

Introduction to Technical Indicators and Oscillators

Introduction

This article is designed to introduce the concept of technical indicators and explain how to use them in your analysis. We will shed light on the difference between **leading** and **lagging indicators**, as well as look into the benefits and drawbacks. Many, if not most, popular indicators are shown as **oscillators**. With this in mind, we will also show how to read oscillators and explain how signals are derived. Later we will turn our focus to specific technical indicators and provide examples of signals in action.

What Is a Technical Indicator?

A technical indicator is a series of data points that are derived by applying a formula to the price data of a security. Price data includes any combination of the open, high, low or close over a period of time. Some indicators may use only the closing prices, while others incorporate [volume](#) and open interest into their formulas. The price data is entered into the formula and a data point is produced.

For example, the average of 3 closing prices is one data point ($(41+43+43) / 3 = 42.33$). However, one data point does not offer much information and does not an indicator make. A series of data points over a period of time is required to create valid reference points to enable analysis. By creating a time series of data points, a comparison can be made between present and past levels. For analysis purposes, technical indicators are usually shown in a graphical form above or below a security's price chart. Once shown in graphical form, an indicator can then be compared with the corresponding price chart of the security. Sometimes indicators are plotted on top of the price plot for a more direct comparison.

What Does a Technical Indicator Offer?

A technical indicator offers a different perspective from which to analyze the price action. Some, such as [moving averages](#), are derived from simple formulas and the mechanics are relatively easy to understand. Others, such as [Stochastics](#), have complex formulas and require more study to fully understand and appreciate. Regardless of the complexity of the formula, technical indicators can provide a unique perspective on the strength and direction of the underlying price action.

A simple moving average is an indicator that calculates the average price of a security over a specified number of periods. If a security is exceptionally volatile, then a moving average will help to smooth the data. A moving average filters out random noise and offers a smoother perspective of the price action. Veritas (VRTS) displays a lot of volatility and an analyst may have difficulty

discerning a trend. By applying a 10-day simple moving average to the price action, random fluctuations are smoothed to make it easier to identify a trend.



Why Use Indicators?

Indicators serve three broad functions: **to alert**, **to confirm** and **to predict**.

- An indicator can act as an **alert** to study price action a little more closely. If momentum is waning, it may be a signal to watch for a break of support. Or, if there is a large positive divergence building, it may serve as an alert to watch for a resistance breakout.
- Indicators can be used to **confirm** other technical analysis tools. If there is a breakout on the price chart, a corresponding moving average crossover could serve to confirm the breakout. Or, if a stock breaks support, a corresponding low in the [On-Balance-Volume](#) (OBV) could serve to confirm the weakness.
- Some investors and traders use indicators to **predict** the direction of future prices.

Tips for Using Indicators

Indicators indicate. This may sound straightforward, but sometimes traders ignore the price action of a security and focus solely on an indicator. Indicators filter price action with formulas. As such, they are derivatives and not direct reflections of the price action. This should be taken into consideration when applying analysis. **Any analysis of an indicator should be taken with the price action in mind.** What is the indicator saying about the price action of a security? Is the price action getting stronger? Weaker?

Even though it may be obvious when indicators generate [buy](#) and [sell](#) signals, the signals should be taken in context with other technical analysis tools. An indicator may flash a buy signal, but if the chart pattern shows a descending triangle with a series of declining peaks, it may be a false signal.

On the Rambus (RMBS) chart, [MACD](#) improved from November to March, forming a positive divergence. All the earmarks of a MACD buying opportunity were present, but the stock failed to break above the resistance and exceed its previous reaction high. This non-confirmation from the stock should have served as a warning sign against a long position. For the record, a sell signal occurred when the stock broke support from the descending triangle in March-01.



As always in technical analysis, learning how to read indicators is more of an art than a science. The same indicator may exhibit different behavioral patterns when applied to different stocks. Indicators that work well for IBM might not work the same for Delta Airlines. Through careful study and analysis, expertise with the various indicators will develop over time. As this expertise develops, certain nuances as well as favorite setups will become clear.

There are hundreds of indicators in use today, with new indicators being created every week. Technical analysis software programs come with dozens of indicators built in, and even allow users to create their own. Given the amount of hype that is associated with indicators, choosing an indicator to follow can be a daunting task. Even with the introduction of hundreds of new indicators, only a select few really offer a different perspective and are worthy of attention. Strangely enough, the indicators that usually merit the most attention are those that have been around the longest time and have stood the test of time.

When choosing an indicator to use for analysis, choose ***carefully*** and ***moderately***. Attempts to cover more than five indicators are usually futile. It is best to focus on two or three indicators and learn their intricacies inside and out. Try to choose indicators that complement each other, instead of those that move in unison and generate the same signals. For example, it would be redundant to use two indicators that are good for showing [overbought](#) and [oversold](#) levels, such as Stochastics and RSI. Both of these indicators measure momentum and both have overbought/oversold levels.

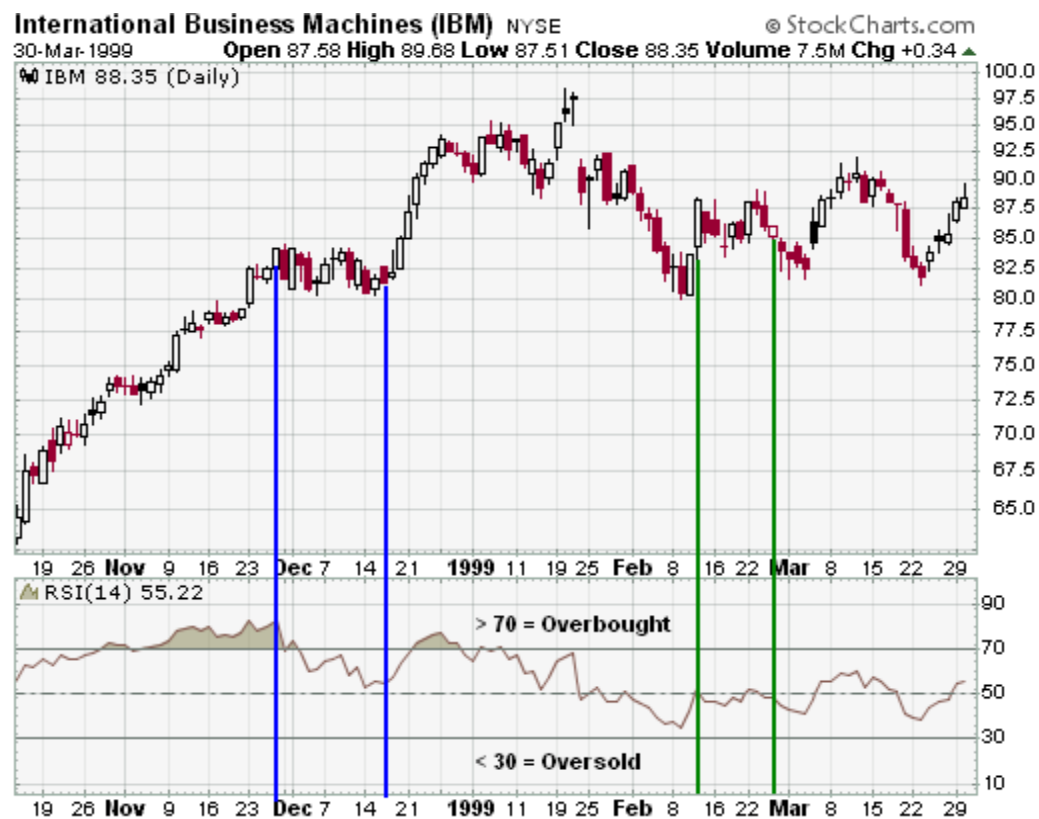
Leading Indicators

As their name implies, leading indicators are designed to lead price movements. Most represent a form of price [momentum](#) over a fixed look-back period, which is the number of periods used to calculate the indicator. For example, a 20-day Stochastic Oscillator would use the past 20 days of price action (about a month) in its calculation. All prior price action would be ignored. Some of the more popular leading indicators include [Commodity Channel Index](#) (CCI), [Momentum](#), [Relative Strength Index](#) (RSI), [Stochastic Oscillator](#) and [Williams %R](#).

Momentum Oscillators

Many leading indicators come in the form of momentum oscillators. **Generally speaking, momentum measures the rate-of-change of a security's price.** As the price of a security rises, price momentum increases. The faster the security rises (the greater the period-over-period price change), the larger the increase in momentum. Once this rise begins to slow, momentum will also slow. As a security begins to trade flat, momentum starts to actually decline from previous high levels. However, declining momentum in the face of sideways trading is not always a bearish signal. It simply means that momentum is returning to a more median level.

RSI



Momentum indicators employ various formulas to measure price changes. **RSI (a momentum indicator) compares the average price change of the advancing periods with the average change of the declining periods.** On the IBM chart, RSI advanced from October to the end of November. During this period, the stock advanced from the upper 60s to the low 80s. When the stock traded sideways in the first half of December, RSI dropped rather sharply (blue lines). This consolidation in the stock was quite normal and actually healthy. From these lofty levels (near 70), flat price action would be expected to cause a decline in RSI (and momentum). If RSI were trading around 50 and the stock began to trade flat, the indicator would not be expected to decline. The green lines on the chart mark a period of sideways trading in the stock and in RSI. RSI started from a relatively median level, around 50. The subsequent flat price action in the stock also produced relatively flat price action in the indicator and it remains around 50.

Benefits and Drawbacks of Leading Indicators

There are clearly many benefits to using leading indicators. **Early signaling for entry and exit is the main benefit.** Leading indicators generate more signals and allow more opportunities to trade. Early signals can also act to forewarn against a potential strength or weakness. Because they generate more signals, leading indicators are best used in trading markets. These indicators can be used in trending markets, but usually *with* the major trend, *not against* it. In a market that is trending

up, the best use is to help identify oversold conditions for buying opportunities. In a market that is trending down, leading indicators can help identify overbought situations for selling opportunities.

With early signals comes the prospect of higher returns and with higher returns comes the reality of greater risk. More signals and earlier signals mean that the chances of false signals and [whipsaws](#) increase. False signals will increase the potential for losses. [Whipsaws](#) can generate commissions that can eat away profits and test trading stamina.

Lagging Indicators

As their name implies, **lagging indicators** follow the price action and are commonly referred to as trend-following indicators. Rarely, if ever, will these indicators lead the price of a security. Trend-following indicators work best when markets or securities develop strong trends. They are designed to get traders in and keep them in as long as the trend is intact. As such, these indicators are not effective in trading or sideways markets. If used in trading markets, trend-following indicators will likely lead to many false signals and whipsaws. Some popular trend-following indicators include [moving averages](#) (exponential, simple, weighted, variable) and [MACD](#).



The chart above shows the [S&P 500 \(\\$SPX\)](#) with the 20-day simple moving average and the 100-day simple moving average. Using a moving average crossover to generate the signals, there were seven signals over the two years covered in the chart. Over these two years, the system would have been enormously profitable. This is due to the strong trends that developed from Oct-97 to Aug-98 and from Nov-98 to Aug-99. However, notice that as soon as the index starts to move sideways in a trading range, the whipsaws begin. The signals in Nov-97 (sell), Aug-99 (sell) and Sept-99 (buy) were reversed in a matter of days. Had these moving averages been longer (50- and 200-day moving averages), there would have been fewer whipsaws. Had these moving averages been

shorter (10 and 50-day moving average), there would have been more whipsaws, more signals, and earlier signals.

Benefits and Drawbacks of Lagging Indicators

One of the main benefits of trend-following indicators is the ability to catch a move and remain in a move. Provided the market or security in question develops a sustained move, trend-following indicators can be enormously profitable and easy to use. The longer the trend, the fewer the signals and less trading involved.

The benefits of trend-following indicators are lost when a security moves in a trading range. In the S&P 500 example, the index appears to have been range-bound at least 50% of the time. Even though the index trended higher from 1982 to 1999, there have also been large periods of sideways movement. From 1964 to 1980, the index traded within a large range bound by 85 and 110.

Another drawback of trend-following indicators is that signals tend to be late. By the time a moving average crossover occurs, a significant portion of the move has already occurred. The Nov-98 buy signal occurred at 1130, about 19% above the Oct-98 low of 950. **Late entry and exit points can skew the risk/reward ratio.**

The Challenge of Indicators

For technical indicators, there is a trade-off between sensitivity and consistency. In an ideal world, we want an indicator that is sensitive to price movements, gives early signals and has few false signals (whipsaws). If we increase the sensitivity by reducing the number of periods, an indicator will provide early signals, but the number of false signals will increase. If we decrease sensitivity by increasing the number of periods, then the number of false signals will decrease, but the signals will lag and this will skew the [reward-to-risk ratio](#).

The longer a moving average is, the slower it will react and fewer signals will be generated. As the moving average is shortened, it becomes faster and more volatile, increasing the number of false signals. The same holds true for the various momentum indicators. A 14 period RSI will generate fewer signals than a 5 period RSI. The 5 period RSI will be much more sensitive and have more overbought and oversold readings. It is up to each investor to select a time frame that suits his or her trading style and objectives.

Oscillator Types

An oscillator is an indicator that fluctuates above and below a centerline or between set levels as its value changes over time. Oscillators can remain at extreme levels (overbought or oversold) for extended periods, but they cannot trend for a sustained period. In contrast, a security or a cumulative indicator like On-Balance-Volume (OBV) can trend as it continually increases or decreases in value over a sustained period of time.



As the indicator comparison chart shows, oscillator movements are more confined and sustained movements (trends) are limited, no matter how long the time period. Over the two year period, [Moving Average Convergence Divergence \(MACD\)](#) fluctuated above and below zero, touching the zero line about 18 times. Also notice that each time MACD surpassed +80 the indicator pulled back. Even though MACD does not have an upper or lower limit on its range of values, its movements appear confined. OBV, on the other hand, began an uptrend in March 2003 and advanced steadily for the next year. Its movements are not confined and long-term trends can develop.

There are many different types of oscillators and some belong to more than one category. The breakdown of oscillator types begins with two types: **centered oscillators** which fluctuate above and below a center point or line, and **banded oscillators** which fluctuate between overbought and oversold extremes. Generally, centered oscillators are best suited for analyzing the direction of price momentum, while banded oscillators are best suited for identifying overbought and oversold levels.

Centered Oscillators

Centered oscillators fluctuate above and below a central point or line. These oscillators are good for identifying the strength or weakness, or direction, of momentum behind a security's move. In its purest form, momentum is positive (bullish) when a centered oscillator is trading above its center line and negative (bearish) when the oscillator is trading below its center line.

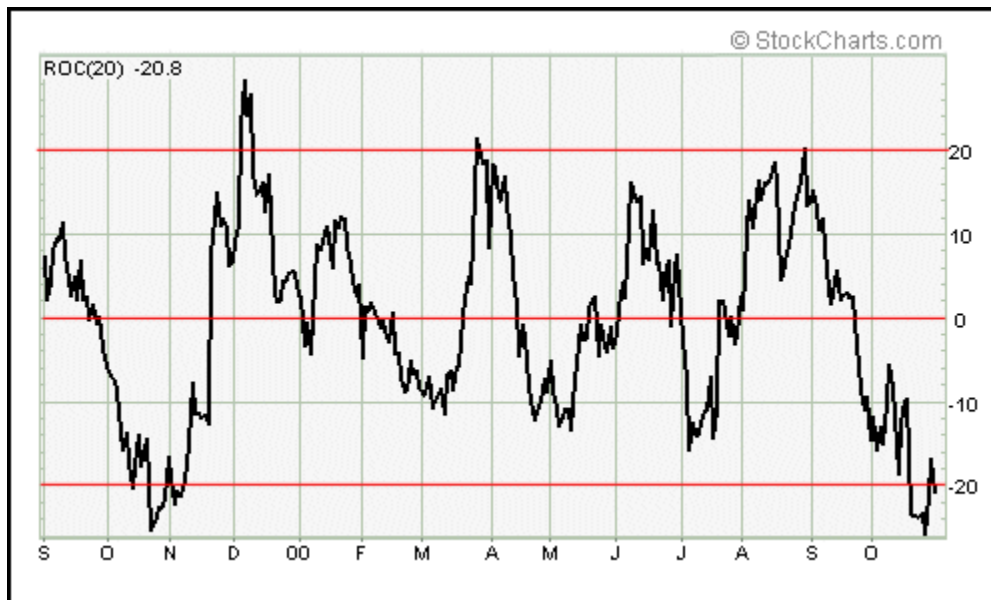
[MACD](#) is an example of a centered oscillator that fluctuates above and below zero. MACD is the difference between the 12-day EMA and 26-day EMA of a security. The further one moving average moves away from the other, the higher the reading. Even though there is no range limit to MACD, extremely large differences between the two moving averages are unlikely to last for long.

MACD

MACD is unique in that it has lagging elements as well as leading elements. Moving averages are lagging indicators and would be classified as trend-following or lagging elements. However, by taking the differences in the moving averages, MACD incorporates aspects of momentum or leading elements. The difference between the moving averages represents the rate of change. By measuring the rate-of-change, MACD becomes a leading indicator, but still with a bit of lag. With the integration of both moving averages and rate-of-change, MACD has forged a unique spot among oscillators as both a lagging and a leading indicator.

ROC

Rate-of-change (ROC) is a centered oscillator that also fluctuates above and below zero. As its name implies, ROC measures the percentage price change over a given time period. For example: 20 day ROC would measure the percentage price change over the last 20 days. The bigger the difference between the current price and the price 20 days ago, the higher the value of the ROC Oscillator. When the indicator is above 0, the percentage price change is positive (bullish). When the indicator is below 0, the percentage price change is negative (bearish).



As with MACD, ROC is not bound by upper or lower limits. This is typical of most centered oscillators and can make it difficult to spot overbought and oversold conditions. This ROC chart indicates that readings above +20% and below -20% represent extremes and are unlikely to last for an extended period of time. However, the only way to gauge that +20% and -20% are extreme readings is from past observations. Also, +20% and -20% represent extremes for this particular security and may not be the same for other securities. Banded oscillators offer a better alternative to gauge extreme price levels.

Banded Oscillators

Banded oscillators fluctuate above and below two bands that signify extreme price levels. The lower band represents oversold readings and the upper band represents overbought readings. These set bands are based on the oscillator and change little from security to security, allowing the users to easily identify overbought and oversold conditions. The [Relative Strength Index](#) (RSI) and the [Stochastic Oscillator](#) are two examples of banded oscillators. (Note: The formulas and rationale behind RSI and the Stochastic Oscillator are more complicated than those for MACD and ROC. As such, calculations are addressed in separate articles.)

Stochastics/RSI



For RSI, the bands for overbought and oversold are usually set at 70 and 30 respectively. A reading greater than 70 would be considered overbought and a reading below 30 would be considered oversold. For the Stochastic Oscillator, a reading above 80 is overbought and a reading below 20 is oversold. Even though these are the recommended band settings, certain securities may not adhere to these ranges and might require more fine-tuning. Making adjustments to the bands is usually a judgment call that will reflect a trader's preferences and the volatility of the security.

Many, but not all, banded oscillators fluctuate within set upper and lower limits. The Relative Strength Index (RSI) is range-bound by 0 and 100 and will never go higher than 100 nor lower than zero. The Stochastic Oscillator is another oscillator with a set range and is bound by 100 and 0 as well. However, the Commodity Channel Index (CCI) is an example of a banded oscillator that is not range bound.

CCI



Pros and Cons of Centered and Banded Oscillators

Centered oscillators are best used to identify the underlying strength or direction of momentum behind a move. Broadly speaking, readings above the center point indicate bullish momentum and readings below the center point indicate bearish momentum. The biggest difference between centered oscillators and banded oscillators is the latter's ability to identify extreme readings. While it is possible to identify extreme readings with centered oscillators, they are not ideal for this purpose. Banded oscillators are best suited to identify overbought and oversold conditions.

Oscillator Signals

Oscillators generate [buy](#) and [sell](#) signals in various ways. Some signals are geared towards early entry, while others appear after the trend has begun. In addition to buy and sell signals, oscillators can signal that something is amiss with the current trend or that the current trend is about to change. Even though oscillators can generate their own signals, it is important to use these signals in conjunction with other aspects of technical analysis. Most oscillators are momentum indicators and only reflect one characteristic of a security's price action. [Volume](#), price patterns and support/resistance levels should also be taken into consideration.

Positive and Negative Divergences

Divergence is a key concept behind many signals for oscillators as well as other indicators. Divergences can serve as a warning that the trend is about to change or set up a buy or sell signal. There are two types of divergences: **positive and negative**. In its most basic form, a **positive** divergence occurs when the indicator advances and the underlying security declines. A **negative** divergence occurs when an indicator declines and the underlying security advances.



On the [Merrill Lynch \(MER\)](#) chart, MACD formed a positive divergence in late October. While MER was trading below its previous reaction low, MACD had yet to penetrate its previous low (green arrows). However, MACD had not turned up and the positive divergence was still just a possibility. When MACD turned up and traded above its 9-day EMA, a positive divergence was confirmed. At this point, other signals came together to create a buy signal. Not only had the stock reached support and gapped up, but there was also a MACD positive divergence and a MACD bullish crossover. (Note: The thick line is the MACD and the thin line is the 9-day EMA of the MACD, which acts as a trigger line. A bullish crossover occurs when MACD moves above its 9-day EMA and a bearish crossover occurs when MACD moves below its 9-day EMA.) After these MACD signals, the stock gapped up the very next day on a huge increase in volume.



On the [IBM](#) chart, the ROC Oscillator formed a negative divergence prior to the decline that began in January. When IBM recorded a high in mid January, the ROC Oscillator failed to surpass its previous high. The stock then began to decline and the ROC Oscillator turned lower as well, thus completing the lower high and the negative divergence. As there was little else to go on at the time, this negative divergence should have been taken as a warning signal. However, when the ROC Oscillator continued to deteriorate and broke below 0 (centerline), it was clear that the stock was weak and vulnerable to a further decline.

Overbought and Oversold Extremes

Banded oscillators are designed to identify overbought and oversold extremes. Since these oscillators fluctuate between extremes, they can be difficult to use in trending markets. Banded oscillators are best used in trading ranges or with securities that are not trending. In a strong trend, users may see many signals that are not really valid. If a stock is in a strong uptrend, buying on oversold conditions will work much better than selling on overbought conditions.

In a strong trend, oscillator signals against the direction of the underlying trend are less robust than those with the trend. **The trend is your friend and it can be dangerous to fight it.** Even though securities develop trends, they also fluctuate within those trends. If a stock is in a strong uptrend, buying when oscillators reach oversold conditions (and near support tests) will work much better than selling on overbought conditions. During a strong downtrend, selling when oscillators reach overbought conditions would work much better. If the path of least resistance is up (down), then acting on only bullish (bearish) signals would be in harmony with the trend. Attempts to trade against the trend carry added risk.

When the trend is strong, banded oscillators can remain near overbought or oversold levels for extended periods. An overbought condition does not indicate that it is time to sell, nor does an oversold condition indicate that it is time to buy. In a strong uptrend, an oscillator can reach an overbought condition and remain so as the underlying security continues to advance. A negative divergence may form, but a bearish signal against the uptrend should be considered suspect. In a strong downtrend, an oscillator can reach an oversold condition and remain so as the underlying security continues to decline. Similarly, a positive divergence may form, but a bullish signal against the downtrend should be considered suspect. This does not mean counter-trend signals won't work, but they should be viewed in proper context and considered with other aspects of technical analysis.

The first step in using banded oscillators is to identify the upper and lower bands that mark the extremities. For RSI, anything below 30 and above 70 represents an extremity. For the Stochastic Oscillator, anything below 20 and above 80 represents an extremity. We know that when RSI is below 30 or the Stochastic Oscillator is below 20, an oversold condition exists. By that same token, when RSI is above 70 and the Stochastic Oscillator is above 80, an overbought condition exists. **Identification of an overbought or oversold condition should serve as an alert to monitor other technical aspects** (*price pattern, trend, support, resistance, candlesticks, volume or other indicators*) **with extra vigilance.**

The simplest method to generate signals is to note when the upper and lower bands are crossed. If a security is overbought (above 70 for RSI and 80 for the Stochastic Oscillator) and moves back down below the upper band, then a sell signal is generated. If a security is oversold (below 30 for RSI and 20 for the Stochastic Oscillator) and moves back above the lower band, then a buy signal is generated. Keep in mind that these are the simplest methods.

Simple signals can also be combined with divergences and moving average crossovers to create more robust signals. Once a stock becomes oversold, traders may look for a positive divergence to develop in the RSI and then a cross above 30. With the Stochastic Oscillator overbought, traders may look for a negative divergence and combine that with a moving average crossover and a break below 80 to generate a signal. (Note: The Stochastic Oscillator is usually plotted with a 3-day simple moving average that acts as the trigger line. When the Stochastic Oscillator crosses above the trigger line it is a bullish moving average crossover, and when it crosses below it is bearish).



The [Cisco \(CSCO\)](#) chart shows that the Stochastic Oscillator can change from oversold to overbought quite quickly. Much depends on the number of time periods used to calculate the oscillator. A 10-day Slow Stochastic Oscillator will be more [volatile](#) than a 20-day. The thin green lines indicate when the Stochastic Oscillator touched or crossed the oversold line at 20. The thin red lines indicate when Stochastic Oscillator touched or crossed the overbought line. CSCO was in a strong up trend at the time and experiencing little selling pressure. Therefore, trying to sell when the oscillator crossed back below 80 would have been against the uptrend and not the proper strategy. When a security is trending up or has a bullish bias, traders would be better off looking for oversold conditions to generate buying opportunities.

We can also see that much of the upside for the stock occurred after the Stochastic Oscillator advanced above 80 (thin red lines). The green circle in August shows a buy signal that was generated with three separate items: one, the oscillator moved above 20 from oversold conditions; two, the oscillator moved above its 3-day MA; and three, the oscillator formed a positive divergence. Confirmation from these three items makes for a more robust signal. After the buy signal, the oscillator was in overbought territory a mere 4 days later. However, the stock continued its advance for 2-3 weeks before reaching its high.



The [Microsoft \(MSFT\)](#) chart reveals trading opportunities with the Relative Strength Index (RSI). Because a 14-period RSI rarely moved below 30 and above 70, a 10-period RSI was chosen to increase sensitivity. With the intermediate-term and long-term trends decidedly bearish, savvy traders could have sold short each time RSI reached overbought (black vertical lines). More aggressive traders could have played the long side each time RSI dipped below 30 and then moved back above this oversold level. The first two buy signals were generated with a positive divergence and a move above 30 from oversold conditions. The third buy signal came after RSI briefly dipped below 30. Keep in mind that these three signals were against the larger downtrend and trading strategies should be adjusted accordingly.

Centerline Crossovers

As the name implies, centerline crossover signals apply mainly to centered oscillators that fluctuate above and below a centerline. Traders have been also known to use centerline crosses with RSI in order validate a divergence or signal generated from an overbought or oversold reading. However, most banded oscillators, such as RSI and Stochastics, rely on divergences and overbought/oversold levels to generate signals. The middle ground is a bit of a no man's land for banded oscillators and is probably best left to other tools. For our purposes, the analysis of centerline crossovers will focus on centered oscillators such as [Chaikin Money Flow](#), [MACD](#) and [Rate-of-Change](#) (ROC).

A centerline crossover is sometimes interpreted as a [buy](#) or [sell](#) signal. A buy signal would be generated with a cross above the centerline and a sell signal with a cross below the centerline. For MACD or ROC, a cross above or below zero would act as a signal.

Movements above or below the centerline indicate that momentum has changed from either **positive to negative** or **negative to positive**. When a centered momentum oscillator advances above its centerline, momentum turns positive and could be considered bullish. When a centered momentum oscillator declines below its centerline, momentum turns negative and could be considered bearish.



On this [Intel \(INTC\)](#) chart with MACD and ROC, there have been a number of signals generated from the centerline crossover. There were a couple of excellent signals, but there were also plenty of false signals and [whipsaws](#). This highlights some of the challenges associated with trading oscillator signals. Also, it stresses the importance of combining various signals in order to create more robust buy and sell signals. Some traders also criticize centerline crossover signals as being too late and missing too much of the move.

A centerline crossover can also act as a [confirmation](#) signal to validate a previous signal or reinforce the current trend. If there were a positive [divergence](#) and bullish [moving average](#) crossover, then a subsequent advance above the centerline would confirm the previous buy signal. Failure of the

oscillator to move above the centerline could be seen as a non-confirmation and act as an alert that something was amiss.



On the [Intel \(INTC\)](#) chart with MACD, the centerline crossover acts as the third in a series of bullish signals. Even after the third signal, Intel still has plenty of upside left.

1. There was the higher low forming that signaled a potential positive divergence.
2. There was the bullish moving average crossover to confirm the positive divergence.
3. And finally, there was the bullish centerline crossover.

Some traders would worry about missing too much of the move by waiting for the third and final confirmation. However, this can be a more reliable signal and help to avoid whipsaws and false signals. It is true that waiting for the third signal will reduce profits, but it can also help reduce risk.



[Chaikin Money Flow](#) is an example of a centered oscillator that places importance on crosses above and below the centerline. Divergences, overbought levels and oversold levels are all secondary to the absolute level of the indicator. The direction of the oscillator's movement is important, but needs to be placed in the context of the absolute level. The longer the oscillator is above zero, the more evidence of accumulation. The longer the oscillator is below zero, the more evidence of distribution. **Hence, Chaikin Money Flow is considered to be bullish when the oscillator is trading above zero and bearish when trading below zero.**

On the [IBM](#) chart, Chaikin Money Flow began to turn down in July. At this time, the stock was declining with the market and the decline in the oscillator was normal. However, in the second half of August, concerns began to grow when the oscillator failed to continue up with the stock and fell below zero. As the stock advanced further, Chaikin Money Flow continued to deteriorate. This served as a signal that something was amiss.

Pros and Cons of Oscillator Signals

Banded oscillators are best used to identify overbought and oversold conditions. However, overbought is not meant to act as a sell signal, and oversold is not meant to act as a buy signal. Overbought and oversold situations serve as an alert that conditions are reaching extreme levels and close attention should be paid to the price action and other indicators.

To improve the robustness of oscillator signals, traders can look for multiple signals. The criteria for a buy or sell signal could depend on three separate yet confirming signals. A buy signal might be generated with an oversold reading, positive divergence and bullish moving average crossover. Conversely, a sell signal might be generated from a negative divergence, bearish moving average crossover and bearish centerline crossover.

Traditional chart pattern analysis can also be applied to oscillators. This is a bit trickier, but can help to identify the strength behind an oscillator's move. Looking for higher highs or lower lows can help confirm previous analysis. A trend line breakout can signal that a change in the direction of the momentum is imminent.

It is dangerous to trade an oscillator signal against the major trend of the market. In bull moves, it is best to look for buying opportunities through oversold signals, positive divergences, bullish moving average crossovers and bullish centerline crossovers. In bear moves, it is best to look for selling opportunities through overbought signals, negative divergences, bearish moving average crossovers and bearish centerline crossovers.

And finally, oscillators are most effective when used in conjunction with pattern analysis, support/resistance identification, trend identification and other technical analysis tools. By being aware of the broader picture, oscillator signals can be put into context. It is important to identify the current trend or even to ascertain if the security is trending at all. Oscillator readings and signals can have different meaning in differing circumstances. By using other analysis techniques in conjunction with oscillator reading, the chances of success can be greatly enhanced

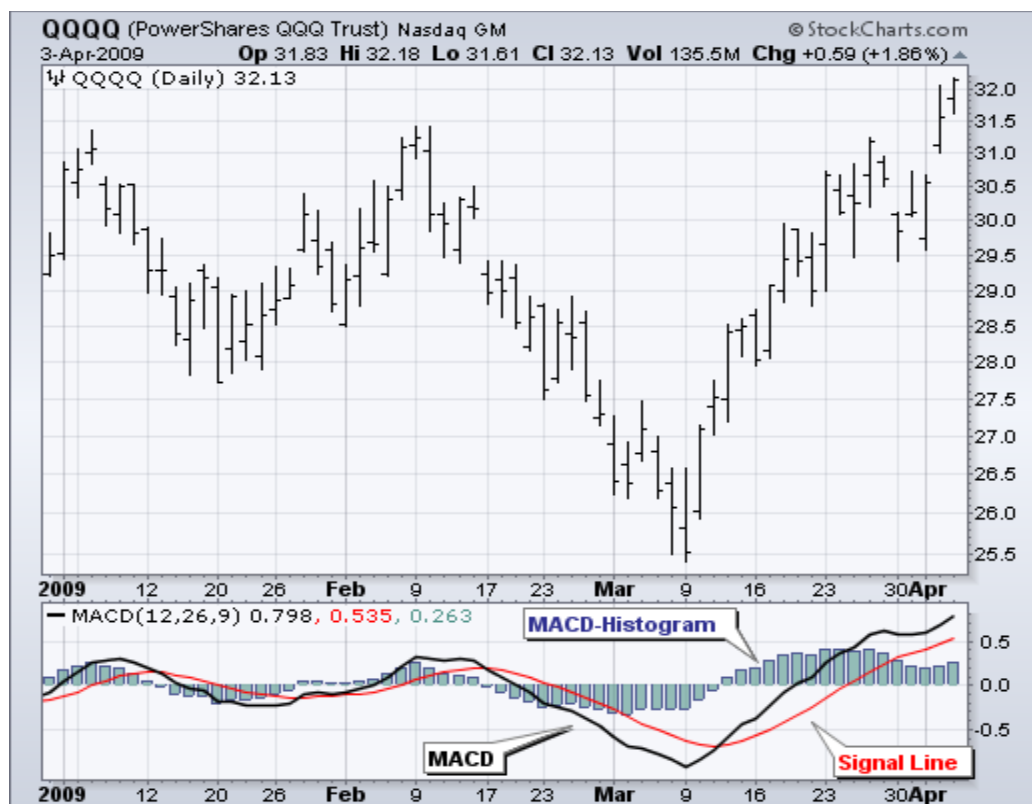
Moving Average Convergence/Divergence Oscillator (MACD)

Introduction

Developed by Gerald Appel in the late seventies, the Moving Average Convergence/Divergence oscillator (MACD) is one of the simplest and most effective momentum indicators available. The MACD turns two trend-following indicators, [moving averages](#), into a momentum oscillator by subtracting the longer moving average from the shorter moving average. As a result, the MACD offers the best of both worlds: **trend following and momentum**. The MACD fluctuates above and below the zero line as the moving averages converge, cross and diverge. Traders can look for signal line crossovers, centerline crossovers and divergences to generate signals. Because the MACD is unbounded, it is not particularly useful for identifying overbought and oversold levels.

Note: MACD can be pronounced as either “Mac-Dee” or “M-A-C-D.”

Here is an example chart with the MACD indicator in the lower panel:



Calculation

MACD Line: (12-day EMA - 26-day EMA)

Signal Line: 9-day EMA of MACD Line

MACD Histogram: MACD Line - Signal Line

The MACD Line is the 12-day [Exponential Moving Average](#) (EMA) less the 26-day EMA. Closing prices are used for these moving averages. A 9-day EMA of the MACD Line is plotted with the indicator to act as a signal line and identify turns. The MACD Histogram represents the difference between MACD and its 9-day EMA, the Signal line. The histogram is positive when the MACD Line is above its Signal line and negative when the MACD Line is below its Signal line.

The values of **12, 26 and 9** are the typical setting used with the MACD, however other values can be substituted depending on your trading style and goals.

Interpretation

As its name implies, the MACD is all about the convergence and divergence of the two moving averages. Convergence occurs when the moving averages move towards each other. Divergence occurs when the moving averages move away from each other. The shorter moving average (12-day) is faster and responsible for most MACD movements. The longer moving average (26-day) is slower and less reactive to price changes in the underlying security.

The MACD Line oscillates above and below the zero line, which is also known as the centerline. These crossovers signal that the 12-day EMA has crossed the 26-day EMA. The direction, of course, depends on the direction of the moving average cross. Positive MACD indicates that the 12-day EMA is above the 26-day EMA. Positive values increase as the shorter EMA diverges further from the longer EMA. **This means upside momentum is increasing.** Negative MACD values indicates that the 12-day EMA is below the 26-day EMA. Negative values increase as the shorter EMA diverges further below the longer EMA. **This means downside momentum is increasing.**



In the example above, the yellow area shows the MACD Line in negative territory as the 12-day EMA trades below the 26-day EMA. The initial cross occurred at the end of September (black arrow) and the MACD moved further into negative territory as the 12-day EMA diverged further from the 26-day EMA. The orange area highlights a period of positive MACD values, which is when the 12-day EMA was above the 26-day EMA. Notice that the MACD Line remained below 1 during this period (red dotted line). This means the distance between the 12-day EMA and 26-day EMA was less than 1 point, which is not a big difference.

Signal Line Crossovers

Signal line crossovers are the most common MACD signals. The signal line is a 9-day EMA of the MACD Line. As a moving average of the indicator, it trails the MACD and makes it easier to spot MACD turns. A bullish crossover occurs when the MACD turns up and crosses above the signal line. A bearish crossover occurs when the MACD turns down and crosses below the signal line. Crossovers can last a few days or a few weeks, it all depends on the strength of the move.

Due diligence is required before relying on these common signals. Signal line crossovers at positive or negative extremes should be viewed with caution. Even though the MACD does not have upper and lower limits, chartists can estimate historical extremes with a simple visual assessment. It takes a strong move in the underlying security to push momentum to an extreme. Even though the move

may continue, momentum is likely to slow and this will usually produce a signal line crossover at the extremities. Volatility in the underlying security can also increase the number of crossovers.

The chart below shows IBM with its 12-day EMA (green), 26-day EMA (red) and the 12,26,9 MACD in the indicator window. There were eight signal line crossovers in six months: four up and four down. There were some good signals and some bad signals. The yellow area highlights a period when the MACD Line surged above 2 to reach a positive extreme. There were two bearish signal line crossovers in April and May, but IBM continued trending higher. Even though upward momentum slowed after the surge, upward momentum was still stronger than downside momentum in April-May. The third bearish signal line crossover in May resulted in a good signal.



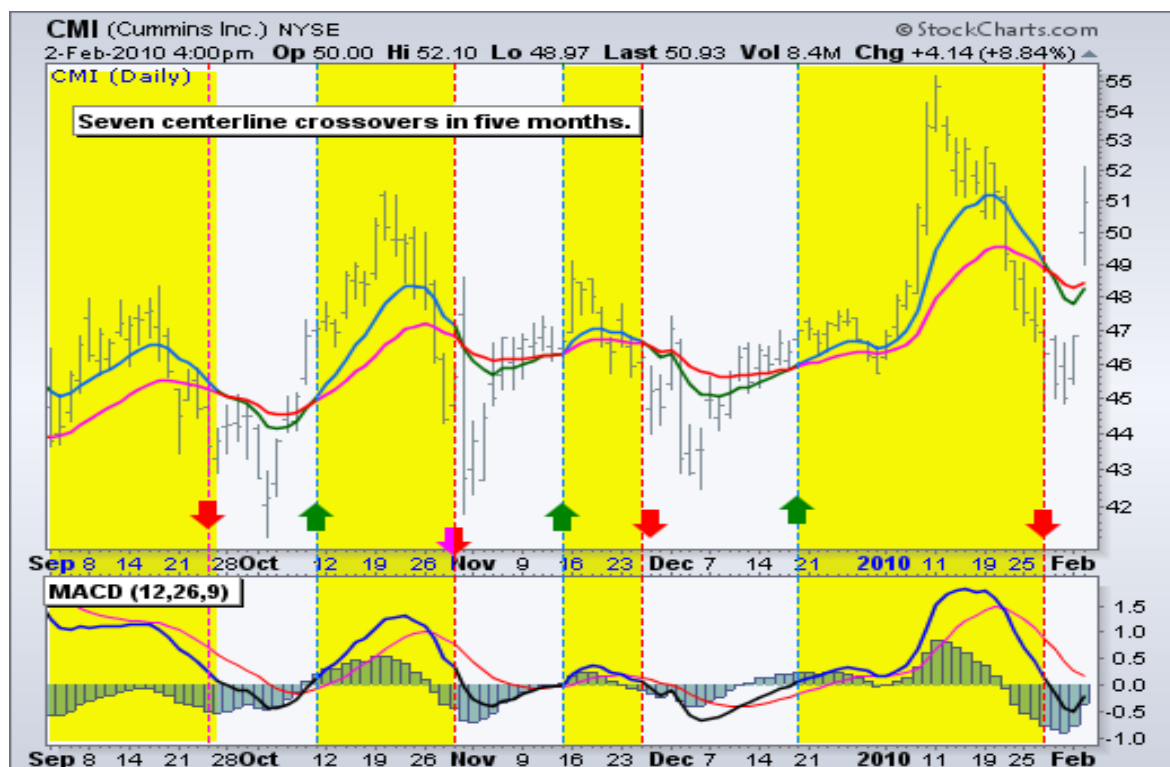
Centerline Crossovers

Centerline crossovers are the next most common MACD signals. A bullish centerline crossover occurs when the MACD Line moves above the zero line to turn positive. This happens when the 12-day EMA of the underlying security moves above the 26-day EMA. A bearish centerline crossover occurs when the MACD moves below the zero line to turn negative. This happens when the 12-day EMA moves below the 26-day EMA.

Centerline crossovers can last a few days or a few months. It all depends on the strength of the trend. The MACD will remain positive as long as there is a sustained uptrend. The MACD will remain negative when there is a sustained downtrend. The next chart shows Pulte Homes (PHM) with at least four centerline crosses in nine months. The resulting signals worked well because strong trends emerged with these centerline crossovers.



Below is a chart of Cummins Inc (CMI) with seven centerline crossovers in five months. In contrast to Pulte Homes, these signals would have resulted in numerous whipsaws because strong trends did not materialize after the crossovers.



The next chart shows 3M (MMM) with a bullish centerline crossover in late March 2009 and a bearish centerline crossover in early February 2010. This signal lasted 10 months. In other words, the 12-day EMA was above the 26-day EMA for 10 months. This was one strong trend.



Divergences

Divergences form when the MACD diverges from the price action of the underlying security. A bullish divergence forms when a security records a lower low and the MACD forms a higher low. The lower low in the security affirms the current downtrend, but the higher low in the MACD shows less downside momentum. Despite less downside momentum, downside momentum is still outpacing upside momentum as long as the MACD remains in negative territory. Slowing downside momentum can sometimes foreshadow a trend reversal or a sizable rally.

The next chart shows Google (GOOG) with a bullish divergence in October-November 2008. First, notice that we are using closing prices to identify the divergence. The MACD's moving averages are based on closing prices and we should consider closing prices in the security as well. Second, notice that there were clear reaction lows (troughs) as both Google and its MACD Line bounced in October and late November. Third, notice that the MACD formed a higher low as Google formed a lower low in November. The MACD turned up with a bullish divergence with a signal line crossover in early December. Google confirmed a reversal with resistance breakout.



A bearish divergence forms when a security records a higher high and the MACD Line forms a lower high. The higher high in the security is normal for an uptrend, but the lower high in the MACD shows less upside momentum. Even though upside momentum may be less, upside momentum is still

outpacing downside momentum as long as the MACD is positive. Waning upward momentum can sometimes foreshadow a trend reversal or sizable decline.

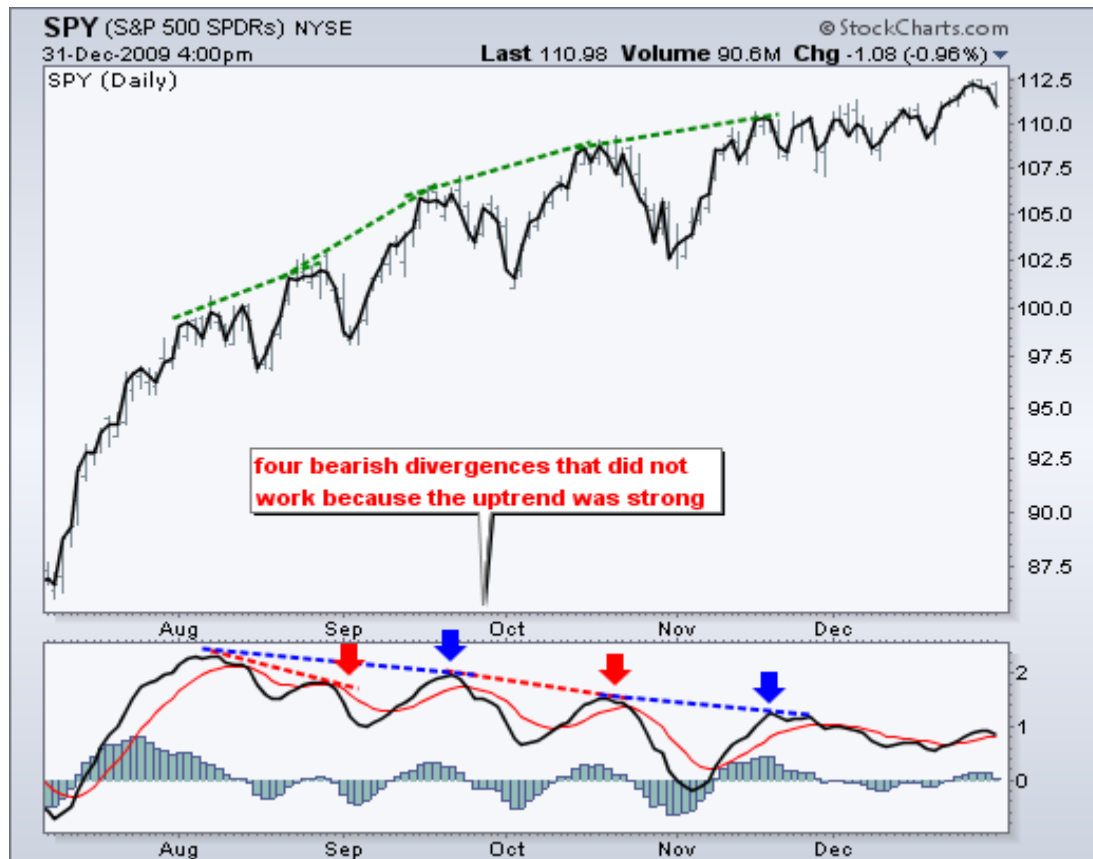
Below we see Gamestop (GME) with a large bearish divergence from August to October. The stock forged a higher high above 28, but the MACD Line fell short of its prior high and formed a lower high. The subsequent signal line crossover and support break in the MACD were bearish. On the price chart, notice how broken support turned into resistance on the throwback bounce in November (red dotted line). This throwback provided a second chance to sell or sell short.



Divergences should be taken with caution. Bearish divergences are commonplace in a strong uptrend, while bullish divergences occur often in a strong downtrend. Yes, you read that right. Uptrends often start with a strong advance that produces a surge in upside momentum (MACD). Even though the uptrend continues, it continues at a slower pace that causes the MACD to decline from its highs. Upside momentum may not be as strong, but upside momentum is still outpacing downside momentum as long as the MACD Line is above zero. The opposite occurs at the beginning of a strong downtrend.

The next chart shows the S&P 500 ETF (SPY) with four bearish divergences from August to November 2009. Despite less upside momentum, the ETF continued higher because the uptrend was strong. Notice how SPY continued its series of higher highs and higher lows. Remember,

upside momentum is stronger than downside momentum as long as its MACD is positive. Its MACD (momentum) may have been less positive (strong) as the advance extended, but it was still largely positive.



Conclusions

The MACD indicator is special because it brings together momentum and trend in one indicator. This unique blend of trend and momentum can be applied to daily, weekly or monthly charts. The standard setting for MACD is the difference between the 12 and 26-period EMAs. Chartists looking for more sensitivity may try a shorter short-term moving average and a longer long-term moving average. MACD(5,35,5) is more sensitive than MACD(12,26,9) and might be better suited for weekly charts. Chartists looking for less sensitivity may consider lengthening the moving averages. A less sensitive MACD will still oscillate above/below zero, but the centerline crossovers and signal line crossovers will be less frequent.

The MACD is not particularly good for identifying overbought and oversold levels. Even though it is possible to identify levels that are historically overbought or oversold, the MACD does not have any upper or lower limits to bind its movement. During sharp moves, the MACD can continue to over-extend beyond its historical extremes.

Finally, remember that the MACD Line is calculated using the actual difference between two moving averages. This means MACD values are dependent on the price of the underlying security. The MACD values for a \$20 stock may range from -1.5 to 1.5, while the MACD values for a \$100 may range from -10 to +10. It is not possible to compare MACD values for a group of securities with varying prices. If you want to compare momentum readings, you should use [the Percentage Price Oscillator \(PPO\)](#), instead of the MACD.

Relative Strength Index (RSI)

Introduction

Developed by J. Welles Wilder, the Relative Strength Index (RSI) is a momentum oscillator that measures the speed and change of price movements. RSI oscillates between zero and 100. Traditionally, and according to Wilder, RSI is considered overbought when above 70 and oversold when below 30. Signals can also be generated by looking for divergences, failure swings and centerline crossovers. RSI can also be used to identify the general trend.

RSI is an extremely popular [momentum indicator](#) that has been featured in a number of articles, interviews and books over the years. In particular, Constance Brown's book, *Technical Analysis for the Trading Professional*, features the concept of bull market and bear market ranges for RSI. Andrew Cardwell, Brown's RSI mentor, introduced positive and negative reversals for RSI. In addition, Cardwell turned the notion of divergence, literally and figuratively, on its head.

Wilder features RSI in his 1978 book, *New Concepts in Technical Trading Systems*. This book also includes the Parabolic SAR, Average True Range and the Directional Movement Concept (ADX). Despite being developed before the computer age, Wilder's indicators have stood the test of time and remain extremely popular.

Calculation

$$RSI = 100 - \frac{100}{1 + RS}$$
$$RS = \text{Average Gain} / \text{Average Loss}$$

To simplify the calculation explanation, RSI has been broken down into its basic components: **RS**, **Average Gain** and **Average Loss**. This RSI calculation is based on 14 periods, which is the default suggested by Wilder in his book. Losses are expressed as positive values, not negative values.

The very first calculations for average gain and average loss are simple 14 period averages.

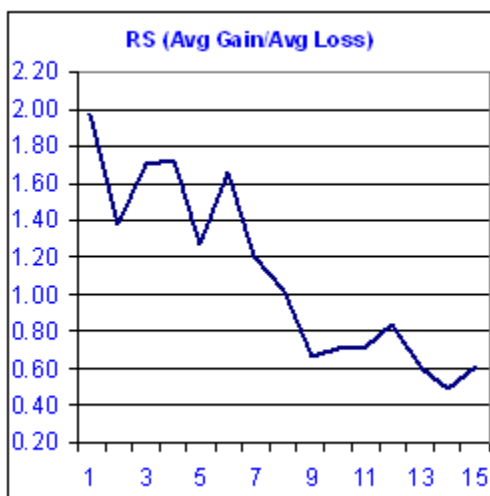
- First Average Gain = Sum of Gains over the past 14 periods / 14.
- First Average Loss = Sum of Losses over the past 14 periods / 14

The second, and subsequent, calculations are based on the prior averages and the current gain loss:

- Average Gain = [(previous Average Gain) x 13 + current Gain] / 14.
- Average Loss = [(previous Average Loss) x 13 + current Loss] / 14.

Taking the prior value plus the current value is a smoothing technique similar to that used in exponential moving average calculation. This also means that RSI values become more accurate as the calculation period extends. SharpCharts uses at least 250 data points prior to the starting date of any chart (assuming that much data exists) when calculating its RSI values. To exactly replicate our RSI numbers, a formula will need at least 250 data points.

Wilder's formula normalizes RS and turns it into an oscillator that fluctuates between zero and 100. In fact, a plot of RS looks exactly the same as a plot of RSI. The normalization step makes it easier to identify extremes because RSI is range bound. RSI is 0 when the Average Gain equals zero. Assuming a 14-period RSI, a zero RSI value means prices moved lower all 14 periods. There were no gains to measure. RSI is 100 when the Average Loss equals zero. This means prices moved higher all 14 periods. There were no losses to measure.



	Date	QQQQ Close	Change	Gain	Loss	Avg Gain	Avg Loss	RS	14-day RSI
1	14-Dec-09	44.34							
2	15-Dec-09	44.09	-0.25		0.25				
3	16-Dec-09	44.15	0.06	0.06					
4	17-Dec-09	43.61	-0.54		0.54				
5	18-Dec-09	44.33	0.72	0.72					
6	21-Dec-09	44.83	0.50	0.50					
7	22-Dec-09	45.10	0.27	0.27					
8	23-Dec-09	45.42	0.33	0.33					
9	24-Dec-09	45.84	0.42	0.42					
10	28-Dec-09	46.08	0.24	0.24					
11	29-Dec-09	45.89	-0.19		0.19				
12	30-Dec-09	46.03	0.14	0.14					
13	31-Dec-09	45.61	-0.42		0.42				
14	4-Jan-10	46.28	0.67	0.67				RS	RSI
15	5-Jan-10	46.28				0.24	0.10	2.39	70.53
16	6-Jan-10	46.00	-0.28		0.28	0.22	0.11	1.97	66.32
17	7-Jan-10	46.03	0.03	0.03		0.21	0.10	1.99	66.55
18	8-Jan-10	46.41	0.38	0.38		0.22	0.10	2.27	69.41
19	11-Jan-10	46.22	-0.19		0.19	0.20	0.10	1.97	66.36
20	12-Jan-10	45.64	-0.58		0.58	0.19	0.14	1.38	57.97
21	13-Jan-10	46.21	0.57	0.57		0.22	0.13	1.70	62.93
22	14-Jan-10	46.25	0.04	0.04		0.20	0.12	1.72	63.26
23	15-Jan-10	45.71	-0.54		0.54	0.19	0.15	1.28	56.06
24	19-Jan-10	46.45	0.74	0.74		0.23	0.14	1.66	62.38
25	20-Jan-10	45.78	-0.67		0.67	0.21	0.18	1.21	54.71
26	21-Jan-10	45.35	-0.43		0.43	0.20	0.19	1.02	50.42
27	22-Jan-10	44.03	-1.33		1.33	0.18	0.27	0.67	39.99
28	25-Jan-10	44.18	0.15	0.15		0.18	0.26	0.71	41.46
29	26-Jan-10	44.22	0.04	0.04		0.17	0.24	0.72	41.87
30	27-Jan-10	44.57	0.35	0.35		0.18	0.22	0.83	45.46
31	28-Jan-10	43.42	-1.15		1.15	0.17	0.29	0.59	37.30
32	29-Jan-10	42.66	-0.76		0.76	0.16	0.32	0.49	33.08
33	1-Feb-10	43.13	0.47	0.47		0.18	0.30	0.61	37.77

Here's [an Excel Spreadsheet](#) that shows the start of an RSI calculation in action.

Note: The smoothing process affects RSI values. RS values are smoothed after the first calculation. Average Loss equals the sum of the losses divided by 14 for the first calculation. Subsequent calculations multiply the prior value by 13, add the most recent value and then divide the total by 14. This creates a smoothing affect. The same applies to Average Gain. Because of this smoothing, RSI values may differ based on the total calculation period. 250 periods will allow for more smoothing than 30 periods and this will slightly affect RSI values. Stockcharts.com goes back 250-days when possible. If Average Loss equals zero, a "divide by zero" situation occurs for RS and RSI is set to 100 by definition. Similarly, RSI equals 0 when Average Gain equals zero.

Parameters

The default look-back period for RSI is 14, but this can be lowered to increase sensitivity or raised to decrease sensitivity. 10-day RSI is more likely to reach overbought or oversold levels than 20-day RSI. The look-back parameters also depend on a security's volatility. 14-day RSI for internet retailer Amazon (AMZN) is more likely to become overbought or oversold than 14-day RSI for Duke Energy (DUK), a utility.

RSI is considered overbought when above 70 and oversold when below 30. These traditional levels can also be adjusted to better fit the security or analytical requirements. Raising overbought to 80 or lowering oversold to 20 will reduce the number of overbought/oversold readings. Short-term traders sometimes use 2-period RSI to look for overbought readings above 80 and oversold readings below 20.

Overbought-Oversold

Wilder considered RSI **overbought** above 70 and **oversold** below 30. Chart 3 shows McDonalds with 14-day RSI. This chart features daily bars in gray with a 1-day SMA in pink to highlight closing prices because RSI is based on closing prices. Working from left to right, the stock became oversold in late July and found support around 44 (1). Notice that the bottom **evolved** after the oversold reading. The stock did not bottom as soon as the oversold reading appeared. Bottoming can be a process. From oversold levels, RSI moved above 70 in mid September to become overbought. Despite this overbought reading, the stock did not decline. Instead, the stock stalled for a couple weeks and then continued higher. Three more overbought readings occurred before the stock finally peaked in December (2). Momentum oscillators can become overbought (oversold) and remain so in a strong up (down) trend. The first three overbought readings foreshadowed consolidations. The fourth coincided with a significant peak. RSI then moved from overbought to oversold in January. The final bottom did not coincide with the initial oversold reading as the stock ultimately bottomed a few weeks later around 46 (3).



Like many momentum oscillators, overbought and oversold readings for RSI work best when prices move sideways within a range. Chart 4 shows MEMC Electronics (WFR) trading between 13.5 and 21 from April to September 2009. The stock peaked soon after RSI reached 70 and bottomed soon after the stock reached 30.



Divergences

According to Wilder, divergences signal a potential reversal point because directional momentum does not confirm price. A bullish divergence occurs when the underlying security makes a lower low and RSI forms a higher low. RSI does not confirm the lower low and this shows strengthening momentum. A bearish divergence forms when the security records a higher high and RSI forms a lower high. RSI does not confirm the new high and this shows weakening momentum. Chart 5 shows Ebay (EBAY) with a bearish divergence in August-October. The stock moved to new highs in September-October, but RSI formed lower highs for the bearish divergence. The subsequent breakdown in mid October confirmed weakening momentum.



A bullish divergence formed in January-March. The bullish divergence formed with Ebay moving to new lows in March and RSI holding above its prior low. RSI reflected less downside momentum during the February-March decline. The mid March breakout confirmed improving momentum. Divergences tend to be more robust when they form after an overbought or oversold reading.

Before getting too excited about divergences as great trading signals, it must be noted that divergences are misleading in a strong trend. A strong uptrend can show numerous bearish divergences before a top actually materializes. Conversely, bullish divergences can appear in a strong downtrend - and yet the downtrend continues. Chart 6 shows the S&P 500 ETF (SPY) with three bearish divergences and a continuing uptrend. These bearish divergences may have warned of a short-term pullback, but there was clearly no major trend reversal.



Failure Swings

Wilder also considered failure swings as strong indications of an impending reversal. Failure swings are independent of price action. In other words, failure swings focus solely on RSI for signals and ignore the concept of divergences. A bullish failure swing forms when RSI moves below 30 (oversold), bounces above 30, pulls back, holds above 30 and then breaks its prior high. It is basically a move to oversold levels and then a higher low above oversold levels. Chart 7 shows Research in Motion (RIMM) with 10-day RSI forming a bullish failure swing.



A bearish failure swing forms when RSI moves above 70, pulls back, bounces, fails to exceed 70 and then breaks its prior low. It is basically a move to overbought levels and then a lower high below overbought levels. Chart 8 shows Texas Instruments (TXN) with a bearish failure swing in May-June 2008.



Trend ID

In *Technical Analysis for the Trading Professional*, Constance Brown suggests that oscillators do not travel between 0 and 100. This also happens to be the name of the first chapter. Brown identifies a bull market range and a bear market for RSI. RSI tends to fluctuate between 40 and 90 in a bull market (uptrend) with the 40-50 zones acting as support. These ranges may vary depending on RSI parameters, strength of trend and volatility of the underlying security. Chart 9 shows 14-week RSI for SPY during the bull market from 2003 until 2007. RSI surged above 70 in late 2003 and then moved into its bull market range (40-90). There was one overshoot below 40 in July 2004, but RSI held the 40-50 zone at least five times from January 2005 until October 2007 (green arrows). In fact, notice that pullbacks to this zone provided low risk entry points to participate in the uptrend.



On the flip side, RSI tends to fluctuate between 10 and 60 in a bear market (downtrend) with the 50-60 zone acting as resistance. Chart 10 shows 14-day RSI for the US Dollar Index (\$USD) during its 2009 downtrend. RSI moved to 30 in March to signal the start of a bear range. The 40-50 zone subsequently marked resistance until a breakout in December.



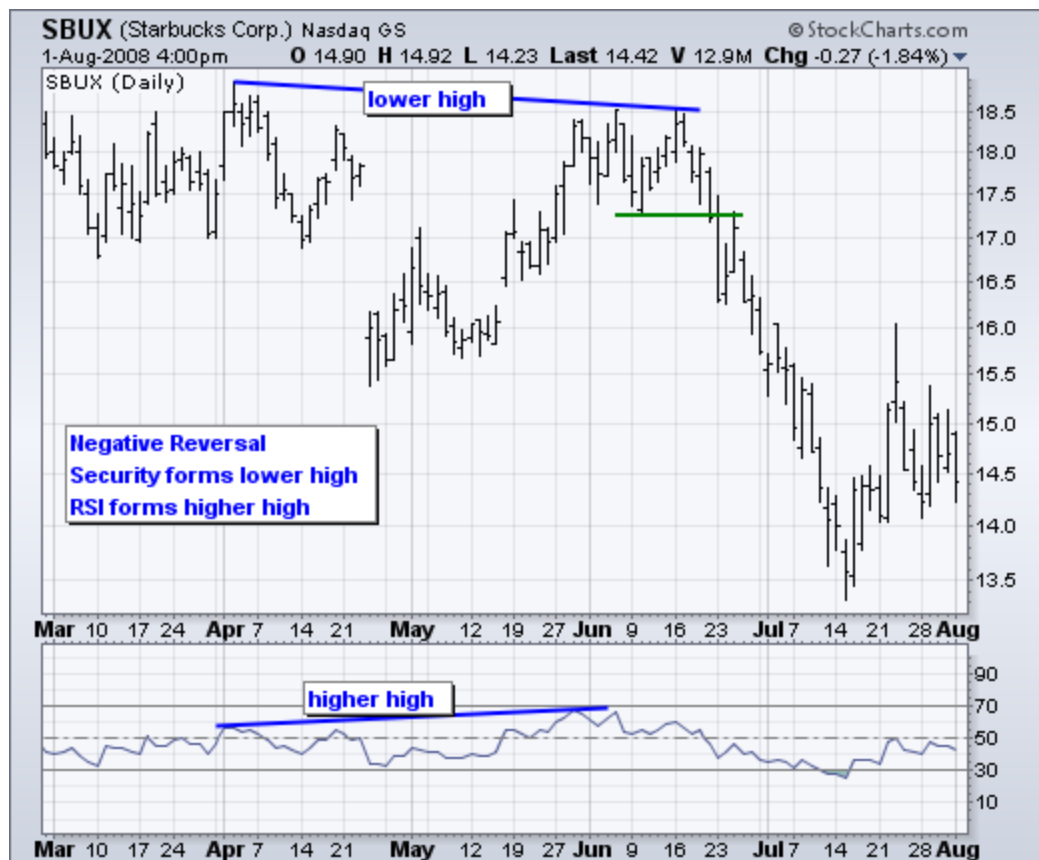
Positive-Negative Reversals

Andrew Cardwell developed positive and negative reversals for RSI, which are the opposite of bearish and bullish divergences. Cardwell's books are out of print, but he does offer seminars detailing these methods. Constance Brown credits Andrew Cardwell for her RSI enlightenment. Before discussing the reversal technique, it should be noted that Cardwell's interpretation of divergences differs from Wilder. Cardwell considered bearish divergences as bull market phenomenon. In other words, bearish divergences are more likely to form in uptrends. Similarly, bullish divergences are considered bear market phenomenon indicative of a downtrend.

A positive reversal forms when RSI forges a lower low and the security forms a higher low. This lower low is not at oversold levels, but usually somewhere between 30 and 50. Chart 11 shows MMM with a positive reversal forming in June 2009. MMM broke resistance a few weeks later and RSI moved above 70. Despite weaker momentum with a lower low in RSI, MMM held above its prior low and showed underlying strength. In essence, price action overruled momentum.



A negative reversal is the opposite of a positive reversal. RSI forms a higher high, but the security forms a lower high. Again, the higher high is usually just below overbought levels in the 50-70 area. Chart 12 shows Starbucks (SBUX) forming a lower high as RSI forms a higher high. Even though RSI forged a new high and momentum was strong, the price action failed to confirm as lower high formed. This negative reversal foreshadowed the big support break in late June and sharp decline.



Conclusions

RSI is a versatile momentum oscillator that has stood the test of time. Despite changes in [volatility](#) and the markets over the years, RSI remains as relevant now as it was in Wilder's days. While Wilder's original interpretations are useful to understanding the indicator, the work of Brown and Cardwell takes RSI interpretation to a new level. Adjusting to this level takes some rethinking on the part of the traditionally schooled chartists. Wilder considers overbought conditions ripe for a reversal, but overbought can also be a sign of strength. Bearish divergences still produce some good sell signals, but chartists must be careful in strong trends when bearish divergences are actually normal. Even though the concept of positive and negative reversals may seem to undermine Wilder's interpretation, the logic makes sense and Wilder would hardly dismiss the value of putting more emphasis on price action. Positive and negative reversals put price action of the underlying security first and the indicator second, which is the way it should be. Bearish and bullish divergences place the indicator first and price action second. By putting more emphasis on price action, the concept of positive and negative reversals challenges our thinking towards momentum oscillators

Stochastic Oscillator

Introduction

Developed by George C. Lane in the late 1950s, the Stochastic Oscillator is a momentum indicator that shows the location of the close relative to the high-low range over a set number of periods. According to an interview with Lane, the Stochastic Oscillator “doesn't follow price, it doesn't follow volume or anything like that. It follows the speed or the momentum of price. As a rule, the momentum changes direction before price.” As such, bullish and bearish divergences in the Stochastic Oscillator can be used to foreshadow reversals. This was the first, and most important, signal that Lane identified. Lane also used this oscillator to identify bull and bear set-ups to anticipate a future reversal. Because the Stochastic Oscillator is range bound, is also useful for identifying overbought and oversold levels.

Calculation

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%K = (Current Close - Lowest Low) / (Highest High - Lowest Low) * 100
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%D = 3-day SMA of %K
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Lowest Low = lowest low for the look-back period
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Highest High = highest high for the look-back period
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%K is multiplied by 100 to move the decimal point two places
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The default setting for the Stochastic Oscillator is 14 periods, which can be days, weeks, months or an intraday timeframe. A 14-period %K would use the most recent close, the highest high over the last 14 periods and the lowest low over the last 14 periods. %D is a 3-day simple [moving average](#) of %K. This line is plotted alongside %K to act as a signal or trigger line.

	Date	High	Low	Highest High (14)	Lowest Low (14)	Current Close	14-day Stochastic Oscillator
1	23-Feb-10	127.01	125.36				
2	24-Feb-10	127.62	126.16				
3	25-Feb-10	126.59	124.93				
4	26-Feb-10	127.35	126.09				
5	1-Mar-10	128.17	126.82				
6	2-Mar-10	128.43	126.48				
7	3-Mar-10	127.37	126.03				
8	4-Mar-10	126.42	124.83				
9	5-Mar-10	126.90	126.39				
10	8-Mar-10	126.85	125.72				
11	9-Mar-10	125.65	124.56				
12	10-Mar-10	125.72	124.57				
13	11-Mar-10	127.16	125.07				
14	12-Mar-10	127.72	126.86	128.43	124.56	127.29	70.44
15	15-Mar-10	127.69	126.63	128.43	124.56	127.18	67.61
16	16-Mar-10	128.22	126.80	128.43	124.56	128.01	89.20
17	17-Mar-10	128.27	126.71	128.43	124.56	127.11	65.81
18	18-Mar-10	128.09	126.80	128.43	124.56	127.73	81.75
19	19-Mar-10	128.27	126.13	128.43	124.56	127.06	64.52
20	22-Mar-10	127.74	125.92	128.27	124.56	127.33	74.53
21	23-Mar-10	128.77	126.99	128.77	124.56	128.71	98.58
22	24-Mar-10	129.29	127.81	129.29	124.56	127.87	70.10
23	25-Mar-10	130.06	128.47	130.06	124.56	128.58	73.06
24	26-Mar-10	129.12	128.06	130.06	124.56	128.60	73.42
25	29-Mar-10	129.29	127.61	130.06	124.57	127.93	61.23
26	30-Mar-10	128.47	127.60	130.06	125.07	128.11	60.96
27	31-Mar-10	128.09	127.00	130.06	125.92	127.60	40.39
28	1-Apr-10	128.65	126.90	130.06	125.92	127.60	40.39
29	5-Apr-10	129.14	127.49	130.06	125.92	128.69	66.83
30	6-Apr-10	128.64	127.40	130.06	125.92	128.27	56.73



Interpretation

The Stochastic Oscillator measures the level of the close relative to the high-low range over a given period of time. Assume that the highest high equals 110, the lowest low equals 100 and the close equals 108. The high-low range is 10, which is the denominator in the %K formula. The close less the lowest low equals 8, which is the numerator. 8 divided by 10 equals .80 or 80%. Multiply this number by 100 to find %K %K would equal 80 if the close was at 108 (.80 x 100). The Stochastic Oscillator is above 50 when the close is in the upper half of the range and below 50 when the close is in the lower half. Low readings (below 20) indicate that price is near its low for the given time period. High readings (above 80) indicate that price is near its high for the given time period. The IBM example above shows three 14-day ranges (yellow areas) with the closing price at the end of the period (red dotted) line. The Stochastic Oscillator equals 91 when the close was at the top of the range. The Stochastic Oscillator equals 15 when the close was near the bottom of the range. The close equals 57 when the close was in the middle of the range.

Fast, Slow or Full

There are three versions of the Stochastic Oscillator available on SharpCharts. The Fast Stochastic Oscillator is based on George Lane's original formulas for %K and %D. %K in the fast version that appears rather choppy. %D is the 3-day SMA of %K. In fact, Lane used %D to generate buy or sell

signals based on bullish and bearish divergences. Lane asserts that a %D divergence is the “only signal which will cause you to buy or sell.” Because %D in the Fast Stochastic Oscillator is used for signals, the Slow Stochastic Oscillator was introduced to reflect this emphasis. The Slow Stochastic Oscillator smooths %K with a 3-day SMA, which is exactly what %D is in the Fast Stochastic Oscillator. Notice that %K in the Slow Stochastic Oscillator equals %D in the Fast Stochastic Oscillator (chart 2).



Fast Stochastic Oscillator:

- Fast %K = %K basic calculation
- Fast %D = 3-period SMA of Fast %K

Slow Stochastic Oscillator:

- Slow %K = Fast %K smoothed with 3-period SMA
- Slow %D = 3-period SMA of Slow %K

The Full Stochastic Oscillator is a fully customizable version of the Slow Stochastic Oscillator. Users can set the look-back period, the number of periods to slow %K and the number of periods for the %D moving average. The default parameters were used in these examples: Fast Stochastic Oscillator (14,3), Slow Stochastic Oscillator (14,3) and Full Stochastic Oscillator (14,3,3).

Full Stochastic Oscillator:

- Full %K = Fast %K smoothed with X-period SMA
- Full %D = X-period SMA of Full %K

Overbought Oversold

As a [bound oscillator](#), the Stochastic Oscillator makes it easy to identify overbought and oversold levels. The oscillator ranges from zero to one hundred. No matter how fast a security advances or declines, the Stochastic Oscillator will always fluctuate within this range. Traditional settings use 80 as the overbought threshold and 20 as the oversold threshold. These levels can be adjusted to suit analytical needs and security characteristics. Readings above 80 for the 20-day Stochastic Oscillator would indicate that the underlying security was trading near the top of its 20-day high-low range. Readings below 20 occur when a security is trading at the low end of its high-low range.

Before looking at some chart examples, it is important to note that overbought readings are not necessarily bearish. Securities can become overbought and remain overbought during a strong uptrend. Closing levels that are consistently near the top of the range indicate sustained buying pressure. In a similar vein, oversold readings are not necessarily bullish. Securities can also become oversold and remain oversold during a strong downtrend. Closing levels consistently near the bottom of the range indicate sustained selling pressure. It is, therefore, important to identify the bigger trend and trade in the direction of this trend. Look for occasional oversold readings in an uptrend and ignore frequent overbought readings. Similarly, look for occasional overbought readings in a strong downtrend and ignore frequent oversold readings.

Chart 3 shows Yahoo! (YHOO) with the Full Stochastic Oscillator (20,5,5). A longer look-back period (20 days versus 14) and longer moving averages for smoothing (5 versus 3) produce a less sensitive oscillator with fewer signals. Yahoo was trading between 14 and 18 from July 2009 until April 2010. Such trading ranges are well suited for the Stochastic Oscillator. Dips below 20 warn of oversold conditions that could foreshadow a bounce. Moves above 80 warn of overbought conditions that could foreshadow a decline. Notice how the oscillator can move above 80 and remain above 80

(orange highlights). Similarly, the oscillator moved below 20 and sometimes remained below 20. The indicator is both overbought AND strong when above 80. A subsequent move below 80 is needed to signal some sort of reversal or failure at resistance (red dotted lines). Conversely, the oscillator is both oversold and weak when below 20. A move above 20 is needed to show an actual upturn and successful support test (green dotted lines).

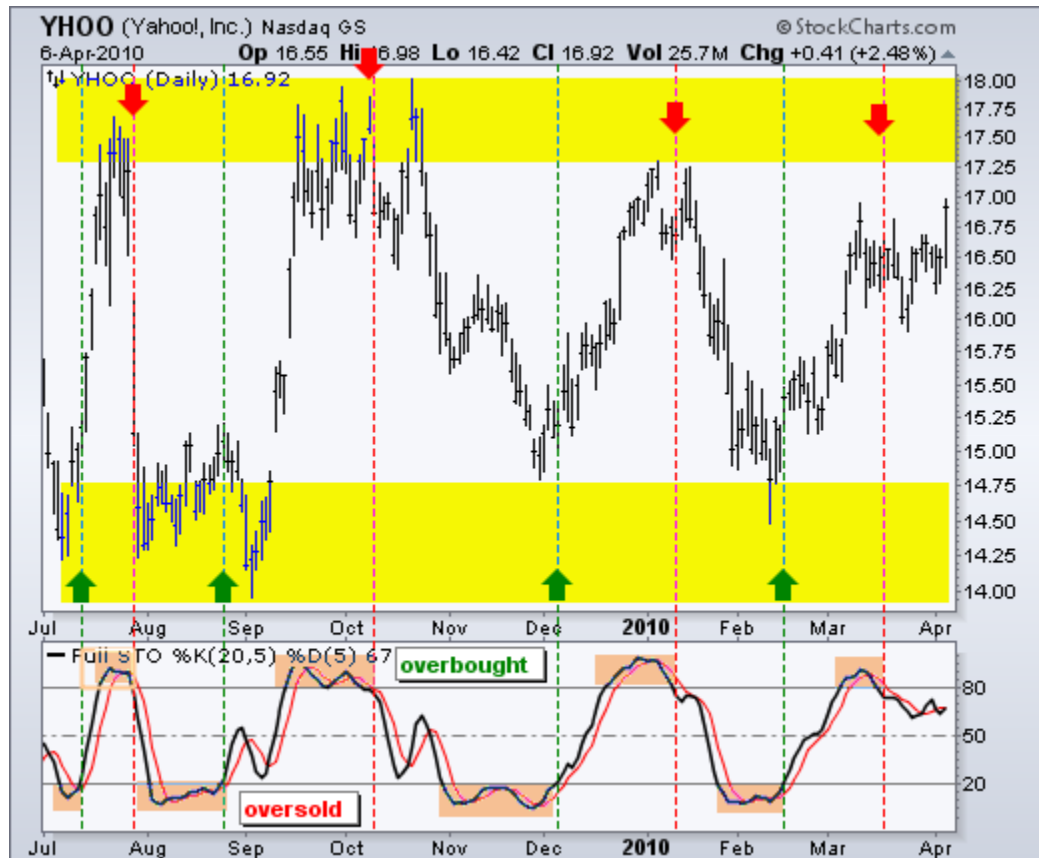


Chart 4 shows Crown Castle (CCI) with a breakout in July to start an uptrend. The Full Stochastic Oscillator (20,5,5) was used to identify oversold readings. Overbought readings were ignored because the bigger trend was up. Trading in the direction of the bigger trend improves the odds. The Full Stochastic Oscillator moved below 20 in early September and early November. Subsequent moves back above 20 signaled an upturn in prices (green dotted line) and continuation of the bigger uptrend.



Chart 5 shows Autozone (AZO) with a support break in May 2009 that started a downtrend. With a downtrend in force, the Full Stochastic Oscillator (10,3,3) was used to identify overbought readings to foreshadow a potential reversal. Oversold readings were ignored because of the bigger downtrend. The shorter look-back period (10 versus 14) increases the sensitivity of the oscillator for more overbought readings. For reference, the Full Stochastic Oscillator (20,5,5) is also shown. Notice that this less sensitive version did not become overbought in August, September and October. It is sometimes necessary to increase sensitivity to generate signals.



Bull Bear Divergences

Divergences form when a new high or low in price is not confirmed by the Stochastic Oscillator. A bullish divergence forms when price records a lower low, but the Stochastic Oscillator forms a higher low. This shows less downside momentum that could foreshadow a bullish reversal. A bearish divergence forms when price records a higher high, but the Stochastic Oscillator forms a lower high. This shows less upside momentum that could foreshadow a bearish reversal. Once a divergence takes hold, chartists should look for a confirmation to signal an actual reversal. A bearish divergence can be confirmed with a support break on the price chart or a Stochastic Oscillator break below 50, which is the centerline. A bullish divergence can be confirmed with a resistance break on the price chart or a Stochastic Oscillator break above 50.

50 is an important level to watch. The Stochastic Oscillator moves between zero and one hundred, which makes 50 the centerline. Think of it as the 50 yard line in football. The offense has a higher chance of scoring when it crosses the 50 yard line. The defense has an edge as long as it prevents

the offense from crossing the 50 yard line. A Stochastic Oscillator cross above 50 signals that prices are trading in the upper half of their high-low range for the given look-back period. This suggests that the cup is half full. Conversely, a cross below 50 means prices are trading in the bottom half of the given look-back period. This suggests that the cup is half empty.

Chart 6 shows International Gaming Tech (IGT) with a bullish divergence in February-March 2010. Notice how the stock moved to a new low, but the Stochastic Oscillator formed a higher low. There are three steps to confirming this higher low. The first is a signal line cross and/or move back above 20. A signal line cross occurs when %K (black) crosses %D (red). This provides the earliest entry possible. The second is a move above 50, which puts prices in the upper half of the Stochastic range. The third is a resistance breakout on the price chart. Notice how the Stochastic Oscillator moved above 50 in late March and remained above 50 until late May.

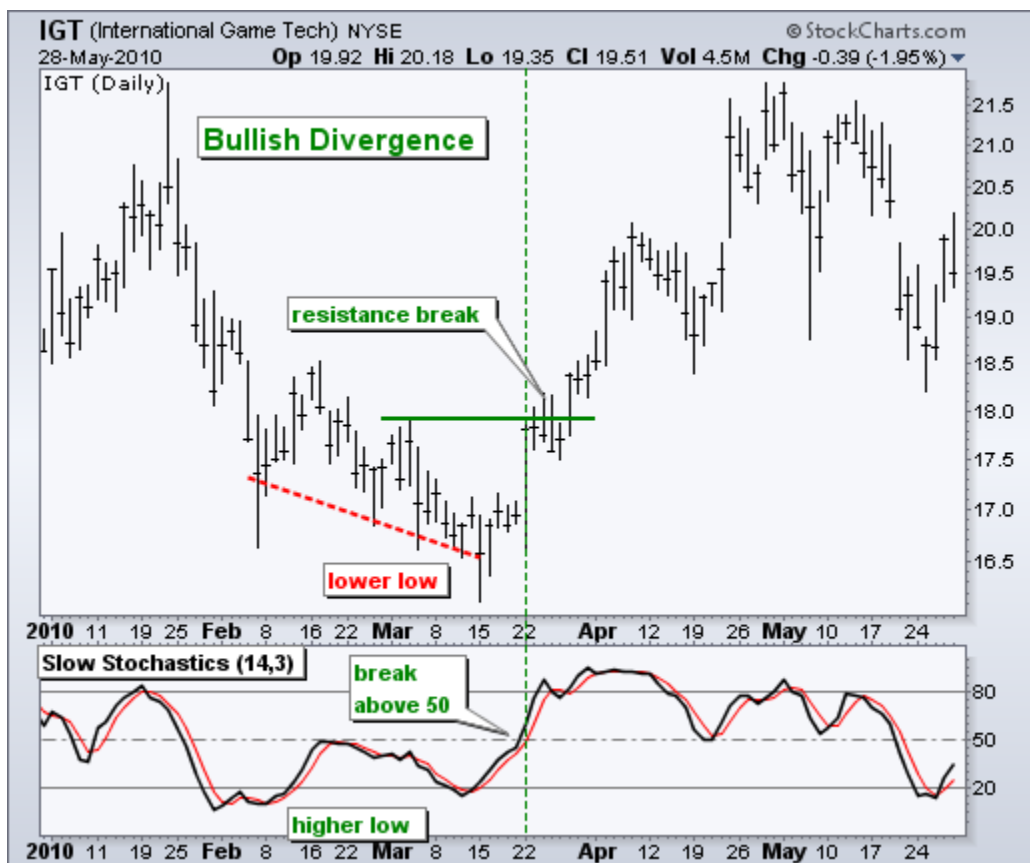


Chart 7 shows Kohls (KSS) with a bearish divergence in April 2010. The stock moved to higher highs in early and late April, but the Stochastic Oscillator peaked in late March and formed lower highs. The signal line crosses and moves below 80 did not provide good early signals in this case because KSS kept moving higher. The Stochastic Oscillator moved below 50 for the second signal and the stock broke support for the third signal. As KSS shows, early signals are not always clean and simple. Signal line crosses, moves below 80 and moves above 20 are frequent and prone to whipsaw. Even after KSS broke support and the Stochastic Oscillator moved below 50, the stock

bounced back above 57 and the Stochastic Oscillator bounced back above 50 before the stock continued sharply lower.



Bull Bear Set-ups

George Lane identified another form of divergence to predict bottoms or tops. A bull set-up is basically the inverse of a bullish divergence. The underlying security forms a lower high, but the Stochastic Oscillator forms a higher high. Even though the stock could not exceed its prior high, the higher high in the Stochastic Oscillator shows strengthening upside momentum. The next decline is then expected to result in a tradable bottom. Chart 8 shows Network Appliance (NTAP) with a bull set-up in June 2009. The stock formed a lower high as the Stochastic Oscillator forged a higher high. This higher high shows strength in upside momentum. Remember that this is a set-up, not a signal. The set-up foreshadows a tradable low in the near future. NTAP declined below its June low and the Stochastic Oscillator moved below 20 to become oversold. Traders could have acted when the Stochastic Oscillator moved above its signal line, above 20 or above 50. Alternatively, NTAP subsequently broke resistance with a strong move.



A bear set-up occurs when the security forms a higher low, but the Stochastic Oscillator forms a lower low. Even though the stock held above its prior low, the lower low in the Stochastic Oscillator shows increasing downside momentum. The next advance is expected to result in an important peak. Chart 9 shows Motorola (MOT) with a bear set-up in November 2009. The stock formed a higher low in late-November and early December, but the Stochastic Oscillator formed a lower low with a move below 20. This showed strong downside momentum. The subsequent bounce did not last long as the stock quickly peaked. Notice that the Stochastic Oscillator did not make it back above 80 and turned down below its signal line in mid December.



Conclusions

While momentum oscillators are best suited for trading ranges, they can also be used with securities that trend, provided the trend takes on a zigzag format. Pullbacks are part of uptrends that zigzag higher. Bounces are part of downtrends that zigzag lower. In this regard, the Stochastic Oscillator can be used to identify opportunities in harmony with the bigger trend.

The indicator can also be used to identify turns near support or resistance. Should a security trade near support with an oversold Stochastic Oscillator, look for a break above 20 to signal an upturn and successful support test. Conversely, should a security trade near resistance with an overbought Stochastic Oscillator, look for a break below 80 to signal a downturn and resistance failure.

The settings on the Stochastic Oscillator depend on personal preferences, trading style and timeframe. A shorter look-back period will produce a choppy oscillator with many overbought and oversold readings. A longer look-back period will provide a smoother oscillator with fewer overbought and oversold readings.

Like all technical indicators, it is important to use the Stochastic Oscillator in conjunction with other technical analysis tools. Volume, support/resistance and breakouts can be used to confirm or refute signals produced by the Stochastic Oscillator

Rate of Change (ROC)

Introduction

The Rate-of-Change (ROC) indicator, which is also referred to as simply Momentum, is a pure [momentum oscillator](#) that measures the percent change in price from one period to the next. The ROC calculation compares the current price with the price “n” periods ago. The plot forms an oscillator that fluctuates above and below the zero line as the Rate-of-Change moves from positive to negative. As a momentum oscillator, ROC signals include centerline crossovers, divergences and overbought-oversold readings. Divergences fail to foreshadow reversals more often than not so this article will forgo a discussion on divergences. Even though centerline crossovers are prone to whipsaw, especially short-term, these crossovers can be used to identify the overall trend. Identifying overbought or oversold extremes comes natural to the Rate-of-Change oscillator.

Calculation

$$\text{ROC} = [(\text{Close} - \text{Close } n \text{ periods ago}) / (\text{Close } n \text{ periods ago})] * 100$$

	Date	Price	12-day ROC	
1	28-Apr-10	11045.27		close 12 days ago
2	29-Apr-10	11167.32		
3	30-Apr-10	11008.61		
4	3-May-10	11151.83		
5	4-May-10	10926.77		
6	5-May-10	10868.12		
7	6-May-10	10520.32		
8	7-May-10	10380.43		close 12 days ago
9	10-May-10	10785.14		
10	11-May-10	10748.26		
11	12-May-10	10896.91		
12	13-May-10	10782.95		
13	14-May-10	10620.16	-3.85	close
14	17-May-10	10625.83	-4.85	
15	18-May-10	10510.95	-4.52	
16	19-May-10	10444.37	-6.34	
17	20-May-10	10068.01	-7.86	
18	21-May-10	10193.39	-6.21	
19	24-May-10	10066.57	-4.31	
20	25-May-10	10043.75	-3.24	close



The table above shows the 12-day Rate-of-Change calculations for the Dow Industrials in May 2010. The yellow cells show the Rate-of-Change from April 28th to May 14th. It is actually 13 trading days, but the close on the 28th acts as the starting point on the 29th. The blue cells show the 12-day Rate-of-Change from May 7th until May 25th.

Interpretation

As noted above, the Rate-of-Change indicator is momentum in its purest form. It measures the percentage increase or decrease in price over a given period of time. Think of it as the rise (price change) over the run (time). In general, prices are rising as long as the Rate-of-Change remains positive. Conversely, prices are falling when the Rate-of-Change is negative. ROC expands into positive territory as an advance accelerates. ROC dives deeper into negative territory as a decline accelerates. There is no upward boundary on the Rate-of-Change. The sky is the limit for an advance. There is, however, a downside limit. Securities can only decline 100%, which would be to zero. Even with these lopsided boundaries, Rate-of-Change produces identifiable extremes that signal [overbought](#) and oversold conditions.

Trend Identification

Even though momentum oscillators are best suited for trading ranges or zigzag trends, they can also be used to define the overall direction of the underlying trend. There are approximately 250 trading days in a year. This can be broken down into 125 days per half year, 63 days per quarter and 21

days per month. A trend reversal starts with the shortest timeframe and gradually spreads to the other timeframes. In general, the long-term trend is up when both the 250-day and 125-day Rate-of-Change are positive. This means that prices are higher now than they were 12 and 6 months ago. Long positions taken 6 or 12 months ago would be profitable and buyers would be happy.



Chart 2 shows IBM with the 250-day, 125-day, 63-day and 21-day Rate-of-Change. There have been three big trends in the last three years. The first was up as the 250-day Rate-of-Change was largely positive until September 2008 (1). The second was down as the indicator turned negative from October 2008 until September 2009 (2). The third is up as the indicator turned positive in late September 2009 (3). Even though the big uptrend remains in force, IBM flattened out on the price chart and this affected the 125-day and 63-day Rate-of-Change. The 63-day Rate-of-Change (quarterly) has been flirting with negative territory since February (4). The 125-day Rate-of-Change (six month) dipped into negative territory for the first time since April 2009 (5). This shows some deterioration in IBM that serves as an alert to watch the stock carefully. A break below the six month trading range would be a bearish development (6).

Overbought/Oversold Extremes

There are basically three price movements: up, down and sideways. Momentum oscillators are ideally suited for sideways price action with regular fluctuations. This makes it easier to identify extremes and forecast turning points. Security prices can also fluctuate when trending. For example, an uptrend consists of a series of higher highs and higher lows as prices zigzag higher. Pullbacks often occur at regular intervals based on the percentage move, time elapsed or both. A downtrend consists of lower lows and lower highs as prices zigzag lower. Counter trend advances retrace a portion of the prior decline and usually peak below the prior high. Peaks can occur at regular intervals based on the percentage move, time elapsed or both. The Rate-of-Change can be used to identify periods when the percentage change nears a level that foreshadowed a turning point in the past.



Chart 3 shows Aetna (AET) with an uptrend from April 2009 until April 2010. Notice how the stock zigzagged up with a series of higher highs and higher lows. Because the overall trend was up, the Rate-of-Change indicator was used to identify short-term oversold levels as a chance to partake in the bigger uptrend. Short-term overbought signals were ignored because the bigger trend was up. Based on the May-June bounces, -10% was set as the oversold boundary. Movements below this level indicated that prices were at a short-term extreme. Overbought and oversold settings depend on the volatility of the underlying security. A more volatile stock may use -15% for oversold, while a less volatile stock may use -5%. Oversold readings serve as an alert to be ready for a turning point. Prices are oversold, but have yet to actually turn. Remember, a security can become oversold and remain oversold as the decline continues. A 20-day [moving average](#) was overlaid to identify an actual upturn. After ROC became oversold in early October, AET moved above its 20-day SMA in late October to confirm an upturn (1). The second oversold reading occurred in early February and AET moved above its 20-day SMA in late February (2).



Chart 4 shows Microsoft (MSFT) in a downtrend from November 2007 until March 2009. This example uses a 20-day Rate-of-Change to identify oversold levels within a bigger downtrend. The number of time periods depends on the individual security and the desired trading time frame. The late December high occurred with an overbought reading above +10%. This means Microsoft was up over 10% in a 20-day period, which is about a month. That's a pretty good bounce within a bigger downtrend. The next overbought reading did not occur until April when the Rate-of-Change again exceeded +10%. MSFT broke trend line support in May to signal a continuation of the downtrend. The next overbought reading occurred in early August 2008. It took a while, but the stock eventually broke support at 24 in mid September and again in early October.



Chart 5 shows Abercrombie & Fitch (ANF) within a trading range from October 2006 to February 2008. The 20-day Rate-of-Change indicator sets overbought at +10% and oversold at -10%. The overbought and oversold levels identify extremes quite well, but timing the actual turn is more difficult because of the volatility. The next chart reduces this volatility by using an exponential [moving average](#) in place of the price plot.

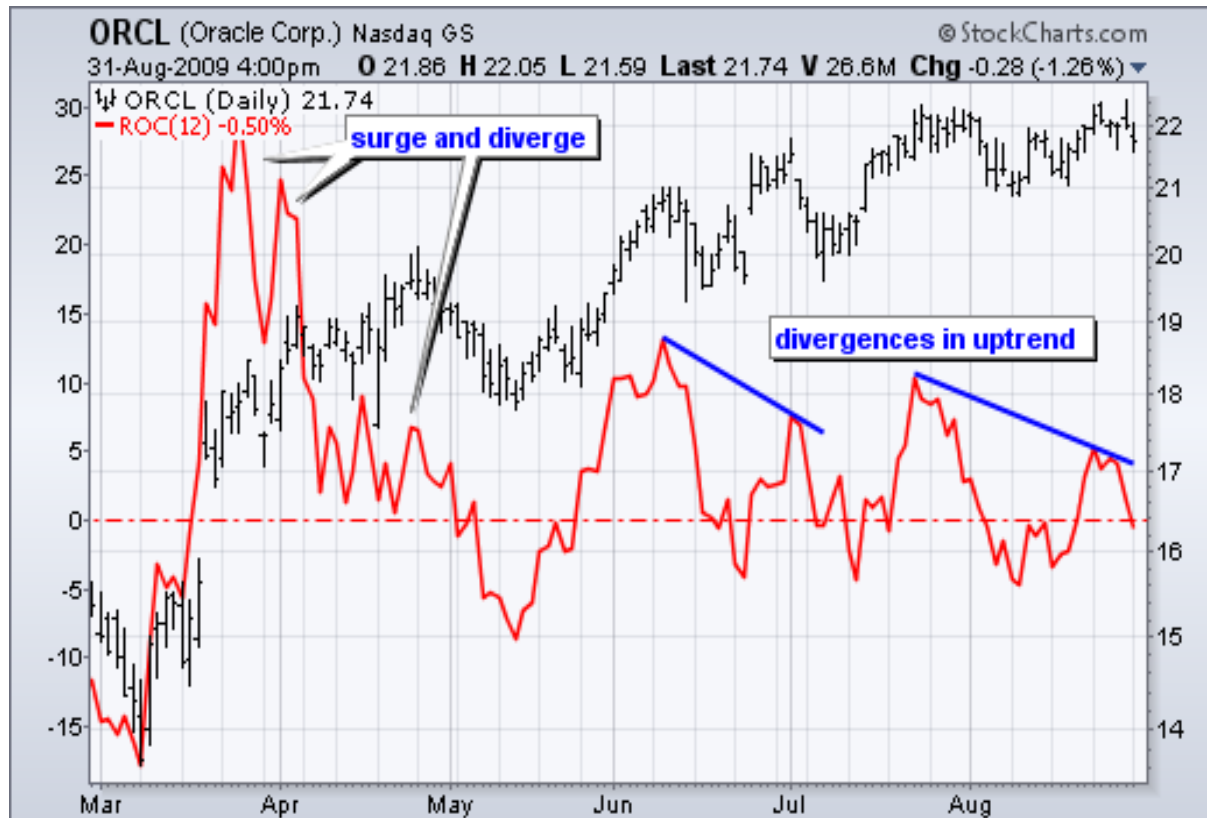


Chart 6 shows ANF as a 10-day EMA (black) and the actual price plot is invisible. A 30-day EMA has been overlaid as a signal line. Furthermore, the 20-day Rate-of-Change is shown with a 5-day SMA to smooth out the fluctuations. There are fewer overbought and oversold readings using the 5-day SMA. Focusing only on the buy signals, the green dotted line shows when ROC exceeds -10% and the green arrow shows when the 10-day EMA crosses above the 30-day SMA. The oversold readings are usually early, but the moving average crossovers are usually late. Such is life with technical analysis. The point here is to reduce whipsaws by smoothing the data. A 10-day EMA was used because it is faster than a 10-day SMA. A 30-day SMA was used because it is slower than a 30-day EMA. Speeding up the shorter moving average and slowing down the longer moving average makes for slightly quicker signals.

Conclusions

The Rate-of-Change oscillator measures the speed at which prices are changing. An upward surge in the Rate-of-Change reflects a sharp price advance. A downward plunge indicates a steep price decline. Even though chartists can look for bullish and bearish divergences, these formations can be

misleading because of sharp moves. Sustained advances often start with a big surge out of the gate. Subsequent advances are usually less sharp and this causes a bearish divergence to form in the Rate-of-Change oscillator. It is important to remember that prices are constantly increasing as long as the Rate-of-Change remains positive. Positive readings may be less than before, but a positive Rate-of-Change still reflects a price increase, not a price decline. Like all technical indicator, the Rate-of-Change oscillator should be used in conjunction with other aspects of technical analysis.



On Balance Volume (OBV)

Introduction

On Balance Volume (OBV) measures buying and selling pressure as a cumulative indicator that adds volume on up days and subtracts volume on down days. OBV was developed by Joe Granville and introduced in his 1963 book, *Granville's New Key to Stock Market Profits*. It was one of the first indicators to measure positive and negative volume flow. Chartists can look for divergences between OBV and price to predict price movements or use OBV to confirm price trends.

Calculation

The On Balance Volume (OBV) line is simply a running total of positive and negative volume. A period's volume is positive when the close is above the prior close. A period's volume is negative when the close is below the prior close.

If the closing price is above the prior close price then:

$$\text{Current OBV} = \text{Previous OBV} + \text{Current Volume}$$

If the closing price is below the prior close price then:

$$\text{Current OBV} = \text{Previous OBV} - \text{Current Volume}$$

If the closing prices equals the prior close price then:

$$\text{Current OBV} = \text{Previous OBV} \text{ (no change)}$$

Date	Close	Up-Down	Volume*	Positive Negative	OBV
27-Oct-10	53.26				
28-Oct-10	53.30	+1	8,200	+8,200	8200
29-Oct-10	53.32	+1	8,100	+8,100	16300
01-Nov-10	53.72	+1	8,300	+8,300	24600
02-Nov-10	54.19	+1	8,900	+8,900	33500
03-Nov-10	53.92	-1	9,200	-9,200	24300
04-Nov-10	54.65	+1	13,300	+13,300	37600
05-Nov-10	54.60	-1	10,300	-10,300	27300
08-Nov-10	54.21	-1	9,900	-9,900	17400
09-Nov-10	54.53	+1	10,100	+10,100	27500
10-Nov-10	53.79	-1	11,300	-11,300	16200
11-Nov-10	53.66	-1	12,600	-12,600	3600
12-Nov-10	53.56	-1	10,700	-10,700	-7100
15-Nov-10	53.57	+1	11,500	+11,500	4400
16-Nov-10	53.94	+1	23,800	+23,800	28200
17-Nov-10	53.27	-1	14,600	-14,600	13600
18-Nov-10	53.60	+1	11,700	+11,700	25300
19-Nov-10	53.65	+1	10,400	+10,400	35700
22-Nov-10	53.62	-1	9,500	-9,500	26200
23-Nov-10	53.27	-1	13,900	-13,900	12300
24-Nov-10	53.44	+1	10,400	+10,400	22700
26-Nov-10	53.28	-1	4,200	-4,200	18500
29-Nov-10	53.14	-1	10,900	-10,900	7600
30-Nov-10	53.31	+1	17,600	+17,600	25200
01-Dec-10	54.09	+1	17,900	+17,900	43100
02-Dec-10	54.08	-1	15,800	-15,800	27300
03-Dec-10	54.01	-1	10,200	-10,200	17100
06-Dec-10	54.17	+1	8,700	+8,700	25800
07-Dec-10	54.24	+1	16,000	+16,000	41800
08-Dec-10	54.45	+1	12,500	+12,500	54300

* Volume rounded and shown in 1000s.

Data in the table above comes from Wal-mart (WMT). Volume figure were rounded off and are shown in 1000's. In other words, 8,200 really equals 8,200,000 or 8.2 million shares. First, we must determine if Wal-mart closed up (+1) or down (-1). This number is now used as the volume multiplier to compute positive or negative volume. The last column (OBV) forms the running total for positive/negative volume. Because OBV has to start somewhere, the first value (8200) is simply equal to first period's positive/negative volume. The chart below shows Wal-mart with volume and OBV.



Interpretation

Granville theorized that volume precedes price. OBV rises when volume on up days outpaces volume on down days. OBV falls when volume on down days is stronger. A rising OBV reflects positive volume pressure that can lead to higher prices. Conversely, falling OBV reflects negative volume pressure that can foreshadow lower prices. Granville noted in his research that OBV would often move before price. Expect prices to move higher if OBV is rising while prices are either flat or moving down. Expect prices to move lower if OBV is falling while prices are either flat or moving up.

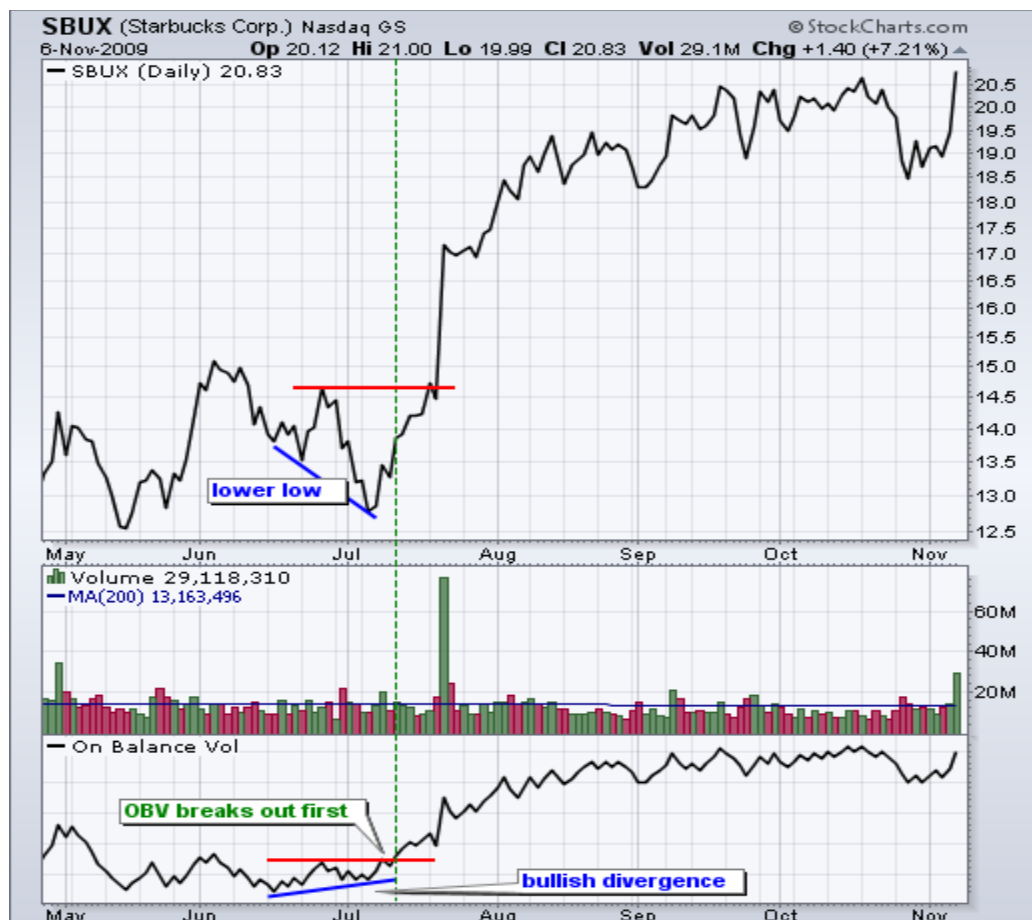
The absolute value of OBV is not important. Chartists should instead focus on the characteristics of the OBV line. First define the trend for OBV. Second, determine if the current trend matches the trend for the underlying security. Third, look for potential support or resistance levels. Once broken, the trend for OBV will change and these breaks can be used to generate signals. Also notice that OBV is based on closing prices. Therefore, closing prices should be considered when looking for

divergences or support/resistance breaks. And finally, volume spikes can sometimes throw off the indicator by causing a sharp move that will require a settling period.

Divergences

Bullish and [bearish divergence](#) signals can be used to anticipate a trend reversal. These signals are truly based on the theory that volume precedes prices. A bullish divergence forms when OBV moves higher or forms a higher low even as prices move lower or forge a lower low. A bearish divergence forms when OBV moves lower or forms a lower low even as prices move higher or forge a higher high. The divergence between OBV and price should alert chartists that a price reversal could be in the making.

The chart for Starbucks (SBUX) shows a [bullish divergence](#) forming in July. On the price chart, SBUX moved below its June low with a lower low in early July. OBV, on the other hand, held above its June low to form a bullish divergence. OBV went on to break resistance before SBUX broke resistance. This was a classic case of volume leading price. SBUX broke resistance a week later and continued above 20 for a 30+ percent gain. The second chart shows OBV moving higher as Texas Instruments (TXN) trades within a range. Rising OBV during a trading range indicates accumulation, which is bullish.





The chart for Medtronic (MDT) shows a bearish divergence with volume leading price lower. The blue dotted lines identify the divergence period. MDT moved higher (43 to 45) as OBV moved lower. Also notice that OBV broke support during this divergence period. The uptrend in OBV reversed with the break below the February low. MDT, on the other hand, was still moving higher. Volume ultimately won the day as MDT followed volume lower with a decline into the low 30s. The second chart shows Valero Energy (VLO) with OBV forming a bearish divergence in April and a confirming support break in May.



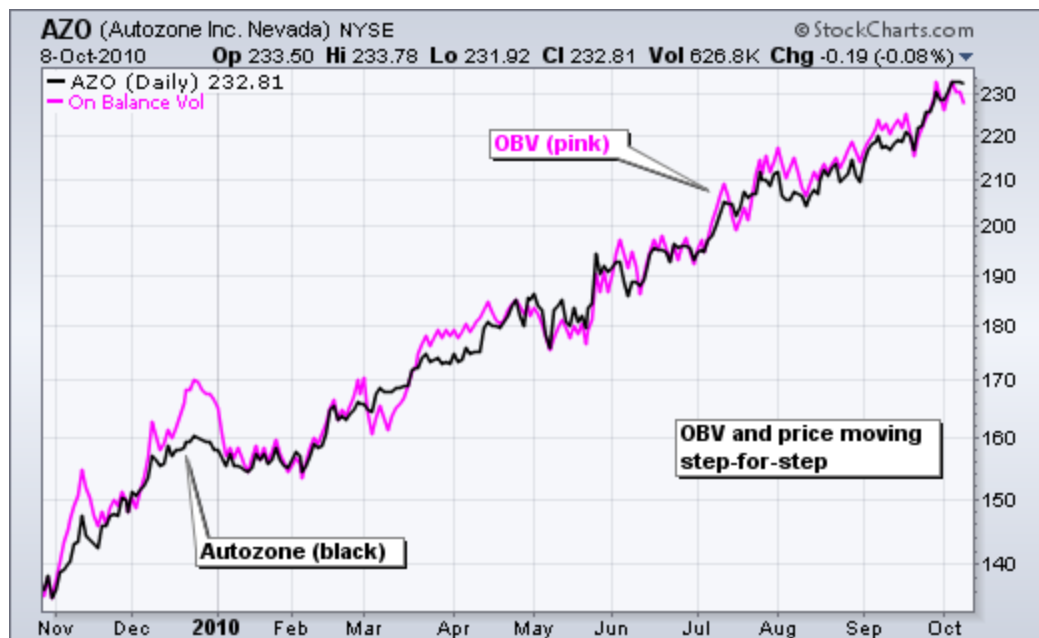
Trend Confirmation

OBV can be used to confirm a price trend, upside breakout or downside break. The chart for Best Buy (BBY) shows three confirming signals as well as confirmation of the price trend. OBV and BBY moved lower in December-January, higher from March to April, lower from May to August and higher from September to October. The trends in OBV matched the trend in BBY.



OBV also confirmed trend reversals in BBY. Notice how BBY broke its down trend line in late February and OBV confirmed with a resistance breakout in March. BBY broke its up trend line in late April and OBV confirmed with a support break in early May. BBY broke its down trend line in early September and OBV confirmed with a trend line break a week later. These coincident signals indicated that positive and negative volume were in harmony with price.

Sometimes OBV moves step-for-step with the underlying security. In this case, OBV is confirming the strength of the underlying trend, be it down or up. The chart for Autozone (AZO) shows prices as a black line and OBV as a pink line. Both moved steadily higher from November 2009 until October 2010. Positive volume remained strong throughout the advance.



Conclusions

On Balance Volume (OBV) is a simple indicator that uses volume and price to measure buying pressure and selling pressure. Buying pressure is evident when positive volume exceeds negative volume and the OBV line rises. Selling pressure is present when negative volume exceeds positive volume and the OBV line falls. Chartists can use OBV to confirm the underlying trend or look for divergences that may foreshadow a price change. As with all indicators, it is important to use OBV in conjunction with other aspects of technical analysis. It is not a stand alone indicator. OBV can be combined with basic [pattern analysis](#) or to confirm signals from [momentum oscillators](#).

Money Flow Index (MFI)

Introduction

The Money Flow Index (MFI) is an oscillator that uses both price and volume to measure buying and selling pressure. Created by Gene Quong and Avrum Soudack, MFI is also known as volume-weighted [RSI](#). MFI starts with the typical price for each period. Money flow is positive when the typical price rises (buying pressure) and negative when the typical price declines (selling pressure). A ratio of positive and negative money flow is then plugged into an RSI formula to create an oscillator that moves between zero and one hundred. As a momentum oscillator tied to volume, the Money Flow Index (MFI) is best suited to identify reversals and price extremes with a variety of signals.

Calculation

There are a several steps involved in the Money Flow Index calculation. The example below is based on a 14-period Money Flow Index, which is the setting recommended by the creators.

- * 1. Typical Price = (High + Low + Close)/3
- * 2. Raw Money Flow = Typical Price x Volume
- * 3. Money Flow Ratio = (14-period Positive Money Flow)/(14-period Negative Money Flow)
- * 4. Money Flow Index = $100 - 100 / (1 + \text{Money Flow Ratio})$

First notice that Raw Money Flow is essentially dollar volume because the formula is volume multiplied by the typical price. Raw Money Flow is positive when the typical price advances from one period to the next and negative when the typical price declines. The Raw Money Flow values are not used when the typical price is unchanged. The Money Flow Ratio in step 3 forms the basis for the Money Flow Index (MFI). Positive and Negative Money Flow are summed for the look-back period (14) and the Positive Money Flow sum is divided by the Negative Money Flow sum to create the ratio. The RSI formula is then applied to create a volume-weighted indicator. The table below shows a calculation example taken from an excel spreadsheet.

	Date	Typical Price	Up or Down	Volume*	Raw Money Flow	1-period Positive Money Flow	1-period Negative Money Flow	14-period Positive Money Flow	14-period Negative Money Flow	14-period Money Flow Ratio	14-period Money Flow Index
1	3-Dec-10	24.63		18,730							
2	6-Dec-10	24.69	1	12,272	302,976	302,976	-				
3	7-Dec-10	24.99	1	24,691	617,060	617,060	-				
4	8-Dec-10	25.36	1	18,358	465,534	465,534	-				
5	9-Dec-10	25.19	-1	22,964	578,388	-	578,388				
6	10-Dec-10	25.17	-1	15,919	400,628	-	400,628				
7	13-Dec-10	25.01	-1	16,067	401,796	-	401,796				
8	14-Dec-10	24.96	-1	16,568	413,516	-	413,516				
9	15-Dec-10	25.08	1	16,019	401,810	401,810	-				
10	16-Dec-10	25.25	1	9,774	246,780	246,780	-				
11	17-Dec-10	25.21	-1	22,573	569,130	-	569,130				
12	20-Dec-10	25.37	1	12,987	329,483	329,483	-				
13	21-Dec-10	25.61	1	10,907	279,371	279,371	-				
14	22-Dec-10	25.58	-1	5,799	148,335	-	148,335				
15	23-Dec-10	25.46	-1	7,395	188,250	-	188,250	2,643,012	2,700,043	0.98	49.47
16	27-Dec-10	25.33	-1	5,818	147,351	-	147,351	2,340,037	2,847,394	0.82	45.11
17	28-Dec-10	25.09	-1	7,165	179,766	-	179,766	1,722,977	3,027,160	0.57	36.27
18	29-Dec-10	25.03	-1	5,673	141,978	-	141,978	1,257,443	3,169,137	0.40	28.41
19	30-Dec-10	24.91	-1	5,625	140,138	-	140,138	1,257,443	2,730,887	0.46	31.53
20	31-Dec-10	24.89	-1	5,023	125,057	-	125,057	1,257,443	2,455,317	0.51	33.87
21	3-Jan-11	25.13	1	7,457	187,374	187,374	-	1,444,817	2,053,521	0.70	41.30
22	4-Jan-11	24.64	-1	11,798	290,653	-	290,653	1,444,817	1,930,658	0.75	42.80
23	5-Jan-11	24.51	-1	12,366	303,090	-	303,090	1,043,007	2,233,748	0.47	31.83
24	6-Jan-11	24.15	-1	13,295	321,133	-	321,133	796,227	2,554,881	0.31	23.76
25	7-Jan-11	23.98	-1	9,257	221,953	-	221,953	796,227	2,207,703	0.36	26.51
26	10-Jan-11	24.07	1	9,691	233,205	233,205	-	699,949	2,207,703	0.32	24.07
27	11-Jan-11	24.36	1	8,870	216,084	216,084	-	636,663	2,207,703	0.29	22.38
28	12-Jan-11	24.35	-1	7,169	174,567	-	174,567	636,663	2,233,936	0.28	22.18
29	13-Jan-11	24.14	-1	11,356	274,191	-	274,191	636,663	2,319,877	0.27	21.53
30	14-Jan-11	24.81	1	13,379	331,942	331,942	-	968,605	2,172,526	0.45	30.84

* Volume shown in 1000s



Interpretation

As a volume-weighted version of RSI, the Money Flow Index (MFI) can be interpreted similar to RSI. The big difference is, of course, volume. Because volume is added to the mix, the Money Flow Index will act a little differently than RSI. Theories suggest that volume leads prices. RSI is a momentum oscillator that already leads prices. Incorporating volume can increase this lead time.

Quong and Soudack identified three basic signals using the Money Flow Index. First, chartists can look for overbought or oversold levels to warn of unsustainable price extremes. Second, bullish and bearish divergence can be used to anticipate trend reversals. Third, failure swings at 80 or 20 can

also be used to identify potential price reversals. For this article, the divergences and failure swings are combined to create one signal group and increase robustness.

Overbought/Oversold

Overbought and oversold levels can be used to identify unsustainable price extremes. Typically, MFI above 80 is considered overbought and MFI below 20 is considered oversold. Strong trends can present a problem for these classic overbought and oversold levels. MFI can become overbought (>80) and prices can simply continue higher when the uptrend is strong. Conversely, MFI can become oversold (<20) and prices can simply continue lower when the downtrend is strong. Quong and Soudack recommended expanding these extremes to further qualify signals. A move above 90 is truly overbought and a move below 10 is truly oversold. Moves above 90 and below 10 are rare occurrences that suggest a price move is unsustainable. Admittedly, many stocks will trade for a long time without reaching the 90/10 extremes. However, chartists can use the StockCharts.com scan engine to find those that do. Links to such scans are provided at the end of this article.



JB Hunt (JBHT) became oversold when the Money Flow Index moved below 10 in late October 2009 and early February 2010. The preceding declines were sharp enough to produce these readings, but the oversold extremes suggested that these declines were unsustainable. Oversold levels alone are not reason enough to turn bullish. Some sort of reversal or upturn is needed to confirm that prices have indeed turned a corner. JBHT confirmed the first oversold reading with a gap and trend line break on good volume. The stock confirmed the second oversold reading with a resistance breakout on good volume.



Aeropostale (ARO) became overbought when the Money Flow Index moved above 90 in late September and late December 2009. Extremes in MFI suggested that these advances were

unsustainable and a pullback was imminent. The first overbought reading led to a sizable decline, but the second did not. Notice that ARO peaked with the first overbought reading and formed lower highs into October. The late October support break signaled a clear trend reversal. After the December overbought reading, ARO moved above 23 and consolidated. There were two down gaps and a support break, but these did not hold. Price action was stronger than the overbought reading. ARO ultimately broke resistance at 24 and surged back above 28. The second signal did not work.

Divergences and Failures

Failure swings and divergences can be combined to create more robust signals. A bullish failure swing occurs when MFI becomes oversold below 20, surges above 20, holds above 20 on a pullback and then breaks above its prior reaction high. A bullish divergence forms when prices move to a lower low, but the indicator forms a higher low to show improving money flow or momentum.

On the Aetna (AET) chart below, a bullish divergence and failure swing formed in January-February 2010. First, notice how the stock formed a lower low in February and MFI held well above its January low for a bullish divergence. Second, notice how MFI dipped below 20 in January, held above 20 in February and broke its prior high in late February. This signal combination foreshadowed a strong advance in March.



A bearish failure swing occurs when MFI becomes overbought above 80, plunges below 80, fails to exceed 80 on a bounce and then breaks below the prior reaction low. A bearish divergence forms when the stock forges a higher high and the indicator forms a lower high, which indicates deteriorating money flow or momentum.

On the Aetna chart above, a [bearish divergence](#) and failure swing formed in August-September. The stock moved to a new high in September, but MFI formed a significantly lower high. A bearish failure swing occurred as MFI became overbought above 80 in late August, failed to reach 80 with the September bounce and broke the prior lows with a decline in late September.

Conclusions

The Money Flow Index is a rather unique indicator that combines momentum and volume with an RSI formula. RSI momentum generally favors the bulls when the indicator is above 50 and the bears when below 50. Even though MFI is considered a volume-weighted RSI, using the centerline to determine a bullish or bearish bias does not work as well. Instead, MFI is better suited to identify potential reversals with overbought/oversold levels, bullish/bearish divergences and bullish/bearish failure swings. As with all indicators, MFI should not be used by itself. A pure [momentum oscillator](#), such as RSI, or [pattern analysis](#) can be combined with MFI to increase signal robustness

Accumulation Distribution Line

Introduction

Developed by Marc Chaikin, the Accumulation Distribution Line is a volume-based indicator designed to measure the cumulative flow of money into and out of a security. Chaikin originally referred to the indicator as the Cumulative Money Flow Line. As with cumulative indicators, the Accumulation Distribution Line is a running total of each period's Money Flow Volume. First, a multiplier is calculated based on the relationship of the close to the high-low range. Second, the Money Flow Multiplier is multiplied by the period's volume to come up with a Money Flow Volume. A running total of the Money Flow Volume forms the Accumulation Distribution Line. Chartists can use this indicator to affirm a security's underlying trend or anticipate reversals when the indicator diverges from the security price.

Calculation

There are three steps to calculating the Accumulation Distribution Line (ADL). First, calculate the Money Flow Multiplier. Second, multiply this value by volume to find the Money Flow Volume. Third, create a running total of Money Flow Volume to form the Accumulation Distribution Line (ADL).

```
1. Money Flow Multiplier = [(Close - Low) - (High - Close)] / (High - Low)
```

```
2. Money Flow Volume = Money Flow Multiplier x Volume for the Period
```

```
3. ADL = Previous ADL + Current Period's Money Flow Volume
```

The Money Flow Multiplier fluctuates between +1 and -1. As such, it holds the key to the Money Flow Volume and the Accumulation Distribution Line. The multiplier is positive when the close is in the upper half of the high-low range and negative when in the lower half. This makes perfect sense. Buying pressure is stronger than selling pressure when prices close in the upper half of the period's range (and vice versa). The Accumulation Distribution Line rises when the multiplier is positive and falls when the multiplier is negative.



The multiplier adjusts the amount of volume that ends up in the Money Flow Volume. Volume is in effect reduced unless the Money Flow Multiplier is at its extremes (+1 or -1). The multiplier is +1 when the close is on the high and -1 when the close is on the low. All volume is positive when +1 and all volume is negative when -1. At .50, only half of the volume translates into the period's Money Flow Volume. The table below shows the Money Flow Multipliers, Money Flow Volume and Accumulation Distribution Line for Research-in-Motion (RIMM). Notice how the multiplier is between .50 and 1 when the close is strong and between -.50 and -1 when the close is weak.

Date	High	Low	Close	MF Multiplier	Volume*	MF Volume	Accu-Dist Line
10-Dec-10	62.34	61.37	62.15	+.61	7,849	+4,774	4774
13-Dec-10	62.05	60.69	60.81	-.82	11,692	-9,629	-4855
14-Dec-10	62.27	60.10	60.45	-.68	10,575	-7,164	-12019
15-Dec-10	60.79	58.61	59.18	-.48	13,059	-6,230	-18249
16-Dec-10	59.93	58.71	59.24	-.13	20,734	-2,758	-21006
17-Dec-10	61.75	59.86	60.20	-.64	29,630	-18,970	-39976
20-Dec-10	60.00	57.97	58.48	-.50	17,705	-8,809	-48785
21-Dec-10	59.00	58.02	58.24	-.55	7,259	-4,000	-52785
22-Dec-10	59.07	57.48	58.69	+.52	10,475	+5,468	-47317
23-Dec-10	59.22	58.30	58.65	-.24	5,204	-1,244	-48561
27-Dec-10	58.75	57.83	58.47	+.39	3,423	+1,345	-47216
28-Dec-10	58.65	57.86	58.02	-.59	3,962	-2,357	-49574
29-Dec-10	58.47	57.91	58.17	-.07	4,096	-293	-49866
30-Dec-10	58.25	57.83	58.07	+.14	3,766	+512	-49354
31-Dec-10	58.35	57.53	58.13	+.46	4,239	+1,965	-47389
03-Jan-11	59.86	58.58	58.94	-.44	8,040	-3,517	-50907
04-Jan-11	59.53	58.30	59.10	+.30	6,957	+2,093	-48813
05-Jan-11	62.10	58.53	61.92	+.90	18,172	+16,339	-32474
06-Jan-11	62.16	59.80	61.37	+.33	22,226	+7,346	-25128
07-Jan-11	62.67	60.93	61.68	-.14	14,614	-2,016	-27144
10-Jan-11	62.38	60.15	62.09	+.74	12,320	+9,116	-18028
11-Jan-11	63.73	62.26	62.89	-.14	15,008	-2,165	-20193
12-Jan-11	63.85	63.00	63.53	+.25	8,880	+2,194	-18000
13-Jan-11	66.15	63.58	64.01	-.67	22,694	-15,100	-33099
14-Jan-11	65.34	64.07	64.77	+.10	10,192	+1,043	-32056
18-Jan-11	66.48	65.20	65.22	-.97	10,074	-9,759	-41816
19-Jan-11	65.23	63.21	63.28	-.93	9,412	-8,759	-50575
20-Jan-11	63.40	61.88	62.40	-.32	10,392	-3,282	-53856
21-Jan-11	63.18	61.11	61.55	-.57	8,927	-5,132	-58988
24-Jan-11	62.70	61.25	62.69	+.99	7,460	+7,357	-51631

* Volume rounded and shown in 1000s.

Interpretation

The Accumulation Distribution Line is a cumulative measure of each period's volume flow, or money flow. A high positive multiplier combined with high volume shows strong buying pressure that pushes the indicator higher. Conversely, a low negative number combined with high volume reflects strong selling pressure that pushes the indicator lower. Money Flow Volume accumulates to form a line that either confirms or contradicts the underlying price trend. In this regard, the indicator is used to either reinforce the underlying trend or cast doubts on its sustainability. An uptrend in prices with a downtrend in the Accumulation Distribution Line suggests underlying selling pressure (distribution) that could foreshadow a bearish reversal on the price chart. A downtrend in prices with an uptrend in

the Accumulation Distribution Line indicate underlying buying pressure (accumulation) that could foreshadow a bullish reversal in prices.

ADL versus OBV

The Accumulation Distribution Line and On Balance Volume (OBV) are cumulative volume-based indicators that sometimes move in opposite directions because their basic formulas are different. Joe Granville developed [On Balance Volume](#) (OBV) as a cumulative measure of positive and negative volume flow. OBV adds a period's total volume when the close is up and subtracts it when the close is down. A cumulative total of this positive and negative volume flow forms the OBV line. This line can then be compared with the price chart of the underlying security to look for divergences or confirmation.



As the formula above shows, Chaikin took a different approach by completely ignoring the change from one period to the next. Instead, the Accumulation Distribution Line focuses on the level of the close relative to the high-low range for a given period (day, week, month). With this formula, a security could gap down and close significantly lower, but the Accumulation Distribution Line would rise if the close were above the midpoint of the high-low range. The chart above shows Clorox (CLX) with a big gap down and a close near the top of the day's high-low range. OBV moved sharply lower because the close was below the prior close. The Accumulation Distribution Line moved higher because the close was near the high of the day.

Trend Confirmation

Trend confirmation is a pretty straight-forward concept. An uptrend in the Accumulation Distribution Line reinforces an uptrend on the price chart and vice versa. The chart below shows Freeport McMoran (FCX) and the Accumulation Distribution Line advancing in February-March, declining from April to June and then advancing from July to January. The Accumulation Distribution Line confirmed each of these price trends.



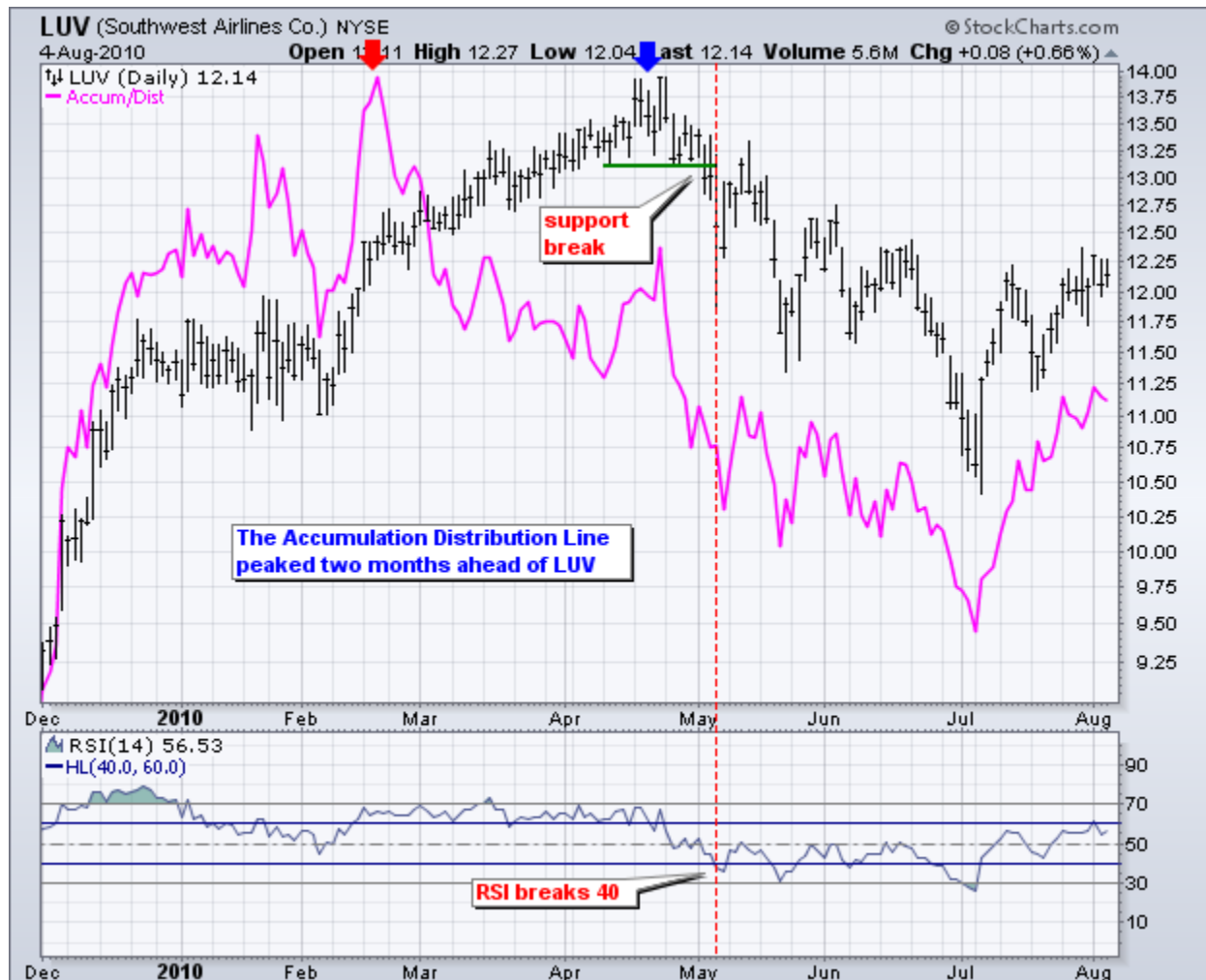
Divergences

Bullish and bearish divergences are where it starts getting interesting. A bullish divergence forms when price moves to new lows, but the Accumulation Distribution Line does not confirm these lows and moves higher. A rising Accumulation Distribution Line shows, well, accumulation. Think of this as basically stealth buying pressure. Based on the theory that volume precedes price, chartists should be on alert for a bullish reversal on the price chart.

The chart above shows Nordstrom (JWN) with the Accumulation Distribution Line. Notice how it is easy to compare price action when the indicator is placed “behind” the price plot. The indicator (pink) and the price trend moved in unison from February to June. Signs of accumulation emerged as the indicator bottomed in early July and started moving higher. JWN moved to a new low in late August. Even though the indicator showed signs of buying pressure, it was important to wait for a bullish catalyst or confirmation on the price chart. This catalyst came as the stock gapped up and surged on big volume.



A bearish divergence forms when price moves to new highs, but the Accumulation Distribution Line does not confirm and moves lower. This shows distribution or underlying selling pressure that can foreshadow a bearish reversal on the price chart.



The chart above shows Southwest Airlines (LUV) with the Accumulation Distribution Line peaking two months ahead of prices. The indicator not only peaked, but it also moved lower in March and April, which reflected some selling pressure. LUV confirmed weakness with a support break on the price chart and RSI moved below 40 shortly afterwards. RSI often trades in bull zones (40-80) and bear zones (20-60). RSI held in the bull zone until early May and then moved into a bear zone.

Disconnect with Prices

The Accumulation Distribution Line is an indicator based on a derivative of price and volume. This makes it at least two steps removed from the actual price of the underlying security. Moreover, the Money Flow Multiplier does not take into account price changes from period to period. As such, it cannot be expected to always affirm price action or successfully predict price reversals with

divergences. Sometimes there is a, gasp, disconnect between prices and the indicator. Sometimes the Accumulation Distribution Line simply doesn't work. This is why it is vitally important to use the Accumulation Distribution Line, and all indicators for that matter, in conjunction with price/trend analysis and/or other indicators.



Conclusions

The Accumulation Distribution Line can be used to gauge the general flow of volume. An uptrend indicates that buying pressure is prevailing on a regular basis, while a downtrend indicates that selling pressure is prevailing. Bullish and bearish divergences serve as alerts for a potential reversal on the price chart. As with all indicators, it is important to use the Accumulation Distribution Line in conjunction with other aspects of technical analysis, such as [momentum oscillators](#) and [chart patterns](#). It is not a stand-alone indicator

Chaikin Oscillator

Introduction

Developed by Marc Chaikin, the Chaikin Oscillator measures the momentum of the Accumulation Distribution Line using the [MACD formula](#). This makes it an indicator of an indicator. The Chaikin Oscillator is the difference between the 3-day EMA of the Accumulation Distribution Line and the 10-day EMA of the Accumulation Distribution Line. Like other momentum indicators, this indicator is designed to anticipate directional changes in the Accumulation Distribution Line by measuring the momentum behind the movements. A momentum change is the first step to a trend change. Anticipating trend changes in the Accumulation Distribution Line can help chartists anticipate trend changes in the underlying security. The Chaikin Oscillator generates signals with crosses above/below the zero line or with bullish/bearish divergences.

Calculation

Calculating the Accumulation Distribution Line (ADL) is the first step to the Chaikin Oscillator. This article will cover the basic elements of the Accumulation Distribution Line. See our [ChartSchool article](#) the details. There are three steps to calculating the Accumulation Distribution Line (ADL). First, calculate the Money Flow Multiplier. Second, multiply this value by volume to find Money Flow Volume. Third, create a running total of Money Flow Volume to form the Accumulation Distribution Line (ADL). Fourth, take the difference between two moving averages to calculate the Chaikin Oscillator.

```
1. Money Flow Multiplier = [(Close - Low) - (High - Close)] / (High - Low)
```

```
2. Money Flow Volume = Money Flow Multiplier x Volume for the Period
```

```
3. ADL = Previous ADL + Current Period's Money Flow Volume
```

```
4. Chaikin Oscillator = (3-day EMA of ADL) - (10-day EMA of ADL)
```

The Accumulation Distribution Line rises when the Money Flow Multiplier is positive and falls when negative. This multiplier is positive when the close is in the upper a half of the period's high-low range and negative when the close is in the lower half. As a MACD type oscillator, the Chaikin Oscillator turns positive when the faster 3-day EMA moves above the slower 10-day EMA. Conversely, the indicator turns negative when the 3-day EMA moves below the 10-day EMA.



The chart above shows the Accumulation Distribution Line (gray) with the 3-day EMA in (blue) and the 10-day EMA (red). The price for General Electric (GE) is invisible so we can focus on the relationship between the Accumulation Distribution Line and the Chaikin Oscillator. Notice how the Chaikin Oscillator moves into negative territory as the 3-day EMA moves below the 10-day EMA. Conversely, the oscillator turns positive when the 3-day EMA crosses above the 10-day EMA.

Interpretation

First and foremost, it is important to remember that the Chaikin Oscillator is an indicator of an indicator. It measures momentum for the Accumulation Distribution Line. This makes it at least three

steps removed from the price of the underlying security. First, price and volume are reshaped into the Accumulation Distribution Line. Second, exponential moving averages are applied to the Accumulation Distribution Line. Third, the difference between the [moving averages](#) is used to form the Chaikin Oscillator. As the third derivative, the indicator is more prone to disconnect from the price of the underlying security.



Having clarified that, the indicator is designed to measure the momentum behind buying and selling pressure (Accumulation Distribution Line). A move into positive territory indicates that the Accumulation Distribution Line is rising and buying pressure prevails. A move into negative territory indicates that the Accumulation Distribution Line is falling and selling pressure prevails. Chartists can

anticipate crosses into positive or negative territory by looking for bullish or bearish divergences, respectively.

Buying/Selling Bias

The Chaikin oscillator can be used to define a general buying or selling bias simply with positive or negative values. The indicator oscillates above/below the zero line. Generally, buying pressure is stronger when the indicator is positive and selling pressure is stronger when the indicator is negative.

The default settings for the Chaikin Oscillator (3,10) often produce a line that frequently crosses zero. Chartists can smooth the indicator by lengthening the moving averages. The example below shows the Chaikin Oscillator (6,20). Both moving averages were doubled to maintain the ratio and smooth the indicator.



The Chaikin Oscillator for US Steel (X) crossed the zero line six times over 12 months. There were some good signals, such as the April sell signal and the October buy signal. There were also some bad signals or whipsaws. The key, as with all indicators, is to confirm the oscillator signals with other aspects of technical analysis, such as a pure price momentum oscillator or pattern analysis.



The chart for Alcoa (AA) shows six zero-line crosses in 2010. The first five did not generate good signals, but the sixth was a dandy. Chartists should experiment with the settings and consider adding trend lines to enhance their analysis. Trend line breaks are often earlier than zero line crosses. A rising Chaikin Oscillator reflects a steady increase in buying pressure. A falling Chaikin Oscillator reflects a steady increase in selling pressure.

Divergences

Bullish and bearish divergences alert chartists to a momentum shift in buying or selling pressure that can foreshadow a trend reversal on the price chart. A bullish divergence forms when price moves to

new lows and the Chaikin Oscillator forms a higher low. This higher low shows less selling pressure. It is important to wait for some sort of confirmation, such as an upturn in the indicator or a cross into positive territory. A move into positive territory shows upside momentum in the Accumulation Distribution Line.

The Fastenal (FAST) chart shows five divergences for the Chaikin Oscillator in 2010. The default settings (3,10) produce a rather sensitive oscillator that will generate many divergences. The key is to differentiate the robust signals from the bogus signals by waiting for confirmation. Even with a bullish divergence, selling pressure outweighs buying pressure until there is a cross above the zero line. Buying pressure dominates until there is a cross into negative territory.



The green lines show the Chaikin Oscillator forming a higher low as the stock forms a lower low for a bullish divergence. The green dotted lines show when the indicator moves into positive territory to confirm the signal. The mid February, early September and late November signals were great. The mid June buy signal would have resulted in a whipsaw and there was not much weakness after the October sell signal from the bearish divergence.

A bearish divergence forms when price moves to a new high and the Chaikin Oscillator fails to confirm this higher high. This failure reflects less buying pressure that can sometimes foreshadow a bearish reversal on the price chart. Confirmation comes when the oscillator moves into negative territory.



The chart for Kohls (KSS) shows three bearish divergences and two bullish divergences over a 12 month period. The bearish divergences (red lines) were confirmed when the Chaikin Oscillator moved into negative territory to show actual downside momentum in the Accumulation Distribution Line. Remember, the Chaikin Oscillator (3,10) turns negative when the 3-day EMA of the Accumulation Distribution Line moves below the 10-day EMA.

Conclusions

The Chaikin Oscillator is a momentum indicator for the Accumulation Distribution Line. Basically, the Chaikin Oscillator turbo charges the Accumulation Distribution Line by measuring momentum. Signals are more frequent and often easier to quantify using the Chaikin Oscillator. As an money

flow oscillator it can be used in conjunction with pure price oscillators, such as MACD or [RSI](#). As with all indicators, the Chaikin Oscillator should not be used as a stand-alone indicator