



A Fidelity Investments Webinar Series

Understanding Indicators in Technical Analysis

BROKERAGE: TECHNICAL ANALYSIS





Technical Analysis Webinar Series

Getting Started with Technical Analysis

Learn the assumptions that guide technical analysis, and get to know the basics of trend trading.

Understanding Indicators in Technical Analysis

Identify the various types of technical indicators, including trend, momentum, volume, volatility, and support and resistance.

Identifying Chart Patterns with Technical Analysis

Use charts and learn chart patterns through specific examples of important patterns in bar and candlestick charts.

Managing Risk with Technical Analysis

Manage your trading risk with a range of confirmation methods.



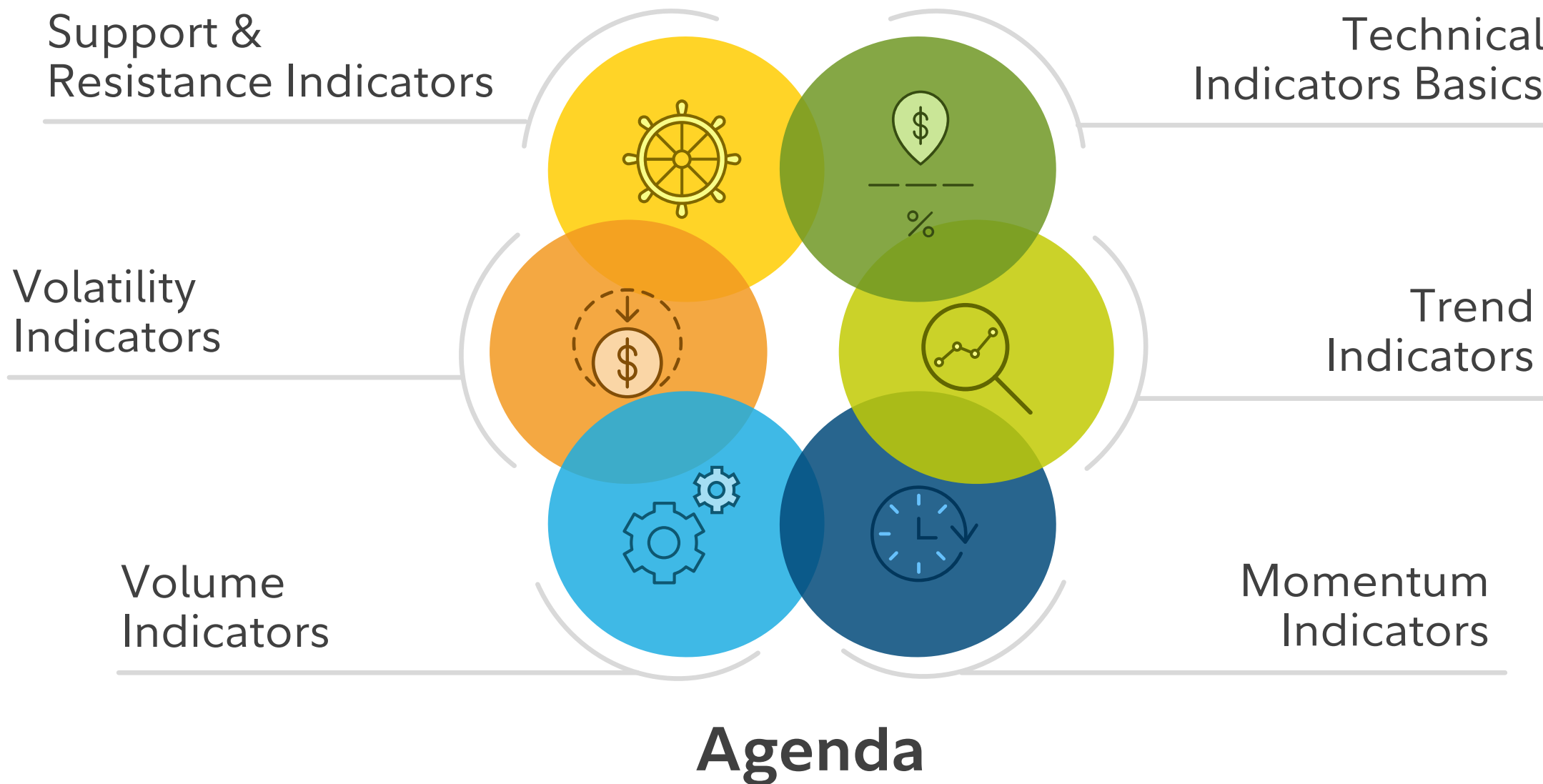
About Our Coauthor

Charles D. Kirkpatrick II, CMT

Charles D. Kirkpatrick II, CMT, is president of Kirkpatrick & Company, Inc., a technical analysis research firm that publishes the *Market Strategist* investment newsletter. A past instructor in finance at the School of Business Administration at Fort Lewis College and adjunct professor of finance at Brandeis University International Business School, he is a two-time winner of the Chartered Market Technicians Association's prestigious Charles H. Dow Award for research in technical analysis, winner of the MTA Annual Award in 2008 for "Outstanding Contributions to the Field of Technical Analysis," and winner in 2012 of the Mike Epstein Award from the MTA Educational Foundation for "Long-Term sponsorship of Technical Analysis in Academia."

He is a Chartered Market Technician, a past member of the board of directors of the Market Technicians Association, past editor of the *Journal of Technical Analysis*, past board member and vice president of the CMT Association Educational Foundation and a member of the American Association of Professional Technicians (AAPTA). He coauthored *Technical Analysis: The Complete Source for Financial Market Technicians*, the primary textbook for the CMT program and for university graduate courses on technical analysis, authored *Beat the Market* and, most recently, *Time the Markets: Using Technical Analysis to Interpret Economic Data*.

He is a graduate of Phillips Exeter Academy, Harvard College (AB), and the Wharton School (MBA) and lives with his wife in Maine.





Technical Indicator Basics

What Is a Technical Indicator?



A technical indicator is a mathematical calculation based on historic price or volume.



Types of Technical Indicators

Trend Indicators

Simple Moving Average (SMA), Exponential Moving Average (EMA), Moving Average Convergence/Divergence (MACD), Average Directional Movement Index (ADX)

Momentum Indicators

Stochastic Oscillator, Relative Strength Index (RSI)

Volume Indicators

On Balance Volume (OBV), Money Flow Index (MFI), Accumulation/Distribution

Volatility Indicators

Bollinger Bands®, Average True Range (ATR)

Support and Resistance Indicator

Fibonacci Retracements



Trend Indicators



Simple Moving Average

Simple Moving Average (SMA)

This is the easiest moving average to construct. It is calculated as the average price over the specified period. The average is called "moving" because it is plotted on the chart bar by bar, forming a line that moves along the chart as the average value changes.

How It Works

Determine trend direction

- If the SMA is positively sloping, the trend is up.
- If the SMA is negatively sloping, the trend is down.

Determine trend duration

- 200-bar SMAs are common proxies for long-term trends.
- 50-bar SMAs are typically used to gauge intermediate trends.
- Shorter-period SMAs can be used to determine short-term trends.

Determine trading signals via price crosses

- When prices cross above the SMA, you may want to go long or cover short.
- When prices cross below the SMA, you may want to go short or exit long.

Simple Moving Average



Using moving average crossovers to generate trading signals

When a more sensitive (faster) SMA crosses above a less sensitive (slower) SMA from below, it is considered bullish.

When a more sensitive (faster) SMA crosses below a less sensitive (slower) SMA from above, it is considered bearish.





Exponential Moving Average

Exponential Moving Average (EMA)

The EMA measures trend direction over a period of time. It applies more weight to data that is more current. Because of its unique calculation, EMA will follow prices more closely than a corresponding SMA.

How It Works

Identify trends earlier

- Use the same rules that apply to SMAs when interpreting EMAs. Keep in mind that EMAs are generally more sensitive to nearer-term price movement.

Determine trend direction

- When the EMA rises, you may want to consider buying when prices dip near or just below the EMA. When the EMA falls, you may consider selling when prices rally toward or just above the EMA.

Indicate support and resistance areas

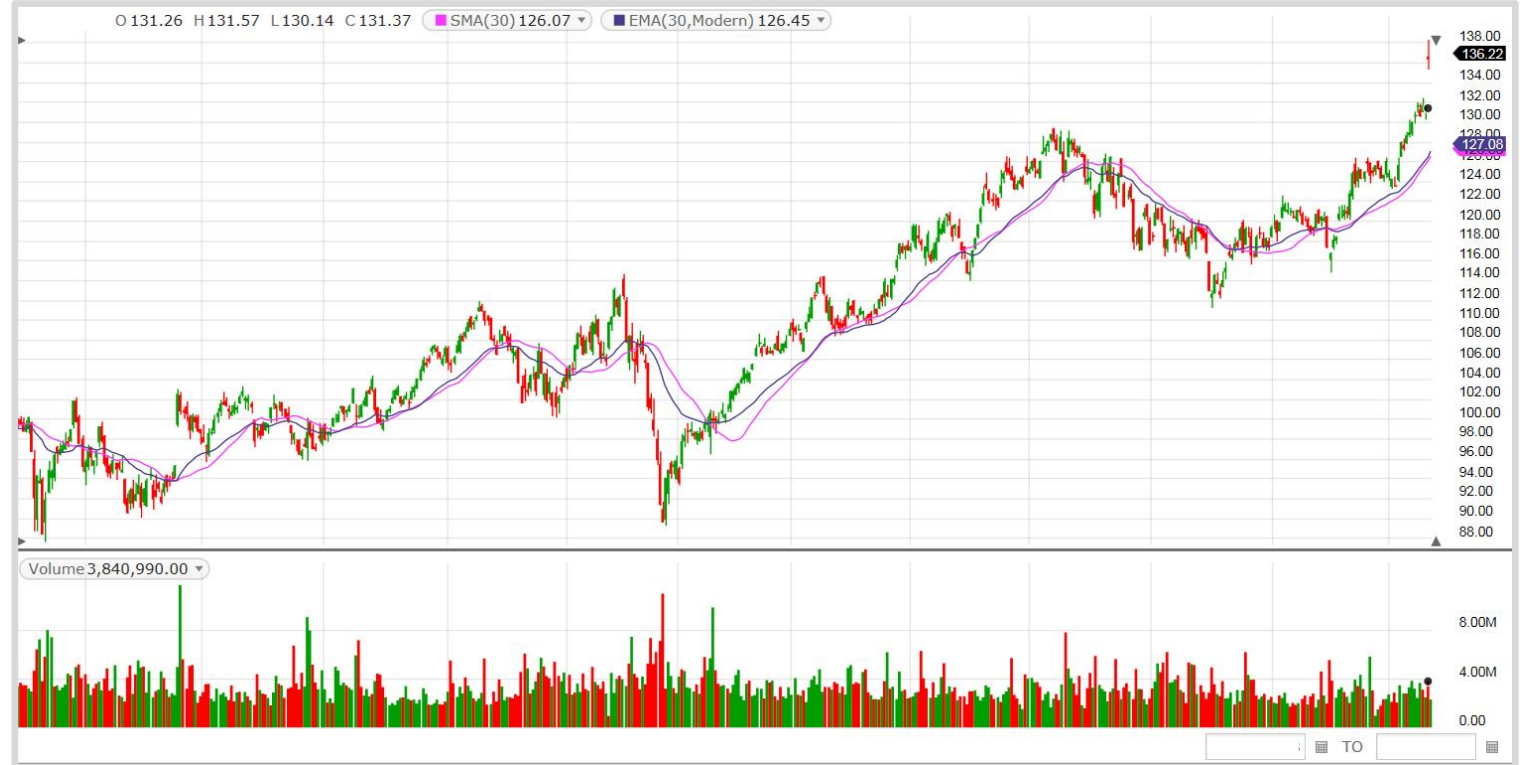
- A rising EMA tends to support the price action, while a falling EMA tends to provide resistance to price action.

Exponential Moving Average



Both the EMA and the SMA here represent 30 days.

EMA reacts faster to the first pullback and the subsequent rally.



Moving Average Convergence/Divergence

Moving Average Convergence/Divergence (MACD)

MACD is a momentum oscillator primarily used to trade trends.

How It Works

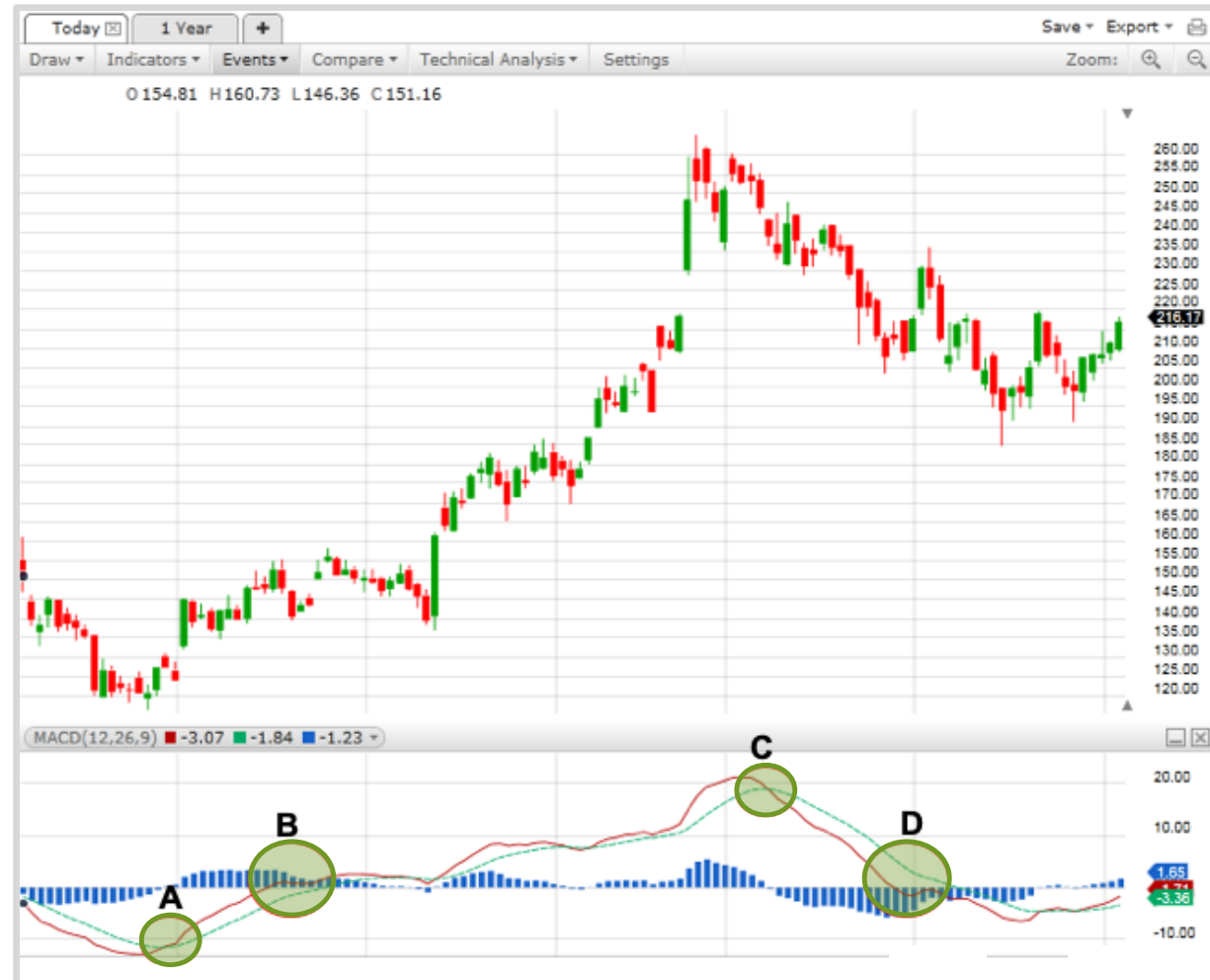
Determine bullish or bearish

- MACD crossing above the zero line is considered bullish, while crossing below the zero line is bearish. When MACD turns up from below the zero line, it is considered bullish. When it turns down from above the zero line, it is considered bearish.
- When the MACD line crosses from below to above the signal line, the indicator is considered bullish. The further below the zero line this cross occurs, the stronger the signal.
- When the MACD line crosses from above to below the signal line, the indicator is considered bearish. The further above the zero line this cross occurs, the stronger the signal.

Moving Average Convergence/Divergence



- A. Bullish
- B. Bullish
- C. Bearish
- D. Bearish





Average Directional Movement Index

Average Directional Movement Index (ADX)

ADX can be used to help measure the overall strength of a trend.

How It Works

Measure strength of trend

- A strong trend is present when ADX is above 25; no trend is present when ADX is below 20.
- If the ADX is declining, it could indicate that the current trend is weakening.
- If the ADX is rising, it could indicate a strengthening trend.
- The ADX indicator incorporates two different components in its construction which are commonly plotted along with the ADX.
 - Positive Directional Indicator (+DMI) shows the difference between today's high price and yesterday's high price. These values are then added up from the past 14 periods and then plotted.
 - Negative Directional Indicator (-DMI) shows the difference between today's low price and yesterday's low price. These values are then summed up from the past 14 periods and plotted.

Average Directional Movement Index

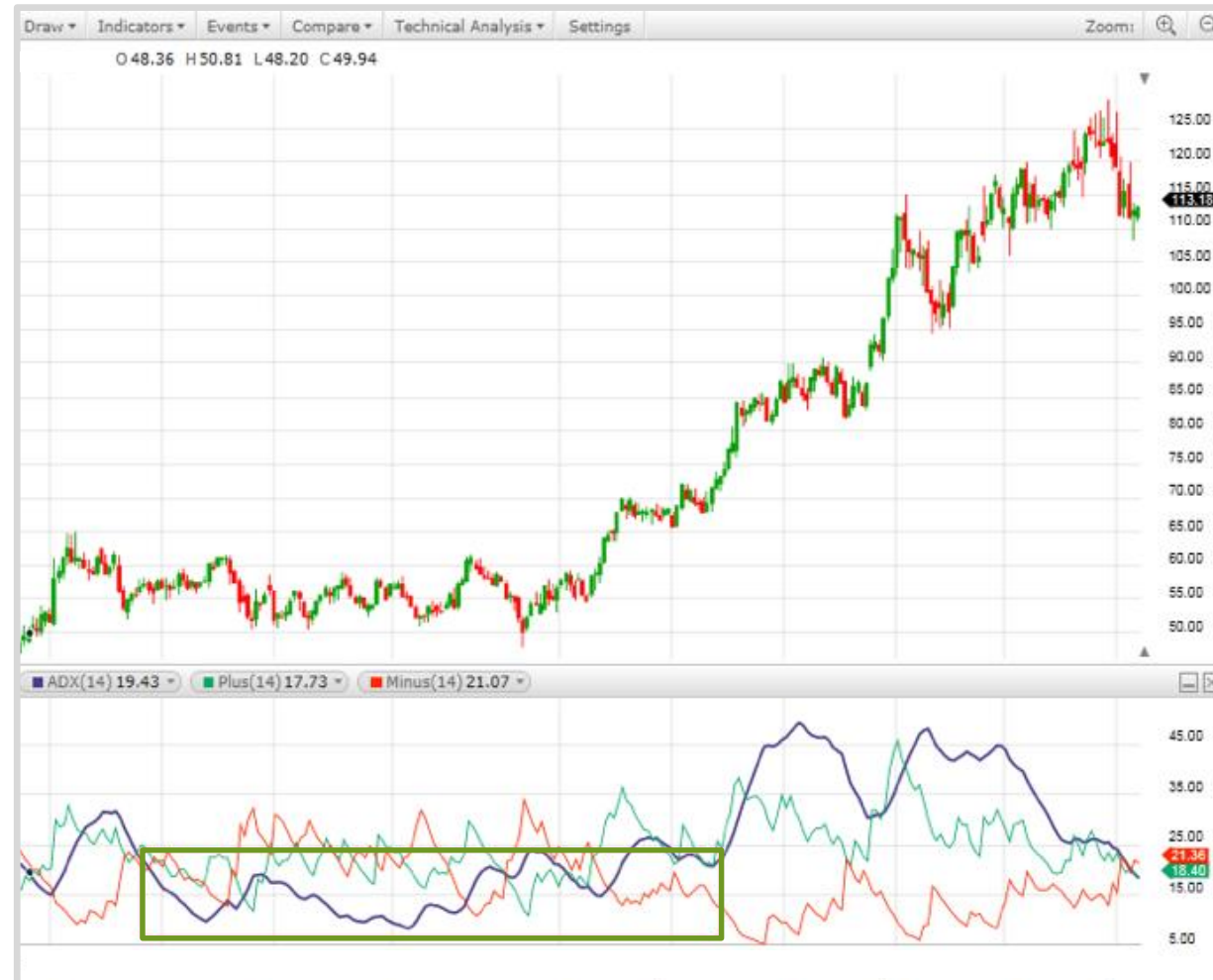


ADX is less than 25 on the left side of the chart.

+DM is greater than -DMI throughout the uptrend, though this is not a requirement.

ADX has fallen below 25 on the right side of the chart and -DM has crossed up above +DM.

Remember that ADX shows trend strength – not direction.





Momentum Indicators

Overbought/Oversold in Oscillators

- In bounded indicators, also called "oscillators," a limit exists as to how high or low they can reach.
- When the oscillator reaches a zone close to its highest bound, it is called "overbought."
- When it reaches a zone close to its lowest bound, it is called "oversold."
- An oscillator value in these zones indicate that the market is vulnerable to reversal. A signal often occurs when the oscillator exits one of these zones.
- In some cases, the reaching of extreme levels indicates that a new trend has begun. In these instances, the oscillator will remain in a zone for the period of the trend and will give many false signals on corrections to the trend.
- The interpretation of oscillator oversold and overbought is thus dependent on the underlying trend.
- They don't work when a trend is strong, but excel in trading range markets.



Stochastic Oscillator

Stochastic Oscillator

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. The indicator can range from 0 to 100. Stochastic Oscillators are most effective in broad trading ranges or slow moving trends.

How It Works

Determine exit and entry

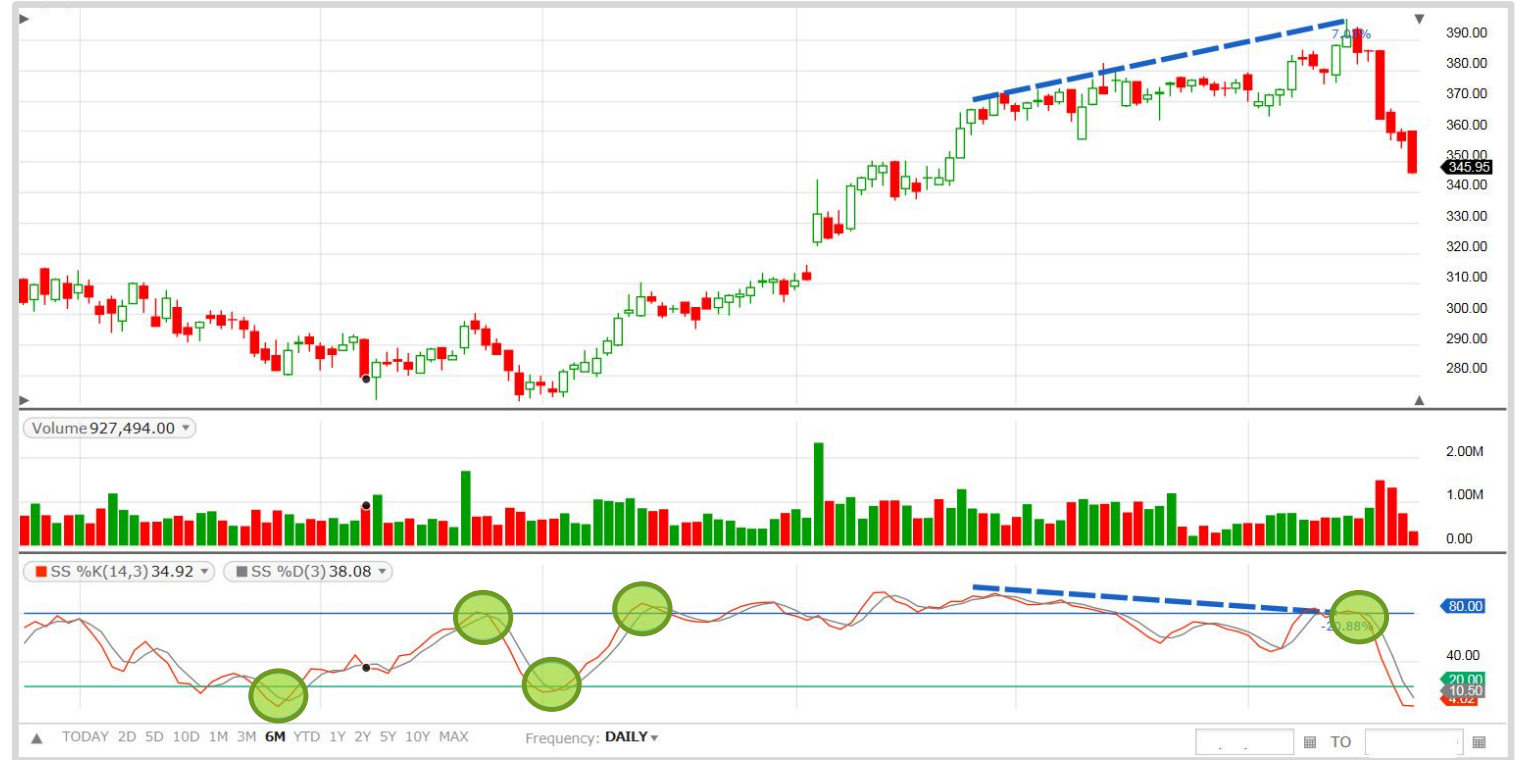
- Generally, the area above 80 indicates an overbought region, while the area below 20 is considered an oversold region.
- A sell signal is given when the oscillator is above the 80 level and then crosses back below 80. Conversely, a buy signal is given when the oscillator is below 20 and then crosses back above 20.
- A crossover signal occurs when the two lines cross in the overbought or oversold region.
- Divergences form when a new high or low in price is not confirmed by the Stochastic Oscillator.

Stochastic Oscillator



This example is using a Slow Stochastic; note the effectiveness of the signals during the sideways trend.

Divergences between price and oscillators can also generate signals.





Relative Strength Index

Relative Strength Index (RSI)

RSI measures the speed and change of price movements.

How It Works

Determine the speed and change of price

- The RSI oscillates from zero and 100. Traditionally, the RSI is considered overbought when above 70 and oversold when below 30.
- In an uptrend or bull market, the RSI tends to remain in the 40-90 range with the 40-50 zone acting as support.
- During a downtrend or bear market, the RSI tends to stay in the 10-60 range with the 50-60 zone acting as resistance.
- If underlying prices make a new high or low that isn't confirmed by the RSI, this divergence can signal a price reversal.

Relative Strength Index



Overbought and oversold signals on the chart indicate price movement in the short term.





Volume Indicators



General Rules of Volume Theory

Increasing volume reinforces the trend direction.

Declining volume diminishes the trend direction.

A price peak or trough on ultrahigh volume is often an important reversal point in a trend.

Volume indicators should be considered warnings but not signals of change in trend direction.

On Balance Volume



On Balance Volume (OBV)

OBV measures buying and selling pressure as a cumulative indicator that adds volume on up days and subtracts volume on down days.

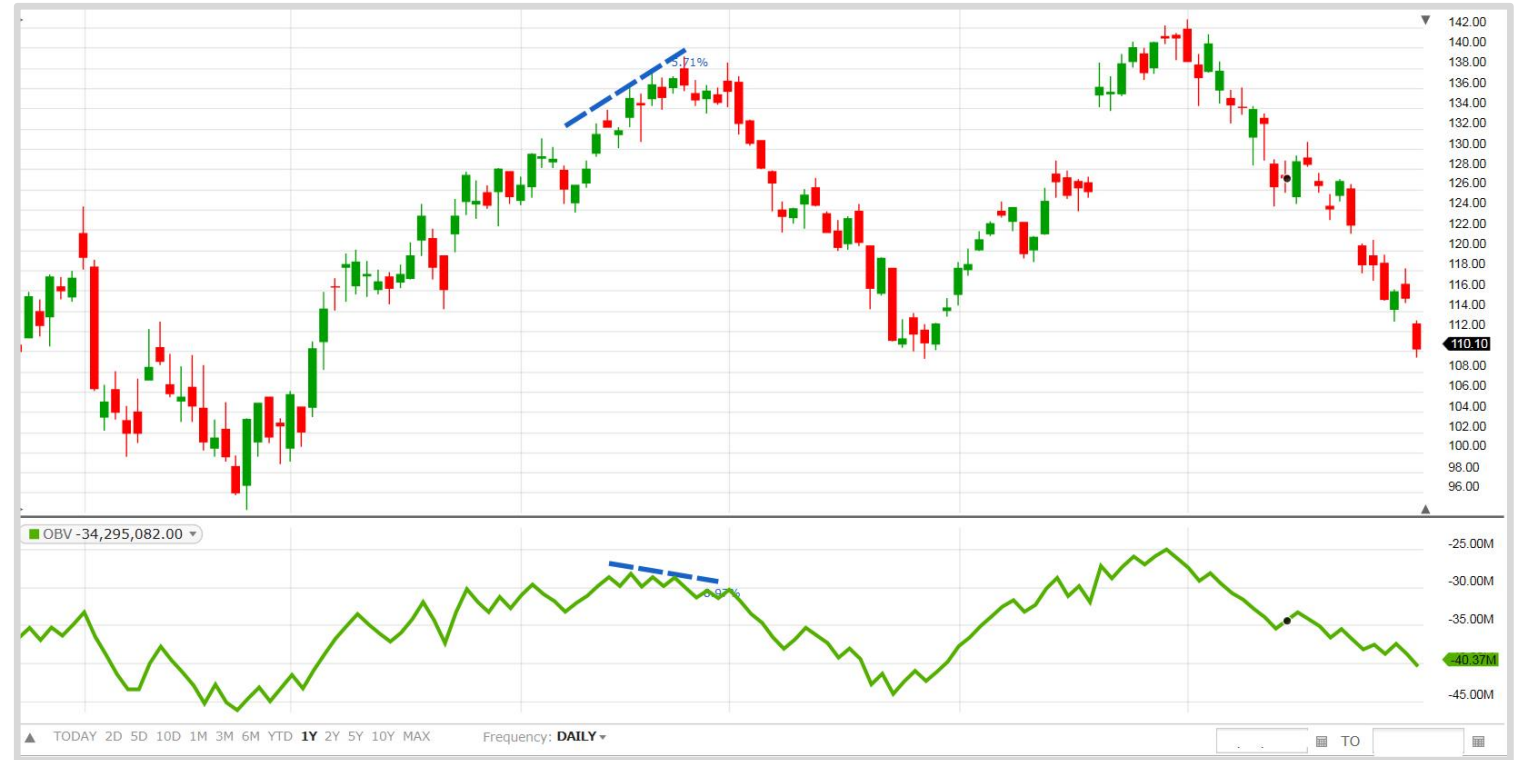
How It Works

- The actual value of the OBV is unimportant; concentrate on its direction.
- When price continues to make higher peaks and OBV fails to make higher peaks, the upward trend is likely to stall or fail. This is called a negative divergence.
- When price continues to make lower troughs and OBV fails to make lower troughs, the downward trend is likely to stall or fail. This is called a positive divergence.

On Balance Volume



Bearish divergence:
OBV is not confirming
the higher peaks in
price, which preceded
the selloff.



Money Flow Index



Money Flow Index (MFI)

MFI is a volume indicator that measures the flow of money into and out of a security over a specified period of time. It is related to the Relative Strength Index (RSI) but incorporates volume, whereas the RSI only considers price.

How It Works

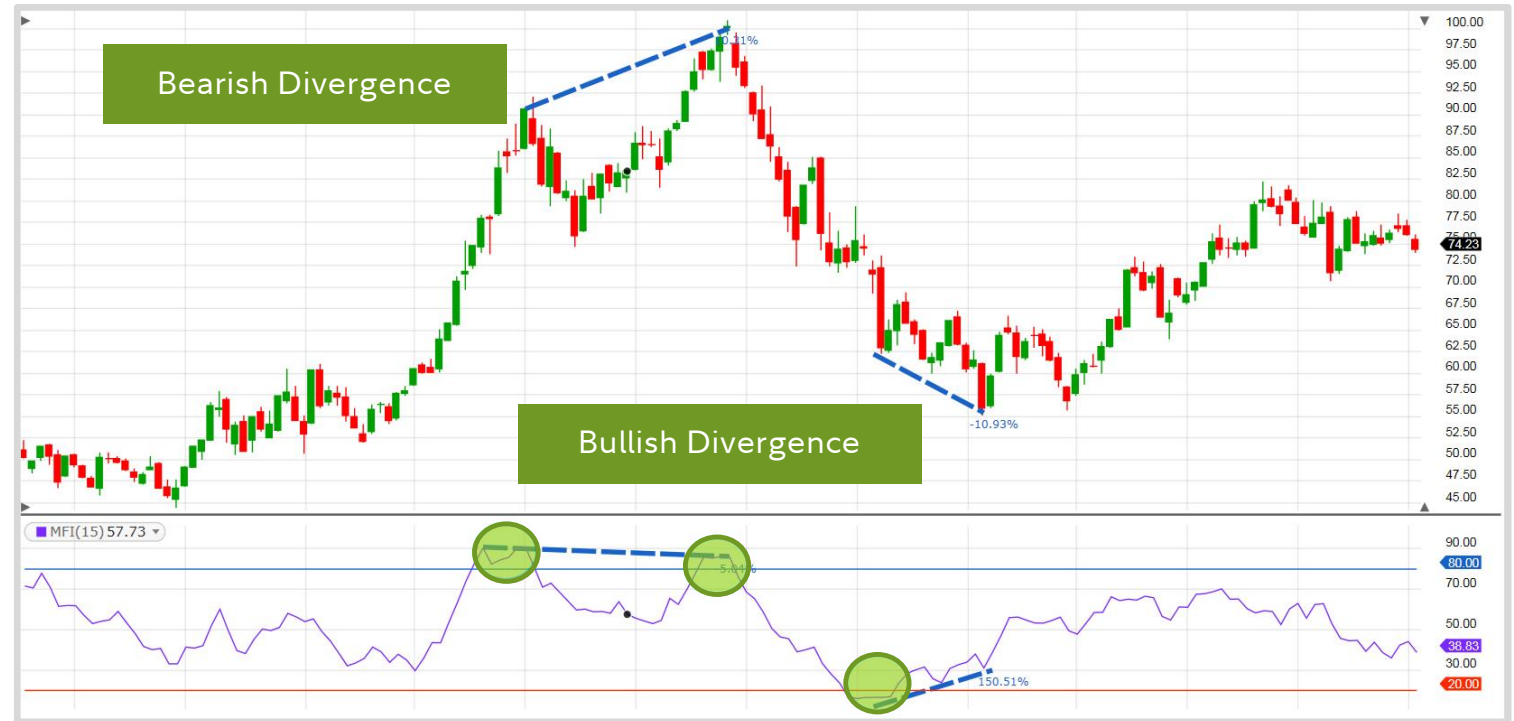
- Oversold levels typically occur below 20 and overbought levels typically occur above 80. These levels may change depending on market conditions.
- Oversold or overbought levels are generally not reason enough to buy or sell and traders should consider additional technical analysis or research to confirm the security's turning point.
- If the underlying price makes a new high or low that isn't confirmed by the MFI, this divergence can signal a price reversal.

Money Flow Index



Bearish divergence:
Price peak not
confirmed by MFI.

Bullish divergence:
Price trough is not
confirmed by MFI.



Accumulation/Distribution



Accumulation/ Distribution

Accumulation/Distribution looks at the proximity of closing prices to their highs and lows to determine if accumulation or distribution is occurring in the market.

How It Works

Determine the direction of a trend

- When both price and Accumulation/Distribution are making higher peaks and higher troughs, the uptrend is likely to continue.
- When both price and Accumulation/Distribution are making lower peaks and lower troughs, the downtrend is likely to continue.
- When price continues to make higher peaks but Accumulation/Distribution fails to make higher peak, the uptrend is likely to stall or fail. This is known as a negative divergence.
- When price continues to make lower troughs and Accumulation/Distribution fails to make lower troughs, the downtrend is likely to stall or fail. This is known as a positive divergence.

Accumulation/Distribution

Negative divergence between price and Accumulation Distribution





Volatility Indicators

Bollinger Bands®



Bollinger Bands

Bollinger Bands are a type of price envelope plotted at a standard deviation level above and below a Simple Moving Average of the price. Bollinger Bands help determine whether prices are high or low on a relative basis.

How It Works

Determine relative price

- When the bands tighten during a period of low volatility, it raises the likelihood of a sharp price move in either direction.
- When the bands separate by an unusually large amount, volatility increases and any existing trend may be ending.
- Use swings within the band's envelopes to help identify potential profit targets.

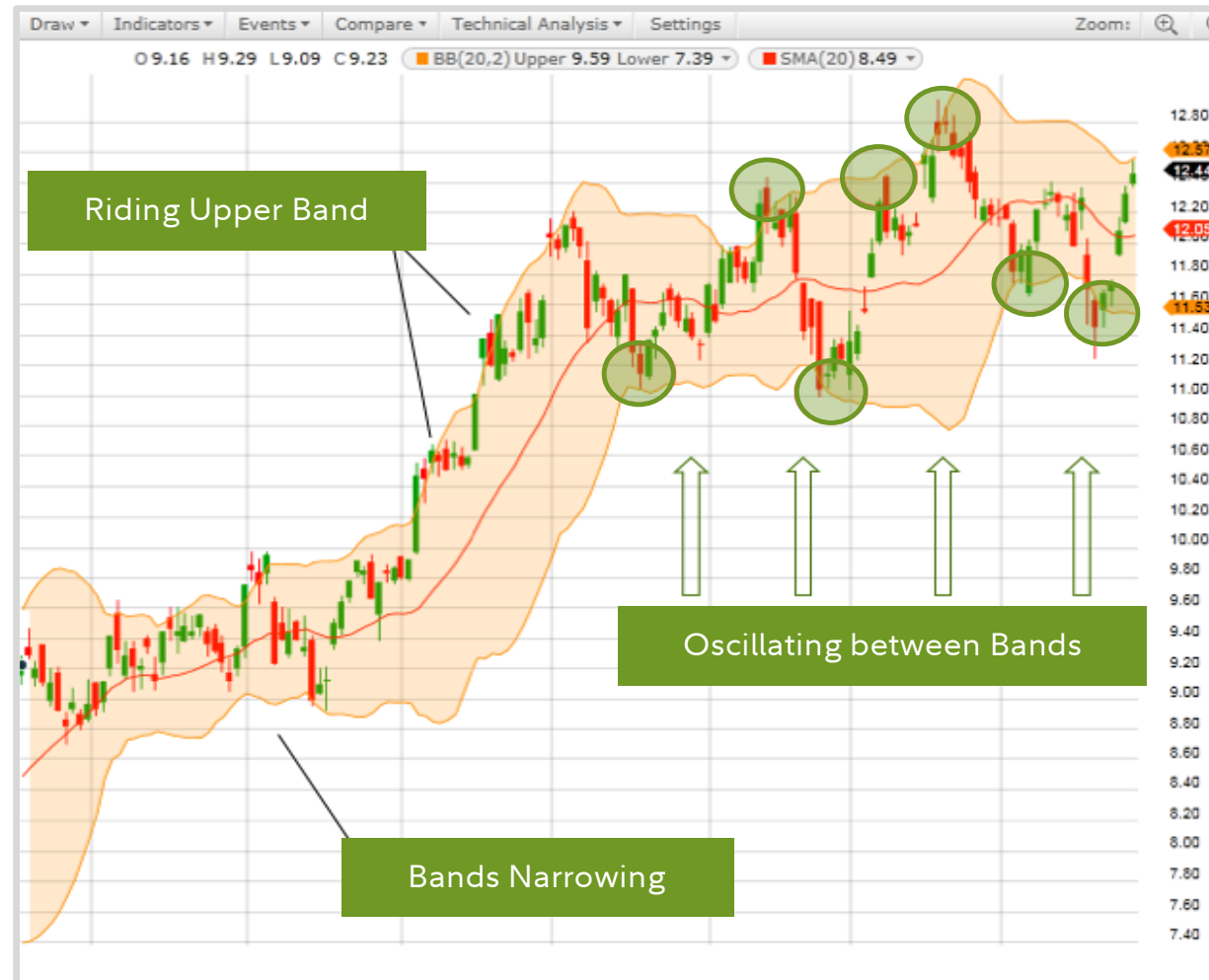
Bollinger Bands®



Riding Upper Band

Oscillating between Bands

Bands Narrowing





Average True Range

Average True Range (ATR)

ATR is the average of true ranges over a specified period. ATR measures volatility, taking into account any gaps in the price movement.

How It Works

Determine market volatility

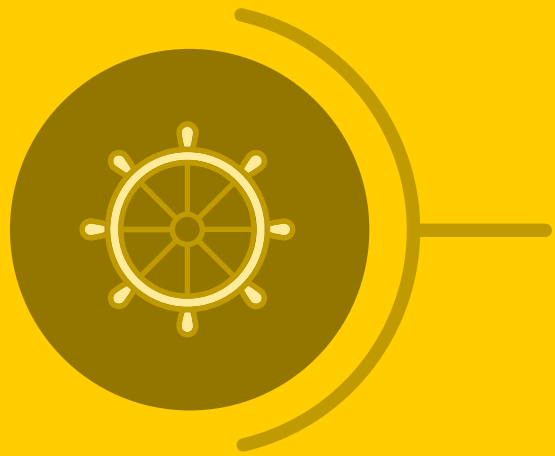
- An expanding ATR indicates increased volatility, whether that's selling or buying pressure.
- A low ATR value indicates decreased volatility, a series of periods with small ranges.
- ATR is useful for stops or entry triggers, signaling changes in volatility.

Average True Range



Periods of increased volatility are clearly identified by ATR.





Support and Resistance Indicators



Fibonacci Retracements

Fibonacci Retracements

Plot percentage retracement lines based on the mathematical relationship within the Fibonacci sequence. These retracement levels provide support and resistance levels that can be used to target price objectives.

How It Works

Provide support and resistance levels

- Applying these percentages to the difference between the high and low price for the period selected creates a set of price objectives.
- Depending on the direction of the market, up or down, prices will often retrace a significant portion of the previous trend before resuming the move in the original direction.
- These countertrend moves tend to fall into certain parameters, which are often the Fibonacci Retracement levels.

Fibonacci Retracements



Here, we have drawn a down sloping Fibonacci Retracement line from the absolute peak to the absolute trough to determine levels of resistance we may meet.

In this example, the first major correction occurred at 61.8% retracement.

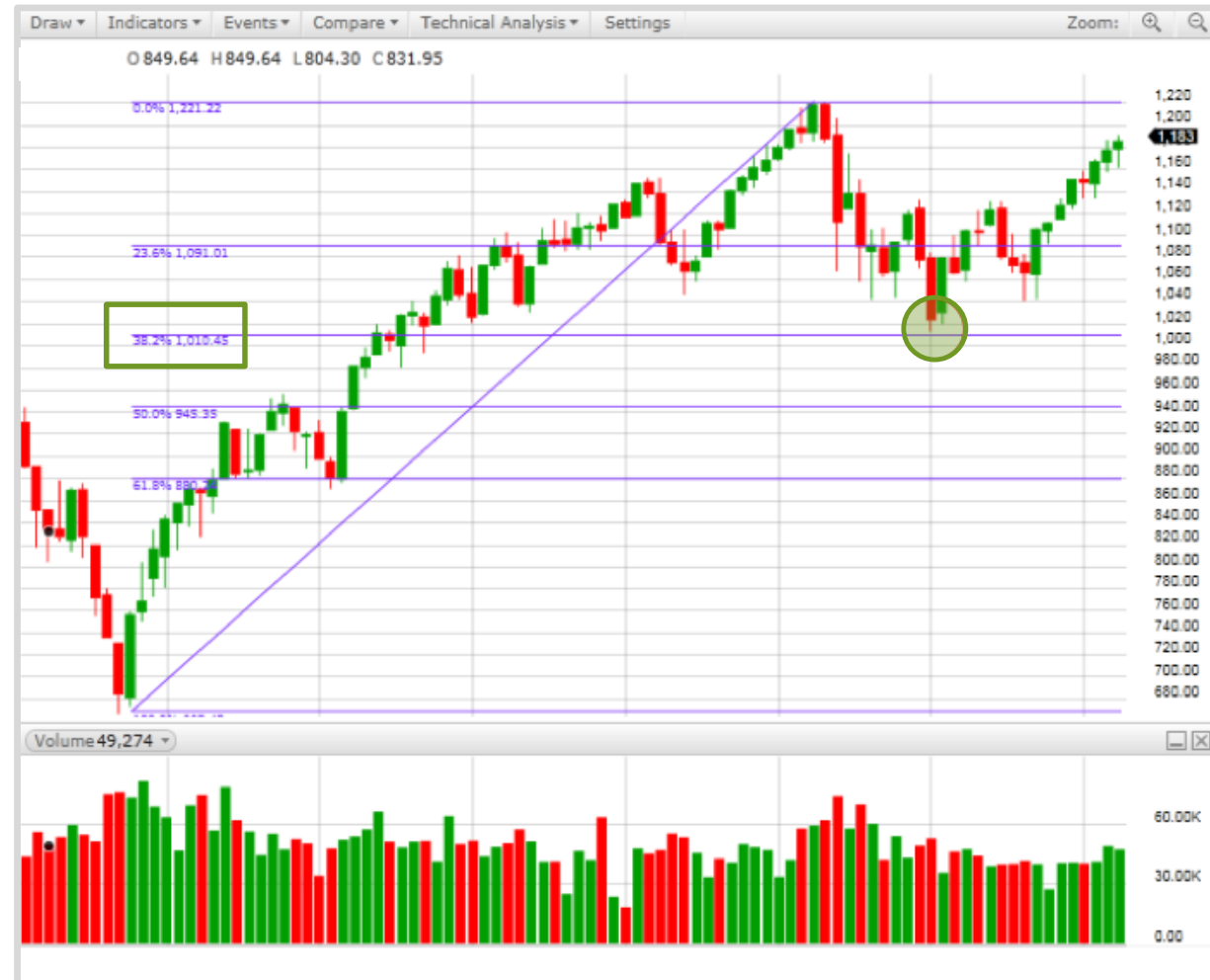


Fibonacci Retracements



In this example, we have drawn a Fibonacci Retracement line from the trough to the peak of the price move for which we're trying to determine retracement levels.

In this instance, we found support at 38.2% retracement.





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