TRADING SYSTEMS

Stay On Track

Zero In On The MACD

Do you find that you trade more than you'd like to while a market is trending? Here's a variation on the moving average convergence/divergence you can use to keep you in trending markets longer so you can capture more of a trend.

Despite the advances in technical analysis, the moving average convergence/divergence (MACD) indicator created by Gerald Appel almost 40 years ago remains a mainstay in the trader's toolbox. Its popularity is well-deserved since it serves more than one purpose. It functions as a momentum oscillator, a directional indicator, an indication of price vigor and, for some, a standalone trading system.

The MACD consists of two parts: the MACD line and the signal line. The standard MACD settings found in most charting software subtract the difference between the 12-period exponential moving average (EMA) and 26-period EMA to create the MACD line. It constructs the signal line by overlaying a nine-period EMA of the value of the MACD line. The MACD line crossing the signal line generates buy and sell signals. The chart of Scana Corporation (SCG) in Figure 1 illustrates the MACD line and its signal line. The arrows show where the buy and sell signals occur. It is the use of the MACD/signal crossovers that many traders find most appealing.

However, according to Appel, two of the most important features of the MACD are whether it is above or below zero, and whether it is rising or falling.

In this article, I'll eliminate the signal line and focus only on the MACD line and its relationship to its zero line, which will highlight the trending and momentum features of the MACD. Focusing on the MACD zero line crossings rather than on the signal line crossings often reduces the number of trades taken and keeps traders in a trend longer.

THE DISPLAY

Usually, the MACD is presented as a solid line that fluctuates above and below a zero line, as seen in Figure 1. But for this article, I'll present it in a histogram-line style format, which produces vertical lines above and below zero, making it easier to see when it actually crosses its zero line. To eliminate the signal line, change the nine-period default to a one-period EMA. Also important is that the MACD values be expressed as a percentage of movement rather than as the change in actual dollar amount.

FIGURE 1: SCANA (SCG) WITH THE MACD INDICATOR. Ordinarily, the MACD indicator displays an MACD line (in blue) and its signal line (in red). The cross of the MACD line on the signal line generates buy and sell signals. The arrows on the price bars and the red and green lines in the MACD indicator panel point out both the location and the frequency of the buy/sell signals on SCG from October 2014 to June 2015.

JOAN CHIVERTON

by Barbara Star, PhD

FIGURE 2: SCANA WITH THE MACD LINE DISPLAYED AS A HISTOGRAM. Eliminating the signal line and displaying the MACD line in a histogram line style above and below its zero line allows traders to focus on price trend and take fewer trades.

Figure 2 displays SCG in the format being used in this article. The chart contains a 12-period EMA and a 26-period EMA on price, with the MACD in the lower panel. The up and down arrows identify the moving average crossovers, which match the places where the MACD crosses its zero line. I have used blue bars to show when the MACD is above the zero line and red bars when it is below the zero line.

If these changes are not possible to make in the software you are using, then simply select a price oscillator indicator, sometimes also called a *price percent oscillator*, which is available in most charting software. Set the fast EMA to 12 and the slow EMA to 26. Display it using a histogram line style instead of the default solid line style.

Many programs also include a feature commonly referred to as the *MACD histogram*. That feature subtracts the numeric value of the signal line from the MACD line to display, in histogram form, the difference or space between the two lines. If possible, turn off that function because it is not the same as the histogram line style that I use in this article.

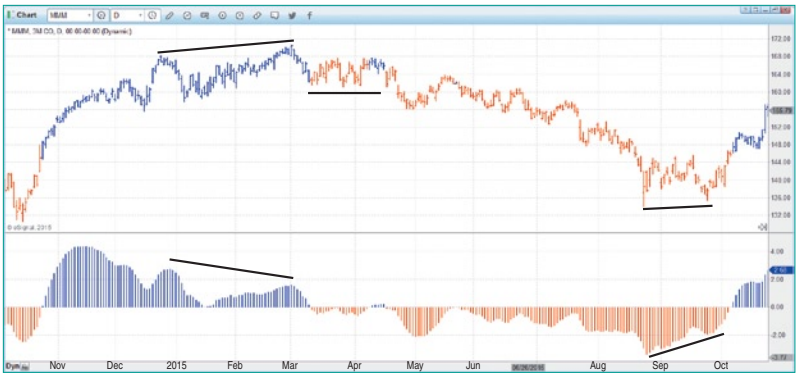

FIGURE 3: THE 3M COMPANY (MMM) AND THE MACD AS A HISTOGRAM. The indicator and price bars are colored blue when the MACD is above its zero line and red when the MACD is below its zero line. This highlights shifts in both trend and momentum. The chart identifies divergences and price consolidations between price movement and the indicator movement.

INTERPRETATION

By itself, the MACD provides traders with a good indication of whether the trading environment favors bulls or bears. An MACD above zero is generally a positive sign and when below its zero line, it is generally negative. But even better, the MACD allows traders to catch major trends, both bullish and bearish, that occur in any time frame. For example, in Figure 3, the trend of 3M Company (MMM) favored the bulls during the four months from November 2014 through February 2015 while the blue vertical lines remained above zero. Price then transitioned into a bearish six-month period with the red vertical lines below zero as 3M gave back all of its gains. Note the colors of the price bars correspond to those of the MACD histogram. For the eSignal code for colored bars, see the online sidebar "eSignal Code For MACD Colored Bars" at http://traders.com/files/Star1605.html.

Figure 3 also illustrates the value of the MACD as a momentum indicator. When it is above its zero line and rising, it means that momentum or the price rate of change is rising. When it is above its zero line but has stopped rising and instead has begun decreasing, moving toward the zero line, it indicates a lessening of momentum even if price continues to rise. Often, decreasing momentum leads to a corrective pullback and sometimes to a complete change of trend.

When the histogram hovers or fluctuates near its zero line, as it did in March and April, it signifies weak momentum, which reflects price action during sideways, indecisive, or range-bound price action. In this case, movement was confined within a six-point price range during that time period before breaking support to the downside in late April.

An MACD below zero and falling indicates that momentum has shifted to the downside and price action generally is negative. When the MACD stops declining and begins to rise toward its zero line, the negative momentum is not as strong. This often occurs during a countertrend rally after which price may continue its downtrend, but it may also lead to a change in trend.

Divergence reversals. Sometimes it is possible to identify an upcoming reversal by watching for bullish or bearish divergences. These occur when price moves in one direction but the MACD does not reflect that move. For instance, in Figure 3, price made a high in December and the MACD also made a high. After a pullback, price rallied to a new high at the end of February but the MACD made a lower high. Soon after, price corrected and moved into a sideways channel that provided temporary support prior to its major decline.

After falling below its zero line, price and the MACD made a series of lower lows until late August. A brief, shallow rally was followed by a retest of the lows in September, which brought price close to the August lows. However, the MACD made a higher low that formed a bullish divergence and led to a change in trend.

Divergences do not always occur, and when they do they may not lead to a trend reversal, but they do point to a change in momentum that could result in, or from, a change in investor behavior, which makes divergences worth observing.

TRADING THE ZERO LINE CROSSOVER

While the MACD zero line crossovers indicate a potential change in direction, they don't necessarily mean it is time to enter the market. For the timing of entries and exits I find it helpful to

apply a 34-period weighted moving average (WMA) and a 55-period EMA to the price bars. As illustrated in the chart of First Solar Inc. (FSLR) in Figure 4, enter the long side when price is above the red 55 EMA and when the price bars are blue. For short selling, enter to the downside when price moves below the 55-period EMA and the price bars are red.

When prices penetrate the 34-period WMA, it can signal a countertrend rally and a need to protect profit by moving a stop-loss. When the momentum of the MACD begins to show signs of a weakening trend as it did in January, price enters the space between the two moving averages. In February, the space began tapering, becoming narrower as the 34 WMA began moving up in response to rising prices. Price crossed the 55 EMA and the bars turned blue when the MACD crossed above its zero line, signaling a change in momentum and a potential change of trend. In this case, it was a countertrend rally that lasted from February through April before FSLR resumed its downtrend.

WARNINGS AND ALERTS

Since not all price movements lead to trends and since no trend lasts forever, it is helpful to have a warning method to identify those times when price retraces, becomes choppy, or consolidates. Figure 5 shows FSLR with a warning method I use that displays diamond symbols above and below price. For eSignal code to display the diamond symbols, see the online sidebar "eSignal Code For Warning Symbols" at http://traders.com/files/Star1605.html.

A diamond symbol above the price bar warns when the price close is less than the 34-period WMA and the price high is greater than or equal to the 55 EMA. That occurs when price enters the space between the two moving averages.

Diamond symbols appear below the price bars when the 55 EMA is above the 34 period WMA and the price closes above the 34-period WMA. This alert occurs during a price decline to warn the trader of a possible shift in price to the upside.

The code for the warning symbol that appears below the price bars is more conservative in that it requires the shorter 34-period WMA to have been below the 55 EMA and then cross above the 55 EMA before it signals an all-clear. The code was written that way to help avoid some of the pullbacks and false breakouts that often occur soon after price begins to move from a downtrend to an uptrend. However, as seen in the February time period in Figure 5, playing it safe may cause traders to delay entry too long, missing additional profit. Aggressive traders may wish to take their chances, using a prudent stop-loss, and enter as soon as price is above the red 55 EMA and the price bars turn blue.

These warning symbols also alert traders to those times when price is in a sideways consolidation period and momentum has decreased, keeping the MACD near its zero line. An example of that type of price behavior appears in the lower left-hand side of the weekly Market Vectors Semiconductor ETF (SMH) chart in Figure 6 prior to its two-and-a-half-year bullish run. These alerts can help traders avoid the whipsaws so common in the use of moving averages and indicators, such as the MACD, that are based on moving averages.

However, once the trend began, traders of SMH were warned of the impending price decline in October 2014, which occurred while the MACD was above its zero line and price bars remained blue. More recently, traders had ample opportunity to

FIGURE 4: FIRST SOLAR (FSLR) WITH MOVING AVERAGES. Adding the 34-period weighted and 55-period exponential moving averages provides entry and cautionary points for traders.

FIGURE 5: FIRST SOLAR WITH WARNING SYMBOLS. The diamond warning symbols above and below the price bars alert traders to some trading pitfalls created by retracements, consolidations, and choppy price movements.

FIGURE 6: WEEKLY MARKET VECTOR SEMICONDUCTOR ETF (SMH) WITH WARNING SYMBOLS. The warning symbols could have helped traders avoid whipsaw price action prior to the start of a long bullish trend and also alerted them to the 2014 and 2015 market corrections.

take profits beginning in late June through mid-July 2015 when the warning symbols appeared above the price bars prior to price breaking the 55 EMA, the MACD falling below its zero line, and the price bars turning red.

ANOTHER ALERT STRATEGY: AROON

I found that the aroon indicator developed by Tushar Chande offers another useful method for alerting and/or confirming changes in the MACD. Unlike the MACD, which is a price-based momentum indicator, the aroon indicator incorporates a time dimension by identifying new highs and lows made over a user-defined time period. Chande used a 25-bar period, but he wrote that any time period could be used. However, the 25 period seems to sync well with the MACD, so I used it in the charts for this article.

The indicator, available in most software packages, is comprised of two lines: an aroon-up and an aroon-down. These lines fluctuate on a scale of zero to 100 with zero indicating weakness and 100 indicating strength. The aroon indicator is designed to reveal the beginning of a new trend or change in price bias. According to Chande, the trend is shown by the line that most recently reached the 100 level. In keeping with the colors used to identify the direction of the MACD, I colored the aroon-up line blue and the aroon-down line red in my example charts.

If an aroon-up line hits 100, it is a sign that a potential change in price direction from down or sideways to up may soon occur. If price continues to advance, then the aroon-up will remain at or near 100, indicating a strengthening trend.

When the aroon-down line surges to the 100 level and the aroon-up declines to zero, it warns of a potential change of trend to the downside. If price continues to make new lows, then the aroon-down remains at or near 100 as the trend becomes stronger.

When it takes longer to continue making new price highs or lows within the chosen time period (as often occurs during retracements, range-bound activity, or sideways price movement), an aroon line weakens and begins to decline from the 100 level. At some point the aroon-up and aroon-down lines will cross as one or the other sharply rises to warn of a directional change.

Crossover examples. It is the crossover and the immediate move up to 100 that will serve as an alert or to confirm the directional changes seen with the MACD line. In Figure 7, the aroon-up crossover that occurred in June 2015 on the daily chart of the medical technology company Becton Dickinson & Co. (BDX) confirmed the MACD change from red to blue on the price bars. The cross of the aroon-down in August alerted of a possible price change to the downside, which did take place a few days later as the MACD fell below its zero line and the price bars broke below the moving averages. The October aroon-up crossover occurred just as price pushed above the moving averages to begin another rally.

FIGURE 7: BECTON DICKINSON & CO. (BDX) WITH AROON ALERTS. The crossovers of the aroon indicator lines are another method that warn or confirm the MACD changes in price direction.

FIGURE 8: ARCHER DANIELS MIDLAND (ADM) WITH AROON ALERTS. The aroon indicator sometimes issues false alerts, as it did in August. It is best to wait for a clear trend change from the MACD and the moving averages before entering a trade.

Focusing on the MACD zero line crossings rather than on the signal line crossings often reduces the number of trades taken and keeps traders in a trend longer.

The chart of Archer Daniels Midland (ADM) in Figure 8 illustrates that some aroon indicator crossovers produce false signals, especially those that occur after price has been trading sideways. The crossovers in April and June 2015 proved to be good alerts that occurred two to five days before the MACD crossed its zero line and price moved above or below its moving averages. However, the aroon-up crossover in August produced a false alert, which took place following a month of sideways price inactivity during July, while the MACD was below its zero line. The MACD never crossed above the zero line and price did not rally above its moving averages. Instead, price continued its decline and soon the aroon-down reasserted its dominance with a signal that confirmed the downtrend. The lesson here is to let price and the MACD reflect the trend change before pulling the entry trigger.

STAYING IN A TREND

Taking a longer-term perspective that emphasizes price trend

reduces some of the noise, and stress, that often accompany the use of shorter-term trading strategies. Displaying the MACD without its signal line and focusing on the ebb and flow of the indicator above and below its zero line offers traders one method for taking that longer-term view. Adding moving averages and indicator alerts can offer valuable trading filters.

Barbara Star, PhD, is a retired university professor. She is a past vice president of the Market Analysts of Southern California and led a MetaStock users group for many years. She has had articles and software reviews published in Technical Analysis of STOCKS & COMMODITIES *since 1991. Currently, she trades part-time and provides individual instruction and consultation to those interested in technical analysis of the financial markets. She lives in Woodland Hills, CA and can be reached at 818 224-4070 or by email at star4070@aol.com.*

The online sidebars containing the eSignal code mentioned in this article can be found at http://traders.com/files/Star1605.html as well as in the Article Code area at our website, Traders.com.

See our ***Traders' Tips*** *section beginning on page 50 for commentary on implementation of Barbara Star's technique in various technical analysis programs. Accompanying program code can be found in the Traders' Tips area at Traders.com.*

FURTHER READING

Chande, Tushar S. [1995]. "A Time Price Oscillator," *Technical Analysis of* STOCKS & COMMODITIES, Volume 13: September.

- www.signalert.com/MACD tutorial.pdf
- www.systemsandforecasts.com./macd.html

‡eSignal