How to use Hamzei Analytics' CI and DCI Indicators
By Fari Hamzei

A key element of your success in trading is early detection of the trend – *before the next big move occurs.* Seeing the next trend in prices, however, is easier said than done. Often the trend is embedded in "noisy" prices – irregular up and down price fluctuations that, at times, mask the overall trend. Thus, to improve their chances of success, traders need to systematically smooth out these price swings to get rid of the noise.

Trend Detection
One way to approach this is with moving averages, which are helpful in detecting the embedded trend. The noisier the prices, the more averaging is needed. The longer the averaging process, the further trend detection shifts further to the right. Thus, a rally could be near its peak by the time the moving average detects it! Therefore, what's needed is a way to reduce the time lag in order to produce consistent trading profits. Indeed, zero-lag trend indicators are much sought-after by astute traders.

Momentum

A liquid tradable asset has a continuous price curve. The magnitude of the price changes over a fixed look-back period, or its slope, is called Momentum of the price.

$$Momentum = Close(0) - Close(-n), \text{ where n is the look back period}$$

In our physical world, momentum is analogous to the speed of a moving car. It foretells the change in the distance traveled by the moving car. Higher the speed, the farther the car travels per fixed time intervals. Similarly, higher momentum readings indicate faster price changes. As a price curve is rising, we observe that the momentum is positive. As prices increase at a slower pace, the momentum stays positive but falls in magnitude. As the prices peak, momentum is zero since prices are neither rising nor falling, i.e., the slope of the price curve is zero(flat). After the prices peak, momentum becomes negative since slope is negative. The value of a negative momentum suggests the quality of the price decline. As the decline in prices wanes, momentum stays negative but its magnitude begins to rise. At the bottom of the decline, momentum is again zero(flat) as is the slope. Again, prices are neither falling nor rising.

To summarize, momentum, applied properly, decodes the direction and pace of the price changes while detecting its turning points.
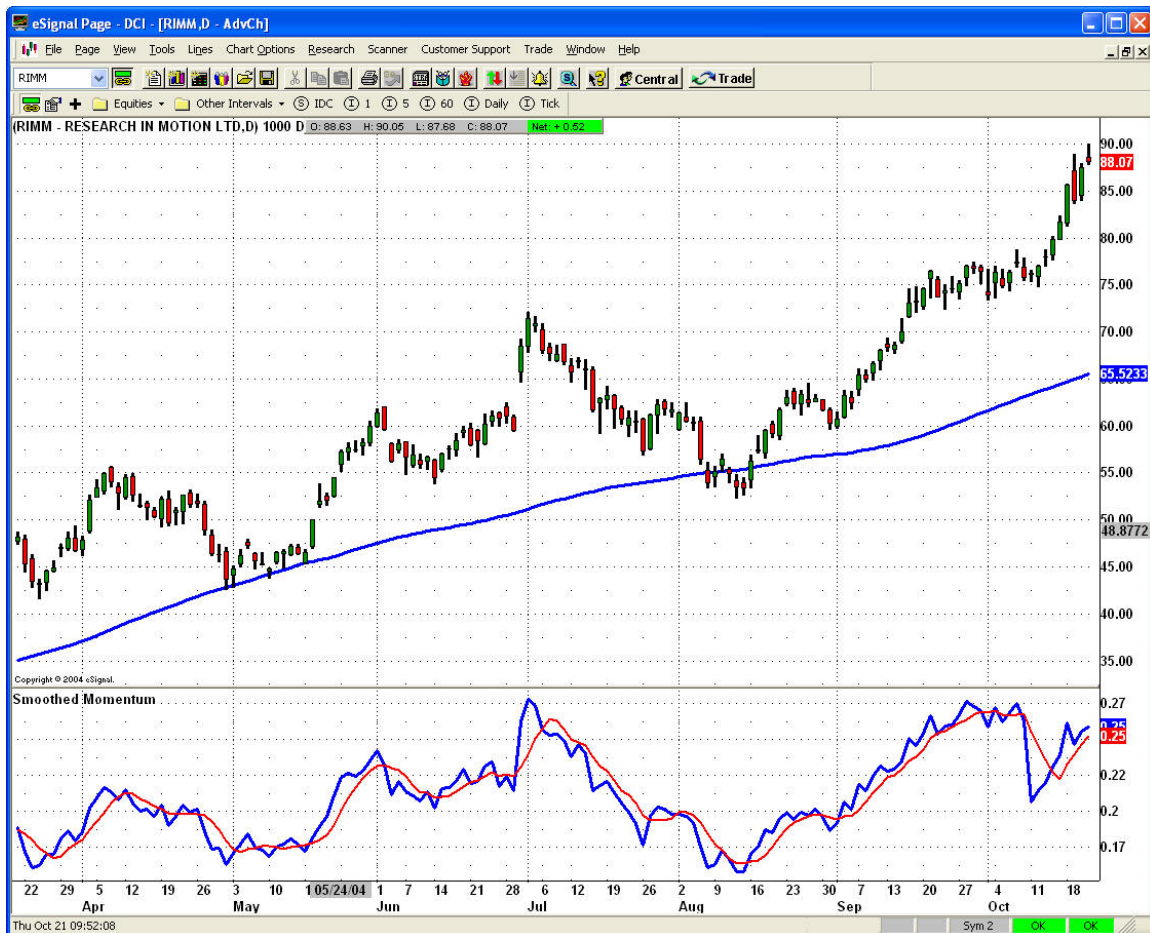
Smoothing of Momentum
The problem with momentum is that it can make noisy prices even nosier. Thus we need to smooth - or even double-smooth the momentum -- to get a better read on the quality of the price changes. The most popular smoothing method used is applying a moving average to a price curve. Moving averages of price using a short look-back periods, while introducing small lag, do not give us a smooth trending indicator. On the other hand, moving averages with long-look back periods introduce considerable lag. In contrast, in the case of the moving average of the momentum of the price curve, the longer the look back period, the lower the lag is. How come? First-year college calculus teaches us that, in the limit, a long moving average of momentum (1st derivative of the price curve) has the exact *shape of the price curve.* Why? The mathematical integration of the first derivative, equates to the original curve minus a constant of integration, regardless of the type of moving average applied, i.e., simple, exponential, or weighted.
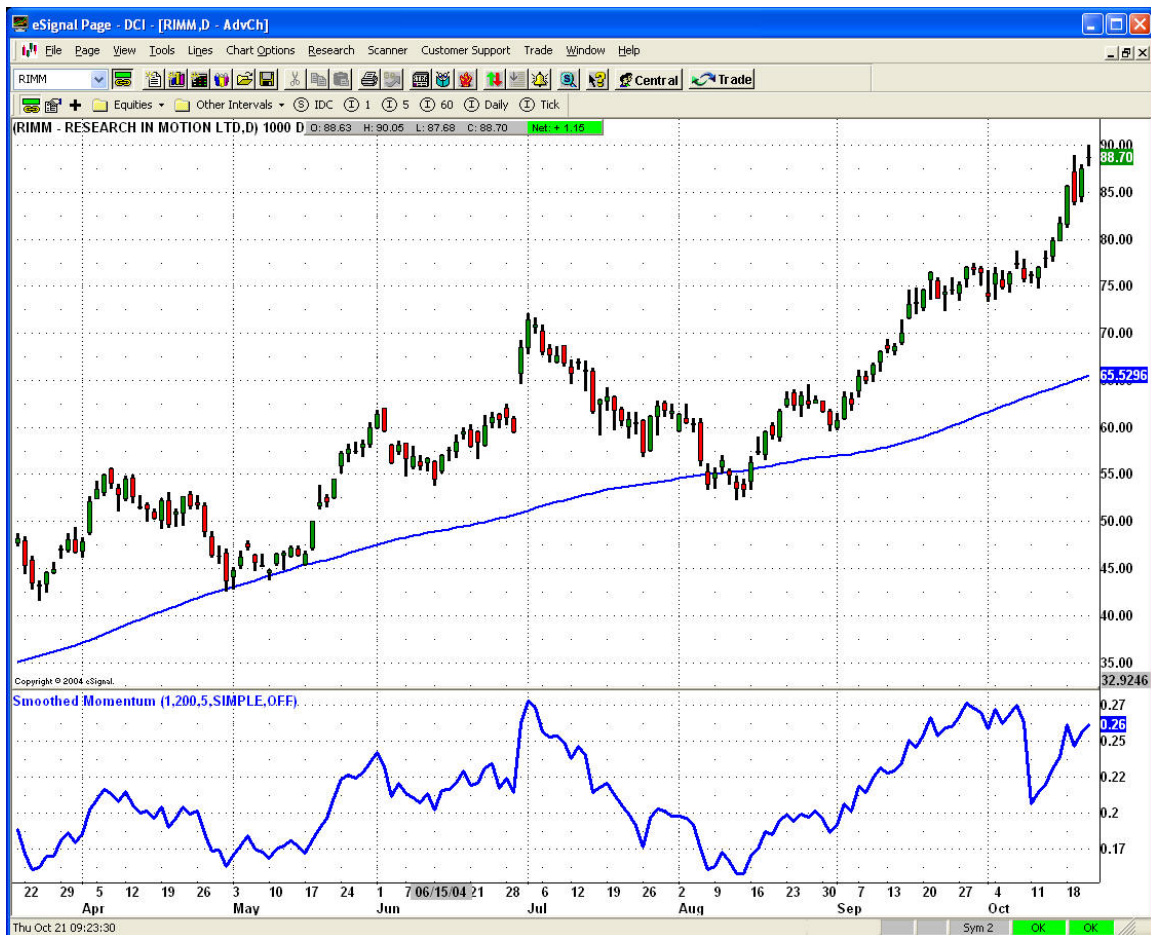
Double Smoothing of Momentum

With the shape of very large moving average on the momentum of the price being equal to that of the price curve, we apply a short period smoothing to long-period smoothed momentum curve, using a, say 5 period, moving average. We now have a double-smoothed momentum of the price curve. Here *we are introducing a very small lag*. See the chart below.

As you can see, the double-smoothing of momentum is an ideal proxy for the price curve if the first smoothing moving average look back period is very large.

True Strength Index Indicator

William Blau[1] created the True Strength Index (TSI) indicator using the above principles to better detect both trend and medium to long-term market overbought/oversold conditions. See Thom Hartle article in Active Trader for an in-depth analysis of the TSI[2].
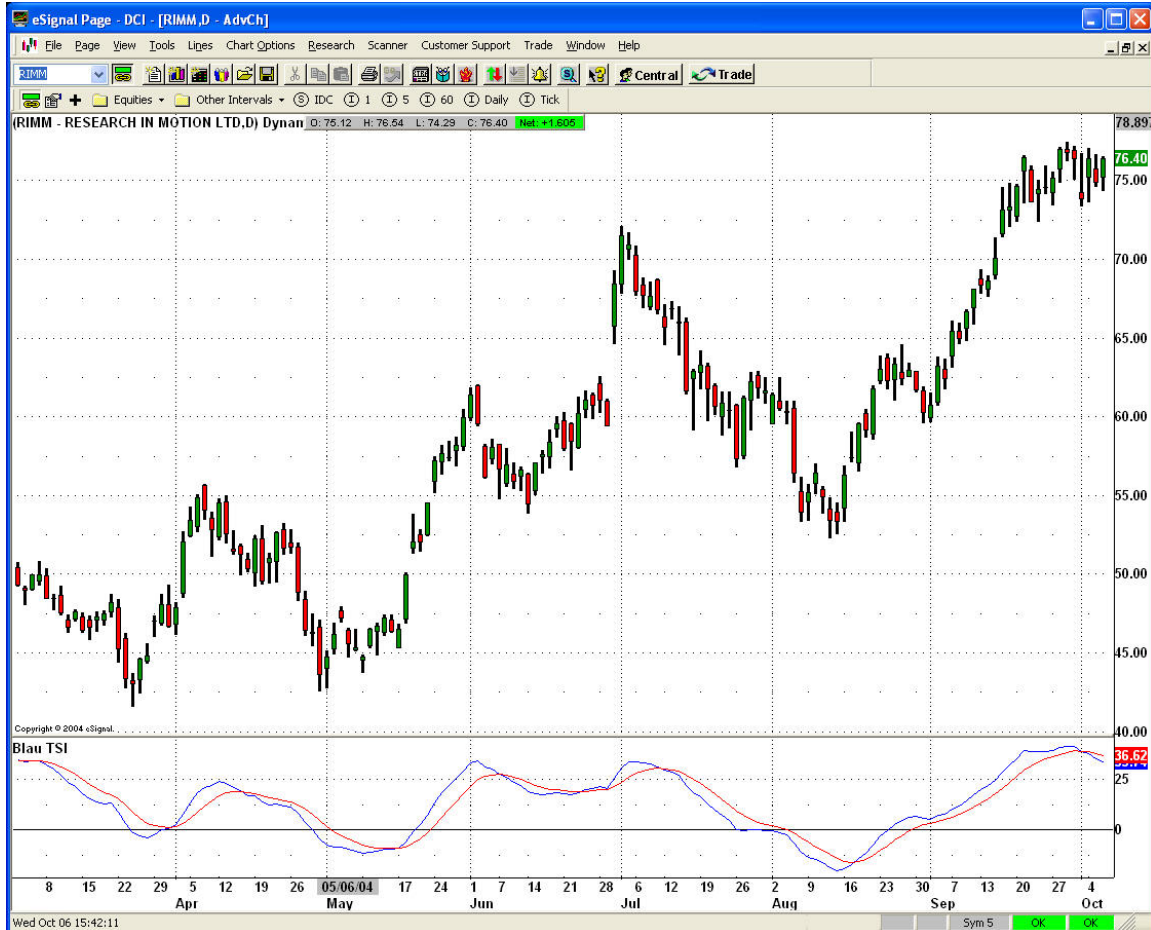
From the above chart, you can observe that the zero-lag property of this remarkable indicator could be very helpful for trading end of day low to medium-beta stocks and broad market ETFs.

Central Intelligence Indicator

Hamzei Analytics' Central Intelligence (CI) indicator takes the TSI one step further. CI is configured to respond properly for intraday trend detection during the opening hour of the trading day. This is the ideal momentum indicator for day-trading high-beta stocks, sector ETFs or futures in Gap-up or Gap-down days. In this indicator, we use a first smoothing factor of less than 50 to enhance the oscillation of the indicator to oscillate better between over-bought and over-sold levels.
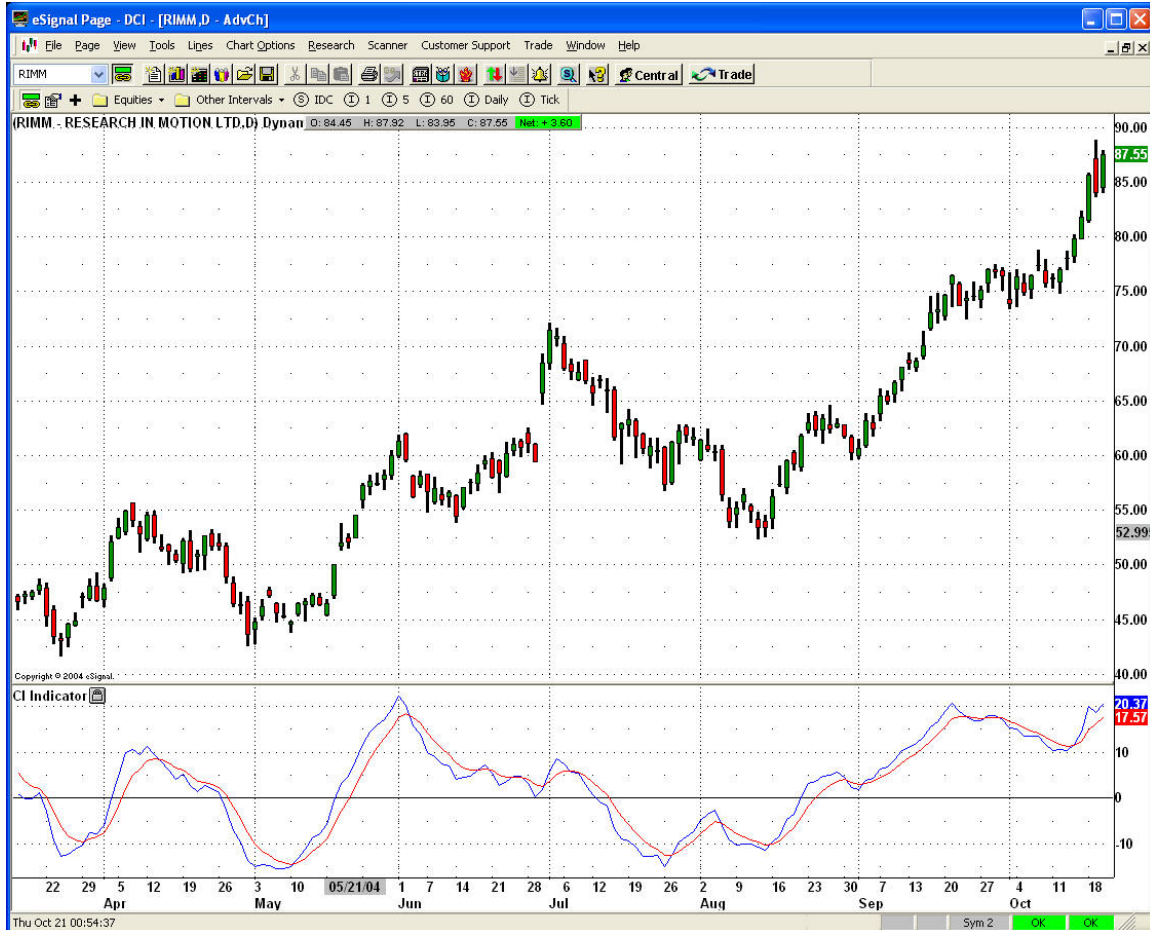
Dual CI

Hamzei Analytics' Dual CI is simply combining two CI indicators with two different look-back periods: a fast and a slow one, much like Gerald Appel's Moving Average Convergence / Divergence (MACD) indicator, but with considerable less lag. This indicator is ideal for detecting bullish and bearish divergences and since it still retains its zero-lag properties, it is an excellent indicator to help us enter and exit at key turning points.
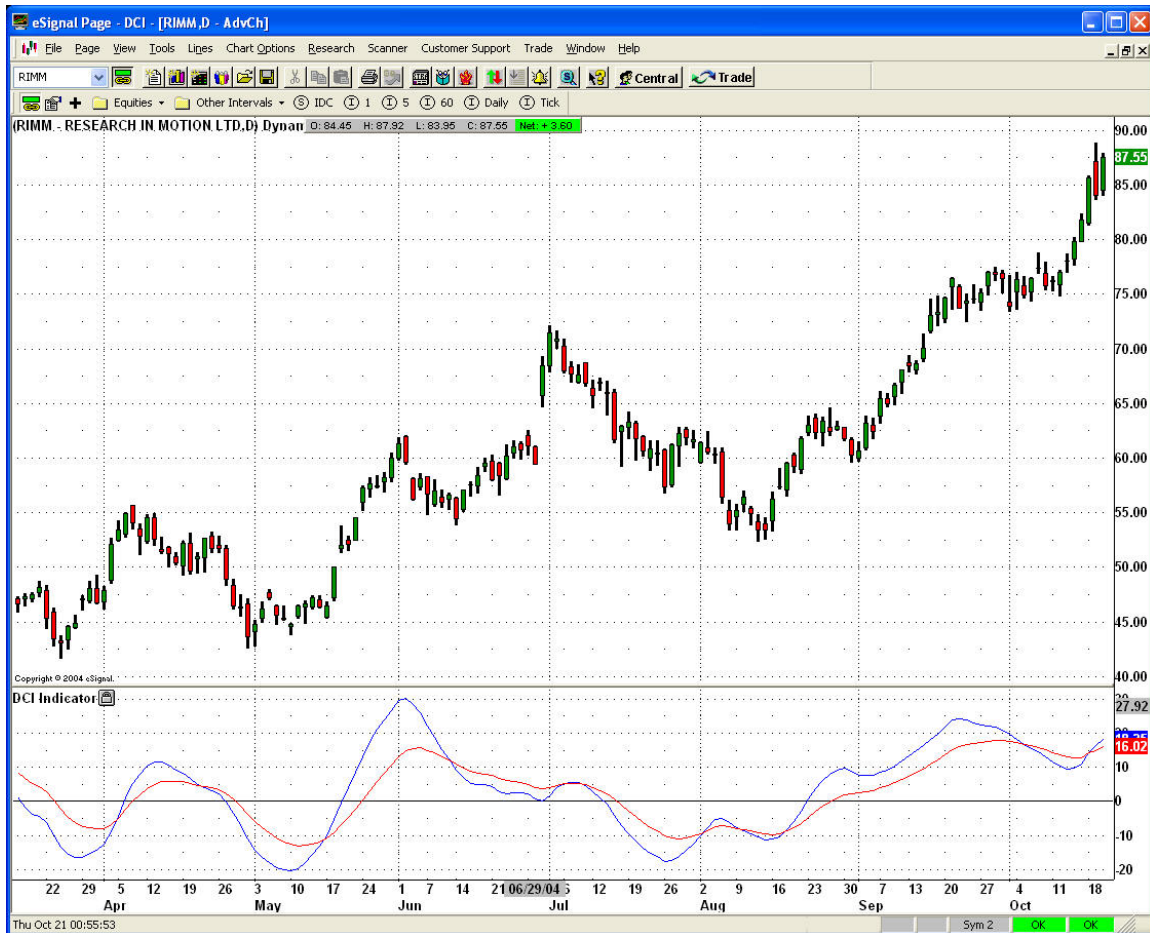
How to trade with CI and DCI
There are two ways to trade with these indicators:
1) Go with the trend, long and short, or
2) Fade the price peaks and troughs in a divergence mode

CI indicator is ideally suited for trend and momentum based trading. As you can see in the chart with the CI indicator, CI (in blue) and its signal line (in red) create a simple cross-over overbought/oversold indicator that is bounded. To go long, just watch for an oversold condition, with CI in –25 to -20 area. Then wait for the CI to cross over its signal line. Typically, that is a good long entry.

Stay long while the Blue line minus Red line stays positive. We call that CI Diff. It looks and acts much like the MACD Diff histogram, but it is more reactive. Usually, the first wave up from oversold levels, the price action is very strong and it reaches for a local maxima (i.e., price peak). Typically, it is in the secondary wave that the price action fails. Thus as long as the CI diff stays positive, remain in your long position. A prudent trader takes some profit here -- a third to half -- of the position at the end of first wave and moves his/her trailing stop to breakeven or better. The second wave of the

price action usually leads to lower CI reading if it occurs immediately following a short retracement. At that point you should cover your longs. Reverse this strategy for short trades. In that case, the short entry should be around CI readings of +20 to +25.

A good way to filter the above trade is to only take positions in the direction of long look-back period TSI or CI. That means matching the direction of a long look-back TSI or CI indicator with the direction of a shorter look-back period CI for tactical timing.
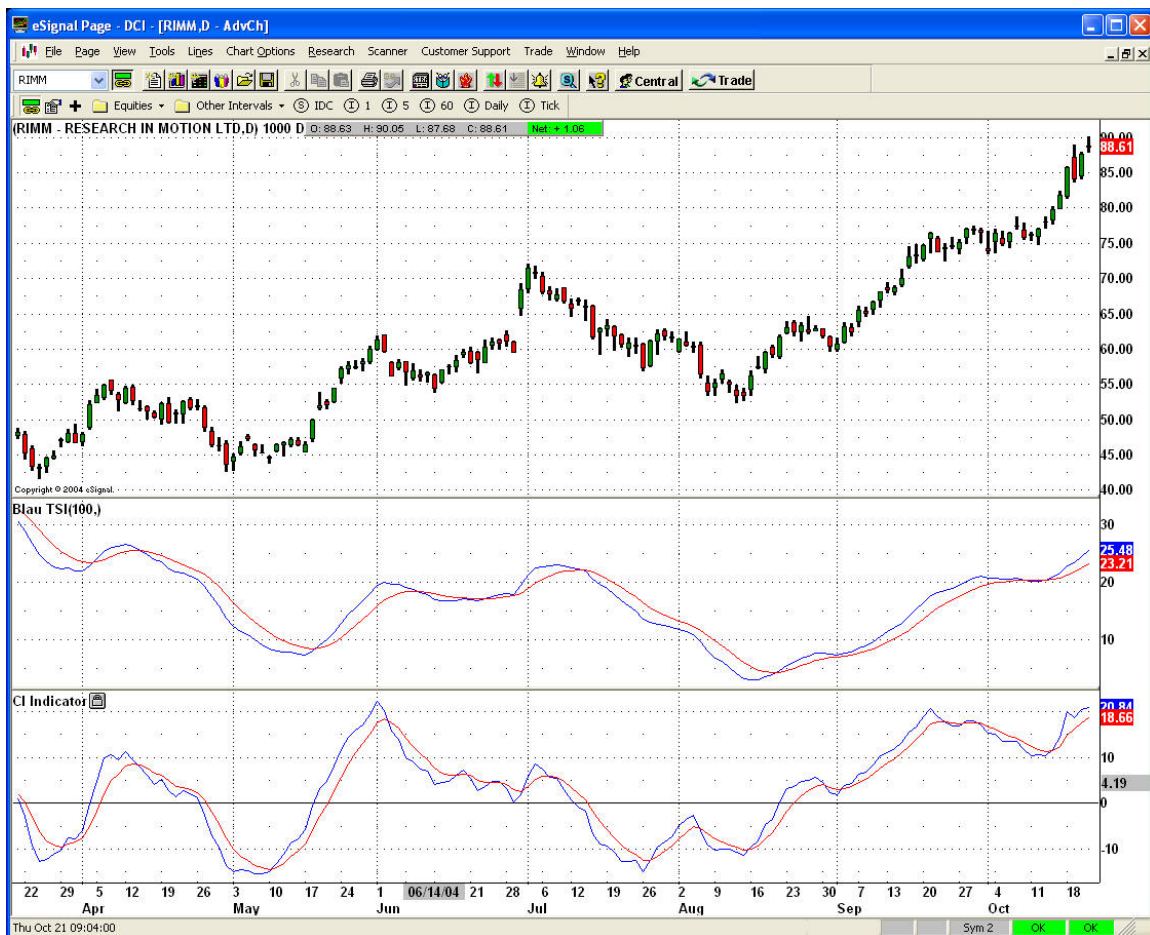
Another approach is to fade the price break-outs and break-downs. The excesses in price fluctuations are statistically not sustainable and allow the talented trader to lock-in sizable gains in a short period of time. Here we can use Dual CI Indicator (DCI) to look for non-confirming Bullish and Bearish Divergences.

Because the inputs of the DCI indicator are user-definable, the user can manipulate and/or optimize it for different markets and/or different bar intervals. A divergence occurs when a price revisits a recent channel break-out high or break-down low while the accompanying indicator fails to do so. Market technicians call it a non-confirmation. Divergences typically provide entry points with an acceptable risk-to-reward ratio.
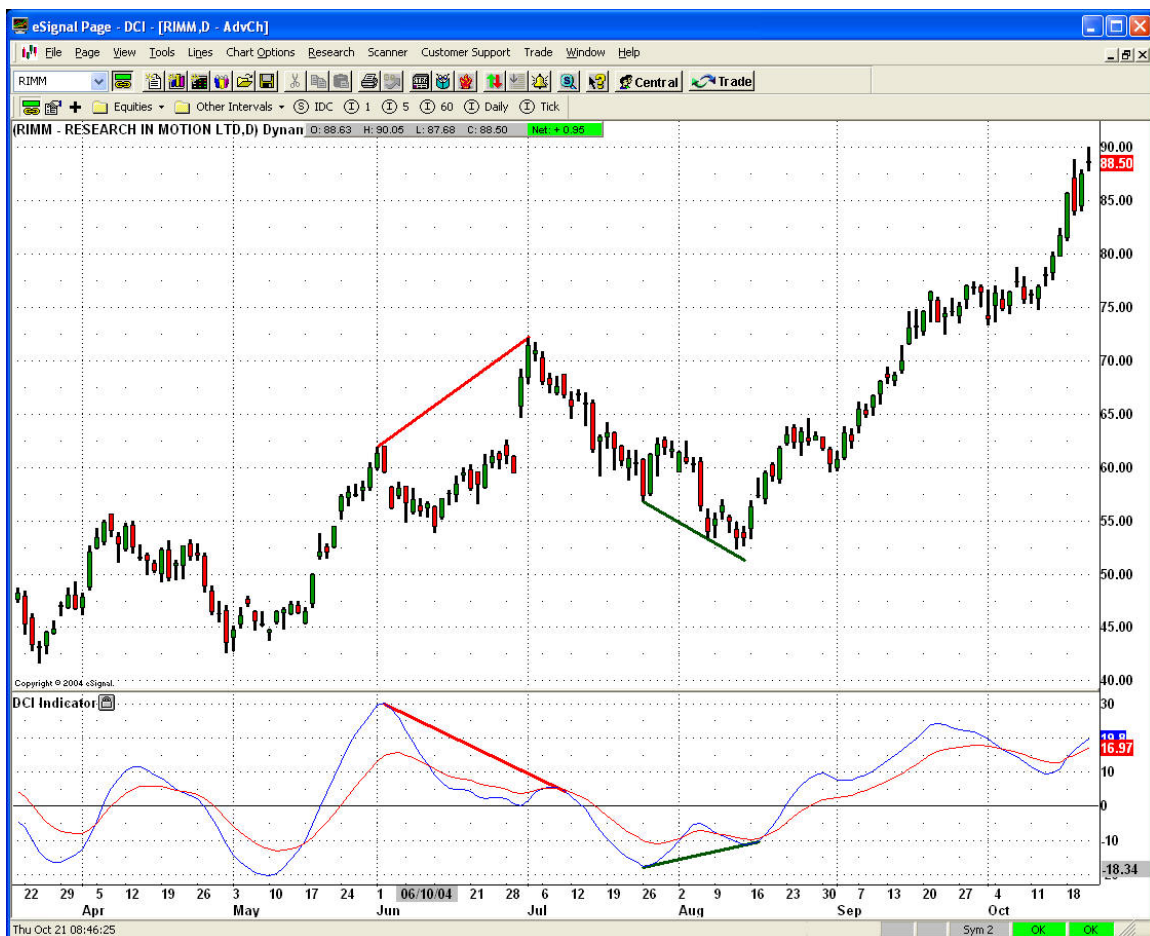
Summary
Momentum indicators lead the markets while moving averages lag. A zero-lag hybrid indicator can provide the talented trader an additional edge in turbulent markets by detecting the over all trend while trading the short term swings for superior returns.

1. Blau, William. *Momentum, Direction, and Divergence*. New York: John Wiley & Sons, 1995.

2. Hartle, Thom. *The True Strength Index*. Active Trader Magazine. January 2002, p. 58.