IMPROVEMENTS IN THE NEWEDGE TREND INDICATOR

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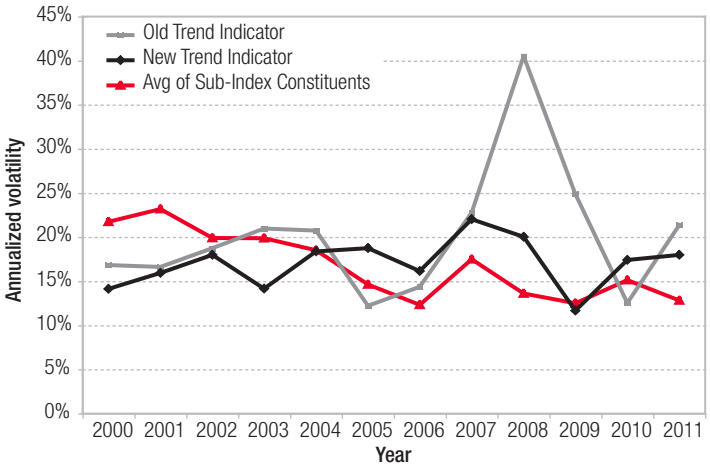
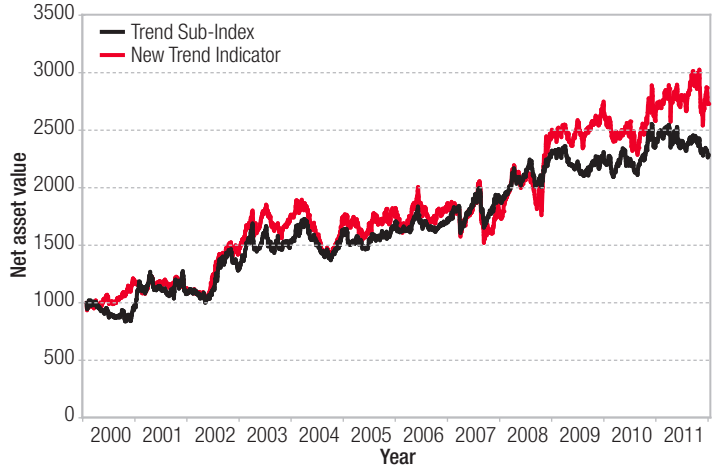
When we first began publishing the Newedge Trend Indicator (Trend Indicator), we recognized opportunities for improving both its return volatility and its correlation with the Newedge CTA Trend Sub-Index (Trend Sub-Index). In particular, our choice of 2-year look back and 1-year rebalancing period produced hugely volatile returns in 2008 and 2009, whereas the CTAs whose returns make up the Trend Sub-Index managed volatility extremely well during these crisis years. We also reported that early comments on our research suggested that we should weight commodities more heavily and equities less heavily then we did.

EXHIBIT 1

Annualized volatilities



Net asset value comparison (Newedge Trend Indicator & Newedge CTA Trend Sub-Index



Source: Societe Generale Corporate & Investment Banking

The purpose of this note is to report on what we believe are significant improvements in the Trend Indicator that will take effect as of the first business day of January 2012. These include:

- A shortening of both the look back periods for estimating volatilities and correlations as well as the time between rebalancings
- A change in sector risk allocations to 30% for currencies, 30% for interest rates, 25% for commodities (up from 10%), and 15% for equities (down from 30%)
- A switch to correlation estimates based on profit/loss series in place of price series for the purposes of constructing the overall portfolio
- Eliminating the signal buffer that we used to discourage spurious trading when the short-term moving average crossed the long-term moving average

Of the four changes, reducing the look back and rebalancing periods contributed the most to controlling volatility and improving correlations. The reallocation of sector weights did not affect correlations much but helps to align the construction of the indicator more closely with the risk allocation practices of the industry. The third change rectifies a theoretical flaw in the original work, and the fourth eliminates what proved to be unnecessary caution and, as it turned out, unnecessary drag on the performance of the index.

While we provide a more detailed evaluation of the effects of these revisions on the behavior of the Trend Indicator, the upper panel of Exhibit 1 shows that the new Trend Indicator exhibits return volatilities that are more in line with the 15% target that we try to achieve. And the lower panel of Exhibit 1 shows that the new Trend Indicator tracks the Trend Sub-Index very well throughout the entire period.

LOOKBACK PERIODS AND REBALANCING FREQUENCIES

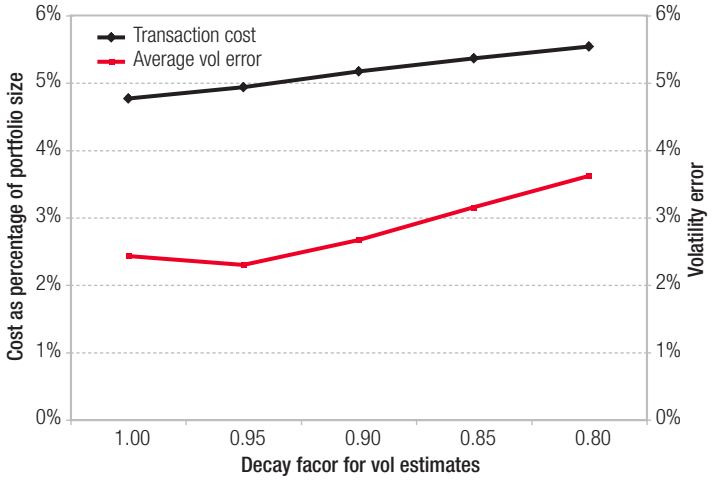
Even when we published the original research, we knew we had a problem with the volatility look back period and with the rebalancing frequency. Our choice of a 2-year look back period that ended on the last day of August, combined with a 1-year rebalancing that would take effect on the first day of October, meant that our portfolio contained positions that were far too large in light of the volatility that we experienced at the end of 2008 and through much of 2009. The result was an annualized return volatility of more than 40% for 2008 and nearly 25% for 2009. If one considers that most of the volatility in 2008 came in the fourth quarter, the Trend Indicator's return volatilities for these three months were over 70% annualized. In contrast, the average volatility for CTAs in the Trend Sub-Index was less than 15%, which speaks volumes about their ability to control return volatility in the face of great financial uncertainty.

To improve the Trend Indicator's volatility behavior, we have done two things. One is to shorten up the look back period. To estimate the volatilities we use to construct the portfolio, we use daily data and look back three months using an exponential decay factor of 0.97 per business day. This is an approach that one finds off the rack in *RiskMetrics*. It also seems to strike a reasonable balance between volatility errors – that is, the difference between the Trend Indicator's realized volatilities and the target value of 15% – and transactions costs. As shown in Exhibit 2, the transactions costs incurred by the model increase as one decreases the decay factor. Also, once one reduces the decay factor to values less than 0.95, the volatility errors rise as well. So a value of 0.97 seems like a reasonable compromise.

To estimate correlations, we use weekly data and look back one year using an exponential decay factor of 0.97 per week. While it is possible to get reliable volatility information from daily price changes, one must use longer periods when estimating correlations because futures markets close at different times of the day. We have settled on weekly data, which do a good job of eliminating the problem of non-synchronous prices. We use 52 weeks to provide us with a healthy sample size. The exponential decay scheme serves to place greater weight on more recent observations.

EXHIBIT 2

Effect of volatility decay factor



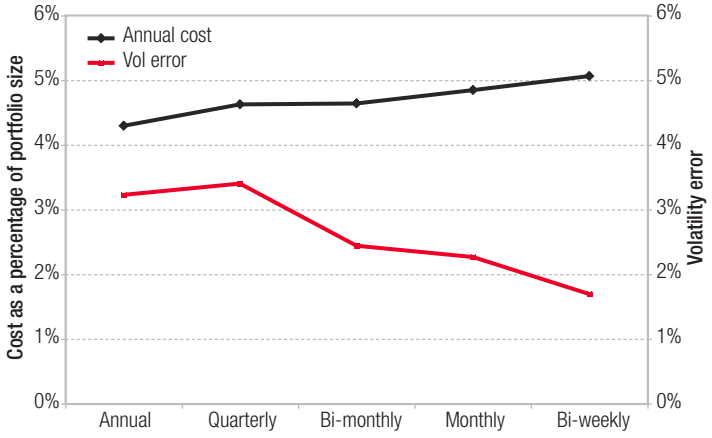
Source: Societe Generale Corporate & Investment Banking

The second is to shorten the rebalancing period to one month with new portfolios applied as of the end of the first business day of each calendar month. In practice, this means that we are using closing prices through the end of each month to estimate volatilities and correlations and rescaling the portfolio using closing prices as of the end of the first business day of the next month. As a result, the Trend Indicator's returns for each month reflect the previous month's positions for one business day and the new positions for the remaining business days.

Our decision to rebalance monthly is somewhat arbitrary, but is intended to strike a balance between reducing our volatility errors and increasing transactions costs. As shown in Exhibit 3, transactions costs as a percent of portfolio value increase steadily as one increases the rebalancing frequency. But in our work, we find a relatively large drop in volatility error when we go from rebalancing every three months to every two months. There is a further, and smaller, drop in volatility error when we go to monthly rebalancing. And, while it appears that we could reduce the volatility error even more by going to bi-weekly rebalancing, we stopped at monthly because it accords with the common practice of monthly liquidity for funds based on month-end values.

EXHIBIT 3

Transaction costs and volatility errors for different rebalancing frequencies



Source: Societe Generale Corporate & Investment Banking

As shown in Exhibit 1, the new look back periods combined with monthly rebalancing produced return volatilities that are much more in line with our target volatility of 15%. The fact that this approach produced return volatilities that were actually greater than 15% most of the time presents us with a research challenge that we may tackle in the next round of work. Within the operating guidelines we have adopted for calculating the Trend Indicator's returns – fixed risk allocations to various sectors and always in with no stops – it is impossible for us to avoid unexpectedly sharp spikes in volatility. Also, distributions of return volatilities are not symmetrical, but are skewed to the high side. For now, though, we think the new estimation and rebalancing approach promise to produce reasonable results.

SECTOR WEIGHTS

In our original work, we allocated risk across four broad sectors – equities, interest rates, currencies, and commodities – allocating 30% to each of the financial sectors and 10% to commodities. Our reasoning was that commodities were less deep and liquid than the financial sectors and that a smaller allocation would make sense for a $2 billion portfolio with a target return volatility of 15%.

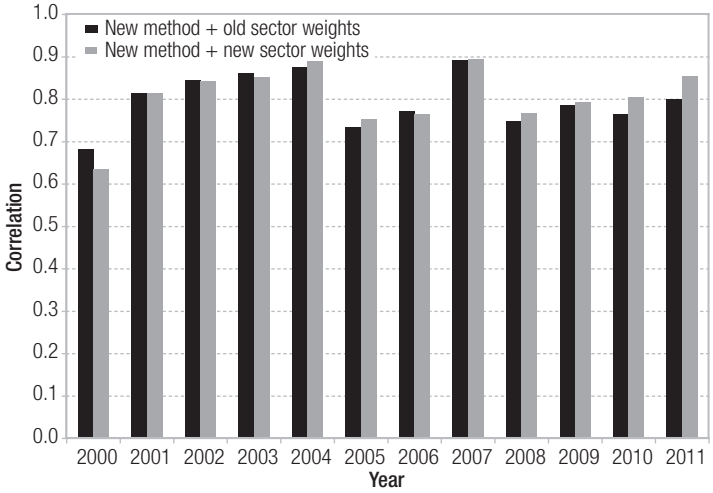
The conversations with managers and investors that followed the publication of *Two benchmarks for momentum trading* suggested that our allocation to commodities was lower than what one found in the industry, and that our allocation to equities was higher. Our interest rate and currency allocations prompted no special comments or criticisms.

For the new version of the Trend Indicator, we have chosen to increase the risk allocation for commodities from 10% to 25% and to decrease the risk allocation for equities from 30% to 15%. We have left the risk allocations for interest rates and currencies unchanged at 30%.

To shed some practical light on the importance of risk allocations, we compare the correlations of the Trend Indicator's returns with those of the Trend Sub-Index using both the original (old) and new sector weights with the new look back and rebalancing procedures. As shown in Exhibit 4, the correlations are higher, if only slightly, from 2007 through 2011. Before 2007, the results are mixed, with the correlation higher in some cases and lower in others. And in no case, was the difference very large.

EXHIBIT 4

Correlation to Newedge CTA Trend Sub-Index
(new v. old sector weights)

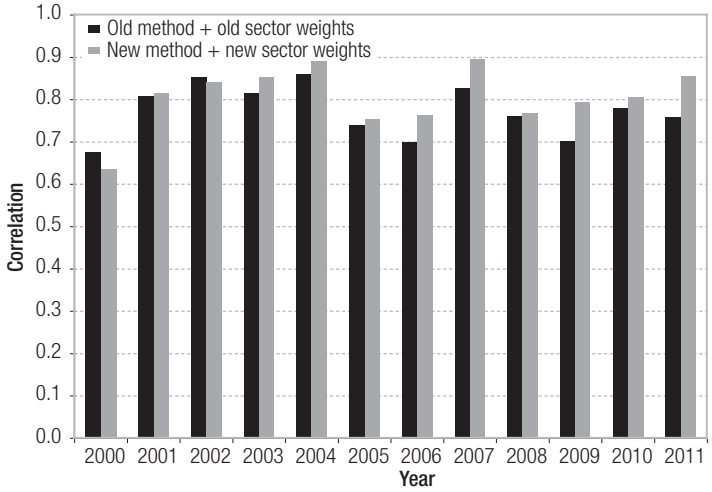


Source: Societe Generale Corporate & Investment Banking

Overall, as shown in Exhibit 5, we find that the new Trend Indicator's returns are more highly correlated with those of the Trend Sub-Index for most of the years since the inception of both indexes in 2000. Also, as shown in Exhibit 6, our correlation cluster analysis for 2011 through the end of November, shows that the new Trend Indicator appears in the large cluster with the nine CTAs whose returns make up the Trend Sub-Index.

EXHIBIT 5

Correlation to Newedge CTA Trend Sub-Index
(new v. old methodology)



Source: Societe Generale Corporate & Investment Banking

CORRELATIONS OF PROFITS AND LOSSES IN LIEU OF CORRELATIONS OF PRICES

We have chosen this version of the Trend Indicator to correct a theoretical problem, even though the correction has a comparatively small practical effect on return correlations.

The theoretical problem is simply this. When constructing the Trend Indicator's portfolios, our objective is to assign a target amount of risk to each of four broad sectors. To do this, we use estimates of both volatilities and correlations. Until now, however, we estimated correlations of changes in contract values converted to dollars, which would be correct for a long-only portfolio – that is, for a dollar based trader who is always and only long each of the contracts and who sweeps daily gains and losses back into dollars on a daily basis. Instead, we should have been using correlations of gains and losses for a trader who may be short some markets while long others depending on the signals generated by a moving average model.

The distinction is subtle and is illustrated in Exhibit 7. If price changes – and as a result, contract value changes – in two markets are positively correlated, the same moving average model applied to both series will tend to be long at the same time or short at the same time. On the other hand, if price changes in two markets are negatively correlated, the same moving average model applied to both series will tend to be long in one market and short in the other. This relationship is captured by this relationship

$$\rho_{L/S} = \frac{4}{\pi} \cdot \arctan\left(\sqrt{\frac{1+\rho}{1-\rho}}\right) - 1$$

in which ρ is the correlation of price changes and $\rho_{L/S}$ is the correlation of the trader's long and short (L/S) positions in the two markets.

EXHIBIT 6

Correlation cluster results of daily returns for the 2011 Newedge CTA Index constituents

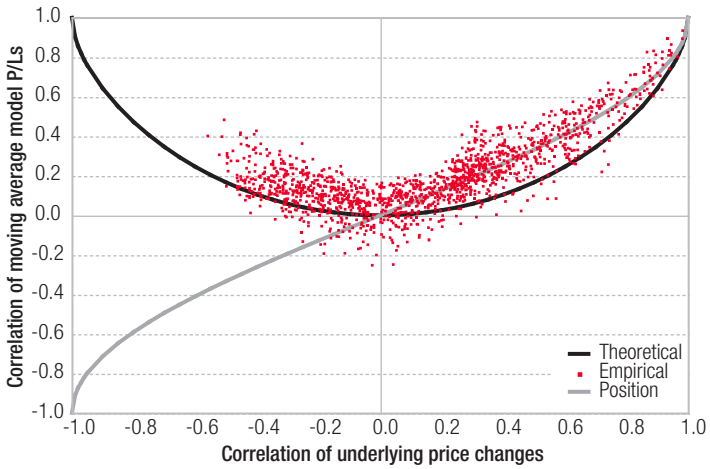
Designation		CTA	Correlation																			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
TF	1	Altis Partners (GFP Composite)	1.00	0.66	0.64	0.76	0.49	0.49	0.73	0.69	0.45	0.73	0.57	0.71	0.58	0.30	0.23	0.26	0.29	0.03	0.22	0.29	0.21
TF	2	Aspect Capital (Div. Fund)	0.66	1.00	0.85	0.87	0.59	0.62	0.79	0.82	0.67	0.75	0.76	0.90	0.80	0.48	0.27	0.41	0.30	0.16	0.28	0.30	0.32
TF	3	Brummer & Partners (Lynx)	0.64	0.85	1.00	0.82	0.62	0.61	0.80	0.77	0.61	0.68	0.74	0.85	0.80	0.51	0.34	0.36	0.26	0.30	0.29	0.32	0.45
TF	4	Campbell & Co. (FME - Large)	0.76	0.87	0.82	1.00	0.55	0.57	0.87	0.85	0.60	0.82	0.78	0.86	0.72	0.46	0.32	0.32	0.30	0.03	0.22	0.26	0.34
	5	FX Concepts (Global Currency)	0.49	0.59	0.62	0.55	1.00	0.90	0.60	0.62	0.57	0.56	0.54	0.54	0.48	0.26	0.24	0.18	0.43	0.09	0.19	0.32	0.29
	6	FX Concepts (Multi-Strategy)	0.49	0.62	0.61	0.57	0.90	1.00	0.64	0.66	0.60	0.61	0.58	0.57	0.52	0.33	0.33	0.17	0.42	0.07	0.12	0.30	0.28
TF	7	Graham Cap'l Mgmt. (K4)	0.73	0.79	0.80	0.87	0.60	0.64	1.00	0.88	0.53	0.85	0.81	0.84	0.69	0.48	0.42	0.30	0.35	-0.03	0.22	0.31	0.26
TF	8	Millburn Capital (Diversified)	0.69	0.82	0.77	0.85	0.62	0.66	0.88	1.00	0.59	0.84	0.76	0.90	0.71	0.39	0.37	0.30	0.39	-0.07	0.16	0.31	0.25
	9	Skandinaviska Enskilda (SEB Asset Sel)	0.45	0.67	0.61	0.60	0.57	0.60	0.53	0.59	1.00	0.45	0.52	0.60	0.64	0.37	0.25	0.20	0.26	0.22	0.26	0.28	0.23
TF	10	Transtrend (Enhanced Risk USD)	0.73	0.75	0.68	0.82	0.56	0.61	0.85	0.84	0.45	1.00	0.77	0.77	0.57	0.43	0.37	0.37	0.32	-0.10	0.23	0.35	0.25
TF	11	Tudor Tensor Fund Ltd	0.57	0.76	0.74	0.78	0.54	0.58	0.81	0.76	0.52	0.77	1.00	0.70	0.58	0.46	0.36	0.33	0.30	0.02	0.17	0.29	0.32
TF	12	Winton Capital Mgmt. (Diversified)	0.71	0.90	0.85	0.86	0.54	0.57	0.84	0.90	0.60	0.77	0.70	1.00	0.83	0.46	0.33	0.34	0.30	0.09	0.24	0.32	0.26
	13	Newedge Trend Indicator 2.0	0.58	0.80	0.80	0.72	0.48	0.52	0.69	0.71	0.64	0.57	0.58	0.83	1.00	0.52	0.34	0.27	0.11	0.36	0.30	0.29	0.25
	14	IKOS Futures Fund	0.30	0.48	0.51	0.46	0.26	0.33	0.48	0.39	0.37	0.43	0.46	0.46	0.52	1.00	0.79	0.26	0.18	0.25	0.25	0.08	0.26
	15	IKOS Partners (Currency)	0.23	0.27	0.34	0.32	0.24	0.33	0.42	0.37	0.25	0.37	0.36	0.33	0.34	0.79	1.00	0.07	0.40	0.10	0.11	0.06	0.20
	16	QIM (Global Fund)	0.26	0.41	0.36	0.32	0.18	0.17	0.30	0.30	0.20	0.37	0.33	0.34	0.27	0.26	0.07	1.00	0.04	0.12	0.20	0.14	0.14
	17	Ortus Capital Mgmt. (Currency)	0.29	0.30	0.26	0.30	0.43	0.42	0.35	0.39	0.26	0.32	0.30	0.30	0.11	0.18	0.40	0.04	1.00	-0.15	-0.05	0.02	0.13
	18	NuWave Inv. Mgmt. (Combined 2X)	0.03	0.16	0.30	0.03	0.09	0.07	-0.03	-0.07	0.22	-0.10	0.02	0.09	0.36	0.25	0.10	0.12	-0.15	1.00	0.18	-0.02	0.16
	19	Mapleridge Capital Corporation	0.22	0.28	0.29	0.22	0.19	0.12	0.22	0.16	0.26	0.23	0.17	0.24	0.30	0.25	0.11	0.20	-0.05	0.18	1.00	0.17	0.23
	20	Graham Capital (Discretionary 6V)	0.29	0.30	0.32	0.26	0.32	0.30	0.31	0.31	0.28	0.35	0.29	0.32	0.29	0.08	0.06	0.14	0.02	-0.02	0.17	1.00	0.17
	21	Boronia Capital (Diversified)	0.21	0.32	0.45	0.34	0.29	0.28	0.26	0.25	0.23	0.25	0.32	0.26	0.25	0.26	0.20	0.14	0.13	0.16	0.23	0.17	1.00

Source: Societe Generale Corporate & Investment Banking

This relationship is represented in Exhibit 7 by the gray curve that runs from the lower left corner to the upper right corner of the chart. Notice that if ρ is +1, the trader would always be long in both markets or short in both markets with no exceptions. In contrast, if ρ is -1, the trader would always be short in one market if long in the other, or long in one market if short in the other. If ρ is 0, then there would be no relationship between long and short positions.

EXHIBIT 7

Correlation transformation for a moving average model



Source: Societe Generale Corporate & Investment Banking

The effect of converting correlations of price changes into correlations of long and short positions is that negative correlations of price changes are converted into positive correlations of gains and losses in those markets for a trader who is moving the same moving average model in both markets. This conversion of negative to positive correlations is captured by this relationship

$$\rho_{P/L} \equiv \rho_{L/S} \cdot \rho$$

and is illustrated by the U-shaped curve in Exhibit 7.

As a practical matter, the effect is small because its influence is felt for negative price correlations that are relatively small. In Exhibit 7, we have overlaid the return correlations produced by a 20/120 moving average model for our 55 markets for the period 2005 through January 2011. Here we see that negative correlations for changes in contract values ranging from 0.0 to -0.6 resulted in p/l correlations for a moving average trader ranging from -0.2 to +0.4.

When we applied p/l correlations in lieu of price correlations when building the Trend Indicator's portfolios, we found that the effect on return volatilities was mixed – sometimes increasing return volatility and, less often, reducing return volatility.

In the face of these mixed results, we must admit that we have made this change because we think it is the right thing to do. We are building a portfolio of trading models, even if it is the same moving average model applied to 55 different markets, rather than a long-only portfolio. Thus, we have built this version of the Trend Indicator around portfolios based on p/l correlations.

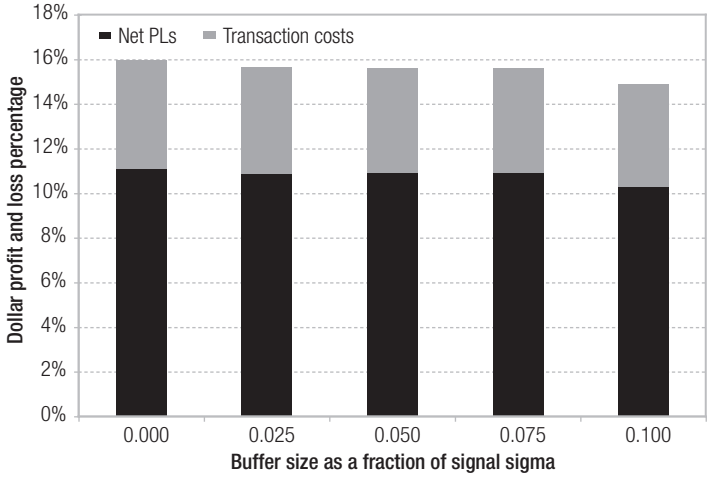
BUFFERING THE SIGNALS FROM A TREND FOLLOWING MODEL

The final change that we have made in this round of research is the elimination of the signal buffer that we have used when applying moving average models. Our intention in using a buffer was to eliminate spurious trading that might be caused by random price fluctuations when the short-term moving average has just crossed the long-term moving average in one direction or the other. In practice, we calculated a running standard deviation of the signal – that is, the fast average less the slow average – and required the signal to be more than +0.1 of this standard deviation greater than zero before the model would change direction from short to long, or more than -0.1 standard deviation less than zero before the model would change direction from long to short.

What we have learned is that this buffer, while it occasionally improved the model's performance, was more often than not a drag on the performance of the model. Exhibit 8 shows how the Trend Indicator would have performed over the period 2000 through November 2011 using buffers ranging on the high end of 0.1 standard deviations to a low end of zero. Overall, the gross return of the Trend Indicator increased from around 15% to 16%. The net return increased by about 0.85%, which suggests that removal of the buffer allowed the model to participate in trades that were profitable enough to more than offset the increase in trading costs.

EXHIBIT 8

Trading P/Ls and costs for different model buffer sizes
(2000 - 2011)



Source: Societe Generale Corporate & Investment Banking

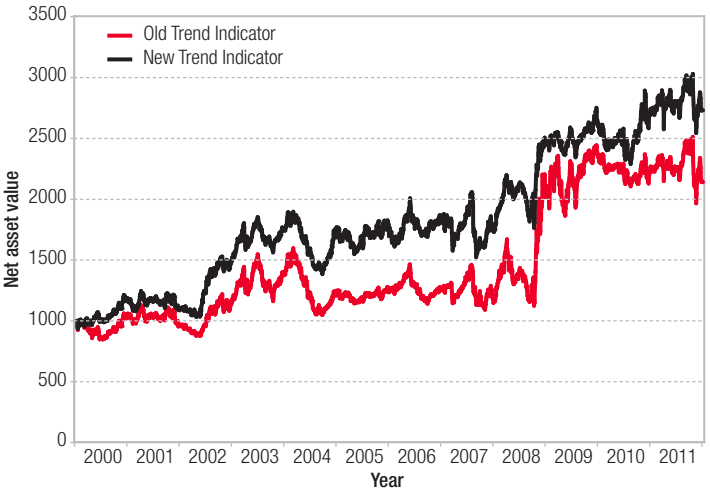
NEXT STEPS

The improvements will be implemented live as of the close of business of the first business day of 2012 given closing prices through the last business day of 2011. In addition, we will publish a reconstructed history of the Trend Indicator beginning with January 2000. We believe that the newly minted Trend Indicator will provide a better research tool when looking back and a better indicator when looking forward.

As shown in Exhibit 9, the new version of the Trend Indicator avoids the huge jump in net asset value that occurred in 2008 because of luck combined with unusually high volatility. The new version still shows a sharp increase in late 2008, but nothing quite as dramatic as we experienced with the original version. We also see in Exhibit 10 that the new Trend Indicator tracks the value of the Trend Sub-Index more closely and smoothly.

EXHIBIT 9

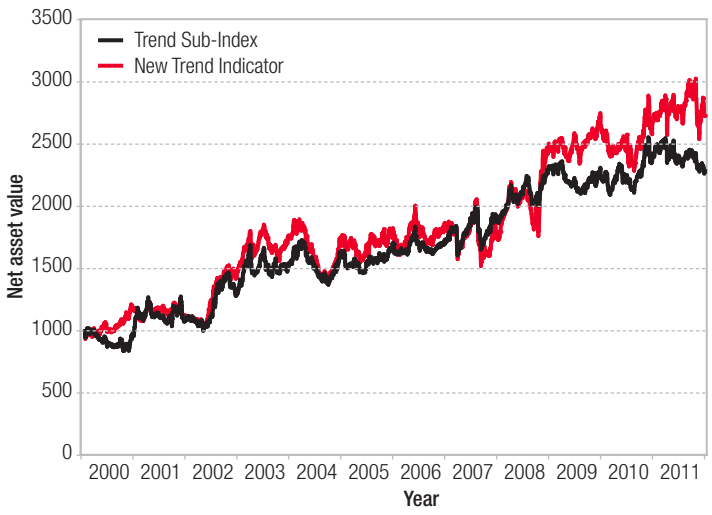
Net asset value comparison for the old and new Trend Indicator



Source: Societe Generale Corporate & Investment Banking

EXHIBIT 10

Net asset value comparison
(Newedge Trend Indicator & Newedge CTA Trend Sub-Index)



Source: Societe Generale Corporate & Investment Banking

This leaves us with two open-ended topics for further research that were mentioned in *Two benchmarks for momentum trading*. These are

- Choice of parameters
- Blending of two or more models and/or parameter sets

As before, our guiding principles in this ongoing work to improve the Trend Indicator's performance will be sense and simplicity. We will depart from the basic assumptions used in our research only with the greatest reluctance. Instead, we will focus on innovations that promise substantial improvements in correlation without violating the spirit of this benchmark.

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