BRIDGE TRADER

The Newspaper for the Financial and Commodity Markets

the global financial information company BRIDGE

May/June 1997 | Circulation 50,000 | Vol. 6, No. 3 | $3.50

IN THIS ISSUE:

The Best Momentum Indicators

EDITOR'S NOTE: Cynthia Kase is internationally acknowledged as a leading innovator in the field of risk management and is well-known for her acclaimed proprietary trading and hedging software. Her indicators are available on TradeStation and shortly will be available on Aspen, (Bridge Profit Center) and CQG. She is the recipient of the Market Technicians Association "Best of the Best" award in relative strength and momentum research, in recognition of her significant and recent contributions to the field.

By Cynthia Kase

Indicator Techniques Use Trend and Momentum

As the use of computers has become more common place throughout the sixties, seventies and eighties, the use of indicators in technical analysis has become increasingly popular. Before the early seventies, most technical analysis and trading was done based on chart patterns, be they either bar patterns (like closing point reversal), or larger geometric formations such as wedges and flags.

With the advent of the hand held calculator in the mid to late seventies and the PC early in the eighties, the use of indicator techniques which employ mathematical formulae or algorithms have become common place. Most of the prevalent and now traditional algorithm techniques employ trending and momentum indicators.

These indicators can be categorized in three groups: trending indicators, first derivative, and second derivative indicators. Simply put, the trending indicators, with their first and second derivative indicators, are similar to distance, velocity and acceleration. The latter two categories are lumped into the general catch-all of "momentum." Trending indicators include moving averages and similar indicators such as the DMI. First derivative momentum indicators include all simple oscillators and other measures such as stochastic and RSI. The MACD histogram is a very good example of a second derivative indicator as it is the difference between an oscillator and its own average.

Why the Old Indicators are Limited

Traditional indicators have a variety of limitations. First, most of the indicators in common use today were developed, as noted earlier, for the

See **Momentum**
Continued on page 6

MOMENTUM

Continued from front page

hand-held calculator. Therefore, by definition, the math is extremely simplistic and does not even begin to assess market behavior in a rigorous and scientific method.

For example, if a fast moving average crosses above a slow one, does that mean the market is going up? When a fast moving average crosses a slow one, all this means is that the average of prices over the last few days is higher than the average of prices over the long run. When looking at a momentum indicator such as the stochastic for example, all we see is whether or not the day's closes are towards the upper end or lower end of a linear range.

While knowing that prices have been higher recently than they have been over the longer term, and the closes in an up market are moving down towards the bottom of the range, are all important pieces of information, they are somewhat superficial. Therefore, they do not give traders more than cursory tools with which to assess the market.

Out with the Old

Two major evolutions in the market place have made it possible to throw out these outdated superficial indicators and replace them with indicators that perform with a much greater degree of accuracy. These two factors have been the advent of high speed desktop computers and advances in financial engineering. We are all familiar with the advances on the computer side. In financial engineering, many of us forget that much of the work in options, such as the Black-Scholes formula, was developed only in recent decades. Real strides in market mathematics have focused on the corporate and institutional side of risk management.

In order to manage commodity, interest rate, or currency risk, the statistical and structural characteristics of these markets must be understood. There has been much work by high-level experts in the mathematics of finance, risk, and structure of these markets. Our practice in risk management and financial engineering has allowed us to harness much of this math and to develop momentum analysis techniques that are the best in the business.

Engineering the Trend

What is a trend? In standard technical analysis, we learn that a trend is a price move containing higher highs and higher lows, or lower highs and lower lows. This, however, is an empirical observation and not an objective measure. How do financial engineers measure? First, let's look at the opposing view and ask what is considered random? A random market or any random series is said to be following a random walk or Brownian motion. In such markets, data changes with a 50/50 chance of going in one direction or another. The most likely long-term outcome is to end up back where we started. Statistically, if a market is random, then all prices will be held nominally within two standard deviations of the mean. Thus, trendiness is the propensity for the market to move outside of a two standard deviation range of the mean.

This is the general idea behind the use of standard deviation bands as a trading technique popularized by Bollinger. If we look at a trending market, we see that generally, price behavior continually breaks the two standard deviation band, pushing the envelope out, so to speak. On retracements and corrections, price generally holds within the two standard deviation band and, if breached, bounces back in the opposite direction.

Historical Volatility

Step 1—calculate the value ln(p[1]/p);
Step 2—take the standard deviation of this value over nine observations
Step 3—normalize the standard deviation by multiplying the result by the value sqrt (observation periods per year divided by observation periods). For example, for daily data we multiply by the square root of 252.

With this understanding we developed the Kase Serial Dependency Index or KSDI. The formula is shown on page 7.

Volatility Equals Standard Deviation

The volatility of a commodity can be defined as the standard deviation of the logarithmic rate of change. Market prices thus increase and decrease with the logarithmic spiral, which is why linear techniques don't work as well as logarithmic.

Thus, the volatility is a measure of standard deviation. We can say that if the market moves more than two times its volatility, it has passed two standard deviations from the norm.

The Kase Serial Dependency Index (SDI)

$$KSDI_{UP} = \frac{\ln(high_0/low_n)}{v\sqrt{n}}$$

$$KSDI_{DN} = \frac{\ln(high_n/low_0)}{v\sqrt{n}}$$

Where "v" is the volatility per "step 2" above.

Here, we are measuring the multiple of the distance the price has traveled to the standard deviation or volatility. With high power PCs we can also add another step to give us a much more accurate measure. By using a loop, we can evaluate the serial dependency over a range of cycle lengths and find the index with the highest value. Then we can find the cycle length which generates the highest serial dependency value. In this way we have a measure that adapts both for volatility and for cycle length. If the $KSDI_{UP}$ is greater than the $KSDI_{DN}$ this means that the market is trending up and vice versa. The higher the index value relative to volatility, then the more significant the trendiness.

The Kase PeakOscillator

Kase PeakOscillator =
maxKSDI_{UP} -maxKSDI_{DN}

The first derivative of the KSDI is simply the difference between the KSDI_{UP} and the KSDI_{DN} as a histogram with some smoothing added. This is the PeakOscillator. Thus, we now have an oscillator which uses a true measure of trend for the oscillator values, not an imperial observation like a moving average. It automatically adapts for volatility and for cycle length. One of the major strengths of the PeakOscillator is that it simply works better than traditional indicators.

The PeakOscillator divergence signal on a stand-alone basis has an 80 percent accuracy. This means that when the PeakOscillator divergence signal takes place, 80 percent of the time the market reverses to a significant enough degree to warrant taking profit. Sixty percent of the time it reverses to a great enough degree that a large move to trade in the opposite direction would be highly profitable. This degree of consistency does not exist with traditional indicators.

A True Overbought/Oversold Signal

Another major advantage of the PeakOscillator is that it can identify non-divergent turns.

Those who use divergence indicators regularly know that either two highs or two lows are required in order to identify a divergent turn. In a bull market, for example, we look for a higher high in price and a lower high in momentum. This is sufficient when we have a sustained trend which makes a number of peaks or valleys. However, in a spike top or sharp correction that moves against the trend and comes right back, we only have one high or one low to look at.

Therefore, it is impossible in such circumstances to use divergence to identify the turn. The PeakOscillator, as we have seen, adapts both for volatility and cycle length.

PeakOscillator Catches Divergences that the Stochastic Misses

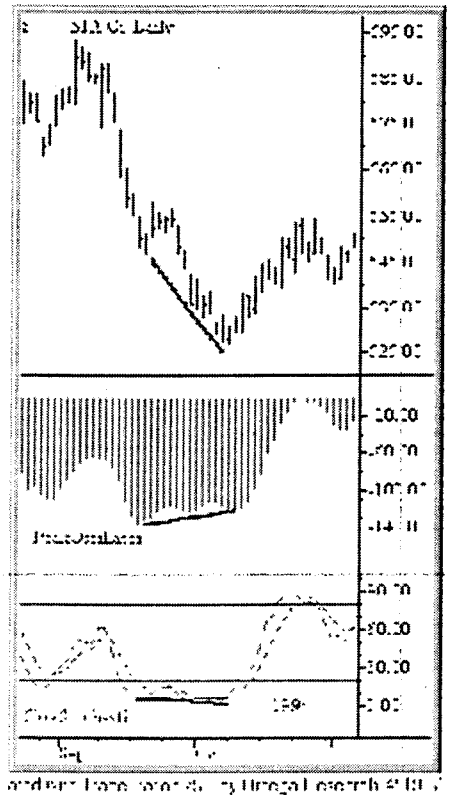


Figure 1

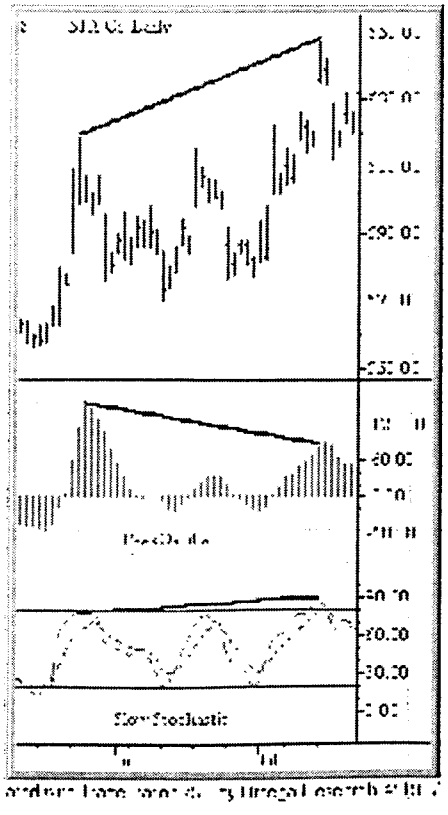
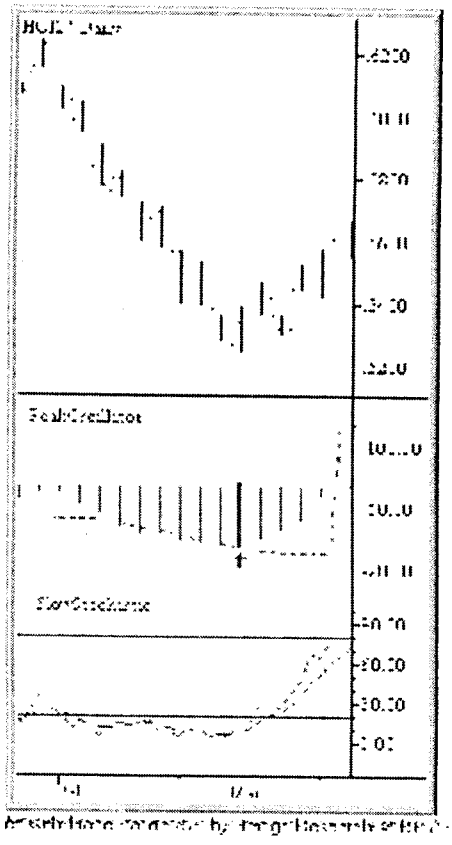


Figure 3
PeakOscillator Catches Non-Divergent Turn



Thus, where a traditional indicator is dependent on the inputs such as the number of bars in the calculation and can generate very different values during volatile markets compared to non-volatile markets, the PeakOscillator has the same meaning under different cycle length conditions and volatility conditions.

PeakOscillator Catches Non-Divergent Turn

The bottom line is unlike that of the RSI or Stochastic or MACD, which are dependent upon parameter length, volatility and unit value. The PeakOscillator can be compared across markets. A value of two, for example, means the same thing for soybeans on a 10 minute chart as it does for S&P on a five minute chart or for crude oil on a weekly chart. Therefore, we can identify true over bought or over sold conditions.

We have analyzed more than 80 years of commodity history (a wide range of commodities with eight to 10 year duration) and determined the 90th percentile of the PeakOscillator. We combined this with the measure of the 98th percentile of the local data, that is, the data over the past 30 bars or so, and plot these extreme lines on our chart with the PeakOscillator. When the PeakOscillator breaches either one of these extreme lines, we call this phenomena a PeakOut.

So, when the PeakOscillator generates a PeakOut sign, this means that the market is over bought or over sold. Often the PeakOut is a penultimate high or low followed by a divergent high or low. However, in spike markets or corrective markets that spike against the trend and then come right back, the PeakOut is a valuable tool to identify non-divergent turns. This signal also has the same accuracy as the PeakOscillator divergence when generated on a spike, or late in a trend.

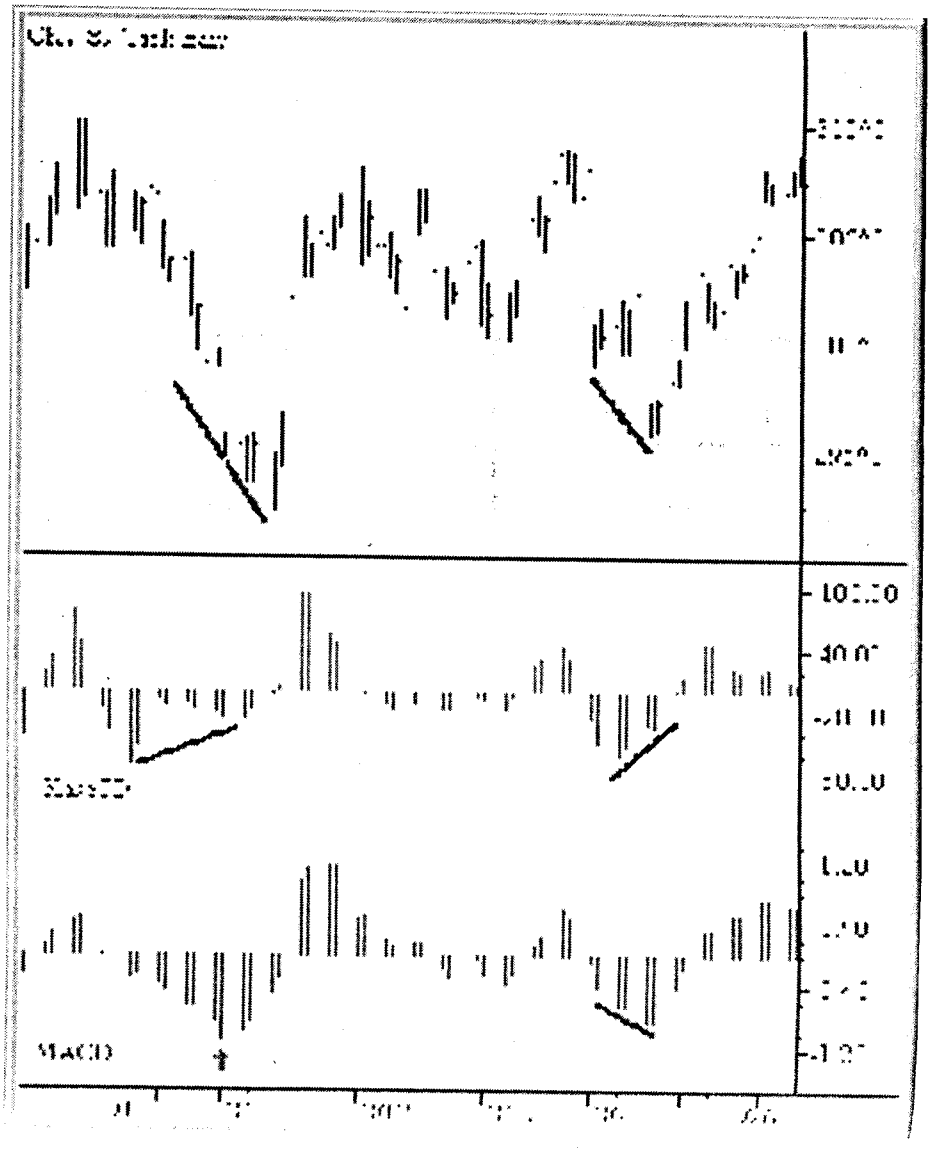
Vroom: Acceleration

Finally, we can design an acceleration indicator which replaces the out-moded MACD. The MACD simply uses the rate of change among a variety of exponential moving averages. As we have seen, moving averages use a very limited amount of information. The KaseCD (KCD) is the rate of change of the PeakOscillator, that is, the PeakOscillator minus its own average, calculated as follows:

KCD = PeakOscillator - average(PeakOscillator),n

Again, the KCD looks virtually identical to the MACD histogram upon initial review. However, it has extreme advantages in that it is highly reliable. That is, we find the same 80 percent probability of success with an KCD divergence as we do with the PeakOscillator divergence and PeakOut late in trend signals.

Figure 4
KCD Diverges - MACD Misses



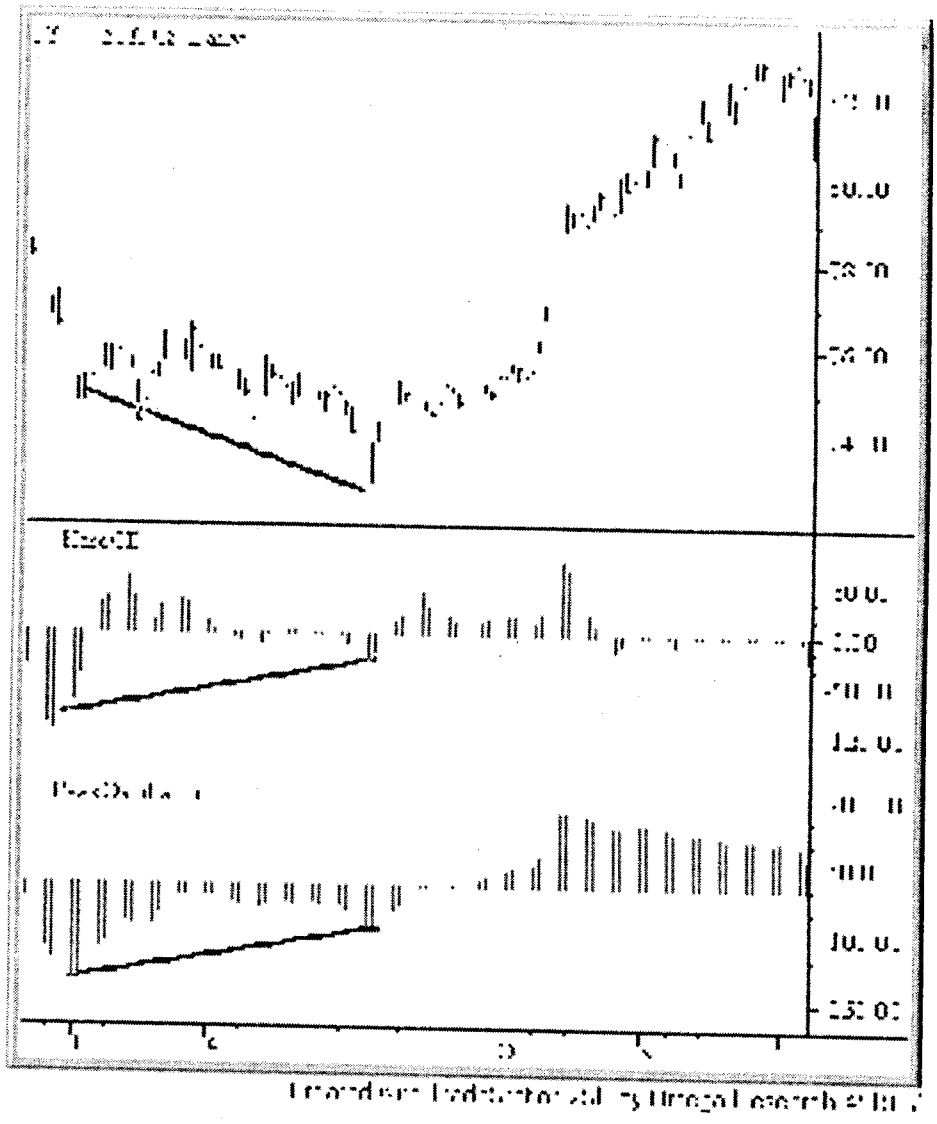
Also of great benefit is a much greater increase in stability in oscillations and fluctuations around the zero line.

This has two major benefits. First is an improved functionality in divergence such that if we have instability around the zero line it is difficult to pick the proper points for divergence for the highs and lows on the oscillator. Second, many traders use MACD crossovers as entry confirmation signals. If we have erratic behavior around the zero line from time to time, this can cause multiple, painful whipsaws. With the KCD, the zero line stability assists in the use of the KCD as a zero line crossover signal as well.

The Sure Thing

Well, nothing in life, as well as trading, is ever a 100 percent sure thing. However, we have discovered a signal that historically generates a reliable signal 95 percent of the time. This is when a KCD divergence is accompanied by a PeakOscillator divergence. We find in these cases that 95 percent of the time the market reverses significantly enough to warrant taking profit and 60 percent of the time enough to have a significant trade in the opposite direction in the same time frame.

Figure 5
95% Accurate "Sure Thing" Signal



Summary—Success in Trading

For many traders, their success or failure in trading is reliant upon their ability to pull the trigger and proceed with the trades. Some traders have the intestinal fortitude to trade with very rudimentary instruments such as the obsolete, antiquated indicators we mentioned at the beginning of this article. However, many of us, especially those who understand the outdated nature of these methods, do not have the confidence in these old fashion indicators and do not trade as aggressively as we would like. With the Kase indicators, we come as close as is practical to understanding true market behavior and can capture highly valuable insights into this behavior which will allow us to trade with confidence.

Cynthia Kase, CMT, CTA *is president of Kase and Company, a risk management, trading advisory, and software firm established in 1991.*

Kase has earned a masters degree in Chemical Engineering, and was of the first generation of energy traders to undergo the transition into a commodity oriented marketplace, and has assisted more than 60 firms in making similar transitions in oil, gas, and now, power.

Her book, Trading with the Odds, *published by Irwin Professional Publishers, has been hailed as the first new approach in 40 years.*

She can be reached on the internet at www.kaseco.com.