



# Small-trader money management

There's theoretical money management, then there's real-world money management for individual traders. Get the tools that will help you size trades and control risk in a practical way.

BY THOMAS STRIDSMAN

**W**hile most of us are willing to spend countless hours searching for the perfect entry and exit signals, very few of us take the time to

think about what very basic money management will do for our bottom line.

Nowadays, when people think of money management, most think of Optimal  $f$  or similar strategies that advo-

cate risking a constant percentage of account equity on each trade. However, for most proprietary traders with limited means, Optimal  $f$ -type strategies have limited usefulness, and they can be very dangerous if applied the wrong way because for smaller accounts (i.e., \$100,000 or less) it is difficult to match the proper amount to risk per trade (up to approximately 2 percent) with reasonable small changes in the number of shares or contracts traded (depending on market volatility, etc.).

For example, there is a world of difference between increasing the number of contracts from one to two vs. 100 to 101. In the former case, you have made yourself twice as big a trader — taking on twice the margin requirement and twice the risk in the event a trade goes severely against you if the market moves significantly past your stop-loss level. In the latter case, you have only fine-tuned your position by one percent.

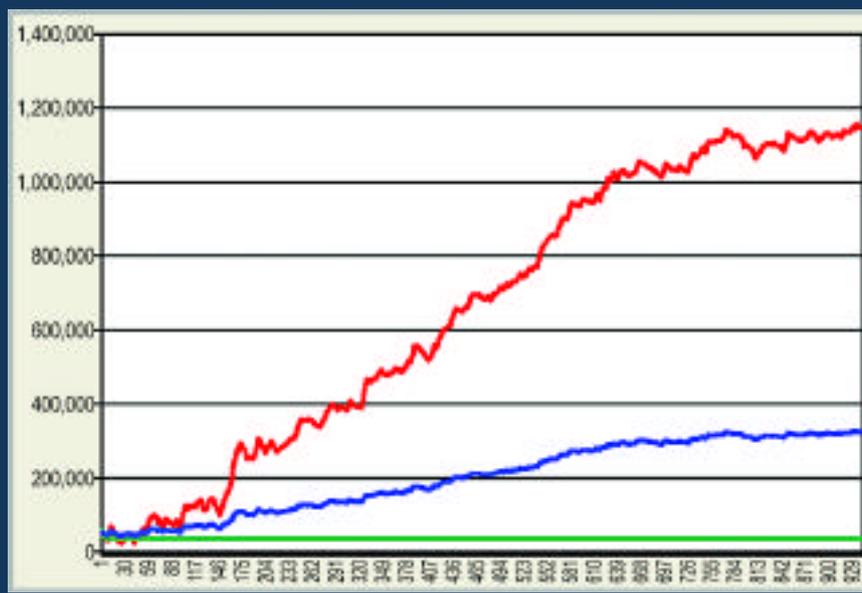
For a small trader, small changes in account balance and market volatility will translate into disproportionately large changes in position size, whereas for a large trader, a change in position size will be commensurate with the variables affecting it.

How can a smaller trader maximize trading capital as it grows? One idea is

*continued on p. 34*

**FIGURE 1** EQUITY CURVE COMPARISON

The blue curve starts out with an account balance of \$50,000, of which \$20,000 is constantly allocated to trade one contract. The green curve also starts out with an initial account balance of \$50,000, but uses \$40,000 of that to margin four contracts. The red line uses the same settings as the green line except it is allowed to continue trading one contract after the initial drawdown occurs.



Proprietary (Excel) calculations

**FIGURE 2** CALCULATION SPREADSHEET

This is part of the spreadsheet used for the calculations in this article. You can download it from [www.activetradermag.com/code.htm](http://www.activetradermag.com/code.htm).

	A	B	C	D	E	F	G	H	I
1									
2		Starting amount		50000		Profit amount		10000	
3		Minimum amount		40000		Contracts added		0	
4		Initial contracts		4		Max contracts added		-	
5		Trade n through DD		1		Winnings only (Y/N)		y	
6									
7		<b>Buy/Sell</b>	<b>Market</b>	<b>Entry Date</b>	<b>Size</b>	<b>Entry Price</b>	<b>Exit Date</b>	<b>ExitPrice</b>	<b>Trade P/L</b>
8		Buy	EM-SP500.CS\	10/02/2001	1	1060.5	10/15/2001	1102	2050
9		Sell	EM-SP500.CS\	10/18/2001	1	1091.25	10/23/2001	1116	-1262.5

These Excel cell references correspond to the cells in Figure 2. The formula says: For every trade, trade as many contracts as stipulated in cell D4 (in Figure 2, four contracts). Also, for testing purposes, if you lose more than your initial margin, continue to trade as many contracts as stipulated in cell D5 (one contract).

Nothing strange so far — this is standard fixed-size trading.

to use a so-called “fixed-ratio” money-management strategy. The main difference between this approach and Optimal *f*-related strategies is the fixed-ratio strategy doesn’t consider market volatility and where the stop-loss is placed to determine the number of shares or contracts to trade. This means you are likely to stick with your current position size until your account equity grows or shrinks past certain levels. Although it is still possible to overtrade your account balance and assume too much risk using this approach, at least it will keep your position size from fluctuating from one trade to the next.

Figure 1 (p. 32) shows three equity curves that reflect different (constant) position sizes applied to the same strategy. The blue curve starts out with an initial account balance of \$50,000,

Now, let’s augment the formula to create some true money-management capabilities that use the parameter settings in cells H2 to H4.

### The system

But first, a few words about the system. It is based on the same logic as the systems in “System-testing redundancy” (*Active Trader*, February 2006) and “Medians on the move” (*Active Trader*, March 2006). It’s a simple crossover system that uses moving medians instead of moving averages to signal trades — that is, a buy is signaled when a shorter-term moving median crosses above a longer-term moving median and a sell occurs on a downside crossover.

## There is a world of difference between increasing the number of contracts from one to two vs. 100 to 101.

of which \$20,000 is constantly allocated to trade one contract. The remaining \$30,000 is there to protect against an eventual drawdown.

The green curve also starts out with an initial account balance of \$50,000, but uses \$40,000 to margin four contracts. Because it only leaves \$10,000 as a drawdown cushion, it goes broke almost immediately, hence its appearance as a straight line. The red line uses the same settings as the green line except we also allowed it to continue to trade one contract through the drawdown phase so we can continue to study the system’s behavior once regular-sized trading resumes.

Figure 2 shows the part of a spreadsheet that was used for these calculations. (You can download it from the *Active Trader* Web site — [www.activetradermag.com/code.htm](http://www.activetradermag.com/code.htm)). The actual trade-result and equity-curve calculations were made in a column further to the left in the spreadsheet and are not shown. The calculations are:

Formula 1:  
`= (IF(M8>D$3,D$4,IF(D$5>0,D$5,0))`

The system was applied to the E-Mini S&P500 (ES), Nasdaq 100 (NQ), Russell 2000 (ER2), and S&P MidCap (ME) futures from Oct. 2, 2001 to Sept. 29, 2005 for a total of 943 trades.

### Back to testing

Figure 3 shows the results from testing this system with a fixed-ratio money-management strategy that adds or subtracts one contract to the position size for every \$10,000 change in account equity. The starting equity was \$30,000, \$20,000 of which was used to trade two contracts initially.

Trading this way would have made you the richest man in universe, with a final profit of \$24,390,015,710,677 (and 20 cents), and the last trade would have consisted of 2,436,565,005 contracts in the E-Mini Nasdaq 100. Meanwhile, we also would have experienced a drawdown of approximately \$40,000,000,000,000 (more than 3,500 times the U.S. GDP).

Naturally, these numbers are totally unrealistic, but they do underscore the powers of this money-management method. As the equity continued to grow, it became increasingly easy to produce the \$10,000 profit necessary to add additional con-

tracts for the next trade; before long, the model went ballistic and exploded to the upside. This formula shows how the position size was altered:

Formula 2:  

$$= (IF(M8 > D\$3, D\$4, IF(D\$5 > 0, D\$5, 0)) + IF(H\$4 < 0, MAX(INT((M8 - IF(H\$5 = "Y", D\$2 * 2, D\$2)) * H\$3 / (H\$2)), 0), MIN(H\$4, MAX(INT((M8 - IF(H\$5 = "Y", D\$2 * 2, D\$2)) * H\$3 / (H\$2)), 0)))) * I9$$

In English, the formula says something like this: Start out with a fixed number of contracts (as stipulated in cell D4), then add or deduct  $n$  contracts (as stipulated in cell H3) for every  $x$ -dollar change in the equity (as stipulated in cell H2). However, do not pass the number of contracts traded stipulated by cell H4 (no such constraint was used for Figure 3). Finally, if cell H5 says "Y," do not start the process of adjusting the number of contracts until you have at least doubled your initial account equity. (This was set to "N" for the test shown in Figure 3, not that it would have made much of a difference.)

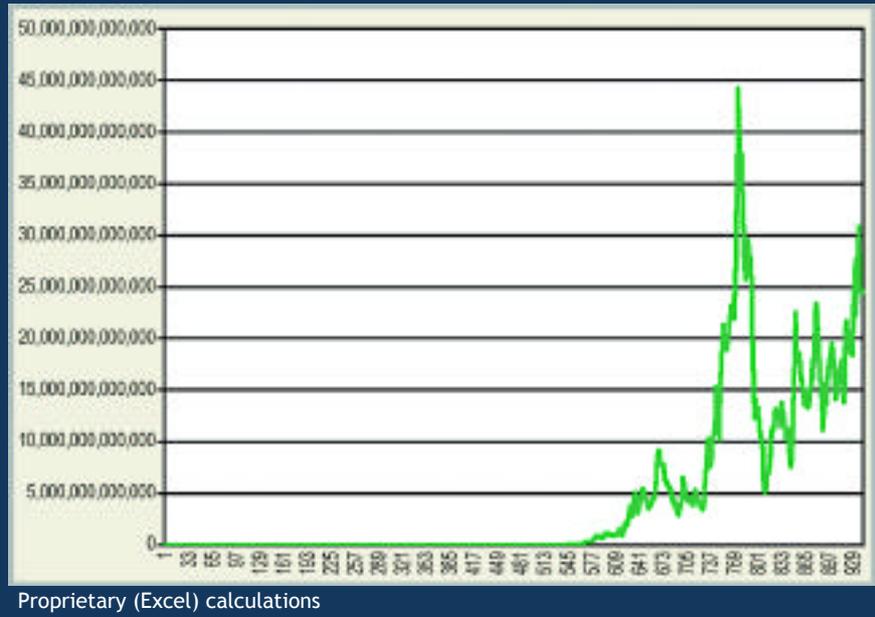
This formula also hints at what you can do to prevent the system from going ballistic, and instead produce more reasonable and realistic numbers: Limit the maximum number of contracts allowed to be traded.

That was done in a subsequent test, which resulted in the equity curves shown in Figure 4. The red curve has the same settings as the green curve in Figure 3, except it limits the maximum number of contracts traded to 50. The blue curve requires the system to double the initial account equity (\$30,000) before applying the money-management process.

Finally, the green curve running at the bottom of the chart shows what would have happened if the system had not traded at least one contract after the initial drawdown. We would have gone broke, and would not have been able to

**FIGURE 3** STRATOSPHERIC RETURNS

*These results from testing the system with a fixed-ratio money-management strategy that adds or subtracts one contract to the position size for every \$10,000 change in account equity are unrealistic, but they underscore the power of this money-management method.*



appreciate the full effects of the money-management approach.

### Analyzing the benefits

Aside from the final profits, there isn't much of a difference in the look and feel of the red equity curve in Figure 1 and the red and blue equity curves in Figure 4. This is because by limiting the maximum number of contracts to trade, the money-management rules eventually cease to impact the system as the equity grows, and we end up with a scaled-up version of the same fixed-contract strategy we are trying to avoid.

Furthermore, on the way to reaching the maximum position size, the system would again be adding contracts at an accelerated pace, generating profits and losses that might be totally unrealistic in dollar terms. Granted, in the land of Woulda, Coulda, Shoulda, we would have made a lot of money, but that is not the focus here. Instead, the goal is to find a money-management technique that we, as small account traders, can grow with and realistically apply in real time on future trade opportunities. To accomplish this, we must somehow adjust the equity *growth* rate according to the cur-

rent account equity in such a way that the more equity we have, the more account equity also needs to increase before the system trades additional contracts.

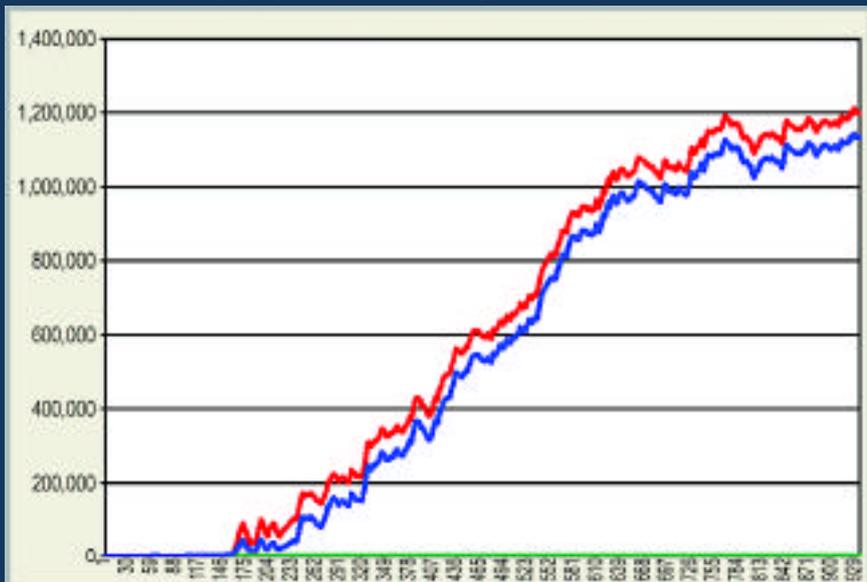
The most logical way to do this is to create a rule along the lines of, "For every  $x$  dollars my equity grows, I will need additional  $n$  dollars in profit before I can add a contract to my position size." For example, if your equity is less than \$100,000 and you plan to add a contract for every \$10,000 in profits, when your equity surpasses \$100,000, you can require \$20,000 in additional profits before you add another contract; when you pass \$200,000 in equity you will need \$30,000 or perhaps even \$40,000 in additional profits before you add a contract.

This idea is nothing new, and it can be handled by one or two analysis programs. However, there is an easier and more sophisticated method that can achieve better results, in that the method remains totally dynamic and does not use any predefined profit thresholds or equity levels to adjust positions.

Look again at Formula 2, specifically *continued on p. 36*

**FIGURE 4** LIMITING TRADE SIZE

Limiting the maximum number of contracts to be traded prevents the system from going ballistic. The red curve has the same settings as the green curve in Figure 3, except it limits the maximum number of contracts traded to 50. The blue curve requires the system to double the initial account equity (\$30,000) before applying the money-management process.



Proprietary (Excel) calculations

er, making the result of the whole equation (i.e., how many contracts to add) smaller. It does this by multiplying the value in cell H2 (the original equity increase required to add a new contract) by the number of times the current equity (cell V8) has grown relative to the starting balance (cell D2) times a “slowdown multiplier” in cell N2. The smaller the slowdown multiplier, the larger the value by which H2 is multiplied. Figure 5 (p. 37) shows the slowdown multiplier set to 0.5 in cell N2 in the same spreadsheet used for all calculations.

More importantly, however, the larger the current equity is relative to the initial equity, the larger the entire denominator will be, and the fewer the contracts traded. That is, as the account grows it will also take progressively larger equity increases to trade additional contracts. The whole process can then be balanced with a well-chosen value for the slowdown multiplier in cell N2.

the part that reads:

$$\text{INT}((\text{M8}-\text{IF}(\text{H5}=\text{"Y"},\text{D\$2*2},\text{D\$2}))\text{H\$3}/(\text{H\$2}))$$

This part of the formula subtracts the initial equity (cell D2) from the current equity (cell M8) and multiplies the remainder by a “contract multiplier” (cell H3), then divides the result by the account equity increase (cell H2) required to add new contracts. The result tells us how many contracts to add to the original fixed-size portion of the entire formula.

Now compare this to Formula 3 and note the reference to cell H2 in Formula 2 has been substituted with:

$$(\text{H\$2*V8}/(\text{D\$2*N\$2}))$$

The modified part of the formula adds to the denominator in the original formula, which originally consisted only of the value in cell H2. Thus, the modified denominator will be larg-

Formula 3:

$$\begin{aligned} &=(\text{IF}(\text{V8}>\text{D\$3},\text{D\$4},\text{IF}(\text{D\$5}>0,\text{D\$5},0))+ \\ &\text{IF}(\text{H\$4}<0,\text{MAX}(\text{INT}((\text{V8}- \\ &\text{IF}(\text{H5}=\text{"Y"},\text{D\$2*2},\text{D\$2}))\text{H\$3}/(\text{H\$2*V8}/(\text{D\$2*N\$2}))),0), \\ &\text{MIN}(\text{H\$4},\text{MAX}(\text{INT}((\text{V8}- \\ &\text{IF}(\text{H5}=\text{"Y"},\text{D\$2*2},\text{D\$2}))\text{H\$3}/(\text{H\$2*V8}/(\text{D\$2*N\$2}))), \\ &0))))\text{I9} \end{aligned}$$

To get a feel for these modified money-management results, take a look at the equity curves in Figure 6. All three have used the same initial settings except for their slowdown multiplier values. Specifically, the initial equity and the initial margin requirement (cells D2 and D3) were set to \$50,000 and \$20,000, respectively, and the original amount needed to add one contract (cell H2) was set to \$10,000. The slowdown multiplier was then set to “2” for the blue curve, “1” for the red

By limiting the maximum number of contracts to trade, the money-management rules eventually cease to impact the system as the equity grows, and we end up with a scaled-up version of the same fixed-contract strategy we are trying to avoid.

curve and “0.5” for the green curve. For the blue strategy this resulted in a final equity of approximately \$2,500,000, trading 10 contracts in the last trade. The same numbers for the red and green strategies were \$1,250,000 and (five contracts in the last trade), and \$750,000 (three contracts in the last trade), respectively.

### Slow and steady

Regardless of whether you would go with the blue, red, or green strategy, it is important to notice how all three strategies slow down the equity growth to more realistic, sustainable and tradable numbers. If you still think we should go with the most aggressive system and trade as many contracts as possible, remember that over-trading a system will not always produce astronomical profits — it can sometimes lead to equally large losses. All systems lose some ability to identify the most opportune entry and exit points when moved from the test bench to live trading.

The wise choice, then, is to stick to a strategy that makes sense and allows for a slow but steady increase in position size. This will help keep you from going broke should a worst-case scenario unfold.

Besides, even for the green strategy in Figure 6, the return for the four-year test period was more than 1,400 percent (700,000/50,000), or almost 100 percent annually. Most likely, we would not be able to reproduce even the most modest testing results. Nonetheless, this money-management formula is a tool that will let you grow as a trader, gradually decreasing excess risk. 📌

For information on the author see p. 10.

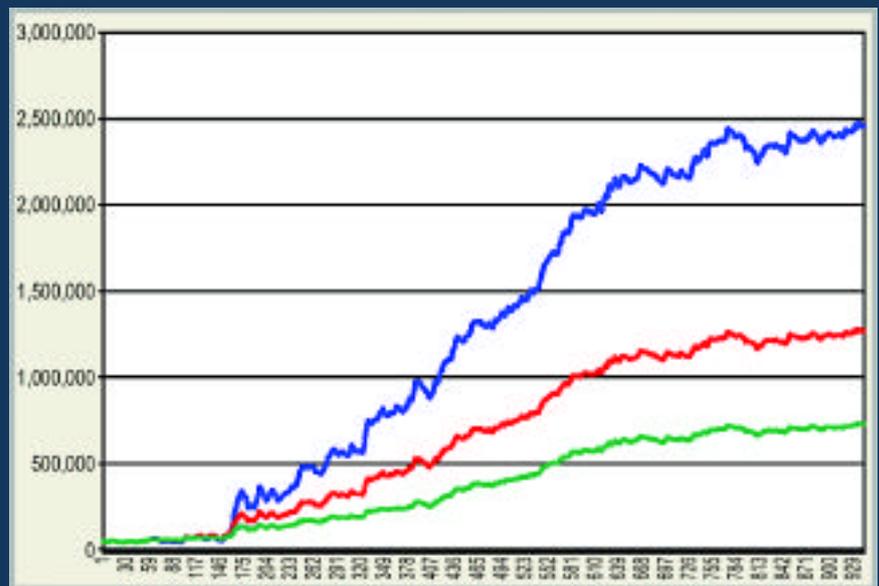
**FIGURE 5 MULTIPLIER**

The smaller the slowdown multiplier, the larger the increases in equity will have to be to trade additional contracts.

	L	M	N	O
1				
2	<b>Slowdown multiple:</b>		<b>0.5</b>	
3				

**FIGURE 6 COMPARING TESTS**

All three equity lines reflect the same initial settings, except for the slowdown multiplier values. The slowdown multiplier was then set to “2” for the blue curve, “1” for the red curve and “0.5” for the green curve. For the blue strategy this resulted in a final equity of approximately \$2,500,000, trading 10 contracts in the last trade.



Proprietary (Excel) calculations