



A Fidelity Investments Webinar Series

Getting Started with Technical Analysis

BROKERAGE: TECHNICAL ANALYSIS





Upcoming Webinars

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, 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.



Charles D. Kirkpatrick II, CMT



About Our Co-Author

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, Fort Lewis College and Adjunct Professor of Finance at Brandeis University International Business School, he is a two-time winner of the 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

Market Technicians Association Educational Foundation and a member of the American Association of Professional Technicians (AAPTA). He co-authored *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.





Defining Technical Analysis

Fundamental Analysis & Technical Analysis



Two Common Types of Analysis

Balance Sheet - Sample



ASSETS		LIABILITIES AND OWNERS' EQUITY			
Current Assets		Long-Term Liabilities			
Cash	\$45,000	\$40,000	Long-Term Debt – 1 Yr.	\$12,000	\$11,000
Marketable Securities	\$65,000	\$60,000	Notes Payable	\$15,000	\$14,000
Accounts Receivable	\$85,000	\$70,000	Accounts Payable	\$13,000	\$12,000
Notes Receivable	\$45,000	\$40,000	Taxes Payable	\$11,000	\$10,000
Inventories	\$85,000	\$80,000	Accrued Expenses	\$21,000	\$20,000
Total Current Assets	\$325,000	\$290,000	Other Current Liabilities	\$10,000	\$9,000
Long-Term Assets		Total Current Liabilities		\$82,000	\$76,000
Land	\$85,000	\$80,000	Long-Term Liabilities		
Buildings	\$100,000	\$90,000	Notes Payable	\$30,000	\$27,000
Machinery	\$30,000	\$25,000	Bonds Payable	\$60,000	\$52,000
Accumulated Depreciation	(\$4,000)	(-\$3,500)	Total Long-Term Liabilities	\$90,000	\$79,000
Net Tangible Assets	\$211,000	\$191,500	Other Liabilities		
Intangible Assets			Pension Obligations	\$90,000	\$82,000
Goodwill	\$15,000	\$5,000	Deferred Taxes	\$70,000	\$62,000
Patents	\$20,000	\$19,000	Minority Interest	\$15,000	\$12,000
Trademarks	\$15,500	\$13,400	Total Other Liabilities	\$175,000	\$156,000
Organizational Costs	\$24,000	\$22,900	Total Liabilities	\$347,000	\$311,000
Total Intangibles	\$74,500	\$60,300	OWNERS' EQUITY		
Other Assets			Preferred Stock	\$60,000	\$50,000
Investments	\$25,000	\$23,000	Common Equity		
Deferred Charges	\$50,000	\$45,000	Common Stock	\$97,500	\$89,000
Total Other Assets	\$75,000	\$68,000	Capital Surplus	\$111,000	\$99,000
Total Long-Term Assets	\$360,500	\$319,800	Retained Earnings	\$120,000	\$105,800
		–Treasury Stock	(-\$50,000)	(-\$45,000)	
		Total Common Equity	\$278,500	\$248,800	
		Total Owners' Equity	\$336,500	\$298,800	
		Total Liabilities and Owners' Equity	\$685,500	\$609,800	



Fundamental Analysis

Technical Analysis

Defining Fundamental Analysis

Balance Sheet - Sample



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Definition

Fundamental analysts study companies using measures such as:

- Quality of management
- Labor relations
- Inventory control
- PE ratio and EPS growth rates
- Return on equity and assets

Defining Fundamental Analysis



Balance Sheet - Sample



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				Total Liabilities and Owners' Equity	\$685,500 \$609,800
Total Assets	\$685,500	\$609,800			

Limits

Fundamental analysis does not help you with:

- Timing of the investment
- Making the selling decision
- Quantifying the risk vs. reward

Defining Technical Analysis



Definition

Technical analysis primarily studies historical market data. It also:

- Focuses on the supply-and-demand dynamic expressed via stock prices
- Visualizes shifts in supply-and-demand which can be seen in chart patterns
- Accounts for the emotional aspects of the marketplace
- Quantifies the capital risk of trading and investment decisions
- Does not try to predict the future

Defining Technical Analysis



Limits

Technical analysis is still not a perfect investment method and has limits:

- Patterns, trends, and indicators are never precise, and charts require human interpretation
- Technical traders are susceptible to the same emotions and cognitive biases as all other investors

Defining Technical Analysis



Assumptions

- Prices in freely traded markets are determined by the economic principles of supply-and-demand
- Price discounts everything
- Prices are nonrandom but not necessarily predictable
- Prices have direction and tend to travel in observable trends
- Behavior and history in the marketplace will repeat itself
- Price patterns summarizing behavior are “fractal”



Charts, Chart Types, and Chart Construction

Charts, Chart Types, & Chart Construction



Overview



Analyze price
behavior



Easily visualize the
patterns and trends
within data

Charts, Chart Types, & Chart Construction



Overview



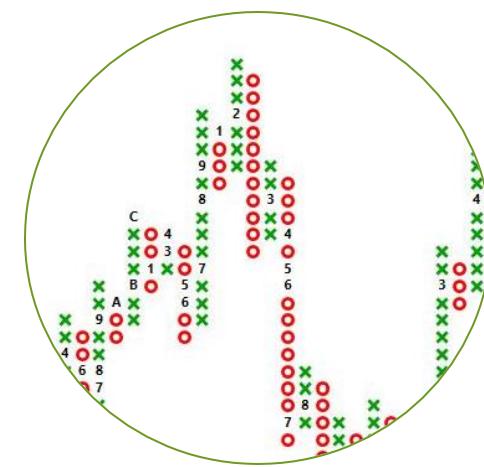
Line
Chart



Bar
Chart



Candlestick
Chart



Point & Figure
Chart

Chart Types



Bar Charts

Visualizes

- Open, High, Low, Close
- Volume for a specific time interval

Advantages

- Most common
- Easy to read
- Provides full range of trading for time interval

Chart Types



Candlestick Charts

Visualizes

- Open, High, Low, Close
- Volume for a specific time interval

Advantages

- Gaining popularity
- More visual than a bar chart
- Uses color to show differences between open and close prices

Chart Construction



Reversal Points

When a price is rising, stops, and then declines, the price at which the rise halted is a “reversal point.”

- In this situation, the reversal point is called a “**peak**” and is important because it is where buyers were overcome by sellers.
- When a price is declining, stops, and then rises, the price at which the decline halted is a reversal point called a “**trough**.” It is the price at which sellers were overcome by buyers.
- Reversal points are the foundations of trends, trend lines, channels, patterns, and support and resistance.

The Value of Reversal Points



The longer the trend, the more important the reversal point

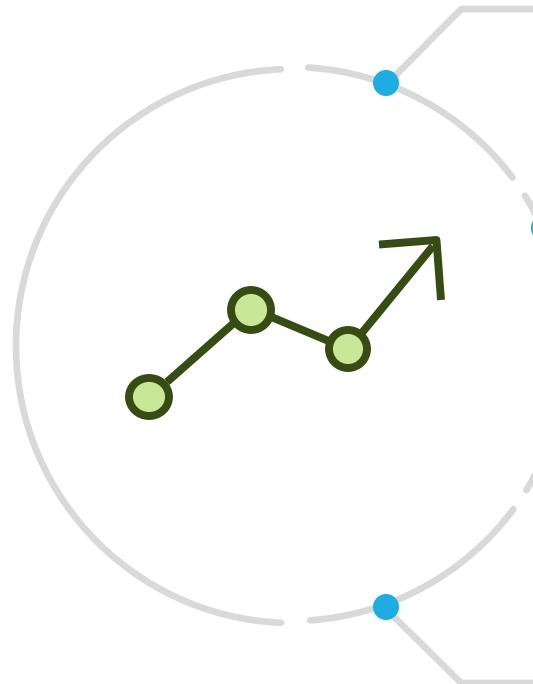
Reversal point importance is determined by the length of the trend before and after the peak or trough.





Basics of Trend Analysis

The Value of Trends



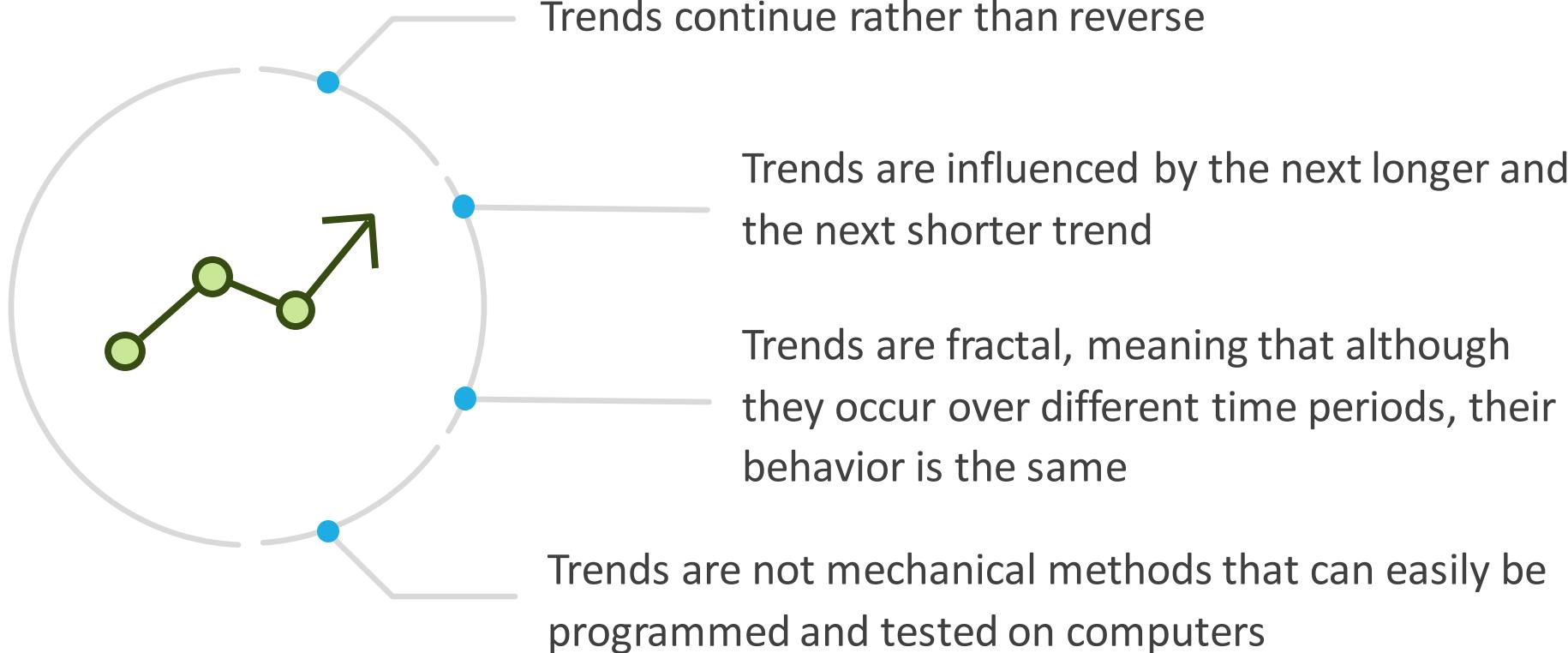
Technical analysis is based on the principles of trends

Trends arise from the interaction of buyers and sellers

Profit is made from a trend in prices

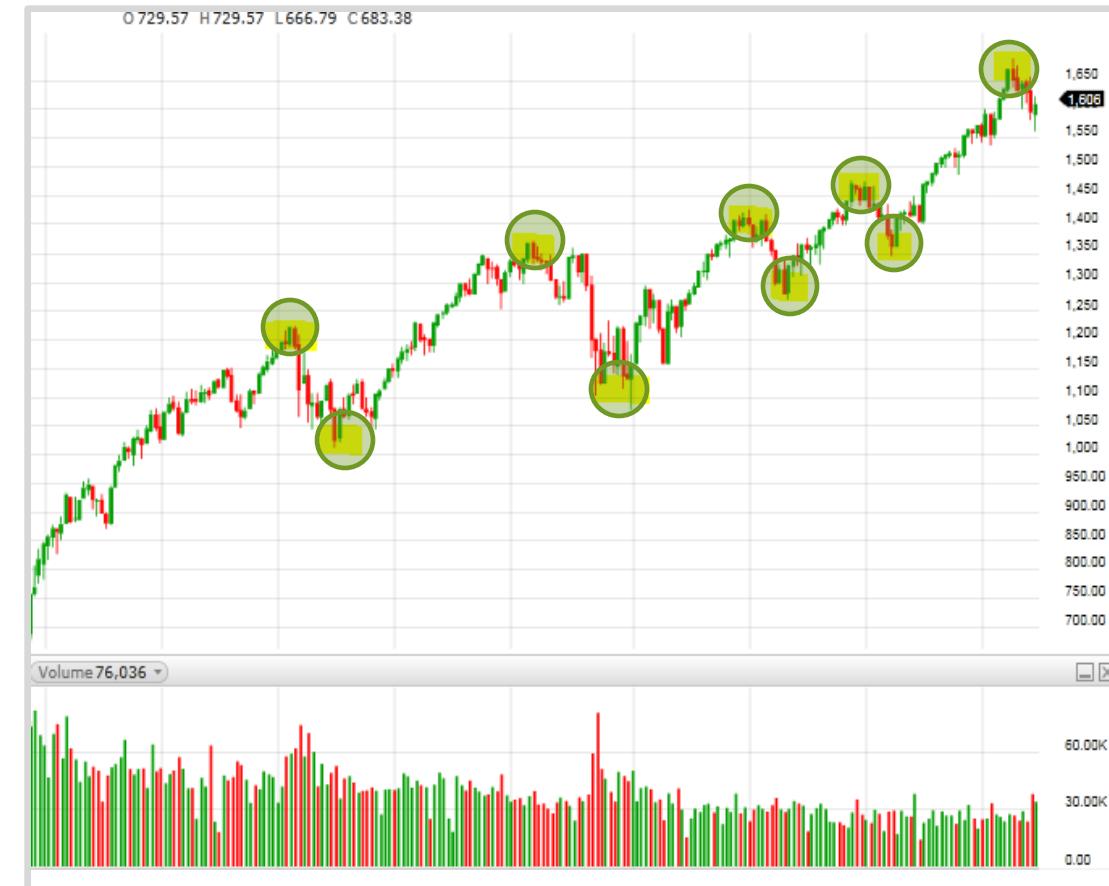
A trend's direction is described by the relative location of peaks and troughs

Assumptions about Trends



Uptrend

An uptrend has successively higher peaks and higher troughs.



Downtrend

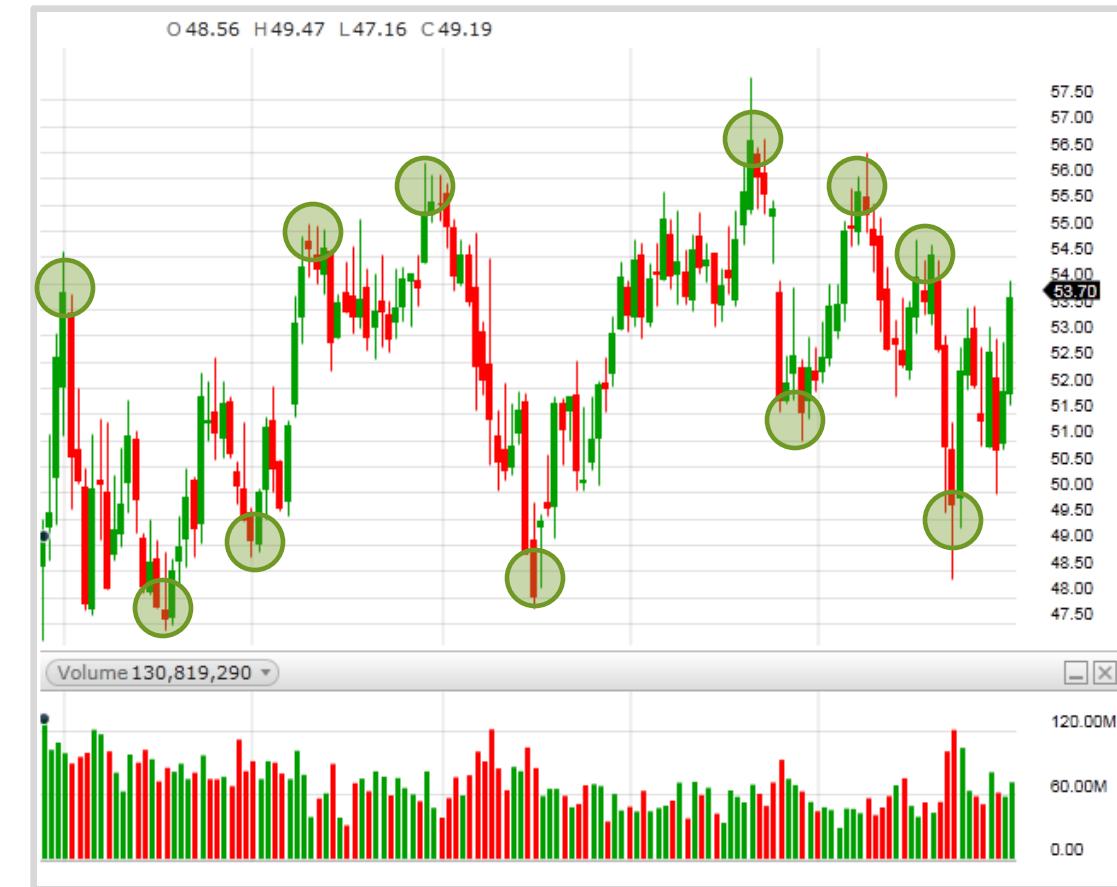


A downward trend has successively lower peaks and lower troughs.



Sideways Trend

A sideways trend is a period with no clear direction in prices.



From Trend to Trend Line



Definition

A trend is a direction; a trend line is an attempt to define and use that direction.

How do we draw trend lines?

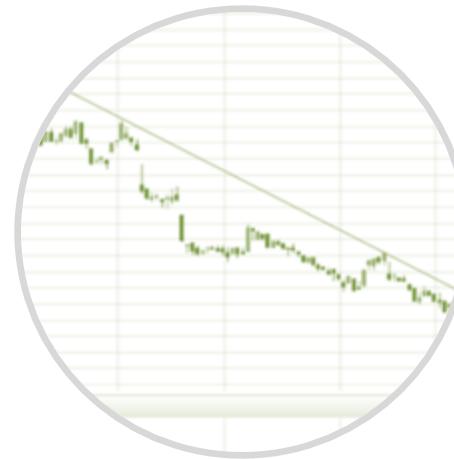
- From peak to peak
- From trough to trough

Types of Trend Lines

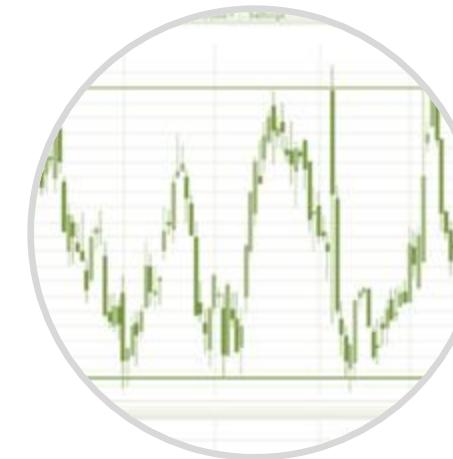
Overview



Upward
Sloping



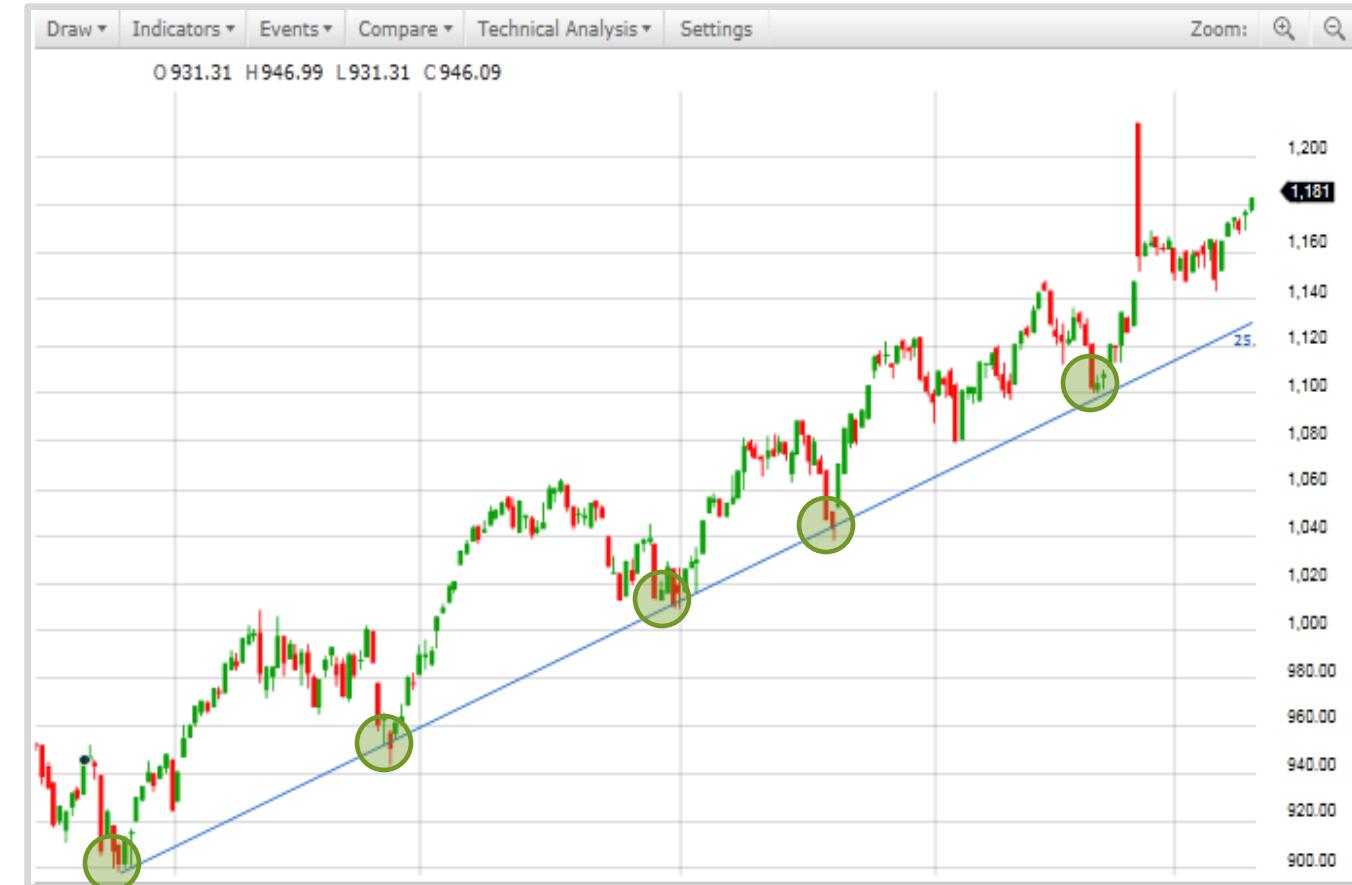
Downward
Sloping



Support and
Resistance

Upward Sloping

A line connecting
trough to higher
trough



Downward Sloping

A line connecting peak to lower peak



Support and Resistance



Support

Horizontal line drawn through troughs at the same price level

Resistance

Horizontal line drawn through peaks at the same price level



Profiting from a Trading Range



Green points are candles that hit support and resistance levels on close.

Red are intraday and do not close at support and resistance.

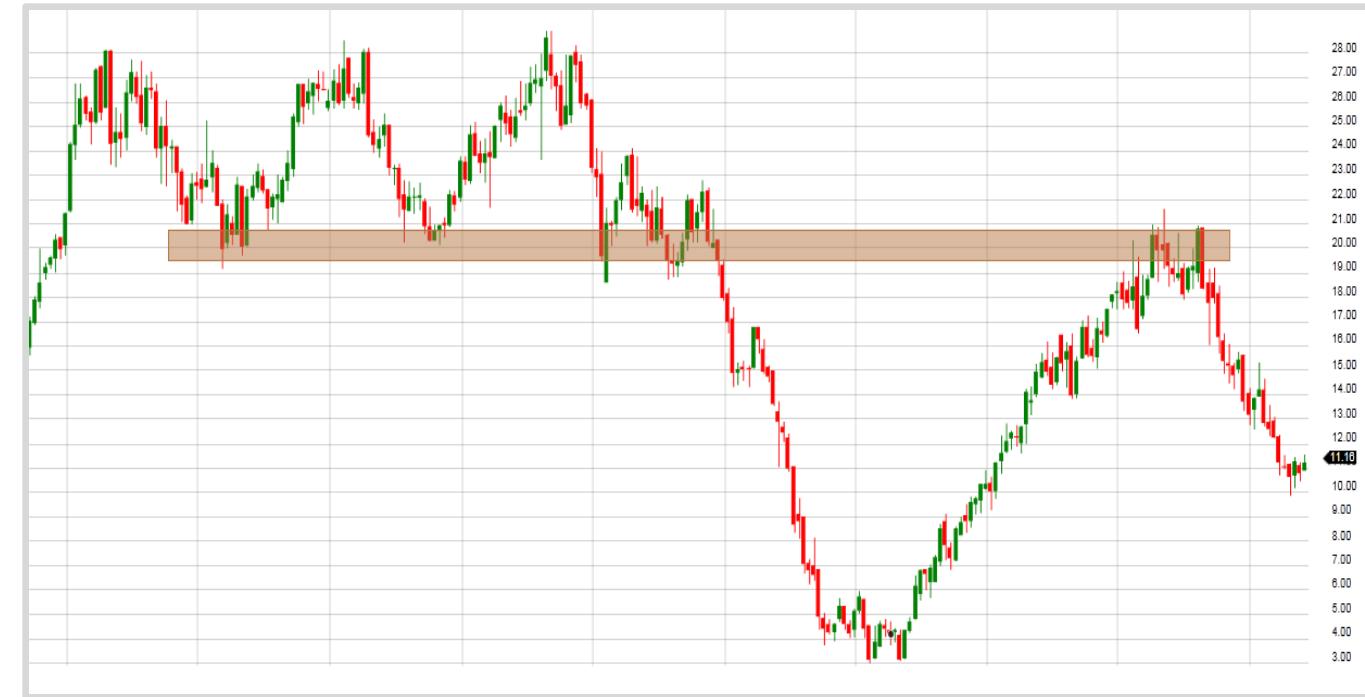


When Support Becomes Resistance



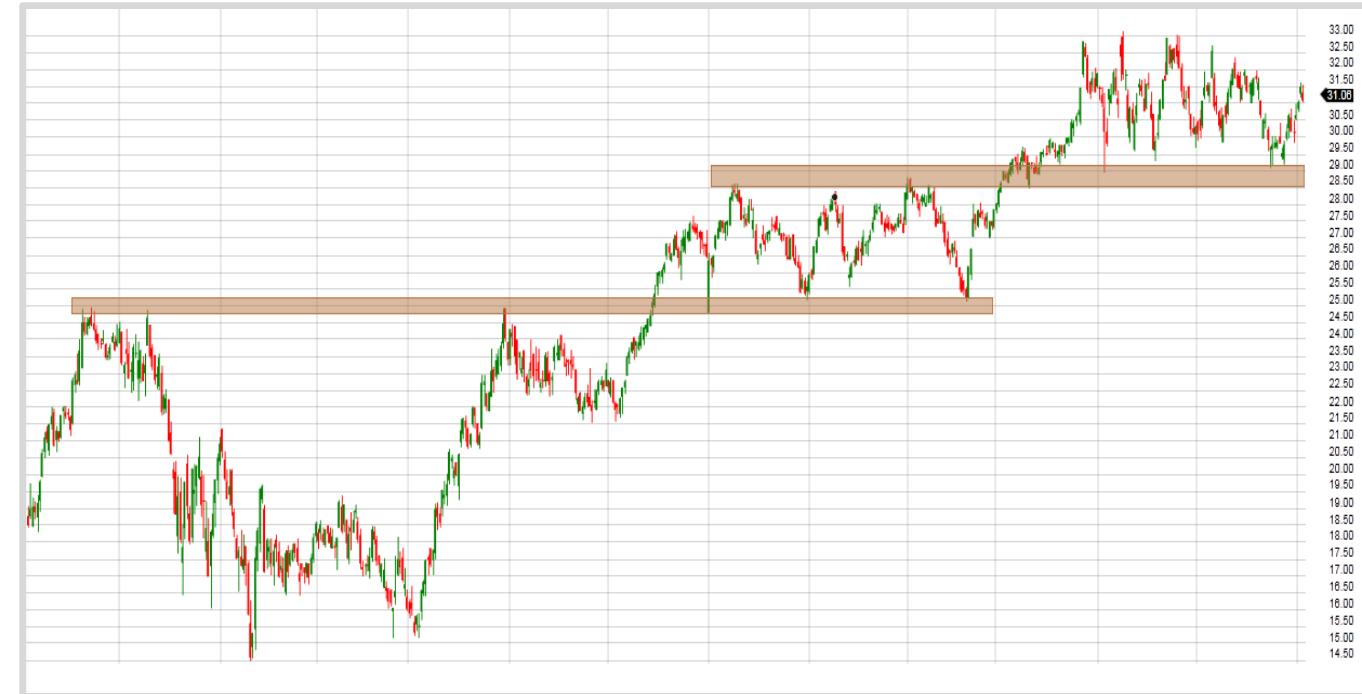
Once the price breaks through support, that support becomes future resistance.

When the price eventually rallies back to that level, it hits selling pressure and reverses back down again.



When Resistance Becomes Support

When resistance is penetrated, it can become support





Best Practices for Trend Traders

Trend Trading

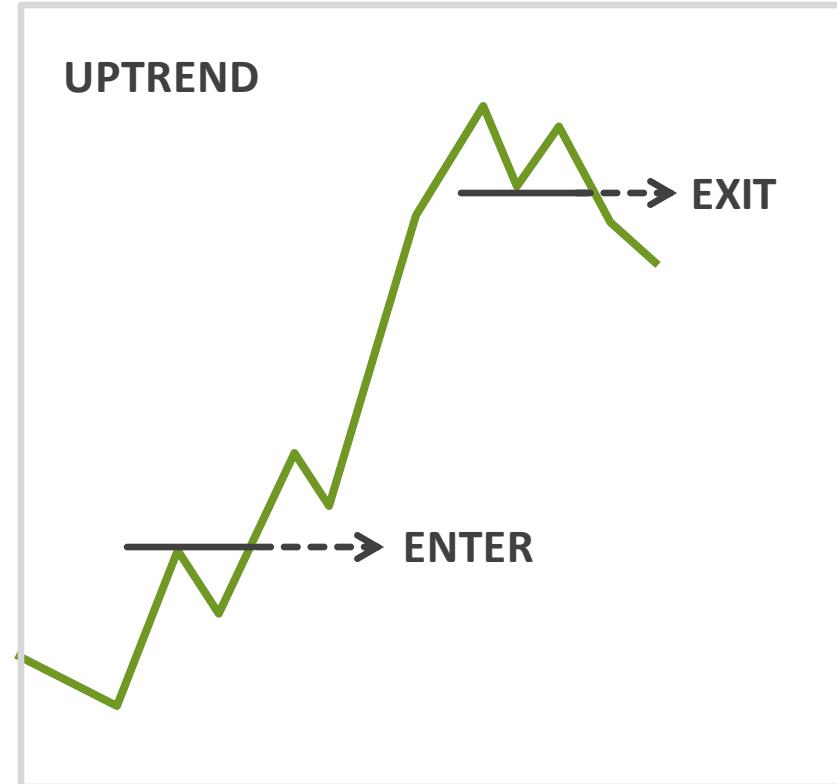


Best Practices

Determine:

- Strategy and conditions for entering/exiting trade
- Need of confirmation
- Triggers that will cause the entry to be executed
- Specific risk involved

Strategies for Trend Investors



Entry and Exit Strategies

Entry strategy

- Consider buying when chart patterns demonstrate a new trend

Exit strategy

- Consider selling when the trend reverses or appears to have ended

When investors using technical analysis execute these two strategies successfully, they may make a profit.

Entry Strategy



Exit Strategy

The trend line crosses previous troughs.

A trigger could be a breakout below the rising trend line.





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Visit the Fidelity Learning Center



Learn more about putting technical analysis to work for you

Read: Access the Technical Indicator Guide

Watch: Check out videos that define core technical concepts

Attend: Register for monthly webinars

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Investing involves risk, including risk of loss.

Technical analysis focuses on market action – specifically, volume and price. Technical analysis is only one approach to analyzing stocks. When considering what stocks to buy or sell, you should use the approach that you're most comfortable with. As with all your investments, you must make your own determination whether an investment in any particular security or securities is right for you based on your investment objectives, risk tolerance, and financial situation. Past performance is no guarantee of future results.

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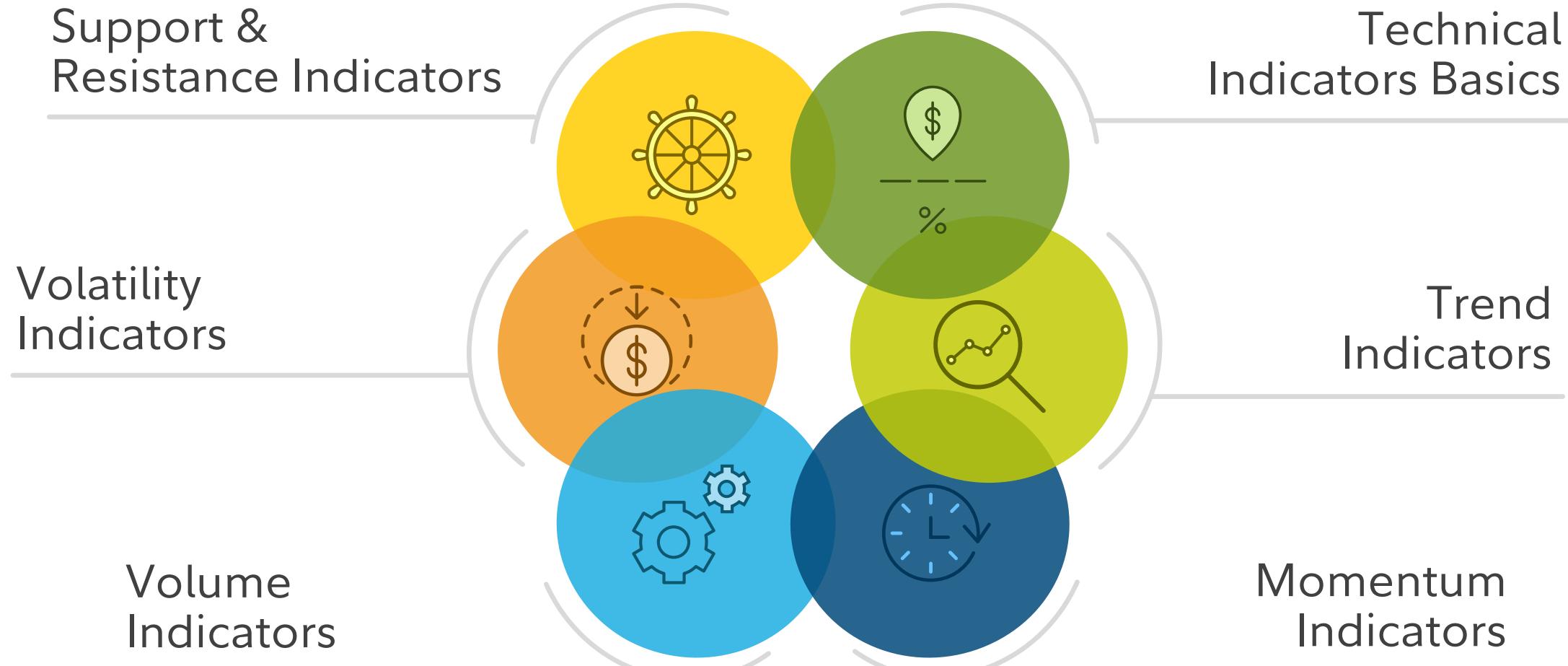


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Agenda



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 Retracement



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

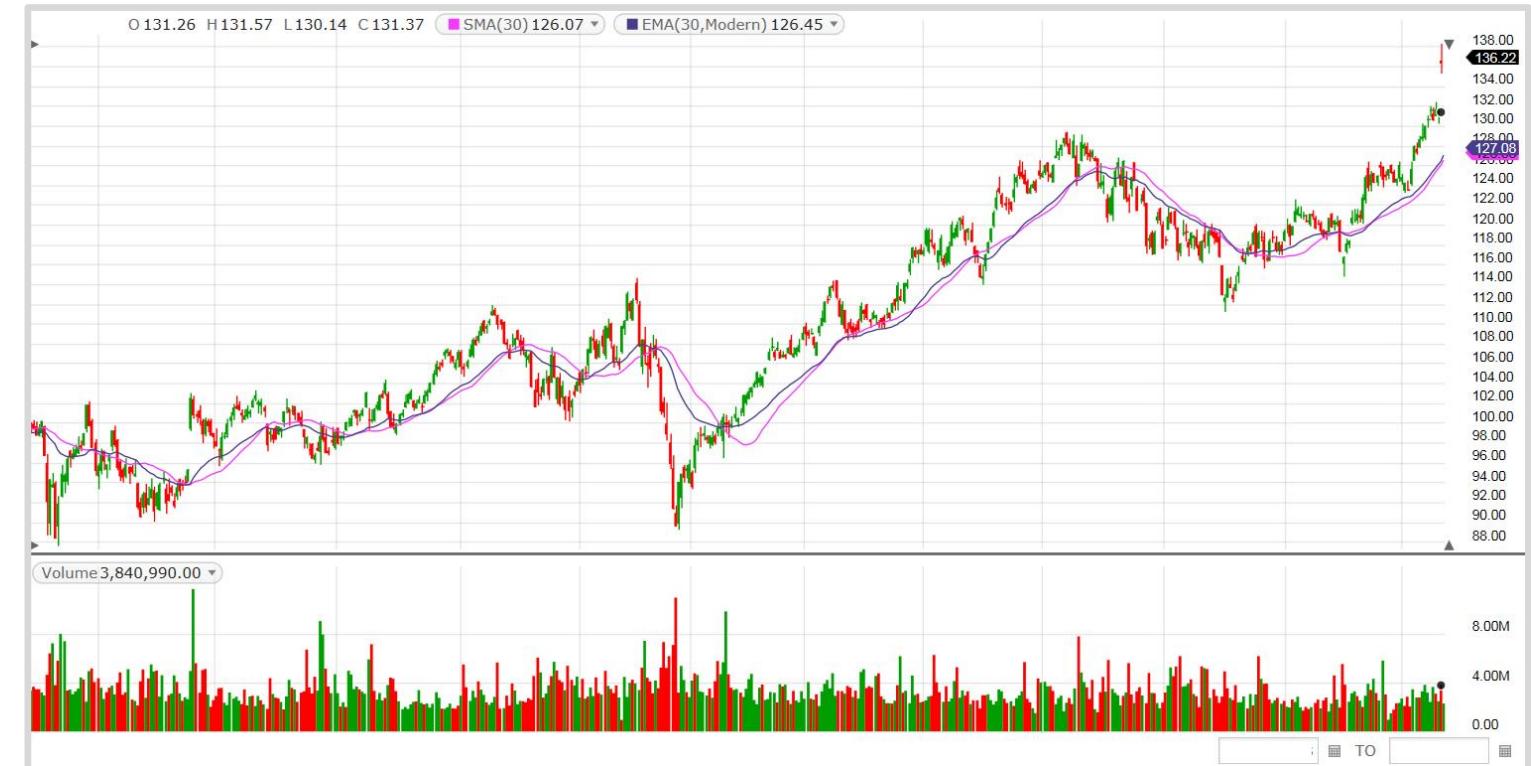
- A rising EMA tends to support the price action, while a falling EMA tends to provide resistance to price action.

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

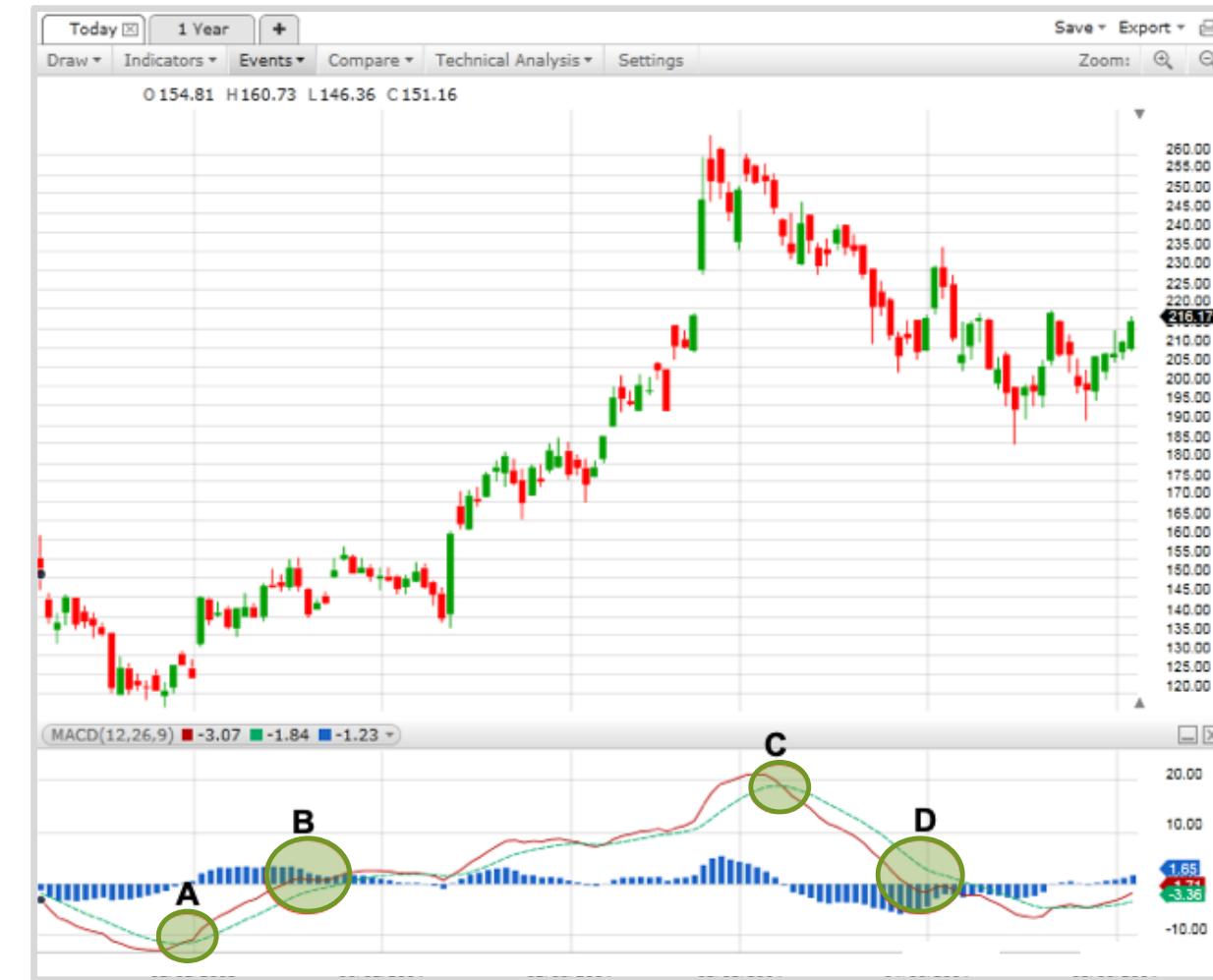
Determine bullish or bearish

- 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 show 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.

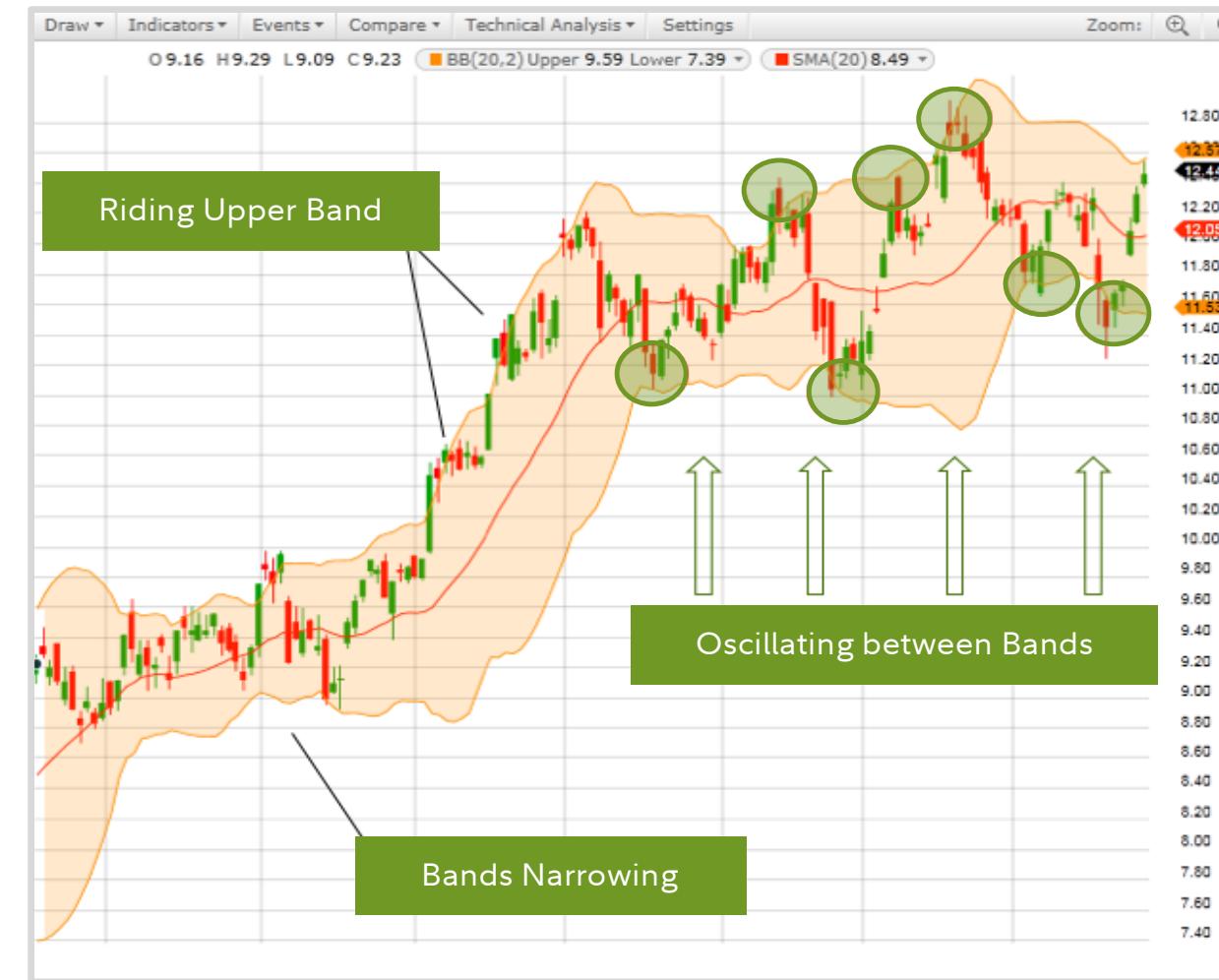
Bollinger Bands®



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

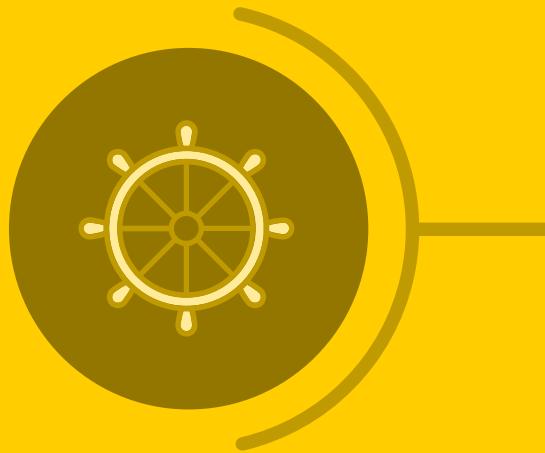
- An expanding ATR indicates increased volatility, whether that's selling or buying pressure.
- A low ATR value indicates decreased volatility, a series of periods with small ranges.
- ATR is useful for stops or entry triggers, signaling changes in volatility.

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.

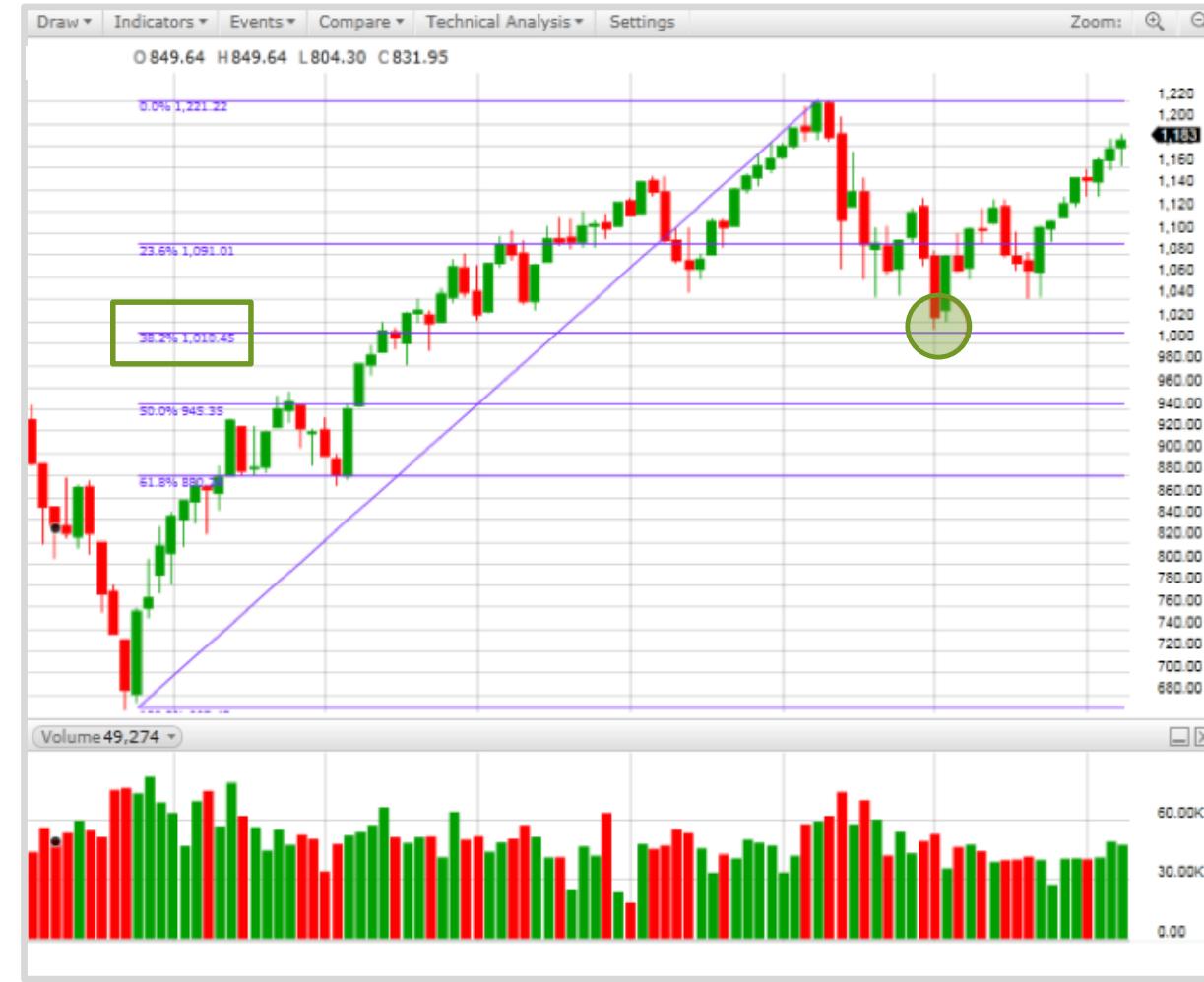


Fibonacci Retracements



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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A Fidelity Investments Webinar Series

Identifying Chart Patterns with Technical Analysis

BROKERAGE: TECHNICAL ANALYSIS





Technical Analysis Webinar Series

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Charles D. Kirkpatrick II, CMT



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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.

Understanding
Patterns and
Their Limits

Techniques for
Trading Patterns

Construction
of Common
Chart Patterns

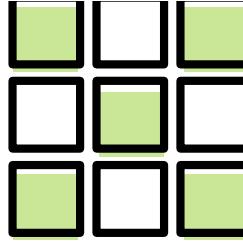


Agenda



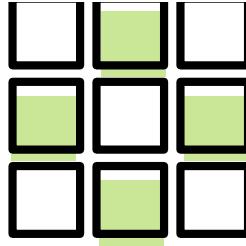
Understanding Patterns and Their Limits

Defining Patterns



- A pattern is bounded by at least two trend lines (straight or curved)
- All patterns have a combination of entry and exit points
- Patterns can be continuation patterns or reversal patterns
- Patterns are fractal, meaning that they can be seen in any charting period (weekly, daily, minute, etc.)
- A pattern is not complete or activated until an actual breakout occurs

The Limits of Patterns



Keep in Mind

Some of our human tendencies can be dangerous for investors.

- See patterns where there aren't any
- Believe "market lore," technical and fundamental, without evidence
- Look backwards rather than forward
- Stick with original price targets of patterns after conditions have changed



Techniques for Trading Patterns

Techniques for Trading Patterns

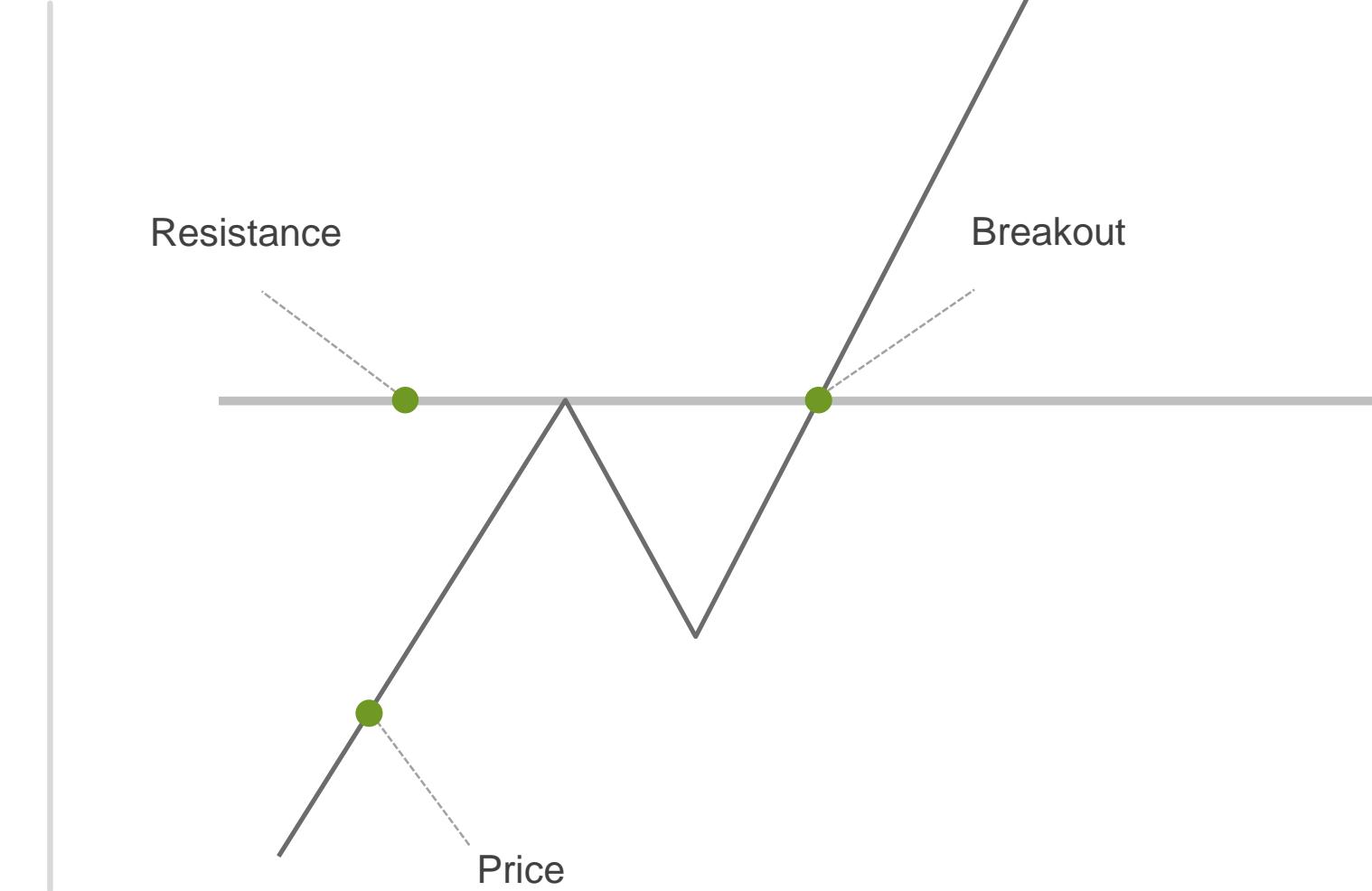


- Breakouts
- Entry Stops
- Protective Stops
- Retracements

Breakouts

Violation of Trend Line,
Support or Resistance, or
previous reversal point

It signifies that a change
in buyer and seller
behavior and signals
the beginning or end
of a trend.



Confirmation Filters

Confirmation Filters

Apply a confirmation filter to determine whether a breakout has taken place.



Types of Filters

- Intrabar
- Multiple closes
- Time
- Percentage or point
- Money

Entry Stops



Entry Stops

Buy stop orders are used to enter trades once the price breaks out.



False and Failed Breakouts



False Breakout

Price breaks out but almost immediately returns back through its breakout price.

Failed Breakout (Trap)

False breakout occurs and the price then breaks out in the opposite direction.



Protective Stops



Protects Capital

Determines the amount of capital risk before entry

Types of placement

- Filters, such as percent, points, or money
- Trend line, support or resistance level with filter



Trading False Breakouts Using Protective Stops



Example

- Enter on breakout
- Place protective stop outside breakout bar opposite from breakout direction
- Place entry stop at same level (called a "stop and reverse" order)
- If price continues in direction of breakout, profit from breakout entry
- If breakout is false, profit from stop and reverse



Retracements



Counter Trend Correction

Types

- Pullback (on breakout down)
- Throwback (on breakout up)

Waiting for

- Don't always occur
- Performance can suffer when they do





Construction of Common Chart Patterns

Common Chart Patterns



Multi-Bar Patterns

Horizontal Congestion

- Double and Triple Tops/Bottoms
- Rectangles

Triangles

- Symmetrical
- Ascending and Descending
- Wedges

Other

- Head and Shoulders
- Cup and Handle

Candlestick Patterns

- Doji
- Harami
- Hanging Man/Hammer
- Shooting Star/Inverted Hammer
- Engulfing
- Dark Cloud/Piercing

Short-Term Patterns

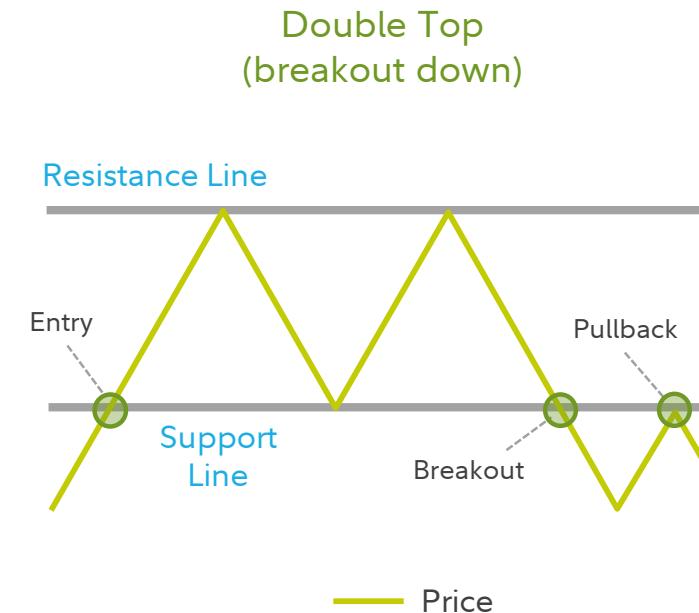
- Pennant/Flag
- Gaps
- Pipe Bottom
- Narrow Range

Horizontal Congestion: Double Top



Characteristics:

- Two successive peaks separated by an opposite reversal point
- Either rounded or pointed peaks that are usually at roughly the same price (resistance level)
- Price must break out of middle reversal point



Calculate target price:

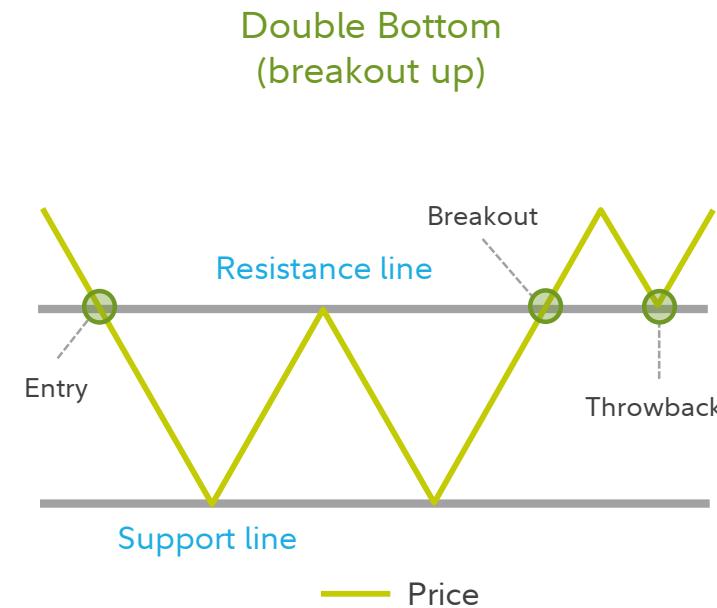
Taking the height from the highest peak to the trough and then subtracting the amount from the breakout price to the downside.

Horizontal Congestion: Double Bottom



Characteristics:

- Two successive troughs separated by a peak
- Either rounded or pointed troughs that are usually at roughly the same price (support level)
- Price must break out of middle peak



Calculate target price:

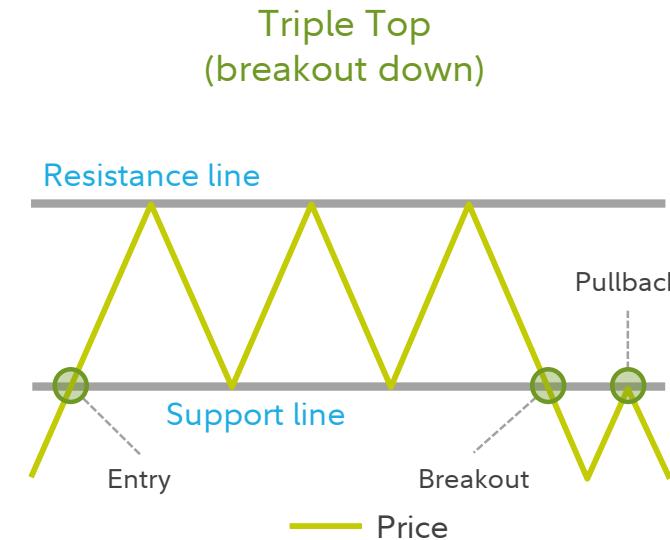
Taking the distance from the troughs to the peak and then adding that amount from the breakout price to the upside.

Horizontal Congestion: Triple Top



Characteristics:

- Three distinct peaks at roughly the same price level separated by two intermittent troughs
- Breakout occurs when price exceeds the extreme of the intermittent trough or a trend line connecting those points



Calculate target price:

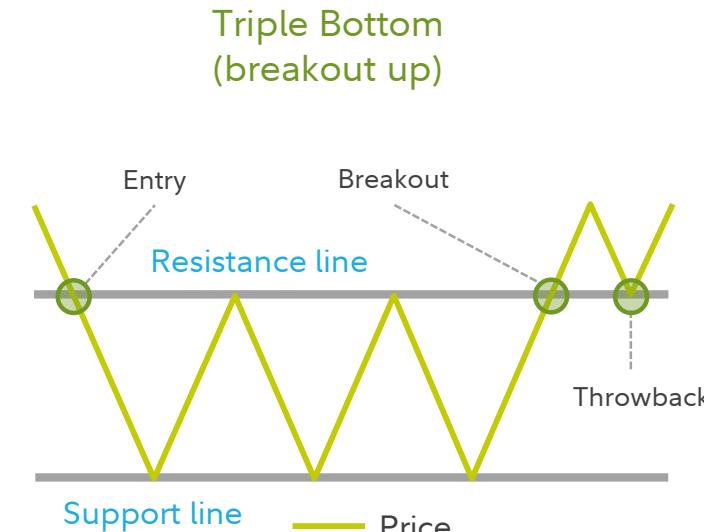
Take the height from the highest peak to the lowest trough in the pattern. Then subtract that amount from the lowest trough in the pattern to generate a price target.

Horizontal Congestion: Triple Bottom



Characteristics:

- Three distinct troughs at roughly the same price level separated by two intermittent peaks at any level
- Breakout occurs when price exceeds the extreme of the intermittent peaks or a trend line connecting those points
- Best performance may be after a sustained decline*
- An average performance, but watch for failures*



Calculate target price:

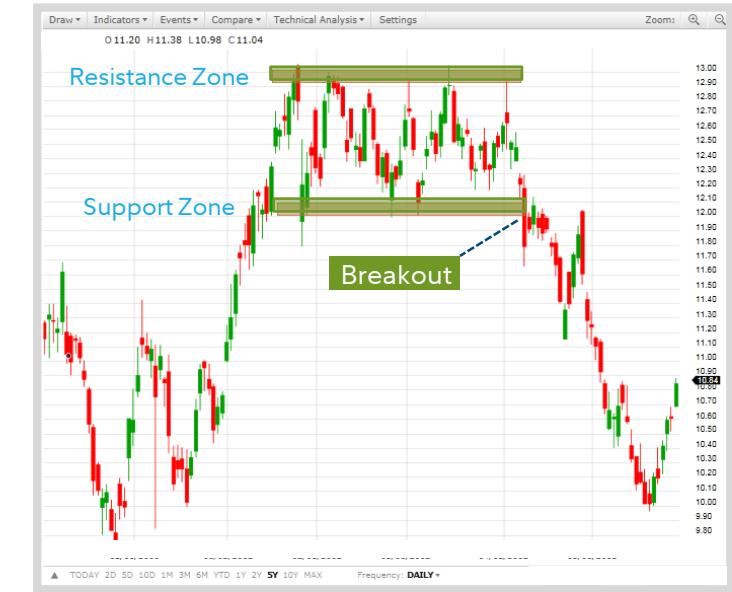
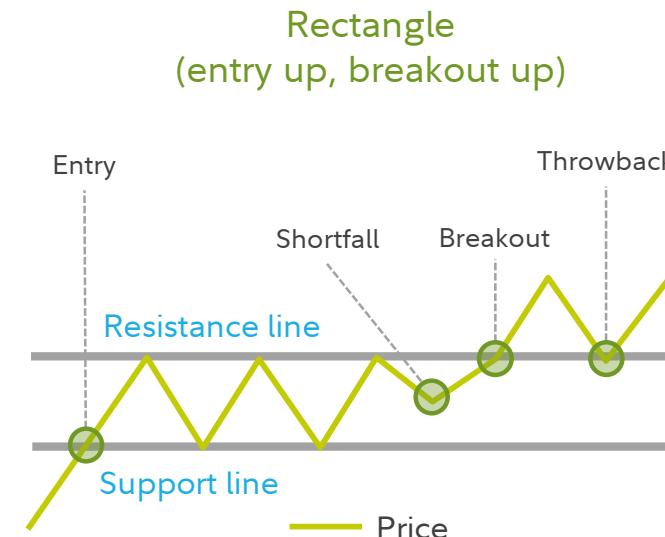
Take the height from the highest peak to the lowest trough in the pattern. Then add that amount to the highest peak in the pattern to generate a price target.

Horizontal Congestion: Rectangles



Characteristics:

- Trading range with support and resistance levels bounding price action
- Slight tilt, similar to horizontal channel
- Often has many false breakouts*
- Things to consider:
 - Confirm a breakout
 - "Shortfall" often indicator of eventual breakout direction
- Best occurrence may be bottom breaking upward*



Calculate target price:

Take the height from the resistance line to the support line. Then either add that amount to the resistance line to generate a price target for an upside breakout, OR subtract that amount from the support line to generate a price target for a downside breakout.

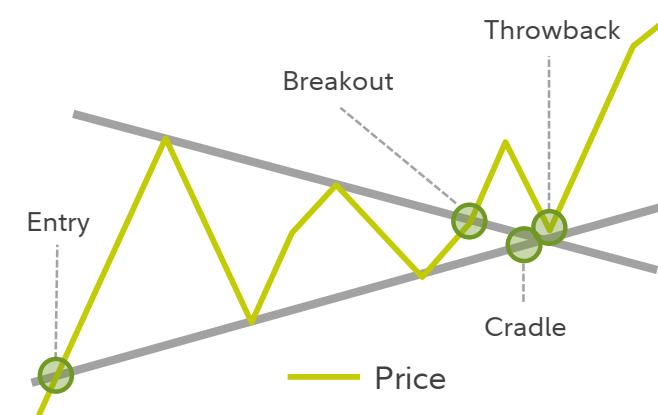
Triangle: Symmetrical



Characteristics:

- Bounded by a downward sloping upper trend line and an upward sloping lower trend line. Each bound is a straight trend line
- Prices must touch each bound at least twice. Many false breakouts. Moderately successful in performance
- Things to consider:
 - Confirm a breakout
- Best occurrence may be upward breaking out – above average for all patterns*

Symmetrical Triangle
(breakout up)



Calculate target price:

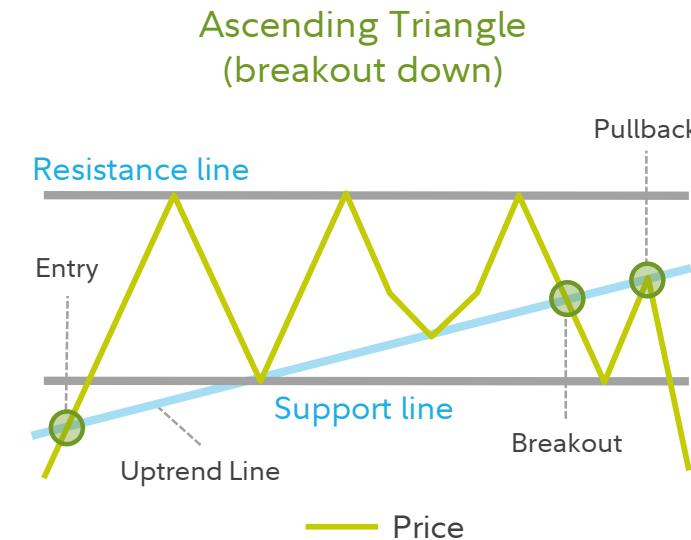
Take the height from the highest peak in the pattern to the lowest trough in the pattern. Then either add it (for upward breakouts) to the breakout price or subtract it (for downward breakouts) from the breakout price to generate a price target.

Triangle: Ascending



Characteristics:

- Bounded by a horizontal upper trend line and an upward sloping lower trend line. Each bound is a straight trend line
- Prices can break in either direction, but more commonly upward*
- Breakout usually occurs in pattern. About average failure rates but many small false breakouts*
- Post breakout performance average on upside but above average on downside*



Calculate target price:

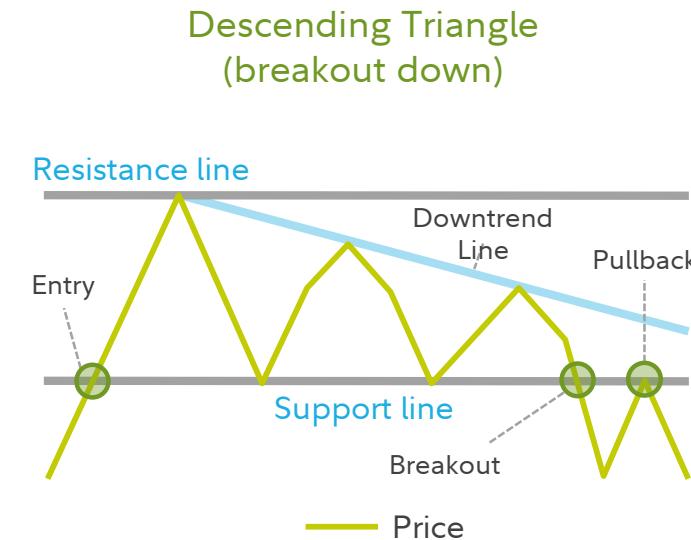
Take the height from the highest peak in the pattern to the lowest trough in the pattern. Then either add it (for upward breakouts) to the breakout price or subtract it (for downward breakouts) from the breakout price to generate a price target.

Triangle: Descending



Characteristics:

- Bounded by two trend lines; the lower is horizontal and the upper slopes downward
- Prices can break in either direction but most commonly downward*
- Above-average performance on upside break; retracements occur often*



Calculate target price:

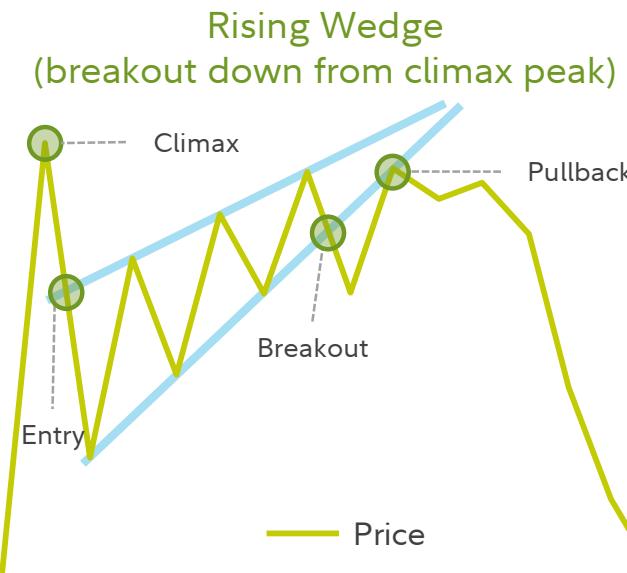
Take the height from the highest peak in the pattern to the lowest trough in the pattern. Then either add it (for upward breakouts) to the breakout price or subtract it (for downward breakouts) from the breakout price to generate a price target.

Triangle: Wedge



Characteristics:

- Bounded by two trend lines, each headed in the same direction; Price must touch a trend line at least five times (3 times on one and 2 times on the other) before a breakout
- Often occur following a panic (declining wedge) or bubble (rising wedge)
- Performance in both types is below average, and retracements are very common*



Calculate target price:

For downward breakout, the lowest trough in the pattern is the price target. For upward breakouts, take the height from the highest peak in the pattern to the lowest trough in the pattern and add that amount to the breakout price for a price target.

Head and Shoulders: Top



Characteristics:

- Three peaks with center peak higher than the other two
- Shoulders should be at approximately the same level and the head higher
- Line connecting the two troughs between the peaks is called the "neckline"
- Pattern is only complete on breaking the neckline
- Target is the distance from the head to the neckline projected from the neckline
- This is a standard pattern for tops and has one of the lowest failure rates

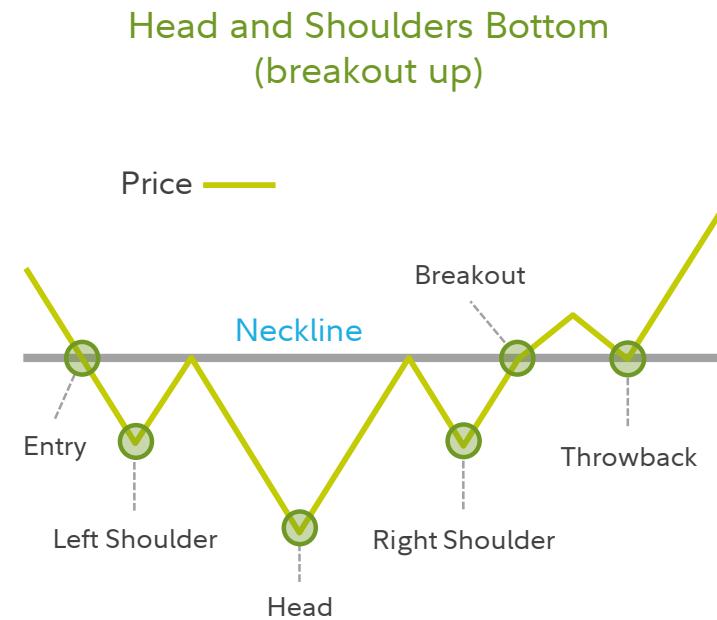


Head and Shoulders: Bottom (Inverse)



Characteristics:

- Inverted but otherwise identical to a top pattern except not as profitable*

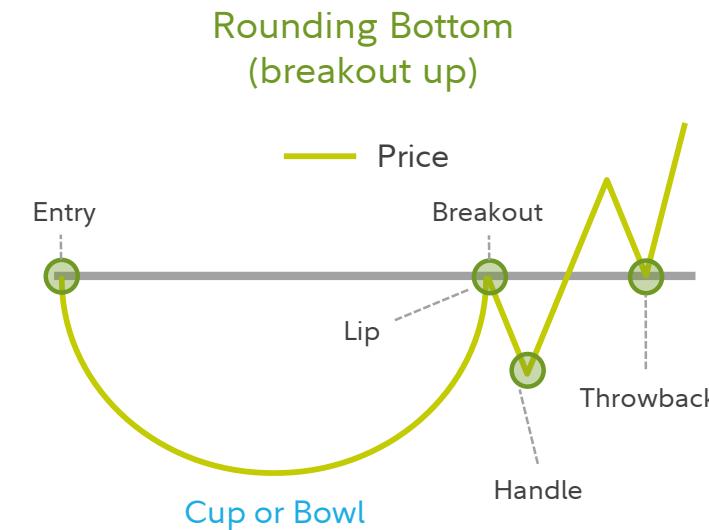


Cup and Handle (also "Saucer")



Characteristics:

- Pattern consists of a rounded bottom (not a "V" bottom), two "lips" at each end, and a "handle" (similar to a flag pattern) from the handle
- Pattern is complete with breakout above both lips
- Often have a throwback
- The pattern's performance ranks about average for bottom patterns*



Calculate target price:

Take the height of the right cup lip to the bottom of the cup, then add that amount to the breakout price.

Trading with Patterns



*Source: Technical Analysis: the Complete Resource for Financial Market Technicians, 2nd ed.

Best Multi-Bar Patterns



Upward Signals

- Descending Triangle
- Rectangle
- Pipe Bottom

Downward Signals

- Flag
- Head and Shoulders top
- Island Reversal

General Information about a Candlestick



Characteristics:

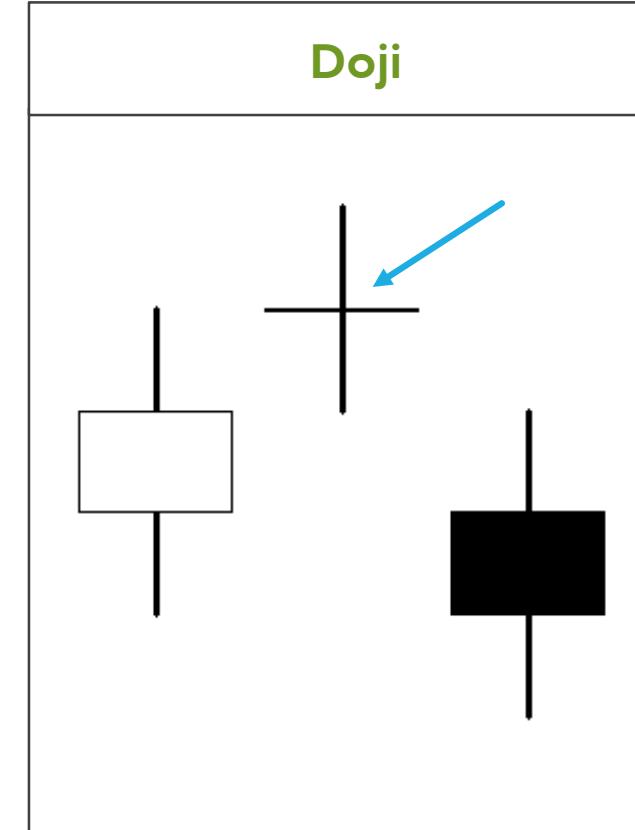
- Traditionally, candlestick patterns are reversal patterns, meaning they are used to identify when a trend is ending
- Candlestick patterns are often used with longer-term trends, thus, upward reversal patterns after a correction in a longer upward trend show the best performance, and vice versa for downward reversal patterns in a long downward trend
- Be careful not to act on a perceived candle pattern until the pattern has formed and is activated by a breakout in a certain direction

Doji



Characteristics:

- A one-candle pattern formed when the open and close are the same price, and the high and low are roughly equidistant from the open and close
- Extremely common
- Indicates indecision in the marketplace and thus is a possible warning of price change

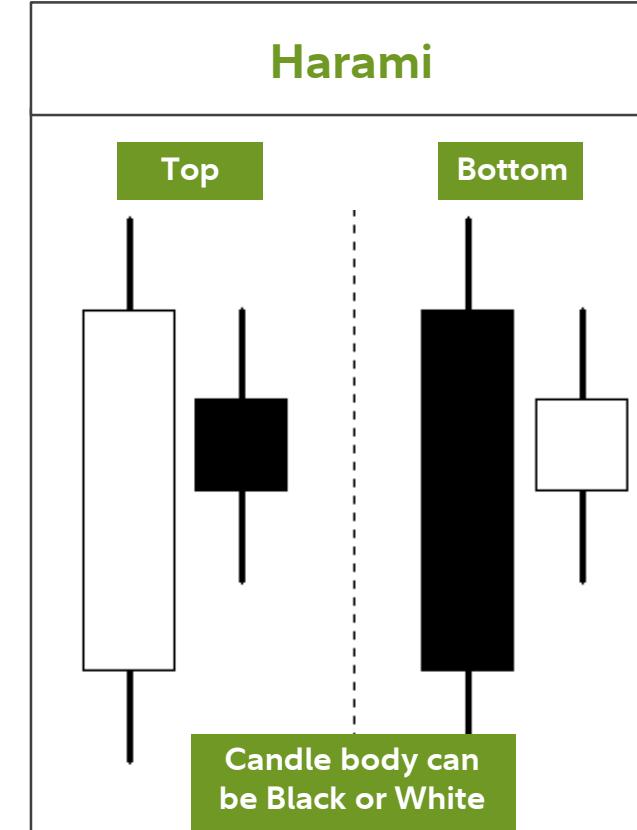


Harami



Characteristics:

- A two-candle pattern of a large body of either color followed by a small body of the opposite color; The second body is completely within the body of the large body and is called a "spinning top"
- Although common belief is that the harami is a reversal pattern, many report that it has the potential of breaking either way
- A variation that has a doji instead of a spinning top as the second candle has equally average performance and random breakout*

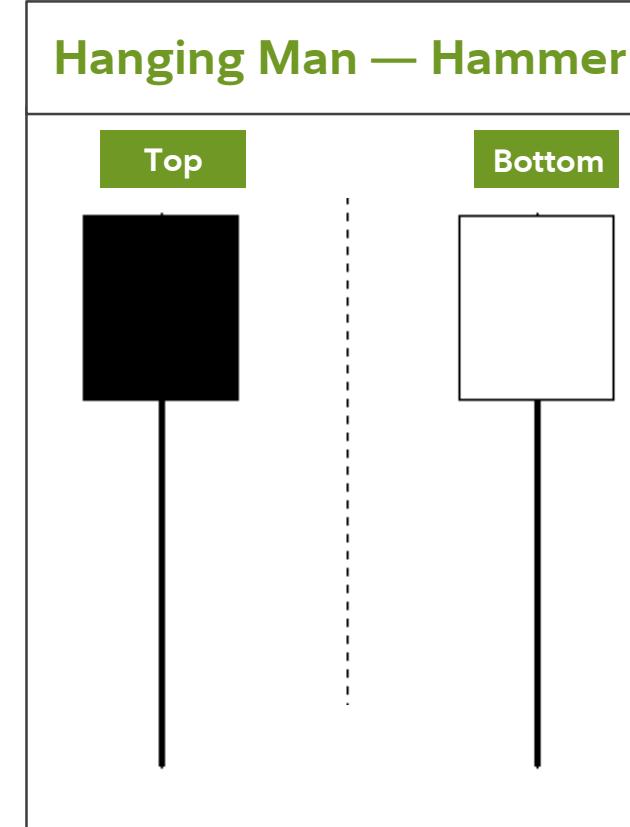


Hanging Man and Hammer



Characteristics:

- One-candle patterns differentiated by the color of the body. Each pattern has a high that coincides with either the opening or closing price
- Hanging man, thought to be a continuation pattern, actually breaks in either direction randomly with a slight upward bias. Its overall performance is below average*
- Hammers occur relatively frequently but have below-average performance*

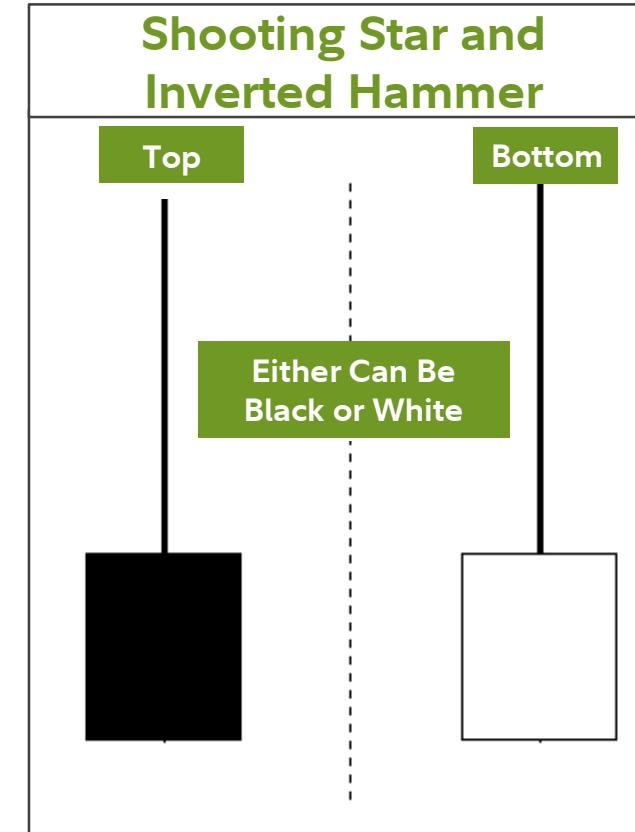


Shooting Star and Inverted Hammer



Characteristics:

- A one-candle inverted hanging man or hammer pattern. Hammers by themselves have white bodies and shooting stars have black bodies
- As a one-candle pattern, the shooting star has average performance. The same is true for the single inverted hammer*

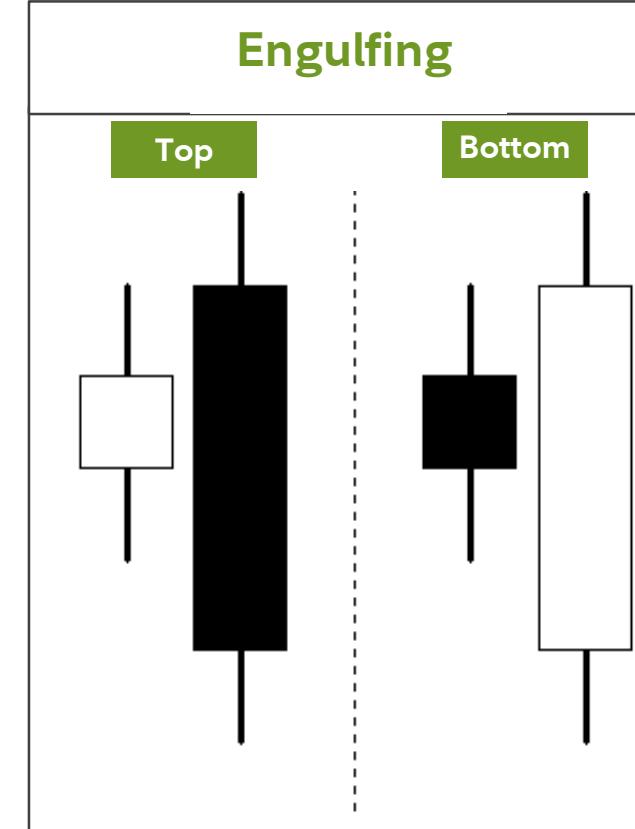


Engulfing



Characteristics:

- A two-bar pattern in which the second bar body completely engulfs the first bar body*
- A bottom engulfing pattern, with a short black body followed by a tall white body, is thought to be an upward reversal pattern and actually has very good performance on a downward breakout in a downward trend*

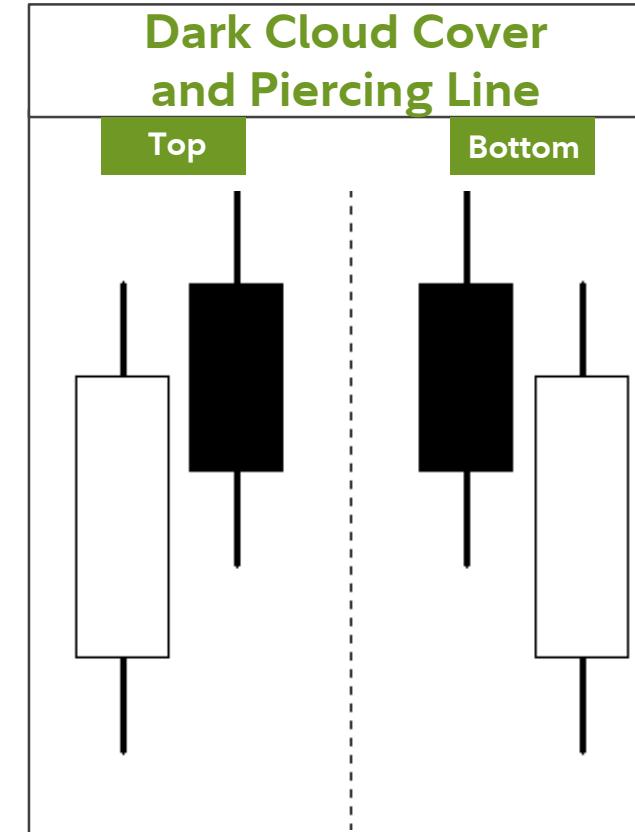


Dark Cloud Cover and Piercing Line



Characteristics:

- The dark cloud cover is a two-bar pattern where the second bar closes higher than the first and is black versus white in the first bar
- The piercing line is the opposite of the dark cloud cover in that the second bar is white and lower than the first bar which is black
- The dark cloud is thought to be a downward reversing pattern
- The piercing line pattern is thought to be an upward reversing pattern*



Pennant/Flag

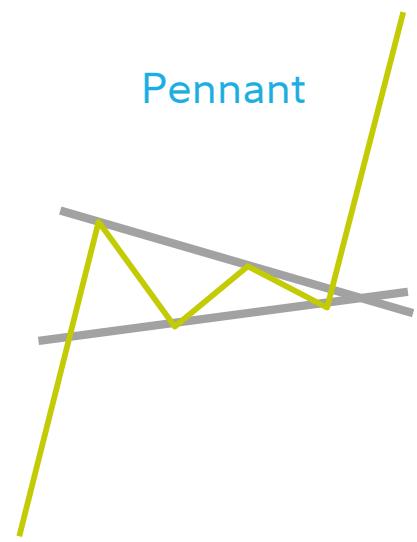
Characteristics:

- Pennant and flag patterns are variations of the same pattern
- These patterns are often preceded by a steep, sharp price change, up or down, and form a short consolidation that appears like a triangle or flag. Generally, the pattern slopes slightly in the direction opposite from the trend
- The breakout in either direction is often followed by a move that equals the earlier steep, sharp price change into the pattern

Flag and Pennant
in upward trend



Pennant



Calculate target price:

Take the height from the start of the "flag pole" to the highest peak in the pennant. Add that amount to the bottom of the pennant for an upward price target.

Gaps



Characteristics

- Definition – no trading (gap) at specific prices
- Gaps can be considered “up” or “down”
- Gaps are caused by appreciable changes in supply and demand from one close to the following open

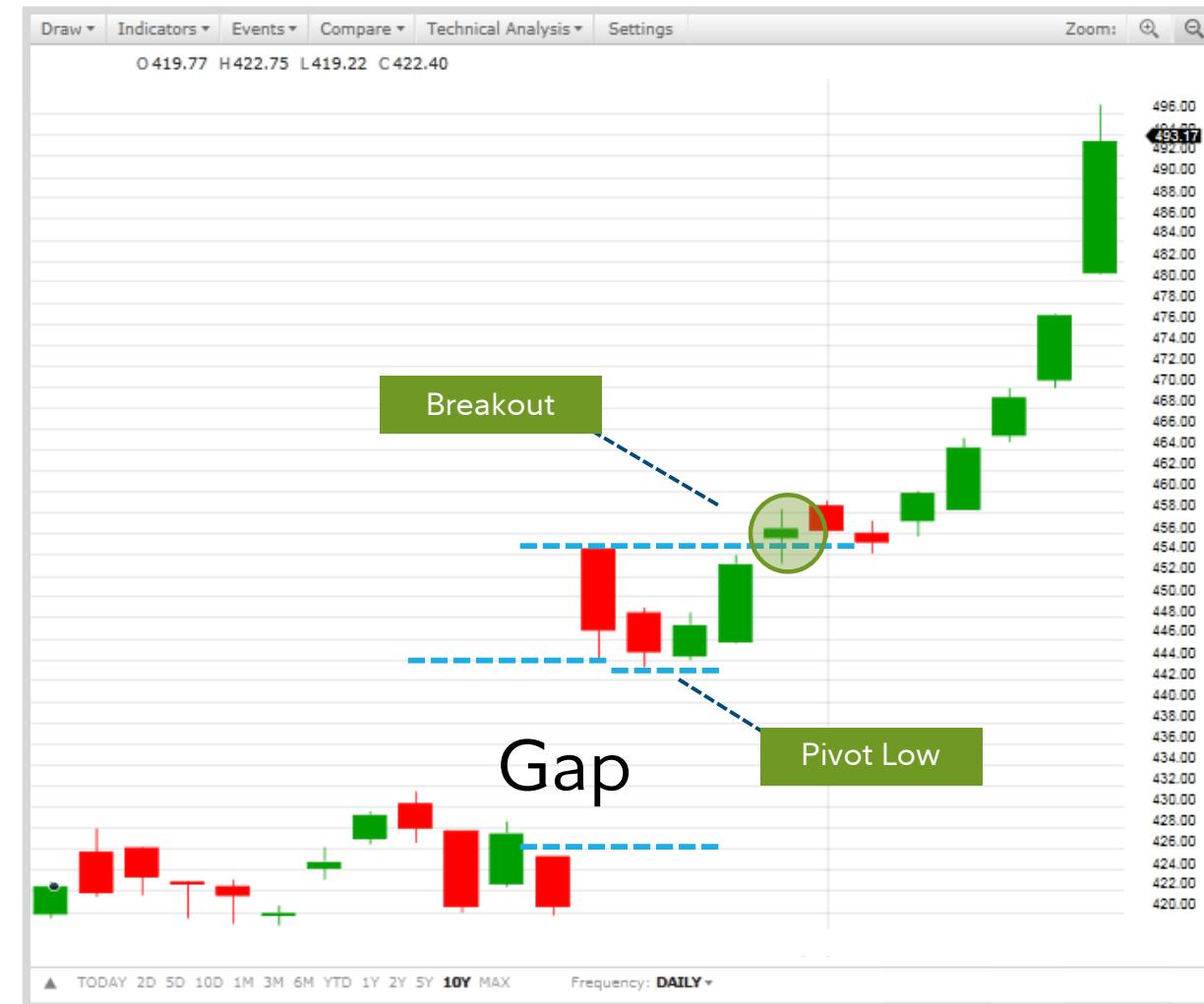


Gaps



Characteristics

- Gaps are generally profitable on breakouts from patterns, trends, support or resistance
- A method of trading a gap is the "explosion gap pivot." It assures that the gap is valid
- After the gap, wait for "throwback." If throwback "covers" the gap, no action. If the throwback stops, this is called the "pivot low." Place buy entry above high of the gap bar
- "Pivot" is the lowest level of the post-gap breakout
- Protective stops initially placed at gap low and then below pivot low



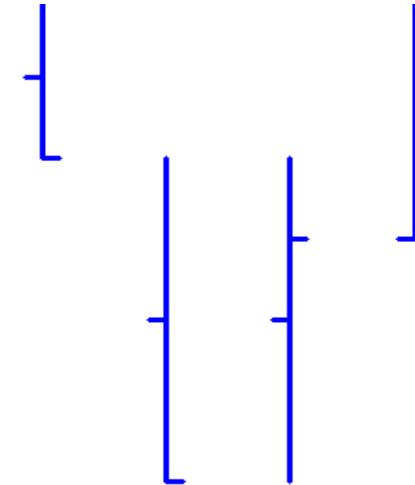
Two-Bar Reversal Button or Pipe Bottom



Characteristics:

- Two bars and occurs at the end of a large trend, up or down trend. Ideally, the first bar, in a bottom pattern, closes at the low, and the second bar closes in the upper half of the range. It is more reliable in weekly data
- Bar ranges are larger than preceding bar ranges
- Action occurs on breakout through second bar

Two-Day Reversal Bottom (or Pipe Bottom)



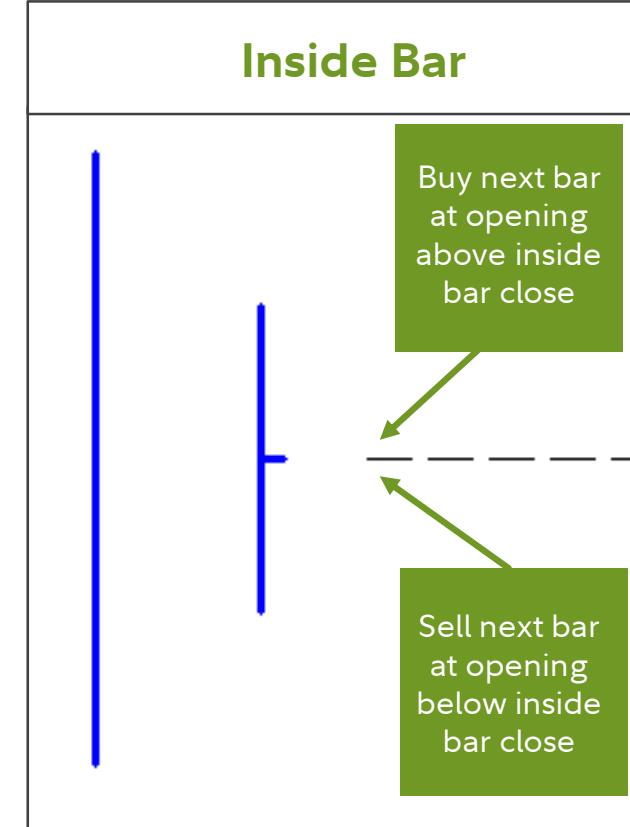
Calculate target price:

Take the height from the taller of the two bars to the lower of the two bars. Add that amount to the taller of the two bars to get a price target.

Volatility Patterns

Characteristics:

- Dull activity is known as “low volatility.” New trends often begin from periods of low volatility
- One way to look at volatility is to observe the relationship between price bars
- “Range” is the spread between high and low in a price bar
- If a bar is followed by a bar with less range, volatility is declining; the second bar is called a “narrow range” bar
- When this second bar’s range is contained within the range of its preceding bar, it is called an “inside bar.”

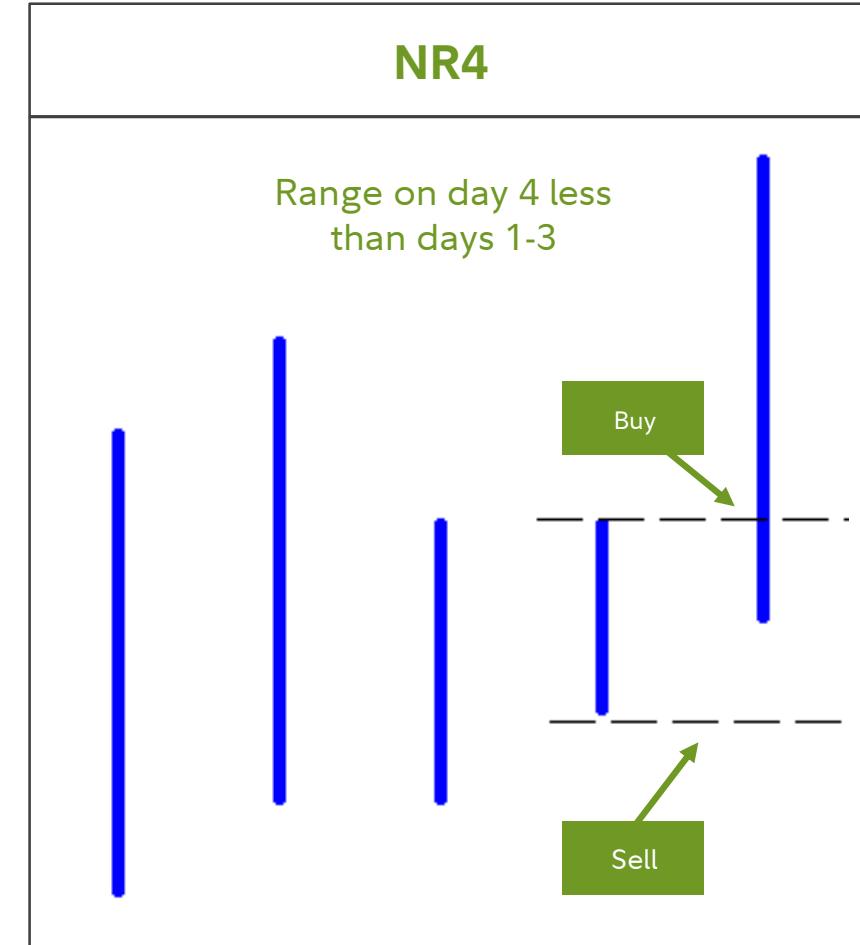


Narrow Range



Characteristics:

- One low volatility pattern is called a “Narrow Range” pattern and consists of a bar with a range narrower than its preceding bars
- The graph shows a four-bar, Narrow Range pattern (NR4) with four bars, the fourth bar having a narrower range than the preceding three bars
- The breakout occurs on a break above or below the high or low of the narrow range





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Past performance is no guarantee of future results

Stop loss orders do not guarantee the execution price you will receive and have additional risks that may be compounded in periods of market volatility. Stop loss orders could be triggered by price swings and could result in an execution well below your trigger price.

Trailing stop orders may have increased risks due to their reliance on trigger pricing, which may be compounded in periods of market volatility, as well as market data and other internal and external system factors. Trailing stop orders are held on a separate, internal order file, placed on a "not held" basis and only monitored between 9:30 AM and 4:00 PM Eastern.

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Webinar Presentation

Technical analysis for volatile times

BROKERAGE: TECHNICAL ANALYSIS





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Charles D. Kirkpatrick II, CMT

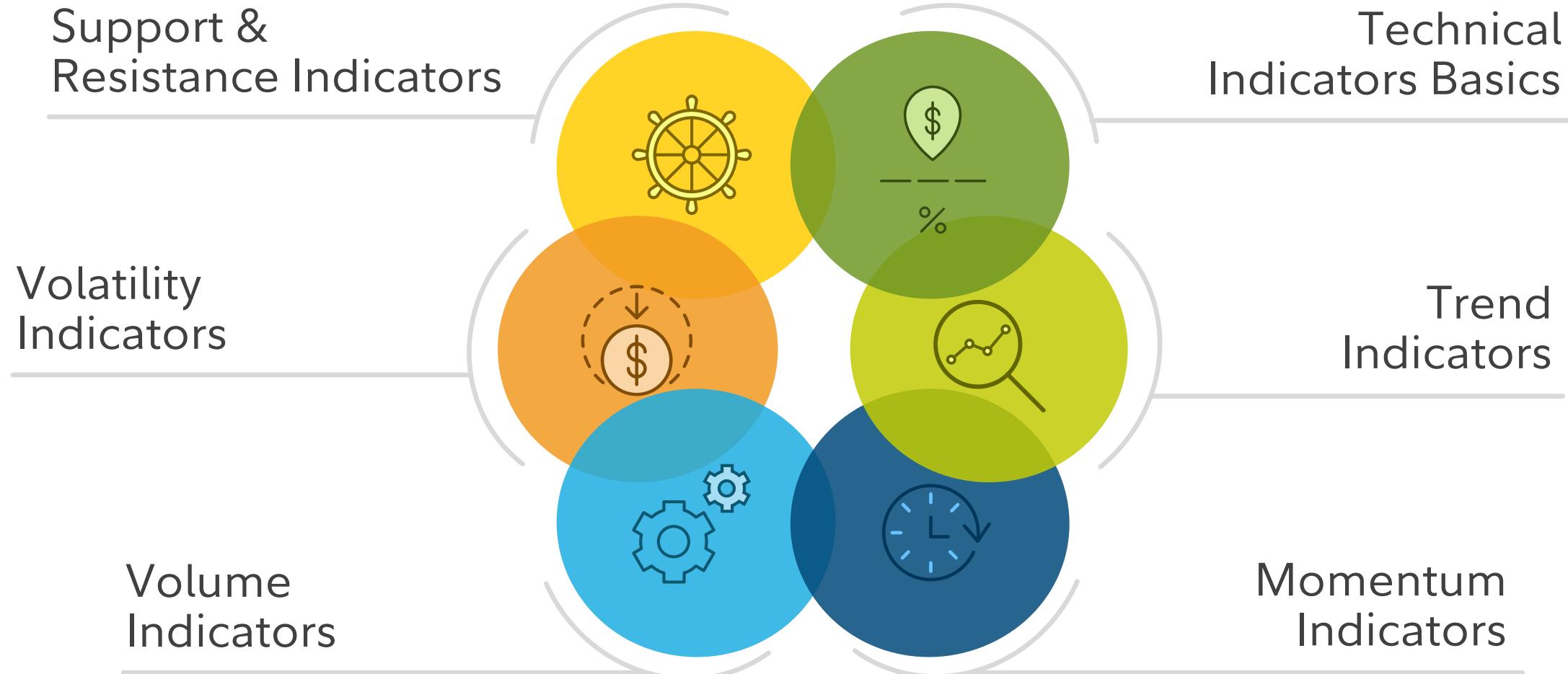


About Our Coauthor

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.



Agenda



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 Retracement



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.



Moving Average Convergence/Divergence



Moving Average Convergence/ Divergence (MACD)

MACD is a momentum oscillator primarily used to trade trends.

How It Works

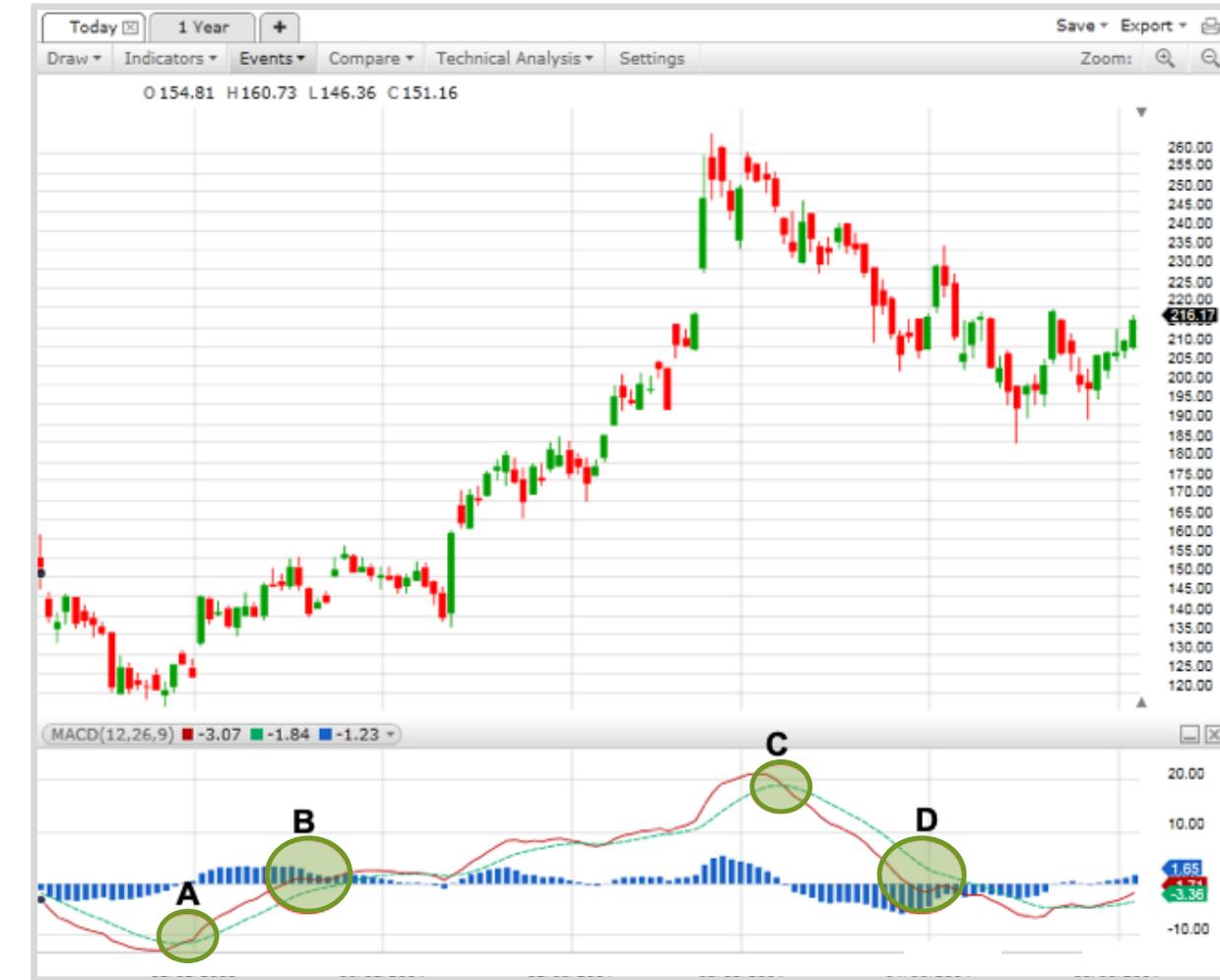
Determine bullish or bearish

- 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

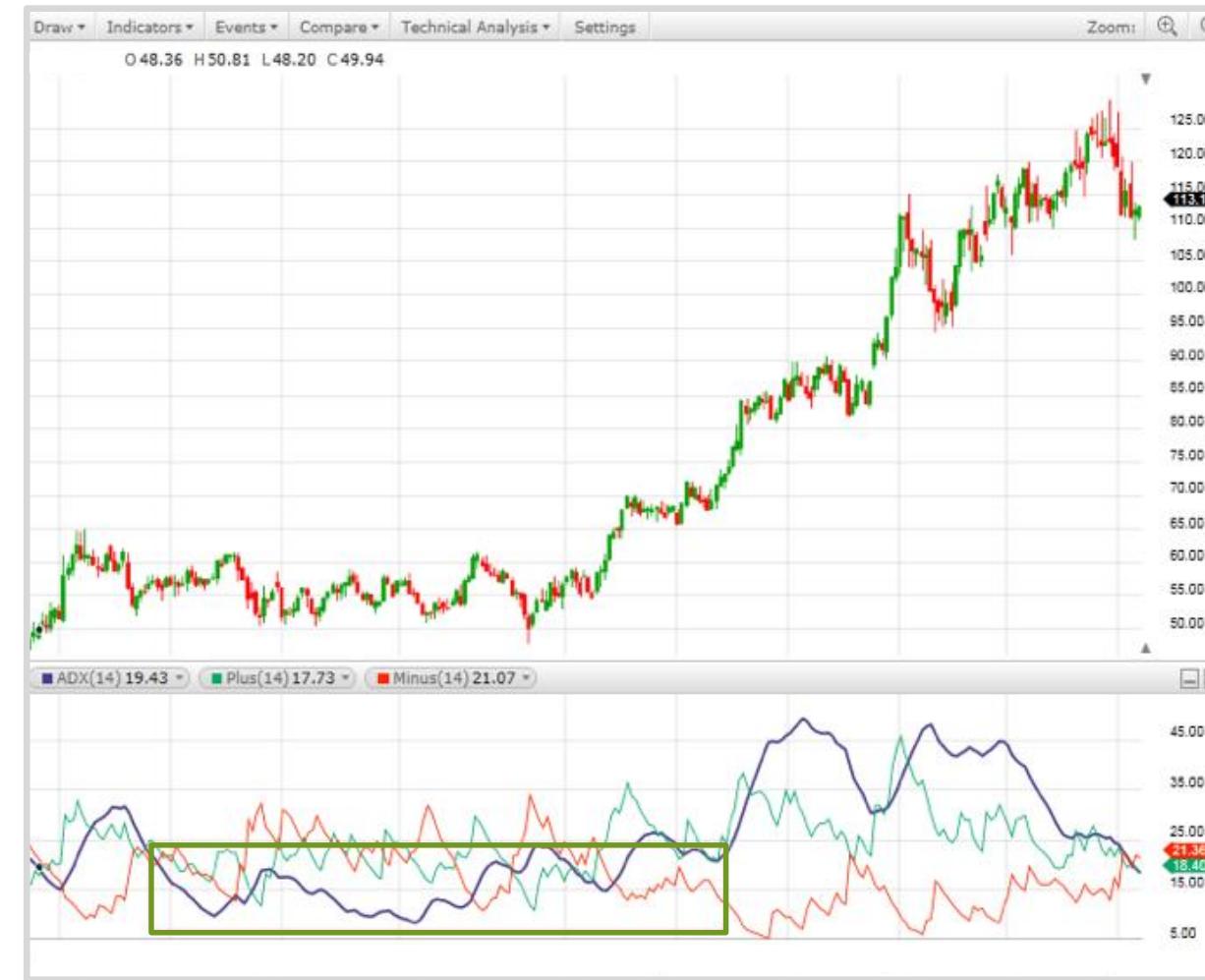


ADX is less than 25 on the left side of the chart.

+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 show 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

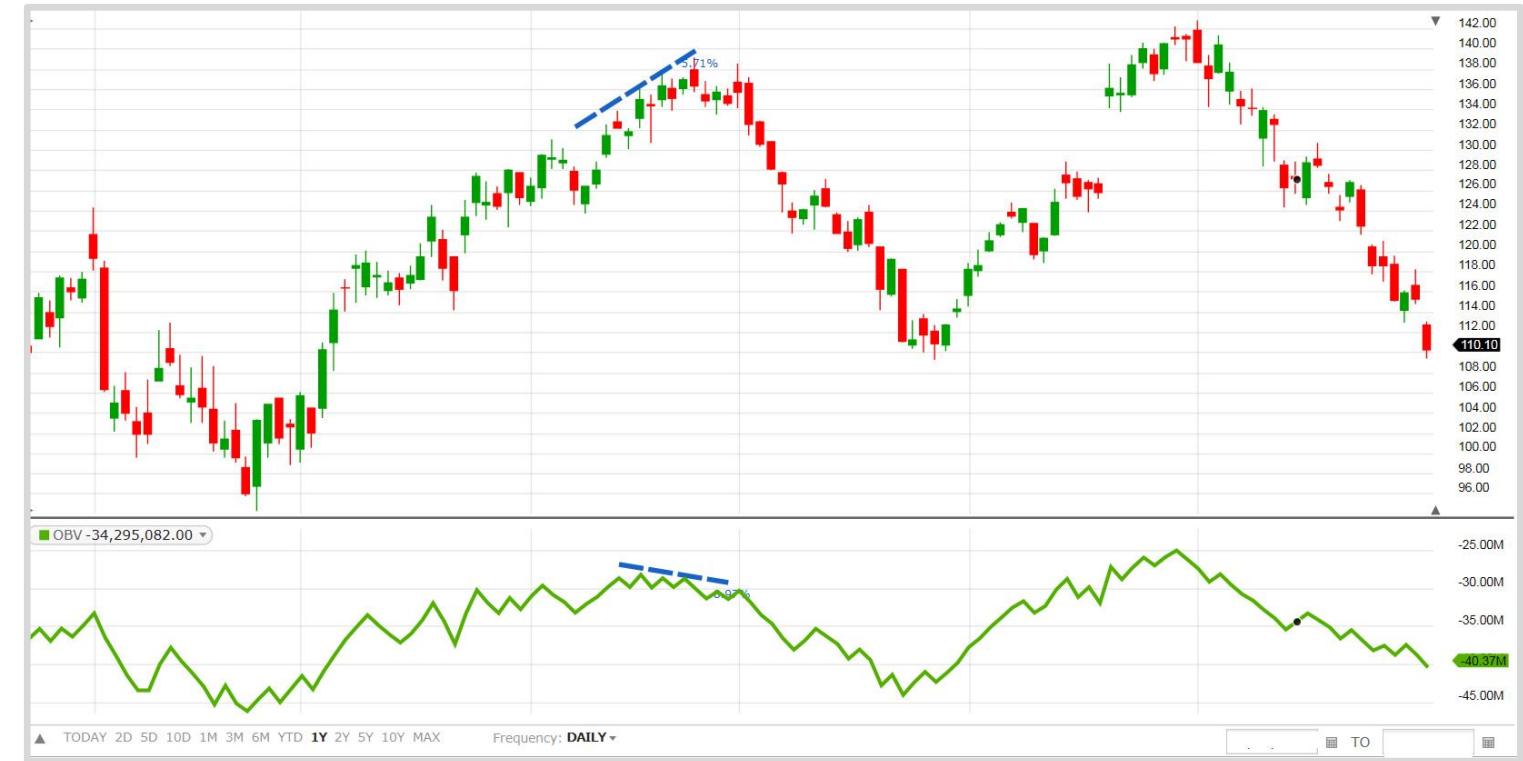
- The actual value of the OBV is unimportant; concentrate on its direction.
- When price continues to make higher peaks and OBV fails to make higher peaks, the upward trend is likely to stall or fail. This is called a negative divergence.
- When price continues to make lower troughs and OBV fails to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

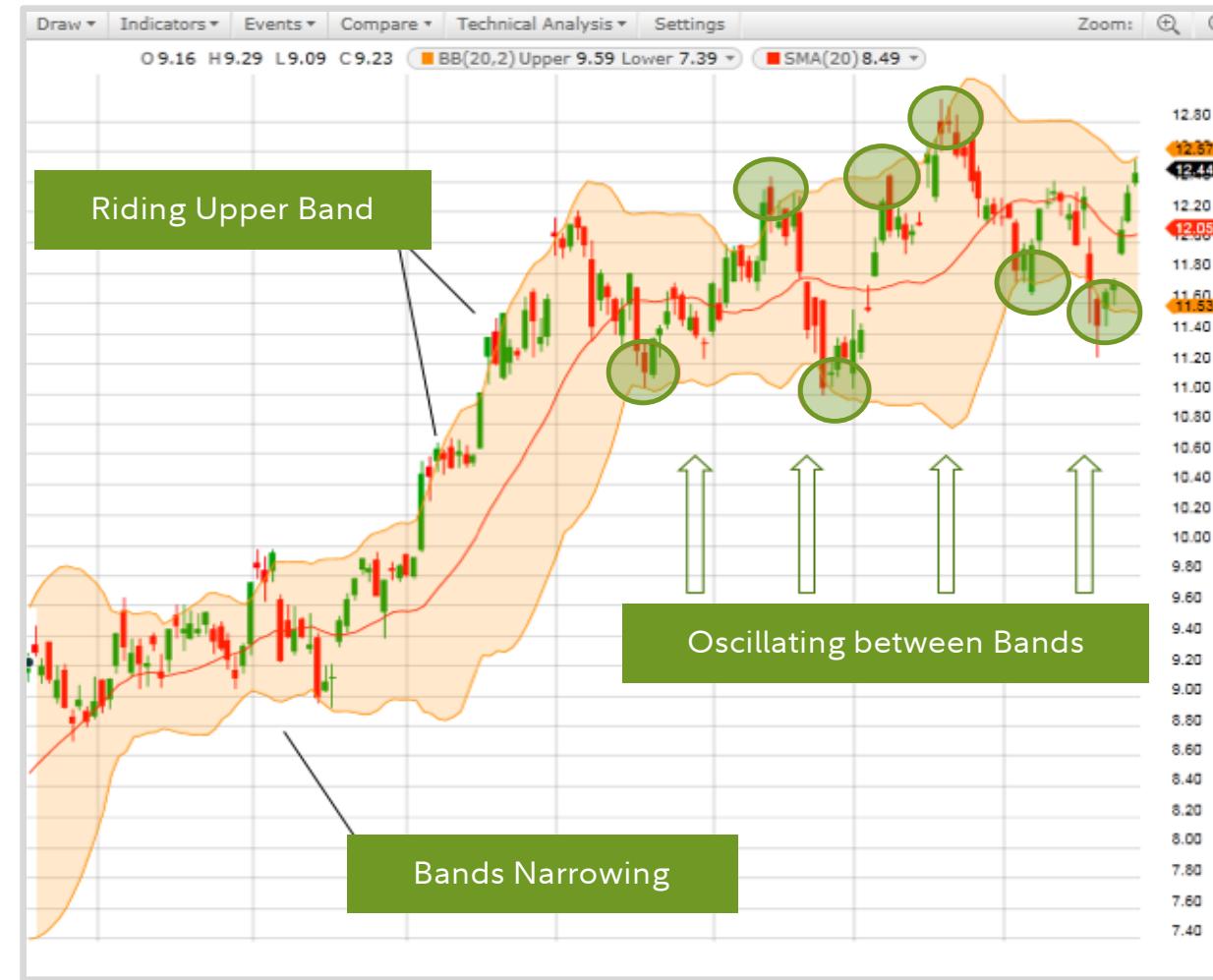
Bollinger Bands®



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

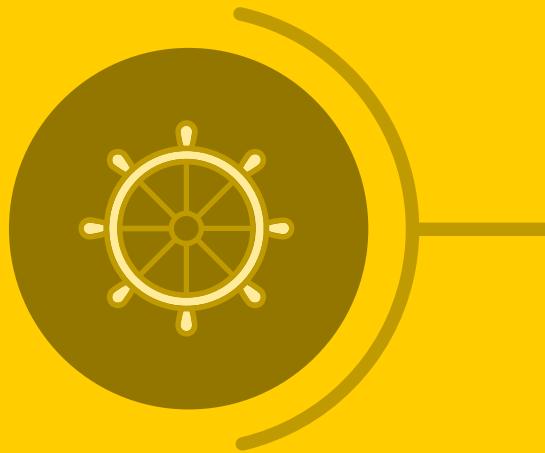
- An expanding ATR indicates increased volatility, whether that's selling or buying pressure.
- A low ATR value indicates decreased volatility, a series of periods with small ranges.
- ATR is useful for stops or entry triggers, signaling changes in volatility.

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.

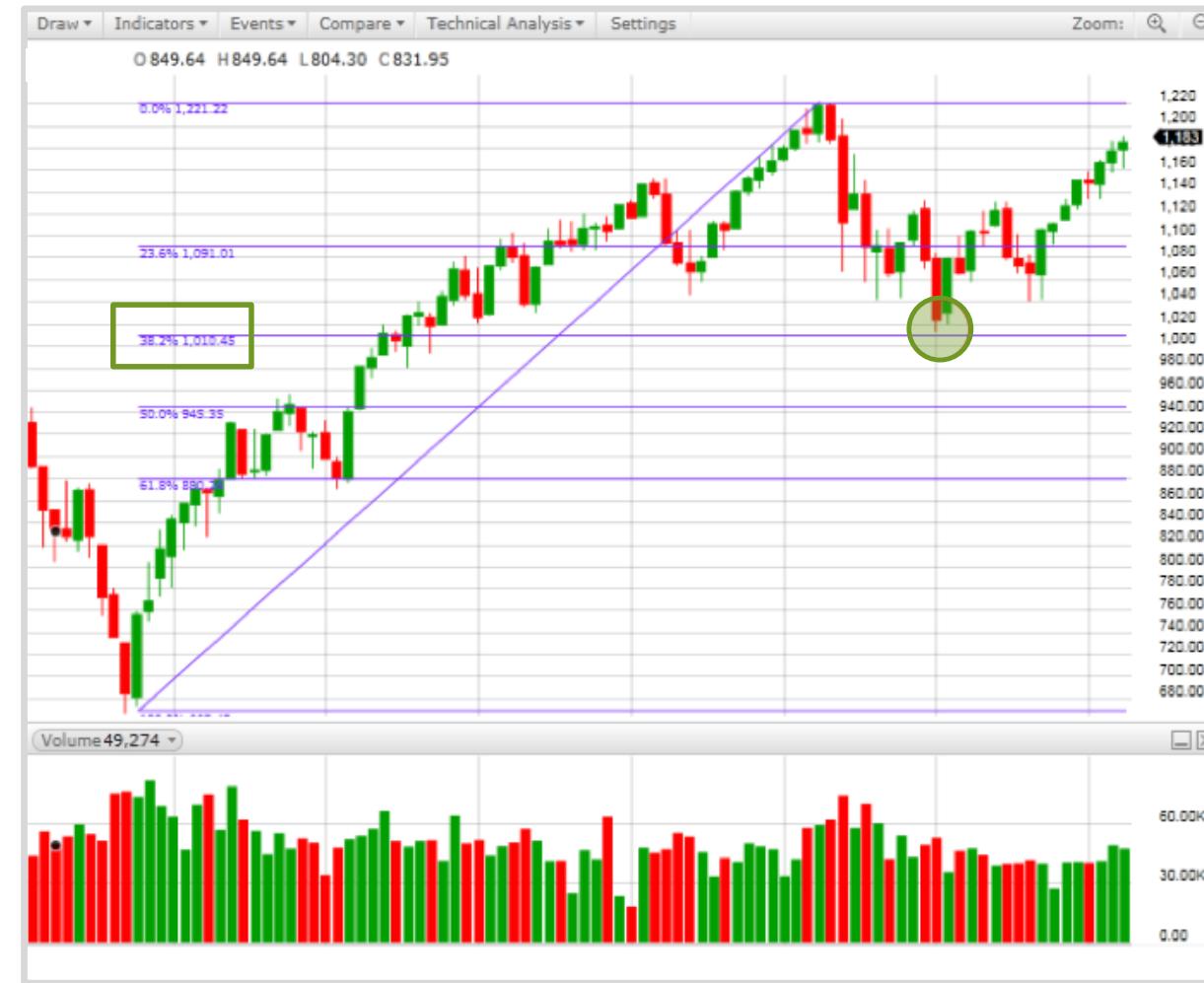


Fibonacci Retracements



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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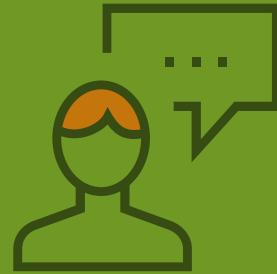
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Understanding the market

Technical Analysis Approach: part I

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PhD Candidate, Department of Statistics

Purdue University

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Outline

- Why Technical Analysis?
- Philosophy of technical analysis
- Fundamental assumptions
- Definitions of trend, support and resistance
- Different Charting styles
- Reversal and Continuation patterns
- Principle of Confirmation and Divergence
- MetaTrader4 introduction
- Conclusion

Question: How to trade successfully in the market?

- Profits significantly out-beat risk-free rate or the return of market index
- Statistically stable performance in a long run
- The “worst” loss is still affordable

“Trading formula”

- Expected profits = (Target price – entry price)*P{success} – (Entry price – stop price)*P{failure}
- Decision making:
Determine (Entry price, Target price, Stop Price) such that the expected profits can be maximized.

The role of Technical Analysis

- Help you make the selection among the three choices at any fixed time t :
 1. Open a position
 2. Close a position
 3. Do nothing

The history of Technical Analysis

- Dow Theory: Charles H. Dow published the first stock market average on July 3, 1884.
The ABC of Stock Speculation, S.A. Nelson, 1903. (The first book the term “Dow Theory” was used.)
Dow Theory, Robert Rhea, 1932.
- Elliott Wave Theory:
The wave principle was published in 1938 by Charles J. Collins, which was based on the original work of Ralph Nelson Elliott.
- William D. Gann: Geometric angles and percentages. Most work was published during the 1950s and ’60s.
- For more information:
<http://history.technicalanalysis.org.uk/>

Philosophy of Technical Analysis

- Market action discounts everything.
- Prices move in trends: A trend in motion is more likely to continue than to reverse. (An adaptation of Newton's first law of motion.)
- History repeats itself.

Basic foundations behind technical analysis

- Price discounts everything
- Price movements are not totally random
- The market has Three trends (Dow)
- Major trends have three phase (Dow)
- Volume must confirm the trend
- A trend is assumed to be in effect until it gives definite signals that it has reversed
- The market is more psychological than logical

Doubts and Criticisms

- The doubts and criticisms have a history as long as that of the theory:
 - Can the past be used to predict the future?
 - Signals are always too late?
 - Analyst Bias: subjective interpretation; art vs. science
 - Trader's Remorse: Not all signals and patterns work
 - Always another level: Bullish or Bearish?

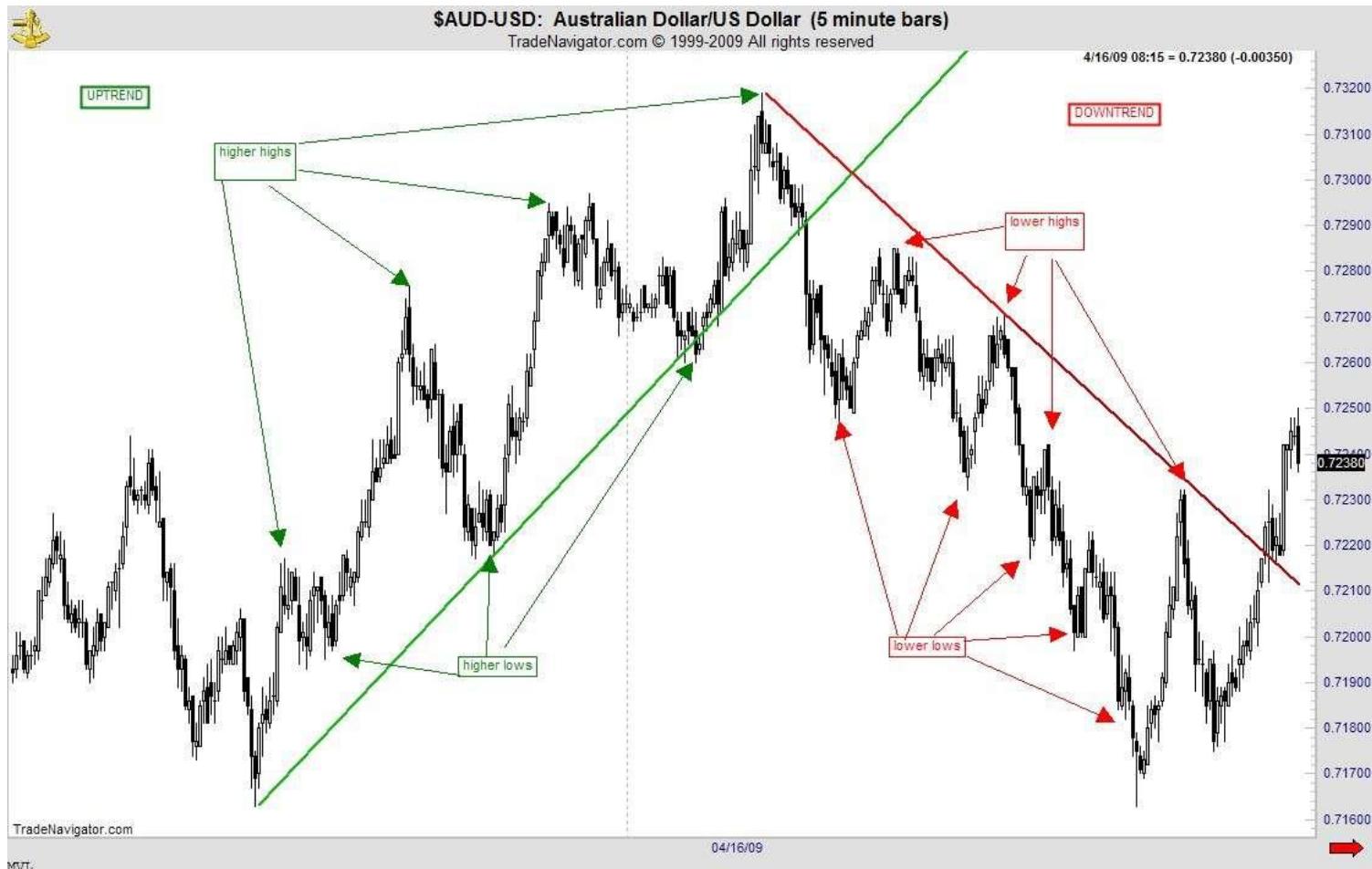
Description vs. Prediction

- “What” is more important than “why”!
- Technical analysis at least is an effective description of the market prices. It helps us know what the market is saying at the moment.
- It is a popular language used by traders to describe the market.

Definitions

- Trend: An upper trend is a series of successively higher peaks and troughs; a downtrend is just the opposite, while horizontal peaks and troughs would identify a sideways price trend (trendless).
- Remark: It is the direction of those peaks and troughs that constitutes market trend.

Example of trends



Support and resistance

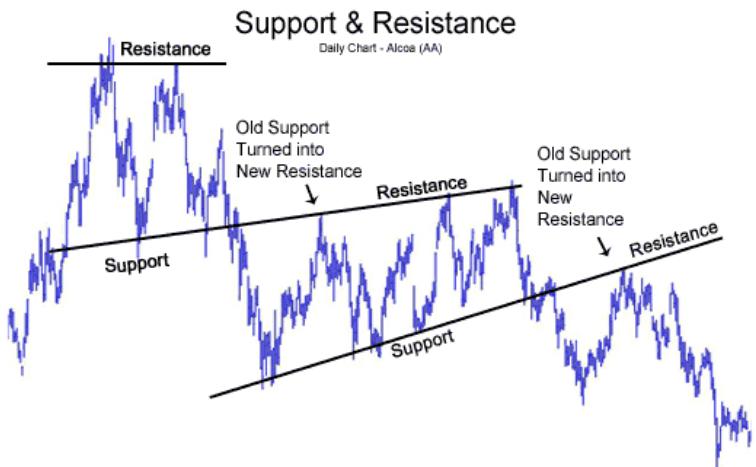
- **Support** is a level or area on the chart **under** the market where buying interest is sufficiently strong to overcome selling pressure and a **decline is halted** and prices turn back up.
- **Resistance** is a level or area **over** the market where selling pressure overcomes buying pressure and a **price advance is turned back**.
- Tested support and resistance are more reliable.
- Previous peaks and troughs are potential supports and resistances. Some other candidates can be those levels or areas indicated by indicators such as MA, trend channels, percentages and so on.

Examples of supports and resistances



Source: Chart by MetaStock

More examples



Remarks on supports and resistance

- Finding supports and resistance plays the key role of technical analysis. This is the hardest part in developing a trading strategy based on technical analysis.
- All the indicators and tools are to help you in **two perspectives**:
 1. evaluate the **strength** of potential supports and resistances.
 2. evaluate the spot probability of price going up vs. going down **at the moment**.
- Good trading opportunities are those levels that satisfy the **3:1** rule and have a high odds ratio.

Charting

- Ways to describe or plot the market prices.
- Different types of charts:
 - Bar Chart
 - Candle-stick Chart
 - Point and Figure (OX chart)
 - Market profile
 - Pro-Sticks chart
- Goal: keep the basic trend or shape of historical prices while omit most prices that not “important” in technical analysis perspective.

Good references

- Candlestick:

<http://www.blackswanfx.blogspot.com/>

- OX Chart:

[http://stockcharts.com/school/doku.php?id=chart
school:chart analysis:pnf charts](http://stockcharts.com/school/doku.php?id=chart_school:chart_analysis:pnf_charts)

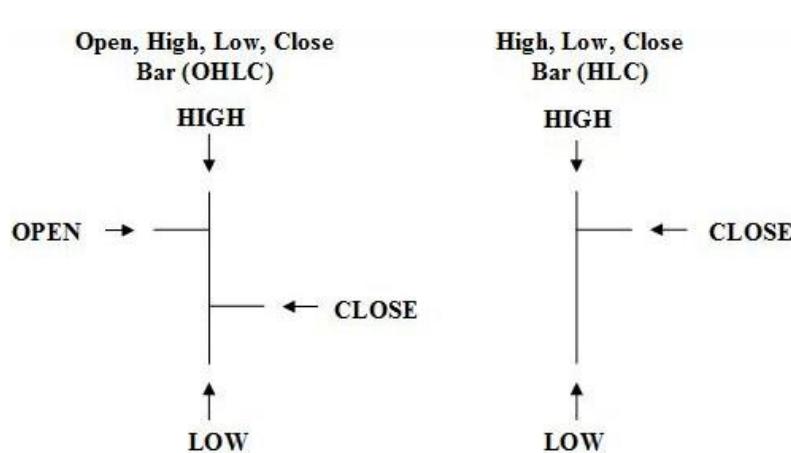
- Market Profile

<http://www.trading-naked.com/MarketProfile.htm>

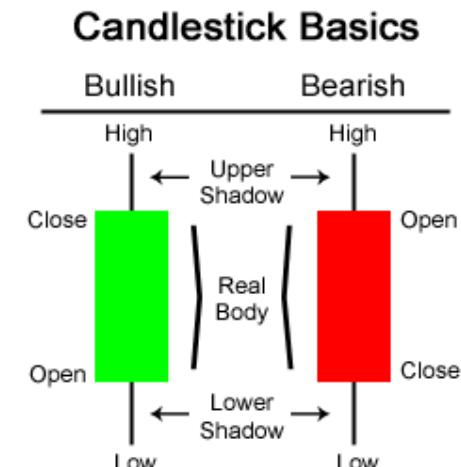
- ProStick

<http://www.prosticks.com>

Bar Chart and Candlestick Chart



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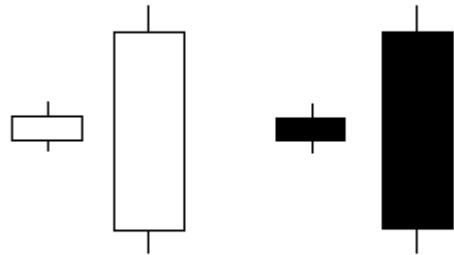


Bar Chart

Candle Chart

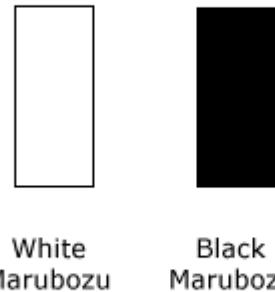
Candle types

Long versus Short



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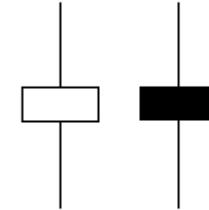
Marubozu



White Marubozu Black Marubozu

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Spinning Tops



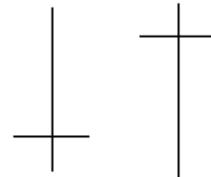
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Doji



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Dragon Fly Doji

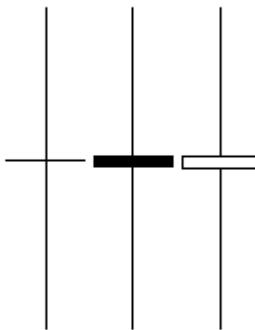


Grave-stone Doji



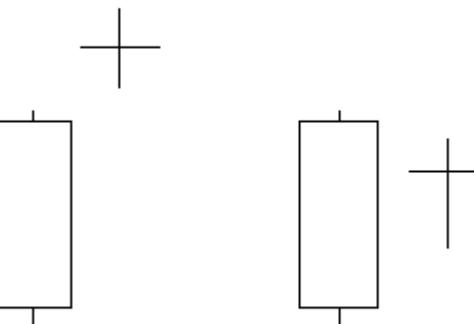
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Long-legged Doji



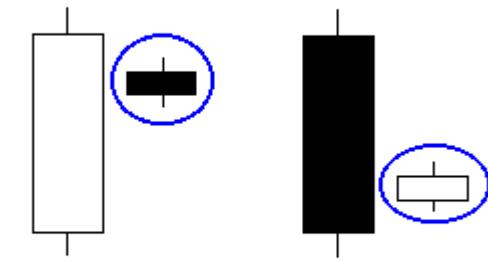
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Long White Candle + Doji



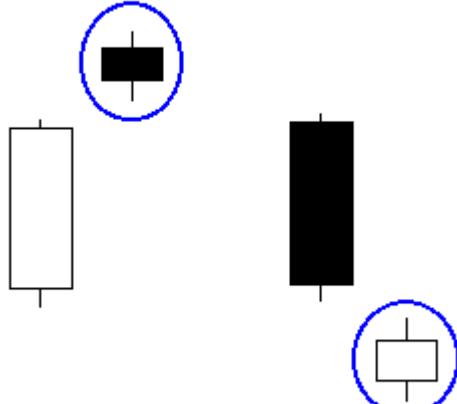
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Harami Position



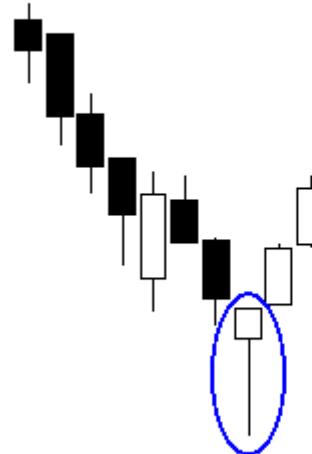
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Star Position

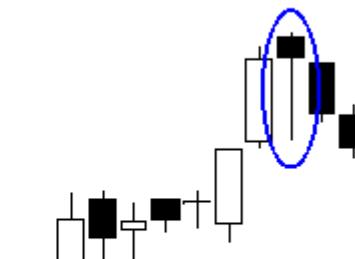


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Hammer

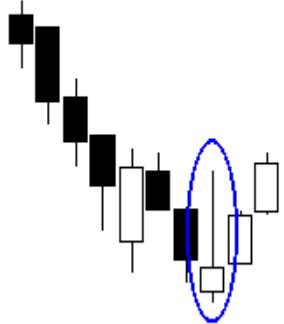


Hanging Man

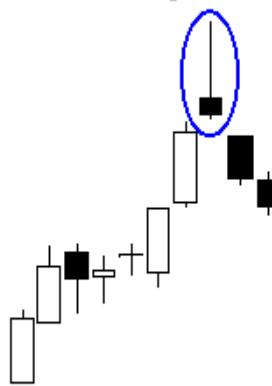


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Inverted Hammer

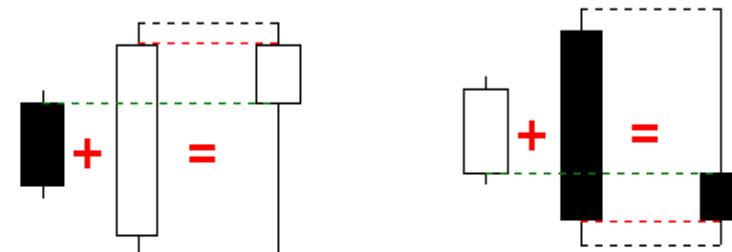


Shooting Star



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Blending Candles



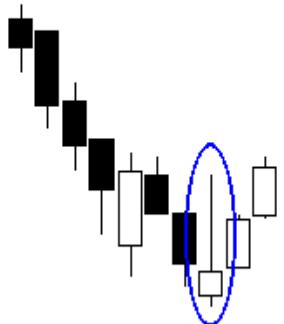
Bullish
Engulfing Hammer

Bearish
Engulfing Hammer

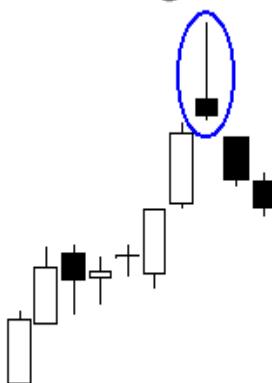
Shooting Star

© StockCharts.com

Inverted Hammer

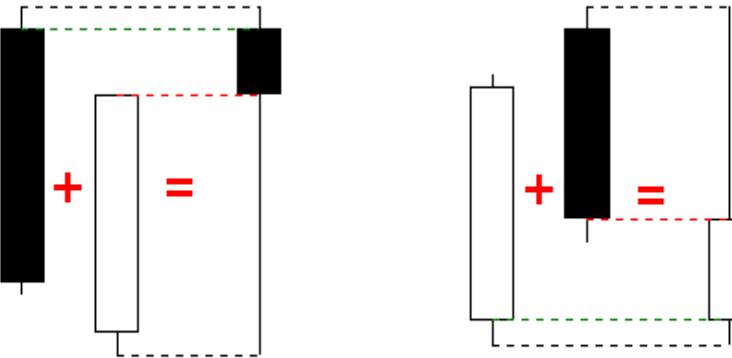


Shooting Star



© StockCharts.com

Blending Candles



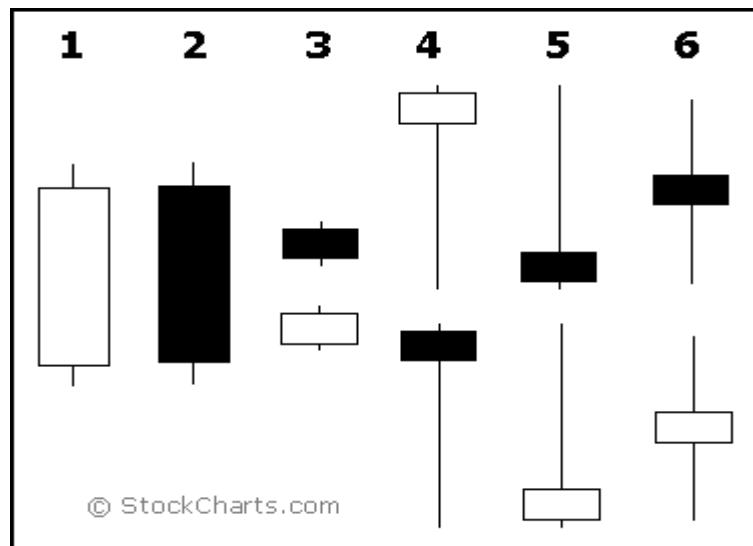
Piercing
Pattern Hammer

Dark Cloud Cover

Shooting Star

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Summary for Candle types



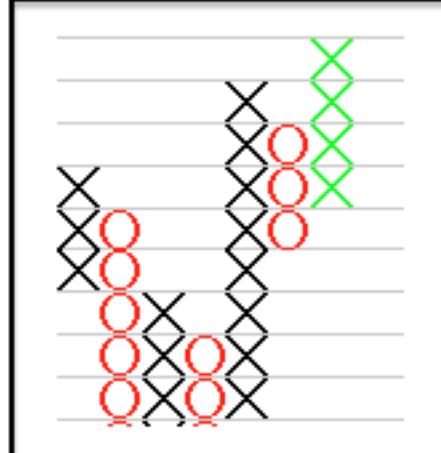
- *Long white candlesticks* indicate that the **Bulls** controlled the ball (trading) for most of the game.
- *Long black candlesticks* indicate that the **Bears** controlled the ball (trading) for most of the game.
- *Small candlesticks* indicate that neither team could move the ball and prices finished about where they started.
- A *long lower shadow* indicates that the **Bears** controlled the ball for part of the game, but lost control by the end and the Bulls made an impressive comeback.
- A *long upper shadow* indicates that the **Bulls** controlled the ball for part of the game, but lost control by the end and the Bears made an impressive comeback.
- A *long upper and lower shadow* indicates that both the Bears and the Bulls had their moments during the game, but neither could put the other away, resulting in a standoff.

Drawbacks of Candle Chart

- Omit all the information except for HLOC within a time interval (one candle), some of which, however, might be important, especially the statistical information of the price magnitude change (Market Profile), assigned volume information such as the prices that most volume concentrate on (Pro-Stick).
- Chart can be further contracted, especially when price moves in a very narrow range for a long time (OX Chart).

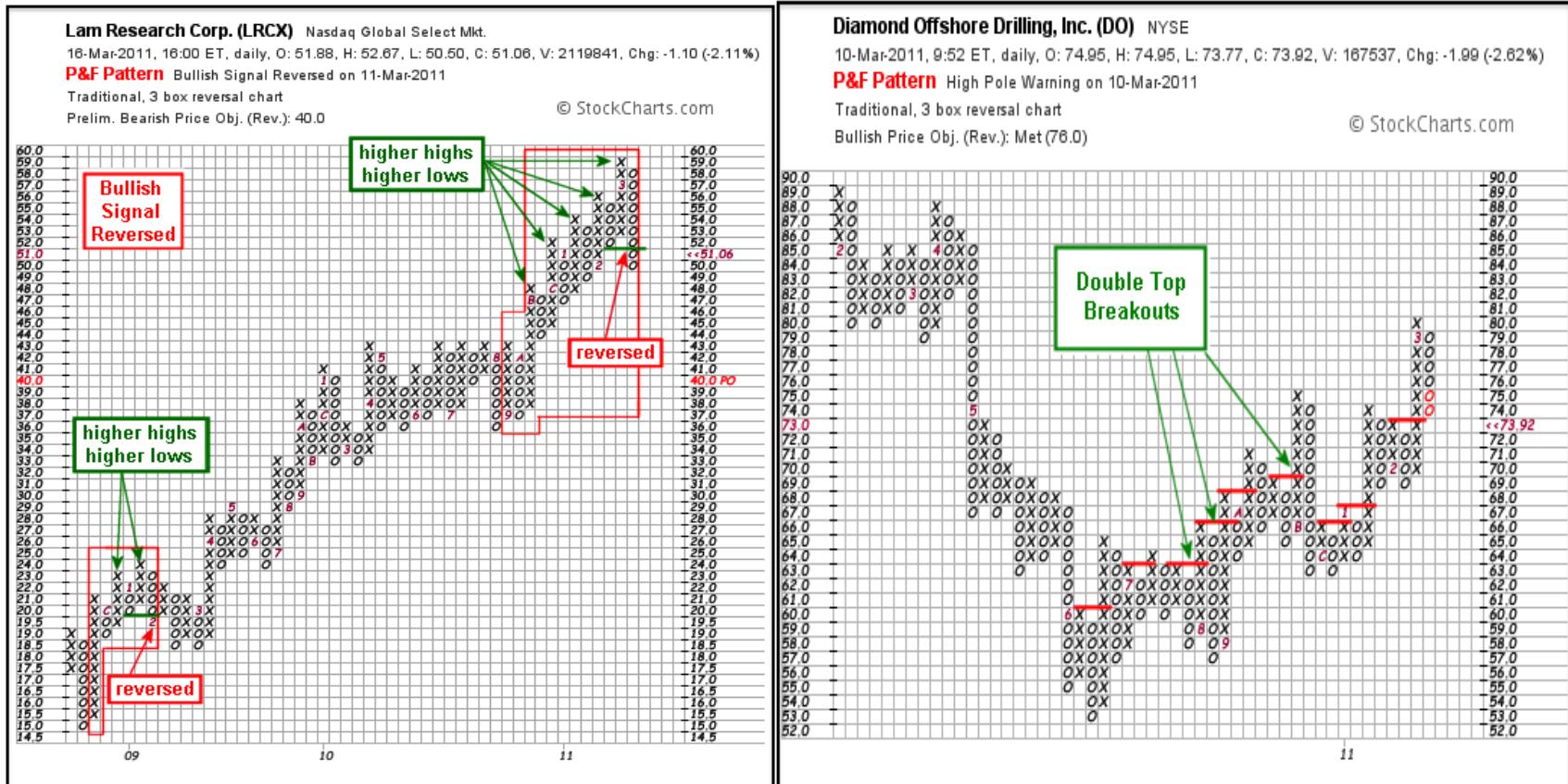
Ox Chart

- Focus on the magnitude changes of prices rather than the changes of prices on time domain.



More on OX Chart

- You can apply similar patterns used in candlesticks chart to the OX chart



Computer Sciences Corp. (CSC) NYSE

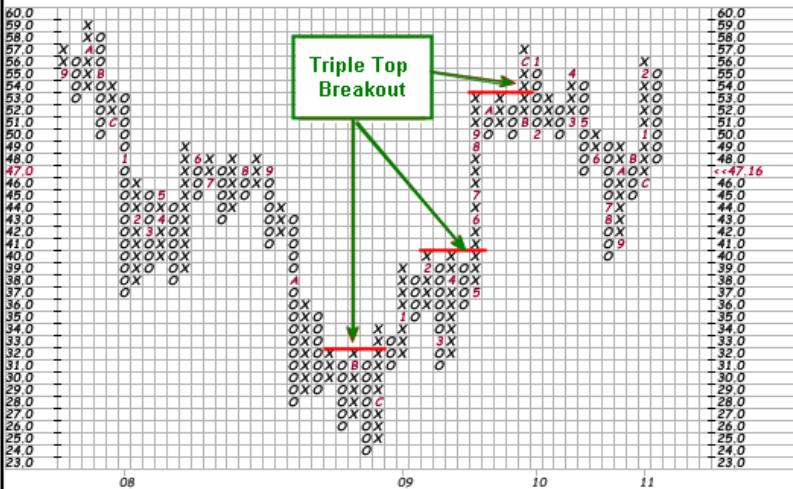
10-Mar-2011, 10:07 ET, daily, O: 47.47, H: 47.69, L: 47.10, C: 47.16, V: 91345, Chg: -0.92 (-1.91%)

P&F Pattern High Pole Warning on 09-Feb-2011

Traditional, 3 box reversal chart

Bullish Price Obj. (Rev.): 79.0

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Monsanto Co. (MON) NYSE

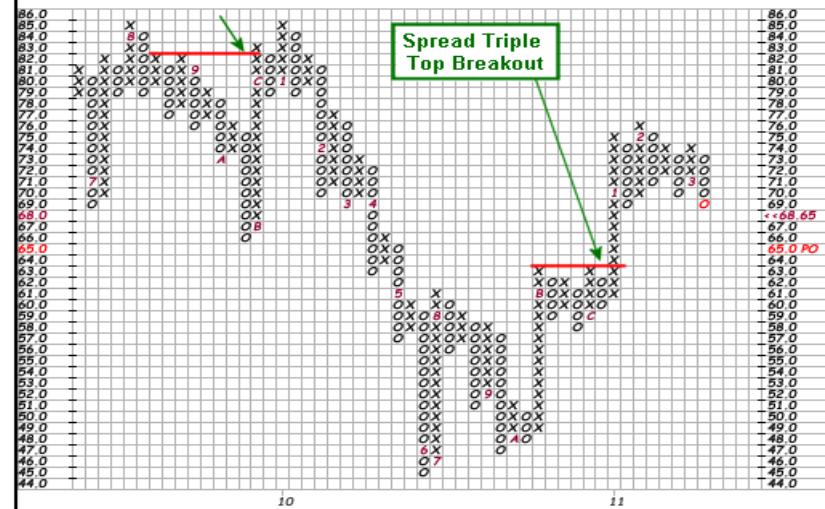
10-Mar-2011, 9:54 ET, daily, O: 68.88, H: 68.88, L: 68.35, C: 68.65, V: 572934, Chg: -0.75 (-1.08%)

P&F Pattern Descending Triple Bottom Breakdown on 10-Mar-2011

Traditional, 3 box reversal chart

Bearish Price Obj. (Rev.): 65.0

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Rockwell Collins (COL) NYSE

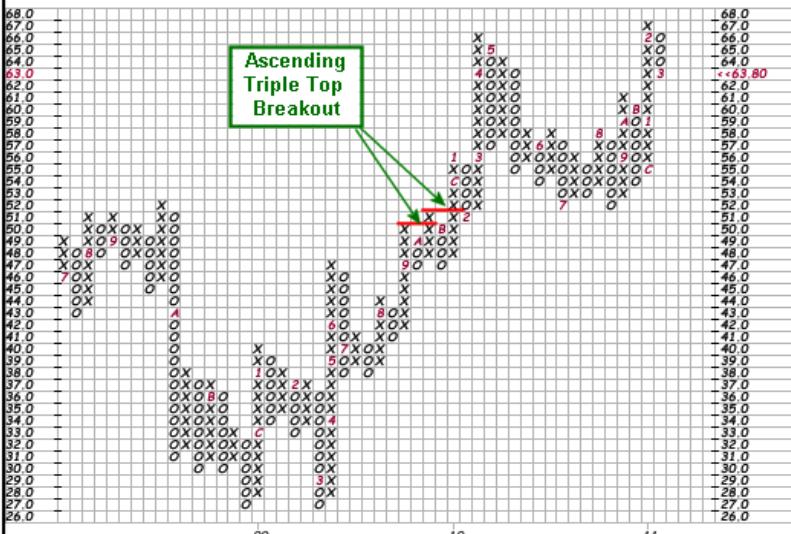
10-Mar-2011, 9:56 ET, daily, O: 63.90, H: 63.95, L: 63.33, C: 63.80, V: 63146, Chg: -0.82 (-1.27%)

No New P&F Pattern

Traditional, 3 box reversal chart

Bullish Price Obj. (Rev.): 80.0

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Enter Ticker: SPY

or choose from:
Update Chart

- Your Favorite Charts -

Other P&F Charts: Text | Dynamic

in: watch_list View All Favorites

S&P 500 SPDRs (SPY) NYSE

23-Mar, 16:00 ET, daily, O: 128.93, H: 130.00, L: 128.32, C: 129.66, V: 148.4M, Chg: +0.37

No New P&F Pattern

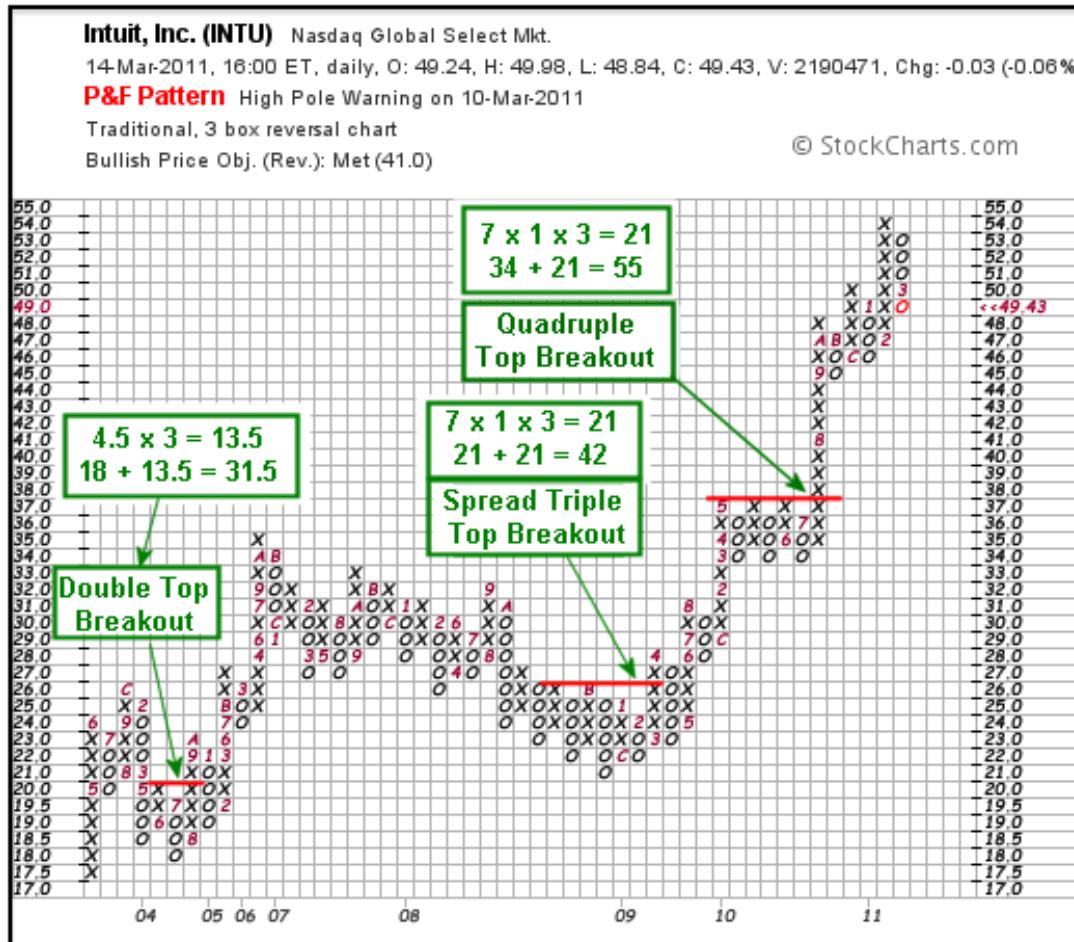
Traditional, 3 box reversal chart

Bullish Price Obj. (Rev.): 190.0

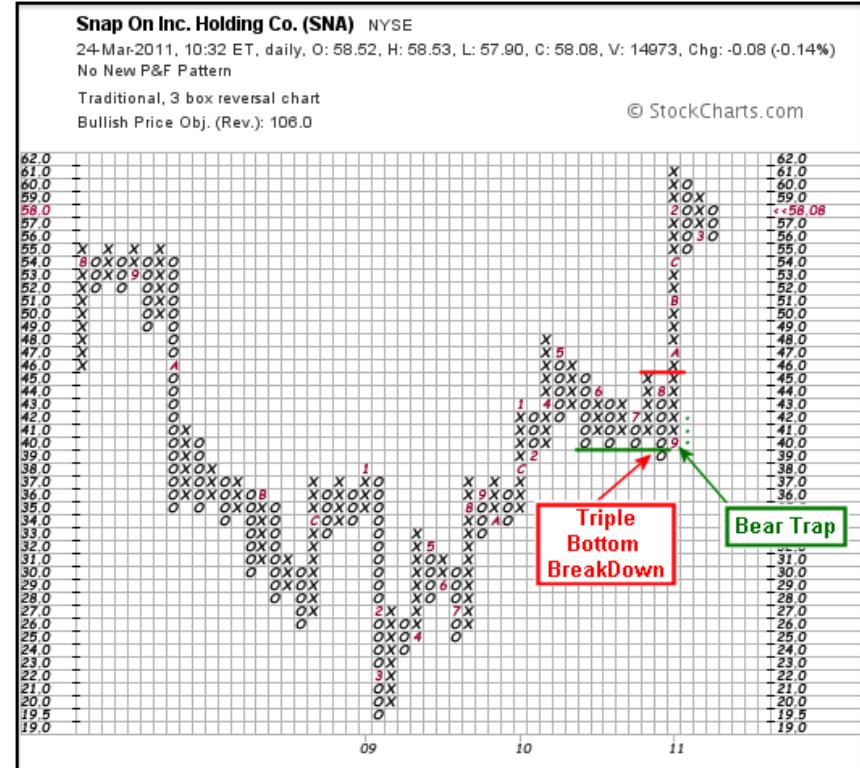
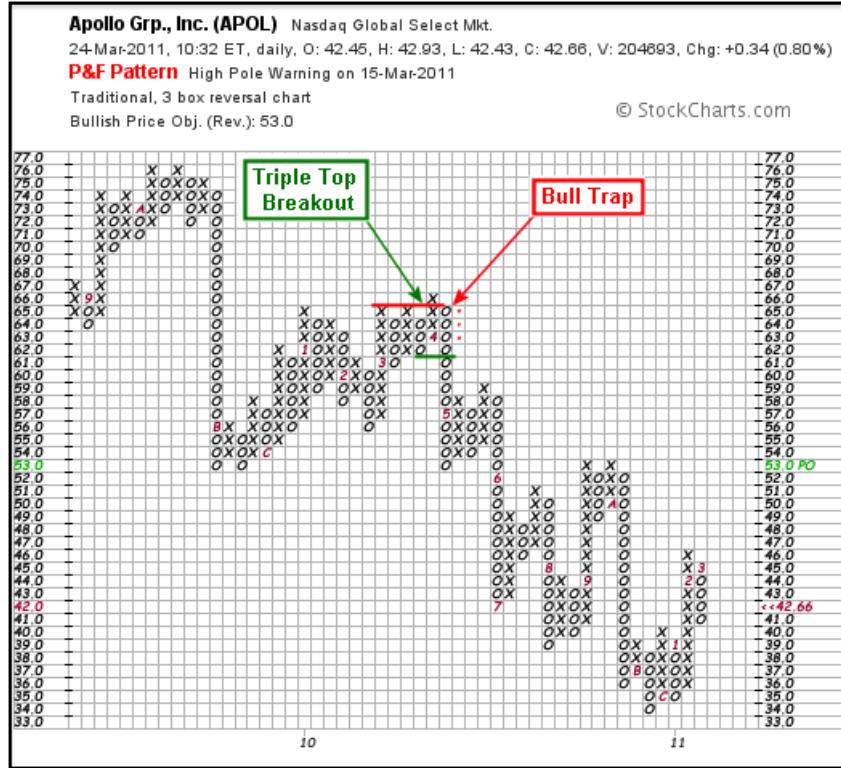
© StockCharts.com



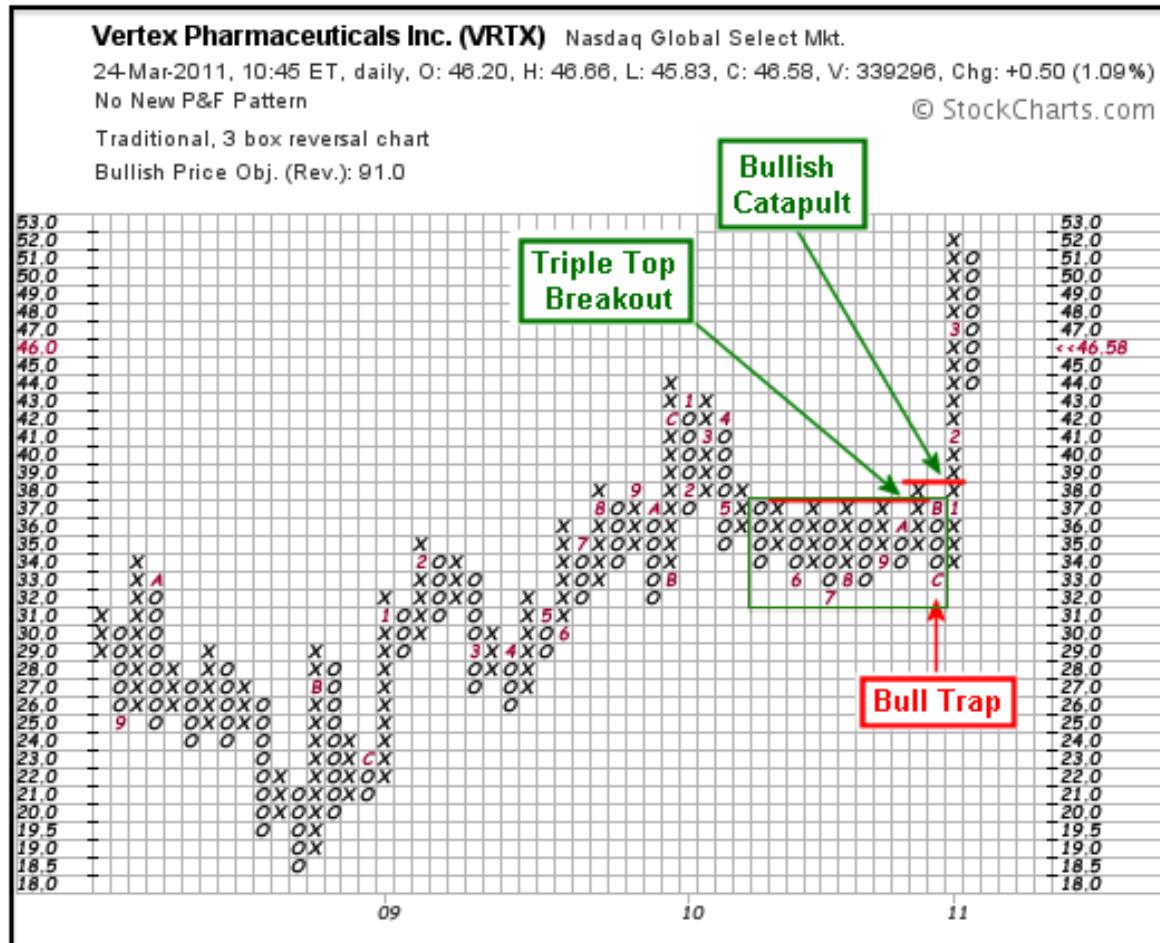
OX chart used for target price predictions



Bull trap and Bear trap



Bullish Catapult



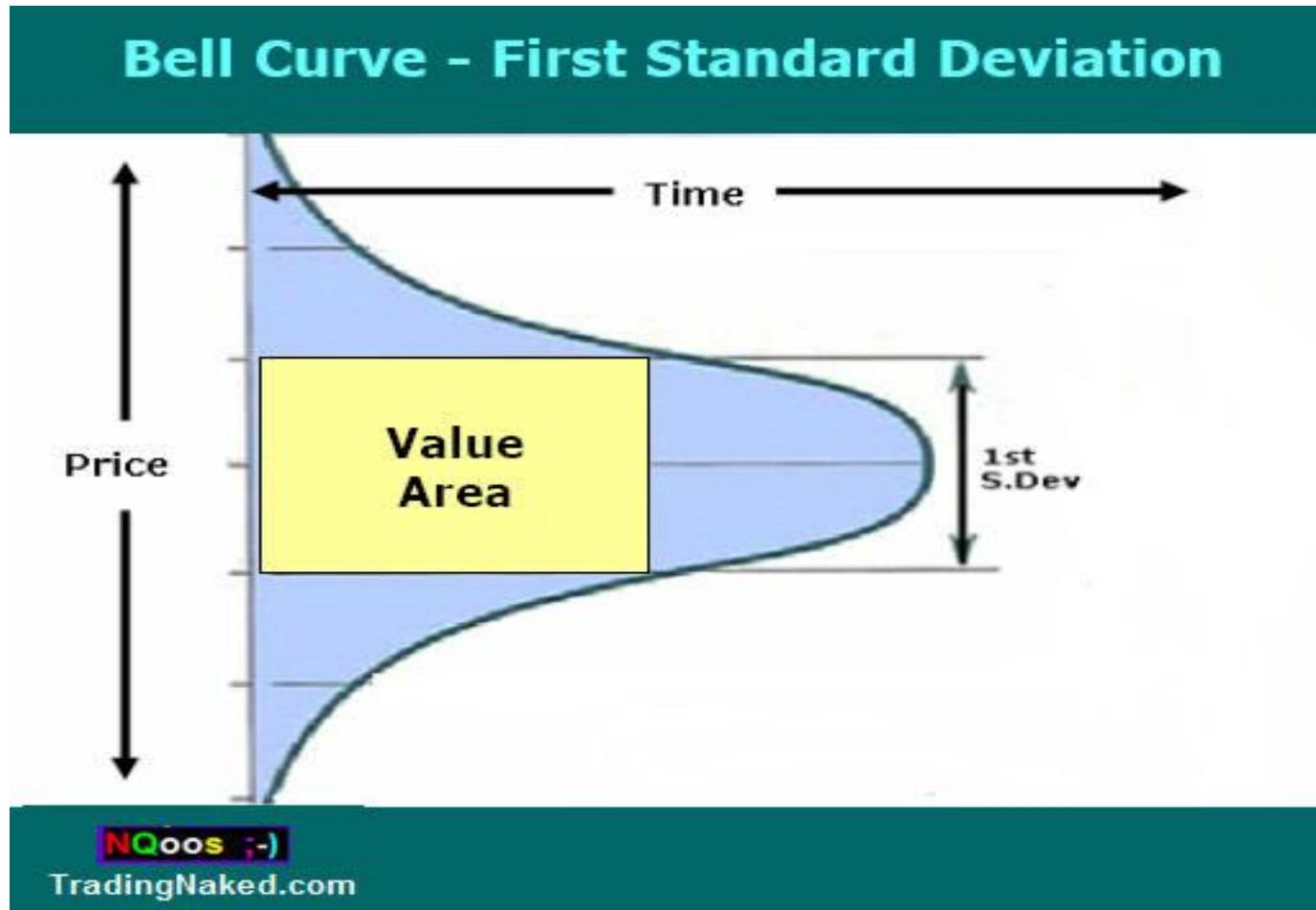
Summary for OX Chart

- Filter insignificant price movements and noise
- Focus on important price movements
- Remove the time aspect from the analysis process
- Make support/resistance levels **much** easier to identify
- Provide automatic and subjective trendlines

Market Profile

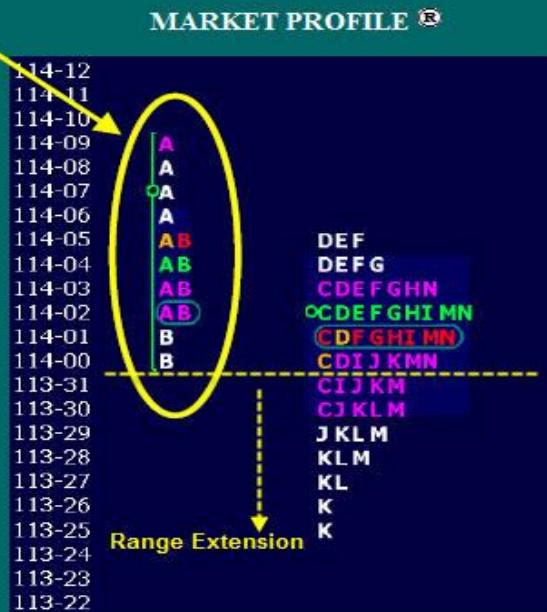
- A chart that displays market data using Time Price Opportunities (TPOs). A **TPO** is a price that the market traded at during a specific period. The typical market profile chart splits the **trading day** into thirty minute segments or periods. The market data for each period is displayed on the basis of a **normal** distribution.

Foundations behind



INITIAL BALANCE

The price range established in the first 60 minutes of real time hours trading activity. Real time hours is different for various trading instruments.
First 60 minutes = letters A-B.



NQoos :-)

TradingNaked.com

*profile is split @ periods A-B for display purposes

Market Profile® Range Extension

Market Activity above/below the initial balance. RE allows us to gauge buyer/seller strength

114-12
114-11
114-10
114-09
114-08
114-07
114-06
114-05
114-04
114-03
114-02
114-01
114-00
113-31
113-30
113-29
113-28
113-27
113-26
113-25
113-24
113-23
113-22

RANGE EXTENSION

Market Profile® Value Area

VALUE AREA

TPO range = 1 standard deviation containing 70% of TPO's in a profile. The Value Area is where price was accepted by the majority of the market participants.

TPO = that price occurred

114-12
114-11
114-10
114-09
114-08
114-07
114-06
114-05
114-04
114-03
114-02
114-01
114-00
113-31
113-30
113-29
113-28
113-27
113-26
113-25
113-24
113-23
113-22

NQoos :-)

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Market Profile® Range

The entire range of the profile including all TPO's

RANGE

114-12
114-11
114-10
114-09
114-08
114-07
114-06
114-05
114-04
114-03
114-02
114-01
114-00
113-31
113-30
113-29
113-28
113-27
113-26
113-25
113-24
113-23
113-22

NQoos :-)

TradingNaked.com

Market Profile® Selling Tail

114-12	
114-11	
114-10	
114-09	A
114-08	A
114-07	A
114-06	A
114-05	ABDEF
114-04	ABDEFG
114-03	ABCDEFGHI
114-02	ABCDEFGHI MN
114-01	BCDFGHJ MN
114-00	BCDIJK MN
113-31	C IJKM
113-30	CJ KLM
113-29	J KLM
113-28	K L M
113-27	K L
113-26	K
113-25	K
113-24	
113-23	
113-22	

"SELLING TAIL" →

Two or more single prints at the upper extreme of the profile

"BUYING TAIL" ↘

Two or more single prints at the lower extreme of the profile

NQoos :-)

TradingNaked.com

Market Profile® Closing Range

114-12	
114-11	
114-10	
114-09	A
114-08	A
114-07	A
114-06	A
114-05	ABDEF
114-04	ABDEFG
114-03	ABCDEFGHI
114-02	ABCDEFGHI MN
114-01	BCDFGHJ MN
114-00	BCDIJK MN
113-31	C IJKM
113-30	CJ KLM
113-29	J KLM
113-28	K L M
113-27	K L
113-26	K
113-25	K
113-24	
113-23	
113-22	

CLOSING RANGE →

The last period of the trading session = N period in this chart

NQoos :-)

TradingNaked.com

Market Profile® Point of Control

114-12	
114-11	
114-10	
114-09	A
114-08	A
114-07	A
114-06	A
114-05	ABDEF
114-04	ABDEFG
114-03	ABCDEFGHI
114-02	ABCDEFGHI MN
114-01	BCDFGHJ MN
114-00	BCDIJK MN
113-31	C IJKM
113-30	CJ KLM
113-29	J KLM
113-28	K L M
113-27	K L
113-26	K
113-25	K
113-24	
113-23	
113-22	

POINT OF CONTROL →

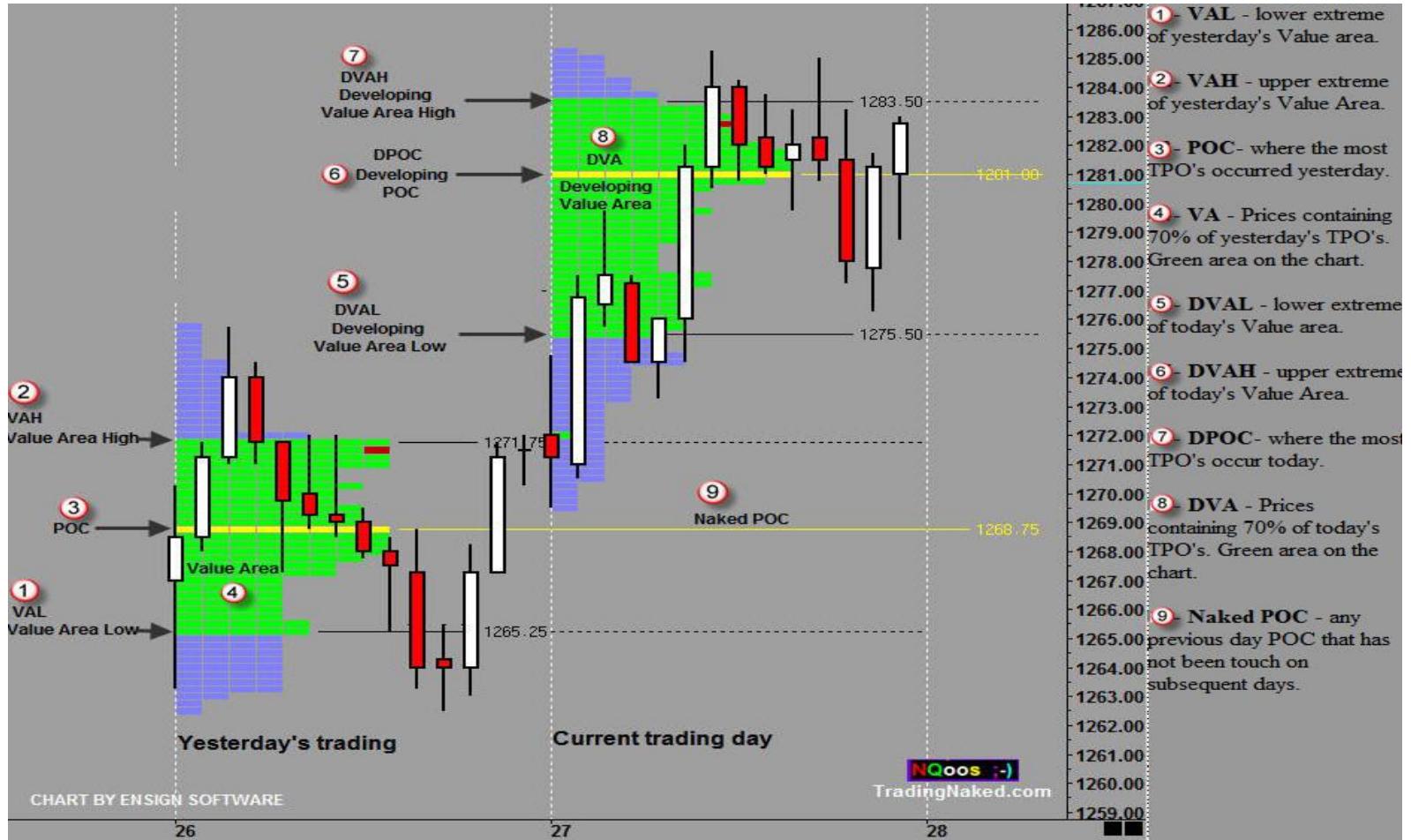
Pice at which the most TPO's occur in the Market Profile during the previous day. Visually the longest row of letters. I can see this with the candlesticks alone. (5TH CHART BELOW)

NQoos :-)

TradingNaked.com

One can combine the candle chart together with the Market Profile

Combination



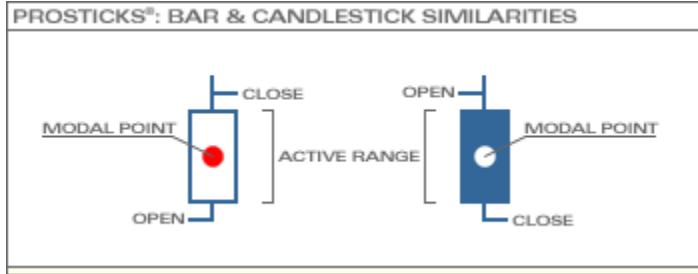
Summary on Market Profile

- Focus on the time-based distributional information of price changes within a time interval
- More detailed version of Candle chart
- Still not directly reflect much on the assigned volume information of the price changes

Pro-Stick

- The introduction of ProSticks attempts to **reduce the limitations of Market Profile** and other technical analysis and charting tools while, at the same time, integrates the elements of volume and time into traditional technical analysis and charting.
- ProSticks has two variations: **ProSticks-By-Time and ProSticks-By-Volume**

ProStick-by-Time & ProStick-by-Volume



- The **Modal Point** in a ProStick bar represents the most heavily transacted price for the particular time interval.
- **ProSticks-By-Time** calculates the Modal Point similar to the way Market Profile builds its bell-curve distribution. The Modal Point is then simply the price with the **most number of transacted 5-minute intervals** for all transacted prices in the trading interval
- **ProSticks-By-Volume** calculates the Modal Point simply by taking the most heavily traded price for the trading day (or other trading intervals). The Modal Point is thus the price that had the most shares traded for that particular day.
- The **Active Range** for both ProSticks-By-Time and ProSticks-By-Volume is computed by first calculating the mean of the entire distribution. Then the **first standard deviation** away from the mean in either direction is added together to form the Active Range. The Active Range equals approximately 68 percent of the entire distribution

ProStick vs. Candlestick



RESISTANCE LEVELS ARE IDENTIFIED BY A PREVIOUS HIGH. A CANDLESTICK CHART OFFERS NO INSIGHT, EVEN AFTER THE FACT, AS TO WHY THE RALLIES STOPPED AT POINTS A AND B.



RESISTANCE LEVELS ARE DRAWN MORE ACCURATELY WITH A PROSTICKS CHART AND CAN HELP EXPLAIN WHY RALLIES STOPPED AT POINTS A AND B



THE THREE BLACK CROWS IN CANDLESTICK CHARTING THEORY IS VERY BEARISH AND WILL ACT AS A STRONG RESISTANCE POINT IN THE FUTURE (AS IN POINT A) BUT WHY WAS THERE RESISTANCE AT EXACTLY THAT PRICE LEVEL?



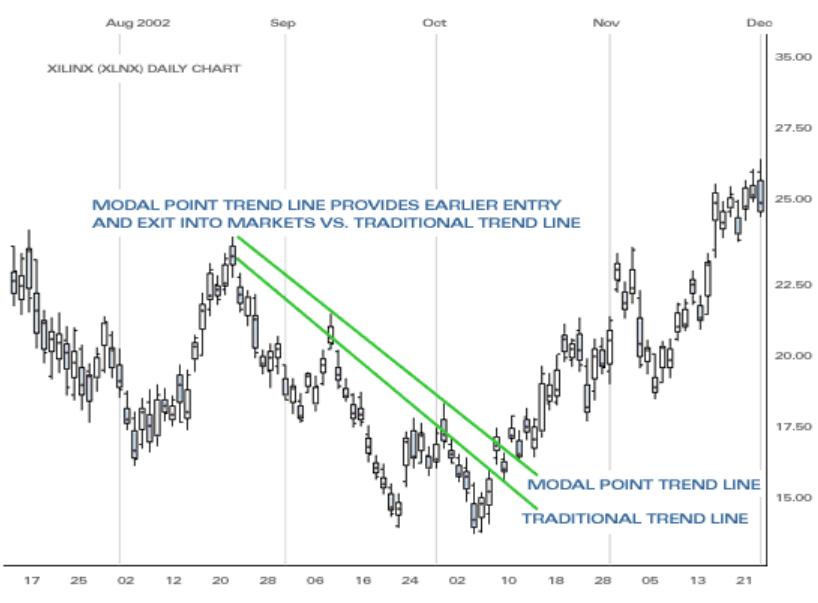
GATEWAY (GTW) BEARISH DARK CLOUD COVER



HOME DEPOT (HD) STOCHASTIC

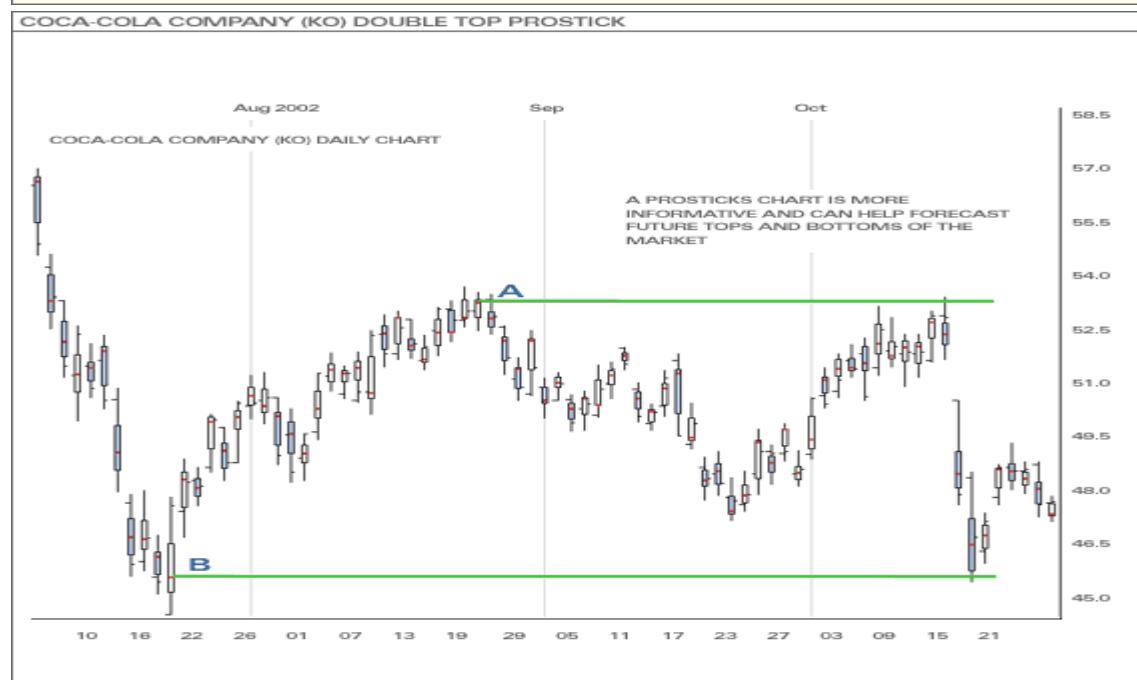
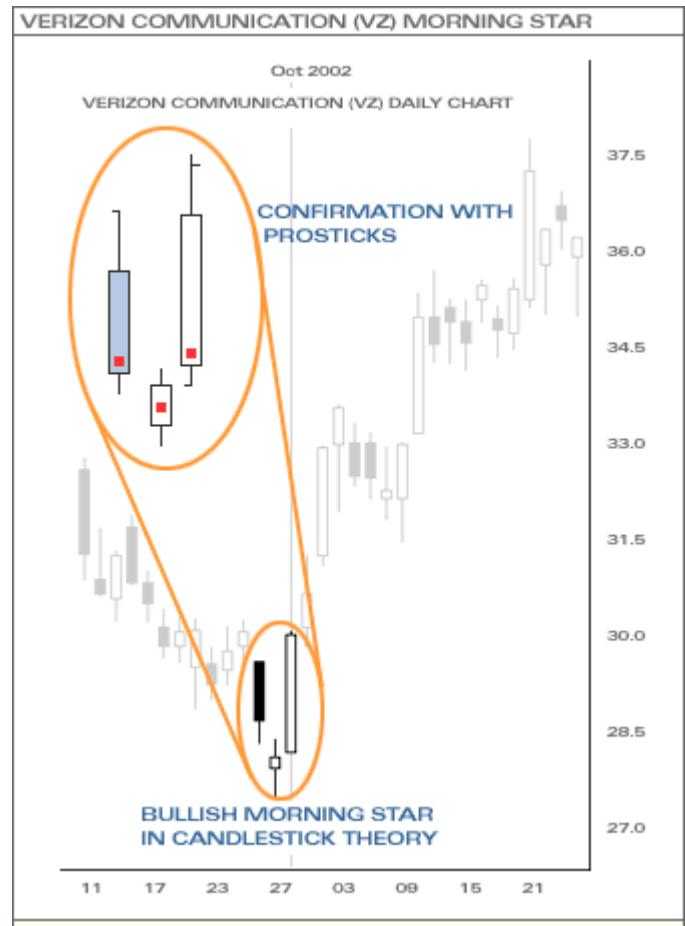


XILINX (XLNX) TREND LINE



NASDAQ MODAL POINT RESISTANCE





Summary for ProStick

- Combine the advantages of both Candlestick and Market Profile
- Help to more accurately find support and resistant points
- Can be used to confirm or deny signals indicated by candlestick theories
- It is more reasonable to take Modal Point as reference compared to close price or H/L price when do technical analysis.

Price Patterns

- Classification and description of **sideways** market movements
- Market price curve = trend_1 + pattern_1 + trend_2 + pattern_2 +...+ trend_i + pattern_i +....
- **Reversal Patterns & Continuation Patterns**
- **Volume** often plays an important role in determining the reliability of patterns
- Most price patterns also have certain **measuring techniques** that help determine the minimum **price objectives**.

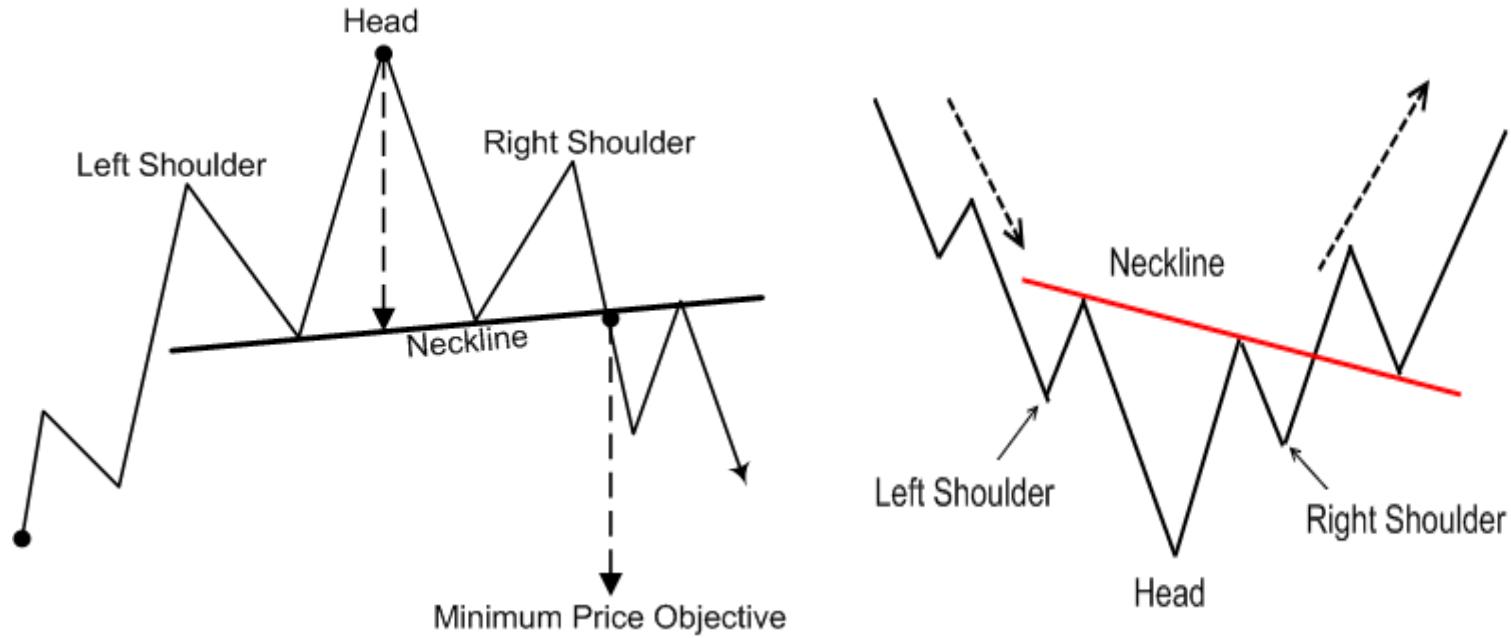
Reversal Patterns

- A prerequisite for any reversal pattern is the existence of a prior trend
- The first signal of an impending trend reversal is often the breaking of an important trendlines
- The larger the pattern, the greater the subsequent move
- Topping patterns are usually shorter in duration and more volatile than bottoms
- Bottoms usually have smaller price ranges and take longer to build
- Volume is usually more important on the upside

Major reversal patterns

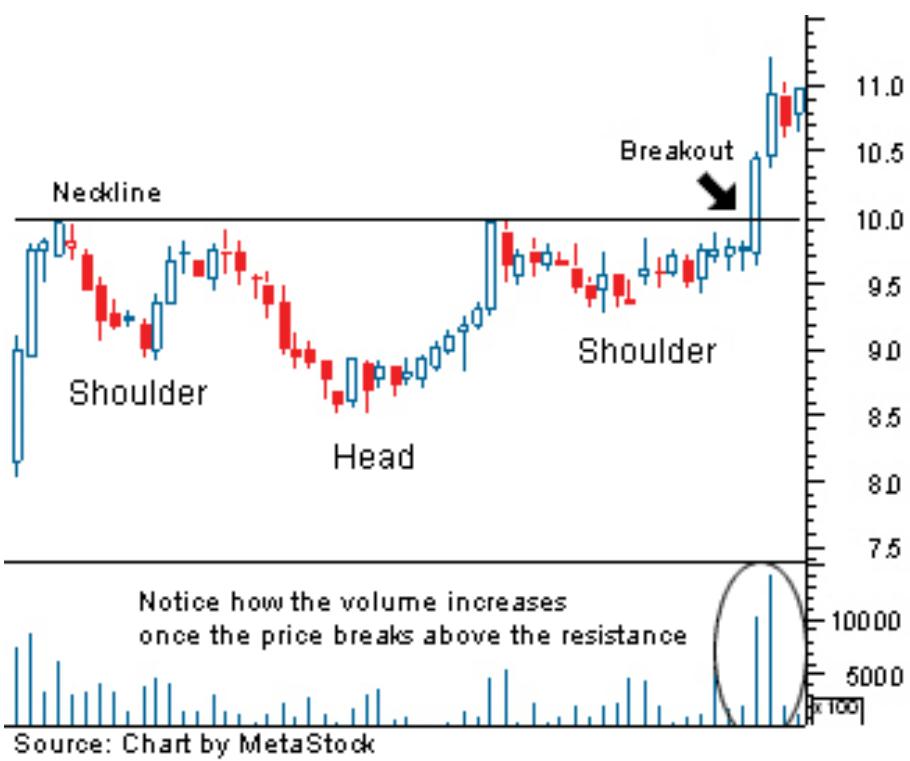
- The Head and Shoulder (H&S)
- Triple tops and bottoms
- Double tops and bottoms
- Spike (V) tops and bottoms
- Rounding pattern

Head and Shoulder



Prices should not move across the Neckline again, otherwise it would be treated as a failed head and shoulder

Volume matters!



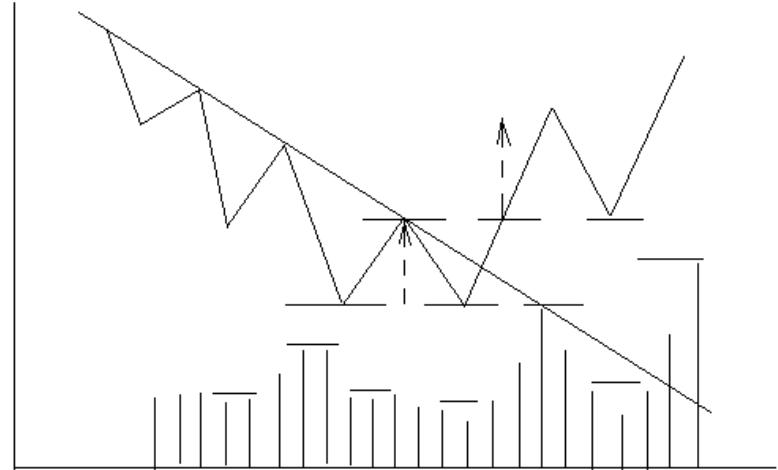
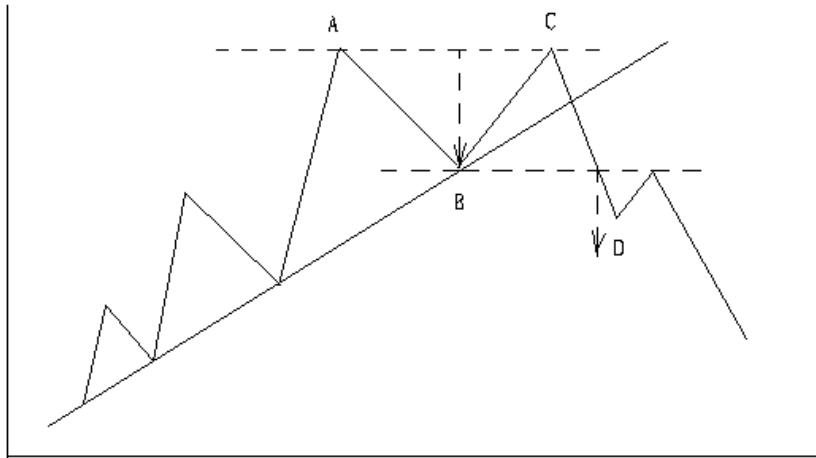
Non-standard head and shoulder



Triple Tops and Bottoms

- A slight variation of “head and shoulder”
- The volume tends to decline with each successive peak at the top and should increase at the breakdown point.

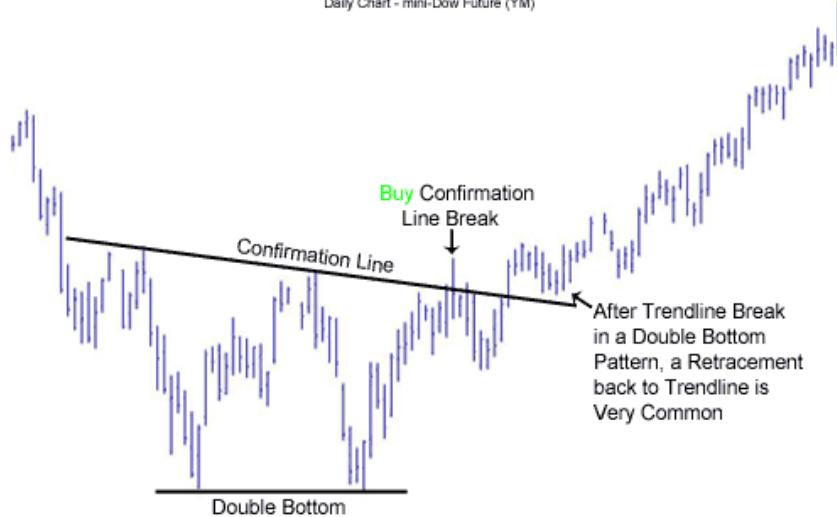
Double Tops and Bottoms



- The pattern has two peaks (A and C) at about the same level.
- The pattern is complete when the middle trough at point B is broken on a closing basis.
- Volume is usually lighter on the second peak C and picks up on the breakdown D.
- A return move back to the lower line is not unusual.
- The minimum measuring target is the height of the top projected downward from the breakdown point.

Double Bottom

Daily Chart - mini-Dow Future (YM)



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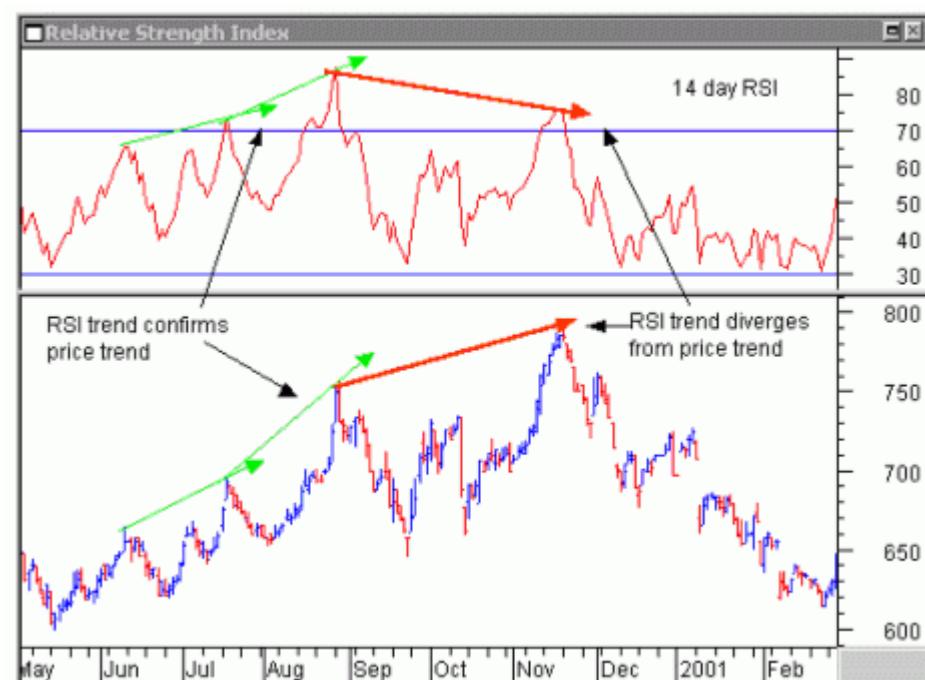
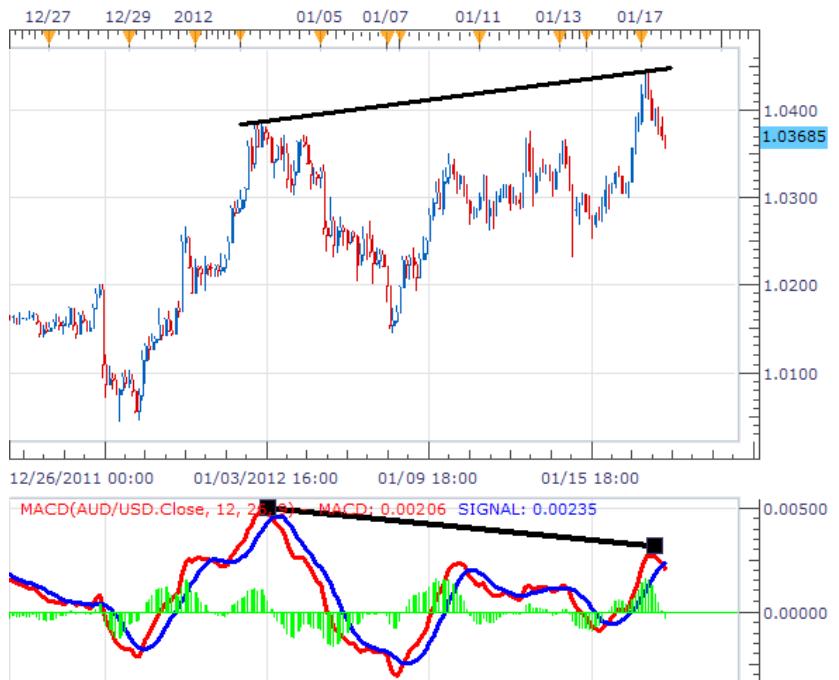
CreatedWithTradestation



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Extensions: Divergence

- Sometimes the second or third peak can be significantly higher than the previous peak, thus a “double or triple top pattern” fails.
- But this still can be treated as a reversal pattern as there is obvious evidence of “divergence” between the price curve and some indicator such as MACD.

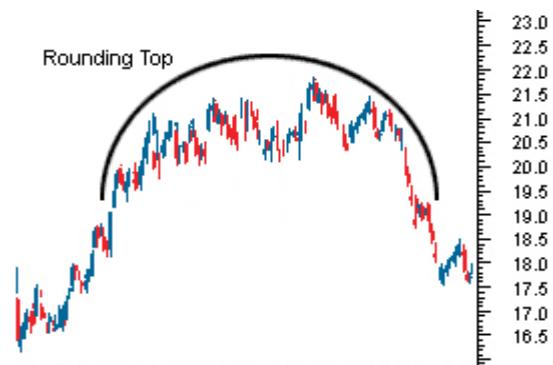
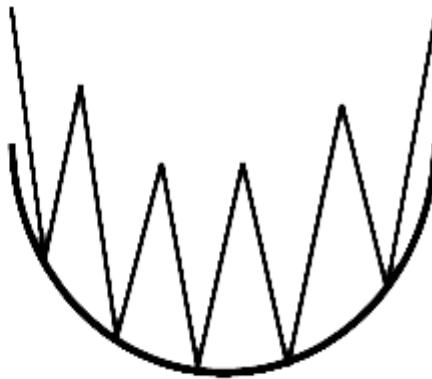
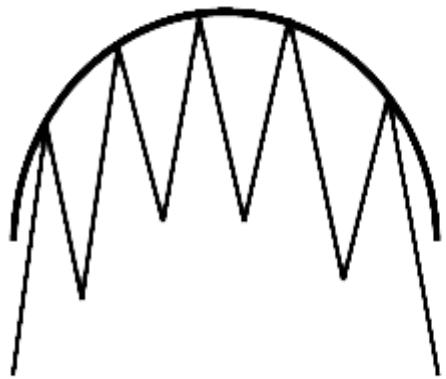


Abuse of Double tops and bottoms



- Remark: The neckline must be crossed before confirming a reversal double tops or bottoms
- The price levels should be high or low “enough” to be considered as reversal patterns

Rounding tops or bottoms



Source: Chart by MetaStock

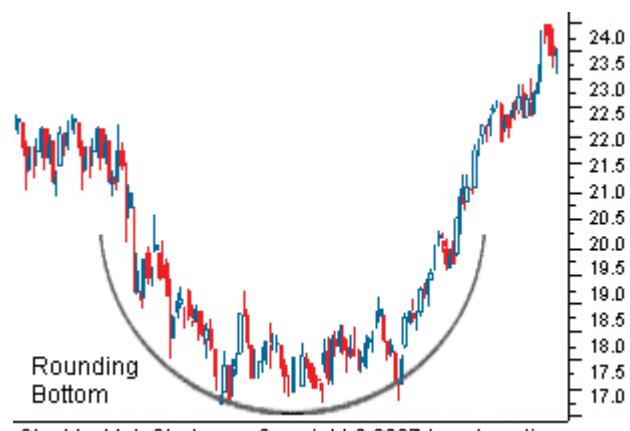
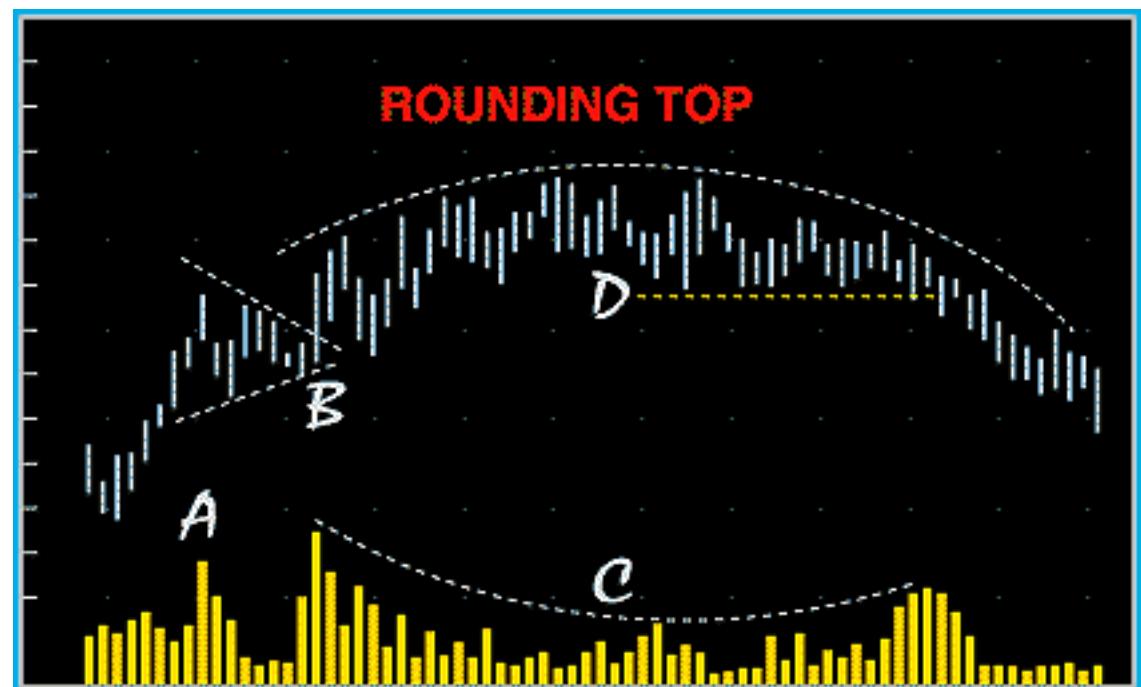
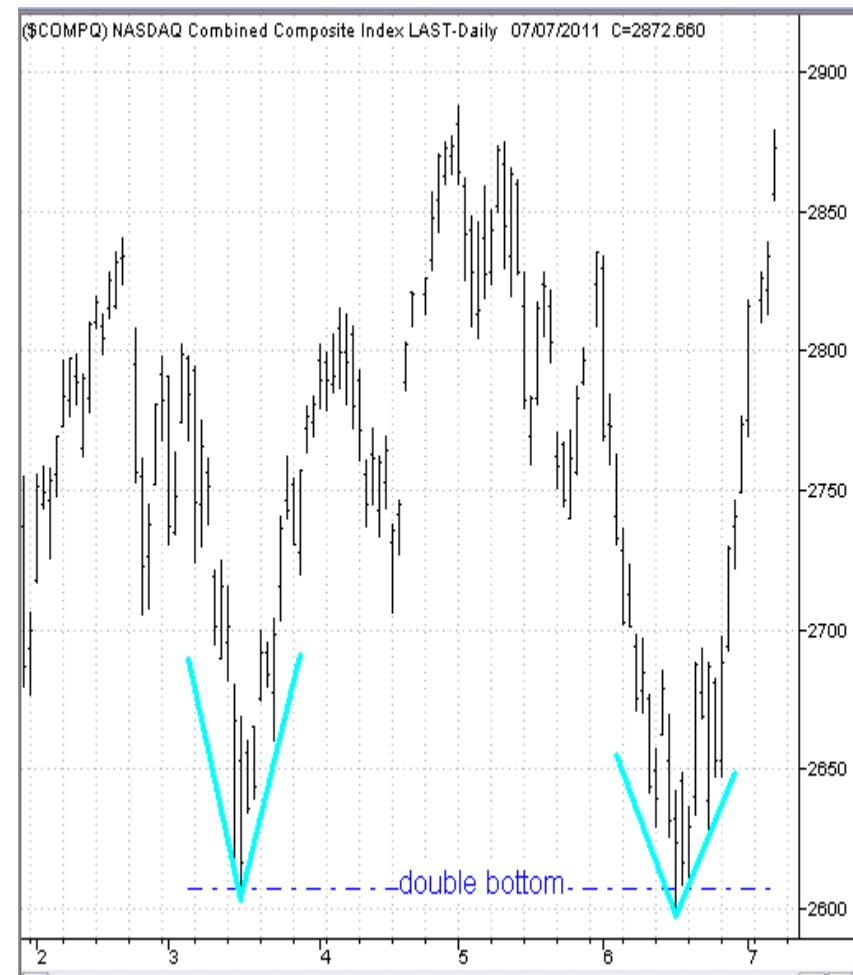


Chart by MetaStock

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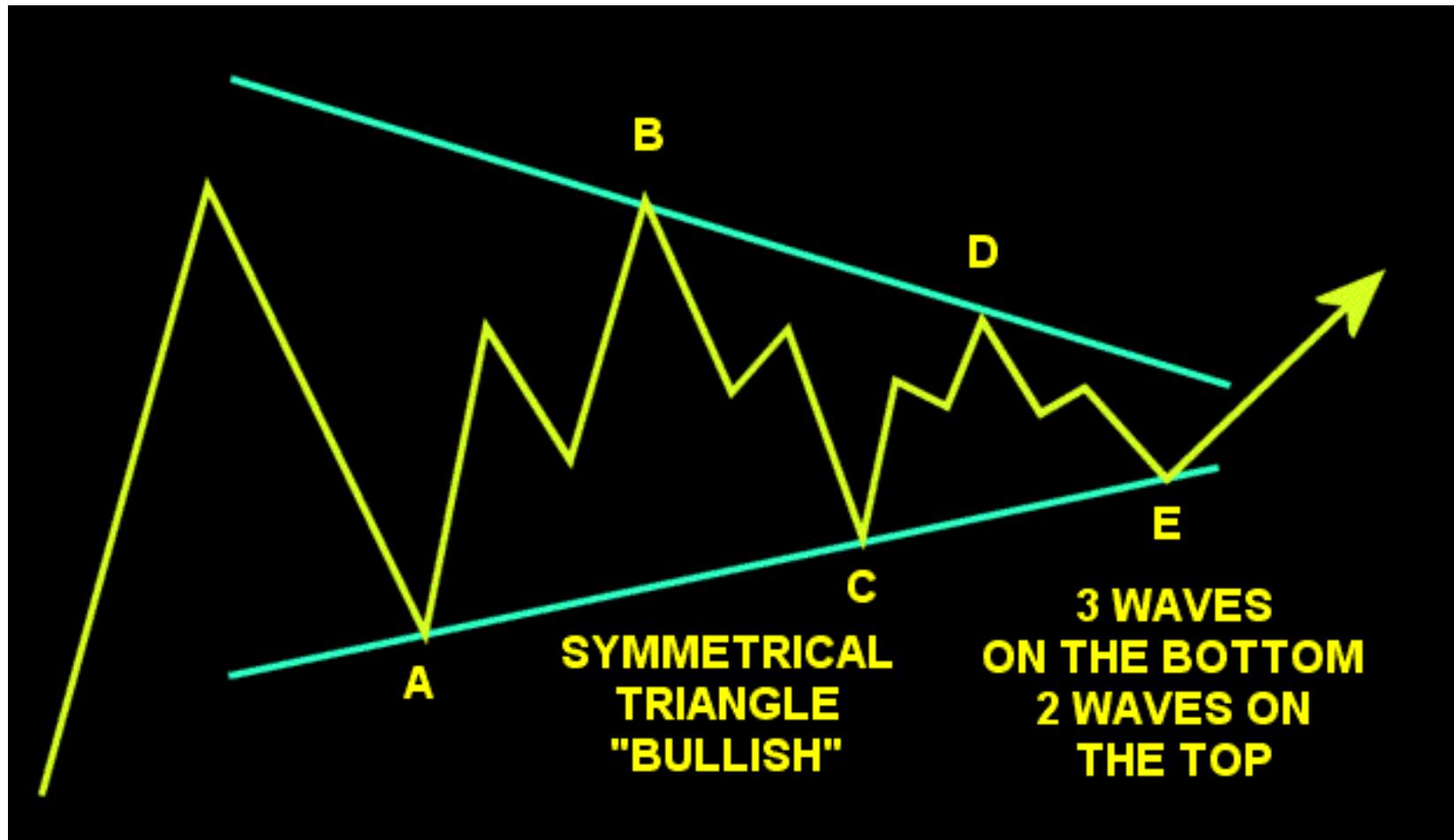
Spike (V) Tops and Bottoms



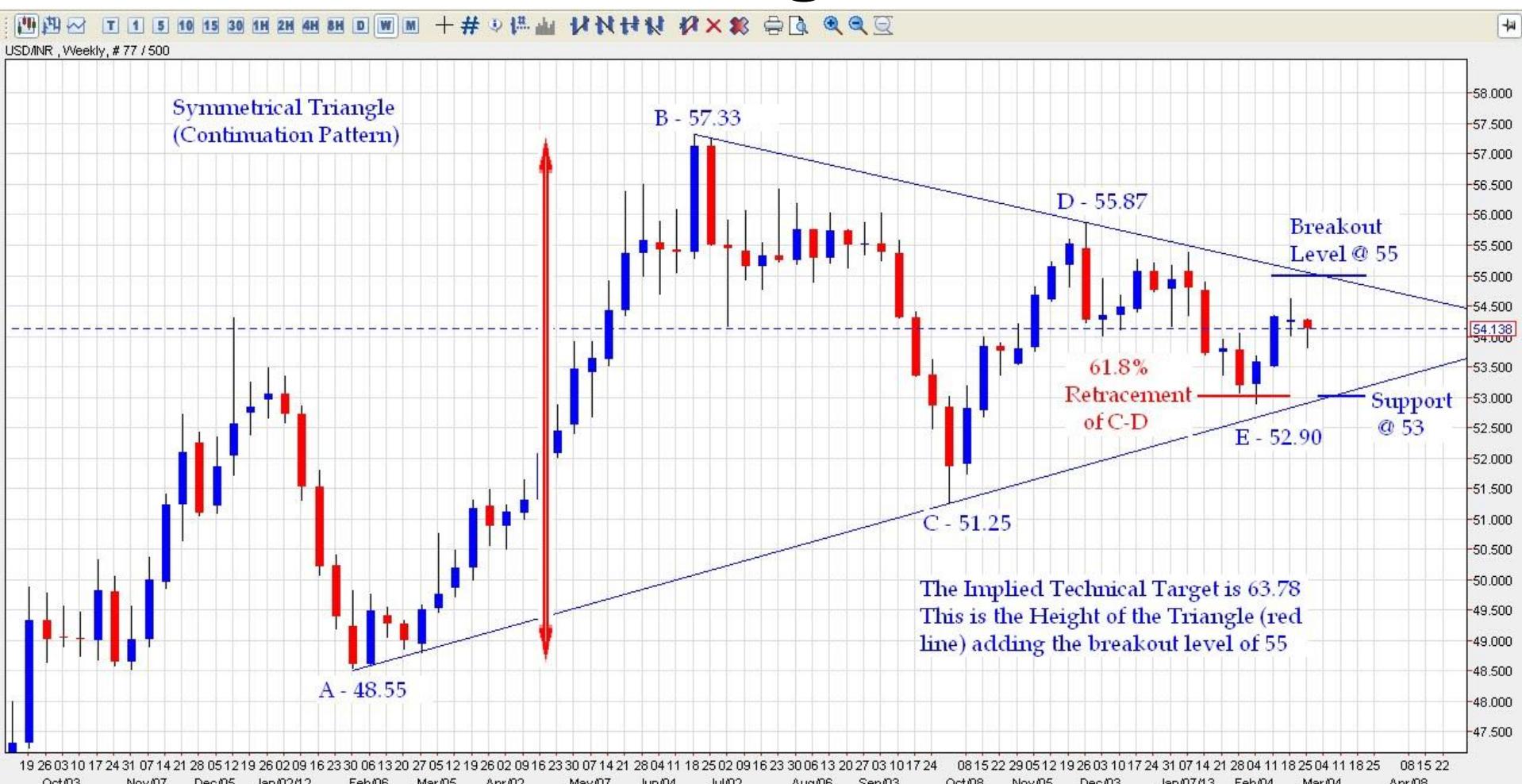
Continuation patterns

- These patterns usually indicate that the sideways price action on the chart is nothing more than a pause in the prevailing trend and the next move will be in the same direction as the trend that preceded the formation.
- Continuation patterns are usually shorter-term in duration and are more accurately classified as near-term or intermediate patterns.

Triangles

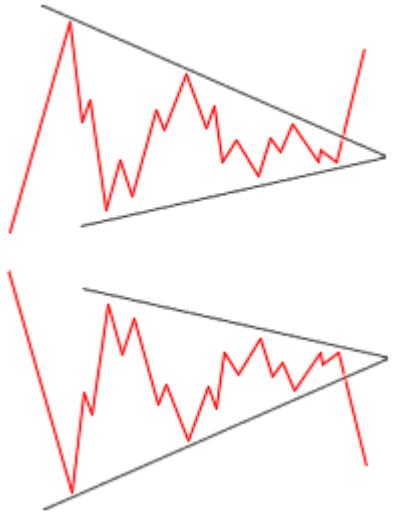


Triangles

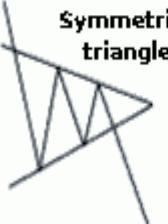


Triangles

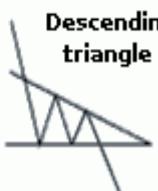
Symmetrical Triangles



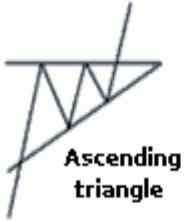
Symmetrical triangle



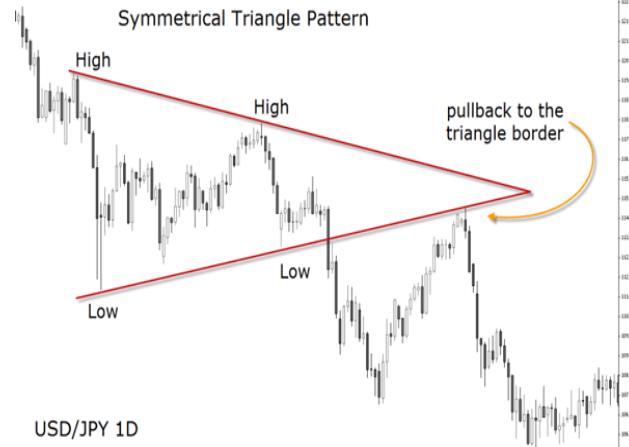
Descending triangle



Expanding triangle

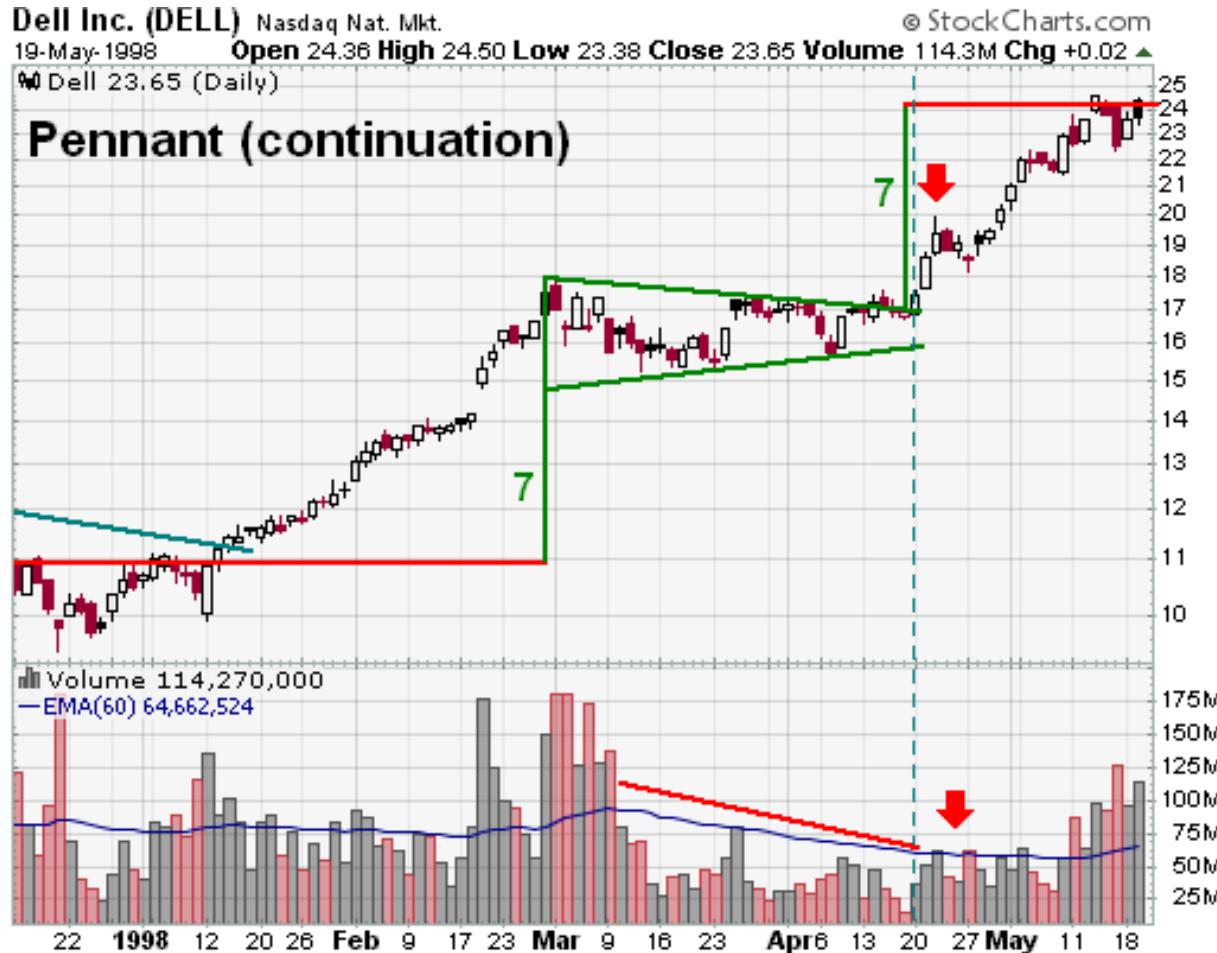


Symmetrical Triangle Pattern



USD/JPY 1D

Volume matters!

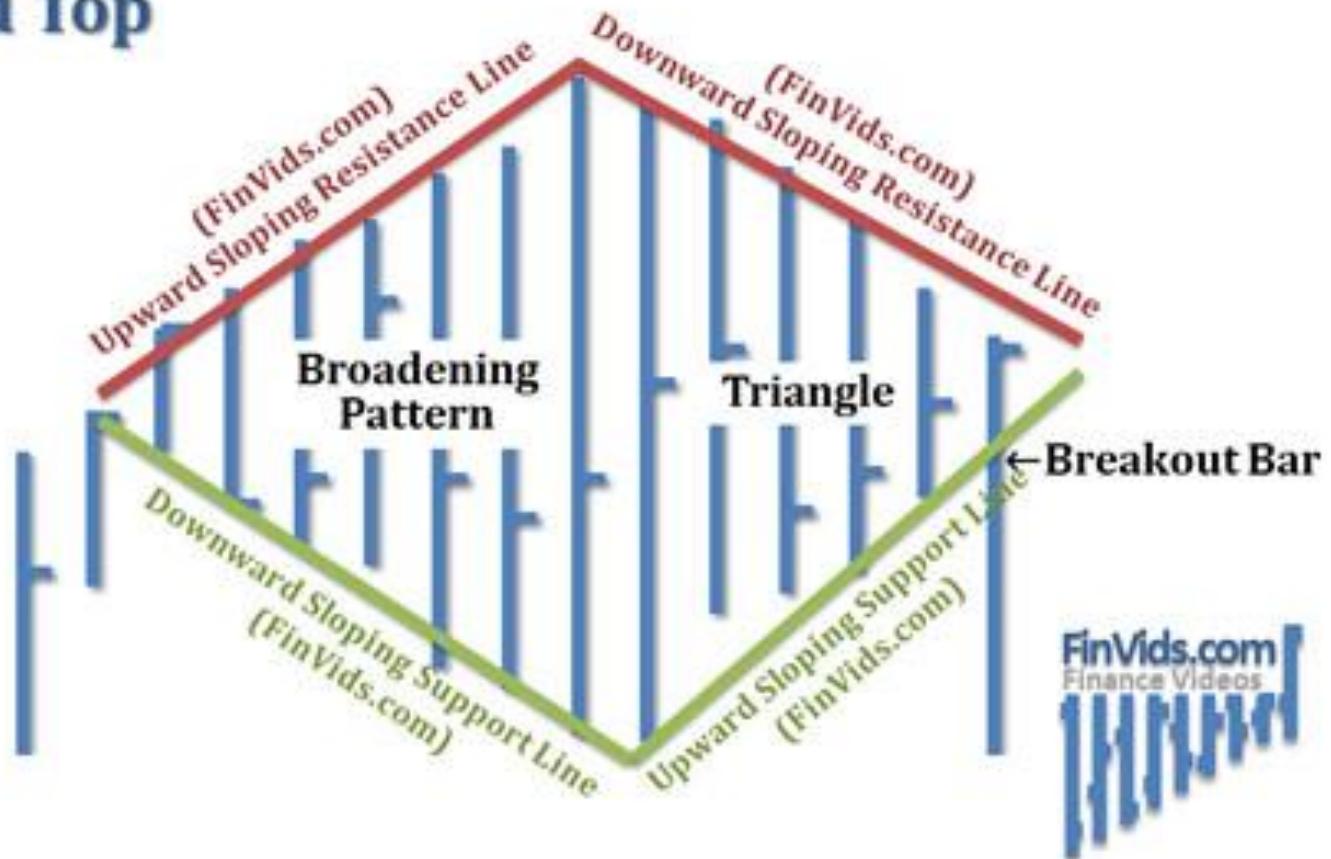


Diamond pattern

- Broadening pattern + Triangle
- Mainly considered as continuation pattern, but can show up at the bottom or top
- Bullish or Bearish prediction depends on the breakout direction
- Profit target is the height of the diamond

Diamond pattern

Diamond Top



Diamond pattern

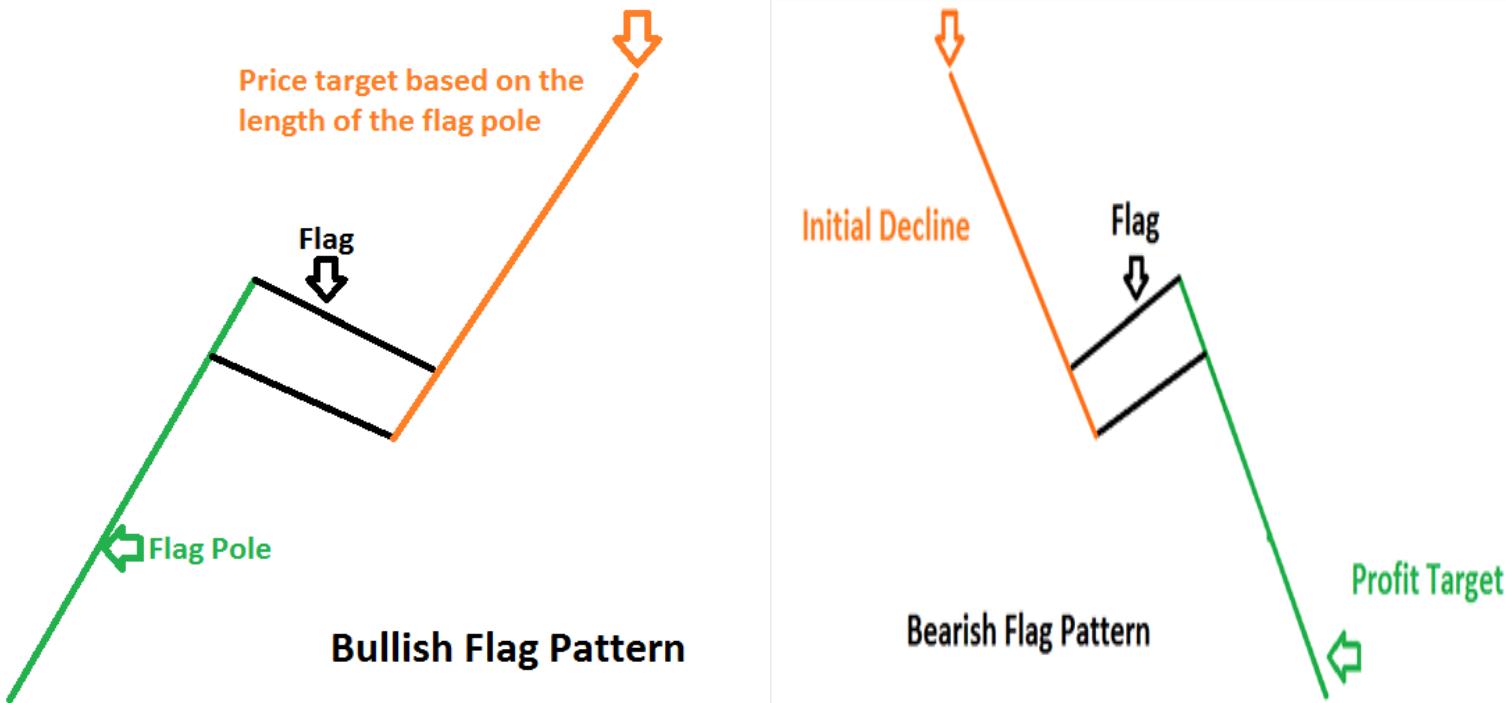


Diamond pattern



Flag patterns

- Most frequently seen continuation patterns
- Volume increase at the breakout point
- Target profit depend on the flag pole



Flag Patterns



Pennant

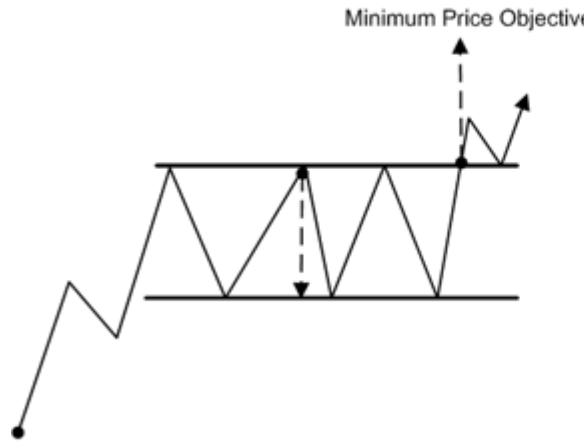


Rectangle

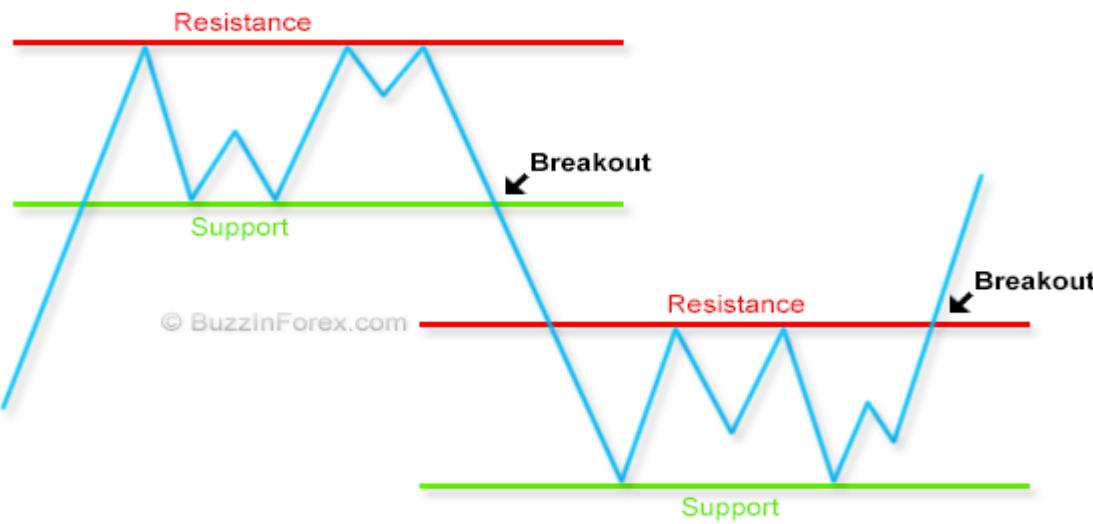
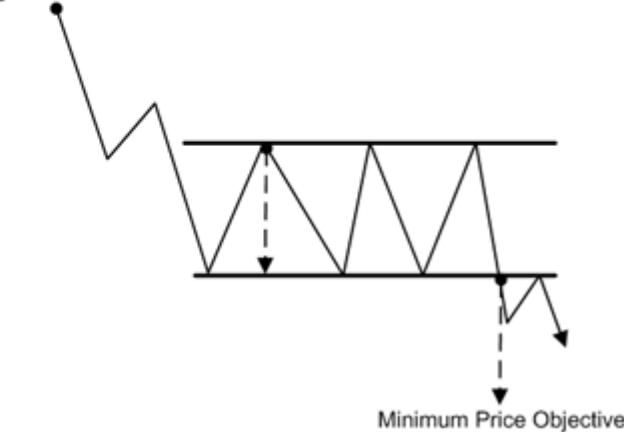
- A flat flag sometimes can be treated as a rectangle pattern.
- The rectangle pattern usually shows up on long term chart (daily or monthly chart).
- The volume pattern of rectangle is different from other continuation patterns since rectangle usually have wider price swings.

Rectangle Patterns

Bullish Rectangle



Bearish Rectangle



Rectangle



Rectangle

Administaff Inc (Human Resources, NYSE, ASF)



Principle of Confirmation

- Confirmation refers to the comparison of all technical signals and indicators to ensure that most of those indicators are pointing in the same direction and are confirming one another.
- Divergence is the opposite of confirmation and refers to a situation where different delivery months or related markets or technical indicators fail to confirm one another. It is one of the best early warning signals of impending trend reversals.

Confirmation of price trends or patterns

- Volume and open interest
- Technical signals
- Comparable market index or products
- Fundamental factors
- Other supports or resistances indicated by some previous (historical) price patterns or trends.

Technical Indicators

- Trend detective indicators:
Moving Average systems, Bollinger Bands, parabolic SAR, Commodity Channel Index, ZigZag
- Oscillation indicators:
MACD, RSI, RVI, Stochastic Oscillator, William's percent range
- Volume indicators:
Volumes, On balance volume, Accumulation, Distribution.

MetaTrader 4

- Download:

<http://www.metatrader4.com/>

- Technical analysis
- Simulation trading account
- Algorithmic Trading with MQL4

<http://docs.mql4.com/>

Part II: Preview

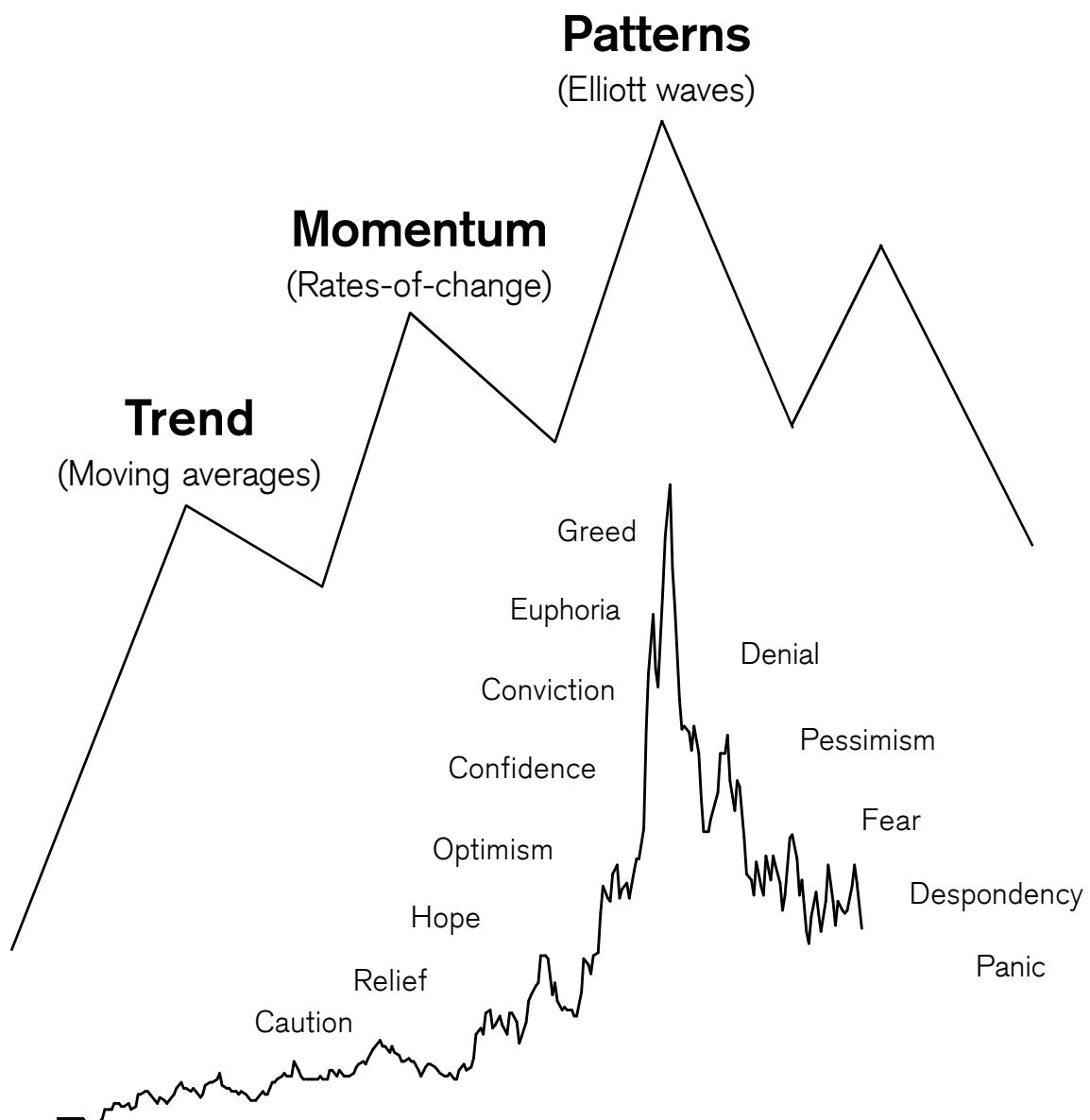
- More on indicators
- Real market practice: currency market
- X Trader introduction
- Algorithmic trading
- Comprehensive list of indicators
- Technical analysis based statistical Modeling
- Axiomatic thoughts on technical analysis

Thank you!

- Questions?
- PQFC: <http://web.ics.purdue.edu/~quantit/>
- Join us now!

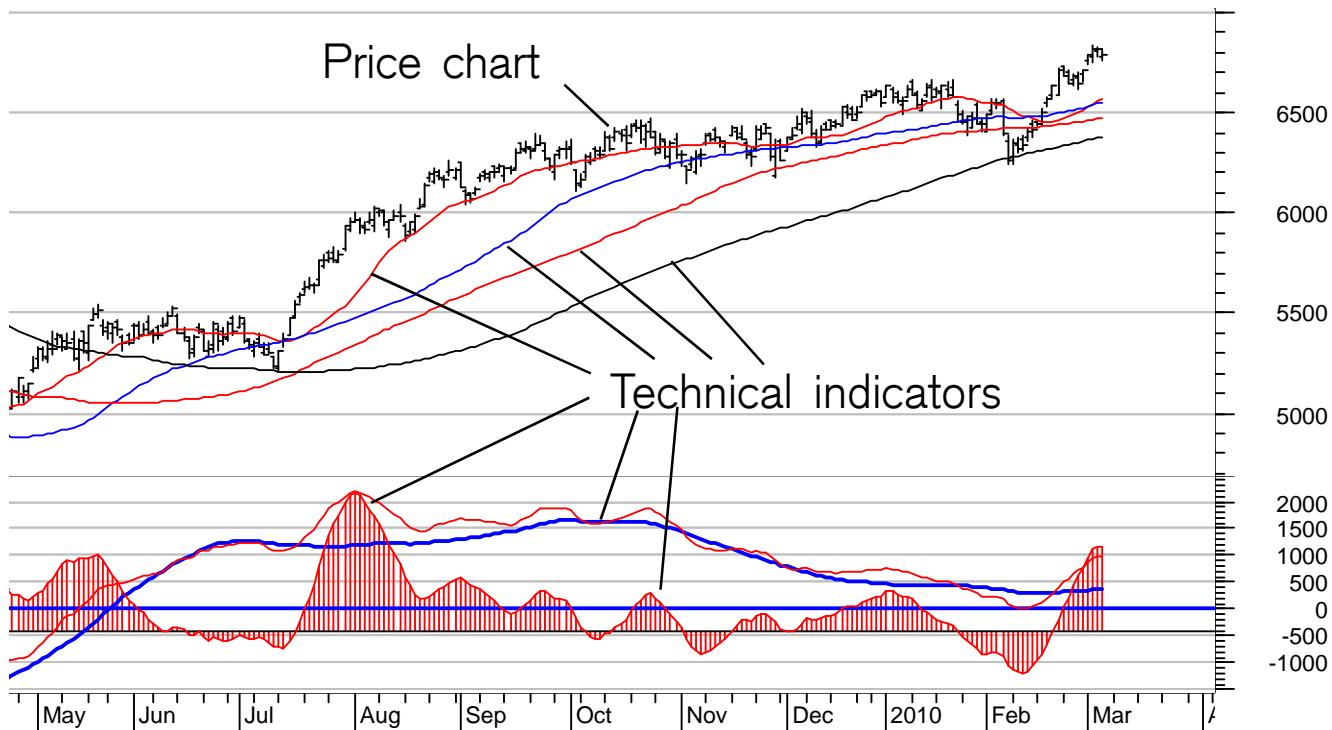
Technical Analysis - Explained

Private Banking



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What is technical analysis?

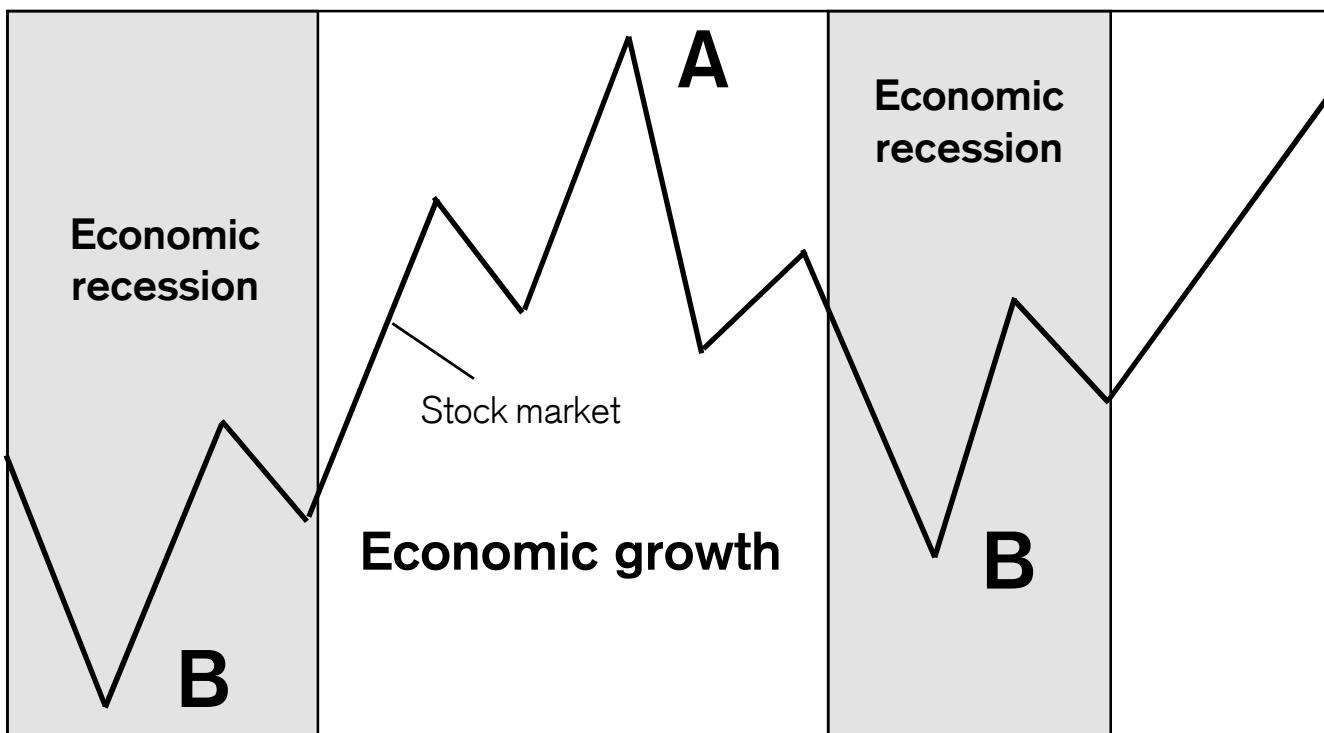
Technical analysis is the study of financial market action. The technician looks at price changes that occur on a day-to-day or week-to-week basis or over any other constant time period displayed in graphic form, called charts. Hence the name chart analysis.

A chartist analyzes price charts only, while the technical analyst studies technical indicators derived from price changes in addition to the price charts.

Technical analysts examine the price action of the financial markets instead of the fundamental factors that (seem to) effect market prices. Technicians believe that even if all relevant information of a particular market or stock was available, you still could not predict a precise market "response" to that information. There are so many factors interacting at any one time that it is easy for important ones to be ignored in favor of those that are considered as the "flavor of the day."

The technical analyst believes that all the relevant market information is reflected (or discounted) in the price with the exception of shocking news such as natural disasters or acts of God. These factors, however, are discounted very quickly.

Watching financial markets, it becomes obvious that there are trends, momentum and patterns that repeat over time, not exactly the same way but similar. Charts are self-similar as they show the same fractal structure (a fractal is a tiny pattern; self-similar means the overall pattern is made up of smaller versions of the same pattern) whether in stocks, commodities, currencies, bonds. A chart is a mirror of the **mood of the crowd** and not of the fundamental factors. **Thus, technical analysis is the analysis of human mass psychology.** Therefore, it is also called behavioral finance.



Technical analysis pre-empts fundamental data

Fundamentalists believe there is a cause and effect between fundamental factors and price changes. This means, if the fundamental news is positive the price should rise, and if the news is negative the price should fall. However, long-term analyses of price changes in financial markets around the world show that such a correlation is present only in the short-term horizon and only to a limited extent. It is non-existent on a medium- and long-term basis.

In fact, the contrary is true. The stock market itself is the best predictor of the future fundamental trend. Most often, prices start rising in a new bull trend while the economy is still in recession (position B on chart shown above), i.e. while there is no cause for such an uptrend. Vice versa, prices start falling in a new bear trend while the economy is still growing (position A), and not providing fundamental reasons to sell. There is a time-lag of several months by which the fundamental trend follows the stock market trend. Moreover, this is not only true for the stock market and the economy, but also for the price trends of individual equities and company earnings. Stock prices peak ahead of peak earnings while bottoming ahead of peak losses.

The purpose of technical analysis is to identify trend changes that precede the fundamental trend and do not (yet) make sense if compared to the concurrent fundamental trend.



Mood governs ratio

Know yourself and knowledge of the stock market will soon follow. Ego and emotions determine far more of investors' stock market decisions than most would be willing to admit.

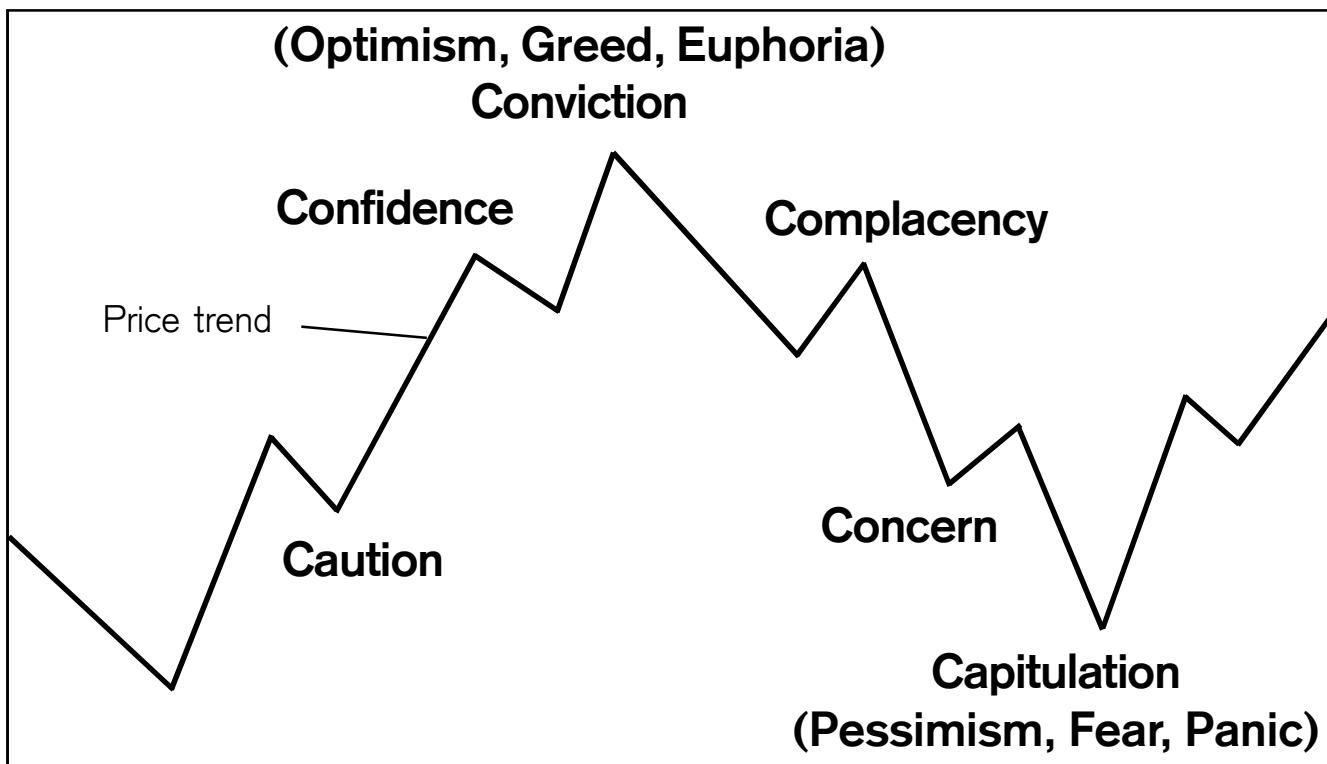
For years, we have dealt with professional money managers and committees and found they were as much subject to crowd following and other irrational emotional mistakes as any novice investor. They were, for the most part, better informed, but facts alone are not enough to make profitable decisions.

The human element, which encompasses a range of emotions from fear to greed, plays a much bigger role in the decision-making process than most investors realize.

In a practical sense, most investors act exactly opposite to the rational wisdom of buying low and selling high based on very predictable emotional responses to rising or falling prices. Falling prices that

at first appear to be bargains generate fear of loss at much lower prices when opportunities are the greatest. Rising prices that at first appear to be good opportunities to sell ultimately lead to greed-induced buying at much higher levels. Reason is replaced by emotion and rationalization with such cyclical regularity, that those who recognize the symptoms and the trend changes on the charts can profit very well from this knowledge.

Investors who manage to act opposite to the mood of the crowd and against their own emotions are best positioned to earn money in the financial markets. **Financial risk and emotional risk correlate inversely.**

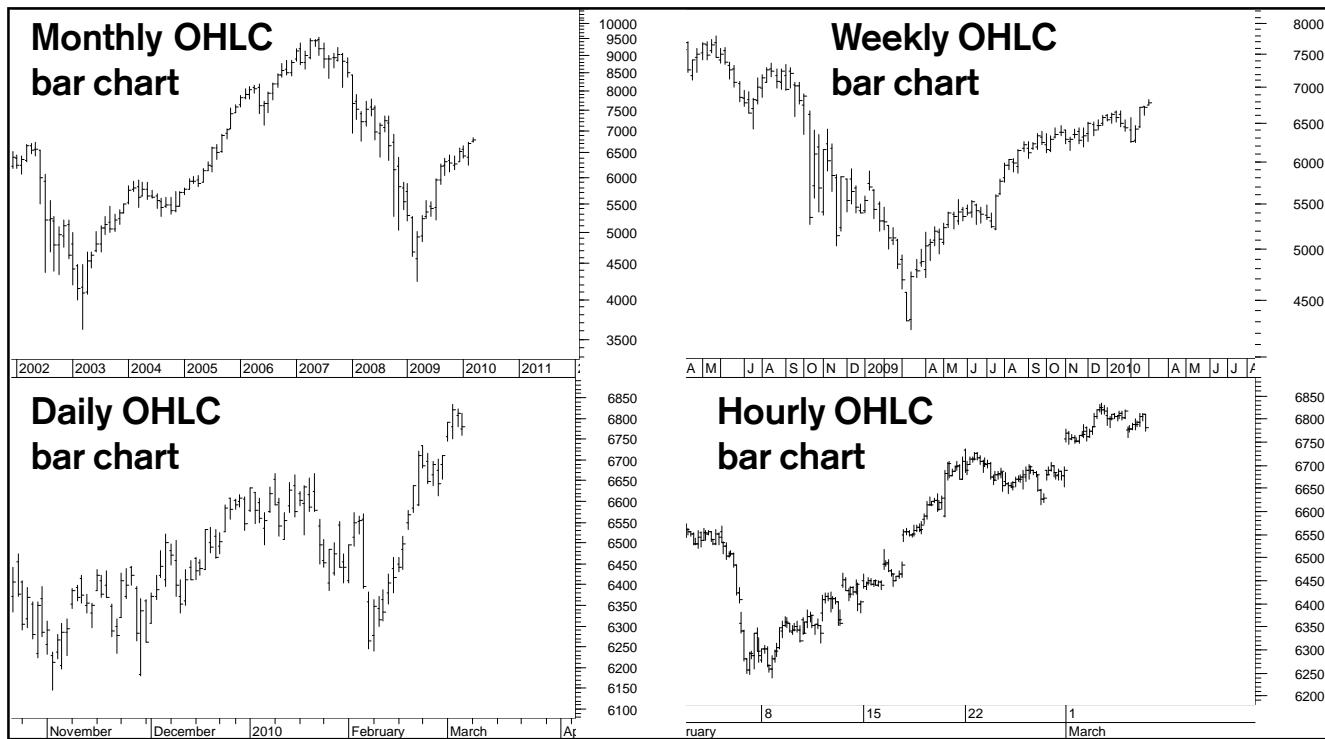


Optimism, pessimism, greed and fear

Why aren't more people making more money in the financial markets? Because, as we have seen, people are motivated by greed (optimism) when buying and by fear (pessimism) when selling. People are motivated to buy and sell by changes in emotion from optimism to pessimism and vice versa. They formulate fundamental scenarios based on their emotional state (a rationalization of the emotions), which prevents them from realizing that the main drive is emotion.

The chart above shows that if investors buy based on confidence or conviction (optimism) they BUY near or at the TOP. Likewise, if investors act on concern or capitulation (pessimism) they SELL near or at the BOTTOM. Investors remain under the bullish impression of the recent uptrend beyond the forming price top and during a large part of the bear trend. Vice versa, they remain pessimistic under the bearish impression from the past downtrend through the market bottom and during a large part of the next bull trend. They adjust their bullish fundamental scenarios to bearish AFTER having become pessimistic under the pressure of the downtrend or AFTER having become optimistic under the pressure of the uptrend. Once having turned bearish, investors formulate bearish scenarios, looking for more weakness just when it is about time to buy again. The same occurs in an uptrend when mood shifts from pessimism to optimism. Investors formulate bullish scenarios AFTER having turned bullish, which is after a large part of the bull trend is already over. Emotions are the drawback of fundamental analysis. Investors must learn to buy when they are fearful (pessimistic) and sell when they feel euphoric (optimistic). This may sound easy (simple contrary opinion), but without Technical Analysis it is hard to achieve.

The main purpose of technical analysis is to help investors identify turning points which they cannot see because of individual and group psychological factors.



Bar charts

Four bar charts of the Swiss Market Index are shown above. They are the most widely used chart types.

The bar charts are:

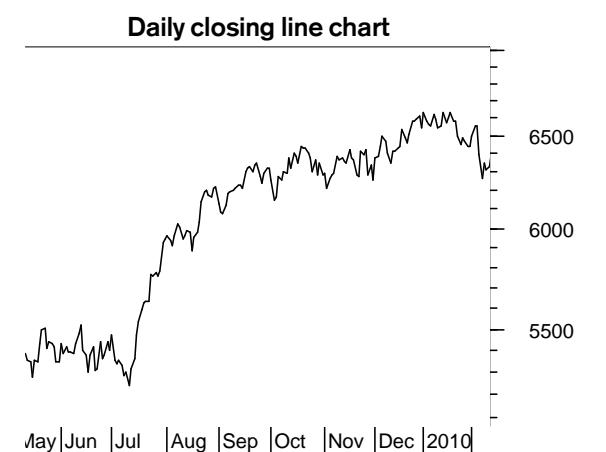
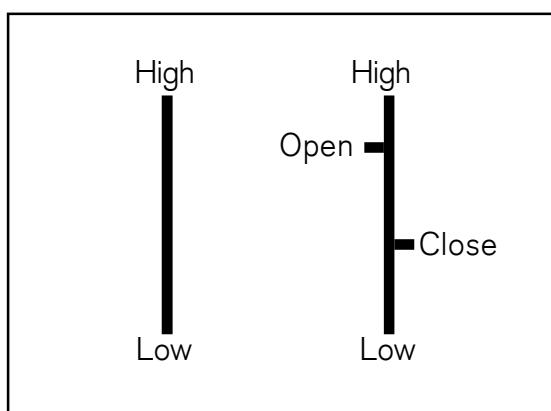
- High-low charts or
- High-low-close charts or
- Open-high-low-close charts

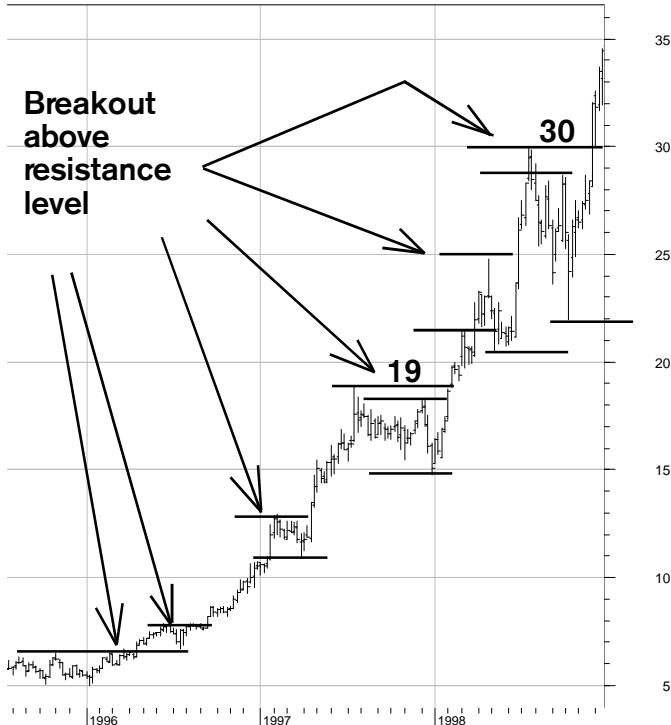
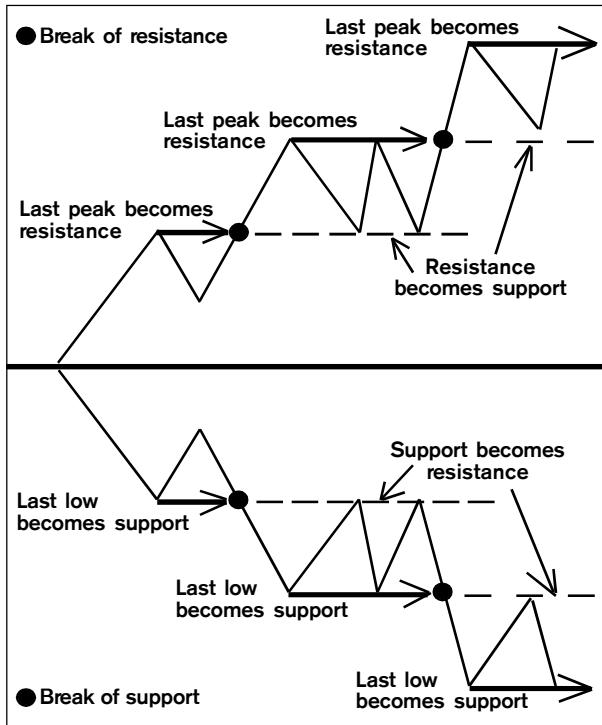
One single bar shows the high and the low of the respective trading period. A vertical bar is used to connect the high and the low. Horizontal lines are used to show the opening price (left) of that specific trading period and the closing price (right) at

the end of the period. For example, on the monthly chart, a bar indicates the high and the low at which the SMI traded during that single month.

Line charts

Sometimes we use line charts, especially for Elliott wave analysis. A line chart is the simplest of all methods. It is constructed by joining together the closing price of each period, for example daily closings for the daily line chart, weekly closings for the weekly chart or monthly closings for the monthly line chart.





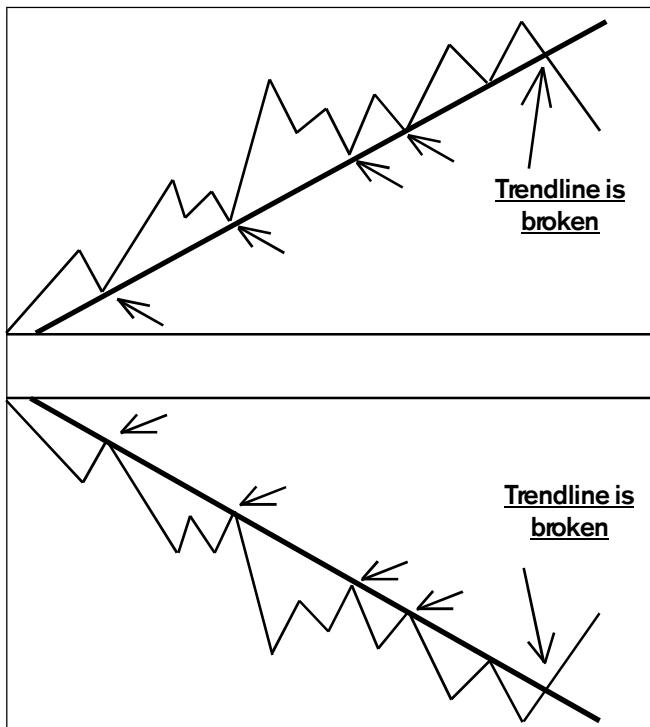
Support and resistance

Resistance lines are horizontal lines that start at a recent extreme price peak with the line pointing horizontally into the future. Support lines are horizontal lines that start at a recent extreme of a correction low and also point toward the future on the time axis. An uptrend continues as long as the most recent peak is surpassed and new peak levels are reached. A downtrend continues as long as past lows are broken, sustaining a series of lower lows and lower highs. Notice that the previous support often becomes resistance and resistance becomes support. A resistance or a support line becomes more important and breaks above or below these lines gain more credibility as the number of price extremes (peaks for resistance; or lows for support) that can be connected by a single line increases.

Some examples for Microsoft are shown on the chart above. Microsoft reached a high of 19 in July 1997. The price started to correct from there and Microsoft remained below this level until February 1998. The 19 level became the resistance, meaning that only if 19 (the highest peak so far in the uptrend) had been broken on the upside would the stock have confirmed its uptrend. The same is true for the peak at 30 in July 1998. The uptrend was confirmed when the price rose above this resistance in November 1998.

Support levels are positioned for example at 11, 15, 20.5 or 22. As long as the price pushes above past peaks (resistance levels) and holds above past support levels (does not break them) the uptrend remains intact. The same is true for the bear trend. The downtrend remains intact as long as the price falls below the recent lows (support levels) and fails to rise above past resistance levels.

A bearish trend reversal occurs when the price breaks through the most recent support after failing to rise above the most recent resistance. A bullish trend reversal occurs when the price penetrates the most recent resistance after holding above the most recent support.



Trendlines

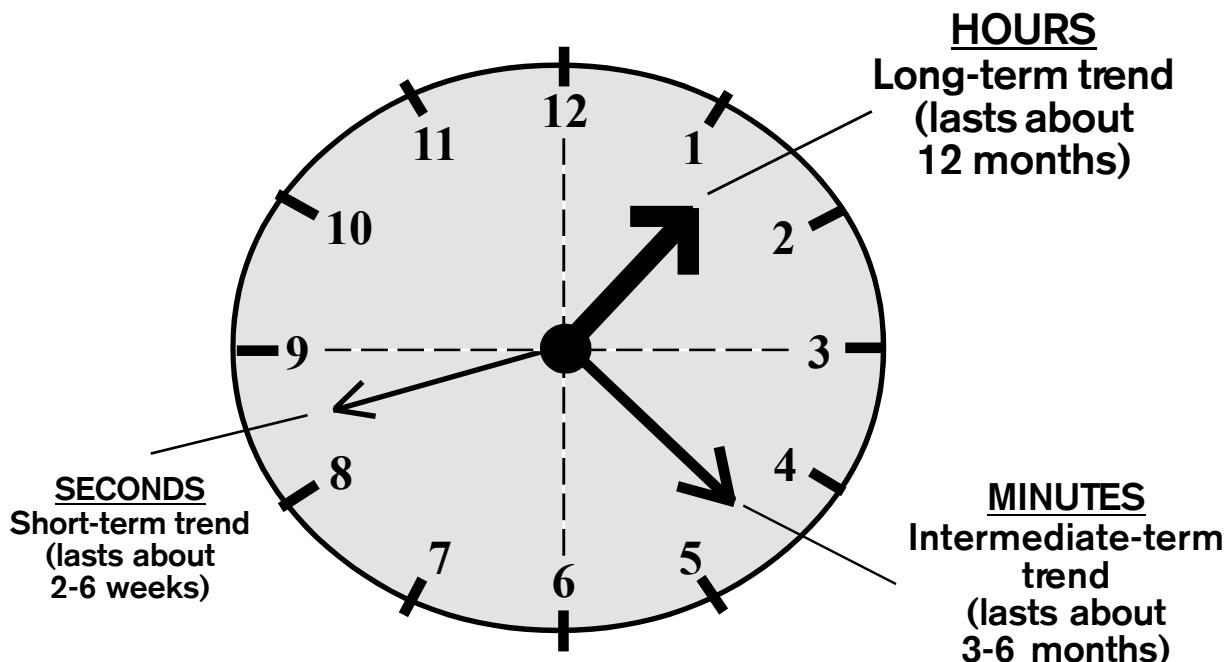
Resistance levels can either be drawn by horizontal lines (as discussed on the previous page) or can be uptrending or downtrending lines.

The trendline is nothing more than a straight line drawn between at least three points. In an upmove the low points are connected to form an uptrend line. For a downtrend the peaks are connected. The important point is that it should not be drawn over the price action. Trendlines must incorporate all of the price data, i.e. connect the highs in a downtrend and the lows in an uptrend.

The trendline becomes more important and gains credibility as the number of price extremes that can be connected by a single line increases. The validity and viability of a line that connects only two price extremes (for example the starting point and one price low) is questionable.

The trend is broken when the price falls below the uptrend line or rises above the downtrend line. Some analysts use a 2-day rule, meaning that the trend is only seen as broken if the price closes above/below the trendline for at least two days. Others use a 1% stop (could be higher depending on market volatility), meaning the trend is only seen as broken if the price closes over 1% above/below the trendline.

The chart above shows Intel's rise from July 1996 to March 1997. Based on the uptrend line, investors would have held onto the position from around 38/40 until 66 or even 74/76. Most often investors take profits much too early. **Stay with a trend until it breaks, avoiding the urge to sell too soon because the profit could be higher than you originally thought.**



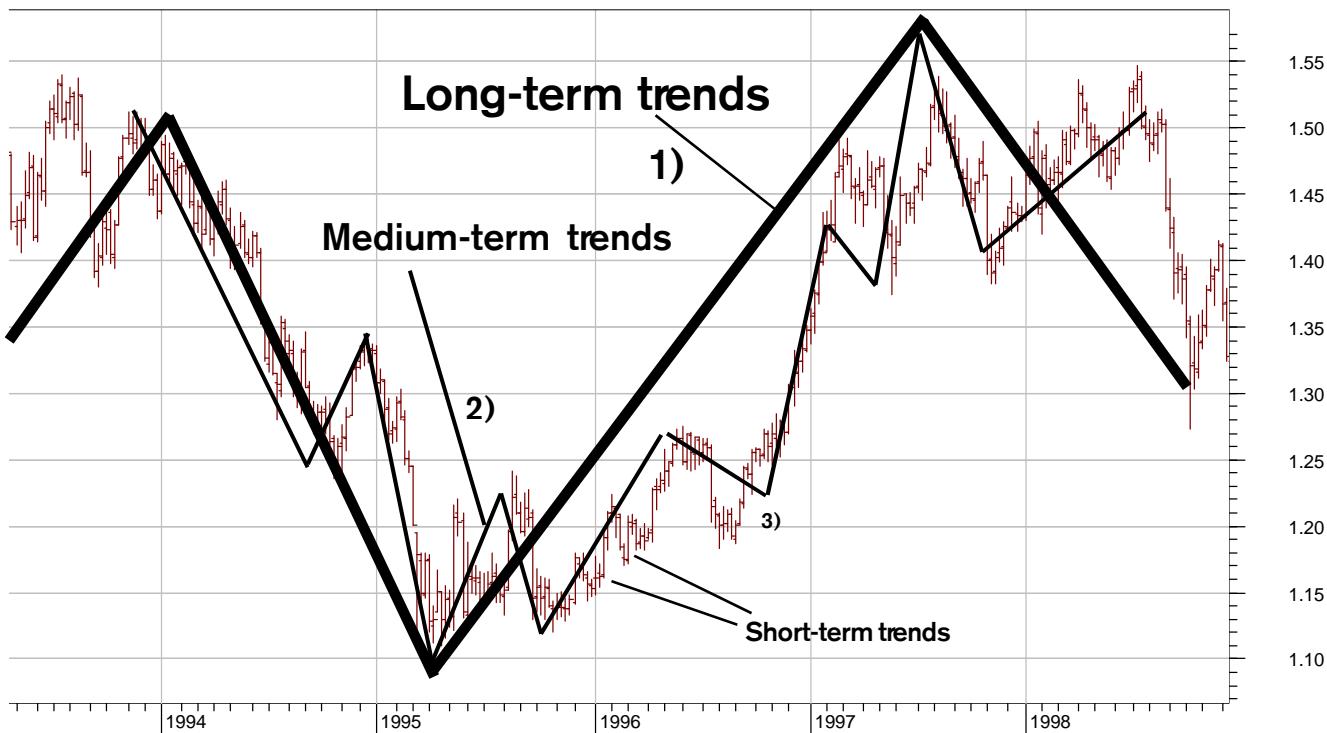
Investment horizons

The charts on the previous pages show that investors require perspective. It is imperative to differentiate between a short-term, a medium-term and a long-term trend. If somebody tells you to buy the US dollar because it is likely to rise, make sure you understand whether the dollar is expected to rise over a few days or a few months and if you should buy the dollar with the intention to hold it for several days, several weeks or several months.

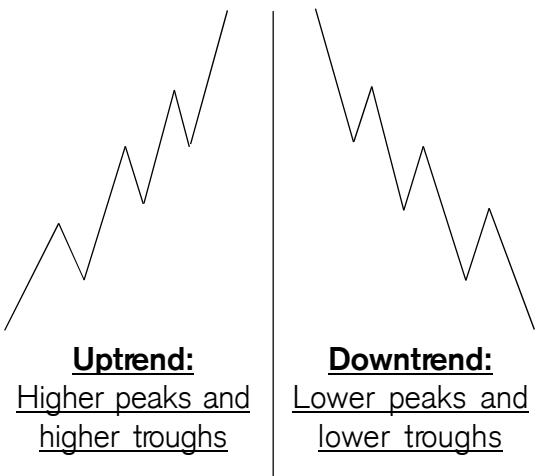
For a technician on the trading floor, the long-term horizon is entirely different from that of an institutional investor. For a trader, long-term can mean several days, while for the investor, it can mean 12 to 18 months.

We can compare the charts and indicators to a clock (shown above). Short-term trends (the seconds) are best analyzed on daily bar charts. Medium-term trends (the minutes) are best seen on weekly bar charts and long-term trends (the hours) are best seen on monthly bar charts. Some investors only want to know the hour, some want to know the seconds and some want to know the exact time.

The best investment results are achieved when all three trends on the daily, weekly and monthly charts point in the same direction.



What trend?



Sideways trend or consolidation:
Horizontal peaks and troughs



The chart above shows three US dollar/Swiss franc trends.

1) The uptrend from 1995 to 1997 is **long term**. It is also called the **PRIMARY** trend (the Hours). It was broken by the 1998 decline. The long-term uptrend is not a straight line, but is interrupted by corrections of a smaller degree.

2) These corrections are the **medium-term** or intermediate-term trends (the Minutes). They are also called **SECONDARY** trends. The medium-term correction is also not a straight line, but is made up of smaller corrections.

3) These smaller trends are the **short-term** trends. They are also called **MINOR** trends (the Seconds).

A minor downtrend can be part of an intermediate-term uptrend, which itself can be part of a longer-term primary downtrend.

Sometimes it is difficult to differentiate between a short- and a medium-term or a long-term trend.

Technical analysis helps you to differentiate between the various trends in all financial markets and instruments.

Day	Close	5-day Total	5-day Average		Day	Close	5-day Total	5-day Average
1	50	x	x		21	48	171	34.2
2	55	x	x		22	40	186	37.2
3	57	x	x		23	43	199	39.8
4	60	x	x		24	41	205	41
5	65	287	57.4		25	35	207	41.4
6	70	307	61.4		26	39	198	39.6
7	66	318	63.6		27	35	193	38.6
8	60	321	64.2		28	37	187	37.4
9	50	311	62.2		29	25	171	34.2
10	54	300	60		30	18	154	30.8
11	45	275	55		31	35	150	30
12	43	252	50.4		32	50	165	33
13	33	225	45		33	40	168	33.6
14	40	215	43		34	45	188	37.6
15	35	196	39.2		35	50	220	44
16	30	181	36.2		36	70	255	51
17	25	163	32.6		37	70	275	55
18	30	160	32		38	60	295	59
19	35	155	31		39	75	325	65
20	33	153	30.6		40	70	345	69

Moving averages

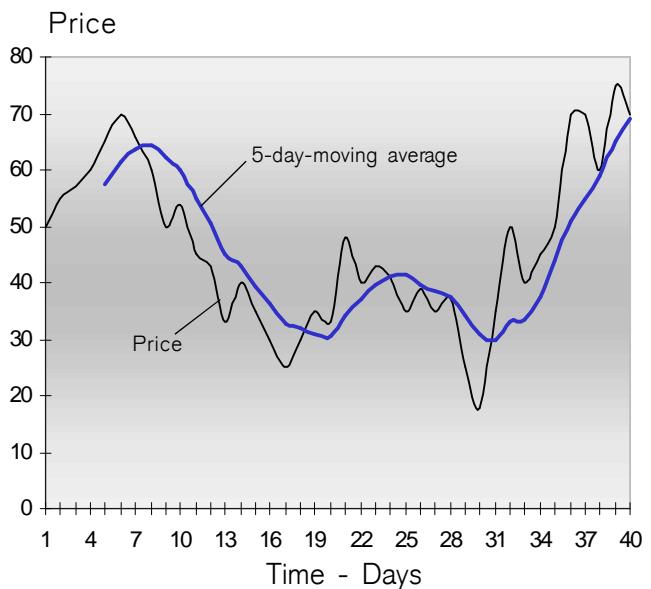
Moving averages are popular and versatile for identifying price trends. They smooth out fluctuations in market prices, thereby making it easier to determine underlying trends.

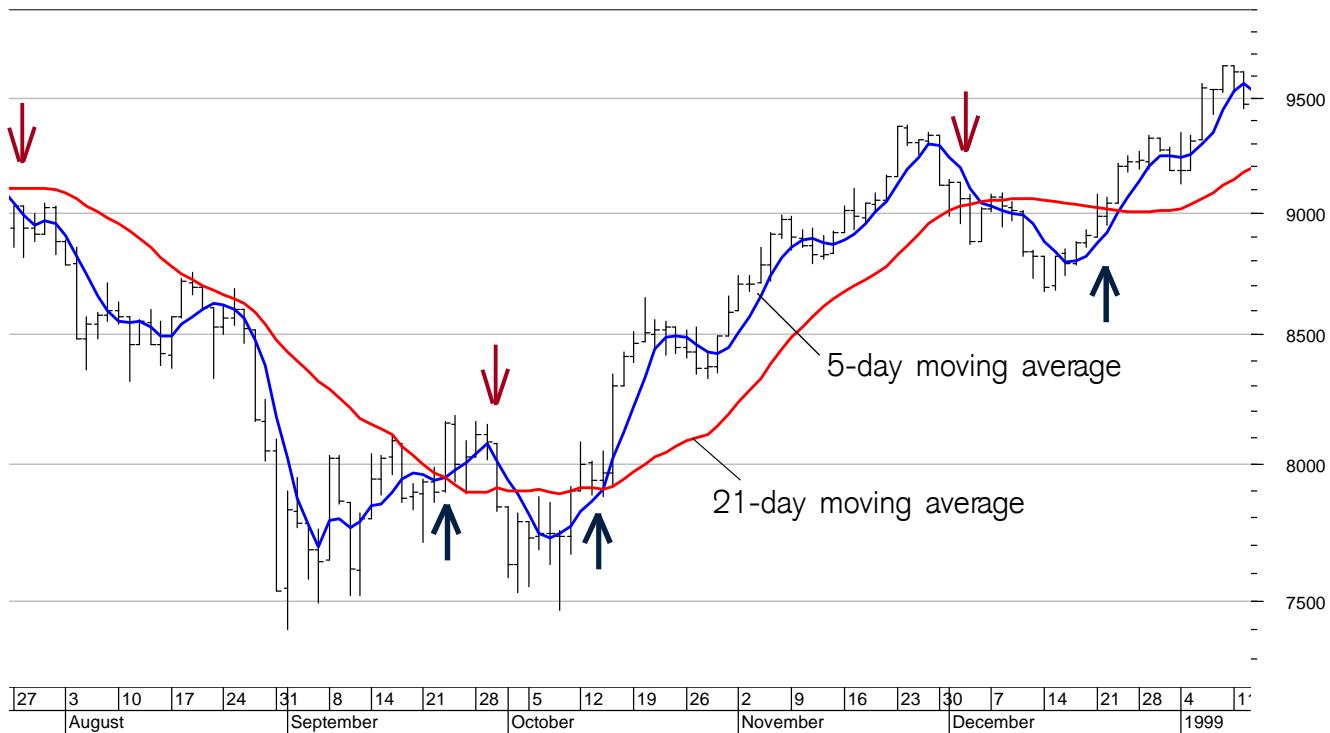
Their other function is to signal significant changes in direction as early as possible.

The simple moving average is the most widely used. Its calculation is shown above in mathematical form and displayed in the chart on the right. For a 5-day moving average, you simply add the closing prices of the last five closings and divide this sum by 5. You add each new closing and skip the oldest. Thus, the sum of closings always remains constant at 5 days.

Whether you choose a 10-day average or a 40-week average, the calculation is the same; instead of adding five days, you add 10 days or 40 weeks and divide the sum by 10 or 40, respectively. In most of our research, we use the moving average length out of the Fibonacci series (see page 29). To analyse the short-term trend, we use the 13-day and 21-day averages. For the medium-term trend, we use the 34-day and 55-day averages. For the long-term trend, we use the 89-day and 144-day averages. Moreover, we also analyze very long-term trends, the so-called secular trends with the 233-day, 377-day, 610-day and 987-day moving averages.

Price and 5-day moving average



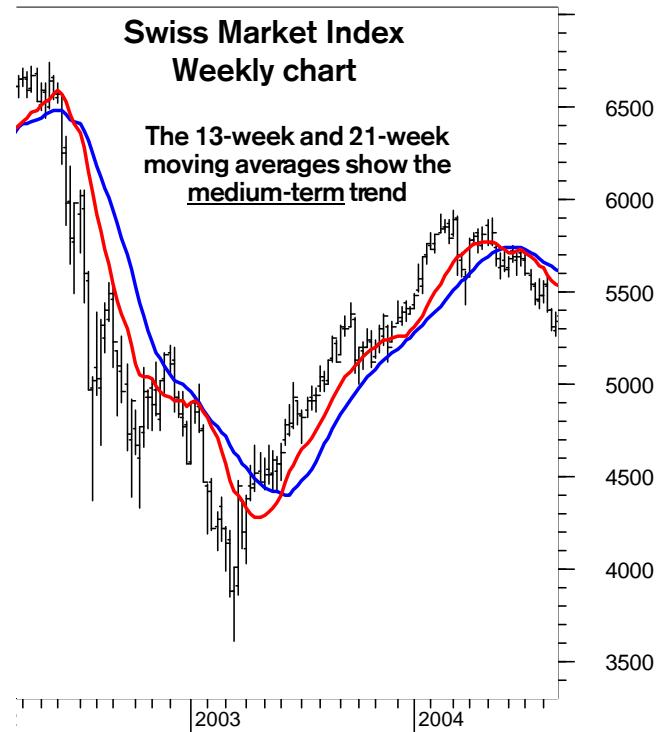


The simple moving average (SMA)

The simple moving average yields the mean of a data set for a given period. For example: a 21-day simple moving average (SMA) would include the last 21 days of data divided by 21, resulting in an average (see chart above for the Dow Industrial Index). This can be calculated at any given time using the last 21 days; hence, the average moves forward with each trading day. The moving average is usually plotted on the same chart as price movements, so a change in direction of trend can be indicated by the penetration/crossover of the SMA. Generally a buy signal is generated when a price breaks above the moving average and a sell signal is generated by a price break below the moving average. It is added confirmation when the moving average line turns in the direction of the price trend.

The moving average naturally lags behind price movement, and the extent by which it lags (or its sensitivity) is a function of the time span. Generally, the shorter the moving average, the more sensitive it is. A 5-day moving average will react more quickly to a change in price than the 21-day moving average, for example. However, the 5-day moving average is more likely to give false signals and "whipsaw" than the 21-day one, which gives signals later and suffers from opportunity loss.

Generally, if the market is trending (in an uptrend or downtrend), a longer time period would be used. If it is ranging (consolidating), the shorter time frame will catch the minor moves more easily. Moving averages can act as support and resistance (as shown by the arrows on the chart above for the Dow Jones Industrial Index), similar to the support and resistance discussed on pages 8 and 9.



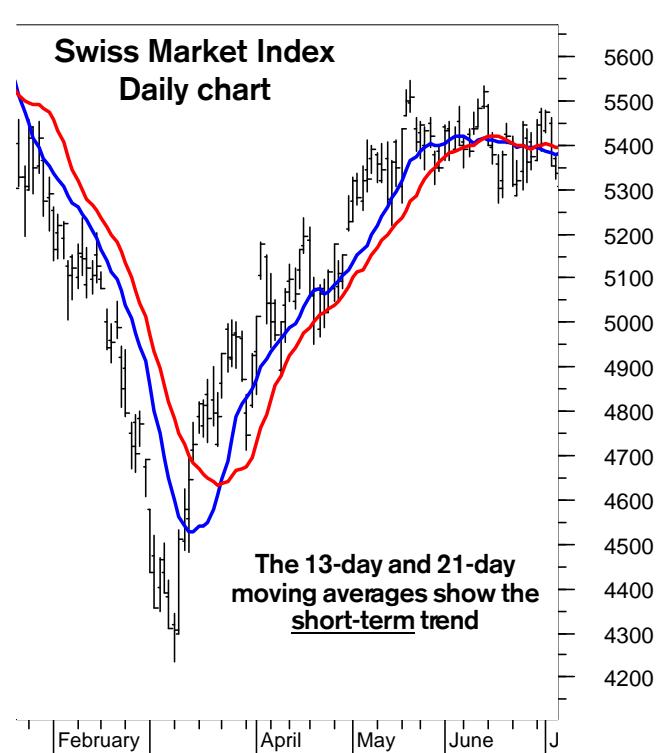
Long-term, medium-term and short-term averages

We incorporate two basic moving averages to track the three investment horizons as discussed on page 10. They are shown on the three charts on this page.

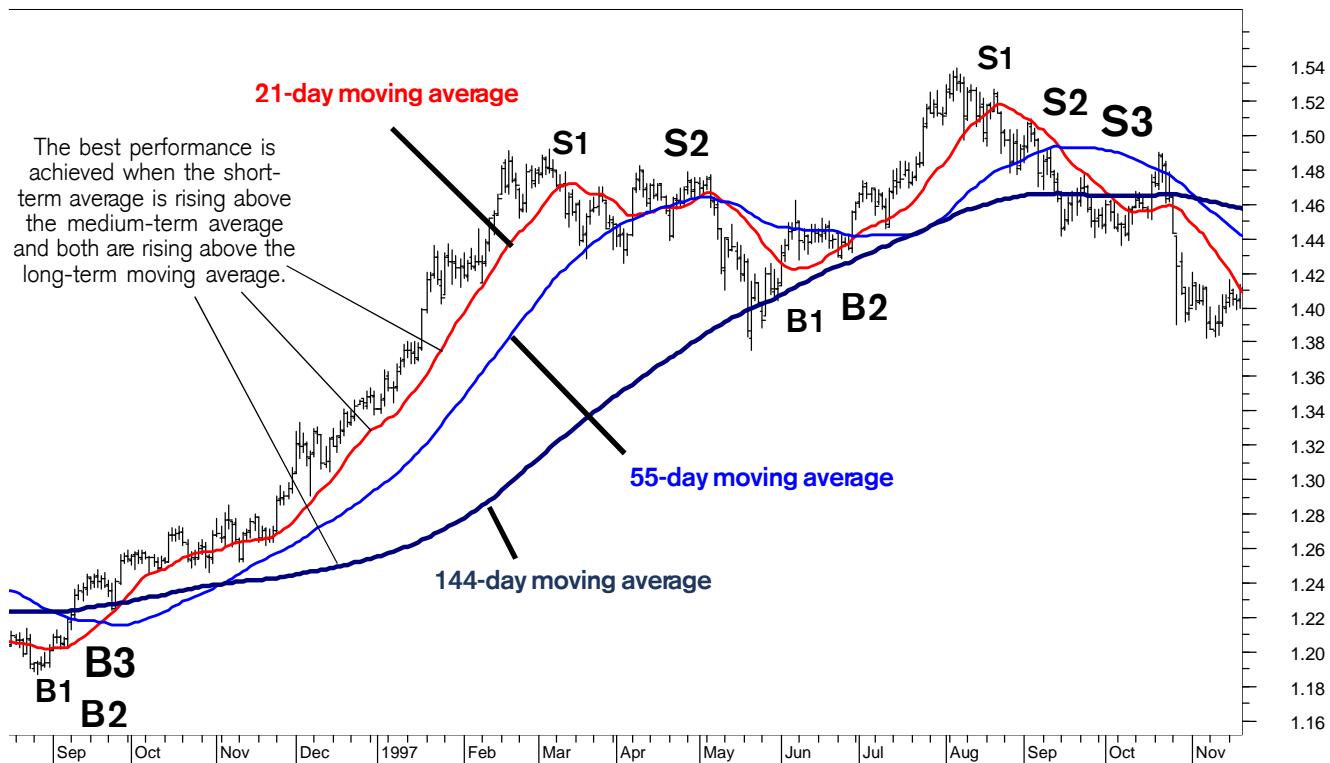
On the monthly chart above, the 13-month and 21-month moving averages track the long-term trend.

On the weekly chart above, the 13-week and 21-week moving averages track the medium-term trend.

On the daily chart to the right, the 13-day and 21-day moving averages track the short-term trend. The direction of the moving averages indicates the direction of the three basic trends in force.



Instead of showing the moving averages on three separate charts to illustrate the three basic trends, we more often display all moving averages on a single daily chart. This is shown on the next page. The long-term moving average is not shown on the monthly chart, but on the daily chart. The medium-term moving average is also shown on the daily chart instead of the weekly chart.



Moving average crossover

The short-term, medium-term and long-term moving averages are all shown here on the daily chart. The 21-day moving average is shown here for the short-term trend, the 55-day moving average for the medium-term trend and the 144-day moving average for the long-term trend. Displaying the three moving averages on one single chart provides important signals based on the moving average trends and crossovers.

BUY and SELL signals are given

- when the price crosses the moving average
- when the moving average itself changes direction

and

- when the moving averages cross each other

A short-term (trading) buy signal (B1) is given when the price rises above the 21-day moving average. The buy signal is confirmed when the 21-day average itself starts rising. A short-term (trading) sell signal (S1) is given in the opposite direction.

A medium-term (tactical) buy signal (B2) is given when the price breaks above the 55-day moving average. It is confirmed when the 21-day average crosses above the 55-day average and the 55-day average itself starts rising. A medium-term (tactical) sell signal (S2) is given in the opposite direction.

A long-term (strategic) buy signal (B3) is given when the price rises above the 144-day moving average. It is confirmed when the 55-day average crosses above the 144-day moving average and the 144-day average itself starts rising. A long-term (strategic) sell signal (S3) is given in the opposite direction.

Day	Close	Difference from 5 days earlier		Day	Close	Difference from 5 days earlier
1	50			21	48	18
2	55			22	40	15
3	57			23	43	13
4	60			24	41	6
5	65			25	35	2
6	70	20		26	39	-9
7	66	11		27	35	-5
8	60	3		28	37	-6
9	50	-10		29	25	-16
10	54	-11		30	18	-17
11	45	-25		31	35	-4
12	43	-23		32	50	15
13	33	-27		33	40	3
14	40	-10		34	45	20
15	35	-19		35	50	32
16	30	-15		36	70	35
17	25	-18		37	70	20
18	30	-3		38	60	20
19	35	-5		39	75	30
20	33	-2		40	70	20

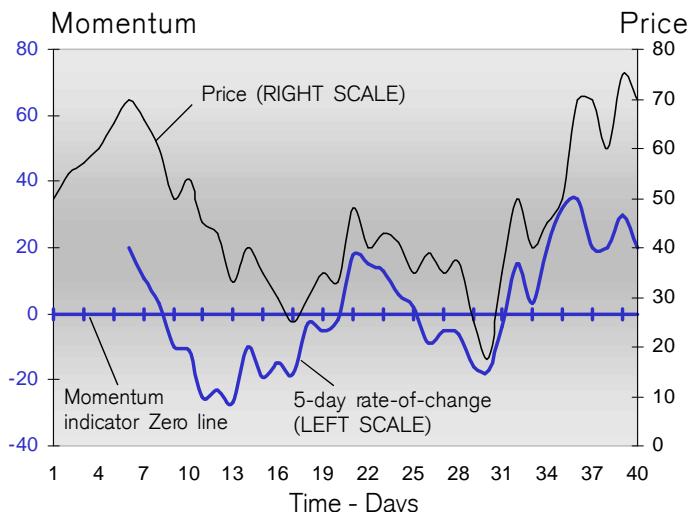
Momentum

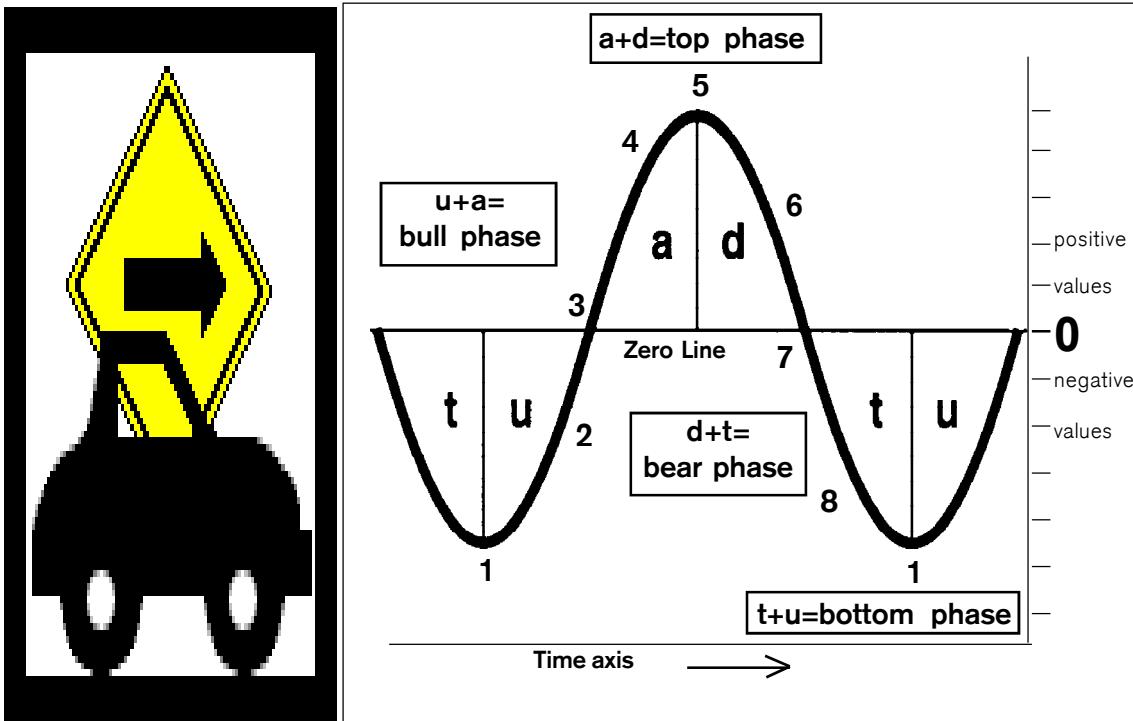
In physics, momentum is measured by the rate of increase and decrease in the speed of an object. In financial markets it is measured by the speed of the price trend, i.e. whether a trend is accelerating or decelerating, rather than the actual price level itself.

While moving averages are lagging indicators, giving signals *after* the price trend has already turned, momentum indicators lead the price trend. They give signals *before* the price trend turns. But once momentum provides a signal it has to be confirmed by a moving average crossover.

Instead of calculating the moving average of the sum of 5 days (see page 12), here we calculate the difference over a constant 5-day period for a 5-day rate of change. This is shown on the chart above together with the zero line. If today's price is higher than five days ago, the indicator is positive, i.e. above the zero line. If the price continues to rise compared to five days earlier, the indicator rises. If the price today is lower than five days ago the indicator is negative, i.e. below the zero line. The rate of change oscillator is rather volatile. Therefore, we have smoothed it out (see blue line) so that it provides easy-to-read directional change signals as explained on the next page. The moving averages are always displayed on the same chart and with the same scale as the price from which they are calculated. The momentum indicators are calculated using the price difference rather than adding the prices (as with the moving averages). This is why the momentum indicators are displayed with a different scale than the price scale. On the chart above, it is shown by the scale to the left.

Price and 5-day rate of change





Momentum indicator signals

The principle of momentum applies exactly the same to driving a car as to price movements. When prices rise and the momentum indicator also rises, the price uptrend accelerates. When prices rise and the indicator falls, the price uptrend decelerates. When prices fall and the momentum indicator falls, the price downtrend accelerates. When prices fall and the indicator rises, the price downtrend decelerates. Therefore, momentum indicators have to be applied together with the moving averages. The momentum oscillator can be in one of four quadrants:

Up quadrant (**u**): Oscillator **below** the zero line and **rising**.

Advancing quadrant (**a**): Oscillator **above** the zero line and **rising**.

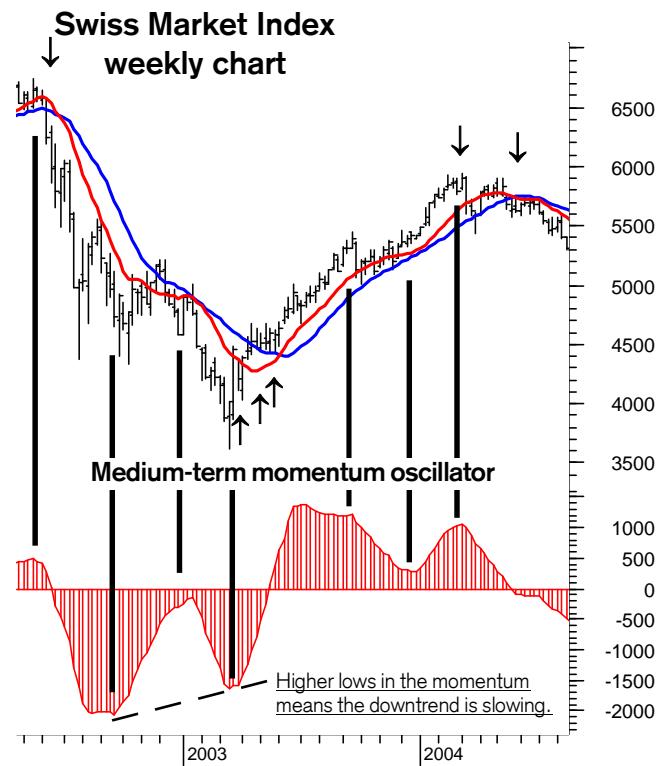
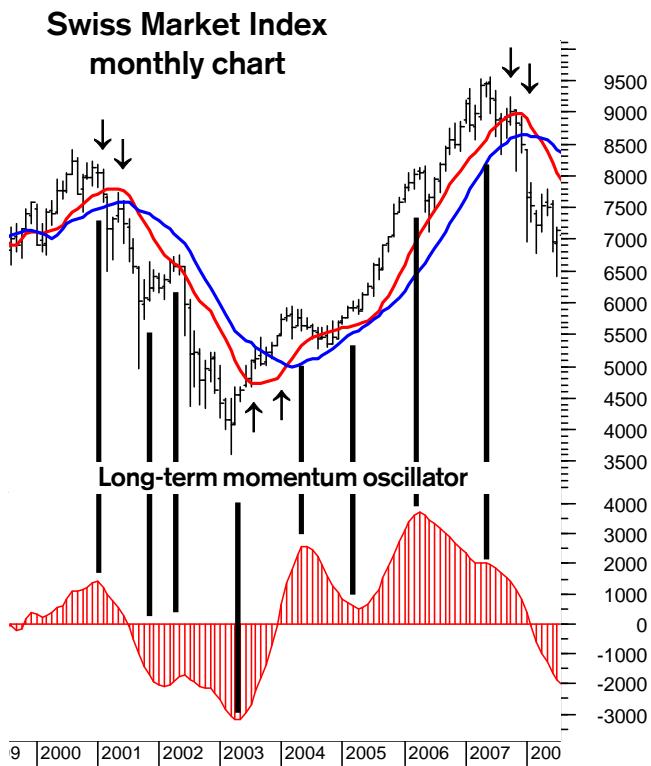
Down quadrant (**d**): Oscillator **above** the Zero line and **declining**.

Terminating quadrant (**t**): Oscillator **below** the Zero Line **and** declining.

The indicator is shown above in an idealized form (bell curve). The same oscillator applies on monthly, weekly or daily charts to identify the long-, medium- and short-term momentum. It is the length of the time axis that differentiates the three time horizons. A real-time example is shown on the next page for IBM on the weekly chart.

1) The indicator is shifting from the "t"erminating phase to the "u"p phase, i.e reversing upwards at an oversold level. Expect a price uptrend to start. Buy! **2)** The indicator is rising through the "u"p phase towards the zero line, i.e. the indicator is becoming neutral: Expect the uptrend to continue. Add to longs! **3)** The indicator crosses above the zero line. It is shifting from the "u"p phase to the "a"dvancing phase. An uptrend reversal is unlikely. Expect the uptrend to continue: Hold! **4)** The oscillator rises through the "a"dvancing phase towards the overbought level. Expect the uptrend to enter the top soon. Get ready to sell! **5)** The indicator

is shifting from the "a"dvancing phase to the "d"own phase. The indicator is reversing downwards at an overbought level. Expect a new price downtrend to start. Liquidate longs. Sell short! **6)** The indicator is declining through the "d"own phase towards the zero line. Expect the downtrend to continue. Add to shorts! **7)** The indicator crosses below the zero line. It is shifting from the "d"own phase to the "t"erminating phase. Expect the downtrend to continue: Hold short! **8)** The oscillator falls through the "t"erminating phase to the oversold level. Expect the downtrend to bottom out soon. Get ready to buy! Buy when a reversal from "t" to "u" occurs.

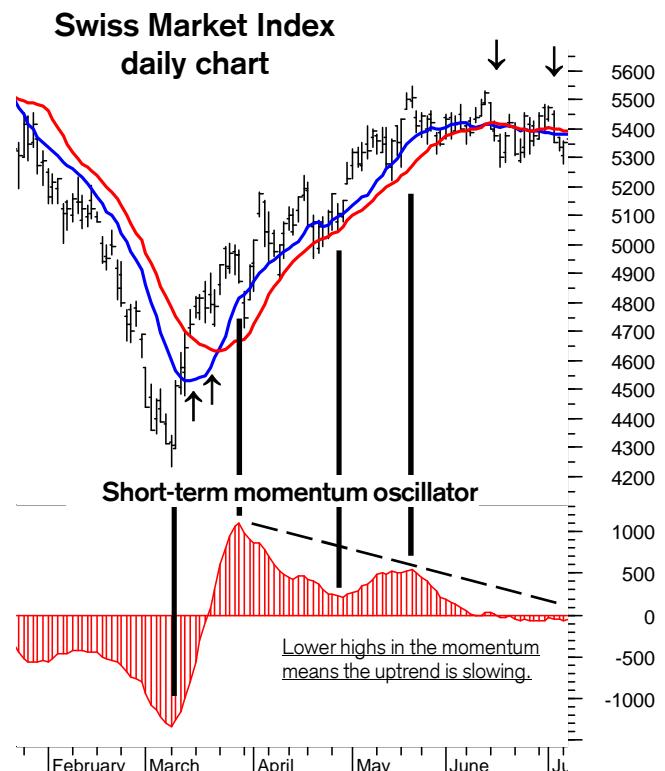


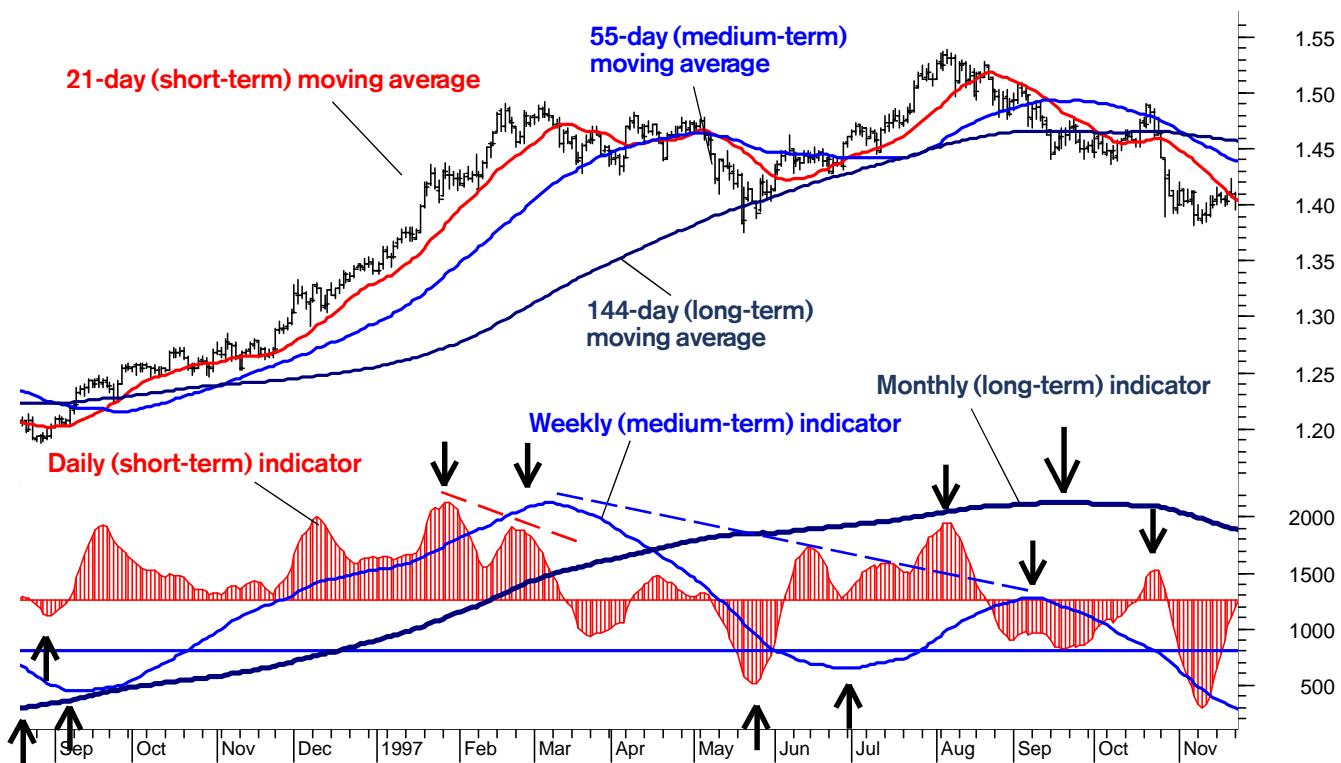
Long-term, medium-term and short-term indicators

We incorporate three momentum indicators to track the three investment horizons as discussed on page 10. The monthly or long-term momentum indicator tracks the long-term trend, roughly a 10-month rate-of-change). The weekly, medium-term or intermediate-term momentum indicator (roughly a 10-week rate of change) tracks the medium-term trend while the daily or short-term momentum indicator (roughly a 10-day rate of change) tracks the short-term trend.

We then combine the momentum indicators with the moving averages to identify the trends in force and to assess the most likely future path of these trends.

The highest investment return is achieved when investors start buying at the momentum bottom and add to positions when the price confirms the momentum indicator's uptrend and rises above the moving average. Likewise, investors should start selling if the momentum indicator tops out and sell more if the price falls below the moving average. **Thus, a combination of the signals given by the momentum oscillators, moving averages, and support and resistance should be applied.**





Trend and momentum combination

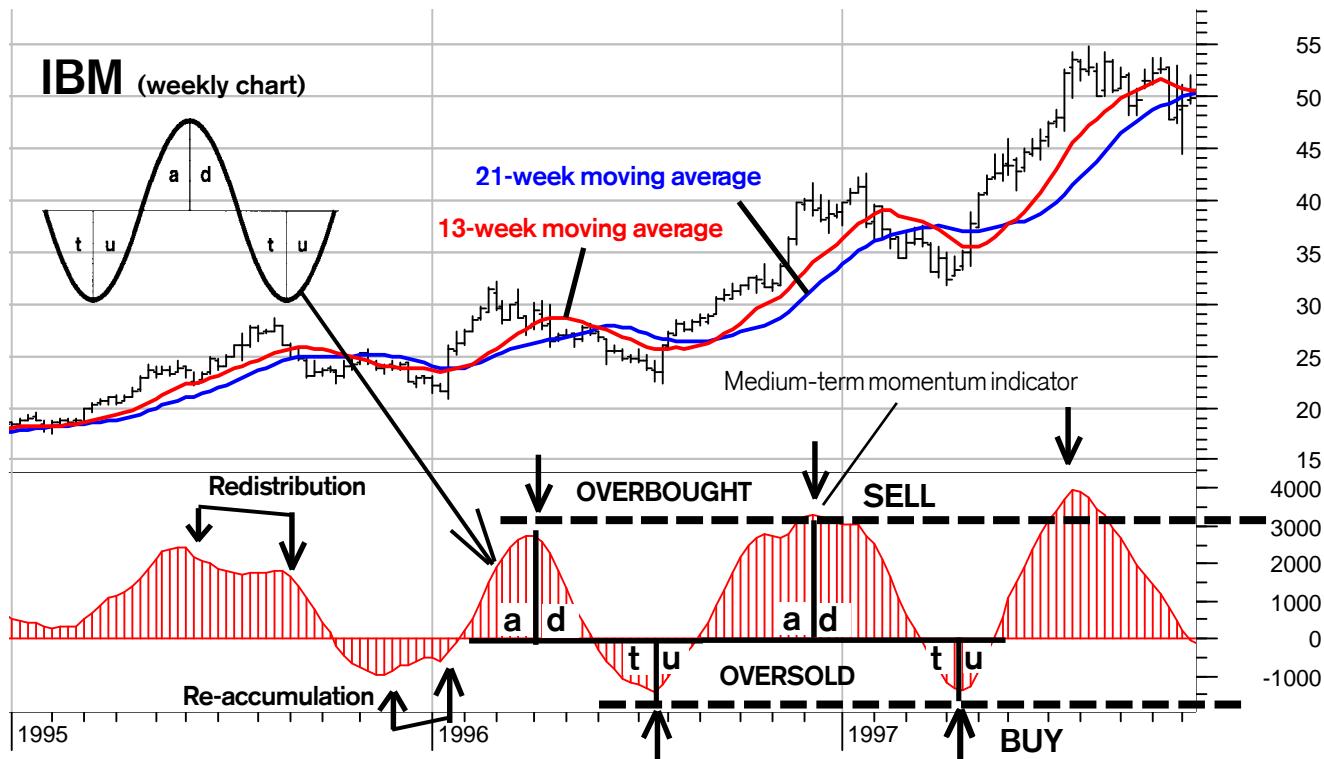
On page 15, we pictured the three moving averages on one single chart which was the daily chart. We do the same analysis here with the momentum indicators. We show all three momentum indicators on the daily chart together with the short-term, medium- and long-term moving averages.

On the chart above for the US dollar/Swiss franc, the long-term trend was rising from 1996 until August 1997. The US dollar was trading above the rising 144-day average and the long-term momentum indicator was rising until it topped in September. The momentum indicator's top was soon confirmed by the dollar's fall below the 144-day average in September and October. The long-term top was also indicated by the negative divergence (dashed blue line) in the medium-term momentum indicator, which registered a lower high in September compared to its high in March. Thus it did not confirm the new price high in the US dollar at CHF 1.54 in August.

The medium-term trend was bullish from September 1996 until March 1997 when the weekly indicator topped and the US dollar fell below the slowing 55-day average. The medium-term top in March was also indicated by the negative divergence of the daily momentum indicator, which did not confirm the new high in the US dollar in February 1997 at 1.49. The daily indicator registered a top that was lower than the top in January.

THE COMBINATION OF THESE SIX INDICATORS reveals the most likely future path of the underlying market in all asset classes. The 21-day average is monitored in combination with the daily (short-term) momentum indicator, the 55-day average with the weekly (medium-term) indicator and the 144-day average with the monthly (long-term) momentum indicator.

The most positive technical constellation is present when the price is above the short-term average, which in turn is rising above the medium-term average, which in turn is rising above the 144-day moving average. AT THE SAME TIME, the daily, weekly and monthly momentum indicators are rising. The same is true in the opposite direction for the most negative constellation.

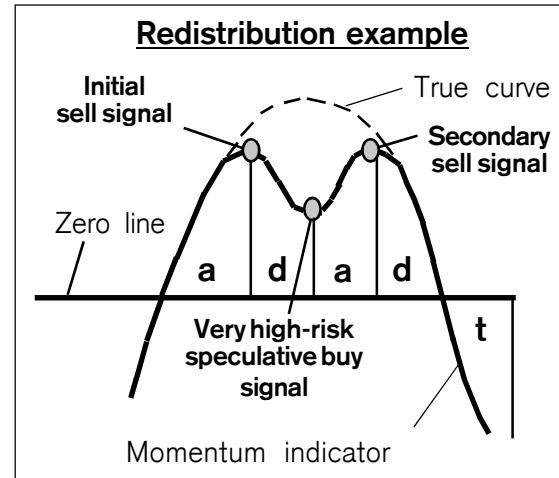


Reversal and redistribution

IBM is shown above together with the medium-term momentum indicator on the weekly chart. Signals are given when the **trend reverses** an extreme levels. The stock is said to be **OVERBOUGHT** when the momentum oscillator reaches an extreme upper level above the zero line and **OVERSOLD** when it reaches an extreme lower level below the zero line. The oscillator acts like a rubber band: the further it stretches, the more the prices need energy to sustain the trend, i.e. a trend reversal should be expected the more stretched the momentum indicator becomes.

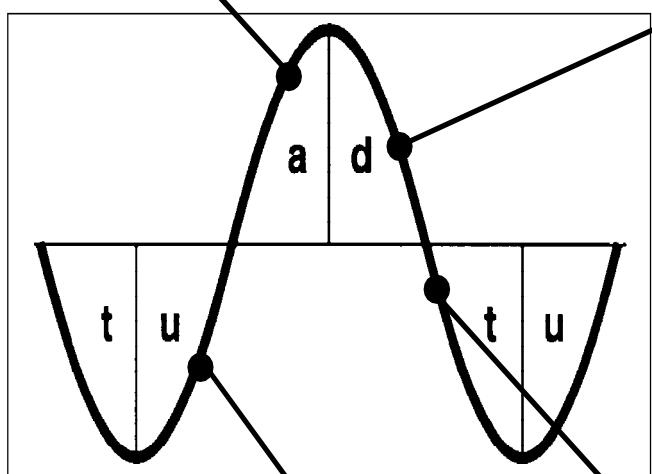
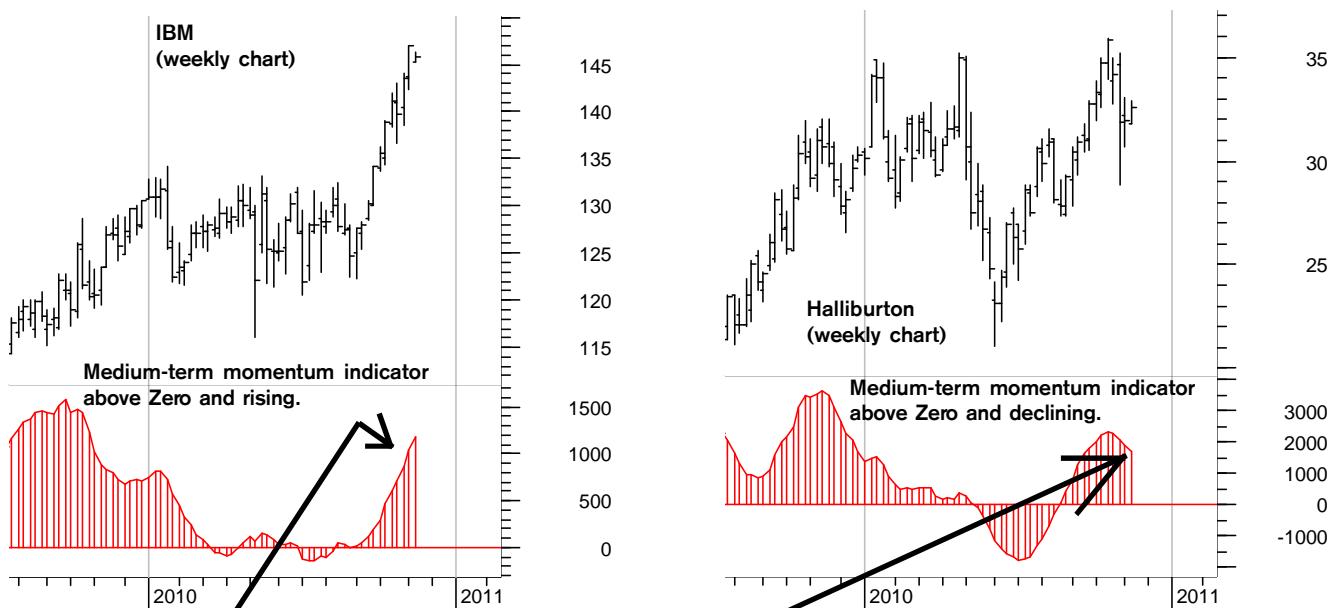
Sometimes signals leave room for interpretation (technical analysis is an art not a science). The indicator does not always cross the zero line before giving a new buy- or sell signal. These signals are called **redistribution** examples (see scheme on the right and chart above) or **re-accumulation**.

Sometimes, the oscillator turns **upwards** again from a high level **above the zero line** instead of bottoming below the zero line. This is seen as a high-risk buying opportunity. Most of the time the ensuing price rallies are short-lived and are, more often than not, fully retraced. The same pattern can occur in the opposite direction when the indicator turns **downward** again from a low level **below the zero line** (still oversold) instead of topping above the zero line (overbought level).



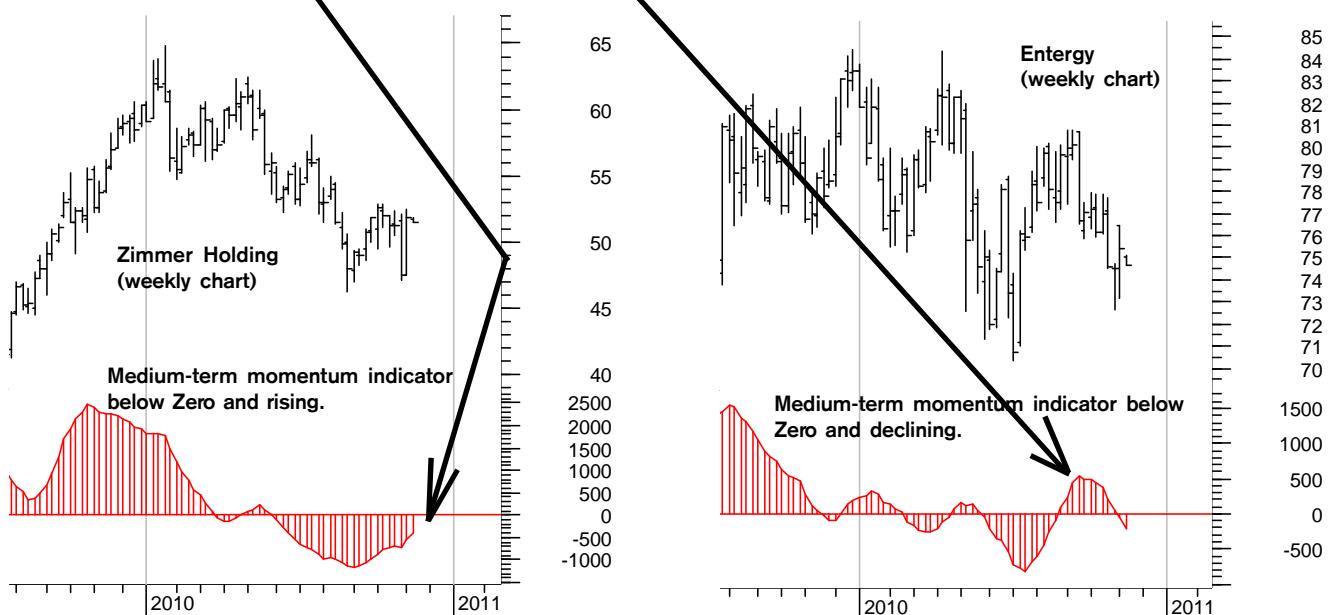
This is seen as a high-risk selling opportunity. Most of the time, the ensuing declines are short-lived and are, more often than not, fully retraced.

The pause and delay in the aberrated trend is often psychologically quite unnerving for the investor. Therefore, patience becomes a tactical requirement, allowing the major underlying trend forces to rebase at the adjusted price level.



Portfolio analysis

Each day we calculate the position of over 1000 stocks on the short-, medium- and long-term momentum model. Four stocks are shown on this page, each displaying the medium-term indicator in one of the 4 possible positions. Investors should look to buy stocks with a rising momentum indicator while selling the stocks with a falling momentum indicator.



% CYCLE PHASE DISTRIBUTION			
Number of Files = 100% 30			
	Long Cycle	Intermediate Cycle	Short Cycle
Up Advancing	0	17	50
Declining	30	53	13
Terminating	30	23	7
	40	7	30

Cycle phase distribution

On the previous page, we pictured 4 stocks and their weekly momentum indicators. If we take 30 stocks instead of only 4 and calculate the medium-term indicator for each of the 30 stocks, we can calculate the number of stocks positioned in each cycle quadrant.

The example above shows the 30 stocks in the Dow Jones Industrial Index. For each stock, we calculated the position of the long-term, medium-term and short-term momentum indicators. On the right, we highlight the distribution of the medium-term indicators from the table above. The distribution shows

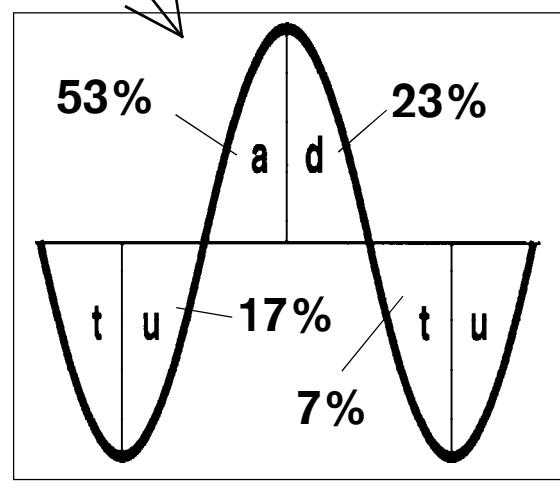
5 stocks (17%) with a momentum indicator rising below the zero line (**up**).

16 stocks (53%) with a momentum indicator rising above the zero line (**advancing**).

7 stocks (23%) with a momentum indicator falling above the zero line (**down**).

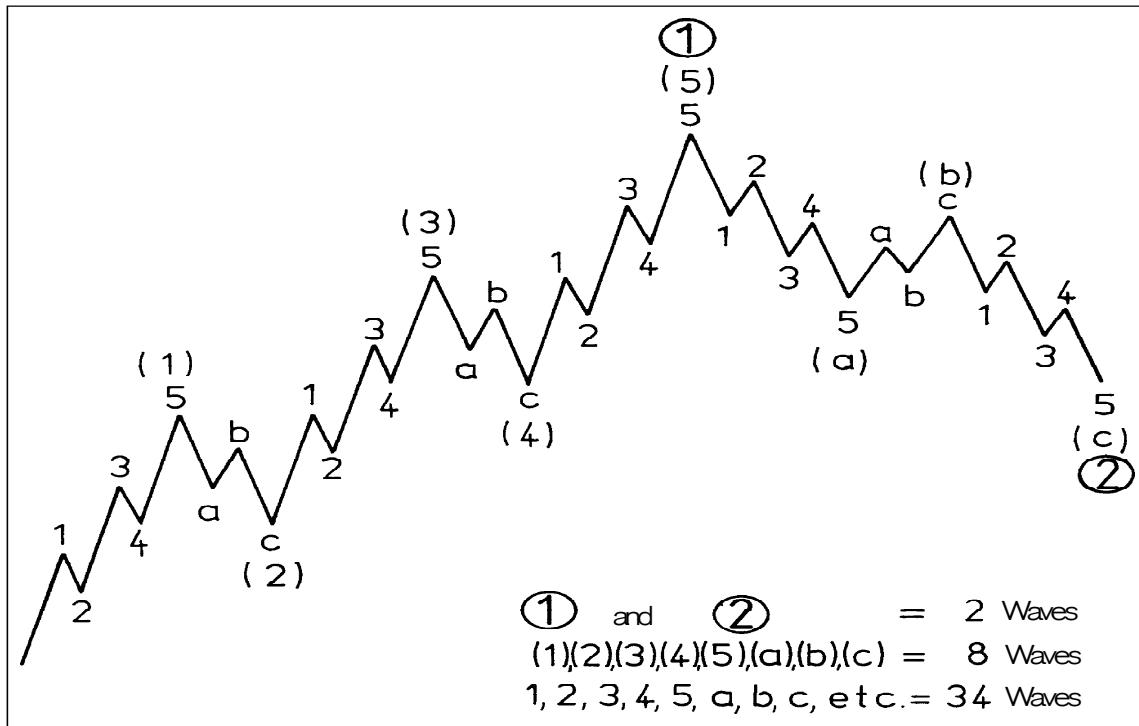
2 stocks (7%) with a momentum indicator falling below the zero line (**terminating**).

Thus, the entire portfolio of 30 stocks equals 100%. We use percentages so that we can compare different portfolios and markets with different stocks and different asset classes.



The same percentage distribution is shown above for the long-term indicators and the short-term indicators. From this data, we can see that, as of this point in time, the 30 stocks were quite advanced in their intermediate-term uptrend ($a+d=76\%$; see page 17 for cycle phases). Moreover, the long-term analysis shows that most stocks were in the bearish phase ($d+t=70\%$). Only the short-term cycle pointed to strength ($u+a=63\%$).

We do this type of momentum analysis for over 1000 stocks, 80 stock market indices, 40 commodities, bond-futures and 40 interest rate series. Also, for the US dollar against 40 currencies and the same for the Japanese yen, euro, Swiss franc and British pound each against 40 currencies. We search for those financial market series that are best positioned in bull phases. The indicators provide a clear outlook and objectivity for the broad market trends, allowing you to buy and sell against the backdrop of subjective emotional stress. **You need to build trust in these indicators so that you can buy against the prevailing pessimism and sell against the prevailing optimism.**



The Elliott Wave Principle

The Wave Principle was Ralph Nelson Elliott's discovery of how social or crowd behaviour trends and reverses in recognizable patterns. It is a detailed description of how financial markets behave. The description reveals that there is a PSYCHE OF THE CROWD inherent in all representative financial market series. The crowd is not a physical crowd but a psychological crowd. It constantly moves from pessimism to optimism, from fear to greed and from euphoria to panic and back in a natural psychological sequence, creating specific patterns in price movements. This concept of recursive patterns across finer and finer scales in the financial markets (their fractal nature), was proposed by Elliott in the 1930s, which antedates today's formal study of non-linear dynamics and chaos.

The main point emerging from the Elliott Wave concept is that markets have **form (pattern)**. It is here that the investor finds determinism in a seemingly random process. Elliott discovered what the main initiator of the chaos theory, Benoit Mandelbrot, confirmed 50 years later in collaboration with Henry Houthakker, an economics professor at Harvard: that patterns made by taking very short-term "snapshots" of stock prices, for example every day are similar to patterns formed by snapshots taken once a week, or once a month, or even once a year.

Elliott isolated thirteen patterns. He cataloged them and explained that they link together, and where they are likely to occur in the overall path of the market development.

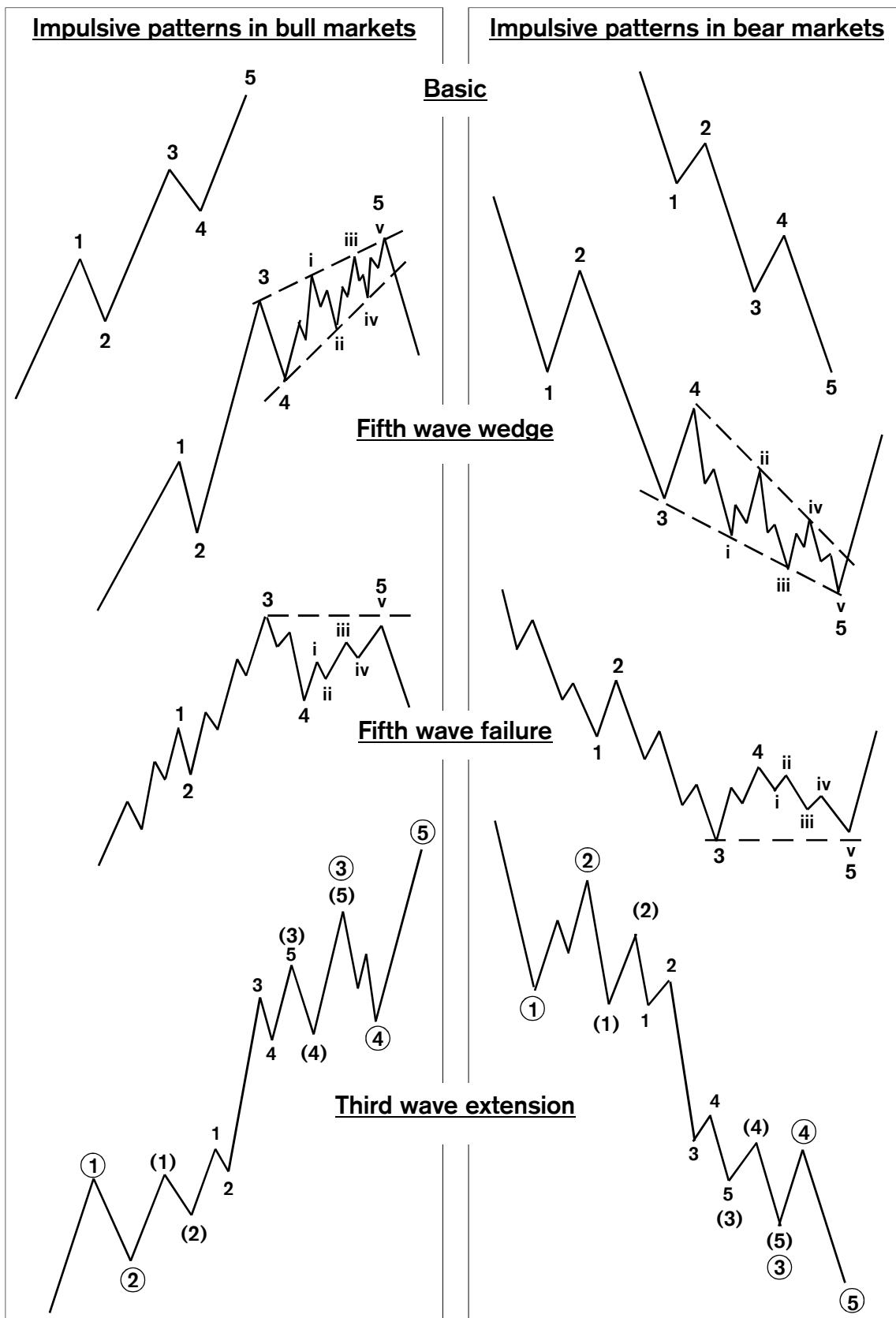
The basic pattern shows that markets move forward in a series of 5 waves of psychological development (from pessimism to optimism). When these 5 forward waves are complete, a reaction sets in, taking place in 3 waves (from optimism to pessimism).

Numbers are used to designate "5-wave" patterns, and letters to designate "3-wave" patterns. These 8 waves then complete a cycle from which a new series of 5 waves commences, to be followed by another set of 5 waves. And finally, after two sets

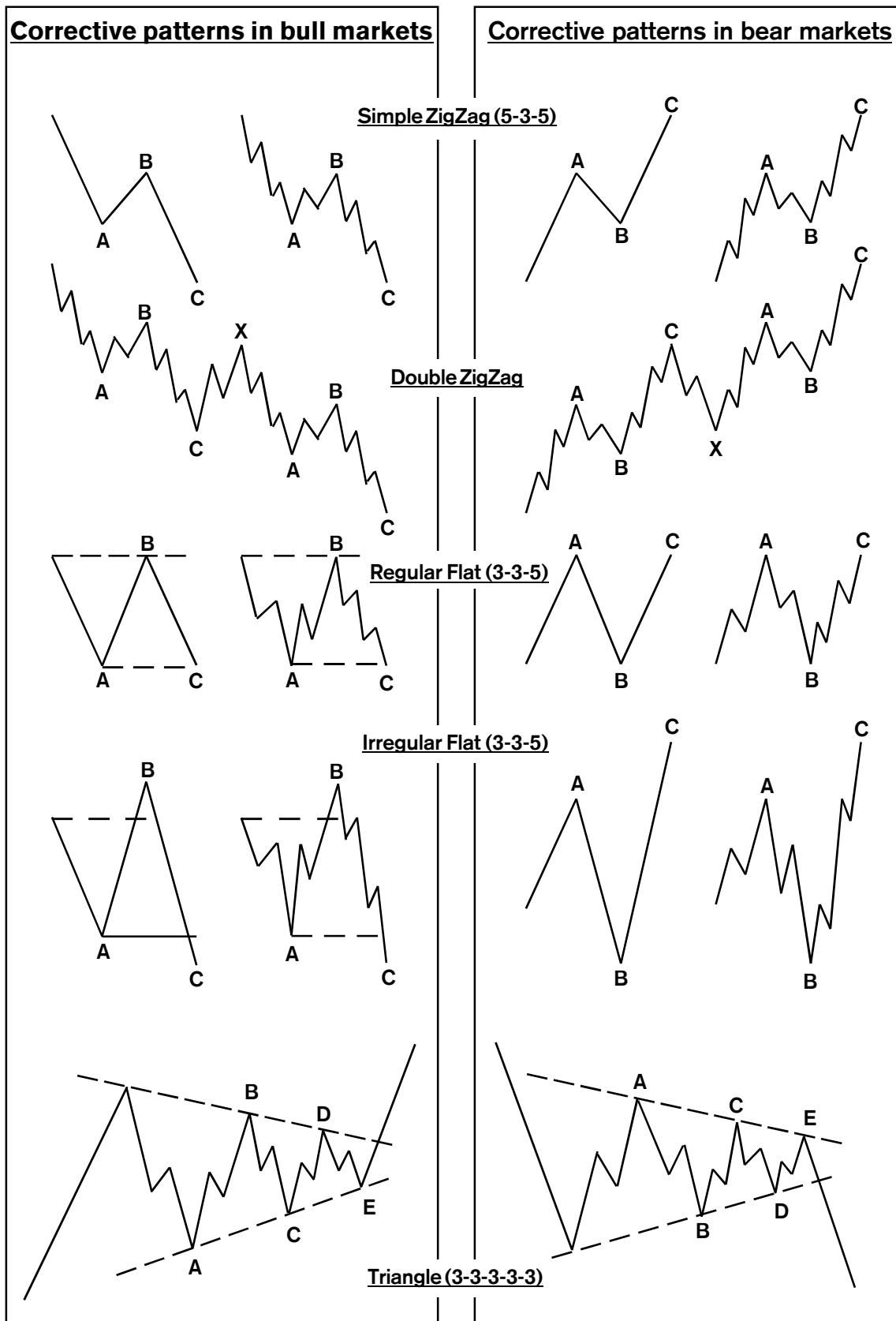
of 5 waves (1) and (3) and two sets of three wave patterns (2) and (4), a final set of 5 waves materializes and completes the whole pattern.

At this point, after wave (5) is complete, there is now a set of 3 waves (a), (b) and (c) of greater magnitude than the two previous corrections. This set would correct the whole of the 5 upward waves, which themselves had each broken into 5 and 3 smaller waves along the way.

Catalog of impulsive waves



Catalog of corrective patterns



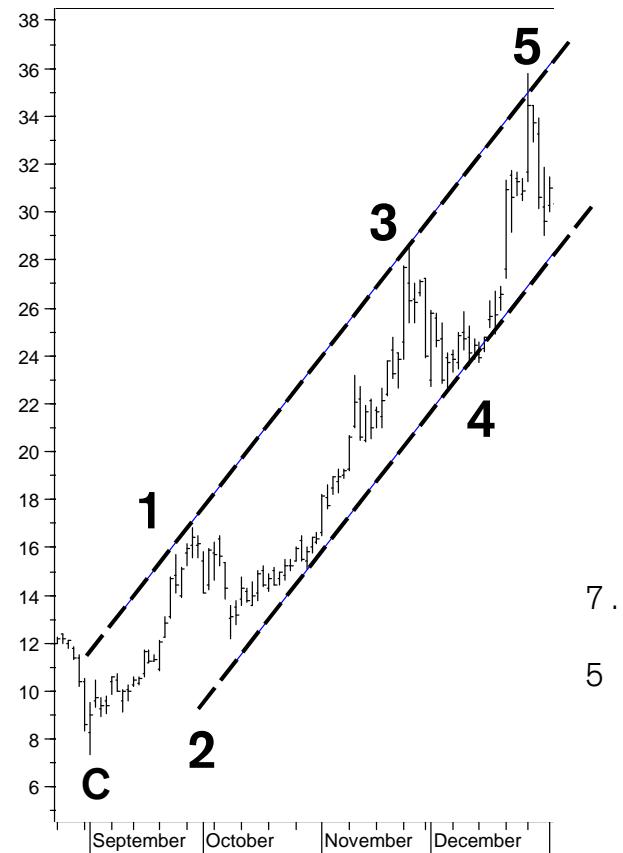


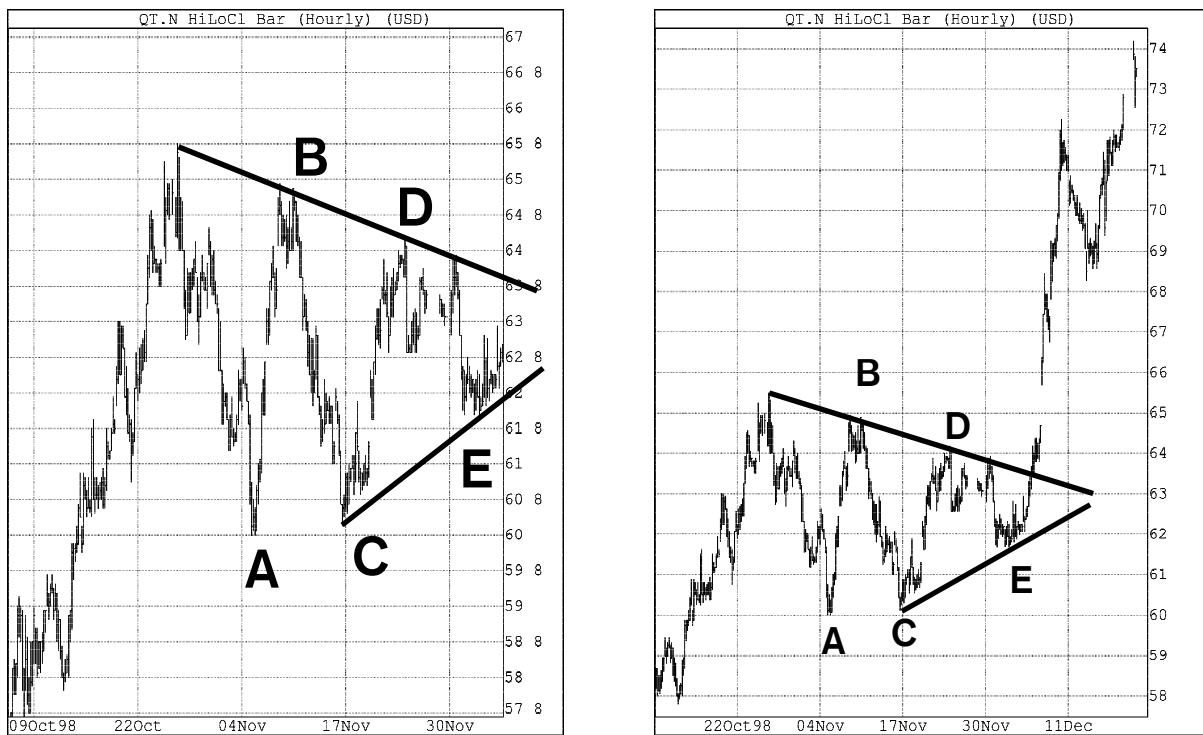
Impulsive wave patterns

If you have followed the argument thus far, the implications begin to appear. Given a series of 5- and 3-wave patterns, the investor should be able to predict the continuation of the next 5-3 pattern until a larger wave pattern is completed. It is the knowledge of these patterns that allows the investor to recognize when a trend change will occur **before** it has occurred.

An example of a five-wave pattern is shown above for Yahoo. The chart is taken from our real-time recommendation. We said in December that the long-term uptrend was not complete yet, and that at least one more upleg (wave 5) should be expected.

The chart on the right is updated to show the 5-wave pattern that was completed from the low in August at Wave correlation suggested that the minimum price target was around 35. The price reached 36 in wave and was immediately followed by a sharp correction. Ultimately, the price completed another five-wave pattern at 440.





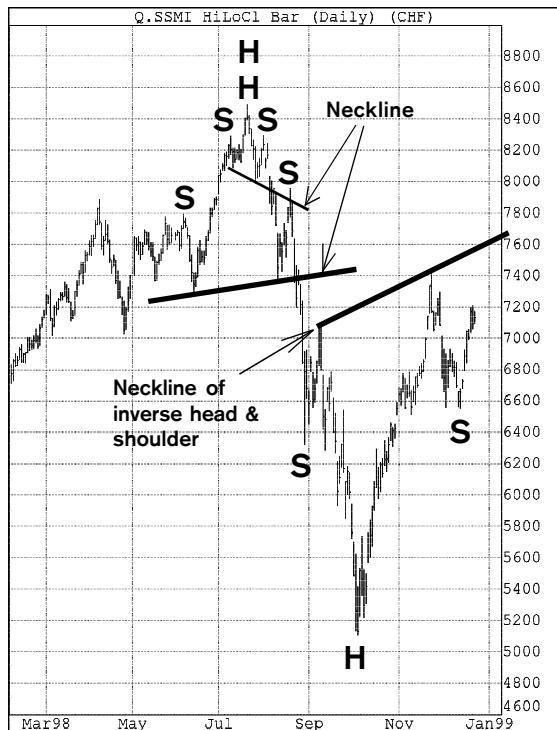
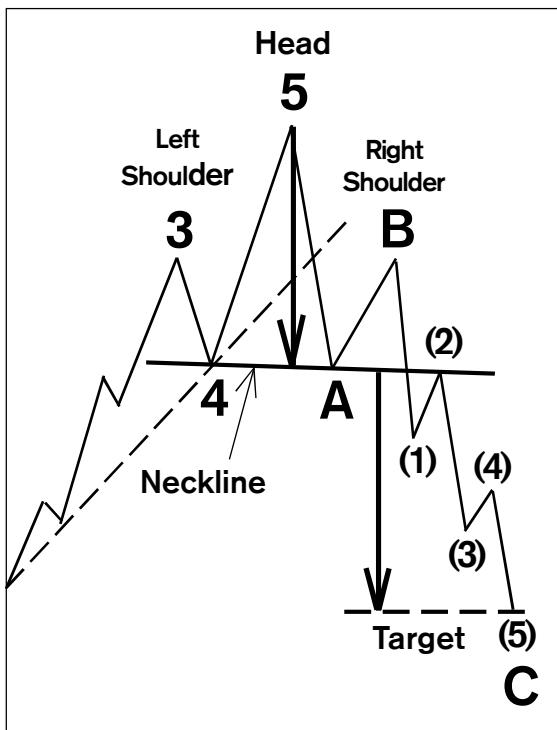
Corrective wave patterns

Page 25 shows the corrective patterns which can appear in financial markets. Corrective patterns can become very complex and difficult to interpret. However, once a correction is completed, its form provides important information on the most likely path of the next impulsive wave.

The chart above displays one of the most widely recognized patterns: the horizontal triangle. It is shown on the hourly chart of ATT between 27 October and late November between 65 and 60. Soon after wave E was completed the stock broke out on the upside and reinstated its larger uptrend.

The triangle example above is one of a few thousand that we have seen developing. Some triangles are ascending, some are descending and some are expanding. Together with the Zigzags and Flats they make up the list of corrective patterns.

What sets the wave principle apart and ahead of other technical approaches is primarily this characteristic of **design** and **form**. Each market pattern has a name and specific form determined by a small number of rules and guidelines. Yet, a specific pattern is never identical to another pattern of the same type. The patterns are variable enough in some aspects to allow for limited diversity within patterns of the same type. **It is this "self-similarity" which makes up the difference between deterministic chaos and random-walk.**



Head and shoulder reversal pattern

The H&S is the best known of all chart reversal patterns and is formed when an uptrend loses momentum, levels off and then establishes a downtrend. At "3" on the graph above left, the uptrend is powerful, with no evidence of a top formation. Volume tends to pick up as higher highs are made. The dip to "4" on lighter volume is, at this stage, considered a correction within the broader uptrend. The rally to "5" on diminishing volume alerts the technician that a top may be close at hand. The fall in prices to "A" is breaking the uptrend, falling towards the previous reaction low at "4". The market then rallies to "B" which is generally 50% to 61.80% of the decline from "5" to "A". To re-establish the primary uptrend, each swing high must exceed the high preceding it. The failure of "B" to regain the high at "5" fulfills half the requirement for a trend reversal (i.e. descending peaks).

Additionally the uptrend line by this stage has been broken on decline "5" to "A", and now all that remains is the break of the "neckline" drawn under the two reaction lows "4" and "A". The neckline can be upward sloping or downward sloping or may be horizontal. A closing break below the neckline on increased volume activates this pattern.

The measured target of the break is the height of the "head" above the neckline (wave 5 to wave A), projected down from the neckline break.

The INVERSE head and shoulder formation works exactly the same only in the opposite direction.

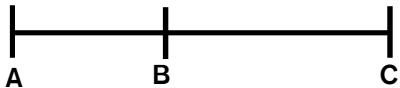
This basic head and shoulder has one negative aspect: investors have to wait for a break of the neckline to sell. However, such a break may occur rather late if the head occurs at a highly overbought level. Applying Elliott Wave analysis together with momentum analysis provides a much earlier sell signal which is when the five-wave uptrend tops and the correction starts to display impulsive patterns on the downside. Moreover, Fibonacci correlations allow for a more precise method to analyze the wave correlation, retracement and wave length as shown on the next page.

**1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144,
233, 377, 610, 987, 1597, 2584.....**

$1+1=2$
 $2+1=3$
 $3+2=5$
 $5+3=8$
 $8+5=13$
 $13+8=21$
 $21+13=34$
 $34+21=55$
 $55+34=89$
 $89+55=144$
 $144+89=233$
 $233+144=377$
 $377+233=610$
 etc.....

1.618 = 3/2, 5/3, 8/5, 13/8,

0.618 = 2/3, 3/5, 5/8, 8/13,



$$AB/BC = BC/AC = 0.618$$

Any length can be divided so the ratio between the smaller part and the larger part is equivalent to the ratio between the larger part and the whole. The ratio is always 0.618.

Fascinating Fibonacci

It may surprise you to learn that the universe, the constellations, the galaxy, flowers, oceans, plant life, man, natural science, music, architecture AND THE FINANCIAL MARKETS have one thing in common: the FIBONACCI SEQUENCE. Leonardo Fibonacci was a thirteenth century mathematician who developed a number sequence of the form:

1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610, 987 where each number is the sum of the previous two numbers.

This sequence of numbers has some very important properties.

For example: The ratio of any number to the next number in the sequence is 0.618 to 1 and to the next lower number is 1.618.

Between alternate numbers in the sequence the ratio is 2.618 or its inverse 0.382.

These numbers have some special relationship of their own such as

$$2.618 - 1.618 = 1 \qquad \qquad 0.618 \times 0.618 = 0.382$$

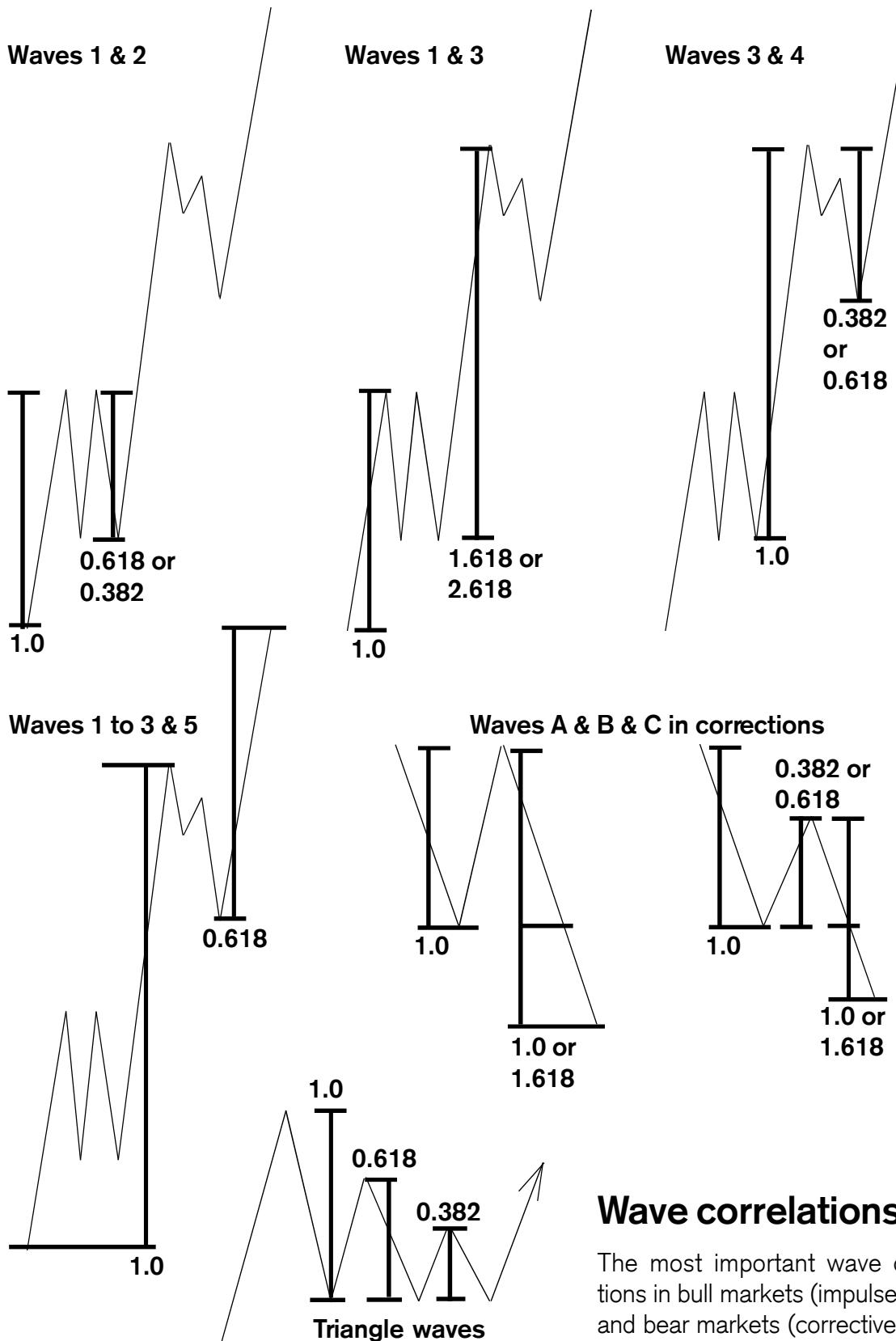
$$1 - 0.618 = 0.382 \qquad \qquad 1.618 \times 1.618 = 2.618$$

$$2.618 \times 0.382 = 1$$

Additional phenomena relating to the Fibonacci sequence includes:

- 1) No two consecutive numbers in the sequence have any common factors.
- 2) The sum of any ten numbers in the sequence is divisible by 11.
- 3) The sum of all Fibonacci numbers in the sequence +1 equals the Fibonacci number two steps ahead.
- 4) The square of a Fibonacci number minus the square of the second number below it in the sequence is always a Fibonacci number.

There are numerous relationships within this series, but the most important is 1.618 or 0.618. It is known as the Golden Ratio or Golden Mean (or phi) and governs nature's growth patterns.



Wave correlations

The most important wave correlations in bull markets (impulse waves) and bear markets (corrective waves) are shown on this page.



Fibonacci correlations - more than coincidence

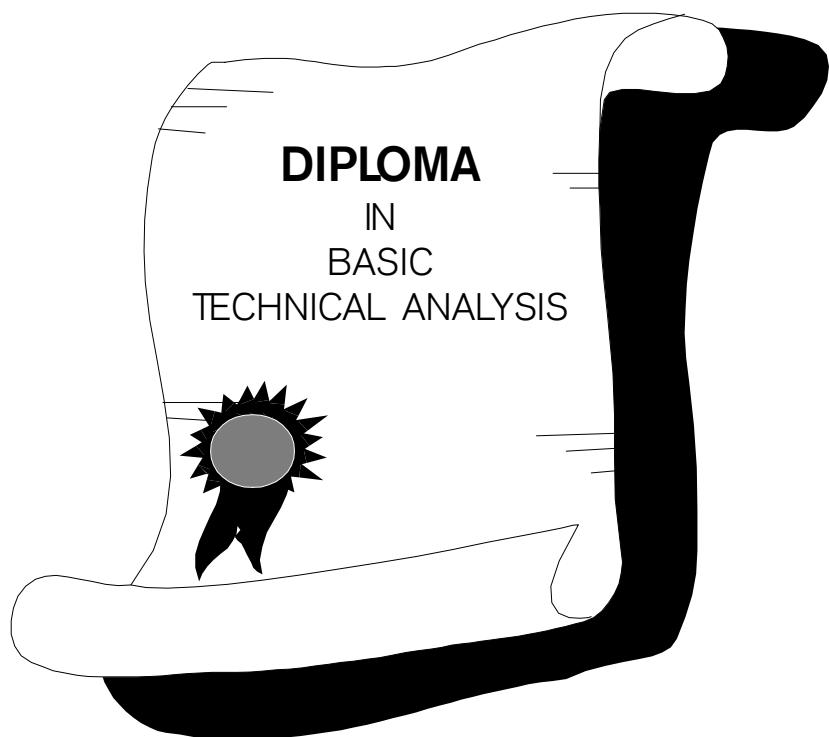
A man's body, if you divide the body at the navel - from the navel to the top of the head is about a 0.618 ratio of the lower part of the body (from the navel to the feet).

The ratio 0.618 to 1 is the mathematical basis for the Parthenon, sunflowers, snail shells, spiral galaxies of outer space or the human DNA spiral. Spirals on shells when examined more closely are shown to have arcs whose lengths are ratios of their diameters that equate to 1.618, and the larger radius is related to the smaller radius by 1.618. This is known as the golden spiral. The Greeks based much of their art and architecture on this proportion.

Financial markets have the same mathematical basis as natural laws. This is because the markets are not only numbers or economic factors but most importantly reflect human nature: **crowd emotions in motion**. Elliott was probably the first to associate Fibonacci with technical analysis and when he wrote "Nature's Law" referred specifically to the Fibonacci sequence as the mathematical basis for the wave principle: a bull market sub-divides into 5 legs, and a bear market into 3 legs which makes a total of 8. If the subwaves are counted, we arrive at 34 waves (see page 23).

The charts above show examples of a 61.80% retracement on a long-term basis. The decline from July 1998 had retraced exactly 61.80% of the previous bull trend from 1995 to 1998 at 55. Moreover, within the long-term uptrend, wave 1 traced out five subwaves from 4Q 1994 to 1Q 1996. The correction traced out a perfect a-b-c pattern. Wave c was equal in length to wave a and the entire a-b-c correction retraced 61.80% of the previous five-wave structure. We could show you hundreds of such examples.

The wave pattern and the Fibonacci relations are the language of the financial markets. It takes time to learn it, but in the end you will understand what the markets are indicating and that it is the mood of the crowd which shapes the fundamental world and not vice versa. The fundamental news and trends are mostly triggered by mass mood psychology.



Congratulations

You made it through the basic concepts of technical analysis. This should help you to follow our

Credit Suisse Technical Research Publications

such as

Research Daily Publications

Daily International Chartpack

Trading Swiss Stocks

Technical Research Flash

Hong Kong and Singapore Equities

Research Bi-Weekly Publications

Technical Chart Outlook - Global Stock Markets

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