

Staying afloat

BY DAVID STENDAHL

There are many ways to increase a system's profit potential. Strangely enough, an increased focus on the losses is one of them. Here's how.

An equity curve is a graphical representation of trading performance over time. The limitation with most traditional equity curves is that they lead traders to focus entirely on a system's profit potential. For a more complete picture of a system's performance, it is important to evaluate other risk/reward measures, such as drawdowns, the Sharpe ratio, the Return Retracement (RR) Ratio and the Rina index.

The underwater equity curve can be used to derive information about all historical periods of drawdown by offering a visual interpretation of drops in equity over time, making it possible to distinguish between normal and extended periods of losses.

Every trading methodology, whether mechanized or discretionary, eventually will experience a period of extended drawdown. Knowing how a system is affected by equity losses can augment sound decisions on whether or not to follow the system. Traders should be prepared to answer such questions as:

- Am I prepared for periods of drawdowns that can last for years?
- Am I properly capitalized to trade volatile markets?
- Am I mentally strong enough to endure periods of sharp equity losses?

The first question addresses the duration of drawdowns and how well a trader is able to continue following a system given the possibility of a sustained string of losses.

The underwater equity curve illustrates the pain and suffering experienced by traders who follow a methodology. Unlike most equity curves, its focus is on trading losses. This unique perspective allows concentration on risk management and the tradability of a system, with an emphasis on equity drawdown in relation to time. Positive expectations from profitable trading systems may be realized only by remaining with the methodology over an extended period of time. Unjustly terminating a trading system due to short-term equity losses prevents taking full advantage of a potentially profitable trading system.

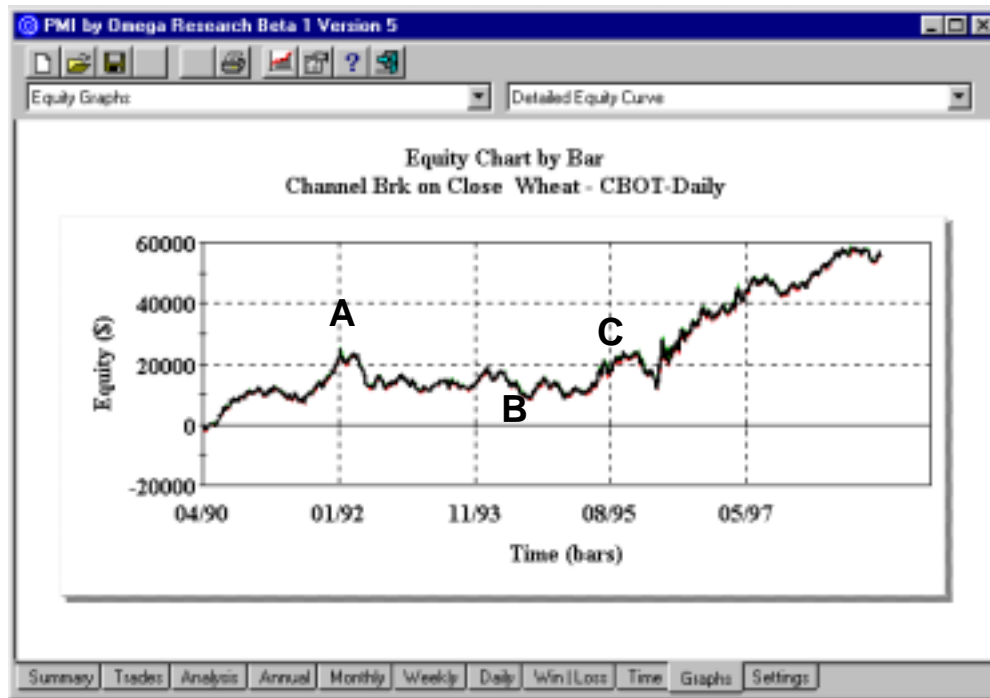
In addition to the potential duration of drawdowns, a second and perhaps greater concern is the magnitude of equity losses. Just as extended periods of reductions in equity may cause the abandonment of a system, sharp losses over a short period of time might lead to the abrupt termination of a system. Volatile market conditions, earning surprises and illiquid markets may cause sharp drawdowns. The underwater equity curve can identify these situations and help to avoid discarding the trading system prematurely.

TRADITIONAL EQUITY CURVE

A traditional equity curve plots the closing equity value or account balance for a trading system on a bar-by-bar basis. It presents the equity in an account (system) in relation to time. In “Traditional equity analysis”, trading wheat generated a net profit of \$53,950 over a nine-year period. Despite this profitability, there were periods of drawdown.

TRADITIONAL EQUITY ANALYSIS

By looking at a traditional equity curve, it can be hard to realize how long the drawdown period between points A and C actually lasted.



In April 1992 (point A), a new equity high was established followed by a lengthy period of losses. After hitting an equity low in August 1994 (point B), the system began a recovery period that reached a new high in December 1995 (point C). During this period (point A through Point C) the account balance increased by \$475 while the drawdown amounted to \$14,850.

Most traders look at a detailed equity curve and focus on the final net profit figure without quantifying the losses. Viewing a system’s traditional equity performance over time; however, the underwater equity curve may be more beneficial for viewing the system with respect to risk.

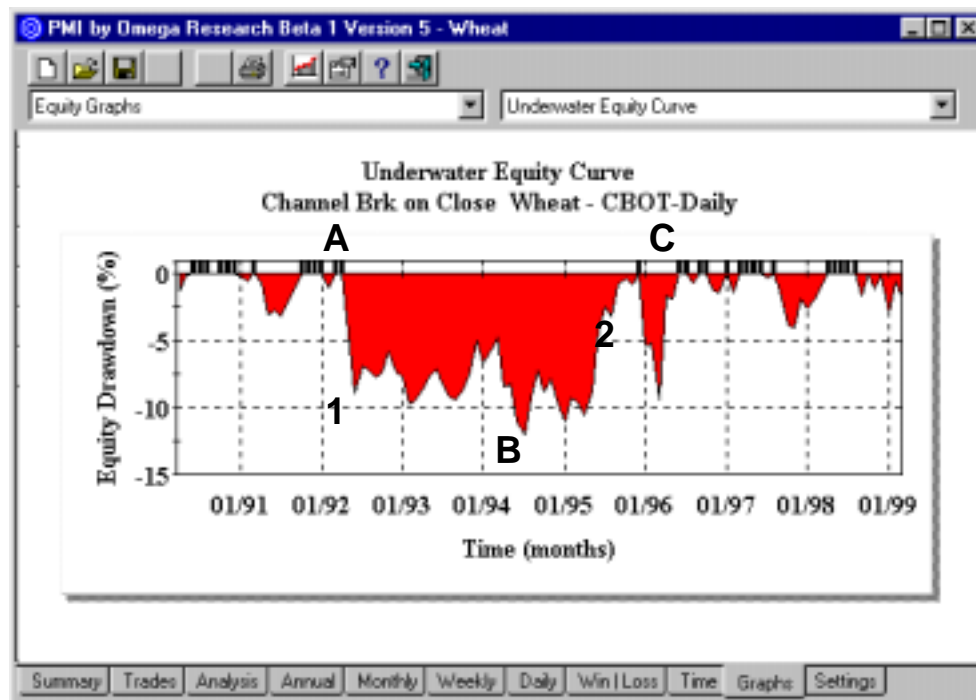
UNDERWATER EQUITY CURVE

The underwater equity curve is constructed using market-to-market monthly data. At the end of each month, a system will either break even, generate a profit or experience a loss. If the account breaks even or does not trade, there is no effect on the underwater equity curve. If a system ends the month with a profit greater than any previous month, then a black bar will be plotted on the graph signifying the new equity high (without noting the magnitude of the high).

When a system ends the month with a loss, it experiences a reduction in capital also known as an equity drawdown. The underwater equity curve plots this reduction as the percentage lost from the previous month's equity high. The drawdown continues until a new monthly equity high is achieved. This focus on losses is deliberate because it forces a trader to review the system's historical performance from the most pessimistic point of view.

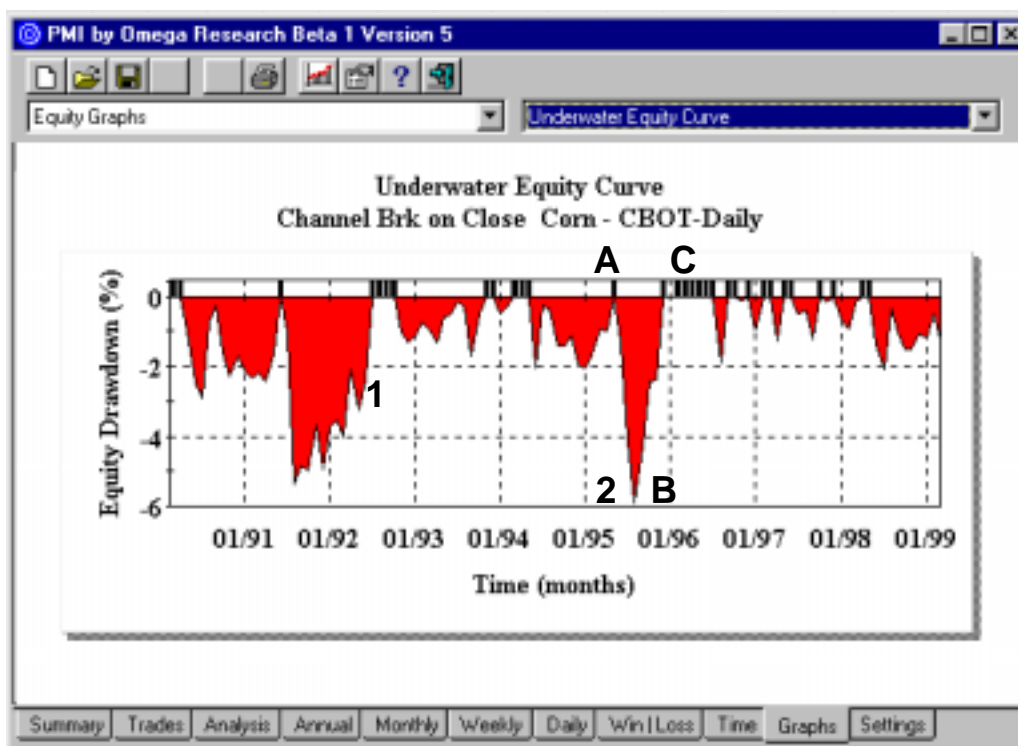
UNDERWATER EQUITY ANALYSIS - WHEAT

Focusing in on the unprofitable periods shows that the drawdowns between points A and C lasted nearly four years.



UNDERWATER EQUITY ANALYSIS - CORN

This underwater equity curve for corn displays drawdowns that are considerably shorter in both duration and magnitude than those for the wheat market. The corn and wheat markets seem likely to complement each other due to the different timing of each drawdown.

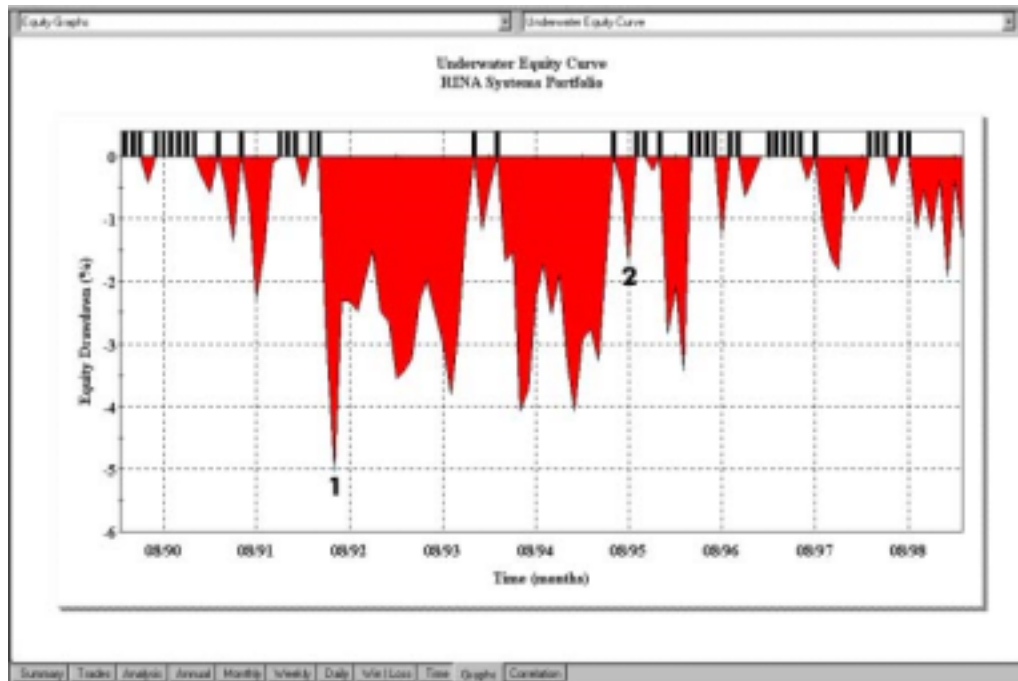


Using the same performance results from the wheat trades in “Traditional equity analysis,” the underwater equity curve in “Underwater equity analysis – Wheat” (see page 3) presents a surprisingly different perspective as a prolonged period of losses can be seen immediately. In July 1994 (point B), the wheat trades were down 12.07% from the prior monthly high. More important, the drawdown lasted three and one-half years (point A through point C). This equity curve forces a trader to focus on risk and equity loss by removing representations of profitability from the graph.

In “Underwater equity analysis – Corn” (above) the underwater equity curve presents a different picture when related to equity loss. The graph depicts drawdowns that were not as long in duration or as sharp in magnitude. The largest equity drop, in August 1995 (point B), resulted in a 5.89% unrealized loss from the previous equity high set in May 1995 (point A). Subsequently, it took seven months to reach a new equity high in December 1995 (point C). This drawdown period as well as another slide in equity loss can help in choosing a system and market with which you are the most comfortable. Feeling at ease with a system and a market’s volatility can be more important than its overall profitability.

UNDERWATER PORTFOLIO ANALYSIS

The wheat and corn markets seem to complement each other well for this particular trading system. When one market is down, the other is up, resulting in drawdown periods that are much shorter in both duration and magnitude, along with a very nice net profit.



PORTFOLIO ANALYSIS

A key reason for trading a portfolio vs. a single market is to diversify risk. By combining several individual systems and markets into one portfolio it is possible to achieve a greater return to variability ratio (Sharpe ratio) or a portfolio equity drawdown of lesser magnitude and duration than trading just one system. “Underwater portfolio analysis” (page 32) shows both the corn and wheat trading systems combined in an underwater equity curve portfolio. This portfolio, created by Portfolio Maximizer, yields a great deal of information concerning the value of trading multiple systems or markets.

In “Underwater portfolio analysis,” the largest underwater equity drawdown occurred in June 1992 (point 1). This is of interest because while the wheat trading system just entered into a lengthy equity slide, the corn system was in the midst of a recovery. The net result is a relatively minor 5.04% underwater equity drop. Both markets complemented each other as the strength of the corn trades compensated for the weakness in the wheat trades. More important, the portfolio recovered quickly from this loss, minimizing the amount of financial pain experienced by the trader.

In August 1995 (point 2) the wheat trading system was making a strong recovery from its worst equity dive just as the corn trading system was experiencing its single worst loss. With the two systems combined in a portfolio, they generated a relatively minor 1.71% underwater equity drop. The net result allowed the strength to compensate for the weakness in the corn trading system. Here are key statistics of performance in the individual wheat and corn markets, as compared to the combined performance for the portfolio.

	Wheat	Corn	Portfolio
Rina index	26.13	22.99	49.07
RR ratio	0.99	1.59	4.51
Sharpe	0.20	0.23	0.27

Because every trading system experiences some period of equity drawdown, it is important to build portfolios that offset the individual components' strength and weaknesses.

Traders should evaluate a trading system portfolio of systems by reviewing the underwater equity curve to make sure that measures of risk are acceptable. The main benefit with this analysis is that it strips away representations of profitability and centers on equity drawdown, allowing for more informed decisions concerning historical system performance. This will ensure preparedness to endure the magnitude and duration of future monthly equity losses.

*Portions of this article are adapted from the video “**Portfolio Analysis & Money Management Workshop**” hosted by David Stendahl.*

*David Stendahl is vice president of RINA Systems, the developer of Portfolio Maximizer, Money Manager and 3D SmartView and the author of **Profit Strategies: Unlocking Trading Performance with Money Management** and co-author of **Computerized Trading**. Reach him via the web at www.rinasystems.com.*