



# How to Properly Tighten Up Your Portfolio Package

## *Harnessing the Power of Portfolio Diversification*

by Mike Chalek

Somewhere in our vast education, most of us have been exposed to chemistry and some of its volatile properties. It was quickly learned that some chemicals are rather innocent in their own individual manner. But when mixed with another seemingly non-volatile chemical you could have destruction on your hands. The same exists with trading different portfolios. We are often confronted with the problem of mixing a proper portfolio package against a background of numerous equity curves. The composite equity curve is simply the algebraic sum of the individual

equity curves under study. You could be trading several equities and/or future markets without knowing how to properly mix the equity curves of each. Finally that problem may have been solved or at least provide a more palatable solution. A software program has been developed to combat the problem that would otherwise take an infinite amount of time and patience to develop a proper portfolio package.

Let me take a minute to tell you how all of this manifested. I received a phone call from a very prominent trading systems specialist, Mike Levin of Genuine Trading. Mike won the US World Trading Championship several years ago and is highly respected for his experience with trading systems and portfolio analysis. Levin inspired me to look into selecting and creating highly profitable portfolio packages using my trading system. As I sat down to address this problem, I quickly realized that just how colossal this project was going to be. I couldn't do it by hand and create a proper selection of several markets that go into building a composite equity curve for different levels of investment. John Hill and I talked about this at great length and he told me he did it "the old fashioned way". That meant he placed several equity curves on thin pieces of paper and tape them up on a window. From there he visually selected the markets to arrive at a composite equity curve. Whew!!! What a daunting task to say the least and tedious too. So the only way to really get down to the bottom of this was to develop a software program that would produce an equity curve based on all possible selections of individual equity curves.

Most of us have always thought that the theory of obtaining a good equity curve would be to search for non-correlated markets. While that may seem to be good fundamental thinking, it may not be the only variable to produce a non-toxic equity curve. All of this falls under the general umbrella called diversification, a generic term that can mean just about anything. A lot of traders today trade equities as well as futures and Forex markets. The problem is; do they have a proper portfolio package that has generated a historical equity curve without too much drawdown or equity flat time. A lot of traders, including myself, have copied equity curves onto a piece of Mylar acetate and overlaid the equity curves, with light shining through them and attempted to visually figure out algebraically what the resultant equity curve would look like. By doing so we are trying to extrapolate what may occur in the future with some certainty. In other words, will the equity curves be compatible enough to suggest a tradable portfolio as

they have demonstrated in the past. We will attempt to minimize that unknown as best we can.

I chose the Dual Thrust trading system as the candidate for creating portfolio packages for the following illustration. It presently tracks in its nightly daily report a total of 12 markets. The question has always been asked what would be the optimal equity curve for a selection of 2, 3, 4, 5, 6, 7... or 10 markets out of the universe of the 12 markets. We have had clients inquiring as to which markets to trade based on their drawdown and how to mix them. The answer has always been met with great difficulty.

The combinatorial algorithm is very expansive and is fully explained below. The charts use a 6 portfolio arrangement as its example. The scatter charts below depict the appropriate relationships over a six year period between net P/L vs. Drawdown (see **Figure 1**) and Net P/L vs. Equity Flat Time (see **Figure 3**). Finally an equity chart is illustrated for a proper selection of the 6 portfolio mix as measured against a blend of drawdown and equity flat time (see **Figure 7**).

The following equation takes into account how many possible combinations exist in a given set of “N” elements taken “R” elements at a time.

$${}_n C_r = n! / (n - r)! * r!$$

where  $n! = n * (n - 1) * (n - 2) * (n - 3) * \dots * (n - (n - 1))$

where  $r! = r * (r - 1) * (r - 2) * (r - 3) * \dots * (r - (r - 1))$

where  $(n - r)! = (n - r) * (n - r - 1) * (n - r - 2) * \dots * ((n - r) - ((n - r) - 1))$

remember that  $0! = 1$

for example  $5! = 5 * 4 * 3 * 2 * 1 = 120$

To generate different portfolios that trades 12 markets we come up with the following possible portfolio combinations:

$${}_{12} C_1 = 12! / (12 - 1)! * 1! = 12 \text{ possible portfolio combinations taking one market at a time.}$$

$${}_{12} C_2 = 12! / (12 - 2)! * 2! = 66 \text{ possible portfolio combinations taking two markets at a time.}$$

$${}_{12} C_3 = 12! / (12 - 3)! * 3! = 220 \text{ possible portfolio combinations taking three markets at a time.}$$

$${}_{12} C_4 = 12! / (12 - 4)! * 4! = 495 \text{ possible portfolio combinations taking four markets at a time.}$$

$${}_{12} C_5 = 12! / (12 - 5)! * 5! = 792 \text{ possible portfolio combinations taking five markets at a time.}$$

$${}_{12} C_6 = 12! / (12 - 6)! * 6! = 924 \text{ possible portfolio combinations taking six markets at a time.}$$

$${}_{12} C_7 = 12! / (12 - 7)! * 7! = 792 \text{ possible portfolio combinations taking seven markets at a time.}$$

${}_{12}C_8 = 12! / (12 - 8)! * 8! = 495$  possible portfolio combinations taking eight markets at a time.

${}_{12}C_9 = 12! / (12 - 9)! * 9! = 220$  possible portfolio combinations taking nine markets at a time.

${}_{12}C_{10} = 12! / (12 - 10)! * 10! = 66$  possible portfolio combinations taking ten markets at a time.

${}_{12}C_{11} = 12! / (12 - 11)! * 11! = 12$  possible portfolio combinations taking eleven markets at a time.

${}_{12}C_{12} = 12! / (12 - 12)! * 12! = 1$  possible portfolio combinations taking twelve markets at a time.

The best tool, and usually the most visual one, to determine whether a trading strategy is profitable, is its equity curve. An equity curve can also show troughs and peaks, drawdowns and run-ups, or in short, how profits or losses have been generated over time. I try as much as possible to avoid over training, curve fitting, linear regression, and other known trading system abuses. Just because two commodities may be individually profitable, their combined drawdown may be hurting the overall equity curve.

In an attempt to condition our “equity curves”, we will try to address two variable components that are paramount to equity curve analysis. These are maximum drawdown and maximum equity flat time. Among the masses, equity flat time isn’t really emphasized as much as equity drawdown. As a quick refresher, equity flat time is the actual time spent between two successive net equity highs. This could also occur within a significant drawdown period.

**Figure 1**

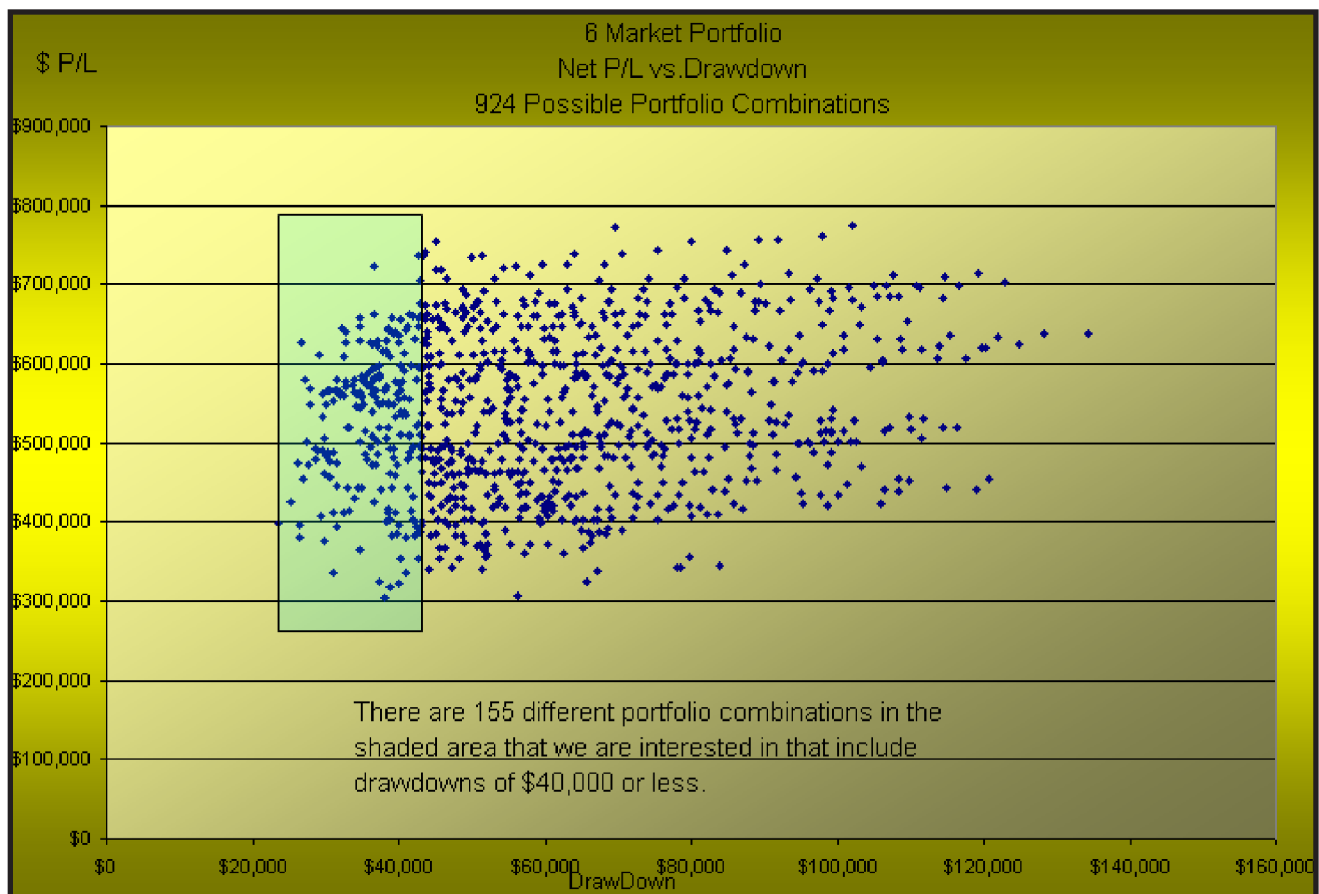


Figure 2

FILE NAME	MARKET1	MARKET2	MARKET3	MARKET4	MARKET5	MARKET6	TOTAL EQUITY	DRAWDOWN	FLAT TIME
E842.PRN	NGAS	BONDS	EURO	SWISS	ERUSSELL	GOLD	397399	23481	161
E338.PRN	CRUDE	NGAS	BONDS	EURO	SWISS	EMIDCAP	425630	25134	177
E849.PRN	NGAS	BONDS	EURO	SWISS	GOLD	COPPER	474384	26156	161
E851.PRN	NGAS	BONDS	EURO	ERUSSELL	EMIDCAP	GOLD	395476	26370	102
E876.PRN	NGAS	EURO	SWISS	ERUSSELL	EMIDCAP	GOLD	379563	26479	126
E723.PRN	UGAS	NGAS	BONDS	EURO	ERUSSELL	COPPER	626717	26714	82
E847.PRN	NGAS	BONDS	EURO	SWISS	EMIDCAP	COPPER	453904	26833	188
E721.PRN	UGAS	NGAS	BONDS	EURO	ERUSSELL	GOLD	580962	27162	100
E740.PRN	UGAS	NGAS	BONDS	ERUSSELL	EMIDCAP	GOLD	501914	27349	117

In Figure 2, we imported our 6 market portfolio file that consisted of 924 combinations into Excel and sorted on the Drawdown. Even though E842.PRN, portfolio consisting of Nat Gas, Bonds, Euro, Swiss, e-mini Russell and Gold, produced the lowest drawdown of only \$23,481, it wasn't really the best portfolio to be chosen. Figure 1 plots the drawdown vs. net P/L over the six year period under study. In fact, the shaded area of Figure 1 shows a menu of 155 different portfolio combinations that are good candidates but need to be further investigated.

Figure 4 is the same 6 market portfolio file that was sorted on just equity flat time, showing the smallest flat times at the top and ascending toward the bottom of the file. Figure 3 plots the equity flat time vs. Net P/L over the six year period under study and reveals that there are about 120 attractive portfolio combinations in the shaded area of the graph.

So our task is to find the common intersection of the two shaded area of both graphs to determine a selection of 6 market portfolio packages. It turns out that there are several of these and we decided to choose the E723.PRN file (selection).

Figure 6 shows the equity chart for the selected portfolio (E723.PRN) consisting of Unleaded Gas, Nat Gas, Bonds, Euro, e-mini Russell and Copper. The resultant equity curve has an equity max drawdown of \$26,714 and an equity flat time of 82 trading days. There are actually several other portfolio models just as palatable, using the 6 market approach.

Figure 3

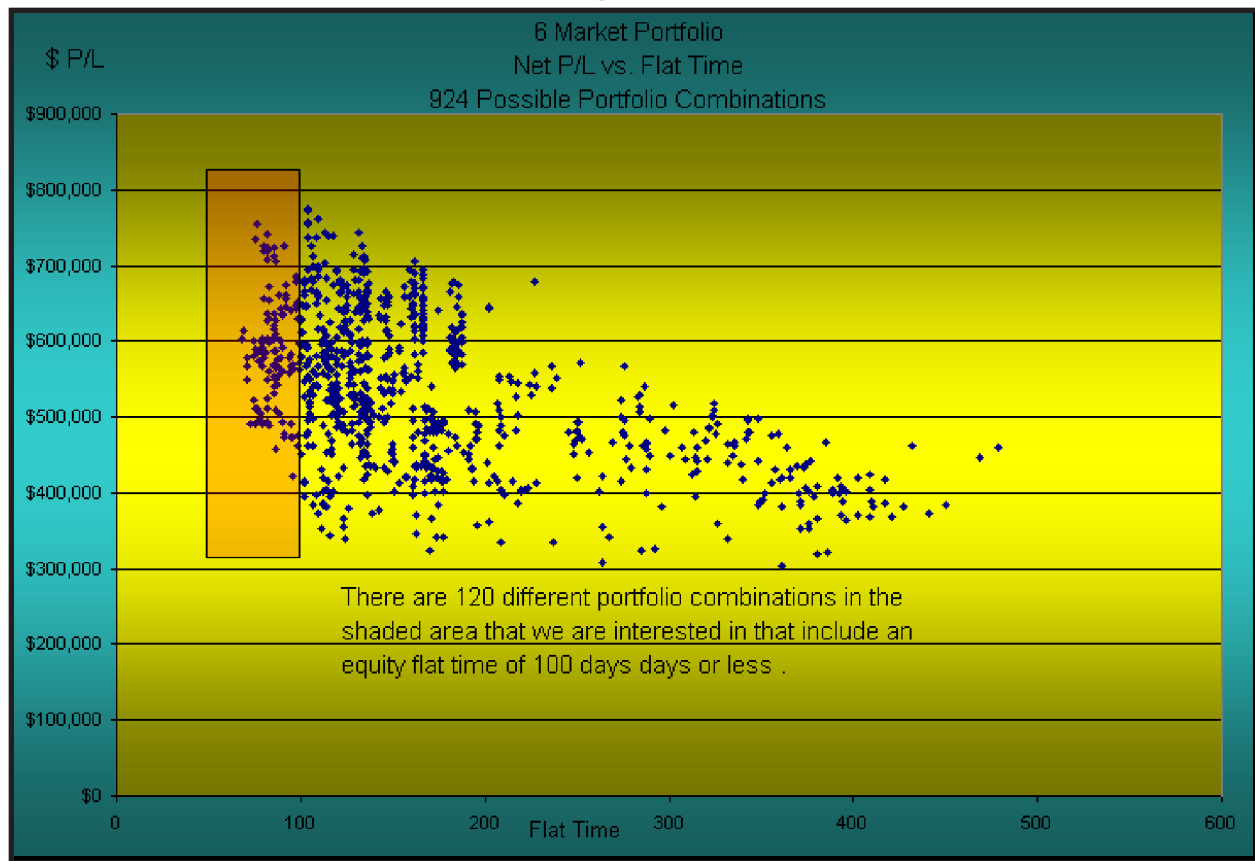


Figure 4

FILE NAME	MARKET1	MARKET2	MARKET3	MARKET4	MARKET5	MARKET6	TOTAL EQUITY	DRAWDOWN	FLAT TIME
E231.PRN	CRUDE	UGAS	NGAS	BONDS	SILVER	COPPER	603266	52076	68
E299.PRN	CRUDE	UGAS	BONDS	EMIDCAP	GOLD	COPPER	614132	45678	69
E747.PRN	UGAS	NGAS	BONDS	EMIDCAP	GOLD	COPPER	578899	33924	71
E778.PRN	UGAS	NGAS	SWISS	EMIDCAP	SILVER	COPPER	549392	39175	71
E784.PRN	UGAS	NGAS	EMIDCAP	GOLD	SILVER	COPPER	567949	44396	71
E599.PRN	HOIL	NGAS	BONDS	EURO	EMIDCAP	SILVER	491895	44454	73
E300.PRN	CRUDE	UGAS	BONDS	EMIDCAP	SILVER	COPPER	600538	45773	74
E253.PRN	CRUDE	UGAS	NGAS	SWISS	EMIDCAP	COPPER	580467	54770	74

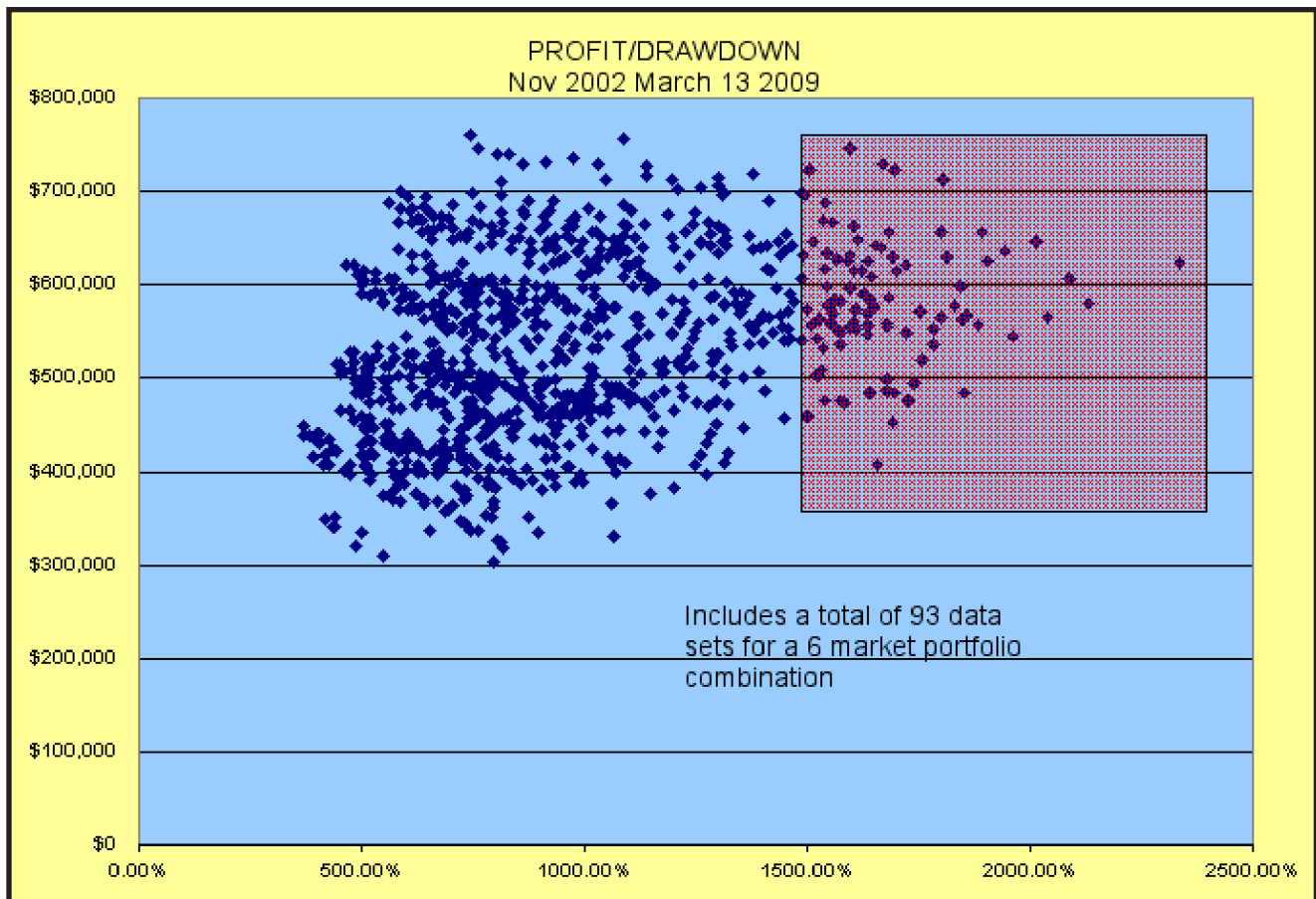
Figure 5

FILE NAME	MARKET1	MARKET2	MARKET3	MARKET4	MARKET5	MARKET6	TOTAL EQUITY	DRAW DOWN	PROFIT/DRAWDOWN	FLAT TIME
E216.PRN	CRUDE	UGAS	NGAS	BONDS	EURO	COPPER	684494	42882	15.962	92
E271.PRN	CRUDE	UGAS	BONDS	EURO	SWISS	COPPER	680182	43566	15.613	92
E275.PRN	CRUDE	UGAS	BONDS	EURO	ERUSSELL	COPPER	663474	36544	18.155	92
E527.PRN	HOIL	UGAS	BONDS	EURO	ERUSSELL	COPPER	716991	44490	16.116	85
E533.PRN	HOIL	UGAS	BONDS	EURO	SILVER	COPPER	743567	43737	17.001	82
E595.PRN	HOIL	NGAS	BONDS	EURO	ERUSSELL	GOLD	505364	39579	12.768	78
E599.PRN	HOIL	NGAS	BONDS	EURO	EMIDCAP	SILVER	504320	44454	11.345	73
E675.PRN	HOIL	BONDS	EURO	EMIDCAP	GOLD	SILVER	524510	42982	12.203	86
E677.PRN	HOIL	BONDS	EURO	EMIDCAP	SILVER	COPPER	565308	41417	13.649	88
E678.PRN	HOIL	BONDS	EURO	GOLD	SILVER	COPPER	592928	44110	13.442	87
E720.PRN	UGAS	NGAS	BONDS	EURO	ERUSSELL	EMIDCAP	555315	31906	17.405	95
E723.PRN	UGAS	NGAS	BONDS	EURO	ERUSSELL	COPPER	623733	26714	23.349	82
E726.PRN	UGAS	NGAS	BONDS	EURO	EMIDCAP	COPPER	637323	39352	16.195	82
E747.PRN	UGAS	NGAS	BONDS	EMIDCAP	GOLD	COPPER	575438	39535	14.555	71
E748.PRN	UGAS	NGAS	BONDS	EMIDCAP	SILVER	COPPER	560804	37964	14.772	86
E761.PRN	UGAS	NGAS	EURO	ERUSSELL	EMIDCAP	SILVER	542904	38484	14.107	82
E762.PRN	UGAS	NGAS	EURO	ERUSSELL	EMIDCAP	COPPER	598336	32503	18.409	86
E771.PRN	UGAS	NGAS	SWISS	ERUSSELL	EMIDCAP	SILVER	456517	39798	11.471	95
E778.PRN	UGAS	NGAS	SWISS	EMIDCAP	SILVER	COPPER	538525	39175	13.747	71
E791.PRN	UGAS	BONDS	EURO	SWISS	EMIDCAP	COPPER	633011	40036	15.811	85
E795.PRN	UGAS	BONDS	EURO	ERUSSELL	EMIDCAP	GOLD	575505	39189	14.685	94
E802.PRN	UGAS	BONDS	EURO	EMIDCAP	GOLD	COPPER	657513	40207	16.353	83
E803.PRN	UGAS	BONDS	EURO	EMIDCAP	SILVER	COPPER	642879	41084	15.648	95
E813.PRN	UGAS	BONDS	SWISS	EMIDCAP	SILVER	COPPER	556492	34742	16.018	88
E819.PRN	UGAS	BONDS	EMIDCAP	GOLD	SILVER	COPPER	580994	37232	15.605	95
E821.PRN	UGAS	EURO	SWISS	ERUSSELL	EMIDCAP	SILVER	538592	37230	14.467	86
E830.PRN	UGAS	EURO	ERUSSELL	EMIDCAP	GOLD	SILVER	563094	40349	13.956	85
E858.PRN	NGAS	BONDS	EURO	EMIDCAP	GOLD	COPPER	486684	27563	17.657	91

To further refine our portfolio analysis, we would want to find the common shaded intersection of Figure 1 and Figure 3 applied to both the maximum drawdown and the equity flat time. In this case we wanted to create a table (see Figure 5) in which the maximum drawdown is \$45,000 or less and the flat time is 95 days or less. That resulted in finding 28 different data sets of portfolios using the six market approach out of a universe of 12 markets.

A trader could use a third dimension in the our decision making process regarding selection of portfolio analysis as depicted in Figure 6. The scatter chart plots “Profit/Drawdown” to “Net P/L”. The chart shows that there are 93 possible portfolio combinations while setting the profit/drawdown to 1500% or greater. This type of chart would attract a trader who is possibly more aggressive and is focusing more on the profit side of the equation. Recognize that while this is a ratio of profit to drawdown, you can experience high profits as well as high drawdowns.

Figure 6



### System Portfolio Diversification

#### Let's Recap

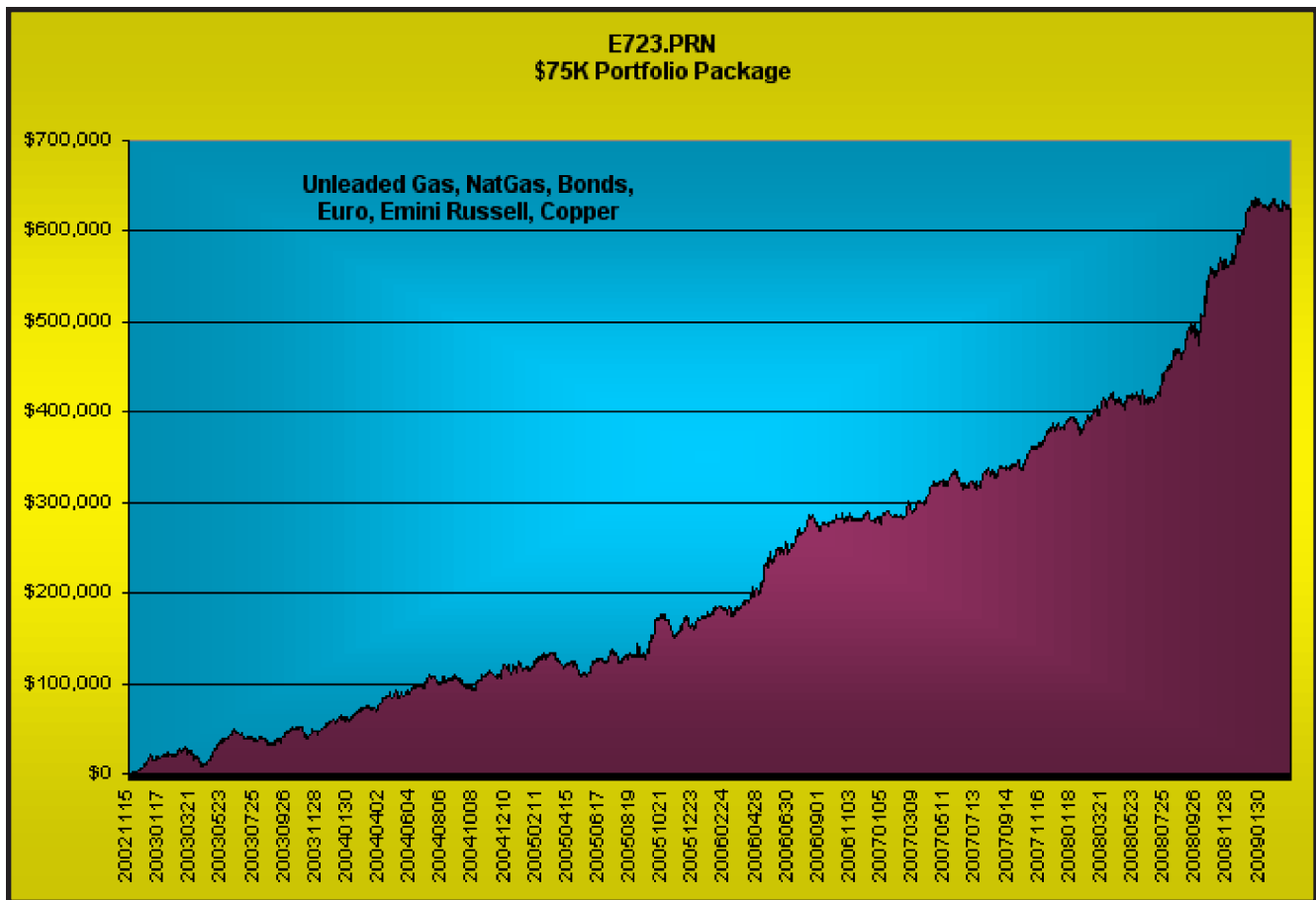
We often hear from trading experts that “money management” is just as important as the trading system is itself, if not more so.

In creating a suite of trading systems, I will coin a phrase “cross vendor pollination”. Diversification means trading many markets with the same system or the same markets with many systems. The holy grail of trading system design is in the chase of that elusive smooth equity curve. The goal is to have a host of systems with each system trading several markets. With an equity software tool, we can now provide a proper alignment of the equity curves that will yield a tantalizing portfolio package.

The future is never known with absolute certainty, but with computer simulation and all of the processing power it lends us, we can derive more credibility and trading confidence with the right portfolio mix. Hopefully more and more brokers who work with system vendors will realize the full potential of this concept of portfolio management and that it will bring the vendors closer together for the common good of the client.

You may contact Mike Chalek at 970.590.5236, Michael Levin of Genuine Trading at 954.762.7446 or George Pruitt of Futures Truth at 828.697.0273 for more information about this article.

Figure 7



*Mike Chalek is a system developer in the stock and commodity markets. During the past thirty years, he has been very active constructing computer based commodity trading systems and developing software for computer trading system techniques, in trend and day trading.*

*His trading systems have been featured in such publications as the **Wall Street Journal**, **Forbes**, **Technical Analysis of Stocks & Commodities**, **Worth Magazine**, **Futures and Options World** and **Futures Magazine**. Mike has been associated with many key individuals in the industry such as Joe Granville, Larry Williams, Walter Bressert, J.D. Hamon, Jake Bernstein, and John Hill... and has been directly responsible for joint development of trading methodologies and systems. Chalek co-developed the "Ultimate Oscillator" with Larry Williams that is now publicly recognized as a built-in indicator on many commercial trading platforms.*