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Galen Burghardt

galen.burghardt@newedgegroup.com

Ryan Duncan

ryan.duncan@newedgegroup.com

Lianyan Liu

lianyan.liu@newedgegroup.com

What you should expect from trend following

Medium to long-term systematic trend following models dominate the managed futures industry. Of the nearly \$100 billion managed by commodity trading advisers, easily a third or more is controlled by a handful of managers who describe themselves as trend followers. Even so, it is no easy thing to find the data one needs to separate the contribution of generic trend following as a trading strategy from the influence of what actual managers do when trading in practice. The most intense research is done by the managers themselves, and they are unlikely to give away any knowledge that has value to peers and competitors. Actual track records are available, of course, as well as indexes based on actual track records. But actual track records represent the combined effect of trading strategies, risk management, leverage, cash management, resizing, and any number of other things that can differentiate one manager from another.

At the same time, there is a long list of questions about trend following trading systems that cry out for answers. For example:

- ◊ Is there an inherent return to trend following?
- ◊ Are trend following systems all the same? And if not, how sensitive are they to: incremental variation in trade signals; portfolio construction; transactions costs; contract rolls; stops; re-sizing; and leverage?
- ◊ How do generic trend following results correlate with actual track records?
- ◊ Do market environments matter?
- ◊ Are there predictable give backs?

And many more.

A generic trend following database

To answer these and other questions about trend following trading systems, we have assembled the data and written the programs necessary to determine the basic profit and loss characteristics of the two most widely used trend following systems – moving average crossover and range breakout. The purpose of this note is to explain the steps involved in constructing a database of trend following profits and losses. The note also serves as an explanatory guide to a new report that shows how these two kinds of trend following systems have worked in a wide range of futures markets.

Exhibit 1

Example of a 20/80 moving average crossover system



The reader is advised that futures and options are speculative products and the risk of loss can be substantial. Futures spreads are not necessarily less risky than short or long futures positions. Consequently, only risk capital should be used to trade futures. The information contained herein is based on sources that we believe to be reliable, but we do not represent that it is accurate or complete. Nothing contained herein should be considered as an offer to sell or a solicitation of an offer to buy any financial instruments discussed herein. All references to prices and yields are subject to change without notice. Past results are no indication of future performance. Any opinions expressed herein are solely those of the author. As such, they may differ in material respects from those of, or expressed or published by or on behalf of, Newedge Group or its officers, directors, employees or affiliates. © Newedge Group, 2008

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The two basic strategies

The two most popular trend following systems are moving average/crossover and range breakout. Each defines a trend or price pattern by comparing a current market price or recent average price with a longer history of the price and buys or sells when the recent price measure is above or below the longer price measure.

Moving average/crossover

The basic moving average crossover systems defines two moving averages – a fast-day average and a slow-day average and is long if the fast-day average is higher than the slow-day average or short if the fast-day average is lower than the slow-day average. That is, if

F = number of days in the “fast” moving average, and
S = number of days in the “slow” moving average

then

***Rule: If F-day average > S-day average, long,
 otherwise short***

For example, if $F = 20$ and $S = 80$, we would calculate the average price for the past 20 days and the past 80 days and compare the two. If the 20-day average were higher than the 80-day average, we would be long. Otherwise, we would be short. And, in the simplest kind of moving average system, we would always be in, either long or short.

An illustration of this simple “two-line” moving average system is provided in Exhibit 1, which traces the fast and slow averages for the S&P500 from March through December 1998. During the early months, the system was long S&Ps. Then, on June 17th, the fast average dipped below the slow average, and the system would go short. On July 1, the fast average crossed the slow average, and the system went long. The system later went short on August 14th and long again on November 9th.

We have added question marks to the short position on June 17th and the subsequent long position on July 1st. The reason for the question marks is that it is possible for a system like this to produce spurious trades if the fast average is not, in some sense, significantly different from the slow average. To prevent the possibility of spurious trading in our own calculations, we have overlaid on the system a simple statistical standard for determining whether the fast average is higher or lower than the slow average. That is, we establish a buffer zone equal to 2 standard deviations of daily changes in the fast moving average and then use the following modified trading rule:

***Rule: If F-day average > S-day average + buffer,
 go long***
***If F-day average < S-day average – buffer,
 go short***

When stated this way, there is a small range of prices around the slow average within which the trader can be short even if the fast average is slightly higher than the slow average or long even if the fast average is slightly lower than the slow average. And, as it happened, the buffer would have eliminated the trades on June 17 and July 1.

One source of differences in the results of applying a rule like this is in the details. In our work, we calculated moving averages using daily closing prices and transacted at the next day’s opening price if

the rule produced a buy or sell signal. Contract rolls (discussed below) were done at closing prices.

Range breakout

A range breakout system compares the current market price with the highest and lowest market prices for the past N days. That is,

$N = \text{number of days used to define the price range}$

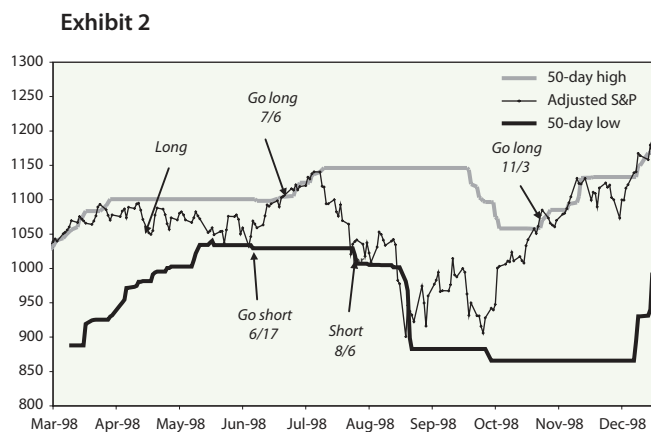
and then

Rule: *if price > N-day high, go long*
if price < N-day low, go short

Or, what is the same thing, whenever the market establishes a new N -day high or N -day low, the system generates a buy or sell signal. In its simplest form, this system is always in, which results in some interesting ambiguities. That is, once you are long, you stay long as long as the price stays above the

N -day low. Or, if you are short, you stay short as long as the price stays below the N -day high. As a result, when the price is trading within the N -day range (which is most of the time), whether you are long or short depends entirely on your most recent trade.

An example of a 50-day range breakout system in action is illustrated in Exhibit 2, which covers the same months as the moving average system shown in Exhibit 1. As it happened, this system also was long during the early months, and produced a short signal on June 17th. Thereafter, it generated long and short signals at roughly, but not exactly the same times as the 20/80 moving average system.



For the purposes of this work, we compared each day's closing price with an N -day high/low determined using daily high and low prices. If the result produced a trading signal, the resulting trades were done at the next day's opening price. Once the initial position was taken, the system was always in the market. Contract rolls were done at daily closing prices.

Making the systems work in practice

Perhaps the hardest part of an exercise like this is sheer volume of detail that is required to do things correctly. Once the markets are selected (perhaps the easiest job of all), there is the problem of gathering data, dealing with things like date mismatches, making sure the calculations are true to the logic of the trading systems, and checking to make sure that the results are reasonable. In this section, we outline our choice of markets, constructing the price series, and the assumptions we used when generating trading signals and calculating gains and losses.

Choice of markets and portfolio weights

For the purposes of this exercise, we chose 39 futures markets that can be grouped into the four broad classes shown in Exhibit 3. We chose this set of contracts for three main reasons. First, they are all comparatively liquid. Second, we have 10-year high/low/open/close price histories for all but three

Exhibit 3

Market selection and portfolio weights

	Futures markets	Standard deviation of daily changes (\$/contract)	Number of contracts	Position standard deviation	Sector standard deviation
Equity	1 S&P 500	3,227	1	3,227	19,707
	2 CAC 40	552	7	3,863	
	3 DAX 30	1,828	2	3,656	
	4 NIKKEI 225	2,029	2	4,059	
	5 AUSSIE SPX	422	9	3,794	
	6 FTSE 250	959	4	3,834	
	7 SWEDISH OMX	150	25	3,739	
	8 NASDAQ 100	5,588	1	5,588	
	9 DJ EURO STOXX	624	6	3,747	
	10 HANG SENG	1,472	3	4,416	
Interest rate	11 US 30 YEAR	663	6	3,976	19,674
	12 US 10 YEAR	428	9	3,854	
	13 GERMAN BUND	417	9	3,755	
	14 GERMAN BOBL	264	14	3,697	
	15 AUSSIE 10 YEAR	434	9	3,905	
	16 UK 10 YEAR GILT	743	5	3,717	
	17 JAPAN 10 YEAR	3,625	1	3,625	
	18 JAPAN 3 MONTH	54	71	3,837	
	19 US 3 MONTH	326	12	3,908	
	20 EUROPE 3 MONTH	78	49	3,806	
	21 UK SHORT STERLING	76	50	3,796	
	22 AUSSIE 3 MONTH	96	39	3,731	
Foreign currency	23 JAPANESE YEN	855	7	5,987	20,618
	24 EURO	684	8	5,470	
	25 SWISS FRANC	635	9	5,713	
	26 BRITISH POUND	488	11	5,372	
	27 AUSTRALIAN DOLLAR	414	13	5,378	
	28 CANADIAN DOLLAR	254	22	5,584	
	29 MEXICAN PESO	395	14	5,532	
Commodity	30 CRUDE OIL	523	11	5,757	20,533
	31 NATURAL GAS	1,487	4	5,948	
	32 SUGAR	193	31	5,993	
	33 HEATING OIL	627	9	5,643	
	34 COTTON	527	11	5,801	
	35 CORN	190	31	5,880	
	36 COFFEE	1,487	4	5,950	
	37 SOYBEANS	404	14	5,658	
	38 GOLD	259	22	5,688	
	39 COPPER	354	16	5,662	
	Portfolio				46,414

of them.¹ And third, they provide good representation of four main market groupings – equities, bonds, currencies, and commodities.

Portfolio construction can vary widely in complexity and sophistication. For our purposes, we first calculated the standard deviation of daily dollar gains and losses for each of the commodities. We then chose whole numbers of each contract so that each individual futures market would exhibit about the same amount of risk within its market sector. We then scaled the numbers of contracts so that each of the broad sectors would exhibit about the same amount of risk as the others. The resulting contract weights are shown in Exhibit 3 along with the standard deviation of dollar changes in position value for each contract.

As a practical matter, the most volatile contracts set a rough lower limit on the size of the trading program. For example, the standard deviation of daily changes in the value of one S&P500 contract for the 10-year period was \$3,227. For the NASDAQ 100, it was \$5,588, while for the 10-year JGB contract, it was \$3,625 (when yen gains and losses were translated into dollar gains and losses). Strictly speaking, we could have chosen the NASDAQ 100 contract as our numeraire and scaled everything else off of that. As it was, we decided to slightly overweight this contract by using the S&P500 and JGB contracts as our representative contracts and scale everything from there.

As the results show, each equity and interest rate contract position had daily

¹ The exceptions are DJ Eurostoxx (6/19/98), Nasdaq100 (4/9/96), and OMX (3/25/94). Our source for price data was Bloomberg, with the exception of Euribor for which CQG was the source and Aussie SPX for which the Sydney Futures Exchange was the source. Our continuous series for the Euro was the resulting of chaining the old Deutschemark contract with the new Euro contract using the fixed conversion rate at the time the Euro was introduced.

Exhibit 4
Contract roll schedule

Instruments	Cycle
S&P 500	HMUZ
DAX 30	HMUZ
Nikkei 225	HMUZ
CAC 40	FGHJKMNQUVXZ
Aussie SPX	HMUZ
FTSE 250	HMUZ
Swedish OMX	FGHJKMNQUVXZ
Nasdaq 100	HMUZ
Hang Seng	FGHJKMNQUVXZ
DJ Euro Stoxx	HMUZ
US 30-Y Bond	HMUZ
US 10-Y Bond	HMUZ
German Bond	HMUZ
German Bobl	HMUZ
Aussie 10 year	HMUZ
UK 10-Y Gilt	HMUZ
Japan 10 year	HMUZ
Japan 3 Month	HMUZ
US 3 Month	HMUZ
Aussie 3 Month	HMUZ
Euro 3 Month	HMUZ
UK Short Sterling	HMUZ
Japanese Yen	HMUZ
Euro	HMUZ
Swiss Franc	HMUZ
British Pound	HMUZ
Australian Dollar	HMUZ
Canadian Dollar	HMUZ
Mexican Peso	HMUZ
Crude Oil	FGHJKMNQUVXZ
Natural Gas	FGHJKMNQUVXZ
Sugar	FHKNV
Heating Oil	FGHJKMNQUVXZ
Cotton	HKNVZ
Corn	HKNUZ
Coffee	HKNUZ
Soybean	FHKNQUX
Gold	GJMQVZ
Copper	FGHJKMNQUVXZ

Explanation:		
F - January	K - May	U - September
G - February	M - June	V - October
H - March	N - July	X - November
J - April	Q - August	Z - December

standard deviation in the mid to upper \$3,000 range. Each of the currency and commodity contract positions had a standard deviation in the upper \$5,000 range. Taken together, each sector as a sub-portfolio had a standard deviation of about \$20,000.

Calculating gains and losses net of transactions costs

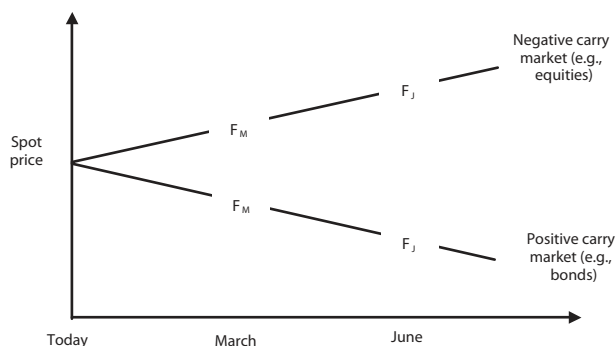
The next step was to simulate gains and losses from the two basic trend following systems. To do this, we had to determine when the systems would buy and sell for any given set of day parameters, the prices at which they would buy and sell, and the numbers of contracts traded in each transaction. And to do this, we first had to deal with the fact that futures contracts have fixed expiration dates and that any trading system using futures has to come to grips with contract rolls. Contract rolls present three kinds of problems. First, there is the practical problem of how to calculate moving averages or price ranges when shifting from one futures price series to the next. Second, a futures trading system will trade for two reasons. The first is when the system generates a buy or sell signal. The second is when the time comes to transfer a long (or short) position from the expiring contract to the next contract month. Third, the trader has some discretion about just when to roll from one contract month to the next.

Concatenating futures price series

One practical feature of futures is the expiration cycle that governs trading in each market. In most cases, it is common practice to concentrate trading in the contract that is nearest expiration, at least until market participants reach a market consensus about shifting, or rolling, their positions and trading into the next contract month.

As shown in Exhibit 4, the quarterly cycle is the most common, at least for financial commodities. In this cycle, contracts expire in March, June, September, and December on dates that are specific to each contract. Some stock index contracts follow a monthly expiration cycle, as do energy futures and copper. Agricultural commodities follow various forms of an every other month cycle.

Exhibit 5
Spot and futures price spreads



In most futures markets, the relationship between futures price and their underlying spot prices is governed by arbitrage relationships. In a negative carry market, where it costs more to finance a position in the underlying commodity than the commodity provides in terms of interest or dividends, futures prices will be higher than spot prices. This kind of relationship is illustrated by the upward sloping line in Exhibit 5. In positive carry markets, where the commodity generates more income than it costs to finance the position, the futures price will be lower than the spot price, and

longer dated futures prices will be lower than nearby futures prices. An example of this would be the downward sloping line in Exhibit 5.

Much of the time, equity futures looks like negative carry markets because dividend income tends to be less than the costs of financing. As a result, futures prices tend to be higher than spot prices, and more distant futures price tend to be higher than futures that expire sooner. And, much of the time, bond markets look like positive carry markets, at least when the yield curve is upward sloping. Coupon income will exceed finance expense, and bond futures prices will be lower than spot prices. FX markets can be either way depending on the relationship between domestic and foreign interest rates, and commodities markets, where arbitrage is often more costly and difficult to do, exhibit patterns that reflect anticipated demands and supplies and can take any shape.

For us, these price relationships complicate the problem of calculating moving averages or high/low price ranges. Consider Exhibit 6, which shows the March '94 S&P500 futures price series as that contract approaches expiration and the June '94 series, which is where open positions will be held once the March contract has expired. The fact that the June contract prices are higher than the March prices is simply a result of negative carry and not because futures prices have risen in any sense.

To incorporate the June price series with the March series, we can do either of two things. First, when calculating any moving average or historical price range, we can increase all March and earlier contract prices by the difference between the June and the March prices, and recalculate everything. Or we can adjust the June futures prices down by an amount equal to the difference between the June and March prices. This second approach, which is illustrated in Exhibit 7, is the simpler approach and allows us to generate a continuous price series that can be used for all of our applications. In Exhibit 8, we compare a history of raw S&P500 futures prices with its continuous price history. As one

Exhibit 6

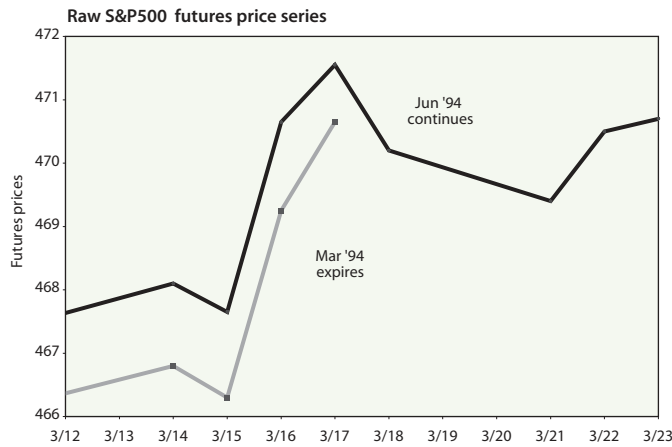


Exhibit 7

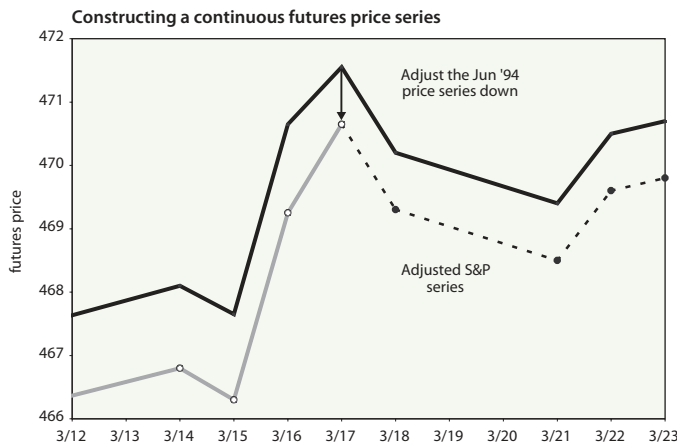
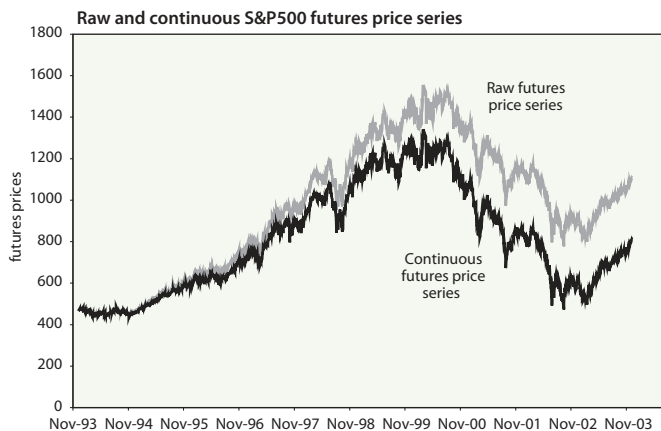


Exhibit 8



would expect, because we are adjusting successive futures prices down, the continuous series tends to drift down relative to the raw series. If we were doing the same thing for a positive carry market, the continuous series would tend to drive up relative to the raw series.

It is worth mentioning here that the construction of a continuous futures price series depends on what we assume about the shift from one contract month to the next. The futures price spread will vary from day to day because of changes in carry and relative richness and cheapness. In our work, we make the shift on expiration day. In other applications, if we were making the shift earlier, we would end up with a different continuous series.

Contract rolls and transactions costs

Every contract roll requires a buy and a sell to maintain an open position. For example, if the system is long going into a contract expiration, we have to sell the expiring contract and buy the next contract. For some markets, as shown in Exhibit 4, this is done quarterly. In others, it is done every month, every other month, or according to some other regular schedule.

The effect of these trades on a system's total transactions costs depends on the liquidity of the spread markets in which these trades would be done. Because spread trades are less risky than outright buys and sells, the markets for spreads are tighter, and often there will be small concessions in terms of brokerage and clearing fees. Thus, in practice, the cost of rolling contracts will be less per contract than the cost of responding to buy and sell signals, which require outright purchases or sales.

Choosing the best time to roll

In this round of work, we do not deal with this problem. Rather, we have assumed that all contract rolls take place at contract expiration. In practice, this approach would not be the best approach because the best time to roll a position depends in part on the market in which you are trading and on whether you want to roll a long or short position. To use futures to your best advantage requires an understanding of how futures trading behaves around contract expirations and how spread markets respond. In some markets, contract rolls take place several weeks before the nearby contract expires. In others, the rolls take place during the last few days of the expiring contract's life. And in almost all cases, one would avoid doing anything on the last day of a contract's life.

Transactions costs

As a rough and liberal approximation of the effect of transactions costs on our simulated p/l results, we have used \$50 per contract per side to represent both market impact (bid/asked spread and slippage) and brokerage costs. With this assumption, the cost of a round turn would be \$100. This is clearly more than the costs of trading in most markets, especially for the spread trades involved in contract rolls.

The number of trades generated by any given system was reckoned this way when calculating the net p/l for a single futures contract. The first buy or sell signal generated by the system results in the purchase or sale of a single contract. All subsequent signals require the purchase or sale of two contracts. For example, if we are already long, then a short signal requires us to sell one contract to offset our long position and to sell a second contract to establish a short position. Further, every contract roll requires us to trade two contracts, one in the expiring contract and one in the next contract to maintain an open long or short position.

Other considerations

In producing our results, we ignored stops, assumed continuous resizing, omit interest income, and make no allowance for management fees. Each of these will be encountered in actual trading programs. Our goal, however, is to produce completely generic trend following gains and losses, and so we have isolated these possible influences.

Stops

Stops are used to get out of the market. In some instances, stops will be triggered by a trading loss of a predetermined size. These are known often as risk management stops. In other instances, stops will be triggered by ambiguous trading signals. For example, a trend follower might use a 3-line moving average that is long only if a fast average is greater than a medium term average, which is in turn greater than a slow average. If any one of the three is out of order, the system would be flat, or out of the market. Range breakout traders might use an inner range and an outer range that allows the trader to be out of the market if the price is trading within the inner range.

Our chief reason for ignoring stops – and risk management stops in particular – is that their application is so varied. That is, while there may be generally accepted risk management stops (e.g., get out if a position loses .5% of portfolio), there is very little agreement about the conditions that would cause the system to get back in the market.

Continuous resizing

Resizing is the problem of adjusting the scale of a trading program as it makes or loses money. Below, when we convert futures gains and losses into rates of return, we will use a denominator of \$5 million. Because our gains and losses are produced by the fixed contract portfolio in Exhibit 3, we never vary the size of the trading program. As a result, our rates of return based on a fixed \$5 million would be the same as those of a manager who returns all profits and who requires additional cash when there are losses. They would also be the same as those of a manager who scales up the size of the trading program when making money and scales it down when losing money.

Again, this is an area of managed futures trading in which there is no one standard practice. Some managers will resize regularly. Others will resize infrequently.

Interest income

The gains and losses reported here are pure futures gains and losses and represent, as a result, pure excess return. In an actual trading program, for which some actual cash has been invested, there would be interest income as well as futures trading income. In such cases, interest income has to be netted out before one can calculate a Sharpe ratio.

Fees

Fees comprise some combination of an ongoing management fee and performance fees. The ongoing management fee is fairly straightforward and usually assessed against the total amount of money invested in the program. Performance fees, however, are time dependent because under most circumstances, a manager only collects a performance or incentive fee if the fund's or account's value is higher than its most recent high water mark. What one pays or collects in performance fees depends to a large extent on when the program starts trading. For this reason, two trading systems might make the same amount of money gross of fees in a given quarter but yield different net amounts because one was above water while the other was under water.

In Appendix B and C, we show Manager Evaluation Reports for a 60/180 day moving average system and an 80-day range breakout system. For these reports, we simulated management and performance fees assuming 2% for the management fee and 20% for the performance fee.

Simulated trading results for individual markets

What can you expect from trend following traders? To shed some light on this question, we have designed the report shown in Appendices A1 and A2. Gains and losses for each of the 39 contracts on the list are shown in the upper half of the report. Volatilities are shown in the lower half. Gains and losses are shown for various horizons. For example, we show four fixed horizons – yesterday, the past week, the past month, and the past year. We also show month to date and year to date, which lengthen as trading days pass. The report shows whether the trading system is long or short in each market and how many of each contract is used to calculate the gain or loss. Individual contract results are aggregated to produce sector gains and losses for equity, interest rate, currency and commodity futures. Sector results are aggregated to produce a portfolio result.

In this particular example, which is where things stood on the last trading day of December 2003, we show what each contract would have made or lost if we had used a 60/180 day moving average system to govern our trading. For example, over the past year, this trading program would have made a total of \$1,477,883.39 net of transactions costs, interest income and gross of any management fees. Of this \$149,297.37 was made in equity futures, \$162,439.92 was lost in interest rate futures, \$870,046.25 was made in foreign currency futures, and \$620,979.70 was made in commodity futures.

We produce a similar report for range breakout systems. And in both cases, you will be able to choose from a range of day assumptions.

How did trend following systems do from 1994 through 2003?

Three of our questions at the outset were: (1) Is there an inherent return to trend following? (2) Are trend following systems all the same? and (3) How do generic trend following results correlate with actual track records?

Inherent return?

Ten years of data is just that – a ten-year experience. Even so, Exhibit 9 provides some interesting insights into the gains and losses generated by trend following trading systems. In the upper panel, for example, we find the portfolio results by year for a 60/180 day moving average system and an 80-day breakout system.² For these ten years, both the moving average system and the breakout system had one losing year. And, although the chart doesn't show it, both systems over the full ten years produced a total gain of \$5.8 million, gross of fees, once all the dust had settled.

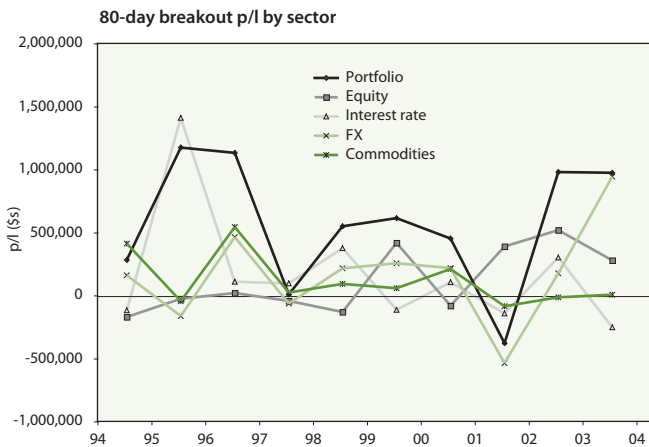
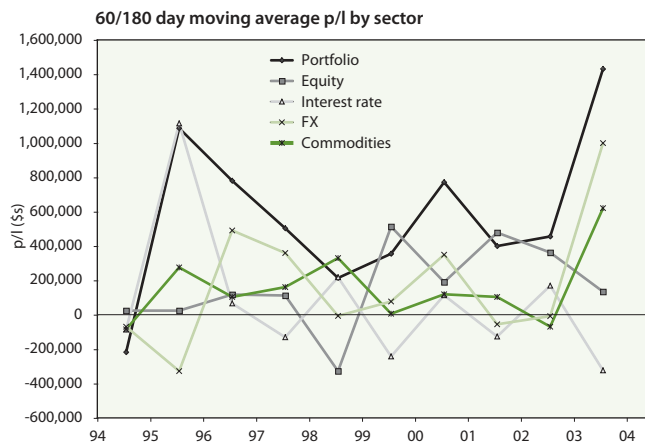
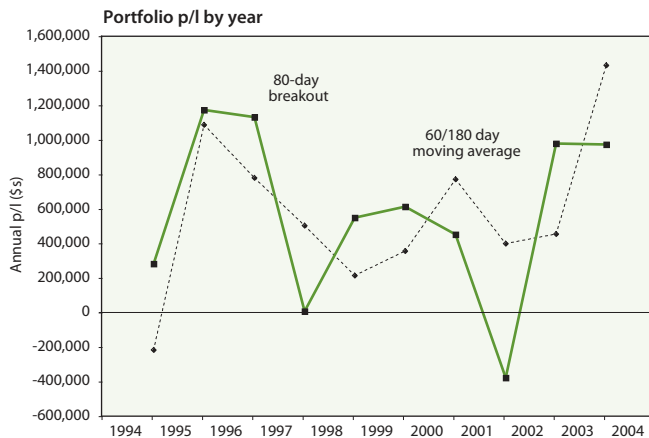
The middle and lower panels show the annual p/l results for the four broad sectors for both systems. These exhibit a great deal more variability year to year than does the portfolio, which seems like a good argument for diversification. Also, even though the chart does not show it, each sector, when all was said and done by the end of 2003, had delivered somewhere between 20% and 30% of the total portfolio return.

Are trend following systems all the same?

It has been suggested that there is very little difference between trend following models, and that there is little room to improve results through a better choice of day for calculating moving averages or breakout ranges. To some extent this is true, but the evidence presented in Exhibit 11 for breakout systems and Exhibit 12 for moving average systems suggest that there can be substantial differences in trading results.

² Actual p/l histories for each trading system begins when the first position is taken. As a result, the starting dates for the p/l histories used here begin at different times. Most systems will have kicked in before the end of 1994, but in the case of a very slow moving average, the first positions might not have been taken until 1995.

Exhibit 9



In particular, both exhibits suggest that relatively short term trading programs do not do especially well. A 20/40 day moving average system, for example, lost money on average, as did 10-day, 20-day, and 30-day breakout systems. On the other hand, we can see in both exhibits that at some point, the trading systems produce roughly the same results over a fairly wide range of day assumptions. For example, in Exhibit 12, we have highlighted all of the slow and long day combinations that produced an average daily p/l of \$3,000 or more. There is a high point in the neighborhood of 40/280, but given the volatility of gains and losses, the neighboring results differ very little. And, in Exhibit 11, we find that once we get to a 70-day breakout, there is very little to be gained by extending the number of days out to 120.

How do generic trend following results correlate with real track records?

The first of our reasonableness checks was to see how our results correlated with real track records. For this exercise, we chose four managers – AHL, Aspect, Campbell, and Graham – who are self described trend followers and who manage a very large fraction of managed futures money. We also included the Lehman total return bond index and the S&P500 as proxies for two real asset classes. Third, we included the Barclay CTA index and both the Mt. Lucas and CISDM generic trend following results. The correlations of monthly returns for the five years form January 1999 through December 2003 are shown in Exhibit 13.

Round turns per million

A second reasonableness check was to see how much trading our systems generated. For these purposes, round turns per million is a standard measure of a manager’s trading velocity. The upper panel of Exhibit 14 shows the relationship between round turns per million for various moving average systems. The lower panels show how trading velocity varies with the number of days used to determine the breakout range. For the trading

systems in the middle of the pack, the number of round turns per million was between 600 and 800 contracts per year, which is reasonably in line with the experience of trend following managers.

Rates of return and leverage

Because futures have no net cashing out value, futures gains and losses are not, by themselves rates of return. To translate them into rates of return, we have to overlay the trading program on some

Exhibit 10
Portfolio trading results for breakout systems
(January 1994 through December 2003)

Days	Daily p/l results		total number of half turns
	average	standard deviation	
10	-2,289	43,080	113,218
20	-904	44,491	90,133
30	-30	44,612	80,579
40	784	45,406	74,765
50	1,359	46,142	70,997
60	1,644	46,131	69,032
70	2,079	46,004	67,381
80	2,295	46,285	66,082
90	2,073	46,541	65,217
100	2,213	46,289	64,475
110	2,259	46,031	63,114
120	2,247	45,317	62,120

amount of cash. For the sake of illustration, Exhibit 15 shows what the annual rates of return and annualized volatilities of returns would have been if we assumed an investment of \$5 million. For the purposes of this exhibit, we chose the 60/180 moving average results and the 80-day breakout results.

In both cases, the program trading results produced what look like reasonable rates of returns and volatilities. Rates of return varied between losses of 5 to 10 percent on the down side to gains of 20 to 30 percent on the upside. Overall, the rate of return for both programs was about 10%. The annualized volatility of returns ranged from a low of around 10% at the beginning of the period to 15% to 20% by the end of the period. And the ratio of return to risk seems to be within reasonable bounds.

Rates of return and return volatilities are inversely proportional to the amount of money we choose to attach to the trading program. If we were to double the investment to \$10 million, we would have half the return and half the volatility. If we were to invest only \$2.5 million in this program, we would double both returns and volatility.

Commodities and capacity constraints

Commodities markets tend to be less liquid than financial markets. Many managers, to get around the constraint that illiquid commodities markets would place on their trading capacity, continue to expand by decreasing the weight that commodities play in their portfolios.

To get a sense of what is lost when commodities play a diminished role in a broader portfolio, we compare the return/risk ratios for two portfolios – one that includes all four sectors, and one that contains only the three financial sectors – using a 60/180 moving average system. Exhibit 15 shows the return/risk ratios (before fees) for the two portfolios by year. As the exhibit shows, the results vary from year to year. In some years the portfolio without commodities has a higher return/risk ratio, while in others the portfolio with commodities has the higher ratio.

On balance, though, the presence of commodities would have improved the performance of this portfolio. In three of the ten years (1995, 1998, and 2003), the improvement afforded by commodities was substantial. Over the entire ten-year period, the return/risk ratio would have been 0.75 [= 10.6%/14.2%] with commodities and 0.65 [= 7.9%/12.1%] without commodities. This drop in the ratio is right in line with what one expect from dropping an uncorrelated return stream from the portfolio.

Market environment and give backs

Now that we can calculate gains and losses for generic trend following trading systems, we intend to tackle two important questions. One is the question of whether market environment has any measurable influence on what trend followers make or lose. Perhaps the hardest part of this next round of research will be to capture what is meant by market environment. We have assembled a list of suggestions that includes bullish and bearish bond and stock markets, ease or tightness of Fed policy, and market volatilities and volatility ratios.

Exhibit 11
Portfolio trading results for moving average crossover systems (with buffer)
(January 1994 through December 2003)

Average daily p/l										
Slow days	Fast days									
	20	40	60	80	100	120	140	160	180	200
40	-578									
60	488	757								
80	838	1,457	1,268							
100	1,429	1,577	995	1,194						
120	1,575	1,715	1,603	1,927	1,155					
140	1,856	2,068	1,994	1,871	1,696	1,501				
160	2,100	2,424	1,891	2,103	1,694	1,728	1,614			
180	2,465	2,844	2,389	1,904	1,916	1,961	1,736	2,065		
200	2,826	3,071	2,785	2,448	2,507	2,416	2,382	2,039	1,921	
220	3,039	3,453	2,898	2,774	2,598	2,540	2,500	2,703	2,137	2,624
240	3,190	3,579	3,082	3,029	3,197	3,096	2,956	2,700	2,802	2,975
260	3,334	3,386	3,305	3,165	3,091	3,077	3,165	2,940	3,008	3,094
280	3,520	3,616	3,597	3,455	3,221	3,335	3,134	2,751	2,732	3,305
300	3,222	3,591	3,394	3,364	3,042	2,970	2,776	2,709	2,934	3,122
320	3,003	3,500	3,366	3,233	2,819	2,636	2,643	2,678	2,963	3,035

Standard deviation of daily p/l										
Slow days	Fast days									
	20	40	60	80	100	120	140	160	180	200
40	45,159									
60	45,207	43,752								
80	45,418	44,688	43,884							
100	45,535	44,992	44,495	43,354						
120	45,992	45,071	44,566	44,084	42,889					
140	45,787	44,985	44,704	43,940	43,369	43,506				
160	45,838	45,235	44,796	44,725	44,246	44,265	44,000			
180	46,069	45,284	44,668	44,820	44,659	44,425	43,871	43,591		
200	46,246	45,362	44,865	45,266	45,091	44,815	44,609	43,888	43,047	
220	46,239	45,162	45,347	45,466	45,198	45,395	45,218	44,449	43,529	43,309
240	46,620	45,498	45,758	45,582	45,564	45,727	45,853	45,119	44,221	43,771
260	46,855	45,673	45,565	45,647	45,606	45,924	45,731	45,031	44,461	44,077
280	47,113	45,949	46,059	45,919	46,122	46,509	46,086	45,470	45,142	45,386
300	46,596	45,926	46,187	46,124	46,317	46,195	46,152	45,595	45,279	45,371
320	47,020	46,361	46,377	46,358	46,447	46,319	46,236	46,192	45,818	45,998

Total number of half turns										
Slow days	Fast days									
	20	40	60	80	100	120	140	160	180	200
40	89,772									
60	78,912	78,372								
80	74,252	72,220	73,500							
100	71,183	69,290	69,491	70,173						
120	68,346	66,730	66,380	66,548	67,239					
140	66,600	65,007	64,694	64,521	65,002	65,599				
160	65,735	63,703	63,403	63,722	63,690	64,116	64,339			
180	63,585	61,824	61,763	61,784	61,643	61,891	62,380	62,998		
200	62,460	60,668	60,404	60,286	60,314	60,476	60,767	61,041	61,689	
220	61,489	60,113	59,707	59,467	59,424	59,381	59,491	59,430	60,203	60,548
240	60,746	59,192	58,841	58,570	58,319	58,318	58,268	58,318	58,439	58,963
260	59,268	57,989	57,482	57,504	57,143	57,126	56,921	56,977	57,013	57,143
280	58,898	57,290	56,933	56,803	56,618	56,381	56,284	56,231	56,463	56,558
300	58,017	56,435	56,125	55,699	55,634	55,620	55,490	55,426	55,337	55,462
320	57,372	55,543	55,257	55,006	54,872	54,767	54,576	54,575	54,481	54,444

Exhibit 12
Correlations of monthly trend following returns with other benchmarks
(January 1999 through December 2003)

	80 Day Breakout	60/180 Day Moving Average	AHL	Aspect	Campbell	Graham	Lehman	S&P	Barclay CTA	Mt. Lucas	CISDM
80 Day B/O	1.00										
60/180 Mvg Avg	0.90	1.00									
AHL	0.74	0.62	1.00								
Aspect	0.66	0.57	0.90	1.00							
Campbell	0.76	0.62	0.72	0.71	1.00						
Graham	0.71	0.61	0.70	0.68	0.77	1.00					
Lehman	0.37	0.47	0.35	0.34	0.41	0.26	1.00				
S&P	-0.38	-0.31	-0.40	-0.37	-0.38	-0.38	-0.30	1.00			
Barclay CTA	0.68	0.54	0.85	0.87	0.82	0.72	0.40	-0.34	1.00		
MLM	0.59	0.57	0.42	0.34	0.49	0.45	0.26	-0.31	0.44	1.00	
CISDM	0.75	0.59	0.80	0.80	0.93	0.83	0.38	-0.42	0.93	0.49	1.00

Exhibit 13

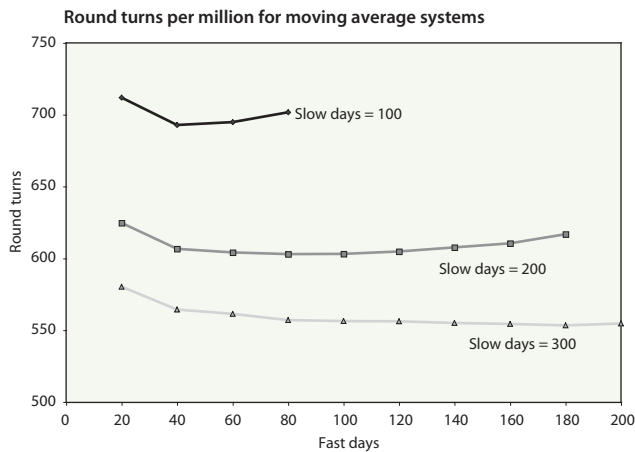
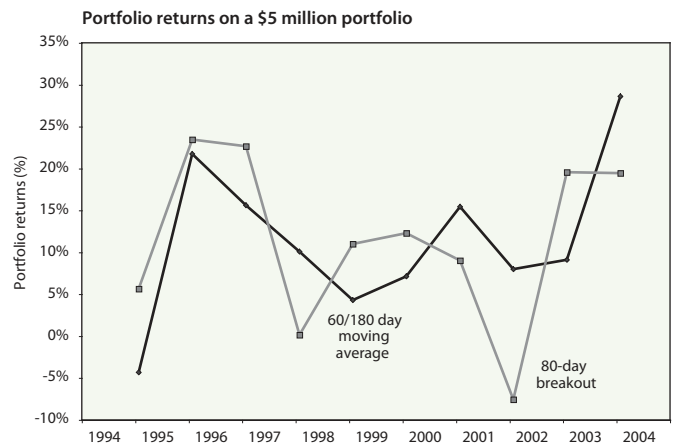
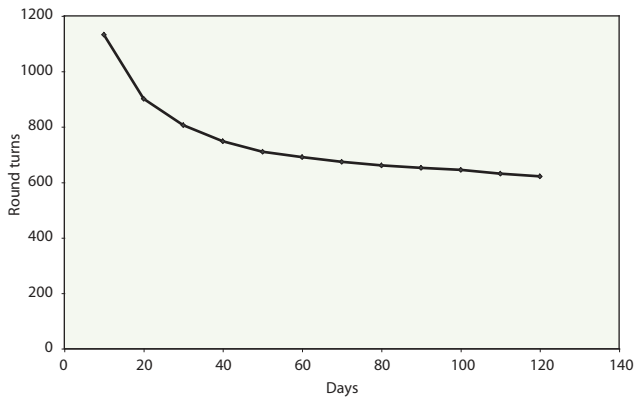


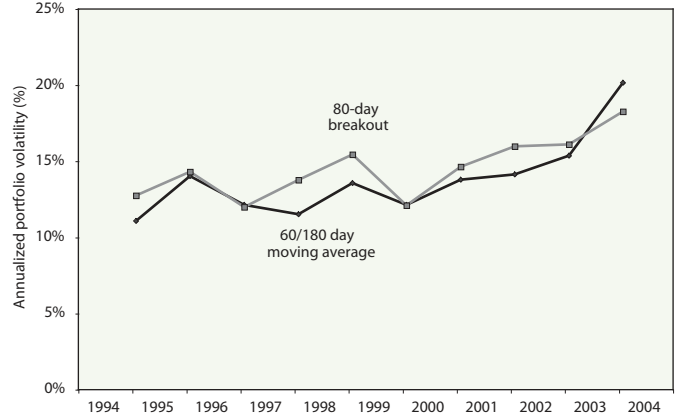
Exhibit 14



Round turns per million for breakout systems

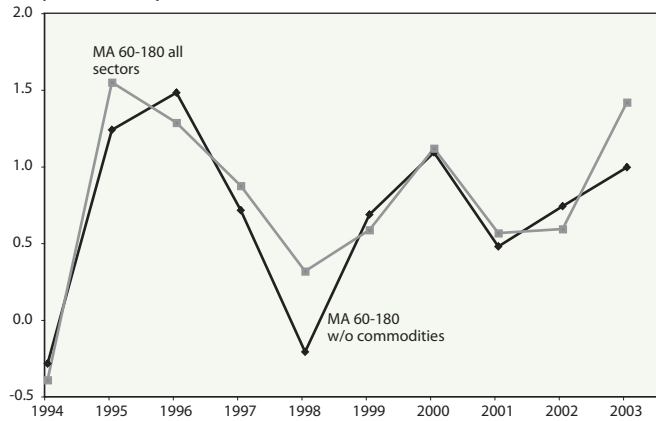


Portfolio risk by year



Another is the question of whether trend followers tend to give back profits after a period of large gains. This is a hotly debated question and has important implications for decisions about when to add money or take money away from any given manager.

Exhibit 15
Ratio of return to risk with and without commodities
(before fees)



Appendix A1

60/180 DAY MOVING AVERAGE MODEL								
Profit and Loss Summary	Fixed Horizons						Current Period	
End Date: 12/31/2003	Position	Contracts	Yesterday	Past Week	Past Month	PastYear	MTD	YTD
PORTFOLIO			\$20,723.35	\$330,084.49	\$533,143.24	\$1,566,890.42	\$406,017.08	\$1,477,883.39
Equity			\$6,797.73	\$44,941.79	\$105,220.54	\$169,287.32	\$103,278.79	\$149,297.37
S&P 500	+	1	\$725.00	\$4,325.00	\$14,250.00	\$45,425.00	\$13,525.00	\$35,725.00
CAC 40	+	7	\$3,042.60	\$5,841.18	\$10,456.44	\$22,237.75	\$11,039.45	\$27,537.21
DAX 30	+	2	\$0.00	\$5,104.54	\$14,253.60	\$31,224.73	\$14,670.04	\$28,066.18
NIKKEI 225	+	2	\$0.00	\$5,771.50	\$11,036.47	(\$16,077.40)	\$10,154.42	(\$11,732.67)
AUSSIE SPX	+	9	\$507.53	\$7,886.43	\$24,633.79	\$21,760.65	\$23,983.63	\$15,513.75
FTSE 250	+	4	\$1,037.16	\$4,271.36	\$6,885.72	\$10,809.64	\$7,742.77	\$8,400.72
SWEDISH OMX	+	25	\$0.00	\$2,045.26	\$2,086.95	(\$16,757.06)	\$3,076.26	(\$13,583.46)
NASDAQ 100	+	1	(\$350.00)	\$3,900.00	\$5,100.00	\$34,200.00	\$4,300.00	\$27,250.00
DJ EURO STOXX	+	6	\$0.00	\$2,328.89	\$8,412.88	\$5,333.87	\$8,555.66	\$7,118.59
HANG SENG	+	3	\$1,835.44	\$3,467.62	\$8,104.70	\$31,130.14	\$6,231.56	\$25,002.05
Interest Rates			(\$8,964.38)	\$15,893.31	(\$121,543.45)	(\$183,540.13)	(\$134,506.80)	(\$162,439.92)
US 30 YEAR	-	6	(\$750.00)	\$11,062.50	(\$37.50)	(\$30,562.50)	(\$7,162.50)	(\$30,000.00)
US 10 YEAR	-	9	(\$1,406.25)	\$7,593.75	(\$2,306.25)	(\$5,343.75)	(\$9,618.75)	(\$15,046.88)
GERMAN BUND	-	9	\$0.00	\$1,930.52	(\$20,003.91)	\$6,006.46	(\$21,503.08)	\$13,312.24
GERMAN BOBL	-	14	\$0.00	\$1,409.19	(\$24,627.33)	\$193.72	(\$27,625.69)	\$4,484.69
AUSSIE 10 YEAR	-	9	\$149.52	(\$299.20)	(\$3,650.94)	(\$6,826.28)	(\$3,406.07)	(\$8,095.27)
UK 10 YEAR GILT	-	5	(\$2,414.07)	(\$1,214.62)	(\$28,581.65)	(\$10,143.01)	(\$22,239.48)	(\$8,687.05)
JAPAN 10 YEAR	-	1	\$0.00	\$4,389.06	\$894.21	(\$35,076.74)	(\$92.70)	(\$29,580.37)
JAPAN 3 MONTH	+	71	\$0.00	\$3.39	(\$6,279.04)	(\$47,162.25)	(\$6,279.04)	(\$41,058.93)
US 3 MONTH	-	12	\$0.00	(\$150.00)	(\$1,950.00)	(\$9,705.00)	(\$2,325.00)	(\$9,555.00)
EUROPE 3 MONTH	-	49	(\$2,308.33)	(\$7,693.59)	(\$23,866.88)	(\$74.04)	(\$23,138.11)	\$5,319.08
UK SHORT STERLING	-	50	(\$2,235.25)	(\$1,119.00)	(\$7,123.75)	(\$26,680.78)	(\$7,123.75)	(\$25,218.72)
AUSSIE 3 MONTH	-	39	\$0.00	(\$18.69)	(\$4,010.42)	(\$18,165.96)	(\$3,992.63)	(\$18,313.72)
Foreign Exchange			\$2,800.00	\$119,302.50	\$251,516.25	\$962,623.73	\$180,405.00	\$870,046.25
JAPANESE YEN	+	7	(\$3,937.50)	(\$1,487.50)	\$13,562.50	\$32,725.00	\$11,987.50	\$55,562.50
EURO	+	8	\$1,500.00	\$17,300.00	\$72,900.00	\$274,600.00	\$57,300.00	\$232,000.00
SWISS FRANC	+	9	\$562.50	\$14,400.00	\$51,300.00	\$37,687.50	\$32,512.50	(\$9,675.00)
BRITISH POUND	+	11	\$3,850.00	\$17,325.00	\$56,443.75	\$192,981.25	\$45,925.00	\$156,818.75
AUSTRALIAN DOLLAR	+	13	\$4,030.00	\$26,520.00	\$44,850.00	\$279,369.98	\$38,090.00	\$275,210.00
CANADIAN DOLLAR	+	22	(\$1,980.00)	\$47,520.00	\$21,560.00	\$248,160.00	\$10,340.00	\$254,980.00
MEXICAN PESO	-	14	(\$1,225.00)	(\$2,275.00)	(\$9,100.00)	(\$102,900.00)	(\$15,750.00)	(\$94,850.00)
Commodity			\$20,090.00	\$149,946.90	\$297,949.90	\$618,519.50	\$256,840.10	\$620,979.70
CRUDE OIL	+	11	(\$2,970.00)	\$7,150.00	\$29,150.00	\$141,240.00	\$22,110.00	\$103,950.00
NATURAL GAS	-	4	\$16,440.00	\$8,720.00	(\$42,240.00)	(\$12,440.00)	(\$47,240.00)	\$26,280.00
SUGAR	-	31	(\$322.40)	\$88,213.60	\$128,141.60	\$139,400.80	\$129,877.60	\$139,723.20
HEATING OIL	+	9	(\$7,212.60)	\$6,130.80	\$30,745.80	\$131,146.20	\$25,560.00	\$105,624.00
COTTON	+	11	\$3,850.00	\$24,695.00	\$46,915.00	(\$81,620.00)	\$17,160.00	(\$90,915.00)
CORN	+	31	\$5,425.00	(\$6,587.50)	\$387.50	(\$74,012.50)	\$1,937.50	(\$62,387.50)
COFFEE	-	4	(\$1,950.00)	(\$1,275.00)	(\$7,825.00)	(\$1,225.00)	(\$7,450.00)	\$450.00
SOYBEANS	+	14	\$8,050.00	\$2,100.00	\$175.00	\$128,450.00	\$22,925.00	\$188,475.00
GOLD	+	22	(\$2,420.00)	\$8,800.00	\$51,700.00	\$158,180.00	\$39,160.00	\$133,980.00
COPPER	+	16	\$1,200.00	\$12,000.00	\$60,800.00	\$89,400.00	\$52,800.00	\$75,800.00

Appendix A2

Volatility Summary		Fixed Horizons					Current Period	
End Date: 12/31/2003	Position	Contracts	Yesterday	Past Week	Past Month	PastYear	MTD	YTD
PORTFOLIO			\$20,723.35	\$33,406.06	\$50,598.75	\$62,051.59	\$41,944.33	\$61,130.60
<i>Equity</i>			\$6,797.73	\$6,803.15	\$12,145.45	\$17,437.86	\$11,657.31	\$17,135.51
S&P 500	+	1	\$725.00	\$1,537.00	\$1,562.62	\$2,417.34	\$1,529.25	\$2,364.05
CAC 40	+	7	\$3,042.60	\$1,074.95	\$1,918.56	\$3,673.58	\$1,903.94	\$3,641.34
DAX 30	+	2	\$0.00	\$2,091.66	\$2,272.54	\$3,306.08	\$2,255.97	\$3,224.77
NIKKEI 225	+	2	\$0.00	\$2,550.52	\$2,963.55	\$2,615.52	\$2,784.81	\$2,586.50
AUSSIE SPX	+	9	\$507.53	\$2,225.47	\$2,637.76	\$3,105.27	\$2,635.67	\$3,044.30
FTSE 250	+	4	\$1,037.16	\$205.88	\$1,739.50	\$3,051.31	\$1,719.75	\$2,971.35
SWEDISH OMX	+	25	\$0.00	\$2,913.08	\$1,779.12	\$2,313.13	\$1,760.37	\$2,317.62
NASDAQ 100	+	1	\$350.00	\$1,093.50	\$1,604.42	\$1,869.17	\$1,566.69	\$1,846.08
DJ EURO STOXX	+	6	\$0.00	\$1,693.68	\$1,524.40	\$2,931.14	\$1,518.12	\$2,855.13
HANG SENG	+	3	\$1,835.44	\$1,300.17	\$2,486.24	\$2,373.31	\$2,463.42	\$2,410.31
<i>Interest Rates</i>			\$8,964.38	\$10,616.08	\$16,562.23	\$23,595.71	\$15,646.72	\$23,245.23
US 30 YEAR	-	6	\$750.00	\$4,703.22	\$4,448.37	\$5,008.56	\$4,347.87	\$5,029.87
US 10 YEAR	-	9	\$1,406.25	\$5,442.21	\$4,477.50	\$4,806.65	\$4,332.39	\$4,841.46
GERMAN BUND	-	9	\$0.00	\$1,901.02	\$3,085.26	\$4,561.43	\$3,027.22	\$4,546.97
GERMAN BOBL	-	14	\$0.00	\$1,291.17	\$3,289.70	\$4,769.38	\$3,133.33	\$4,754.01
AUSSIE 10 YEAR	-	9	\$149.52	\$441.09	\$445.42	\$487.80	\$445.07	\$483.26
UK 10 YEAR GILT	-	5	\$2,414.07	\$2,109.26	\$3,178.92	\$3,450.23	\$2,972.68	\$3,451.26
JAPAN 10 YEAR	-	1	\$0.00	\$1,951.37	\$3,637.30	\$3,352.62	\$3,533.09	\$3,510.72
JAPAN 3 MONTH	+	71	\$0.00	\$827.43	\$2,010.94	\$1,400.12	\$1,896.07	\$1,300.48
US 3 MONTH	-	12	\$0.00	\$164.32	\$273.51	\$585.77	\$268.19	\$582.45
EUROPE 3 MONTH	-	49	\$2,308.33	\$2,030.04	\$1,617.72	\$2,847.20	\$1,615.76	\$2,804.45
UK SHORT STERLING	-	50	\$2,235.25	\$1,831.07	\$1,721.17	\$2,809.21	\$1,719.65	\$2,784.23
AUSSIE 3 MONTH	-	39	\$0.00	\$23.89	\$814.78	\$547.02	\$813.95	\$540.81
<i>Foreign Exchange</i>			\$2,800.00	\$21,063.53	\$22,931.32	\$26,933.15	\$19,990.31	\$26,935.49
JAPANESE YEN	+	7	\$3,937.50	\$2,198.50	\$2,980.32	\$4,081.87	\$2,882.91	\$3,972.34
EURO	+	8	\$1,500.00	\$3,342.60	\$4,401.01	\$6,946.92	\$3,765.09	\$7,028.88
SWISS FRANC	+	9	\$562.50	\$3,858.44	\$4,591.77	\$5,796.39	\$3,749.70	\$5,852.60
BRITISH POUND	+	11	\$3,850.00	\$3,053.23	\$3,989.16	\$5,488.53	\$3,823.71	\$5,524.91
AUSTRALIAN DOLLAR	+	13	\$4,030.00	\$2,724.42	\$4,246.42	\$5,436.64	\$4,105.24	\$5,382.30
CANADIAN DOLLAR	+	22	\$1,980.00	\$11,766.81	\$10,388.31	\$9,013.74	\$9,912.28	\$9,011.95
MEXICAN PESO	-	14	\$1,225.00	\$638.21	\$2,767.81	\$4,321.01	\$2,719.24	\$4,304.86
<i>Commodity</i>			\$20,090.00	\$13,870.45	\$24,690.89	\$26,134.25	\$20,761.19	\$25,328.22
CRUDE OIL	+	11	\$2,970.00	\$5,991.21	\$6,992.66	\$8,029.81	\$6,875.16	\$7,912.72
NATURAL GAS	-	4	\$16,440.00	\$13,012.04	\$14,247.66	\$10,363.80	\$14,163.58	\$10,451.33
SUGAR	-	31	\$322.40	\$13,238.53	\$10,918.96	\$5,813.26	\$10,787.59	\$5,785.48
HEATING OIL	+	9	\$7,212.60	\$7,438.97	\$8,431.41	\$8,880.60	\$8,388.85	\$8,814.97
COTTON	+	11	\$3,850.00	\$6,388.58	\$8,137.17	\$6,078.34	\$5,305.64	\$6,057.02
CORN	+	31	\$5,425.00	\$7,268.08	\$4,186.29	\$4,701.24	\$4,181.56	\$4,714.66
COFFEE	-	4	\$1,950.00	\$1,197.18	\$1,952.80	\$1,838.19	\$1,952.72	\$1,861.09
SOYBEANS	+	14	\$8,050.00	\$9,483.64	\$7,201.57	\$6,205.05	\$8,460.68	\$6,374.16
GOLD	+	22	\$2,420.00	\$2,630.82	\$5,282.35	\$8,392.94	\$4,766.89	\$8,345.96
COPPER	+	16	\$1,200.00	\$2,267.16	\$5,386.27	\$4,218.47	\$5,257.76	\$4,284.60

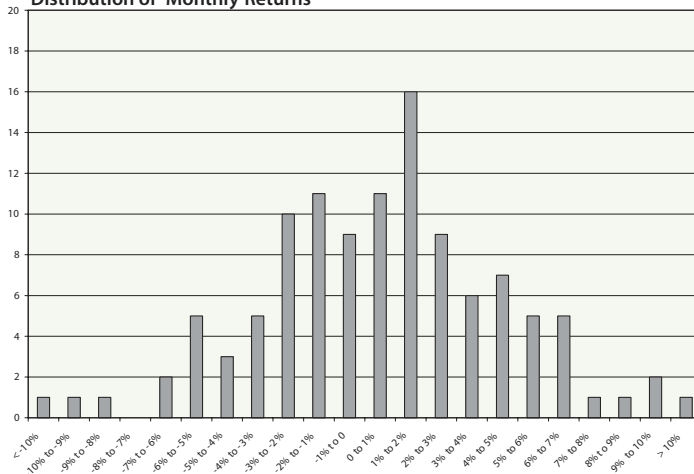
Appendix B



Alternative Investments Group

December 2003 - 60/180 DAY MOVING AVERAGE

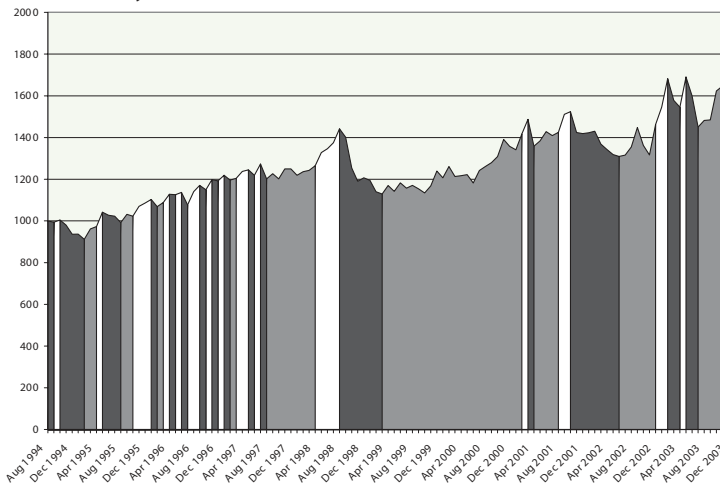
Distribution of Monthly Returns



SUMMARY STATS (9/1994 TO 12/2003)

	Arithmetic	Logarithmic
Rates of Return		
<i>Monthly</i>	0.58%	0.50%
<i>Annual</i>	6.98%	6.01%
Standard Deviations		
<i>Monthly</i>	4.00%	3.99%
<i>Annual</i>	13.87%	13.83%
Shape		
<i>Skewness</i>	-0.05	-0.18
<i>Kurtosis (Excess)</i>	0.32	0.40
Risk/Return		
<i>Return/Risk</i>	0.50	0.43
<i>Sortino Ratio (0%)</i>	0.80	0.66

NAV Analysis

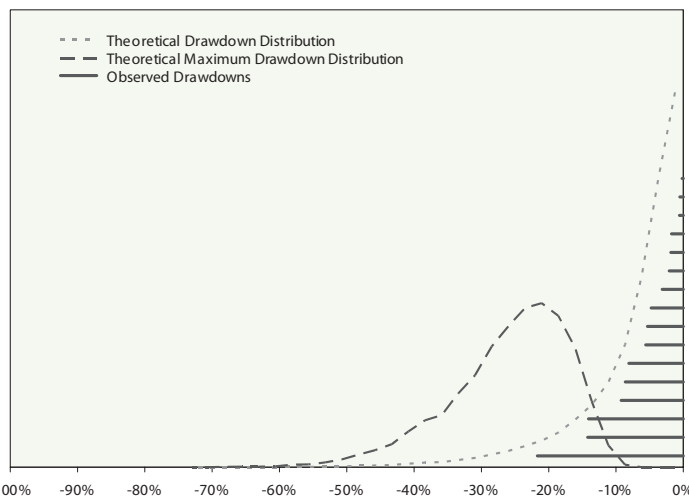


DRAWDOWN STATS

Period	Drawdown
Aug 1998 - Feb 2001	-21.68%
May 2003 - Nov 2003	-14.21%
Oct 2001 - Dec 2002	-14.09%
Oct 1994 - Apr 1995	-9.24%
Mar 2001 - Aug 2001	-8.62%
Feb 2003 - Apr 2003	-8.09%
Jul 1997 - Apr 1998	-5.59%
Jun 1996 - Jul 1996	-5.33%

Assets Under Management: 5.0 Mil.

Drawdown Analysis



Trading Strategy

The 60/180 day moving average strategy calculates the 60-day and 180-day moving averages using the daily closing price of each market. If the 60-day average is greater than the 180-day average, a long position is taken the next day at the open. If the 60-day average is less than the 180-day average, a short position is taken the next day at the open. Once an initial position is taken, the strategy is always in the market. The 60/180 day moving average trades 618 round turns per million.

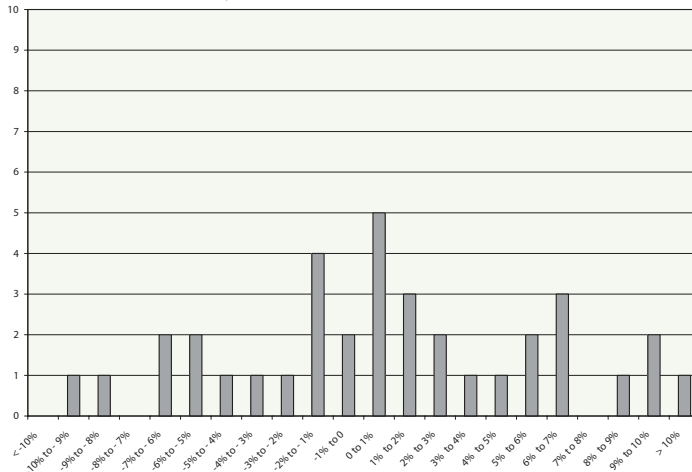
60/180 Day Moving Average INCEPTION ANALYSIS: September 1994 THROUGH December 2003



Alternative Investments Group

December 2003 - 60/180 DAY MOVING AVERAGE

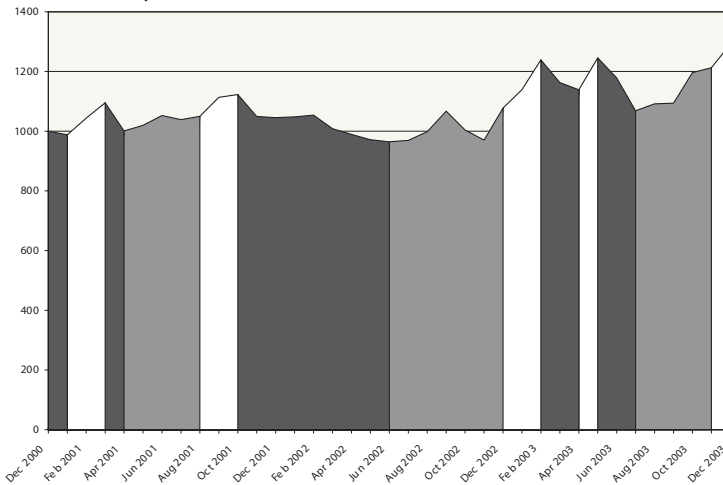
Distribution of Monthly Returns



SUMMARY STATS (1 / 2 0 0 1 TO 1 2 / 2 0 0 3)

	Arithmetic	Logarithmic
Rates of Return		
Monthly	0.84%	0.71%
Annual	10.13%	8.52%
Standard Deviations		
Monthly	5.20%	5.17%
Annual	18.03%	17.91%
Shape		
Skewness	0.04	-0.07
Kurtosis (Excess)	-0.27	-0.25
Risk/Return		
Return/Risk	0.56	0.48
Sortino Ratio (0%)	0.83	0.76

NAV Analysis



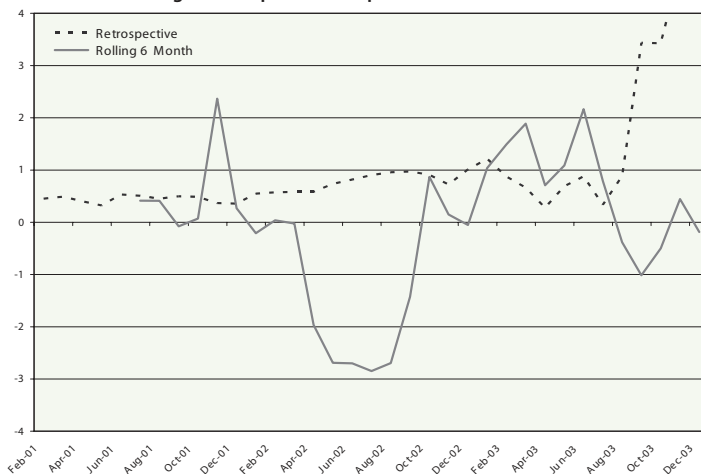
DRAWDOWN STATS

Period	Drawdown
May 2003 - Nov 2003	-14.21%
Oct 2001 - Dec 2002	-14.09%
Mar 2001 - Aug 2001	-8.62%
Feb 2003 - Apr 2003	-8.08%

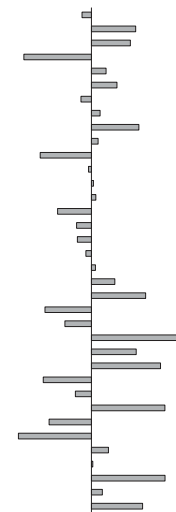
CONDITIONAL GAINS/LOS

	SES	Losses	Gains
Number		15	21
Mean		-3.93%	4.26%
Standard Deviation		2.91%	3.48%

Six Month Rolling & Retrospective Sharpe Ratios



Jan 2001	-1.20%
Feb 2001	5.63%
Mar 2001	4.95%
Apr 2001	-8.62%
May 2001	1.85%
Jun 2001	3.24%
Jul 2001	-1.33%
Aug 2001	1.10%
Sep 2001	6.04%
Oct 2001	0.85%
Nov 2001	-6.53%
Dec 2001	-0.38%
Jan 2002	0.25%
Feb 2002	0.55%
Mar 2002	-4.31%
Apr 2002	-1.90%
May 2002	-1.80%
Jun 2002	-0.71%
Jul 2002	0.50%
Aug 2002	2.97%
Sep 2002	6.91%
Oct 2002	-5.93%
Nov 2002	-3.38%
Dec 2002	11.09%
Jan 2003	5.70%
Feb 2003	8.80%
Mar 2003	-6.15%
Apr 2003	-2.06%
May 2003	9.36%
Jun 2003	-5.40%
Jul 2003	-9.31%
Aug 2003	2.17%
Sep 2003	0.16%
Oct 2003	9.37%
Nov 2003	1.39%
Dec 2003	6.51%



60/180 Day Moving Average THREE YEAR ANALYSIS: January 2001 THROUGH December 2003

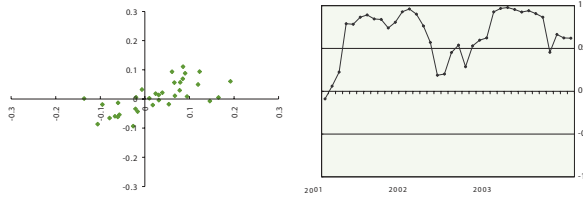


Alternative Investments Group

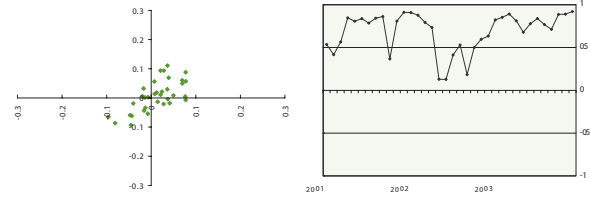
December 2003 - 60/180 DAY MOVING AVERAGE

Three Year Correlation Analysis : Monthly Return Scatter Plots and Six Month Rolling Correlations
(60/180 Day Moving Average returns on the vertical axis)

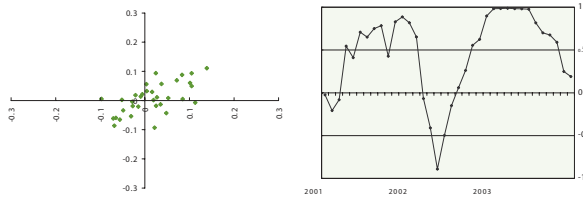
Graham Cap'l Mgmt. (K4) -- Corr: 0.67274 (t: 5.30)
Downside Corr: 0.59903



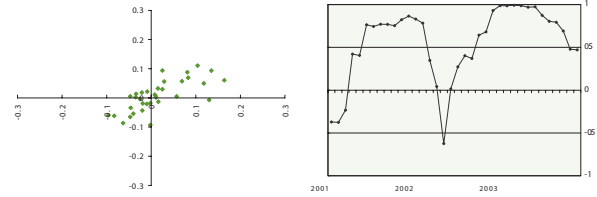
Campbell & Co. (F.M.E. (Large)) -- Corr: 0.68584 (t: 5.50)
Downside Corr: 0.75806



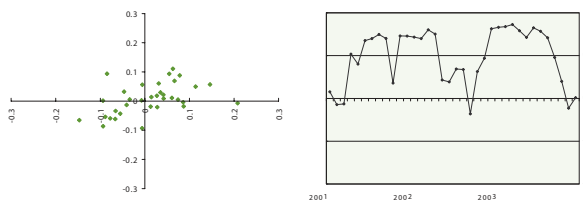
Aspect Capital (Div. Fund (USD)) -- Corr: 0.63188 (t: 4.75)
Downside Corr: 0.44744



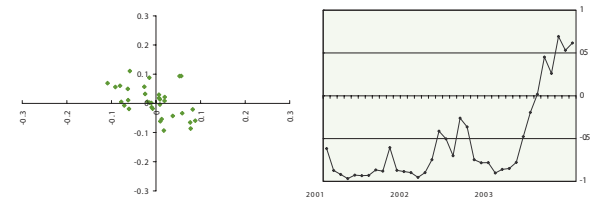
Man Investments (Man AHL Div. plc) -- Corr: 0.73504 (t: 6.32)
Downside Corr: 0.53116



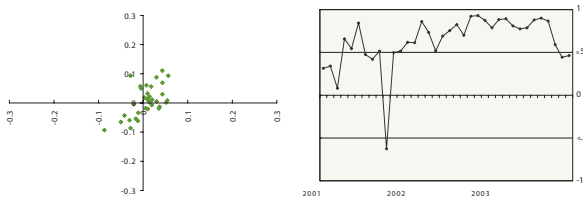
Henry, John W. & Co. (Strat. Alloc.) -- C corr: 0.48765 (t: 3.26)
Downside Corr: 0.64445



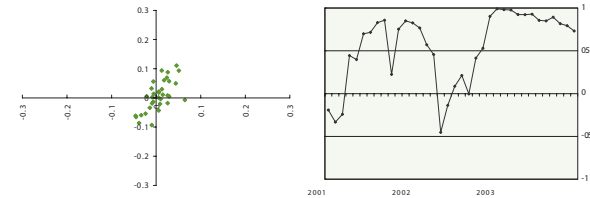
S&P 500 Total Return Index -- Corr: -0.41937 (t: - 2.69)
Downside Corr: -0.40297



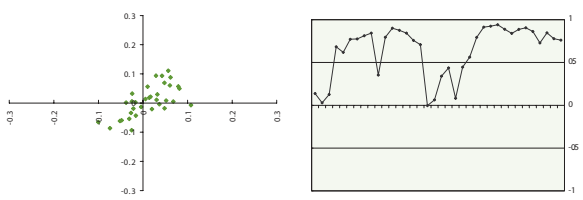
Lehman Brothers Treasury Bond Index -- Corr: 0.58072 (t: 4.16)
Downside Corr: 0.71701



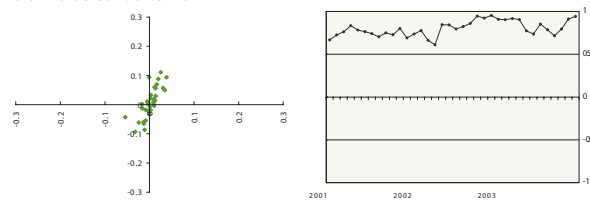
Barclay CTA Index -- Corr: 0.68773 (t: 5.52)
Downside Corr: 0.60123



CISDM Trend-Based Sub-Index -- Corr: 0.68380 (t: 5.46)
Downside Corr: 0.71681



MLM Index -- Corr: 0.77087 (t: 7.06)
Downside Corr: 0.37297



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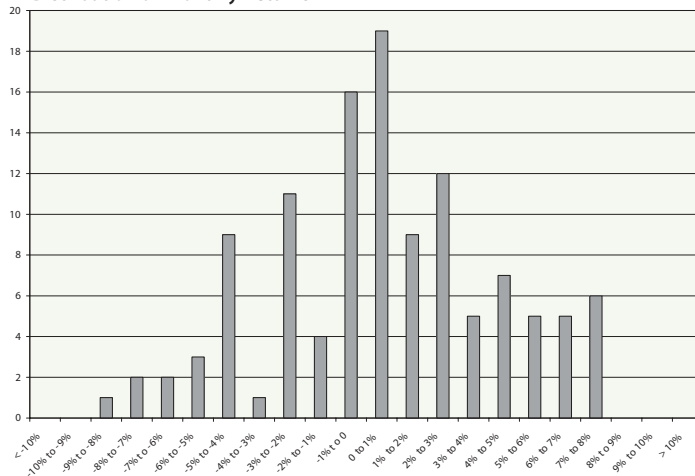
Appendix C



Alternative Investments Group

December 2003 - 80 DAY BREAKOUT

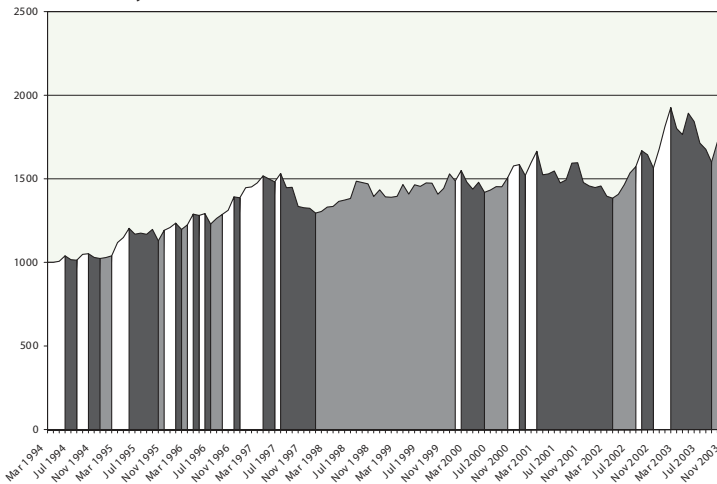
Distribution of Monthly Returns



SUMMARY STATS (4 / 1994 TO 12 / 2003)

	Arithmetic	Logarithmic
Rates of Return		
<i>Monthly</i>	0.58%	0.51%
<i>Annual</i>	6.96%	6.13%
Standard Deviations		
<i>Monthly</i>	3.71%	3.70%
<i>Annual</i>	12.85%	12.83%
Shape		
<i>Skewness</i>	-0.14	-0.23
<i>Kurtosis (Excess)</i>	-0.25	-0.19
Risk/Return		
<i>Return/Risk</i>	0.54	0.48
<i>Sortino Ratio (0%)</i>	0.85	0.73

NAV Analysis

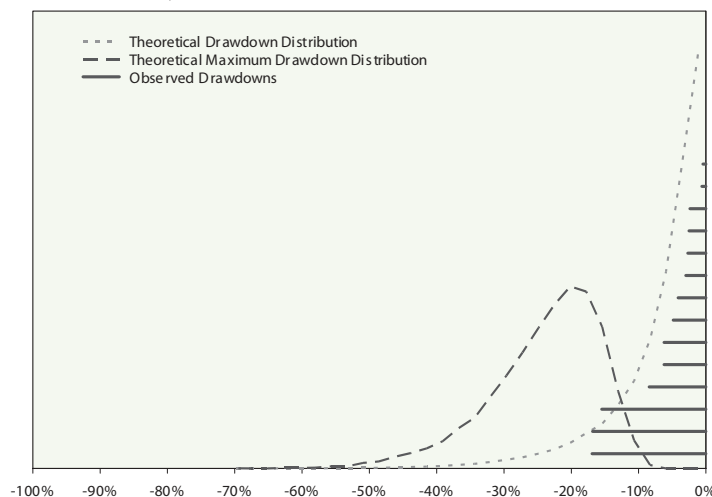


DRAWDOWN STATS

Period	Drawdown
Feb 2003 - May 2004	-16.92%
Mar 2001 - Aug 2002	-16.83%
Jul 1997 - Jan 2000	-15.48%
Feb 2000 - Oct 2000	-8.43%
May 1995 - Nov 1995	-6.22%
Sep 2002 - Nov 2002	-6.22%
Jun 1996 - Sep 1996	-4.85%
Dec 2000 - Jan 2001	-4.13%

Assets Under Management: 5.0 Mil.

Drawdown Analysis



Trading Strategy

The 80 Day Breakout strategy calculates an 80 day high/low using the market's high/low over the past 80 days. Each day the closing price is compared to the high/low values. If the close is greater than the 80 day high, a long position is taken the next day at the open. If the close is less than the 80 day low, a short position is taken the next day at the open. Once an initial position is taken, the strategy is always in the market. The 80 day breakout trades 660 round turns per million.

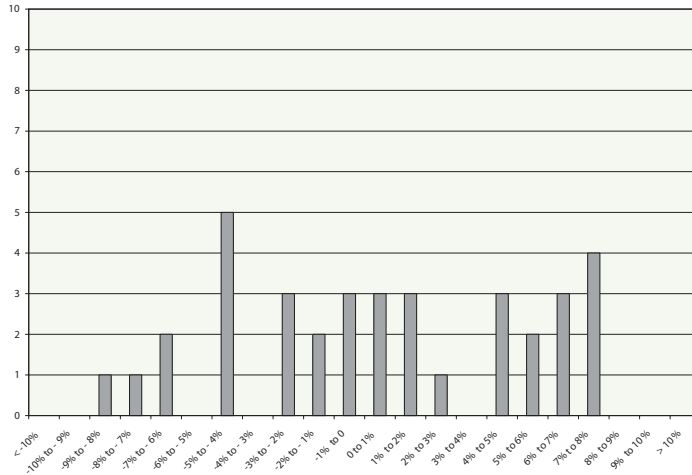
80 Day Breakout INCEPTION ANALYSIS: April 1994 THROUGH December 2003



Alternative Investments Group

December 2003 - 80 DAY BREAKOUT

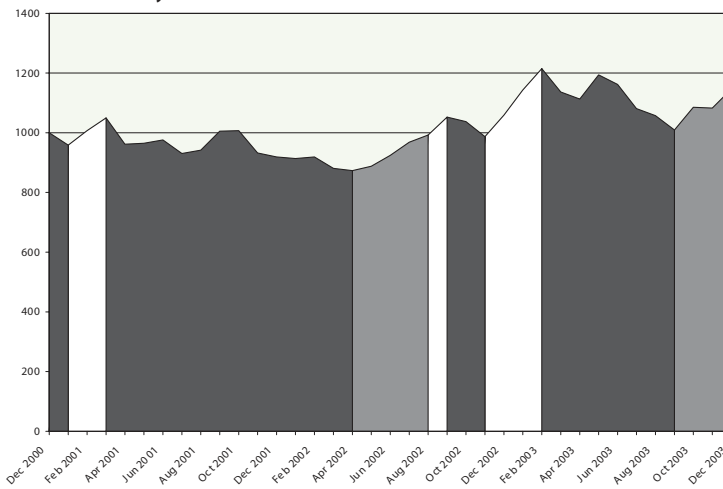
Distribution of Monthly Returns



SUMMARY STATS (1 / 2001 TO 12 / 2003)

	Arithmetic	Logarithmic
Rates of Return		
Monthly	0.49%	0.38%
Annual	5.90%	4.56%
Standard Deviations		
Monthly	4.80%	4.79%
Annual	16.63%	16.61%
Shape		
Skewness	-0.06	-0.13
Kurtosis (Excess)	-0.81	-0.76
Risk/Return		
Return/Risk	0.35	0.27
Sortino Ratio (0%)	0.56	0.42

NAV Analysis



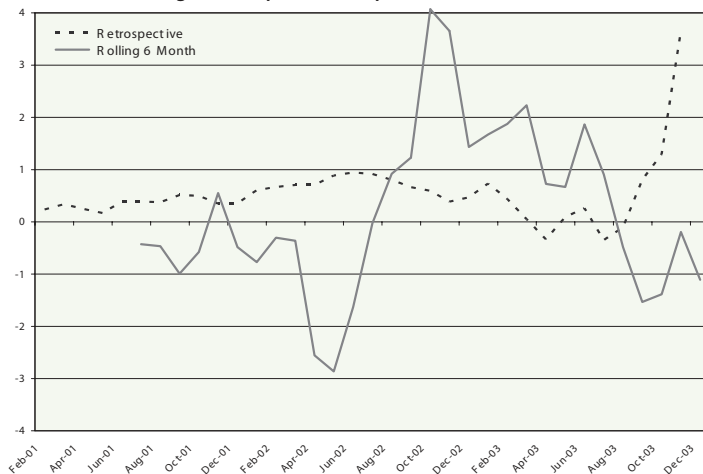
DRAWDOWN STATS

Period	Drawdown
Feb 2003 - May 2004	-16.91%
Mar 2001 - Aug 2002	-16.83%
Sep 2002 - Nov 2002	-6.22%

CONDITIONAL GAINS/LOSSES

	Losses	Gains
Number	17	19
Mean	-3.71%	4.25%
Standard Deviation	2.55%	2.72%

Six Month Rolling & Retrospective Sharpe Ratios



Jan 2001	-4.13%
Feb 2001	5.06%
Mar 2001	4.23%
Apr 2001	-8.41%
May 2001	0.35%
Jun 2001	1.16%
Jul 2001	-4.67%
Aug 2001	1.21%
Sep 2001	6.76%
Oct 2001	0.18%
Nov 2001	-7.44%
Dec 2001	-1.41%
Jan 2002	-0.62%
Feb 2002	0.63%
Mar 2002	-4.20%
Apr 2002	-0.85%
May 2002	1.66%
Jun 2002	4.12%
Jul 2002	4.78%
Aug 2002	2.49%
Sep 2002	6.03%
Oct 2002	-1.44%
Nov 2002	-4.85%
Dec 2002	7.35%
Jan 2003	7.91%
Feb 2003	6.26%
Mar 2003	-6.46%
Apr 2003	-2.05%
May 2003	7.27%
Jun 2003	-2.67%
Jul 2003	-6.99%
Aug 2003	-2.18%
Sep 2003	-4.53%
Oct 2003	7.51%
Nov 2003	-0.23%
Dec 2003	5.87%

80 Day Breakout THREE YEAR ANALYSIS: January 2001 THROUGH December 2003

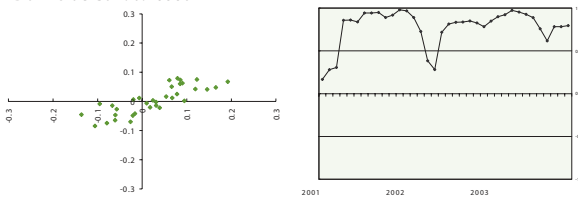


Alternative Investments Group

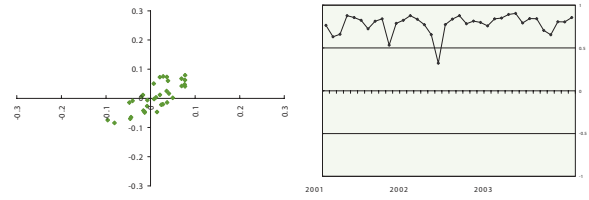
December 2003 - 80 DAY BREAKOUT

Three Year Correlation Analysis: Monthly Return Scatter Plots and Six Month Rolling Correlations
(80 Day Breakout returns on the vertical axis)

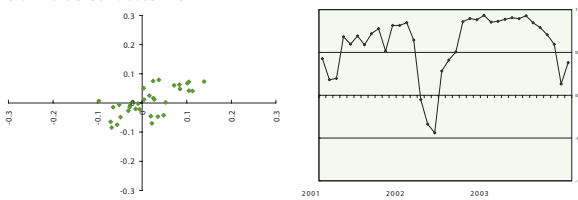
Graham Cap'l Mgmt. (K4) -- Corr: 0.80179 (t: 7.82)
Downside Corr: 0.46860



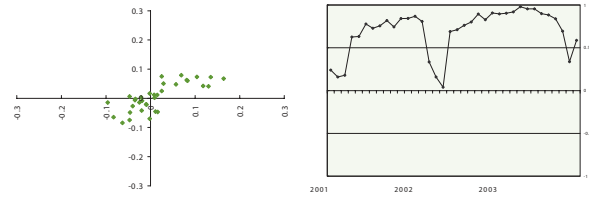
Campbell & Co. (F.M.E. (Large)) -- Corr: 0.77796 (t: 7.22)
Downside Corr: 0.62587



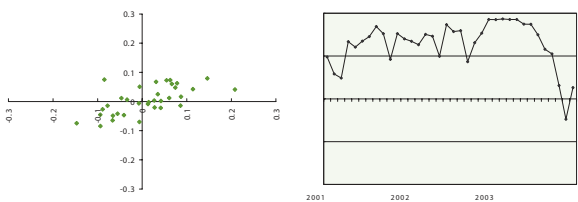
Aspect Capital (Div. Fund (USD)) -- Corr: 0.66704 (t: 5.22)
Downside Corr: 0.05426



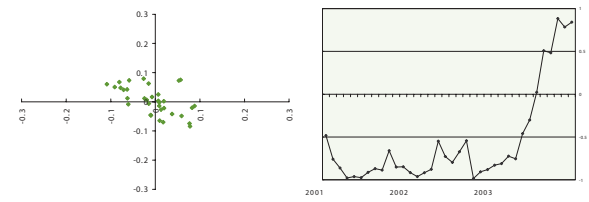
Man Investments (Man AHL Div. plc) -- Corr: 0.77491 (t: 7.15)
Downside Corr: 0.08962



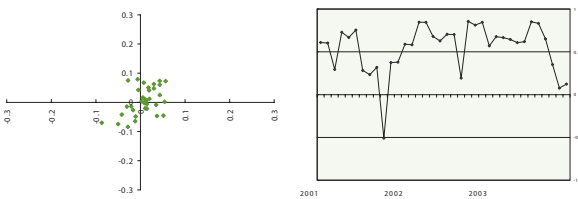
Henry, John W. & Co. (Strat. Alloc.) -- Corr: 0.64422 (t: 4.91)
Downside Corr: 0.61510



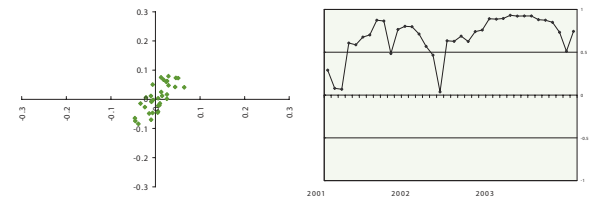
S&P 500 Total Return Index -- Corr: -0.50795 (t: -3.44)
Downside Corr: -0.28476



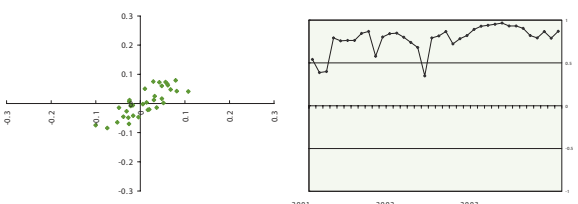
Lehman Brothers Treasury Bond Index -- Corr: 0.46910 (t: 3.10)
Downside Corr: 0.43077



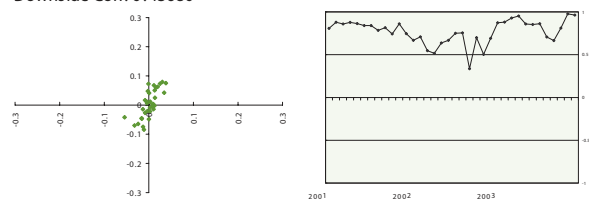
Barclay CTA Index -- Corr: 0.75240 (t: 6.66)
Downside Corr: 0.42585



CISDM Trend-Based Sub- Index -- Corr: 0.80677 (t: 7.96)
Downside Corr: 0.64282



MLM Index -- Corr: 0.74484 (t: 6.51)
Downside Corr: 0.43680



DISCLAIMER

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AlternativeEdge series

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- **Measuring market impact and liquidity**
- **Superstars versus teamwork**
- **What you should expect from trend following**
- **There are known unknowns**
- **Costs of active management**
- **Correlations and holding periods:**
The research basis for the AlternativeEdge Short-Term Traders Index

Please feel free to contact Galen Burghardt (312-762-1140, galen.burghardt@newedgegroup.com) or Ryan Duncan (312-762-1122, ryan.duncan@newedgegroup.com) with questions about the AlternativeEdge series of research notes.