Improving both ends of a system

Before abandoning a sub-par strategy, see what scaling into trades and adjusting exit rules can do for performance.

BY KEVIN J. DAVEY

If you've read any installments of *Active Trader*'s ongoing System Design series, you know building a viable trading strategy from scratch is more difficult than it seems. Strategy development is a marathon, not a sprint, but traders are often lured into chasing the latest approaches with the best-looking performance.

Unfortunately, this quest may cause traders to discard good but not great strategies. Sometimes, however, you might already have a viable strategy that simply needs an extra boost. Straightforward steps that can potentially enhance system performance include adding to open positions, exiting winning trades early with a profit target, or simply getting out after holding trades a certain amount of time.

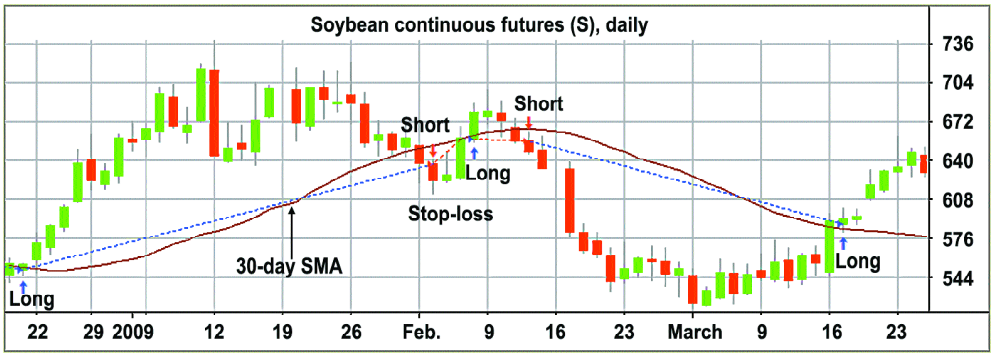
The following examples show how and why a basic moving-average strategy can be improved without changing its basic trade-entry rules.

Identifying the trend

The easiest way to identify the market's trend is with a simple moving average (SMA). If price crosses below a moving average, the trend is down; if price crosses above a moving average, the trend is up. This strategy buys the market when price exceeds a 30-day SMA and sells when price drops below a 30-day SMA.

We chose a 30-day look-back period for the moving average because it represents an intermediate-term trend. It wasn't optimized in any fashion. For simplicity, the approach focuses on daily soybean futures over the past five

FIGURE 1: TRADE EXAMPLES



Although the moving-average strategy misfired in early February 2009, it caught two intermediate trends — long in late-December 2008 and short in mid-February 2009.

Source for all figures and tables: TradeStation

TABLE 1: ORIGINAL STRATEGY PERFORMANCE

Net profit	$44,875
Profit factor	1.74
Win %	26%
Avg. trade	$408
Market exposure	90%
Max. drawdown	-$21,238
Net profit / max. drawdown	2.11

These statistics are a good starting point for a basic trading strategy, but tweaking its exit rules might boost performance and reduce risk.

years — from Dec. 15, 2004 to Dec. 15, 2009.

Figure 1 shows five trades in soybean futures (S) from December 2008 to March 2009. The strategy caught the soybean uptrend in late December and early January, and it also sold short as the market slipped sharply in mid-February. But it wasn't perfect, generating two losing trades in early February when the trend was unclear.

This trading approach is in the market most of the time as long signals end short trades and then trigger buy orders, and short signals end long trades and trigger short trades. To prevent catastrophic losses, the system includes a $1,000 stop-loss, an amount that also wasn't optimized. The trade rules are:

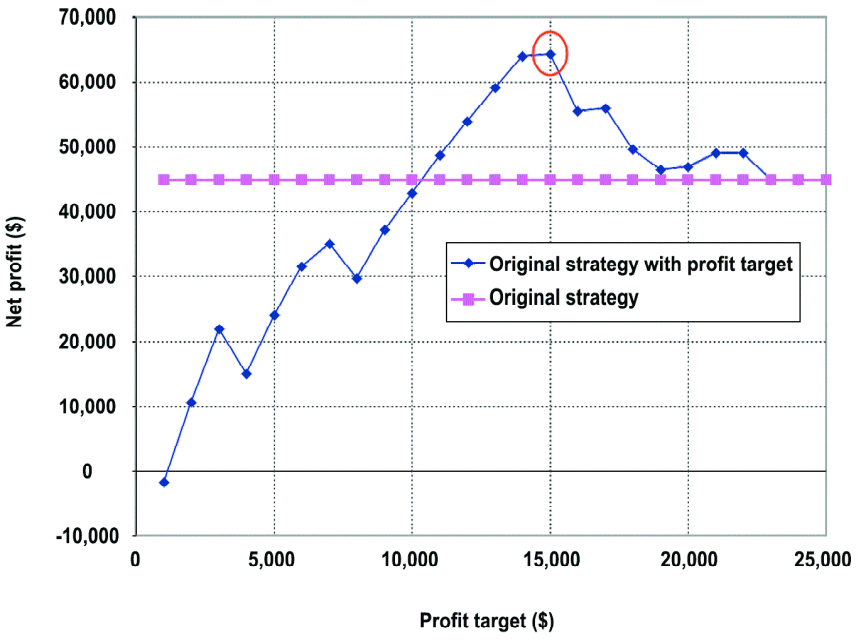
1. Go long (and exit shorts) at tomorrow's open if today's closing price crosses above the 30-day SMA.
2. Sell short (and exit longs) at tomorrow's open if today's closing price crosses below the 30-day SMA.
3. Exit any trade if its open loss climbs to $1,000 per contract.

Table 1 shows this simple strategy's five-year performance using one contract with $50 round-turn slippage and commission costs included. The approach gained $44,875 during this period, which is a good starting point. However, the point is to improve performance with several common techniques that can be applied to virtually any strategy.

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

- *Simple moving average (SMA)*

FIGURE 2: OPTIMIZING THE PROFIT TARGET



Adding a profit target improved net profit for most amounts. System performance was highest with a profit target of $15,000 (blue line).

Add a profit target

Adding a profit target that exits winning trades at a certain point is a simple concept. But many traders don't like to use profit targets because they sometimes cut winners short. Indeed, for a trend-following system such as this one, which typically depends on large, infrequent gains to overcome more frequent losses, limiting profits can be a mistake.

Figure 2 shows how the original system's net profit varies based on profit-target amounts from $1,000 to $25,000. For most amounts, a profit target benefits the strategy, and performance peaks at a $15,000 target. Table 2 lists the strategy's performance statistics after adding that optimum profit target.

This technique changes performance roughly as you'd expect. Smaller targets aren't as beneficial as larger targets, a dynamic that corresponds with letting profits run and explains why most trend-following systems avoid them. The strategy improves with mid-sized targets, while the widest targets have little effect.

However, this new exit rule didn't

continued on p. 30

TABLE 2: ORIGINAL STRATEGY WITH PROFIT TARGET

Net profit	$64,288
Profit factor	2.07
Win %	26%
Avg. trade	$584
Market exposure	85%
Max. drawdown	-$19,975
Net profit / max. drawdown	3.22

By adding a $15,000 profit target, net profit climbed 43 percent and the maximum drawdown fell slightly.

boost the system's winning percentage significantly, although the maximum drawdown dropped slightly and overall profit climbed 43 percent. Thus, a $15,000 profit target is worth using and will remain part of the strategy as we add other rules.

Adding to winners

The next technique is to scale into a winning trade by adding another contract at some point. After an open trade earns a certain amount of profit, the initial trade signal was likely correct, and the market will probably continue moving in the same direction. The idea is for the market to confirm the trend before the strategy doubles down.

If we have a maximum profit target of $15,000 per contract, perhaps adding a second contract after the first earns a certain percentage of this target will boost performance. The formula is defined as follows:

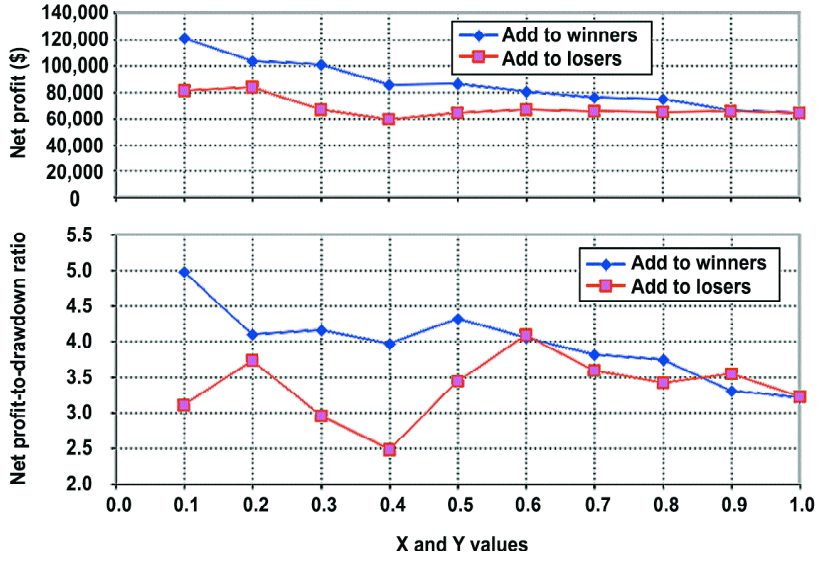
Open profit > x * $15,000 profit target

Figure 3 compares the strategy's net profit and net profit-to-maximum-drawdown ratio for *x* values ranging from 0.1 (10 percent) to 1.0 (100 percent). Net profit drops as the value of *x* rises, because the strategy adds the second contract increasingly later in the course of each winning trade.

But the strategy's maximum drawdown falls as it waits to enter that second contract. In terms of risk, the optimum point lies at the maximum profit-to-drawdown ratio value. In Figure 3, the largest ratio value of 5.0 occurs when *x* is 0.1, or 10 percent. Therefore, the analysis suggests adding a second contract after an open trade has already gained $1,500 — 10 percent of the original $15,000 profit target.

Although not tested here, you could also add to a winning position more than once. For example, you could add a second contract after one-quarter of the target has been reached, add a third at 50 percent, and a fourth at 75 percent. The drawback is risk increases quite a bit, and a price shock could lead to a significant loss.

FIGURE 3: ADDING TO WINNERS AND LOSERS



When adding to wining trades (top), net profit drops as the x's value climbs because the strategy adds the second contract progressively later in the course of each winning trade. When adding to losers (bottom), the net-profit-to-drawdown ratio peaks at 60 percent of the stop-loss amount (y=0.6).

TABLE 3: SCALE INTO WINNERS OR LOSERS

	Profit target and adding to winners	Profit target and adding to losers
Net profit	$120,988	$66,575
Profit factor	2.34	2.15
Win %	27%	22%
Avg. trade	$786	$524
Market exposure	81%	84%
Max. drawdown	-$24,338	-$16,313
Net profit / max. drawdown	4.97	4.08

Adding to winning positions was more profitable than adding to losing ones.

Adding to losers

The opposite approach is adding a futures contract to losing trades (i.e., "averaging down"). New traders prefer this technique as they want to be right in their predictions of market direction. "If I was correct in my initial call," proponents say, "now I can buy more at a better price."

This technique can be very dangerous if you add multiple contracts as a position loses money; consequently, this test adds

only one contract to losing trades. Like scaling into winners, the tactic adds one contract, but only after trades lose a percentage of the original $1,000 stop-loss:

Open profit < y * -$1,000

Figure 3 compares the strategy's net profit and the profit-to-drawdown ratios for *y* values ranging from 0.1 (10 percent) to 1.0 (100 percent). Table 3 compares the performance statistics for both techniques: adding to winners and losers.

If you compare Table 3 to Table 2, it's clear that adding to losers only slightly boosted net profit, although the maximum drawdown fell. However, this tactic doesn't work as well as adding to winning trades. And taken to an extreme, it will inevitably wipe out your account.

Time-based exits

Another technique is to simply wait and exit after a certain number of days. At first glance, this exit rule may not make sense, because it has nothing to do with price action. But many professionals have found it effective.

Let's add a rule that exits after, say, 20 trading days, or roughly one month. Table 4 shows the statistics for a strategy that combines the 20-day exit rule with the version that has performed best so far: a $15,000 profit target plus adding to winners after a $1,500 open profit.

If you compare Table 4 to Table 3, you will notice the time-based rule lowered the strategy's net profit to $95,350 from $120,988. But the maximum drawdown fell to under $20,000 from $24,338, and market exposure dropped to 60 from 80 percent. This is significant, because less exposure means less risk, and it also releases trading capital for other strategies.

There are many other ways to use time-based exit rules. Instead of just waiting a certain number of days, you could exit after a certain period only if the current trade is a loser, which cuts

continued on p. 32

TABLE 4: STRATEGY PERFORMANCE: COMBINED TECHNIQUES

	Profit target, adding to winners, and exiting after 20 days
Net profit	$95,350
Profit factor	2.13
Win %	29%
Avg. trade	$627
Market exposure	60%
Max. drawdown	-$19,650
Net profit / max. drawdown	4.85

System performance jumped quite a bit by adding three trade rules — a $15,000 profit target, adding to winning trades, and exiting after 20 trading days.

Related reading

Kevin J. Davey articles:

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

"System design, part 7: Balancing risk and reward"
Active Trader, August 2009.
We address tough questions about risk by adding stop losses and profit targets to our basic pullback system.

"Intermarket soybean strategy," *Active Trader,* May 2009.
Deciphering the relationships between markets offers a different way to trade commodity futures.

"Inverse Martingale rule (futures)," *Active Trader,* April 2006.
The following system reverses the Martingale logic: Instead of trading against the market, the system follows the markets direction, doubling its position size each time a certain profit target is reached.

"Martingale rule (futures)," *Active Trader,* December 2005.
This system tests the Martingale rule on a basket of futures markets. The rule is based on one often used by inexperience gamblers: Start with one bet and each time you lose, double the amount of your prior lost bet.

the loss before it gets worse. And you could ensure time exits aren't applied to winning trades. On the other hand, you could reverse that scenario so time exits only apply to losers.

Don't lose by winning

Table 4 suggests the revised strategy is promising, but analysis of individual trades found a problem: After trades earned an open profit of $1,500, the system added a second contract even if this approach had failed previously on the same trade.

Figure 4 shows the problem in a winning trade from August 2009 (top chart). After buying soybean futures on July 31, the strategy purchased another contract when the trade had earned $1,500 two days later. That second trade was stopped out on Aug. 6, but the system went long again the next day as the first contract regained $1,500 open profit. Clearly, suffering multiple small losses during what should be a profitable move is a painful way to trade.

The solution is to change the rules so the strategy only adds a second contract to the original position once. If it gets stopped out and the original trade becomes profitable again, no further contract will be added (Figure 4, bottom chart).

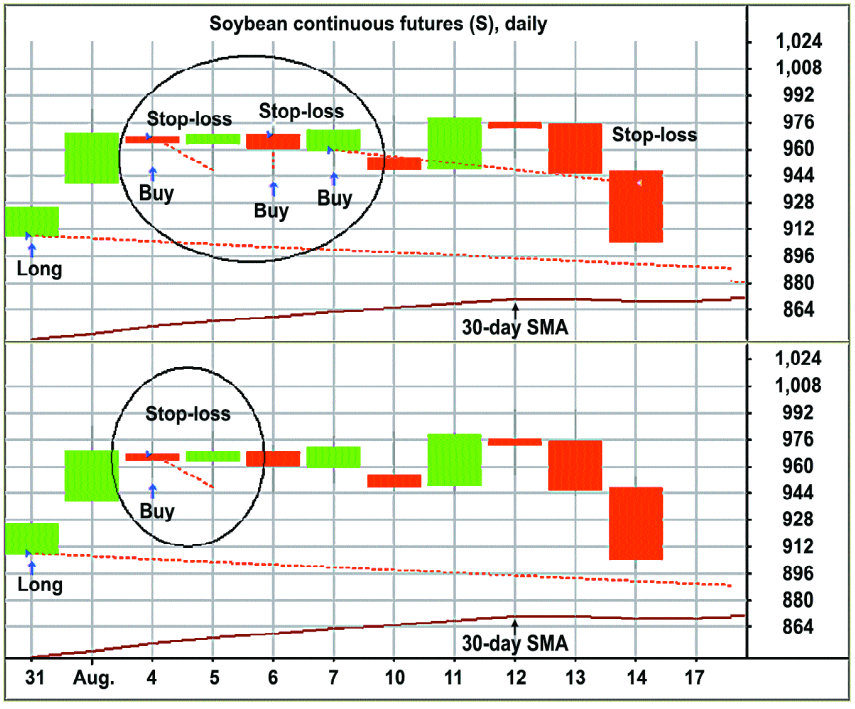
Table 5 compares performance statistics of the strategy's original rules to the revised version, which uses a $15,000 profit target, adds to winners once, and exits after 20 days. The revised strategy performed better than all other versions tested; its net profit exceeded the others, while its drawdown lagged the others, an ideal combination.

Remember the final step required no optimization. Instead, we simply mixed optimized values from previous steps, a more robust procedure.

Focusing on which techniques improve this specific moving-average strategy in soybean futures isn't the point. Instead, simply remember nearly any strategy can be improved by applying similar methods. The best techniques should shine in out-of-sample testing and with minimal optimization.

For information on the author see p. 6.

FIGURE 4: HOLDING ON TO OPEN PROFITS



The initial attempt to add to winning trades was flawed because the approach kept increasing position size even if it didn't work the first time (top). By contrast, adding to winners only once helped the strategy retain unrealized gains (bottom).

TABLE 5: EXTREME MAKEOVER, STRATEGY EDITION

	Original strategy	Profit target, adding to winners once, and exiting after 20 days	Improvement
Net profit	$44,875	$100,818	125%
Profit factor	1.74	2.36	36%
Win %	26%	30%	19%
Avg. trade	$408	$726	78%
Market exposure	90%	57%	59%
Max. drawdown	-$21,238	-$14,975	42%
Net profit / max. drawdown	2.11	6.73	219%

Combining three or four exit-based rules increased the strategy's net profit by 125 percent and lowered its maximum drawdown by 42 percent.