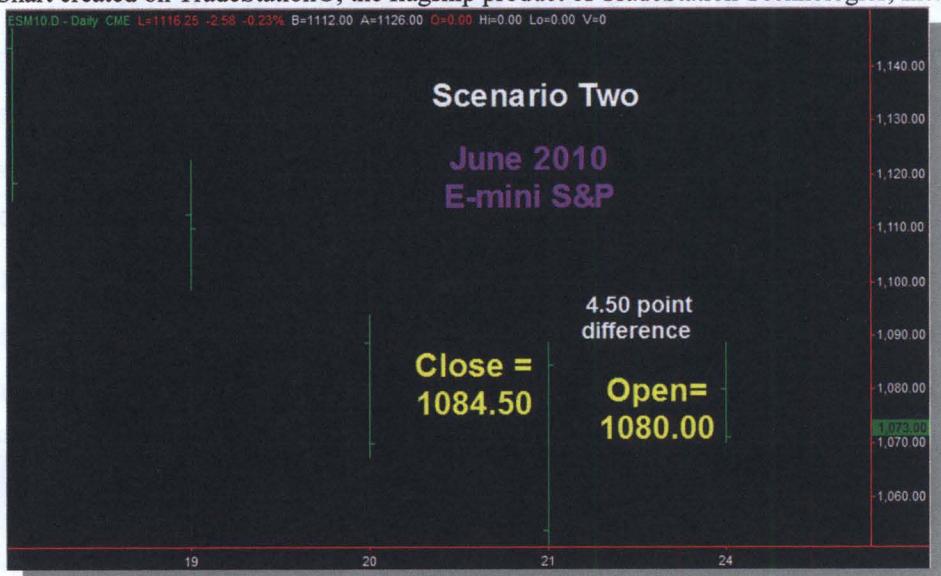


Figure 5 Daily chart of E-mini S&P and Scenario Two

The chart above in Figure 5 shows the June E-mini S&P from May 19-24, 2010 with a Gap Down where the open on May 24 is down 4.50 points from the previous day's close but still above the previous day's low.

Scenario III

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.

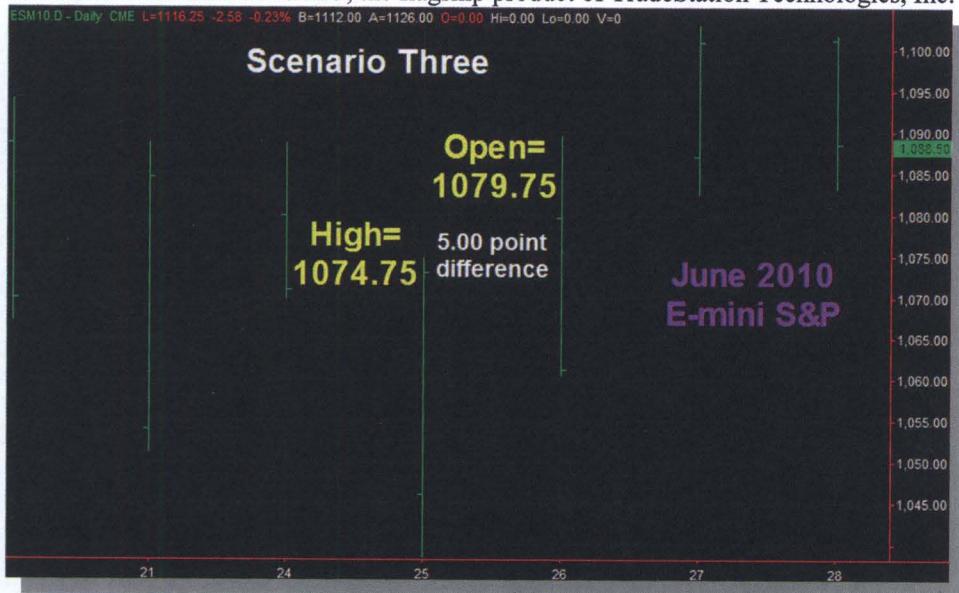


Figure 6 Daily chart of E-mini S&P and Scenario Three

The chart above in Figure 6 shows a Gap Open on May 26 where the open is higher than the previous day's high by 5.00 points on the E-mini S&P. The daily charts above are for the day session that goes from 8:30 am – 3:15 pm CST.

Scenario IV

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.

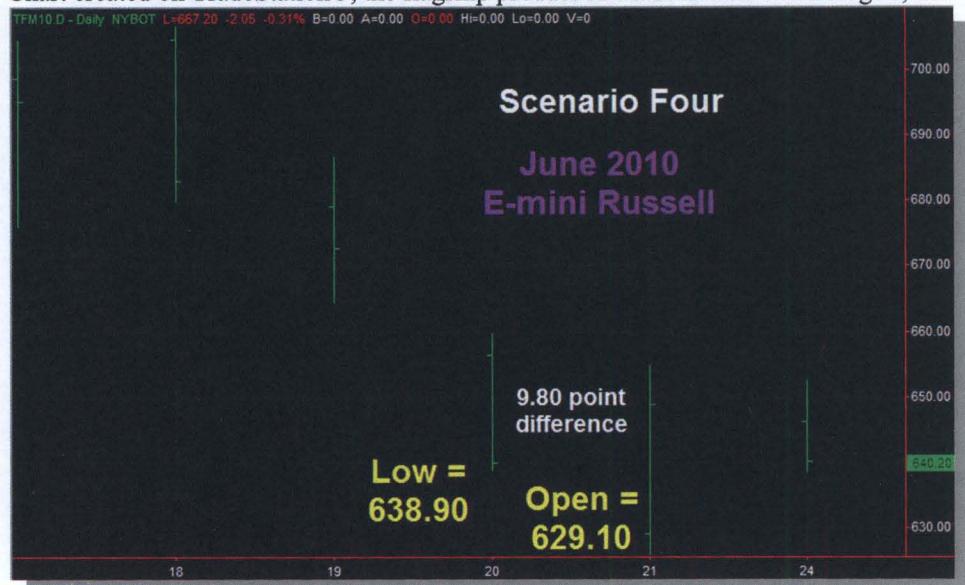


Figure 7 Daily chart of E-mini Russell and Scenario Four

In Figure 7, the June E-mini Russell opens 9.80 points below the previous day's low on May 21, 2010. The Gap Down below the previous day's low shows us Scenario Four.

Now that we have clearly defined all four scenarios, there are additional exit scenarios for each. We will look at each scenario and design a trading plan.

3. Gap Fill

There are two basic strategies we can use when we have a Gap in the market. The first strategy we will look at is the Gap Fill pattern. In later chapters we will discuss the Gap Continuation pattern. We will develop four trading systems for the Gap Fill in this chapter.

Setup Patterns

We will use Scenario I and Scenario II in the first trading system we develop to work with Gap patterns that open away from the previous day's close but still within the previous day's range (below the high and above the low).

Scenario I

In Scenario One, we have the opportunity to take a Gap Fill trade by shorting the open. There are four basic ways to exit this trade.

- 1.) We set a profit target.
- 2.) We exit at the previous day's close.
- 3.) We exit at the end of the day.
- 4.) We get stopped out with a loss.

There are additional ways to exit this trade but we will focus on these four methods. In this scenario we are looking for the market to "fill the gap" by going in the opposite direction of the opening. In

this example of a gap fill from a higher open, the market opens above the previous day's close and "fills the gap" by moving lower to the previous day's close. Once it fills the previous day's close, the market can make two basic movements:

- 1.) Continue to trade lower and close down for the day (as it did on January 29, 2010) or
- 2.) Reverse and trade higher to close up for the day.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.



Figure 8 Scenario I Gap Fill trade in the E-mini Russell

In this example, the market went as high as 615.30 before filling the gap and closing down for the day at 598.90. The point value per contract in the E-mini Russell is \$100 with a minimum tick size = 0.10 or \$10.

If we shorted the March 2010 E-mini Russell at the open and exited at the close, then our profit on the day would have been \$970. Since the market moved higher, up to 615.30, we would have had to have a stop loss larger than \$670 to stay in the trade.

Scenario Two

In Scenario Two, we have the opportunity to take a Gap Fill trade by going long at the gap open. The same four exit strategies exist for long trades. Here is an example of a gap fill trade on the long side in this scenario where we exit at the previous day's close.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.



Figure 9 Scenario II Gap Fill trade in the E-mini S&P

Trading System 1: Gap Fill I

We will now use the Tradestation platform to determine the best trading plan for taking gap trades using Scenario I and II for Gap Fills. We will use the E-mini S&P and look at the last five years of

trading (from 5/31/2010 going back five years) to come up with a plan for potentially trading future price action. This strategy will use Scenario I for short trades and Scenario II for long trades. Using the EasyLanguage editor in the Tradestation platform and testing the possibilities above, the best trading plan is outlined next.

- 1.) Determine the overall daily trend by looking at the 100 day moving average of the daily chart to determine if long or short trades should be taken. If the daily close is above the 100 day moving average then long trades are taken. If the daily close is below the 100 day moving average then short trades are taken. The chart below shows a 100 day moving average represented by the blue line. “Moving” means that the average is updated on a daily basis by taking the average of all closing prices from the previous 100 days.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.



Figure 10 June E-mini S&P Daily chart with 100 day MA

The timeframe shown above mainly represents a “bull” market where most of the prices have been above the 100 day moving average.

- 2.) If the Scenario One condition is met then a short position is taken after the first minute of trading if the market is below its 100 day moving average.
- 3.) If the Scenario Two condition is met then a long position is taken after the first minute of trading if the market is above its 100 day moving average.
- 4.) Once a position is taken, there is a \$500 stop loss (10 points in the E-mini S&P), a \$200 profit target (4 points in the E-mini S&P), or exit at the close of the trading day.

What do the results look like? We see a strategy that averages about 80 trades per year, an average profit per trade exceeding \$50 (which is what we shoot for in day-trade strategies, high accuracy at 75%, and a low drawdown. The Tradestation Performance Summary seen on the next page is just a screen shot. There are additional tabs and charts including Trade Analysis, Trade Lists, Periodical Returns, Performance Graphs, and Trade Graphs. We will looks at the Trades Graphs later and use some graphical analysis to help our exit strategy and determine stop losses.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.

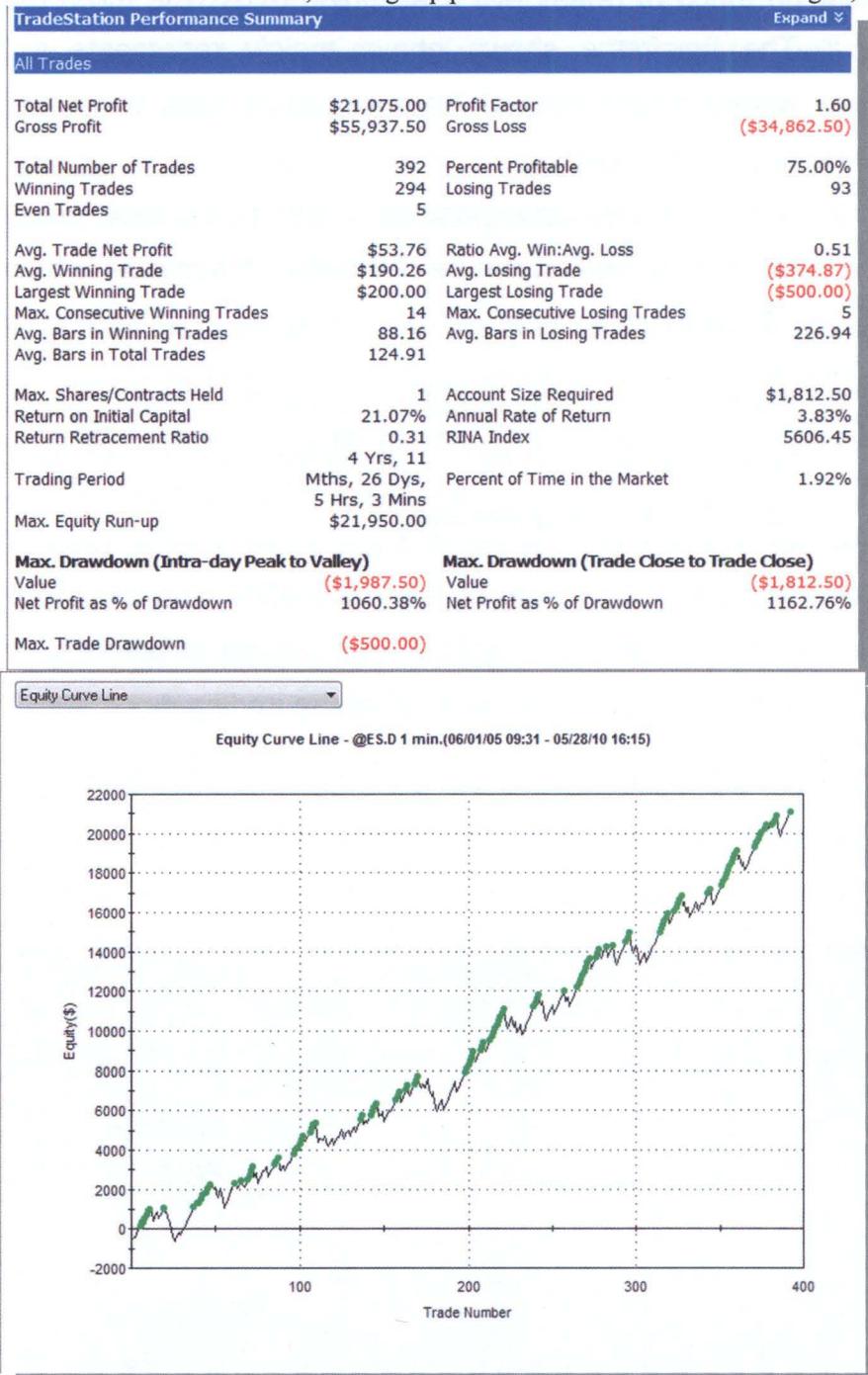
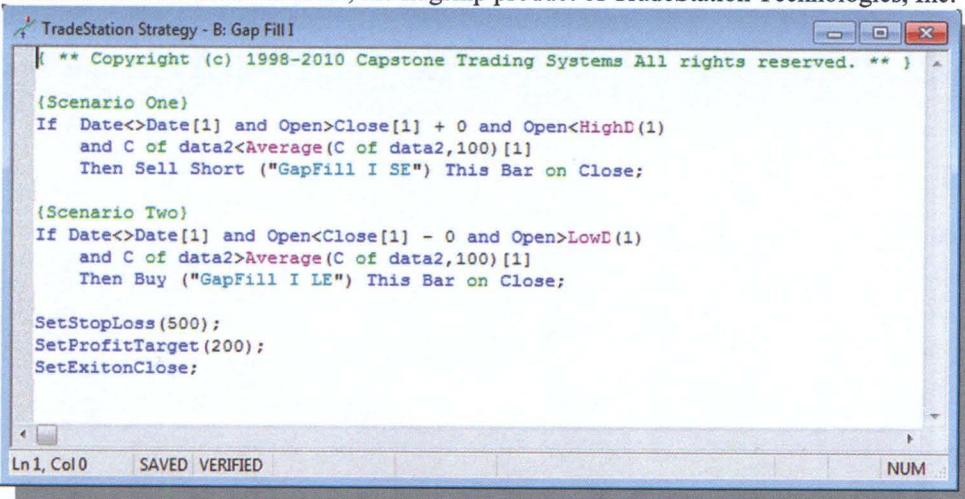


Figure 11 Results for Gap Fill I

EasyLanguage and Workspace Setup

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.



The screenshot shows the TradeStation Strategy editor window titled "TradeStation Strategy - B: Gap Fill I". The code area contains the following EasyLanguage script:

```
{ ** Copyright (c) 1998-2010 Capstone Trading Systems All rights reserved. ** }

(Scenario One)
If Date<>Date[1] and Open>Close[1] + 0 and Open<HighD(1)
    and C of data2<Average(C of data2,100)[1]
    Then Sell Short ("GapFill I SE") This Bar on Close;

(Scenario Two)
If Date<>Date[1] and Open<Close[1] - 0 and Open>LowD(1)
    and C of data2>Average(C of data2,100)[1]
    Then Buy ("GapFill I LE") This Bar on Close;

SetStopLoss(500);
SetProfitTarget(200);
SetExitOnClose;
```

The status bar at the bottom indicates "Ln 1, Col 0" and "SAVED VERIFIED".

Figure 12 EasyLanguage Code for Gap Fill I

The workspace setup is a 1 minute chart of @ES.D on data1 and a daily chart of @ES.D on data2. To automate in Tradestation, the front month contract month is required. For example ESU10.D is the current contract month at the time this is written. If a long look back period is required, adding the @ symbol and using @ESU10.D will “back-adjust” and add previous contract data. To break it down, “ES” is the symbol for the E-mini S&P, “U” refers to the September contract, “10” is the year 2010, and “.D” is the day session that is from 8:30 am – 3:15 pm CST.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.



Figure 13 Gap Fill I Workspace Setup

4. Gap Fill II

Setup Patterns

We will now use Scenario III and Scenario IV in the second Gap Fill trading system. These setups will focus on the more extreme Gaps where the open is outside of the previous day's range.

Scenario Three

In Scenario Three, the opportunity can be even greater as the larger the gap the greater the potential move. When the market opens up above the previous day's highest trading price, it is possible for there to be a strong move higher (continuation gap – discussed later in Chapter 9) or a quick reversal down for a Gap Fill for two reasons:

- 1.) The market realizes that prices have become out of line with fair value and the less liquid overnight session had an overly extended move.
- 2.) Profit taking for those who were long overnight.

The four ways to exit this trade are the same as Scenario One. In this scenario we are looking for the market to move down and fill the gap by returning to previous day's high. An additional move down to the previous day's close, and potentially a complete reversal where the market trends down for the rest of the day to close on its lows are all possible as well.

Looking at the intra-day chart in Figure 14 below of the June E-mini S&P on May 26, 2010, we see Scenario Three unfold. The market did trade higher early in the day by as much as 10 points from the open. The previous day's close was not reached until the last hour of the trading day. Trading can require patience. Using the statistics from a system can help validate a trading plan by knowing the tendency of the market.

This trade looks good in hindsight but many participants give up early on a trade, right before it starts to move in the direction of the initial position. Trading systems help traders handle expectations and know how much adversity to expect and when to cut losses. Trading usually requires larger stop losses than most beginning traders expect. Most strategies that we test seem to require at least a \$500 stop loss, although there are a few that work with a \$300 stop loss. Trying to pinpoint a trade with a 1-2 point stop loss has never been profitable in my own testing in the past 15 years of research.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.



Figure 14 June E-mini S&P with a Gap Fill trade.

Scenario Four

For Scenario Four, an intra-day chart of the June E-mini Russell on May 21, 2010, shows a clear picture of the market opening up almost 10 points lower than the previous day's lowest price. This trading scenario is similar to Trading Scenario Two. The trade works the opposite of trading Scenario Three by going long instead of short.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.

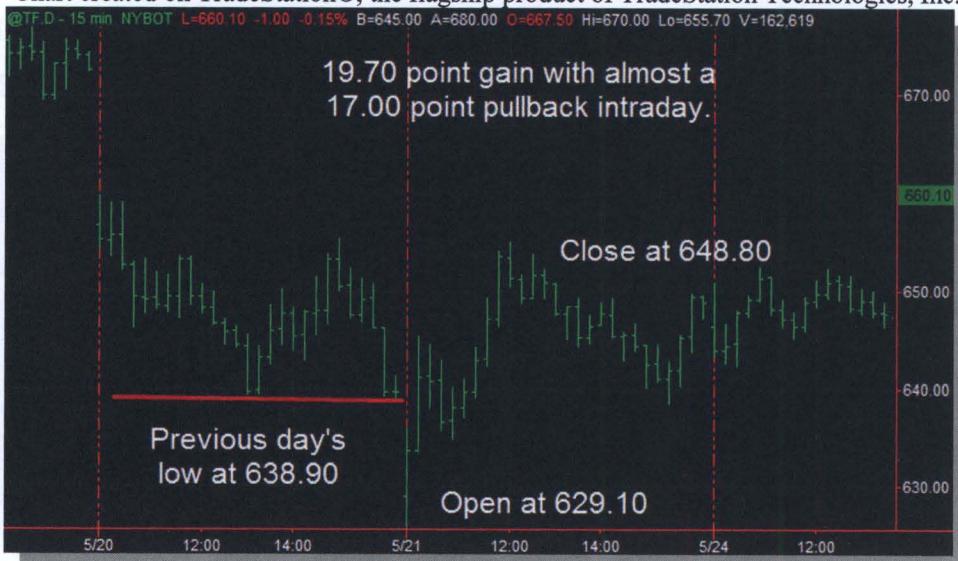


Figure 15 Gap Fill for Scenario IV on the E-mini Russell

Trading System 2: Gap Fill II

As in the previous example, we will now use the Tradestation platform to determine the best trading plan for taking Gap Fill trades for Scenario Three and Four. We will use the E-mini S&P and look at the last five years of trading (going back from 5/31/2010) to again come up with a plan for potentially trading future price action.

This strategy will use Scenario Three for short trades and Scenario Four for long trades. Using the EasyLanguage editor in the Tradestation platform and testing the possibilities above, the best trading plan is outlined below:

- 1.) Determine the overall daily trend by looking at the 100 day moving average as we did in the previous scenarios to determine the trend and take long or short trades accordingly.
- 2.) If the Scenario Three condition occurs then a short position is taken after the first minute of trading.
- 3.) If the Scenario Four condition occurs then a long position is taken after the first minute of trading.
- 4.) Once a position is taken, there is a \$500 stop loss (10 points in the E-mini S&P) or exit at the close of the trading day.

What do the results look like? Below is a picture of the Tradestation Performance Summary.

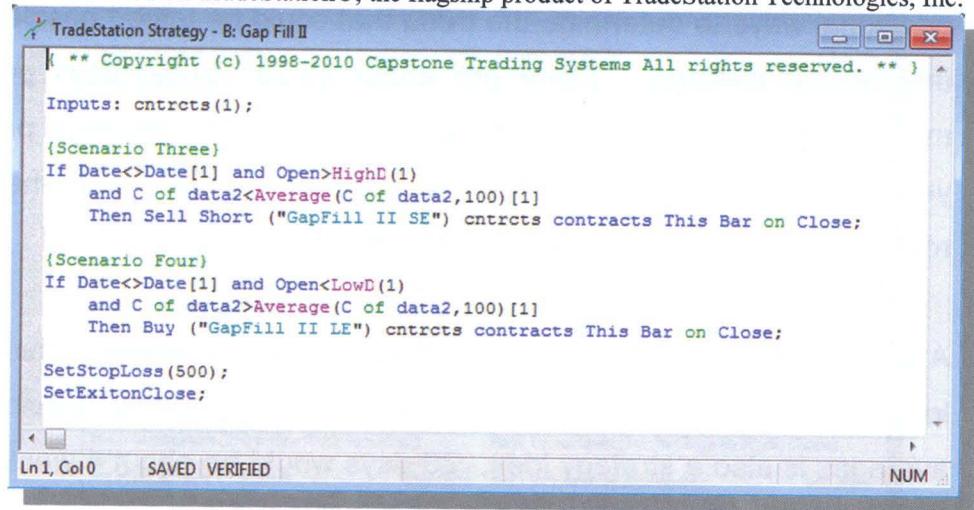
Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.



Figure 16 Tradestation Performance Summary for Gap Fill II

EasyLanguage and Workspace Setup

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.



The screenshot shows the TradeStation Strategy editor window titled "TradeStation Strategy - B: Gap Fill II". The code is written in EasyLanguage and defines two scenarios for trading based on price gaps between two data series. Scenario Three triggers a short trade if the open price is above the high of the previous bar and the current bar's close is below the average of the previous 100 bars' closes. Scenario Four triggers a long trade if the open price is below the low of the previous bar and the current bar's close is above the average of the previous 100 bars' closes. Both scenarios involve setting stop losses at \$500 and exiting on the close. The status bar at the bottom indicates "Ln 1, Col 0 SAVED VERIFIED NUM".

```
/* Copyright (c) 1998-2010 Capstone Trading Systems All rights reserved. */

Inputs: cntrcts(1);

{Scenario Three}
If Date<>Date[1] and Open>HighD(1)
    and C of data2<Average(C of data2,100)[1]
    Then Sell Short ("GapFill II SE") cntrcts contracts This Bar on Close;

{Scenario Four}
If Date<>Date[1] and Open<LowD(1)
    and C of data2>Average(C of data2,100)[1]
    Then Buy ("GapFill II LE") cntrcts contracts This Bar on Close;

SetStopLoss(500);
SetExitOnClose;
```

Figure 17 EasyLanguage Code for Gap Fill II

The workspace setup is the same as Gap Fill I, a 1 minute chart of @ES.D on data1 and a daily chart of @ES.D on data2.

Gap Fill Observations

Several observations can be made in comparing these two trading strategies. The first observation is the average profit per trade is much higher and the percentage of profitability is much lower in Gap Fill II. The reason for this is that there is not a profit target in Gap Fill II and trades are held until the close of the day instead of using a \$200 profit target.

Another observation that cannot be emphasized enough is to trade on the side of the trend. In the Gap Fill trading strategy, the trend was determined by the 100 day moving average. There are additional ways to determine the trend that could be tested besides the moving average. There are about 22-23 trading days per month, depending on the month and about 250 trading days per year. It is important to keep these numbers in your mind when referencing “trading days” versus total calendar days.

A popular moving average is the 200 day moving average. Using look-back periods that are multiples of the monthly moving averages is also a strategy idea. 20 days would be about 4 weeks while 125 days would be roughly a six month moving average.

Different indexes can also be referenced besides the market that is traded. Current cash index values for the Dow are \$INDU and \$INX is the symbol for the S&P.

Using criteria for long trades such as: if the close today is greater than the close 22 days ago or if the close today is greater than last month's close.

The next Tradestation report shows what happens in this trading strategy for Gap Fill II if the 100 day moving average rule is taken out.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.

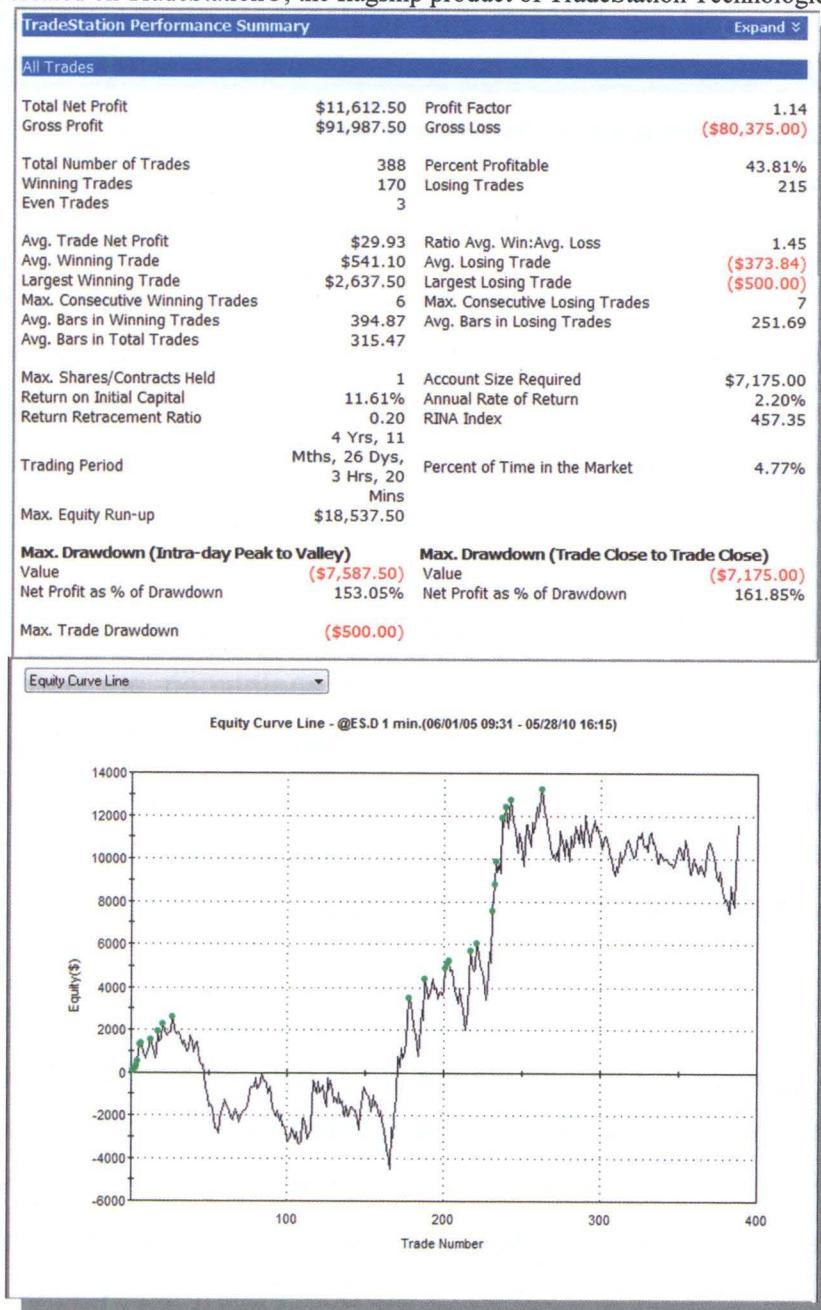


Figure 18 Results for Gap Fill II without the 100 day MA

The strategy is still profitable but not worth trading based on the average profit per trade of only \$29. We are working to achieve \$50 or more for the average profit per trade for these day-trading strategies.

5. Win/Loss Ratio

I wanted to pause here before we look at some additional Gap Fill applications and talk about the Win/Loss Ration or (PT/SL Ratio as I call it) and Trading Psychology.

In trading system design there tends to be an inverse relationship between percentage profitability and average profit per trade. This relationship is also based on the ratio of profit target to stop loss - PT/SL Ratio.

In Gap Fill II, if the profit target is changed to \$50 with a stop loss of \$500 then the percentage profitability goes up to 88% but the strategy becomes a net loser. The concept that you can't go broke taking profits isn't accurate. This would only be true if there was never any adverse price movement from the start of the trade. This could only be done by picking exact turning points 100% of the time.

There has to be a balance in the design so that the average profit per trade is high enough and typically greater than \$50 per trade for day-trade strategies on the E-mini S&P. With tight profit targets, it is easy to design a strategy with a straight line equity curve whose average profit per trade is too low to be trade-able. After slippage and commission (execution costs) there will be no profit left if the average profit per trade is too small.

It is possible to have good strategies with less than \$50 per trade. These are typically high frequency trading strategies and for those traders able to get very low transaction costs.

6. Trading System Psychology

The PT/SL ratio is important because it is important to find a trading strategy that matches your personality and psychology or you won't be able to stay with it. There are two extremes to this ratio and advantages and disadvantages to each.

The first extreme is when the PT/SL ratio (win/loss ratio) is very high, for example: a \$2,000 profit target with a \$300 stop loss. In this case, there may be a small percentage of winners, maybe only 20-30% winners on a good strategy but the average winner will be much larger than the average loser and can still be a very profitable system.

Many traders trade this way to keep losses small and to follow the rule we all know well as traders "cut your losses". This can be frustrating for some traders as the number of consecutive losers will add up and it will be tempting to give up on the strategy before a winner occurs or net profitability is realized.

The second extreme is to have a very low PT/SL ratio, for example, a \$100 profit target, and a \$500 stop loss. In this case it is possible to have 90% winners but one loser can take away the profit of five winners. The advantage is that most trades are winners but there is always that one "bigger loser" at some point in the future.

In this scenario, there is never a big winner. It may look like a system that does not let “profits run” while letting losses get too big but if a valid system can be designed around this approach then it can be trade-able. The challenge here is having a large enough average profit per trade. The Gap Fill I Trading System takes this approach with the ratio being 200 (profit target)/500 (stop loss) or 0.40 for the ratio.

Another concept to understand is that when a trade is time limited (such as a day-trade strategy that exits at the end of the day), then your PT/SL ratio is skewed as you may exit at the end of the day with a smaller profit or smaller loss if the profit target or stop loss has not yet “been hit”.

The Secret Behind Optimization

The optimization tool can be used to give insight on a trading system that has already been developed. Most traders do not think about using the optimization tool in the final testing and analysis of a strategy. The traditional approach is to use this tool when initially developing a strategy. There are a couple of benefits to using it during the final analysis.

The first benefit of the optimization tool is using it to provide an analysis on the stability of the inputs developed in the strategy. Initial parameters can be used based on market observations and

knowledge of general tendencies in the market. In Chapter 10, a graphical strategy is used to find a stop loss.

Checking the stability of the input parameters would include running an optimization of parameters that encompass the current inputs and then reviewing the optimization report and looking at the results for the input parameters that are “close” to the inputs in your strategy. Validation is making sure there is not a “significant” difference in the results between a range of parameters on either side of the current inputs.

An example of this would be to look at the stop losses between \$300 and \$700, every \$50 - \$100 increment, if the input for your stop loss is set at \$500 to see if the results for the ranges of stop losses all have consistent results.

The same is true for testing the profit targets. The next chart shows the results of the optimization report for an optimization of profit targets between \$50 and \$1000 in \$50 increments for Gap Fill I. This report is used to show the stability of parameters but also to show how the PT/SL ratio works.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.

The screenshot shows a software window titled "TradeStation Strategy Optimization Report - @ES.D 1 min...". The window contains a table with 20 rows of data. The columns represent various performance metrics: B: Gap Fill I: PrfTg, All: Net Profit, All: Max Intraday Drawdown, All: Return on Account, All: % Profitable, All: Avg Trade, and All: ProfitFactor. The data shows a general downward trend in Net Profit and Drawdown as the number of trades (PrfTg) increases from 1 to 20, while other metrics like Return on Account and Profitable % remain relatively stable or show slight fluctuations.

	B: Gap Fill I: PrfTg	All: Net Profit	All: Max Intraday Drawdown	All: Return on Account	All: % Profitable	All: Avg Trade	All: ProfitFactor
1	1,000	30,887.50	-4,762.50	648.56	53.45	68.79	1.43
2	950	30,575.00	-4,575.00	668.31	53.45	68.10	1.43
3	900	30,225.00	-3,400.00	888.97	53.67	67.32	1.42
4	850	28,037.50	-3,662.50	765.53	53.67	62.44	1.39
5	800	28,500.00	-3,512.50	811.39	54.12	63.47	1.40
6	750	29,937.50	-3,425.00	874.09	54.57	66.68	1.42
7	700	29,825.00	-2,612.50	1,141.63	55.01	66.43	1.43
8	650	29,887.50	-2,950.00	1,013.14	55.46	66.56	1.43
9	600	29,737.50	-3,350.00	887.69	56.12	66.23	1.44
10	550	28,662.50	-3,850.00	744.48	57.02	63.84	1.43
11	500	28,987.50	-3,012.50	962.24	58.57	64.56	1.45
12	450	29,875.00	-3,162.50	944.66	60.13	66.54	1.48
13	400	29,425.00	-2,837.50	1,037.00	61.92	65.53	1.50
14	350	27,900.00	-2,287.50	1,219.67	63.92	62.14	1.50
15	300	26,512.50	-2,312.50	1,146.49	66.59	59.05	1.51
16	250	27,400.00	-2,250.00	1,217.78	70.82	61.02	1.60
17	200	23,150.00	-1,925.00	1,202.60	74.39	51.56	1.58
18	150	16,312.50	-2,000.00	815.63	78.40	36.33	1.46
19	100	13,737.50	-1,775.00	773.94	85.52	30.60	1.56
20	50	9,187.50	-1,500.00	612.50	93.32	20.46	1.78

Figure 19 Optimization Report for Gap Fill I

In the table above the stability of parameters becomes evident. The table also shows the inverse PT/SL relationship we are talking about at the beginning of the chapter.

This is the second benefit of using the optimization tool. All of my initial favorite parameters can be seen in the optimization report and there are several profitable and stable solutions.

This is where the trading psychology comes in for this chapter and how it is related to the optimization tool. Knowing your own trading personality is important. This analysis can help develop and understand your own trading personality if it is not yet clear by looking at the report and working to imagine which results would match you the best. Real-time trading will be the ultimate proving ground for what works but this initial preparation can provide a short cut versus the alternative of just “jumping in”.

There are trade-offs usually between percentage profitability and average profit per trade and time in the market.

Some traders have then need to be in and out quickly and achieve high accuracy with the occasional large loser while others prefer to take a more passive approach to the market and leave more profits on the table and stay in the trade longer for the potential big winner.

There is a definite inverse relationship between profit target and percentage profitability shown in the table. Using a \$50 profit target, the strategy shows 93.32% accuracy while using a \$1000 stop loss is 53.45% accurate. The \$50 profit target only has a \$20 average trade profit, which is too small. Our goal is to stay above \$50 average profit per trade so a profit target of no less than \$200

would be necessary on this strategy. Using a \$200 profit target, the average profit per trade is \$51 and accuracy is almost 75%.

Notice that the inputs for Gap Fill I are not even the most optimal solution. The return on account is greatest using a \$350 profit target and the average trade profit is \$11 higher than what we developed but the accuracy drops to 64%.

Is Trading an Art or a Science?

This chapter is here to provide some guidelines and one way of thinking when developing a strategy. This can be where the art meets the science. The art of trading is what potential observations and “opportunities” each individual trader perceives in the market as well as what type of approach will fit that trader’s psychology. The art is also keeping track of those perceptions and noticing a change in the market or shift in perception and the basis for even applying the science to the trade.

The science is always “what is really true in the market”. It is easy to have certain biases or false perceptions and to believe that something is either always true or never true. Accurately testing the observations is the science behind finding real answers. Remove as many biases as possible to see the truth.

7. Trading System Psychology

A Multi-System Approach

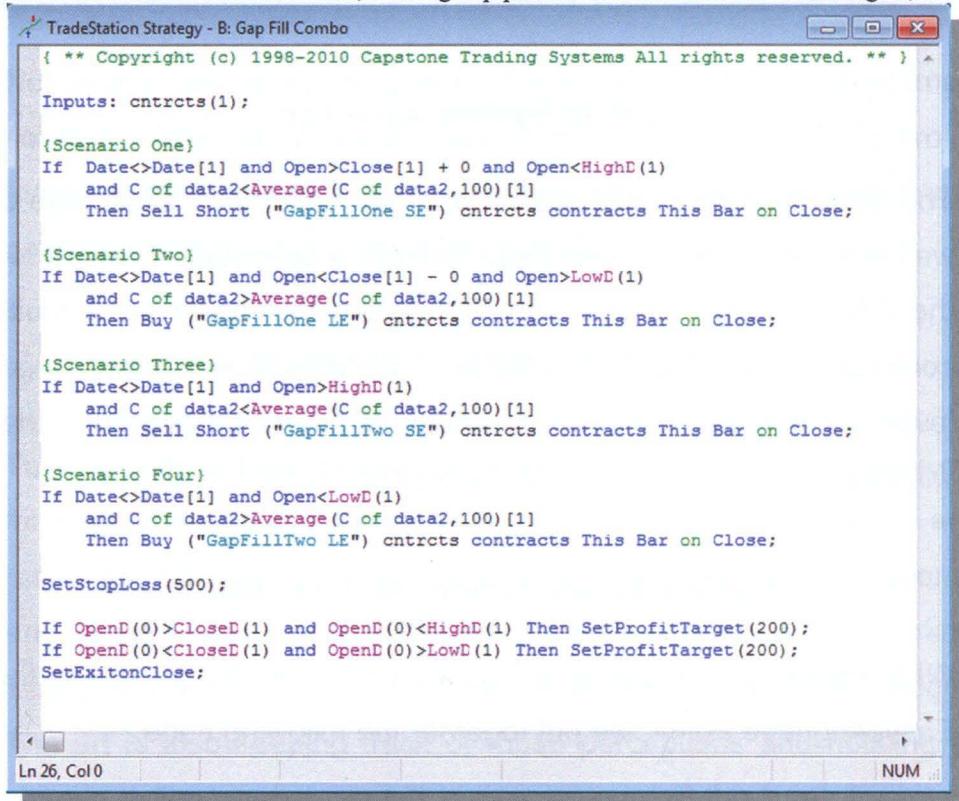
The advantage of a multi-system approach is to take advantage of well designed systems that trade through a spectrum of ranges on the PT/SL Ratio. In the Gap Fill system this could be a multi-contract system that has different stop losses and profit target levels for different contracts to create a diversified approach that will take advantage of different market conditions.

Trading System 3: Gap Fill Combination

What happens if we combine Gap Fill I and Gap Fill II? Using the EasyLanguage Editor, we put together the following code.

EasyLanguage and Workspace Setup

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.



The screenshot shows the TradeStation Strategy editor window titled "TradeStation Strategy - B: Gap Fill Combo". The code is written in EasyLanguage and defines four scenarios for gap fills:

```
/* Copyright (c) 1998-2010 Capstone Trading Systems All rights reserved. */

Inputs: cntrcts(1);

{Scenario One}
If Date<>Date[1] and Open>Close[1] + 0 and Open<HighD(1)
    and C of data2<Average(C of data2,100)[1]
    Then Sell Short ("GapFillOne SE") cntrcts contracts This Bar on Close;

{Scenario Two}
If Date<>Date[1] and Open<Close[1] - 0 and Open>LowD(1)
    and C of data2>Average(C of data2,100)[1]
    Then Buy ("GapFillOne LE") cntrcts contracts This Bar on Close;

{Scenario Three}
If Date<>Date[1] and Open>HighD(1)
    and C of data2<Average(C of data2,100)[1]
    Then Sell Short ("GapFillTwo SE") cntrcts contracts This Bar on Close;

{Scenario Four}
If Date<>Date[1] and Open<LowD(1)
    and C of data2>Average(C of data2,100)[1]
    Then Buy ("GapFillTwo LE") cntrcts contracts This Bar on Close;

SetStopLoss(500);

If OpenD(0)>CloseD(1) and OpenD(0)<HighD(1) Then SetProfitTarget(200);
If OpenD(0)<CloseD(1) and OpenD(0)>LowD(1) Then SetProfitTarget(200);
SetExitOnClose;
```

The status bar at the bottom left indicates "Ln 26, Col 0".

Figure 20 Gap Fill Combination EasyLanguage

The workspace setup is the same as we have used in Gap Fill I and Gap Fill II.

We have basically combined the code from both strategies into one strategy. The one additional provision that we have to keep in mind is that there is a profit target in the Gap Fill I strategy. Because of this, we write the code so that the profit target only works when we have entries from Gap Fill I by adding some of the conditions that

would occur only for entries based on Gap Fill I. This is only one way to do this program the combination of two strategies. The simplicity of our approach made it possible to combine both strategies and see how the strategies would work together in one system in Tradestation. The results for the combination strategy can be seen below in Figure 21.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.

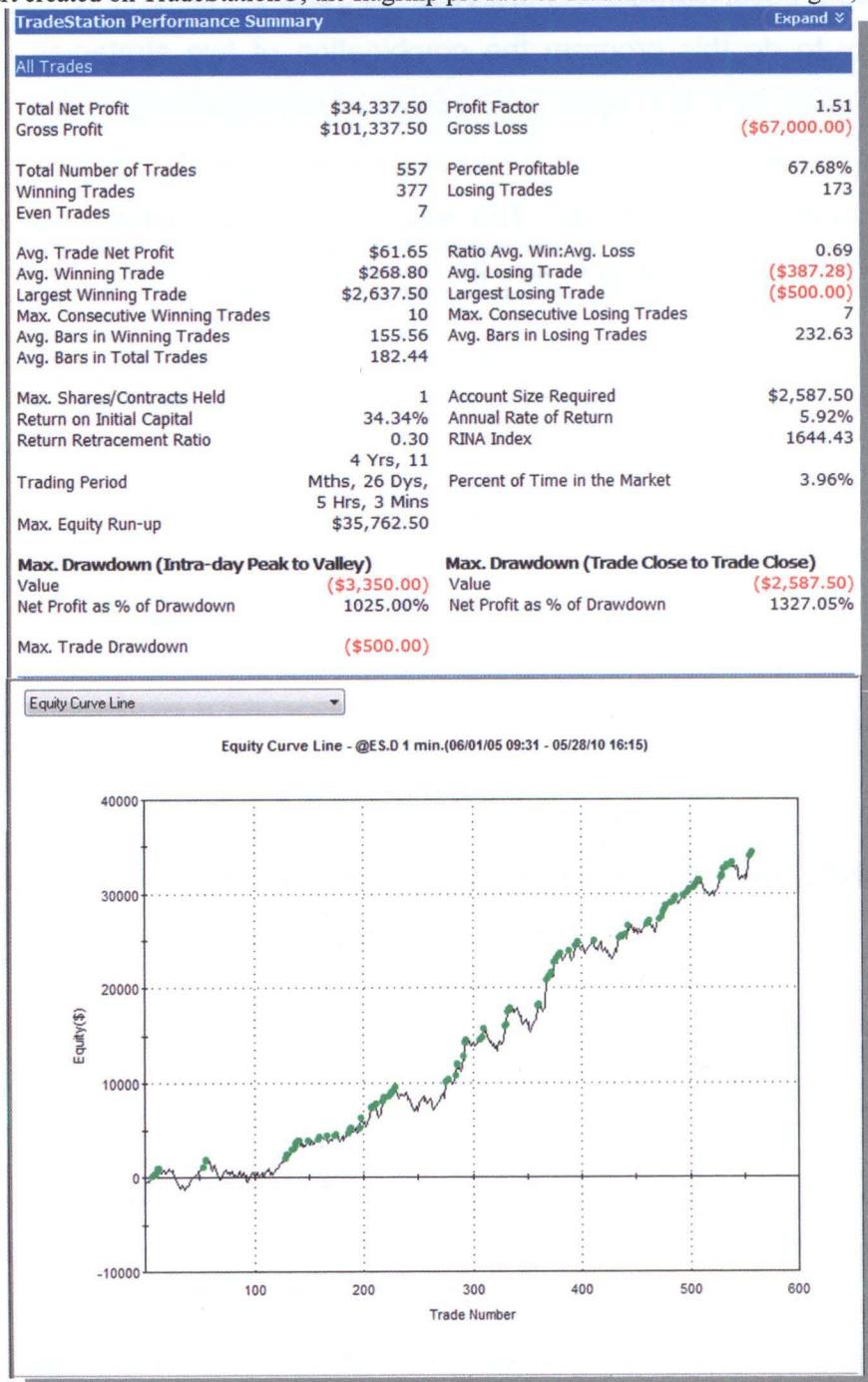


Figure 21 Results for Gap Fill Combination

Gap Fill Combination Observations

Some of the advantages to this system are very clear. The average profit per trade is over \$60 per trade and the profit factor is greater than 1.50. The drawdown is relatively low and the equity curve looks good, especially starting on 9/15/2006 (around trade 100 in Figure 21 above). What are the results from 9/15/2006 forward?

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.



Figure 22 Gap Fill Combination Results 9/15/2006 forward

The average profit per trade is booted by \$16 up to \$77 from 9/15/2006 forward. When we look backward to January 2001, we can see that the average profit per trade decreases to \$43 but the strategy is still very profitable with a good equity curve.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.

TradeStation Performance Summary				Expand ▾
All Trades				
Total Net Profit	\$46,075.00	Profit Factor	1.35	
Gross Profit	\$177,025.00	Gross Loss		(\$130,950.00)
Total Number of Trades	1064	Percent Profitable	65.70%	
Winning Trades	699	Losing Trades		355
Even Trades	10			
Avg. Trade Net Profit	\$43.30	Ratio Avg. Win:Avg. Loss	0.69	
Avg. Winning Trade	\$253.25	Avg. Losing Trade		(\$368.87)
Largest Winning Trade	\$2,637.50	Largest Losing Trade		(\$500.00)
Max. Consecutive Winning Trades	14	Max. Consecutive Losing Trades		7
Avg. Bars in Winning Trades	158.23	Avg. Bars in Losing Trades		259.54
Avg. Bars in Total Trades	194.20			
Max. Shares/Contracts Held	1	Account Size Required	\$3,862.50	
Return on Initial Capital	46.08%	Annual Rate of Return	4.03%	
Return Retracement Ratio	0.16	RINA Index		1720.82
Trading Period	9 Yrs, 4 Mths, 23 Dys, 5 Hrs, 3 Mins	Percent of Time in the Market		4.28%
Max. Equity Run-up	\$48,425.00			
Max. Drawdown (Intra-day Peak to Valley)		Max. Drawdown (Trade Close to Trade Close)		
Value	(\$4,175.00)	Value		(\$3,862.50)
Net Profit as % of Drawdown	1103.59%	Net Profit as % of Drawdown		1192.88%
Max. Trade Drawdown		(\$500.00)		

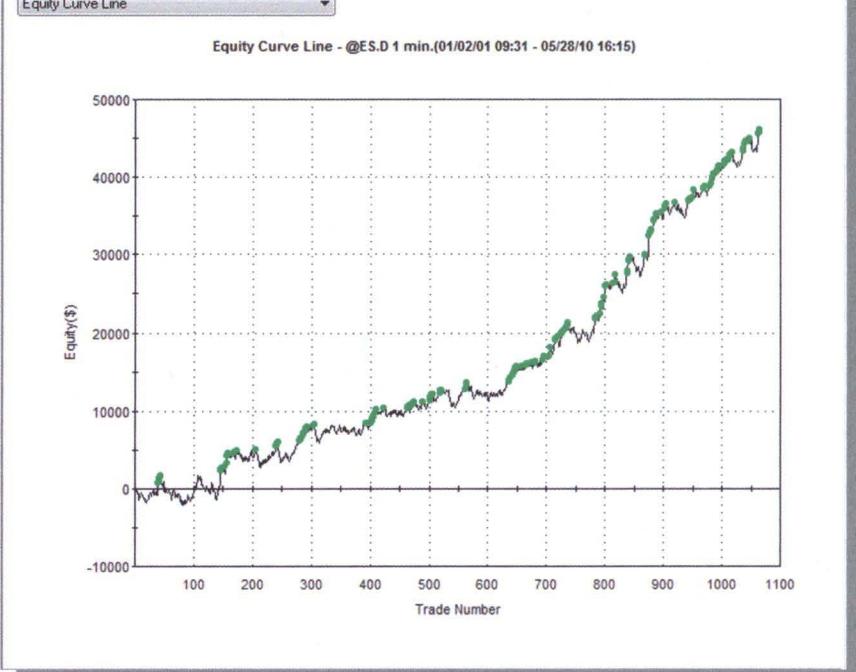


Figure 23 Gap Fill Combination for January 2001 forward

This is a basic approach for trading a Gap Fill strategy with very basic entries and exits that do not include many extra rules or conditions. It is possible to improve upon this strategy by adding extra entry and exit conditions. The more complex a system becomes, the less likely it will work well when walking forward in time. This is referred to as “optimizing” a strategy where “over-optimization” can curve fit a strategy so tightly to past data, that any deviation or change in market condition will prevent the strategy from being profitable going forward from the time it was designed.

Using an unbiased approach when developing strategies on historical data by using simple methods based on many real-time observations, instead of a “formulation” of the market, is the recommended approach since markets are non-linear and cannot be bound by linear approaches.

Even the most unbiased design in a trading system can lead to future trading results that are not profitable. If a system is built based on current market observations and current tendencies, current market relationships (even those observed over a longer period of 10+ years) can change quickly.

8. Gap Fill Rank

Which Market Do I trade?

Thus far we have built our Gap Fill system around the E-mini S&P futures. The E-mini S&P futures have more volume than any other stock index futures market at the time of this writing. This strategy can work well on other stock indexes. A multi-market approach can give us diversity and a way to trade more liquidity if needed. In 2010, the other US stock index futures that can be traded are the Nasdaq, Russell 2000, Midcap 400, and Dow Jones.

The correlation between these markets is very high so trading a similar strategy on different stock index futures markets that are highly correlated only provides a small amount of diversity. One way to pick a stock index is to use conventional wisdom and the ranking system.

Trading System 4: Gap Fill Rank

Conventional wisdom tells us as traders that when we want to go long a sector or group of indexes, we should pick the strongest market in that group of indexes to get long. The same conventional wisdom tells us to short the weakest market in that group of indexes when looking to go short.

This conventional wisdom is counter-intuitive when thinking in terms of value investing. Short term trading price action usually shows us that the strongest market tends to stay the strongest and the weakest market tends to stay the weakest for a longer period of time than we anticipate. Divergences between similar markets and indexes usually take time to “correct”.

Using this conventional wisdom, the Gap Fill Rank approach can be employed. The way we employ the Gap Fill Rank strategy is to take only long trades in the E-mini S&P when it has the strongest open when compared to the other stock indexes. We will only take short trades when the E-mini S&P has the weakest open when compared to the other stock indexes.

Here is a quote screen from Tradestation showing four stock indexes; September E-mini Dow, E-mini S&P, E-mini Russell, and E-mini Midcap. The Net % Change column shows how these indexes are ranked from strongest to weakest during the trading day. This Net % Changes is based on the previous day's close.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.

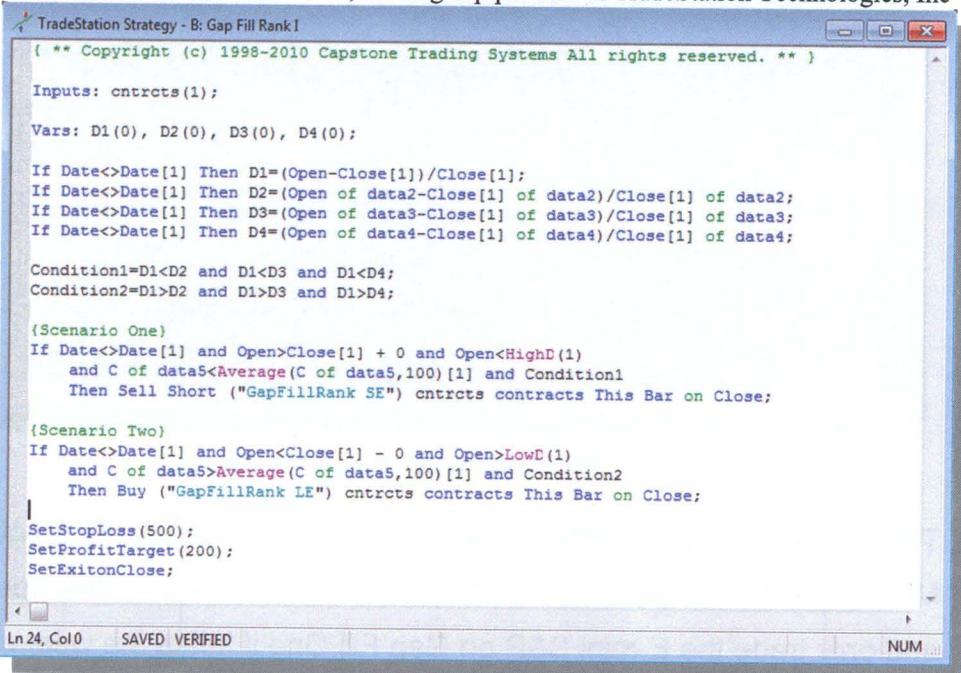
	Symbol	Last	Net Chg	Net %Chg	Bid	Ask	High	Low	Volume Today
1	YMU10	10329	18	1.85%	10328	10329	10331	10132	133,027
2	ESU10	1108.50	22.25	2.05%	108.50	1108.75	1109.00	1084.25	2,284,250
3	TFU10	664.50	14.00	2.15%	664.50	664.60	664.90	649.80	99,735
4	EMDU10	776.20	16.20	2.13%	776.10	776.30	776.70	759.70	26,254
5									
6									

Figure 24 Quote screen for the stock index futures

Using this in our Gap Fill approach, we re-write the code for Gap Fill I in the following EasyLanguage code.

EasyLanguage and Workspace Setup

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc



The screenshot shows the TradeStation Strategy workspace window titled "TradeStation Strategy - B: Gap Fill Rank.I". The code editor contains the following EasyLanguage script:

```
{ ** Copyright (c) 1998-2010 Capstone Trading Systems All rights reserved. ** }

Inputs: cntrcts(1);

Vars: D1(0), D2(0), D3(0), D4(0);

If Date<>Date[1] Then D1=(Open-Close[1])/Close[1];
If Date<>Date[1] Then D2=(Open of data2-Close[1] of data2)/Close[1] of data2;
If Date<>Date[1] Then D3=(Open of data3-Close[1] of data3)/Close[1] of data3;
If Date<>Date[1] Then D4=(Open of data4-Close[1] of data4)/Close[1] of data4;

Condition1=D1<D2 and D1<D3 and D1<D4;
Condition2=D1>D2 and D1>D3 and D1>D4;

{Scenario One}
If Date<>Date[1] and Open>Close[1] + 0 and Open<HighD(1)
    and C of data5<Average(C of data5,100)[1] and Condition1
    Then Sell Short ("GapFillRank SE") cntrcts contracts This Bar on Close;

{Scenario Two}
If Date<>Date[1] and Open<Close[1] - 0 and Open>LowD(1)
    and C of data5>Average(C of data5,100)[1] and Condition2
    Then Buy ("GapFillRank LE") cntrcts contracts This Bar on Close;

SetStopLoss(500);
SetProfitTarget(200);
SetExitOnClose;
```

The status bar at the bottom of the window indicates "Ln 24, Col 0 SAVED VERIFIED".

Figure 25 Gap Fill Rank EasyLanguage Code

Let's take a look at how this is setup in the workspace window with five different data sets.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.



Figure 26 Workspace setup for Gap Fill Rank

The additional data sets (data2-data4, E-mini Russell, E-mini Midcap, E-mini Dow) let us look at each stock index on the open and only trade the E-mini S&P on Gap Fill One if it has the weakest open (for shorts) or the strongest open (for longs). Data5 is still part of the workspace as we are still looking at the 100 day moving average of the daily chart to determine the trend.

Trading System Results

The results for this strategy show some pretty amazing statistics with excellent Profit Factor, Average Profit Per Trade, Percent Profitability, and very low drawdown. The biggest problem with this strategy is the low trade frequency with only eight or nine trades per year.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.

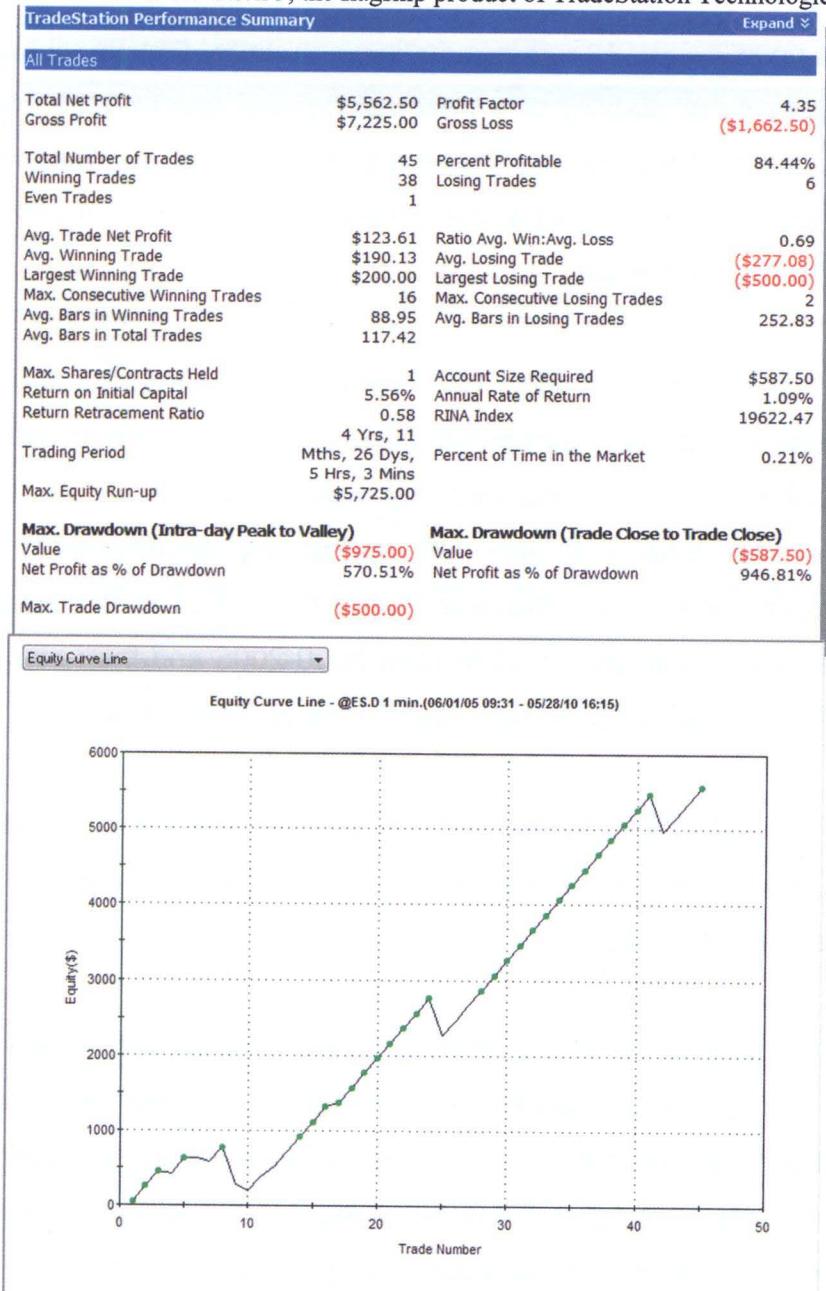


Figure 27 Gap Fill Rank

We take a look at this strategy over the last 10 years next to check the consistency. “Walking” forward in time can to check the consistency or stability of a new trading idea can only be done by waiting for time to pass. There are two ways to approach a new trading idea when seeking longer term validation of how consistent the strategy “could be”.

The first way is to develop the new idea on data starting 3-5 years and going back from that point. Develop the new idea to see if it is profitable in the past and then test it on future data for the last 3-5 years (the data that was left out during development). For example, the year that this is written is 2010. To use this approach, develop the new idea on data from 2000-2005 and then see how it would have done, “walking forward” from 2006 to 2010.

The second way is go back in time and see how the strategies that are developed now based on recent market perceptions would have done in the past.

It is possible to develop a strategy based on changes in the market and would only be valid in the present. As long as there is a fundamental understanding of why the system should work on a shorter test period then it can be validated. Knowing why a system works can help determine when to stop trading it as well.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.

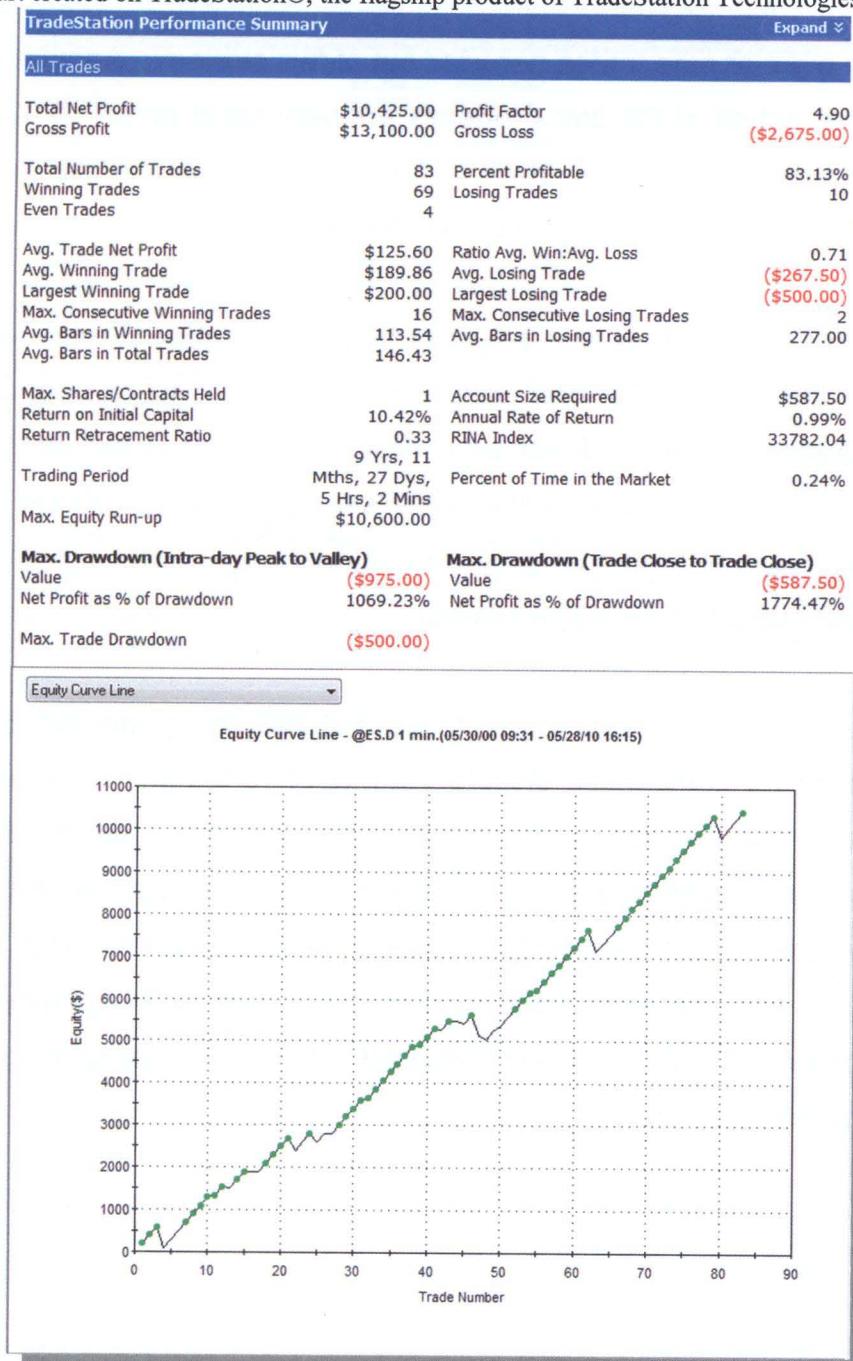


Figure 28 Gap Fill Rank going back 10 years.

Going back 10 years, the results remain consistent. We still get only eight or nine trades per year out of this strategy. Another note is that not all of the stock indexes are very liquid before 2003 and some did not start until 2002. This is a quick analysis that we will bring back to the last two years of trading.

Making this strategy less selective by comparing the E-mini S&P to only one stock index such as the E-mini Russell we can get about 36 trades per year but with an average profit per trade of only \$45. A quick and easy way to make the strategy look at only one other stock index without changing the EasyLanguage code is to change data2 - data4 to the same symbol.

Testing different stock indexes, we find that using only the E-mini Midcap for comparison gives us the most trades and best results. The E-mini Midcap is the least liquid and can “overshoot” the greatest percentage in both directions (to the upside and the downside) since there is less liquidity. Comparing the most liquid market with the least liquid market works best when applying this approach of shorting the weakest market or going long the strongest market.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc

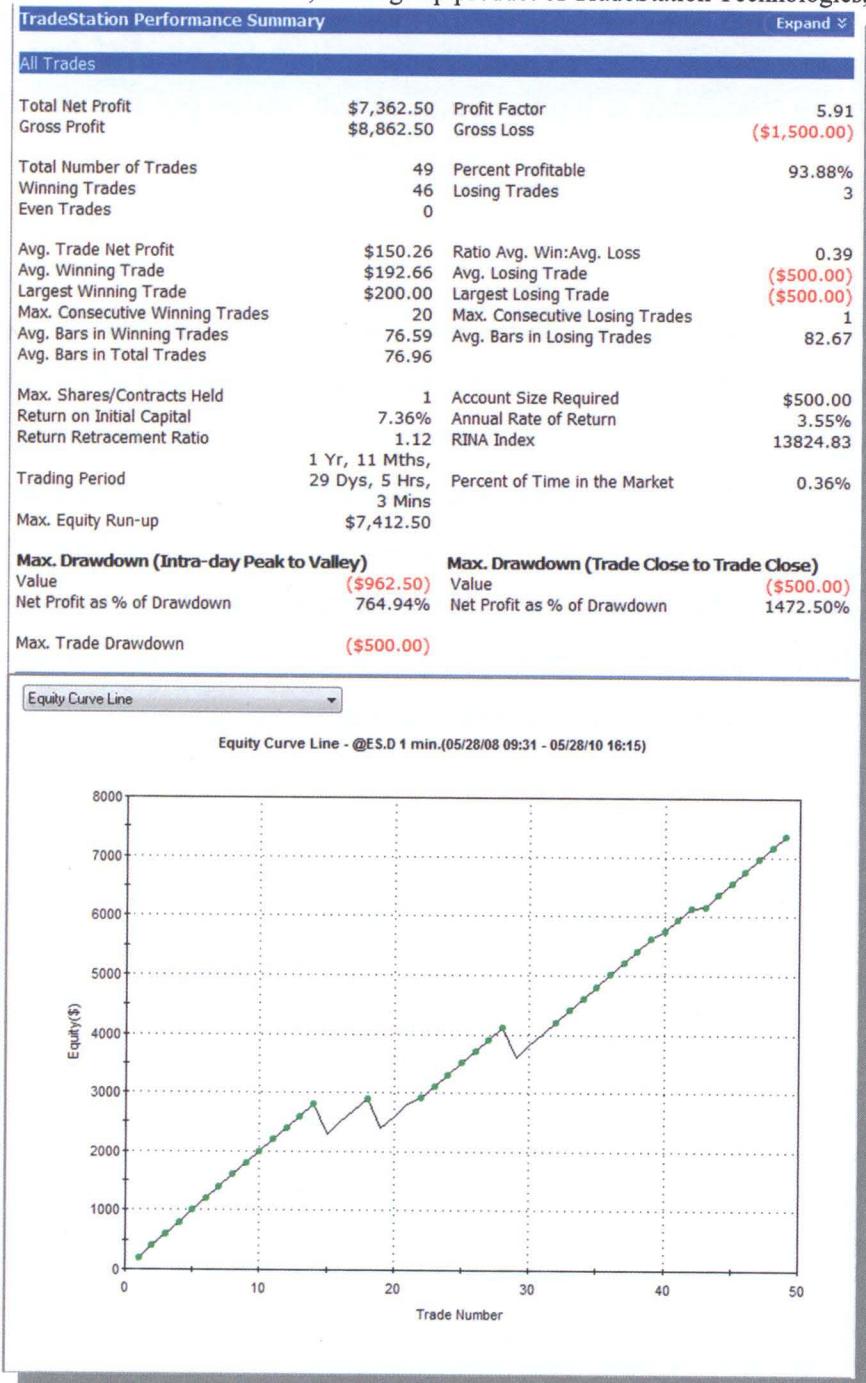


Figure 29 Gap Fill Rank compare only E-mini Midcap

This strategy shows some amazing results for the last two years and the frequency is high enough at two trades per month. There is also an incredibly high accuracy of almost 94% and great average profit per trade.

Still seeking more trades we take out the condition that requires that we trade on the side of the 100 day moving average. We end up getting more trades and more net profit with an increase in drawdown and overall decrease in total return and an average profit per trade that is cut in half. The equity curve still looks great. Looking at the results without the trend condition helps us further validate the approach by showing how the strategy without this one rule, is still very profitable. See the results below.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc

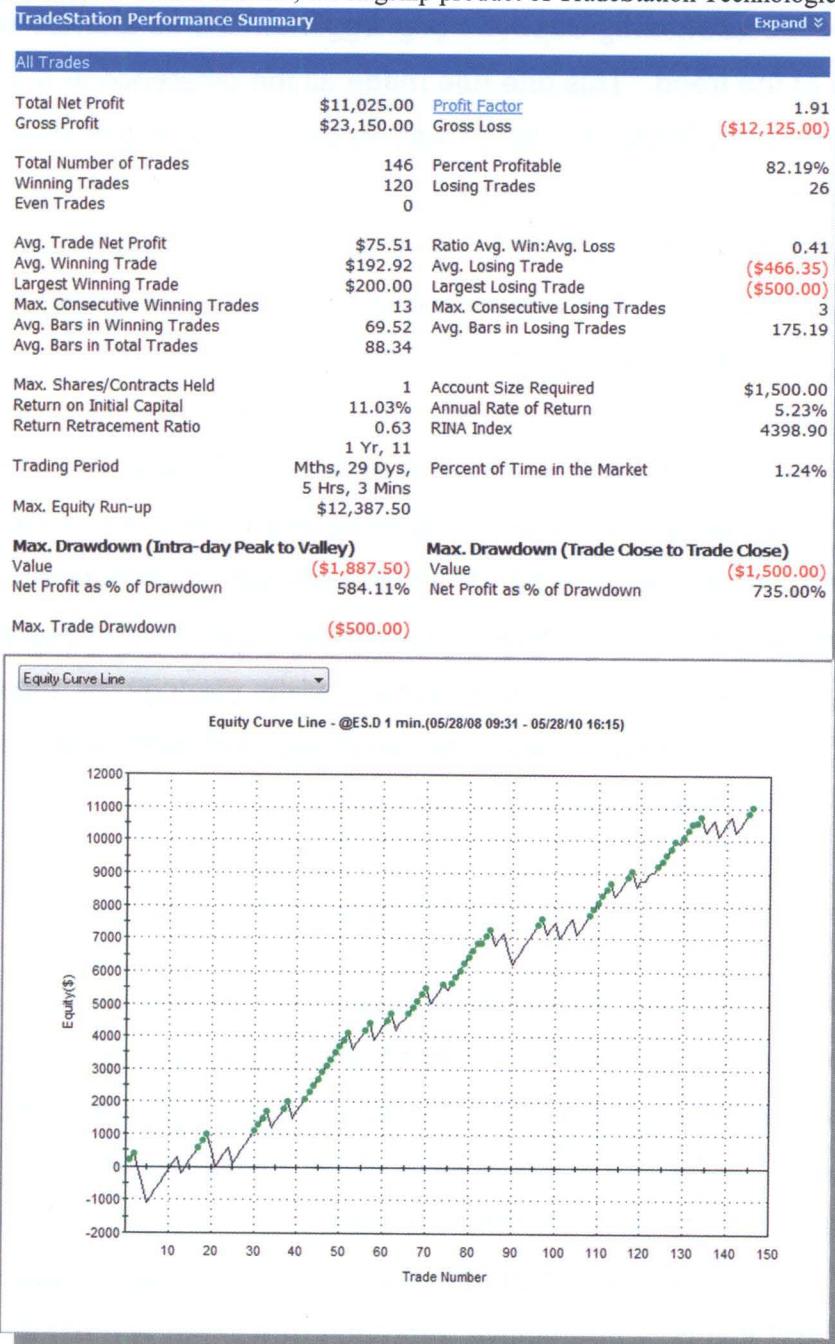


Figure 30 Gap Fill Rank without 100 day MA rule

We stated before in Gap Fill I how important it was to trade on the side of the trend. This one rule made all the difference in a system that was profitable enough to trade versus a system that was still profitable on paper and in the Tradestation Performance Summary but not profitable enough to trade in real time. Without the trend requirement, the average profit per trade before transaction costs was only \$29.

By adding the Rank filter, we now have two effective rules and can still see how effective and profitable trading on the side of the trend can be. Removing the trend requirement can be justified since we have an effective approach using just the Rank filter. There can be advantages to a higher frequency trading strategy as there are money management and multi-contract strategies that can be applied in order to compound contracts.

Gap Fill Observations and Conclusions

Applying the Gap Fill Rank does not work as well on Gap Fill II. The condition for Gap Fill II has us shorting a stronger market and buying a weaker market than we do in Gap Fill I since the gap is “bigger”. The conventional wisdom we mentioned in the Gap Fill Rank approach is to short the weakest market on the smallest gap up or going long the strongest market on the smallest gap down. We find this counter-intuitive approach true when we test it out on

Gap Fill Rank I and additional proof is shown when we see that it does not work as well on bigger gaps by testing it on Gap Fill II.

These strategies are very basic and could add additional conditions or rules. We enter the market after the first minute of trading at the market. Additional time delay or entering the market at higher or lower prices from the open or previous day's close could all be tested. Additional stop loss and profit targets could be tested as well as trailing stop losses or other exit strategies. There are other ways to determine the trend as previously mentioned in Chapter 4 such as looking at different indexes including the cash S&P, cash Dow Jones, cash Russell 2000, or other stock index futures markets could also be tested when looking at the 100 day moving average. Additionally other trend analysis techniques could also be applied instead of only the 100 day moving average.

9. Gap Continuation I

In the previous chapter we looked at the Gap Fill strategy. In the next couple of chapters we look at Gap Continuations. The Gap Continuation can be one of the most difficult patterns to trade since buying a Gap Up or shorting a Gap Down would not be a natural strategy for most traders. Run away markets still provide opportunities for traders. This Gap Continuation strategy provides a method for trading a run-away market and a way to take trades that feel “un-natural”.

Setup Patterns

We will again look at Scenario I and Scenario II as we did for Gap Fills in the previous chapters and see if there is a profitable strategy for Gap Continuations.

Scenario One

In Scenario One, the market opens above the previous day's close but below the previous day's high. On May 21, 2010, the June E-mini Russell opened up at 696.90, 5.50 points higher than the previous day's close and then closed at 713.40 on the day.

Taking this trade by going long on the open would have generated 16.50 points per contract in the E-mini Russell or \$1650, if held until the close.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.



Figure 31 Gap Continuation for Scenario I, E-mini Russell

Scenario Two

A good example of Scenario Two can be seen below in the June E-mini Russell on May 25, 2010. The market opened at 646.40, only 2.40 points below the previous day's close of 648.80. The day was choppy and does not stand out as a day with a nice trend. Many trades can fall into this category.

If a trade was taken to short at the open, the price went as high as 652.50 before closing down at 639.70. The trade would be at a \$610 loss near the high of the day but ending up with a \$670 profit if the trade was exited on the close.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.



Figure 32 Gap Continuation on Scenario II

Trading System 5: Gap Continuation I

Using the Tradestation platform, we will take a look at the Gap Continuation for Scenario One and Two on the E-mini S&P, E-mini Russell, and E-mini Midcap with some additional conditions.

We will look at the specific rules, the Tradestation results, and then the EasyLanguage code.

The trading plan is outlined below:

- 1.) We limit our entries between 12:00 noon and 4:00 pm EST and less than two entries per day.

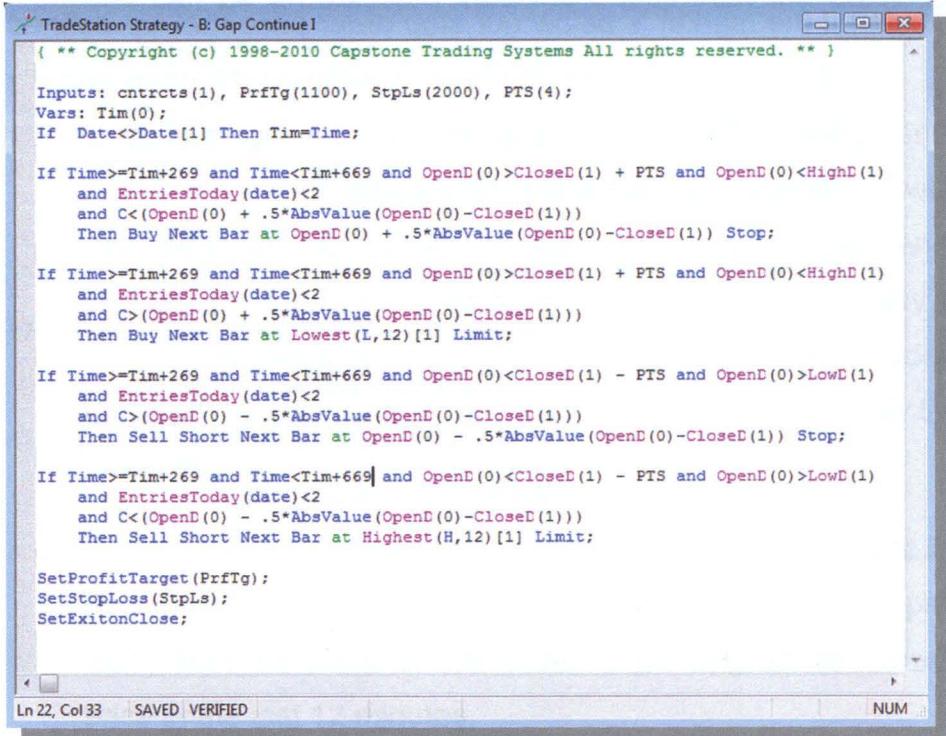
- 2.) In the Scenario One condition, the Opening price will be greater than the previous day's close + PTS (a point value that can be an adjusted input) and less than the previous day's high for long trades to be considered.
- 3.) Once a long trade can be considered based on Rules 1 and 2 above, we look for an entry price. In this strategy we will use 50% of the difference between today's open and yesterday's close and add that value to the current day's open. This value becomes the entry price with a stop order between 12 noon and 4 pm EST if the market is currently below that level.
- 4.) If the market is above our stop order price that we defined in Rule 3 above, (and the time is between 12 noon and 4 pm EST) then we place a limit order to go long at the lowest price in the last 12 minutes.
- 5.) In the Scenario Two condition, the Opening price will be less than the previous day's close - PTS (a point value that can be adjusted as an input) and greater than the previous day's low for short trades to be considered.
- 6.) Once a short trade can be considered based on Rules 1 and 5 above, we look for an entry price. In this strategy we will use 50% of the difference between today's open and yesterday's close and subtract that value from the current day's open. This value becomes the entry price with a stop

order between 12 noon and 4 pm EST if the market is currently above that level.

- 7.) If the market is below our stop order price that we defined in Rule 6 above, (and the time is between 12 noon and 4 pm EST) then we place a limit order to go sell short at the highest price in the last 12 minutes.
- 8.) Once a position is taken, there is a \$2000 stop loss (20 points in the E-mini Russell and Midcap 400 and 40 points in the E-mini S&P), a \$1100 profit target (11 points in the E-mini Russell and Midcap 400 and 22 points in the E-mini S&P), or exit at the close of the trading day.

EasyLanguage and Workspace Setup

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.



The screenshot shows the TradeStation Strategy workspace titled "B: Gap Continue I". The code is written in EasyLanguage and defines a strategy for gap continuation trading. It includes inputs for contract symbols, profit target, stop loss, and time periods, as well as variables for current time and date. The logic involves checking for specific price conditions (e.g., Open > Close + PTS, Open < Close - PTS) and entry/exit criteria (e.g., entries today < 2, C > (Open + .5 * AbsValue(Open - Close))) to buy or sell the next bar at specific price levels or limits. The code concludes with setting profit targets and stop losses.

```
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Inputs: cntrcts(1), PrfTg(1100), StpLs(2000), PTS(4);

Vars: Tim(0);
If Date>>Date[1] Then Tim=Time;

If Time>=Tim+269 and Time<Tim+669 and OpenD(0)>CloseD(1) + PTS and OpenD(0)<HighD(1)
    and EntriesToday(date)<2
    and C<(OpenD(0) + .5*AbsValue(OpenD(0)-CloseD(1)))
Then Buy Next Bar at OpenD(0) + .5*AbsValue(OpenD(0)-CloseD(1)) Stop;

If Time>=Tim+269 and Time<Tim+669 and OpenD(0)>CloseD(1) + PTS and OpenD(0)<HighD(1)
    and EntriesToday(date)<2
    and C>(OpenD(0) + .5*AbsValue(OpenD(0)-CloseD(1)))
Then Buy Next Bar at Lowest(L,12)[1] Limit;

If Time>=Tim+269 and Time<Tim+669 and OpenD(0)<CloseD(1) - PTS and OpenD(0)>LowD(1)
    and EntriesToday(date)<2
    and C>(OpenD(0) - .5*AbsValue(OpenD(0)-CloseD(1)))
Then Sell Short Next Bar at OpenD(0) - .5*AbsValue(OpenD(0)-CloseD(1)) Stop;

If Time>=Tim+269 and Time<Tim+669 and OpenD(0)<CloseD(1) - PTS and OpenD(0)>LowD(1)
    and EntriesToday(date)<2
    and C<(OpenD(0) - .5*AbsValue(OpenD(0)-CloseD(1)))
Then Sell Short Next Bar at Highest(H,12)[1] Limit;

SetProfitTarget(PrfTg);
SetStopLoss(StpLs);
SetExitOnClose;
```

Figure 33 EasyLanguage Code for Gap Continue I

Below is a picture of the Tradestation Performance Summary to see the results for all three markets.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.

TradeStation Performance Summary			
All Trades			
Total Net Profit	\$24,500.00	Profit Factor	1.92
Gross Profit	\$51,037.50	Gross Loss	(\$26,537.50)
Total Number of Trades	184	Percent Profitable	57.07%
Winning Trades	105	Losing Trades	78
Even Trades	1		
Avg. Trade Net Profit	\$133.15	Ratio Avg. Win:Avg. Loss	1.43
Avg. Winning Trade	\$486.07	Avg. Losing Trade	(\$340.22)
Largest Winning Trade	\$1,100.00	Largest Losing Trade	(\$2,000.00)
Max. Consecutive Winning Trades	8	Max. Consecutive Losing Trades	5
Avg. Bars in Winning Trades	181.46	Avg. Bars in Losing Trades	193.60
Avg. Bars in Total Trades	186.97		
Max. Shares/Contracts Held	1	Account Size Required	\$3,112.50
Return on Initial Capital	24.50%	Annual Rate of Return	4.39%
Return Retracement Ratio	0.28	RINA Index	4860.50
Trading Period	4 Yrs, 11 Mths, 27 Dys, 5 Hrs, 1 Min	Percent of Time in the Market	1.32%
Max. Equity Run-up	\$28,500.00		
Max. Drawdown (Intra-day Peak to Valley)		Max. Drawdown (Trade Close to Trade Close)	
Value	(\$3,575.00)	Value	(\$3,112.50)
Net Profit as % of Drawdown	685.31%	Net Profit as % of Drawdown	787.15%
Max. Trade Drawdown	(\$2,000.00)		

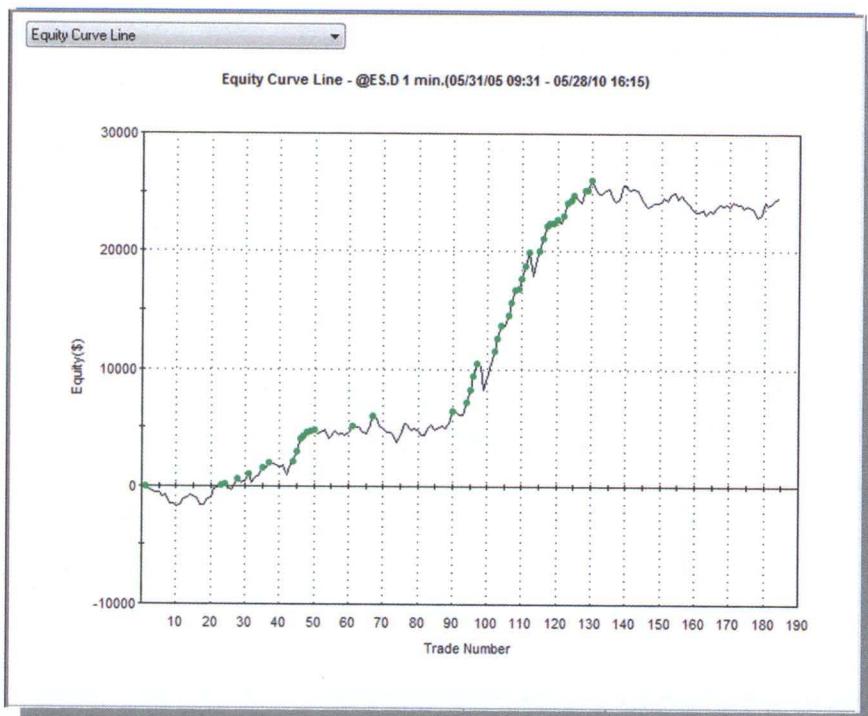


Figure 34 E-mini S&P Gap Continue 05/31/2005-05/28/2010

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.

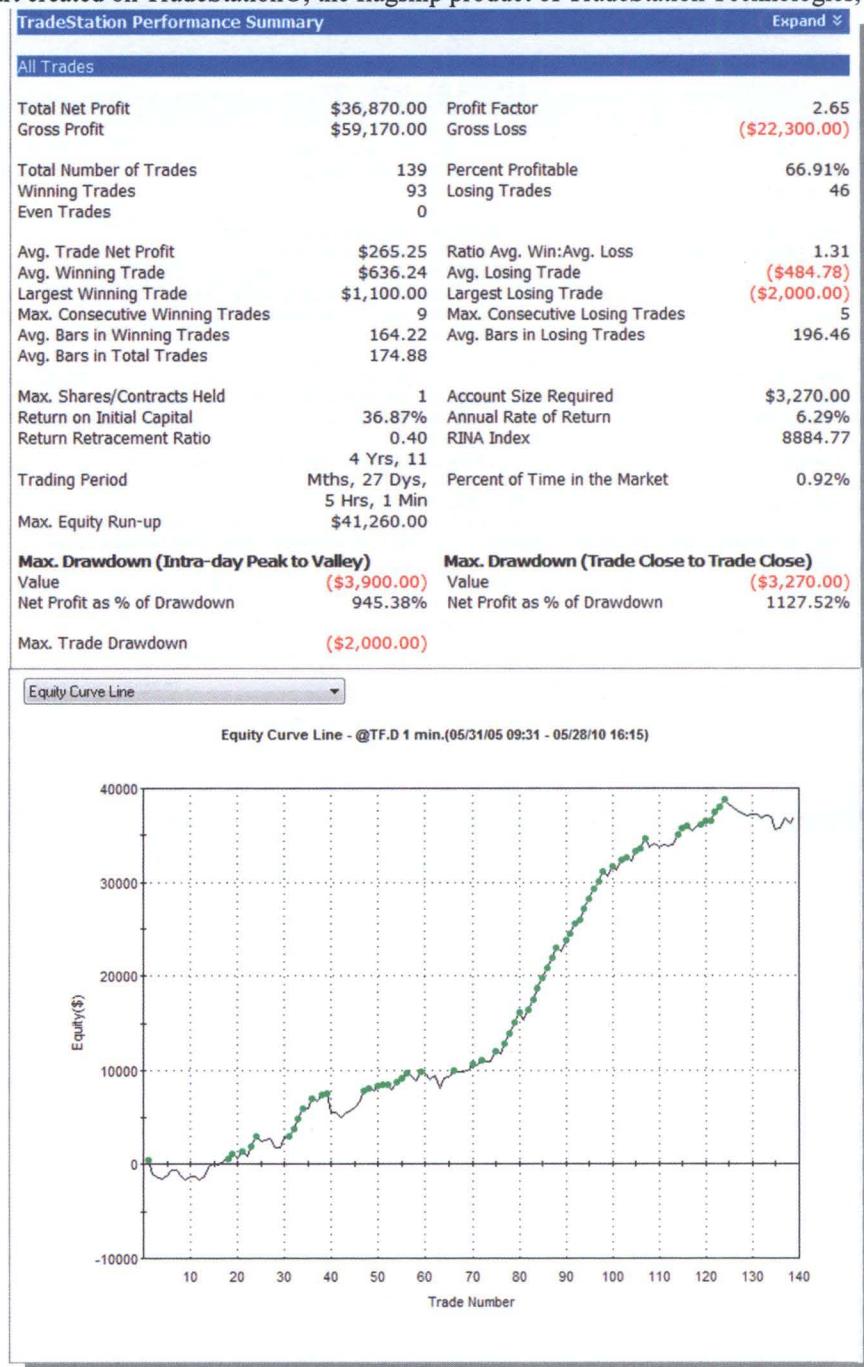


Figure 35 E-mini Russell Gap Continue 05/31/2005-05/28/2010

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.

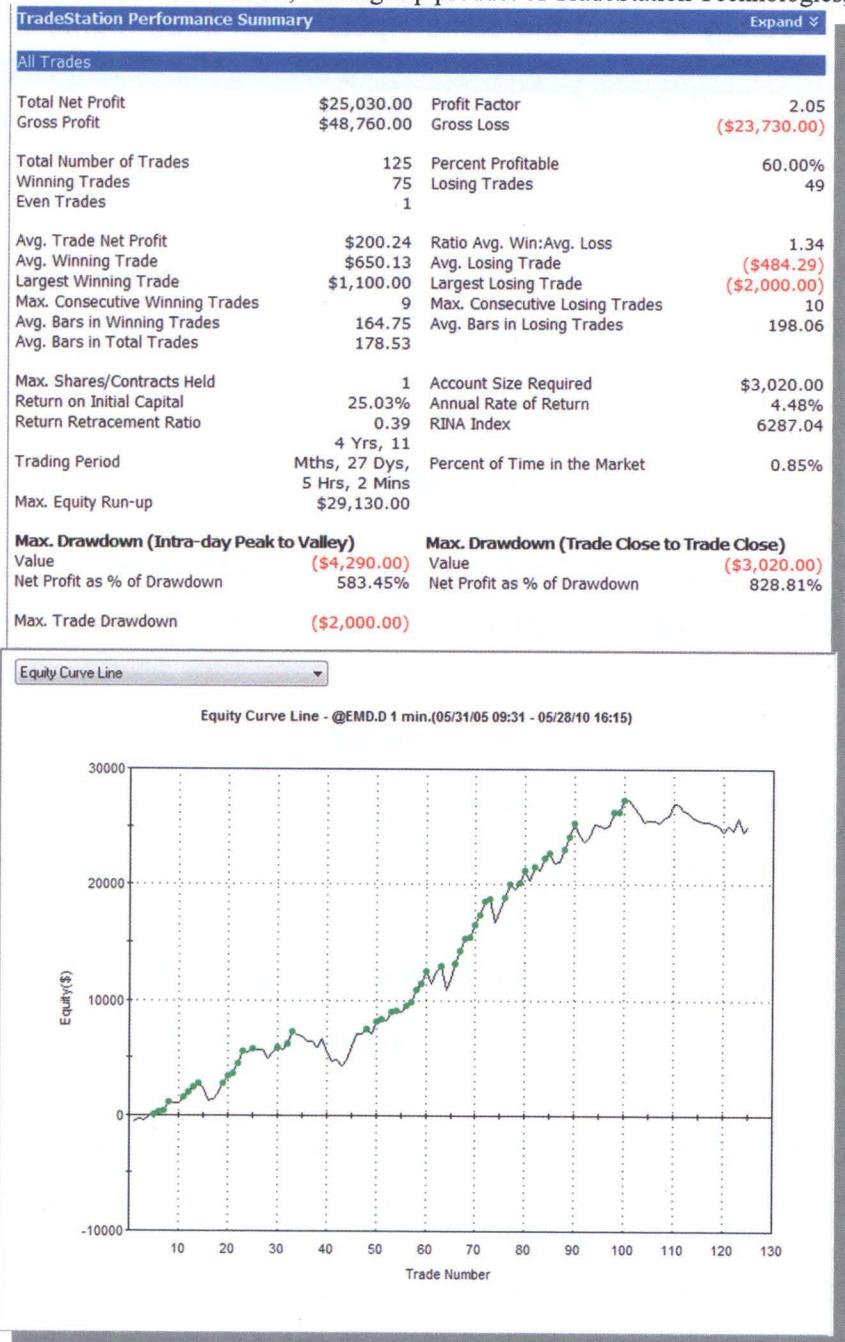


Figure 36 E-mini Midcap Gap Continue 05/31/2005-05/28/2010

This strategy is using the same inputs for all three markets with a strong average profit per trade.

10. Gap Continuation II

Setup Patterns

Now we look again at Scenario III and Scenario IV to test for additional Gap Continuations when the market has these strong gap opens outside of the previous day's range.

Scenario Three

This occurs when the market opens above the previous day's high. A Gap Continuation up occurs in a very strong market.

Scenario Four

This occurs when the market opens below the previous day's low. A Gap Continuation down occurs in a very weak market.

Trading System 6: Gap Continue II

The trading plan is outlined below:

- 1.) Take trades from the open up until 3:45 pm EST with no more than two entries per day.
- 2.) For long trades the Open for the day session must be greater than the previous day's High (the High on the day session, not including the overnight session) plus PTS

(points above the high – this is set to 0 – so that all we need is at least 1 tick above the previous day's high).

- 3.) Once the conditions in 1 and 2 are met, then we go long at the lowest price in the last 24 minutes as long as the current price is above the current day session open.
- 4.) For short trades the Open for the day session must be less than the previous day's Low (the Low on the day session, not including the overnight session) minus PTS (points below the low – this is set to 0 – so that all we need is at least 1 tick below the previous day's low).
- 5.) Once the conditions in 1 and 4 are met, then we go short at the highest price in the last 24 minutes as long as the current price is below the current day session open.

Exit Strategies and Techniques

Previously, we have placed stop losses and sometimes profit targets without any real explanation. I wanted to add this section to show a good way to find a solid stop loss that uses a graphical technique. When looking at the TS Performance Summary, Trade Graphs, we can look at the Maximum Adverse Excursion chart. This sounds like a sophisticated statistical analysis but it is really an easy graphical way to see what is going on with your trades. Below is a chart of the Maximum Adverse Excursion for Gap Continue II.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.

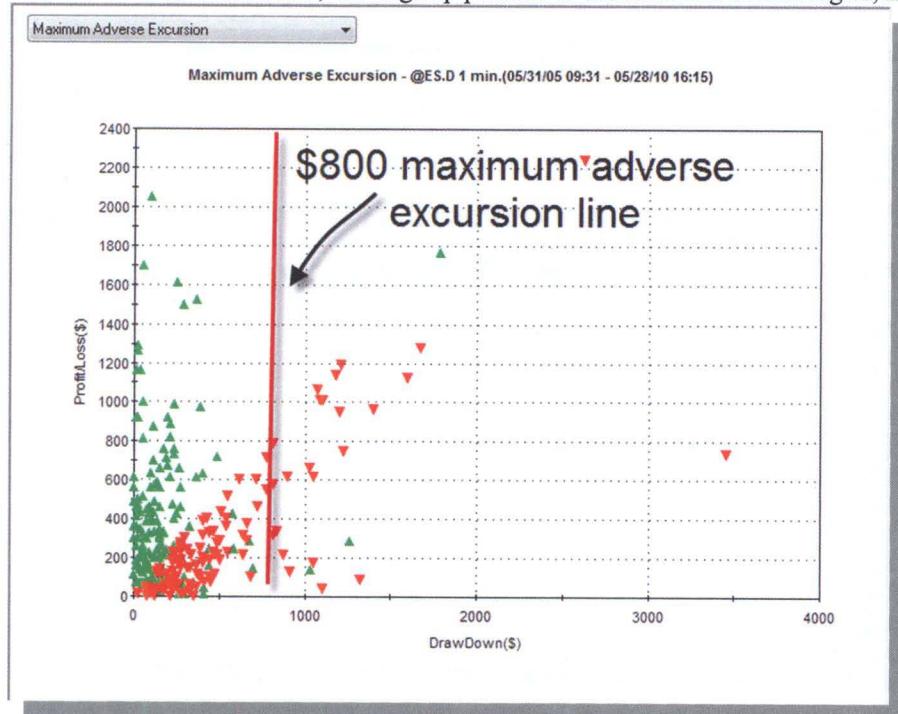


Figure 37 Maximum Adverse Excursion, Gap Continue II

This shows a plot of all the winning and losing trades and how much each trade was unprofitable before it showed a profit or a loss and then exited. An important note here is to only have the end of day exit as the only active exit strategy when using this technique to determine a stop loss.

The visual stop loss that makes the most sense visually is the \$800 maximum adverse excursion line. Using the optimization tool to see the stability of this stop loss (but not necessarily to use the most optimal stop loss) can also be tested. From the plot, it is possible to see that with an \$800 stop loss, three additional winning trades (2 small, and 1 large) would be missed. The net losses of all

the losing trades that exceed the \$800 threshold are greater than the net profit from the three winners we miss out on.

The Maximum Favorable Excursion can also be used to look for profit targets. Below is a chart of the Maximum Adverse Excursion and the Maximum Favorable Excursion with an \$800 stop loss and end of day exit.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.

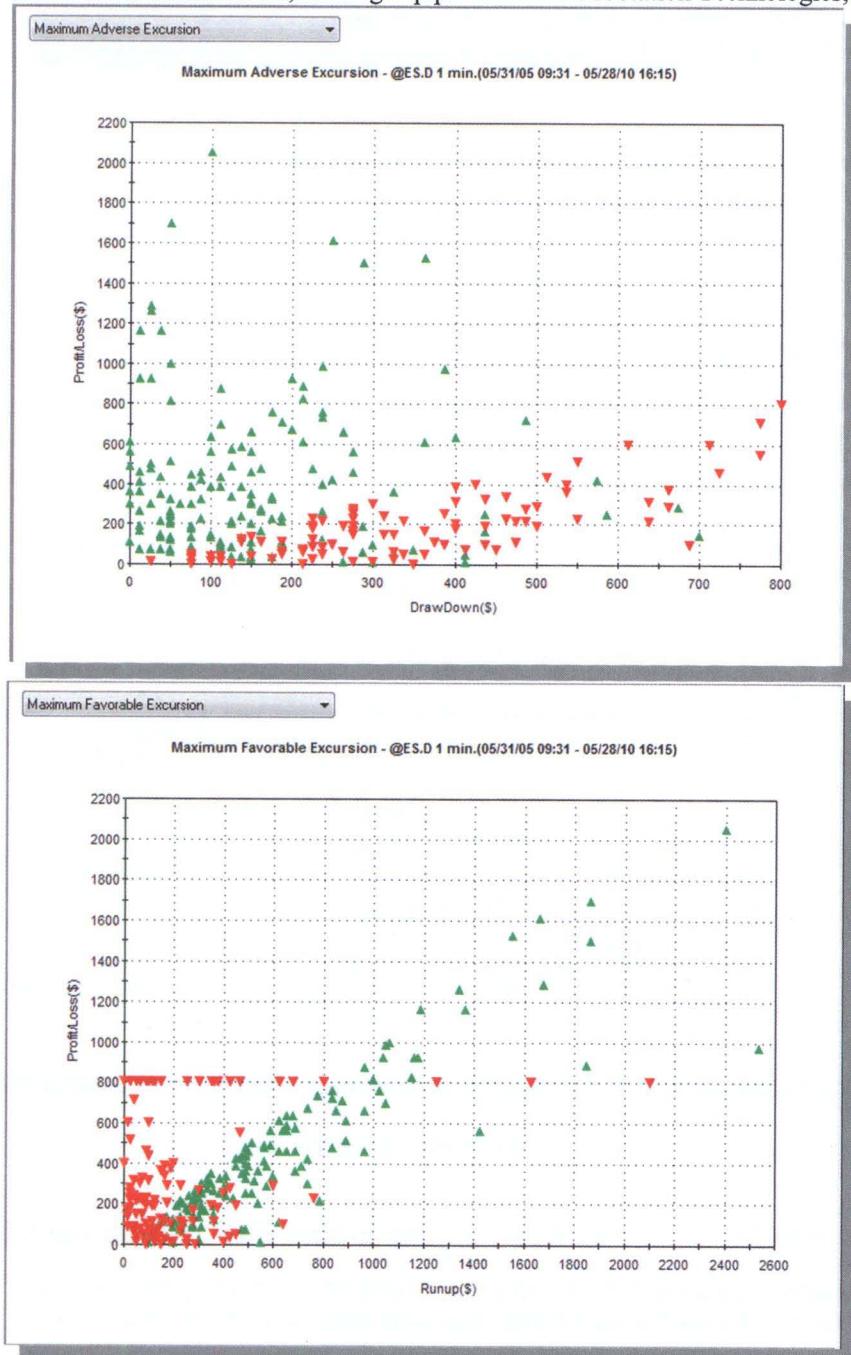


Figure 38 Maximum Adverse and Favorable Excursions

Looking at this chart and testing different profit targets, we settle on a \$550 profit target.

Here is a chart of the Maximum Favorable Excursion with the \$550 profit target, \$800 stop loss, and end of day exit.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.

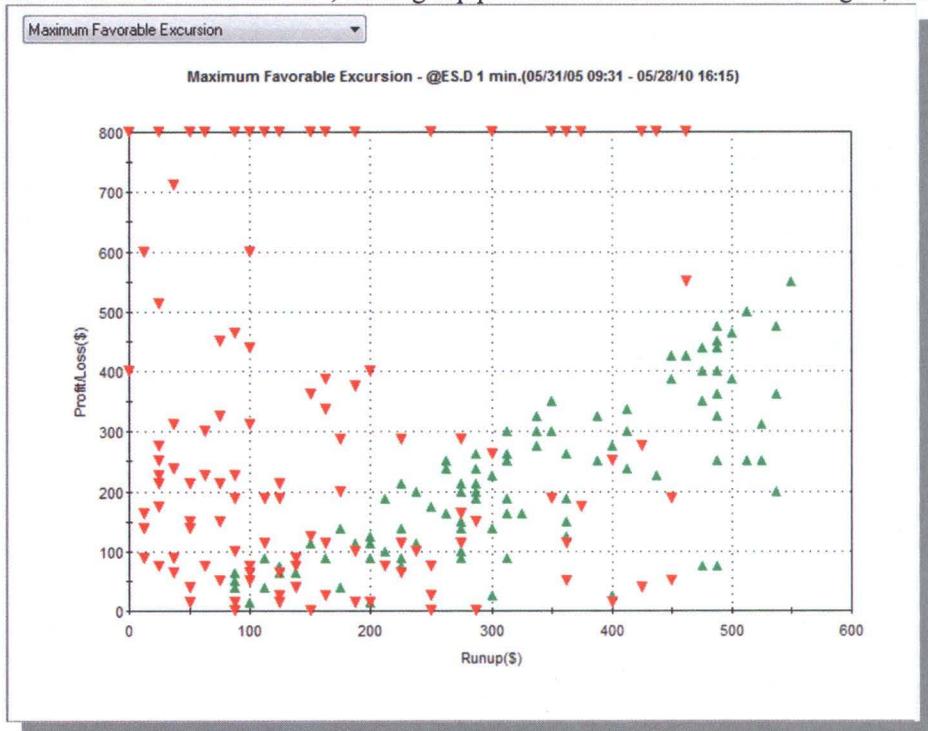


Figure 39 Maximum Favorable Excursion

The results for this strategy on the E-mini S&P can be seen below showing the usual Performance Summary and Equity Curve.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.

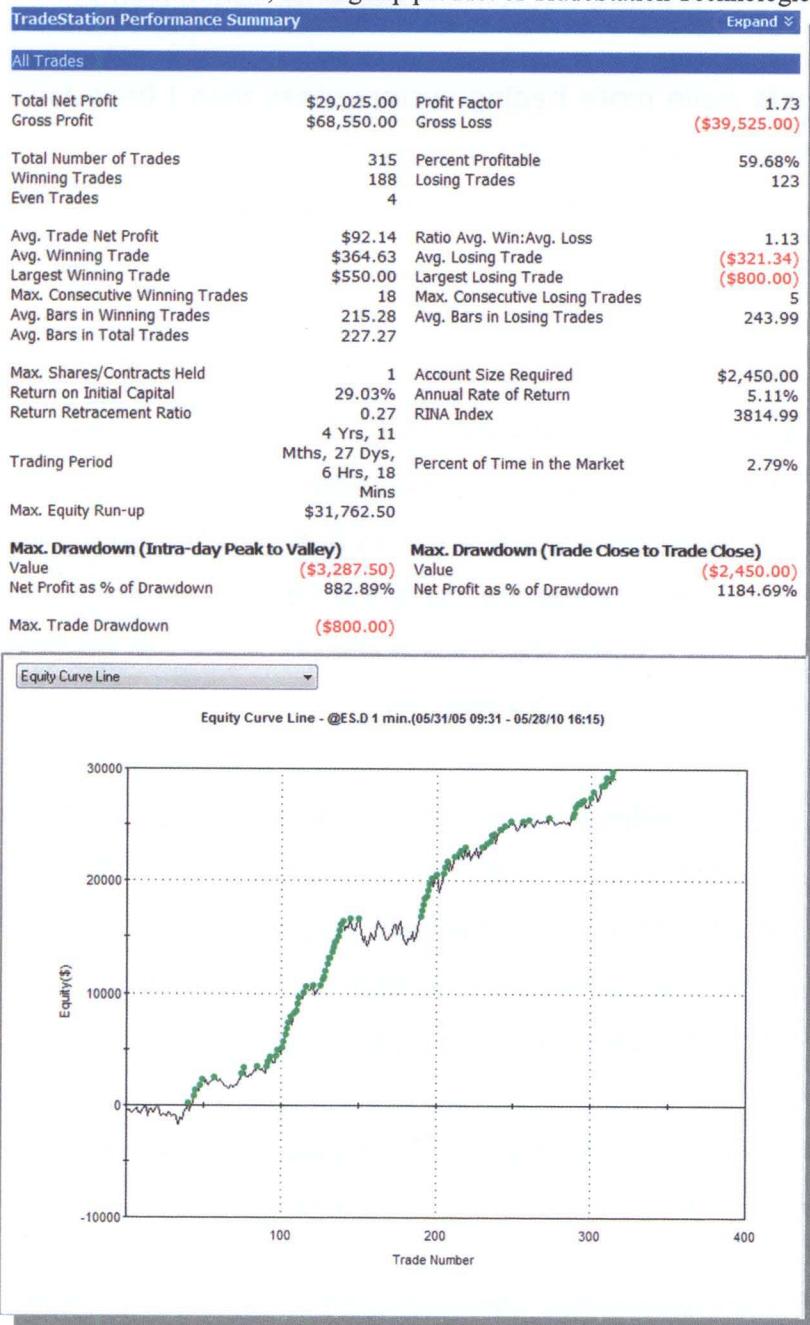


Figure 40 Gap Continue E-mini S&P Results

Trading System 7: Gap Continue II Bonus

I usually have more trading system ideas than I have time to test but there are a couple of extra rules that stood out to me that would be beneficial to test for a Gap Continuation II in Scenario Three and Four.

The modification is to wait until 12:00 noon CST before taking trades and only take trades until 3:00 pm CST. The purpose of waiting is to see if the Gap Continuation has held, instead of being filled. To make sure that the market has “held” the gap continuation pattern, we require that the low of the day has not traded below the previous day’s high. We then continue to work to go long at the lowest price in the last 24 minutes.

The short modifications are exactly the same on the short side, taking trades only between 12:00 noon CST and 3:00 pm CST. We require that the gap has held and the market has not traded above the previous day’s low and then work to go long at the highest price in the last 24 minutes.

I only tested 12 minutes and 24 minutes for the interval so other intervals could be tested. The results for this strategy are below.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.

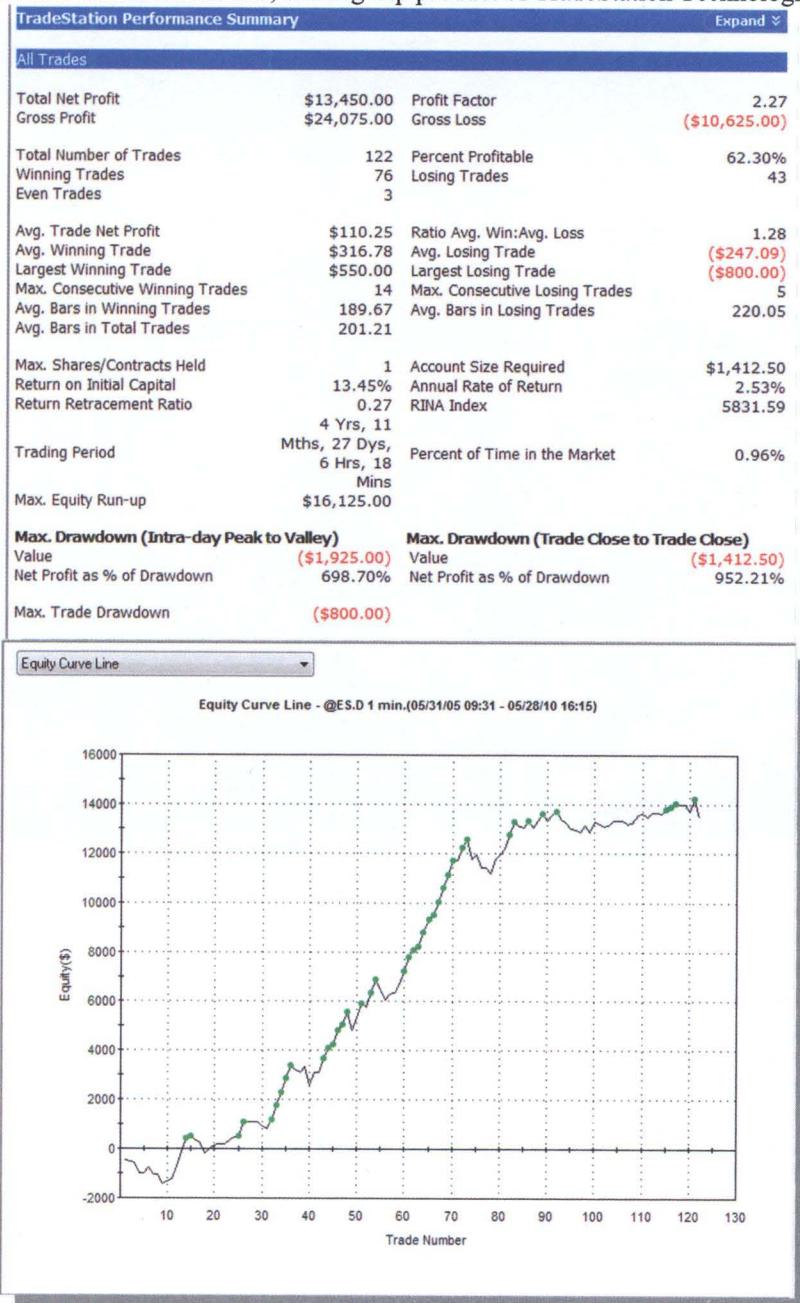
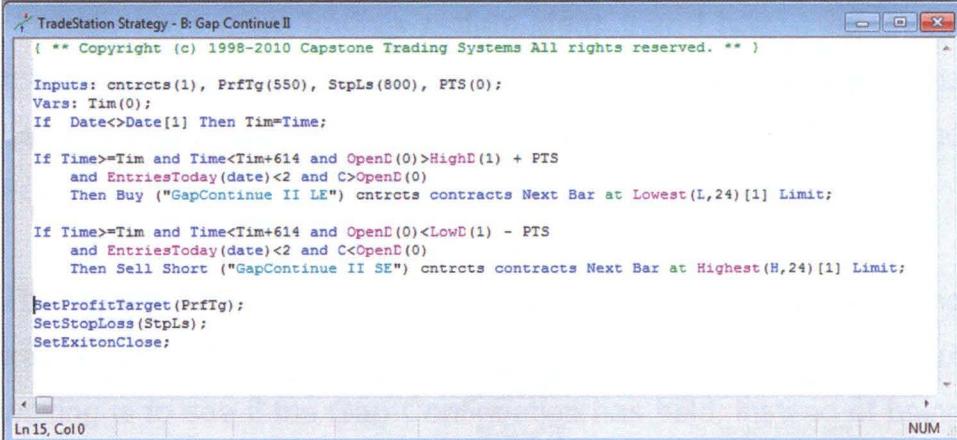


Figure 41 Gap Continue II Bonus E-mini S&P Results

EasyLanguage and Workspace Setup

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.



```
TradeStation Strategy - B: Gap Continue II

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Inputs: cntrcts(1), PrfTg(550), StpLs(800), PTS(0);
Vars: Tim(0);
If Date<>Date[1] Then Tim=Time;

If Time>=Tim and Time<Tim+614 and OpenD(0)>HighD(1) + PTS
    and EntriesToday(date)<1 and C>OpenD(0)
    Then Buy ("GapContinue II LE") cntrcts contracts Next Bar at Lowest(L,24)[1] Limit;

If Time>=Tim and Time<Tim+614 and OpenD(0)<LowD(1) - PTS
    and EntriesToday(date)<1 and C<OpenD(0)
    Then Sell Short ("GapContinue II SE") cntrcts contracts Next Bar at Highest(H,24)[1] Limit;

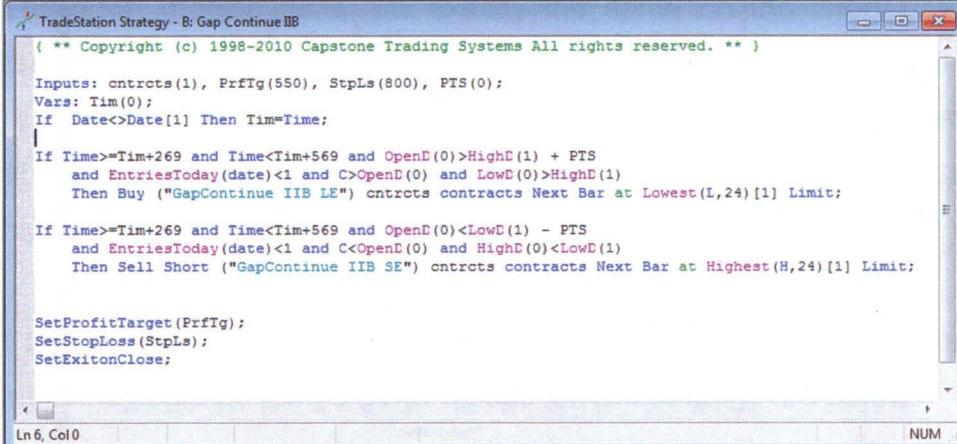
SetProfitTarget(PrfTg);
SetStopLoss(StpLs);
SetExitOnClose;

Ln 15, Col 0
```

Figure 42 Gap Continue II

To setup the workspace all you need is a 1 minute chart with @ES.D as the only data set.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.



```
TradeStation Strategy - B: Gap Continue IIB

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Inputs: cntrcts(1), PrfTg(550), StpLs(800), PTS(0);
Vars: Tim(0);
If Date<>Date[1] Then Tim=Time;

If Time>=Tim+269 and Time<Tim+569 and OpenD(0)>HighD(1) + PTS
    and EntriesToday(date)<1 and C>OpenD(0) and LowD(0)>HighD(1)
    Then Buy ("GapContinue IIB LE") cntrcts contracts Next Bar at Lowest(L,24)[1] Limit;

If Time>=Tim+269 and Time<Tim+569 and OpenD(0)<LowD(1) - PTS
    and EntriesToday(date)<1 and C<OpenD(0) and HighD(0)<LowD(1)
    Then Sell Short ("GapContinue IIB SE") cntrcts contracts Next Bar at Highest(H,24)[1] Limit;

SetProfitTarget(PrfTg);
SetStopLoss(StpLs);
SetExitOnClose;

Ln 6, Col 0
```

Figure 43 Gap Continue IIB

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.

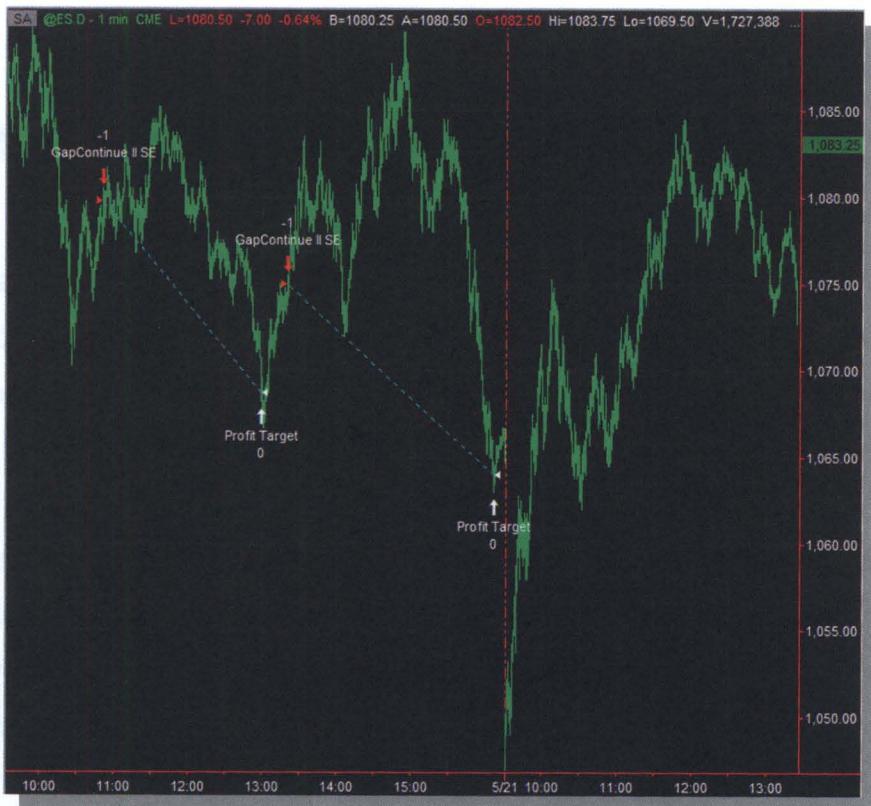


Figure 44 Workspace Window for Gap Continue II Bonus

11. Conclusions

We have discussed seven trading systems for trading the Gap Open. The rules and EasyLanguage code for Tradestation are fully disclosed for each of these strategies. At this point, one major question becomes, “Which system should be traded?” since there are seven strategies to choose from.

This can be determined by your level of capitalization and how much experience you have as a trader. If this is the first time you have used a trading system, the Gap Fill I would be the best strategy to start with. Once your experience and capitalization increases, adding additional systems can be an option.

There is some correlation between strategies since they are all based on trading the Gap Open. Choosing one or two of your favorite Gap Open strategies and then adding other strategies that do no focus on trading the open or trading additional markets would provide more correlation.

If you are an experienced trader, trading a large number of systems, we developed Gap Fill Combination in Chapter 7 by combining Gap Fill I and Gap Fill II. Additionally, Gap Fill Rank,

Gap Continue I, and Gap Continue II and/or Gap Continue II B could be added to a portfolio.

There are several different software tools on the market that can provide complete analysis and results for any combination as well as money management techniques for all of your trading systems. Portfolio Evaluator is a tool that can be integrated with Tradestation directly.

On our website, there is a free too called the Portfolio Calculator on the Portfolios tab at www.capstonetradingsystems.com. It will show basic results for the combination of any of the Gap strategies as well as our other strategies in MS Excel.

The code is left open in this book and can be easily added into Tradestation with the EasyLanguage editor. Those who are interested can also develop and test their own ideas, starting with the code in this book, on other stock index futures markets and any other financial market such as other commodity futures contracts, forex, or individual stocks and ETF's.

It is very easy to create the strategies in EasyLanguage and setup the workspaces outlined in this book. Going through the process manually also gives you a better feel for how the strategy works. For convenience and those looking for a quick plug-in solution, check our website for the latest at www.capstonetradingsystems.com

12. Appendix

Below is a workspace view of how to set up all seven strategies in Tradestation. The top four charts are Gap Fill I, Gap Fill II, Gap Fill Combination, and Gap Fill Rank. In the second row, the three charts are Gap Continue I, Gap Continue II, and Gap Continue II B.

Chart created on TradeStation®, the flagship product of TradeStation Technologies, Inc.

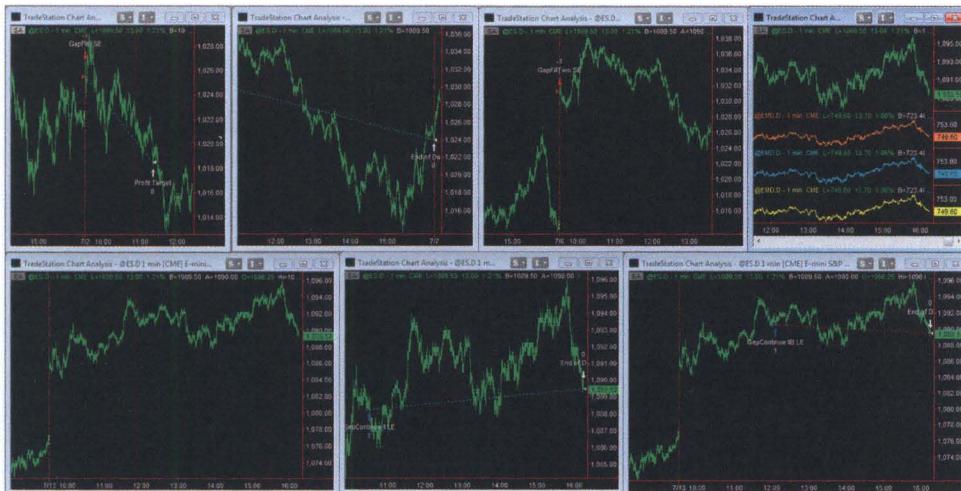


Figure 45 Workspace for all Seven Systems