

Various scale-out trade-management strategies are all the rage with E-mini day-traders these days. Here, we'll look at what really works and offer a realistic appraisal of what can be expected from popular profit-target and stop-loss rules.

## Calibrating profit and loss strategies

BY MICHAEL GUTMANN

**M**ini stock index futures electronic contracts, because of their liquidity, leverage, tax advantages and supporting electronic infrastructure, attract speculators interested in a low-risk and potentially high-return market. A number of advanced direct-access trading platforms and brokers make for an ever-increasing pool of retail day-traders.

Part of the E-mini day-trading phenomenon is the plethora of trading literature and online sources offering techniques and training to purportedly day-trade them successfully. Liquidity, leverage and low-cost commissions in these products attract attention from the retail trading community.

Day-trading strategies cover a wide spectrum of technical analysis — time-of-day studies, price level guidelines, use of market "internals," economic report release timing, market-depth data and volume strategies, to mention a few.

But once you pull the trigger on a trade, the real work begins with your trade management. A basic question that the day-trader must answer is how to manage — that is, exit — a trade posi-

tion once in the market. Most, if not all, stock index futures day-traders advocate a strict stop-loss target on every position to avert an individual large loss. This is one of the attractions of the E-mini day-trading experience as there should be no single large loss to endure, and it reinforces the idea of generating a regular daily income from the market.

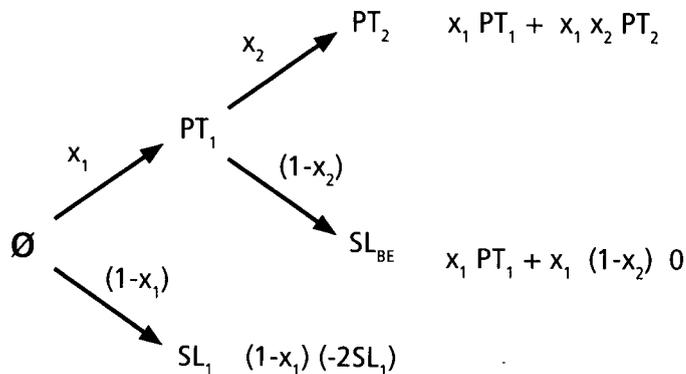
In broadest terms, there are essentially two trade-management strategies: all-

in/all-out and scaled. Either technique can be used for high-frequency scalping, where a few contract ticks are garnered per trade, or a day-trade that may last for a larger portion of the day.

The all-in/all-out strategy might be characterized as a one-punch trade with the goal of getting a single trade decision correct, while the scaled strategy uses subsets or tiers of an original position to take off profits quickly, moderately

### TWO TIMES THE EXIT

Using probabilities, we can map out the possible outcomes from a two-tiered scale-out strategy for trade exits and determine the expected value of our strategy, given certain inputs.



quickly or over a fairly lengthy period during the day. At the heart of the scale strategy is the desire to reduce risk and retain a number of winning runners, or contracts that can be held at no cost to the trader that may take advantage of a large intraday rally or sell-off. There are both scale-in and scale-out variations to scaled trade management.

Because of the variation possible with the scaled strategy, its efficacy can be difficult to analyze. That said, we can compare well-publicized scaled strategies using directed graphs. This helps us to understand the expected value of each strategy.

### TWO-TIERED SCALE STRATEGY

In a two-tiered scale-out strategy, a position is entered with a multiple of two contracts. An initial stop-loss order is placed above (short position) or below (long position) the trade entry price using a stop order for the entire position. A profit-target price for half the position is pre-determined and executed with a limit order or manually by the trader when the profit-target price is touched.

If the initial stop-loss is executed, the position is closed at a small loss. If the first profit-target is reached, half the contracts are closed for a quick profit. The stop-loss is then moved — usually to breakeven — for the remaining position. The trader has a small profit and now is “trading on the house.” A second profit-target price may be entered or a trailing-stop strategy may be used.

A channeling, or rotational, market, may dictate the trader take a final exit at a pre-determined profit-target, such as at the outer edge of the trading channel. On the other hand, if the trader perceives a trending market, he may wish to use a trailing stop for the final exit.

“Two times the exit” (left) models the two-tiered scale-out management strategy with a directed graph. The nodes of the graph represent trade states. The edges represent the probabilities of moving from one state to another. The symbol  $\emptyset$  stands for the initial trade entry state. SL1 is the first stop-loss state. PT1

STRATEGY RESULTS									
Here, using the inputs shown, we quantify the directed graphs to generate expected values for our various scale-out strategies.									
Inputs									
1st Profit Target Win % (X1)	67%	Double Down Ticks (DD)			4				
2nd Profit Target Win % (X2)	30%	X11 %			50%				
Winning Runner % (X3)	5%	X21 %			30%				
1st Profit Target Ticks (PT1)	4	X31 %			5%				
2nd Profit Target Ticks (PT2)	8	X41 %			5%				
Winning Runner Ticks (PT3)	40	War-Zone Contracts			2				
1st Stop Loss Ticks (SL1)	8	W-Z Winning Runner % (X3WZ)			30%				
Strategies									
2-Tiered	SL1	SL-BE	PT2						
	-5.28	2.68	4.29						
3-Tiered	SL1	SL-BE	SL-PT1	PT3					
	-7.92	2.68	4.42	4.69					
3-Tiered Double-Down	SL-BE	PT2	SL1	SL-DD	SL-BE1	SL-PT1	PT3		
	2.68	4.288	-3.96	-0.26	1.24	1.09	1.08		
3-Tiered War-Zone	SL1	SL-BE	SL-PT1	PT3					
	-7.92	2.68	-0.75	25.9					

is the first profit-target state. SLBE is the breakeven stop-loss state for the second half of the original position. This is the state where the first profit-target was realized and the stop-loss is moved to a breakeven level, but the trade subsequently does not realize the second profit-target and exits at the breakeven price. PT2 is the second profit-target state. The x1 and x2 are the probabilities of moving from  $\emptyset$  to PT1 and from PT1 to PT2.

The graph is sufficient to model either a second profit-target limit or the trailing stop-market strategy. When modeling trade management, some input value will be required to determine a final exit price. While the final exit price can be varied to analyze profit-loss scenarios, a final exit price is needed to close the directed graph. One way to model a trailing stop is to pick a percentage price reversal level from an expected final exit price and then use that value as a final exit profit-target.

Once the graph is drawn, it is a straightforward exercise to assign outcomes to the termination nodes. Summing the outcomes produces trade profit/loss expected values. A spreadsheet easily accommodates the exercise and provides the flexibility to alter trade inputs to study possible outcomes.

Active traders who employ one or more of the strategies here may want to input data from their trade statistics to analyze strategy performance.

With  $x1=67%$ ,  $x2=30%$ , the SL1 price eight ticks from the entry price, the PT1 price four ticks from the entry price, and the PT2 price eight ticks from the entry price, a little more than 1.5 ticks is the expected value for the two-tiered scale strategy (see “Strategy results,” above). Given the modest four- and eight-tick profit targets, this seems a reasonable result. Note that all probability and price levels are inputs and can be varied. In addition, the model uses the minimum number of contracts for the trade strategy studied. In the two-tiered model, two contracts are initially opened. If four contracts were opened, then the profitability, as a number of ticks, would double (when all other inputs are held constant).

### THREE-TIERED SCALE STRATEGY

The three-tiered scale strategy adds a third profit-target level to the two-tiered strategy. Whereas the two-tiered strategy may be preferred in rotational or channeling markets, where the second profit-target level can be used at the outer boundary of a trading range, the three-tiered scale strategy attempts

to retain some number of contracts (one-third of the initial position) as winning runners.

The directed graph model of the three-tiered strategy is a direct extension of the two-tiered case (see "Three's a crowd," below). However, because the final third of the original position is held for a winning runner, PT3, the third profit-target level used to estimate a winning runner, requires some attention. The technique used here is to measure the average true range (ATR) of the market to determine a reasonable winning runner price move. For example, a reasonable winning runner price move for the E-mini S&P 500 futures contract might be 10 points (40 ticks), representing approximately two hours of intraday price action.

A winning runner probability must also be chosen ( $=x_3$ ). As with all model parameters, the trader can vary this input to reflect actual market conditions and to test profit-loss scenarios. A value of 5% is used here.

The three-tiered model more than doubles the return of the two-tiered model, even when a one-in-20 input is used for the third, winning runner contract (see "Strategy results"). This may explain why the three-tiered model is widely advocated among day-trading proponents. Again, model input parameters must be adjusted to reflect real-world trading.

## DOUBLING DOWN

The term doubling-down means to double the original wager. It is sometimes advocated by E-mini day-traders. As long as a stop-loss order is maintained to limit the maximum loss, it may make for a winning strategy. The idea of doubling-down when trading the E-mini contract uses the following rationale and techniques:

- The trader perceives a price level where the market is expected to reverse. The price level may be based on support/resistance levels and other technical methods. The trader realizes it is impossible to precisely determine a reversal price, so an

averaging technique is used.

- A limit order is placed at an initial price level for half the total number of contracts the trader is willing to risk. At the time the position is opened, a maximum stop-loss market order is placed. (Trade platforms support multiple entry/exit one-cancels-other order entry.)
- If the market does reverse at the original estimated price level, the trade is working on half the maximum number of contracts the trader might have used.
- If the market does not reverse at the original price level, then a second limit order is used midway between the first entry point and the final exit price. If executed, it fills the second half of the allowed maximum number of contracts and the stop-loss market order quantity is doubled to the total number of open contracts.

The trader, knowing he cannot pinpoint a reversal price, uses an averaging technique to enter the trade, while adhering to the discipline of a stop-loss if the entire trade fails.

The double-down strategy is modeled with the directed-graph in "Double trouble" (right). The model provides both scale-in and scale-out trade management. If the original position opens with 2x contracts and the double-down logic is not used, a two-tiered scale-

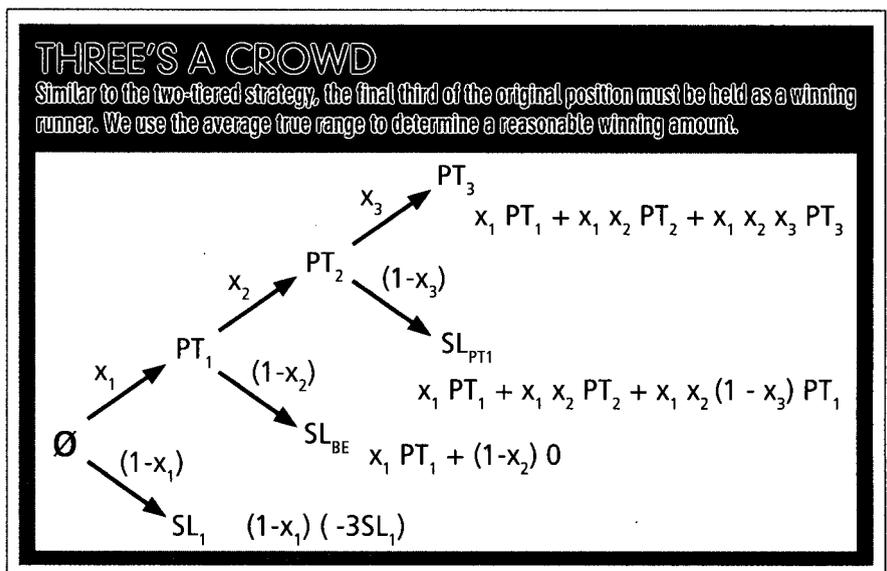
out strategy is used. If a double-down position is taken, then 4x contracts are opened, and by removing 1x contracts at each profitable level (BE1, PT11, PT21, PT3), all contracts are eventually closed with 1x contracts remaining for a winning runner. Obviously, the trade management technique used in a double-down strategy has many variations.

While the double-down model adds complexity to the two- and three-tiered models, the use of a directed graph helps to organize the analysis. Profit/loss formulas for the leaf nodes (trade exits) are easily constructed. Using a spreadsheet with variable inputs makes re-calculation and analysis straightforward. The double-down model showed an approximate 150% improvement over the three-tiered strategy (see "Strategy results"). Again, model input parameters can be adjusted to reflect real world trading.

## WAR ZONE TRADING

Another prevalent form of doubling-down has to do with aggressively adding contracts to a winning position when a longer-term trend can be identified.

Rather than testing the market for a reversal, as described in the previous section, what is referred to as a war zone mentality adds contracts during price movement perceived to be develop-



ing into longer rallies or sell-offs. Price reversals or breakouts that occur at key support/resistance levels or with economic news that increases volatility may warrant more aggressive trading.

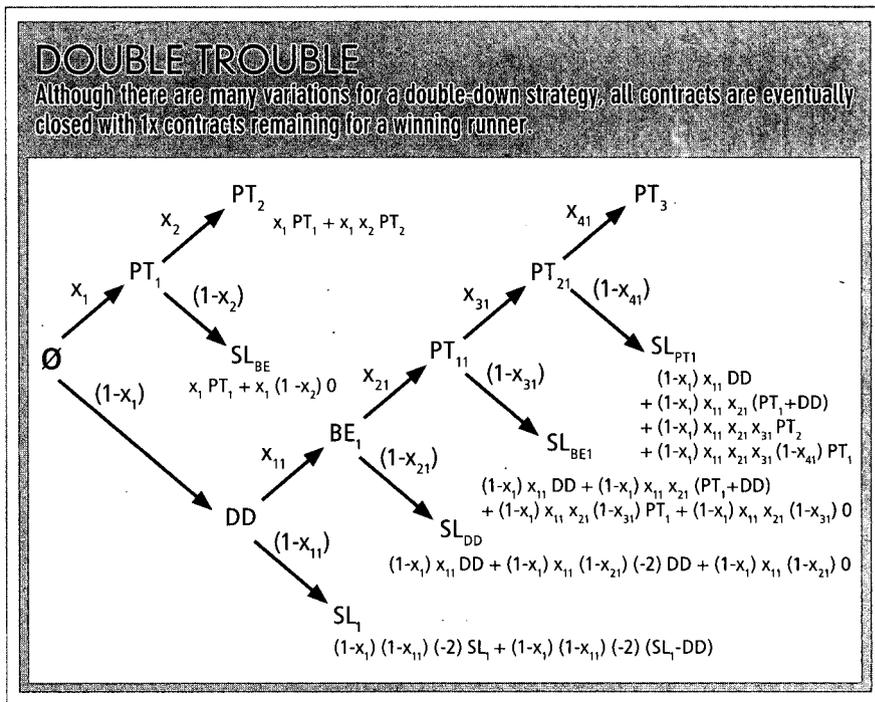
A war zone trading period describes aggressive trading that seeks to jump on a trend with additional contracts. War zone contracts are added to the three-tiered strategy to investigate their effect.

To study the effect of war zone trading, the directed graphs do not need to be modified, but exit node calculations are adjusted. Consider the three-tiered scale strategy. Assume that as a result of successfully realizing the second profit target (PT2), and because of additional market conditions, it is determined that a longer-lived trend is in place and a war zone mentality is adopted. Additional contracts are added/subtracted from the SLPT1 and PT3 calculations (the probability  $x_3$  may also be adjusted to reflect the likeliness of a longer-term trend and this is done here with the  $x_3WZ$  term).

The last entry in "Strategy results" gives the profit/loss expected value calculation for a war zone model. A war zone contract number has been added to account for additional contracts added at the PT2 level. In this example,  $2x$  war zone contracts are added. The more profitable model is a result of the addition of winning runner contracts.

The model outputs are highly dependent on their inputs. However, by holding the inputs constant across the models, it is possible to reach some general conclusions that can help the trader.

The models gave increasingly positive results and, in that sense, ratified some of the day-trading folklore prevalent among active traders. In particular, the double-down strategy, considered risky by some practitioners, gave more than a 350% larger return over the two-tiered strategy and more than a 150% larger return over the basic three-tiered strategy. Which method is best may depend on specific scenario analysis. As previously mentioned, the two-tiered model may be more appropriate for channel-



ing markets and the three-tiered market for trending markets. The double-down strategy may be warranted when trading around significant support or resistance levels.

The war zone model offered the most impressive results. One conclusion from this work is that war zone trading may be required for significant profitability. War zone trading gave a more than 500% increase in profitability compared to the original three-tiered model. However, war zone trading does include one potential contradiction: A war zone trade adds contracts without managing them using the purportedly preferred scale-out techniques.

There is one additional point to be made regarding war zone trading. In the case that the PT2 profit target is reached, then the trade has generated enough profit to offset the loss from the additional war zone contracts should the war zone fail (the SLPT1 path is taken in the model). In this case, the trader is using booked profits to offset the additional risk of the war zone contracts. If successful market action has taken the trade to the PT2 level, and there are signs that a strong trend is in place, then this type of trading may

be warranted and can be significantly more profitable.

As we have seen with the use of directed-graphs and accompanying expected value calculations for two basic trade-management scenarios — two- and three-tiered scale-out strategies and their variations — the impact of what technique is employed can be substantial.

While model results are highly dependent on input parameters, the underlying models provide a framework for the trader to begin to analyze trade management practices. An aggressive war zone trade mentality may be required to realize the full potential of the E-mini day-trading endeavor. **FM**

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