Exiting on a high note

The first installment of a two-part series tests whether certain some exit signals are better than random.

BY KEVIN DAVEY

Any trader who has suffered a prolonged losing streak has probably thrown up their hands at some point and said, "I'd be more successful if I just randomly entered trades!" This might invoke images of monkeys throwing darts at the newspaper stock listings, but it's not such an absurd idea. Is entering the market at the right time truly as important as everyone thinks?

To find out, the following study examines a trading strategy that enters markets at random times, but exits them using specific rules based on *x*-day highs and lows, moving averages, and the relative strength index (RSI), profit targets, and stop-losses.

Choosing different exit points for a strategy affects its performance more than you might expect. Comparing a strategy with defined trade rules to one without is a critical test of its real-world durability. The analysis uses daily prices of four continuous futures contracts — crude oil (CL), soybeans, Euro (EC), and E-Mini S&P 500 (ES) — over the past five years.

TradeStation code

You can copy TradeStation code for these tests at www.activetradermag.com: Click on Web Only > Strategy Code

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A random walk

The first step in creating a strategy with random entry signals is to generate a list of random numbers. Programmers can do this with functions designed for the task, which you can find in almost any software platform. For example, in TradeStation you can create a uniformly distributed random number between zero and *x* with the function random(x). And in Excel, you can generate random numbers in the same range of values with the following formula "=RAND()*(x-0)". Random trades are split evenly between long and short positions and occur only after a random number of days (from one to 10) have passed since the system exited the previous trade. All trades have no directional bias and are independent of the prior trade's direction.

Let's first measure the performance of trades that match random entries with random exits. In the first test, random trades are closed one to 10 days after they are entered, and a random number determines their length. All exits simply close existing positions; they don't stop and reverse direction.

In theory, over a large number of trials a system that combines random entries and random exits should have an average trade of zero, excluding commissions and slippage. This system can then be used as a benchmark to compare to other strategies.

Exit strategies

Because we are testing a basket of four futures markets, each of which has a different contract size, exiting trades after they gain or lose a fixed-dollar amount of, say, $2,000, doesn't make sense. Instead, exits are triggered after price moves a certain multiple of the average true range (ATR). This allows you to

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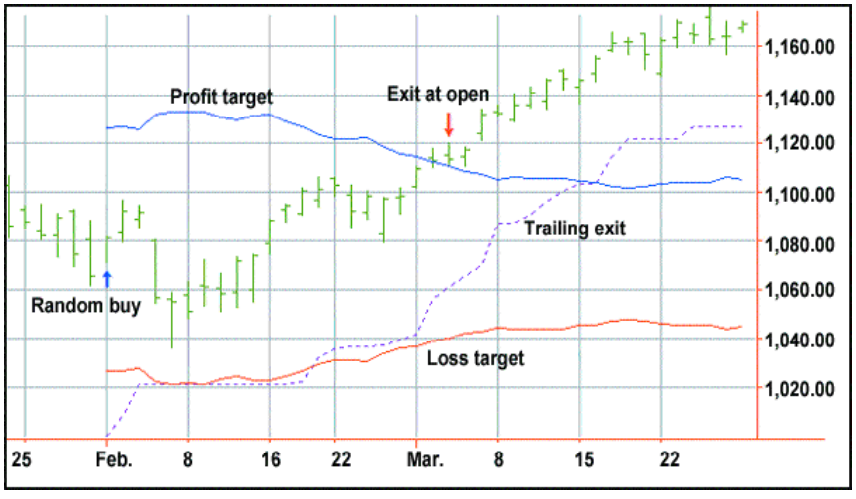
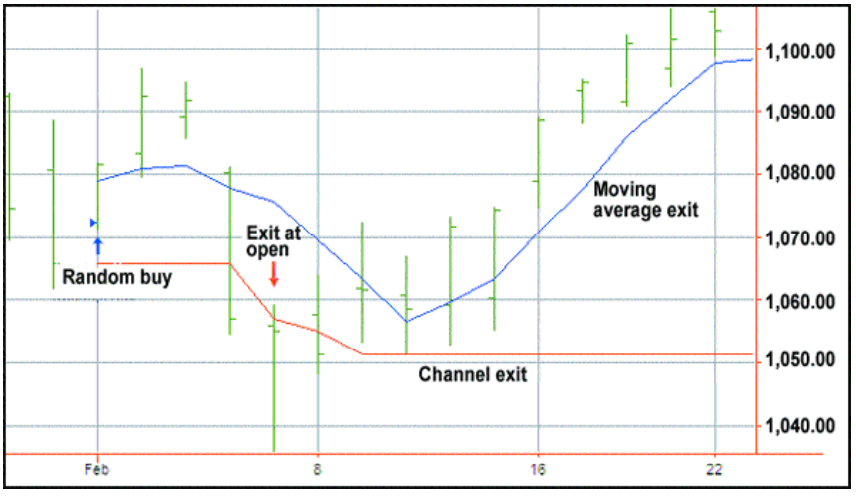
FIGURE 1: RANDOM ENTRY EXAMPLE



After randomly buying the E-Mini S&P 500 futures on Feb. 1, the strategy held on as price slipped, and finally exiting when the profit target was triggered on March 3.
Source: TradeStation

FIGURE 2: UNHAPPY ENDING



This trade is the same example as Figure 1, but the system exited at a loss after ES dropped below its 10-day moving average on Feb. 5.
Source: TradeStation

apply the same exit signal to several markets without having to compensate for different market volatilities.

The first exit signal closes a position if its profit is greater than the 14-day ATR multiplied by *x*; it also closes a position if its loss is greater than the 14-day ATR multiplied by *y*.

The second signal is a trailing exit that closes a winning position if today's closing price moves against the trade by the 14-day ATR multiplied by *z*. The trailing value moves only in the direction of the trade. In trending markets, the exit locks in profits but also gives positions room to run. Figure 1 shows a daily chart of the continuous E-Mini S&P 500 futures (ES) in February and March 2010 with stop-loss, profit, and trailing-stop targets.

The final three exit signals are based on standard technical indicators. The breakout channel exit closes long positions if price drops to an *x*-day low close and closes short positions if price climbs to an *x*-day high close. The moving average exit closes positions if price closes above or below an *x*-day MA. Finally, the RSI exit closes positions if the 14-day RSI moves from overbought or oversold condition to a normal range. Figure 2 shows the daily E-Mini S&P 500 futures with a 35-day breakout channel and 40-day MA exit signal.

Random system performance

The first test combines the random entry signal with the random exit signal in crude oil (CL), soybeans (S), Eurocurrency (EC), and E-Mini S&P 500 futures from Jan. 1, 2005 to Jan. 1, 2010.

Figure 3 shows the average profits of

500 tests per market (2,000 total) for the random system. It shows how often each result fell into one of 21 groups: -$1,000 to -$901, -$900 to -$801…up to $901 to $1,000. Figure 4 shows how the average maximum drawdowns of those same tests were distributed among the categories.

As expected, the average trade's gain or loss is close to zero. This verifies the idea that a random system should have no edge. However, the average trade values and maximum drawdowns vary quite a bit. For example, in 86 tests the average trade was more than $500, while in 38 tests it was less than $500. The average maximum drawdown exceeded $100,000 in 19 tests, while it was less than $5,000 in 23 tests. This indicates a random system can sometimes perform extremely well or poorly. Going forward, we will look for average trade amounts that are significantly better than random.

Adding exit rules

The next step is to optimize versions of the system that combine the random entry signal with five additional exit signals. Let's replace the random exit signal with profit and stop-loss targets with the following parameter combinations:

Profit target = x*14-day ATR
Where:
x = 3 to 5, in steps of 1

Stop-loss target = y*14-day ATR
Where:
y = 2 to 4, in steps of 1

There are three parameter values for

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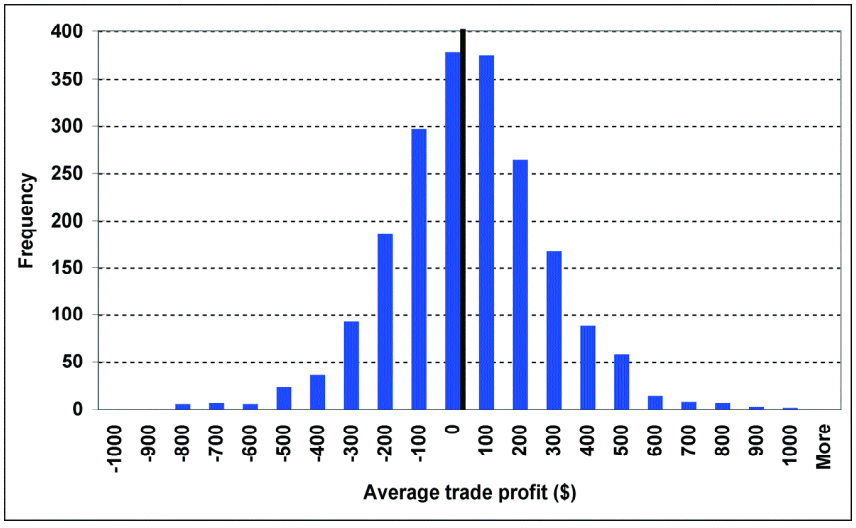
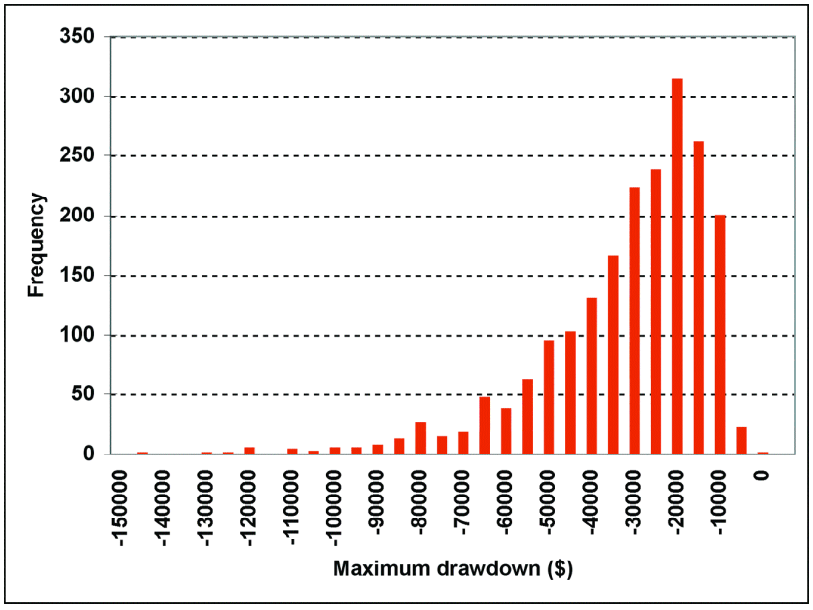
FIGURE 3: RANDOM SYSTEM: AVERAGE GAIN/LOSS



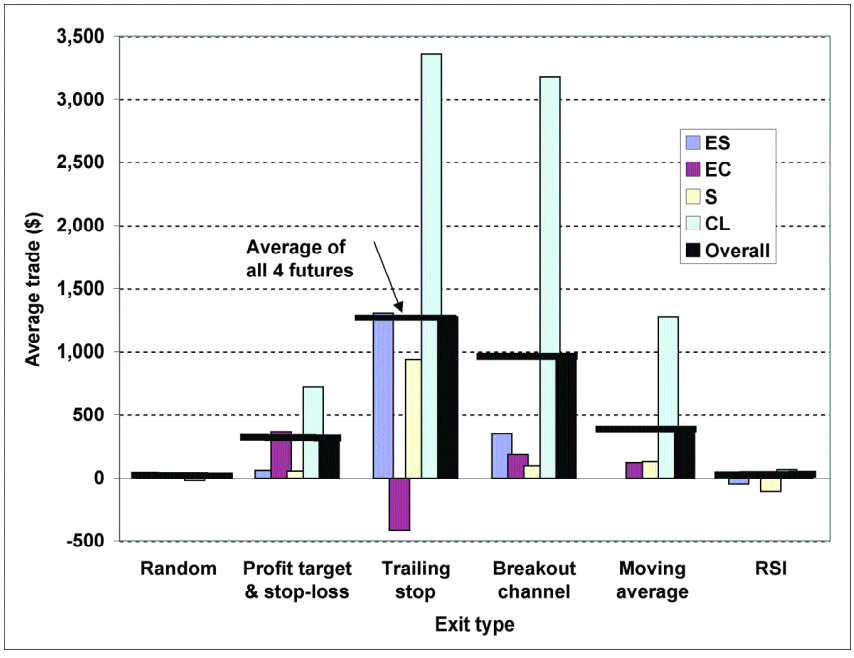
The random system's average trade is close to zero, confirming that no edge lies in trading without a plan.

FIGURE 4: RANDOM SYSTEM: DRAWDOWN



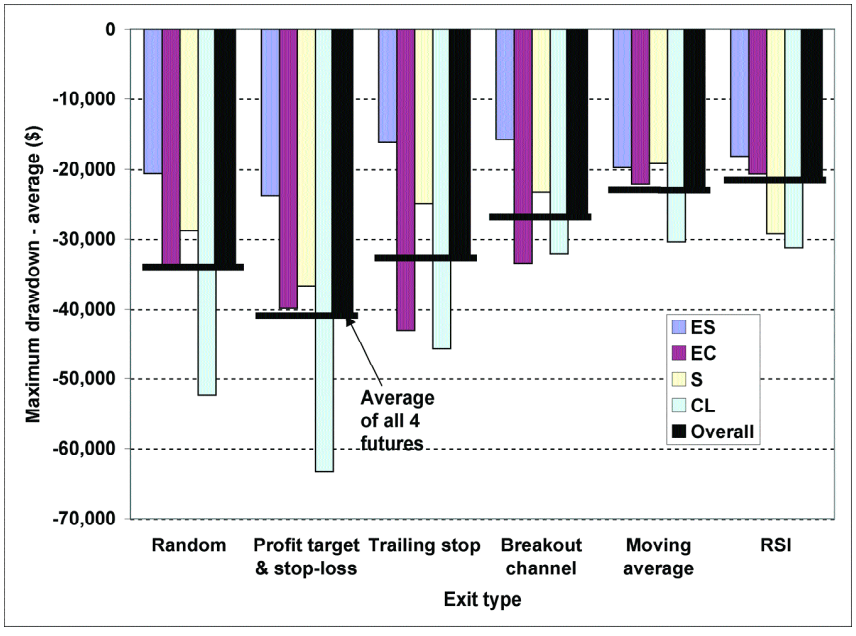
The random system had maximum drawdowns of around $30,000, but the results varied.

FIGURE 5: DIFFERENT EXITS: AVERAGE GAIN/LOSS



Overall, adding a trailing stop to a random-entry system was more profitable than other approaches.

FIGURE 6: DIFFERENT EXITS: DRAWDOWN



The RSI exit strategy had the smallest drawdown, but it also had the lowest average trade (Figure 5). On a risk-adjusted basis, the trailing stop outshined the other exits.

both targets, leading to nine total combinations. Each was tested 500 times (4,500 total tests). We used a similar approach when optimizing the trailing stop:

Trailing stop = z*14-day ATR
Where:
z = 3 to 5, in steps of 0.5

These five trailing stop parameter values were tested for a total of 2,500 runs overall. For each exit signal, we chose the parameter value that produced the largest average profit.

Using the profit target and stop-loss combination, the highest average trade (except in the Euro futures) occurred with a profit target of five ATRs and a stop-loss of three ATRs. Using the trailing stop, the system performed best with a *z* value of 4; it was profitable in all four markets, especially crude oil.

The three technical exit signals were optimized the same way:

Breakout channel = five to 40 days, in steps of five days (4,000 total runs).

Moving average length = five to 40 days, in steps of five days (4,000 total runs).

RSI thresholds = 10 to 40 (oversold) and 60 to 90 (overbought), in steps of

KC *For more information about the following concepts, go to "Key concepts" on p. 76.*

- *Breakout channel*
- *Optimization*
- *Moving average*
- *Relative strength index*

Related reading

Kevin J. Davey articles:

"Improving both ends of a system," *Active Trader,* April 2010.
How do you know if an apparently second-rate strategy has hidden potential?

"Refining crude oil breakouts," *Active Trader,* March 2010.
A guide to improving trading strategies without adding extra rules or filters.

"After testing, before trading," *Active Trader,* January 2010.
Even after successful walk-forward testing, there's a great deal you can — and should — learn about your system before risking money on it.

"From cliché to strategy," *Active Trader,* December 2009.
A gold-based system shows how effective trading requires moving beyond vague concepts to tested concepts.

Other articles:

"Scaling in as an exit technique," *Active Trader,* September 2009.
Analyzing how scaling out of trades and moving stops to breakeven impacts a simple trading technique.

"Scaling in as an entry technique," *Active Trader,* October 2009.
Testing whether scaling into trades really improves performance.

"Scaling in as an exit technique," *Active Trader,* September 2009.
Analyzing how scaling out of trades and moving stops to breakeven impacts a simple trading technique.

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five (3,500 total runs).

The best-performing breakout channel length was 35 days, the optimal moving average look-back period was 40 days, and the most favorable RSI threshold values were 40 and 60.

Figure 5 shows the random system's average gain or loss in all four futures markets and overall (left). It also compares them to the performance of the five exit signals using optimized values. Figure 6 shows the average maximum drawdown of each strategy.

All the exit signals except the RSI earned more money than exiting randomly. However, the profits vary among markets. The trailing stop generated the largest average profit, followed by the breakout channel and moving average exits. In terms of drawdowns, the RSI exit risked less than the others, but this was overshadowed by its low average trade size.

If you weigh profit against drawdown, the trailing stop outshined the other exit rules. Looking at its individual trades, the trailing stop method rode trends well when opportunities arose, and when markets went nowhere, they tended to exit losing trades fairly quickly. Both exits give positions room to breathe, and they can lose some ground without exiting too quickly during profitable trades.

Out-of-sample verification

To verify the trailing stop's superior performance wasn't the result of the specific test period, we retested it (using the optimized value of four ATRs) in the five years from Jan 1, 2000 to Jan. 1, 2005.

The strategy was retested on the four futures markets (500 random runs per market), earning an average profit of $321 per trade. Although the out-of-sample performance was much lower than the in-sample performance of $1,274, it is still much greater than zero, indicating this exit method, even with a random entry, has value.

Don't walk off a cliff

Choosing different exits clearly can have a large impact on system performance. You can use this approach to find out if a particular exit really is better than random. If so, it will probably work with well-designed entry rules. If not, it's probably worthless.

Next month, we will examine the opposite scenario: matching specific entry rules with random exits.

For information on the author, see p. 6.