

TECHNICAL ANALYSIS INDICATORS

Objective

Technical indicators use mathematical formulae to compute certain values which can be used to identify bullish and bearish trends in the market. These have been discussed in this chapter.

Agenda

Indicators

- Volume
 - Accumulation/Distribution
 - On Balance Volume
 - Price and Volume Trend
- Trend
 - Bollinger bands
 - Moving Averages
 - Parabolic SAR
 - Standard Deviation

Oscillator

- Average Directional Index
 - Average True Range
 - DeMarker
 - Envelopes
 - MACD
 - RSI
 - Stochastic
- Market Profile

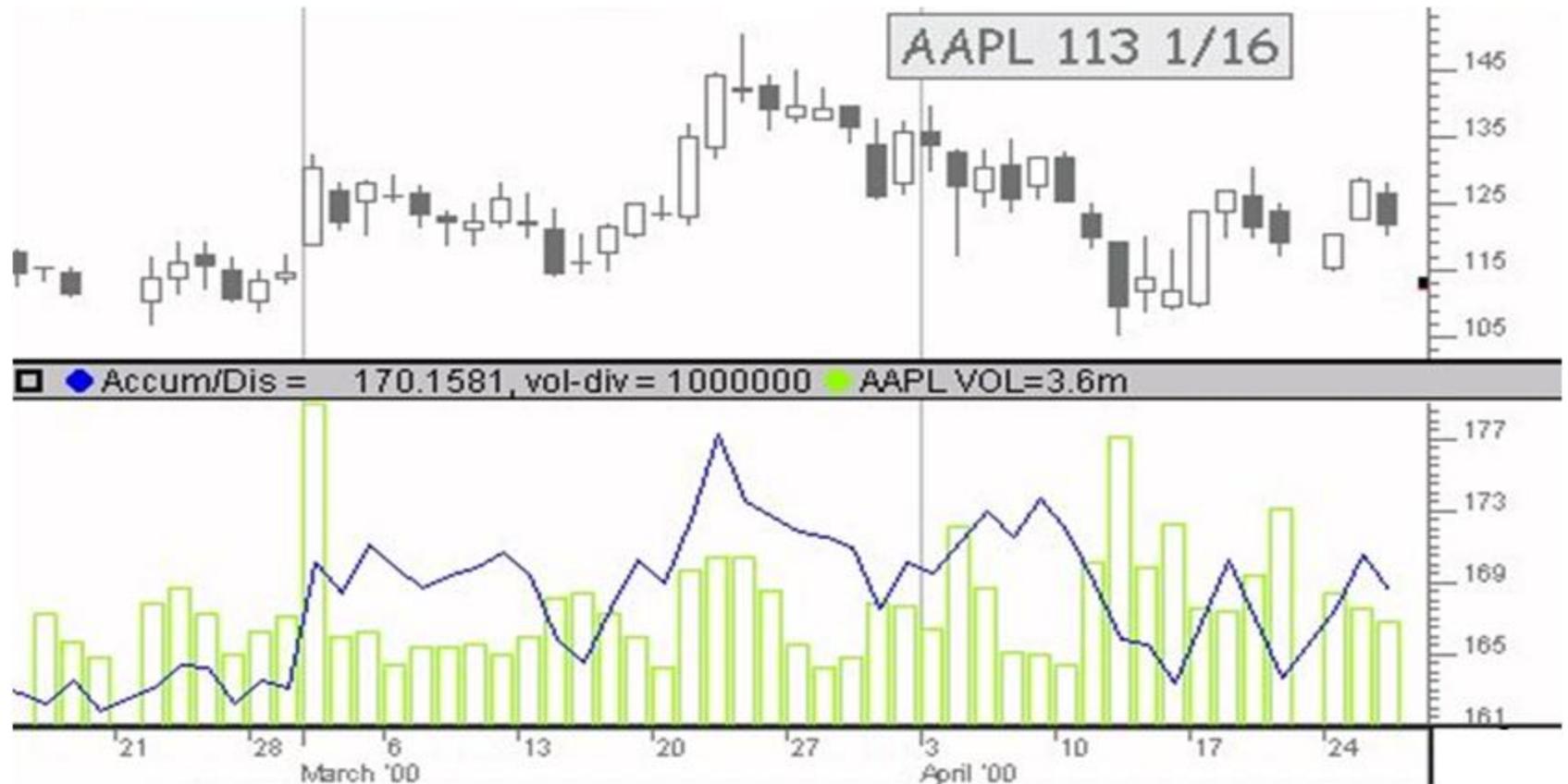
Technical Indicators

- Based on mathematical calculations on price and/or volume
- Values obtained are thus used to forecast probable price changes
- There are many technical indicators already developed
- Types
 - Volume
 - Oscillator
 - Trend/ Momentum

Accumulation Distribution

- Determined by the changes in price and volume
- Volume acts as a weighting coefficient at the change of price
- Increase => Accumulation (buying) of security, => Upward trend of prices
- Decreases => Distribution (selling) of security, => Downward price movement
- $$\frac{A/D(i) = ((CLOSE(i) - LOW(i)) - (HIGH(i) - CLOSE(i))) * VOLUME(i)}{(HIGH(i) - LOW(i)) + A/D(i-1)}$$

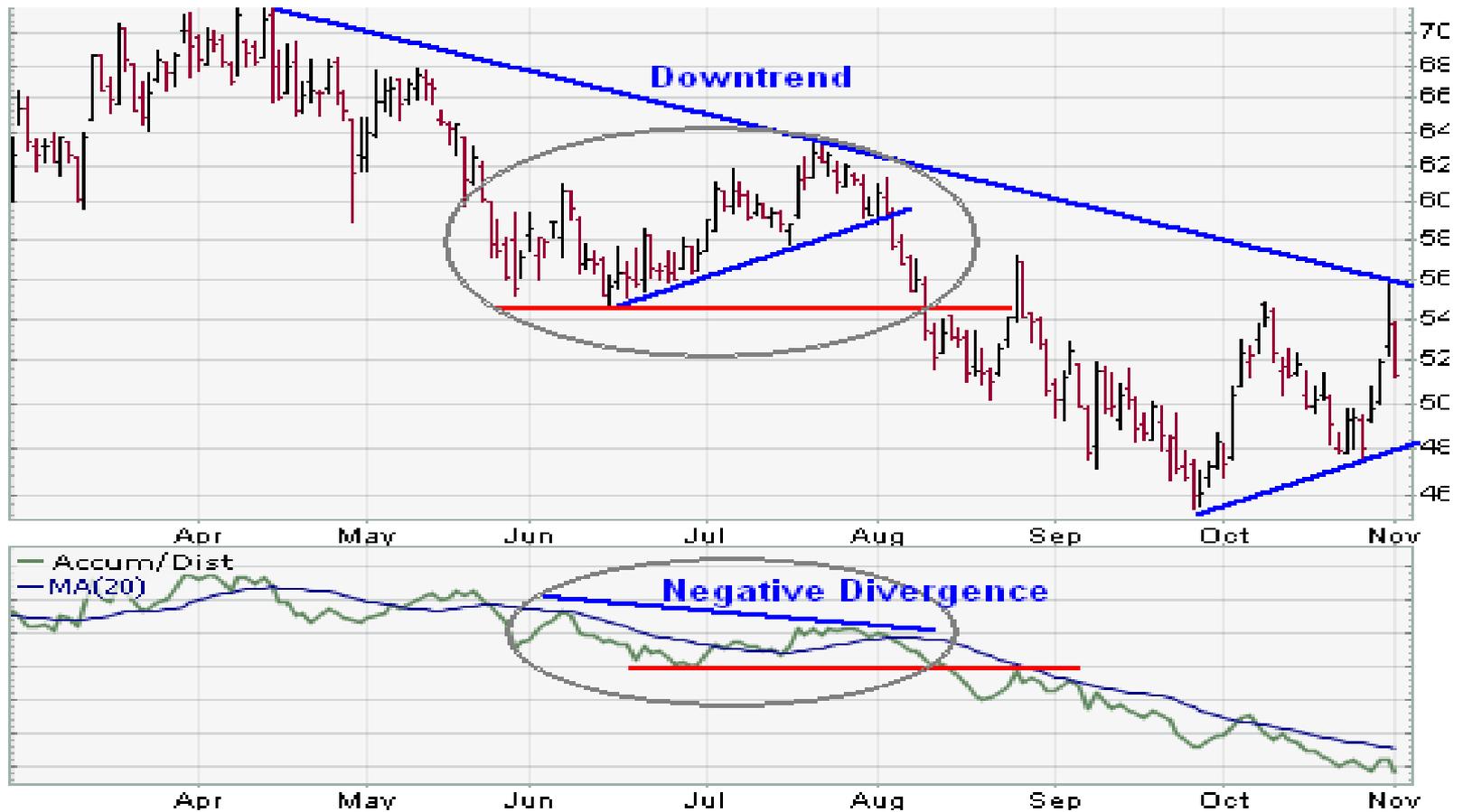
Example



Bullish



Bearish



On Balance Volume

- Joe Granville introduced On Balance Volume (OBV) indicator
- Measure positive and negative volume flow
- Concept: Volume precedes price
- Rising volume can indicate the presence of smart money flowing into a security
- Numerical value of OBV is not important, but direction of the line
- Calculation
 - $OBV = \text{Yesterday's OBV} + \text{Today's Volume}$
 - $OBV = \text{Yesterday's OBV} - \text{Today's Volume}$
- Line can then be compared with the price chart of the underlying security to look for divergences or confirmation

OBV: Example



Price and Volume Trend

- Growing sum of values of the trade volume calculated regarding the change of closing prices
- A part of the current volume is added or subtracted
 - Depends on the movement of price in respective time period
- PVT is considered more precise than OBV in showing the dynamics of trade volume
- Trend matters more than value
- Calculation

$$\left(\left(\frac{\text{Close} - \text{Yesterday's Close}}{\text{Yesterday's Close}} \right) * \text{Volume} \right) + \text{Yesterday's PVT}$$

PVT Example



Bollinger Bands

- Bollinger Bands consist of a middle band with two outer bands
- A simple moving average forms the middle line
- They are two standard deviations above and below the moving average
- Buy signal => Price closes below lower band, and
- Sell signal=> Price closes above the upper band
 - Assumes that prices cant move beyond outer bonds
- Bands contract => big move is coming, but not sure whether up or down
- Bands should contain 88-89% of the price action

Bollinger Bands Example



W Bottom



M Top



Moving Averages

- Moving averages smooth the price data to form a trend following indicator
- Define the current direction with a lag
- MA can be taken of
 - Top, Bottom, Close or Open
- Two most popular types are
 - Simple, Exponential, Smoothed, Linear weighted Moving Average (EMA)

Moving Averages

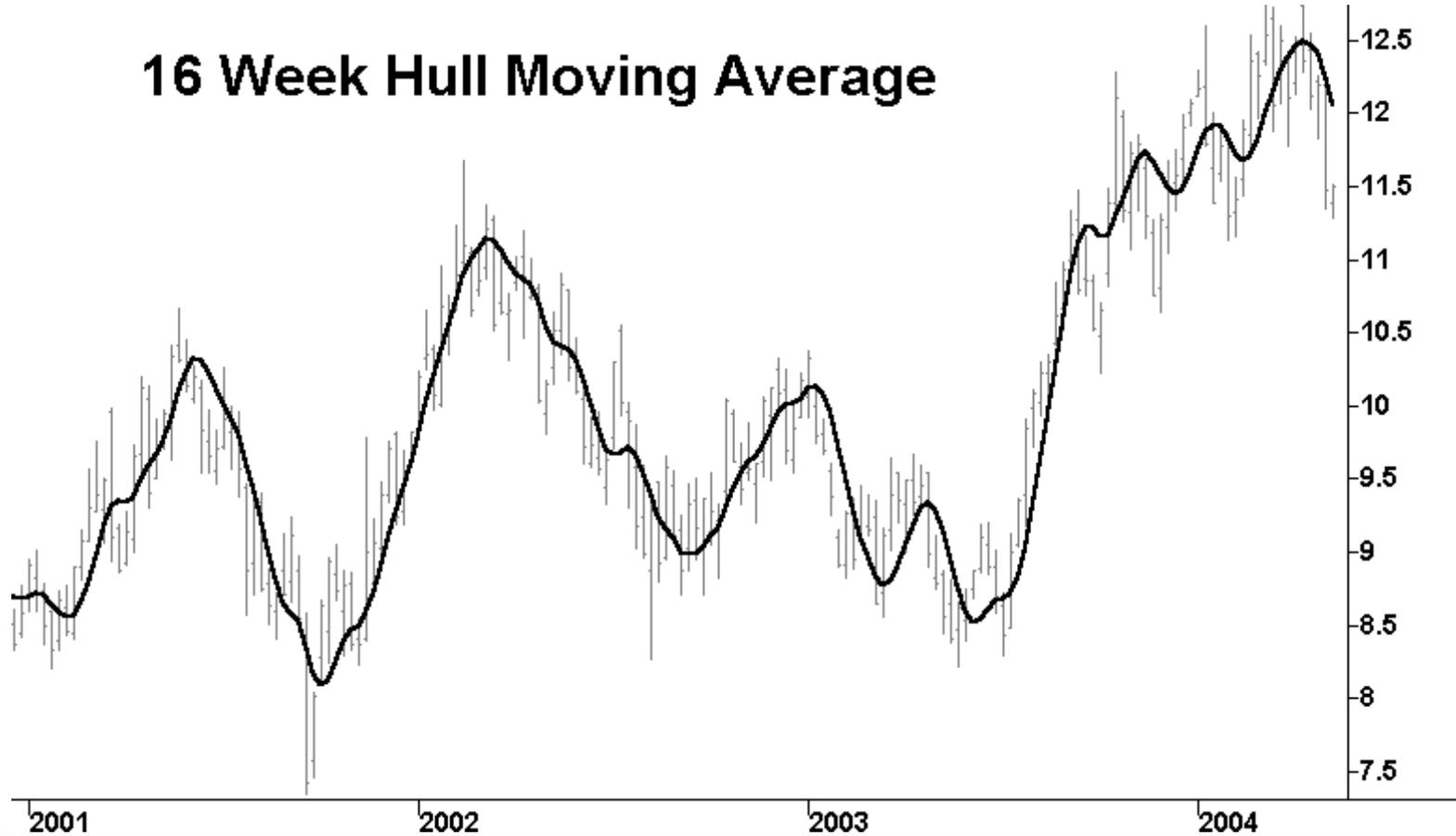
- Helps in identifying the trend
- Commonly used Moving Averages
5 (Weekly), 21 (Monthly), 200 (Yearly)
- Can also be used as envelope
- 200 DMA is used as a very good resistance or Support

Adding Weights of Average

- Latest price has more importance than the previous prices
- Weights are added to price in such a way that the newer prices get more importance in calculating the average
- This method is called Weighted Moving Average

Moving Average: Example

16 Week Hull Moving Average



Crossover Trading



Crossover Trading

- When the faster moving average crosses over the slower average, a corresponding buy or sell signal can be generated
- Example: If 10 Moving Average increases to more than 30 Moving Average, a BUY trade can be performed
- Example: If 10 Moving Average decreases to less than 30 Moving Average, a SELL trade can be performed

Parabolic SAR

- Developed by Welles Wilder, known as “Stop And Reversal”
- SAR sets trailing price stops for long or short positions
- Parabolic SAR is more popular for setting stops than for establishing direction or trend
- Establishing the trend first, and then trading with Parabolic SAR in the direction of the trend
- Trend is up => buy when the indicator moves below the price
- Trend is down=> sell when the indicator moves above the price
- The Parabolic SAR works best during strong trending periods,
- Estimates occur roughly 30% of the time

Example



Use

- The dotted lines below the price establish the trailing stop for a long position and
- The lines above establish the trailing stop for a short position
- There are two variables: the step and the maximum step
 - The higher the step is set, the more sensitive the indicator will be to price changes
 - If the step is set too high, the indicator will fluctuate above and below the price too often, making interpretation difficult
 - The maximum step controls the adjustment of the SAR as the price moves
 - The lower the maximum step is set, the further the trailing stop will be from the price
 - Wilder recommends setting the step at .02 and the maximum step at .20

Standard Error

- Envelope whose bands are obtained by the calculation of the beta and alpha coefficients of linear regression
- Used to measure the strength of a trend, and it is interpreted in a simple way
- When they begin to widen, this is a sign that the trend is beginning to lose strength because the market is overbought or oversold, and
 - Measures should therefore be taken expecting a reversal
- As for ranging markets, they have a large envelope in which the prices tend to fluctuate

Example

Standard Error
Bands (21-day)

Standard Error Bands

Daily Chart - Wal-Mart (WMT)



Stochastic

- A momentum indicator that shows the location of the close relative to the high-low range over a set number of periods
- “Doesn't follow price, it doesn't follow volume or anything like that. It follows the speed or the momentum of price. As a rule, the momentum changes direction before price
- bullish and bearish divergences
- Measures the level of the close relative to the high-low range over a given period of time
- Low readings (below 20) indicate that price is near its low over a given time period
- High readings (above 80) indicate that price is near its high over a give time period

Example

Stochastic Fast & Slow

Daily Chart - Nasdaq 100 ETF (QQQQ)



Types



Overbought and Oversold



Uses

- Can also be used to identify turns near support or resistance
- A break above 20 to signal an upturn and successful support test
- A break below 80 to signal a downturn and resistance failure
- Settings on the Stochastic Oscillator depend on personal preference, trading style and timeframe
- Shorter look-back period will produce a choppy oscillator with many overbought and oversold readings
- Longer look-back period will provide a smoother oscillator with fewer overbought and oversold readings
- In conjunction with other technical analysis tools. Volume, support/resistance and breakouts can be used to confirm or refute signals produced

Average Directional Index (ADX)

- Evaluates the strength of a current trend, be it up or down
- Oscillator that fluctuates between 0 and 100
- Readings above 60 are relatively rare
- Low readings, below 20, indicate a weak trend
- High readings, above 40, indicate a strong trend
- Does not grade the trend as bullish or bearish, but merely assesses the strength of the current trend
- When ADX begins to strengthen from below 20 and moves above 20, it is a sign that the trading range is ending and a trend is developing

ADX

- ADX is derived from two other indicators, Positive Directional Indicator (+DI) and Negative Directional Indicator (-DI)
- Buy and sell signals can be generated by +DI/-DI crosses
- A buy signal occurs when +DI moves above -DI
- A sell signal when -DI moves above the +DI. Be careful, though
- When a security is in a trading range, this system may produce many whipsaws
- +DI/-DI crosses should be used in conjunction with other aspects of technical analysis
- Increasing the number of periods will smooth the ADX line (making it less volatile), and display more significant readings

Example



Moving Average Convergence-Divergence (MACD)

- Developed by Gerald Appel in the late seventies
- One of the simplest and most effective momentum indicators available
- Calculation = Shorter MA - Longer MA
- Trend following and Momentum
- Fluctuates above and below the zero line
 - Moving averages converge, cross and diverge
- Goes below zero => Sell Signal
- Goes above zero => buy Signal

MACD Example



Signal Line Crossover



Relative Strength Index (RSI)

- J. Welles Wilder developed the Relative Strength Index (RSI) in 1978
- Extremely popular indicator
- Momentum oscillator that measures speed and change of price movements
- RSI oscillates between zero and 100
- RSI is overbought => above 70 and
- Oversold=> below 30
- Signals can be generated by looking for
 - Divergences, failure swings and centerline crossovers
- RSI can also be used to identify the general trend
- Generally period is taken as 14
 - $RSI = 100 - 100 / (1 + RS)$
 - $RS = \text{Average Gain} / \text{Average Loss}$

RSI Example



RSI: Resistance



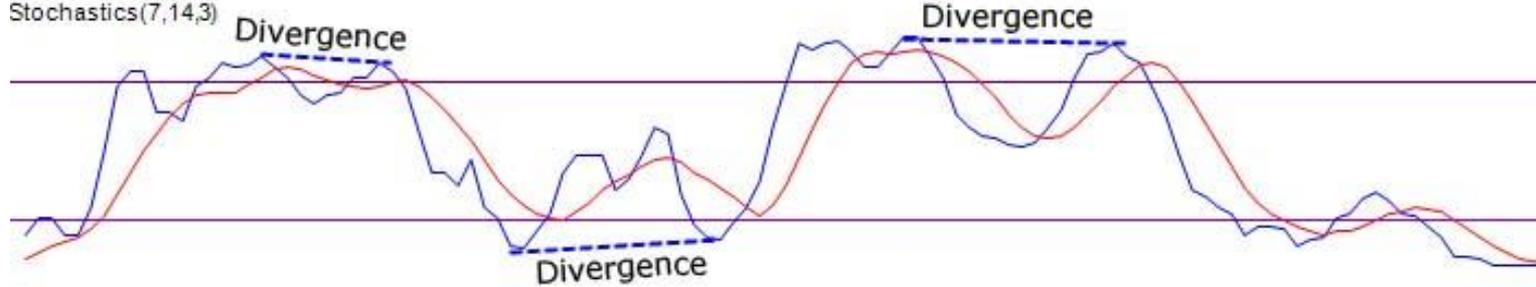
Divergence

- When the indicator and the price move in such a way that they do not follow their standard movement, it is called as Divergence
- In divergence, we assume that the indicator rightly depicts the trend, and the price will soon adjust its direction to match with the indicator values

Divergence



Stochastics(7,14,3)



RSI: Divergence



Bullish Divergence

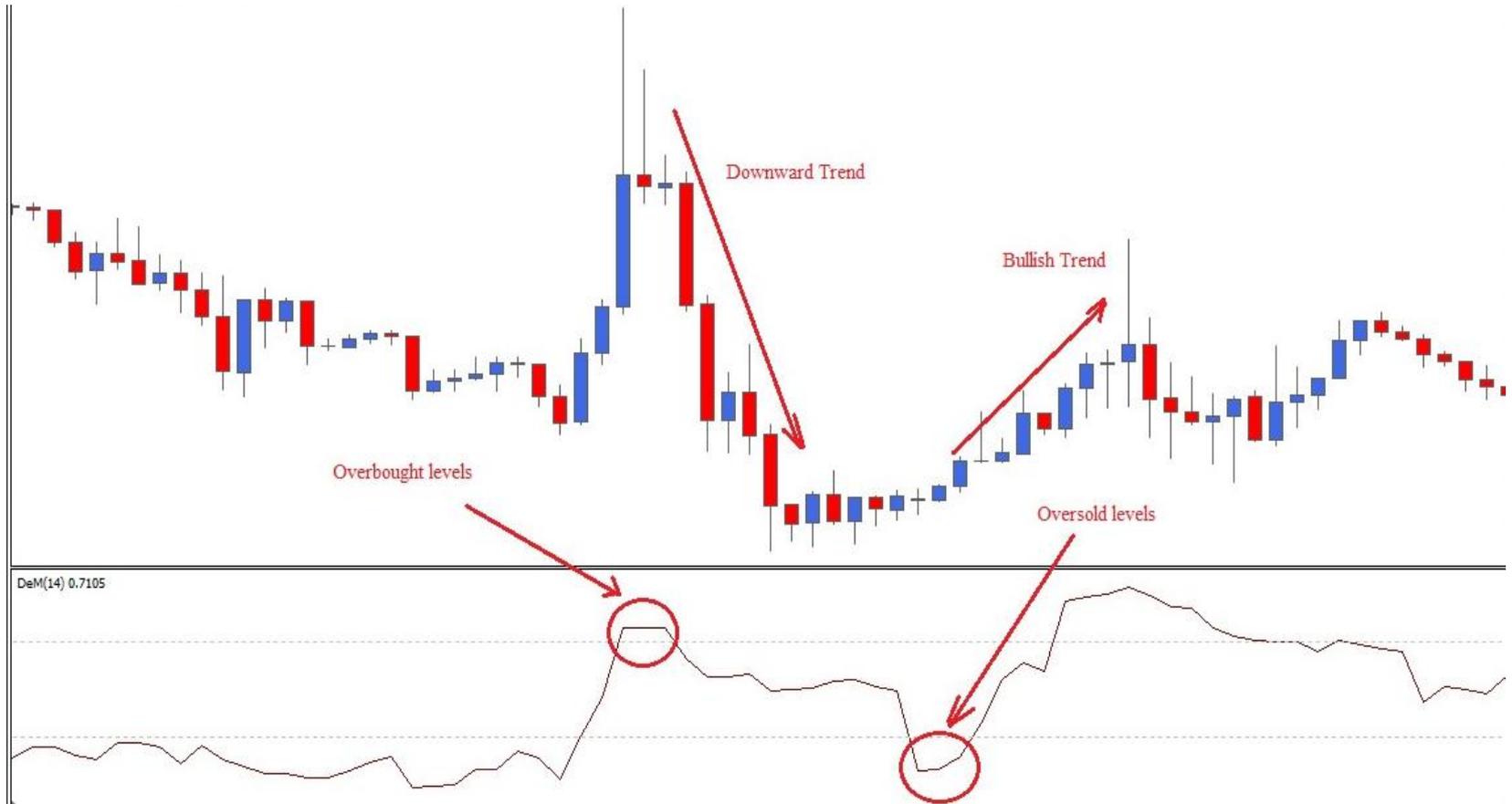


DeMarker

- Developed by Tom Demarker for identifying
 - High-risk buying or selling areas in a given market
- DeMark $> .7 \Rightarrow$ downward price turn
- Demark $< .3 \Rightarrow$ price will shortly turn upward
- Determine when to enter a market

$$DMark_j = \frac{MAve_j(DeMax, N)}{MAve_j(DeMax, N) + MAve_j(DeMin, N)}$$

DeMarker: Example



Average True Range (ATR)

- Introduced by Welles Wilder (1978)
- Shows volatility of the market
- Reflects the degree of interest or disinterest in a move
- Used as a component of numerous other indicators and trading systems
- Low value => Weaker Trend
- High Value => Strong Trend

ATR: Example



Market Profile

- Chicago Board of Trade has a registered trademark and holds exclusive copyrights to the Market Profile charting technique
- Assumptions
 - The purpose of all markets is to facilitate trade
 - The markets are self regulating. The regulating constraints include price, time, and volume
 - The markets, as they attempt to facilitate trade, will use price probes to "advertise" for sellers or buyers
 - The reaction to these probes provides valuable clues about the strength or weakness of the market

Market Profile

- TPO (Time-Price Opportunity)
- Helps traders to examine days such as normal, trend, neutral, and long-term market activity charts
- The half-hour segment represents the price range that developed over that time period
- Market's acceptance of price is where 70% of the day's volume occurred. => day's value area
- Internal structure of the markets
- Designed to offer logical, statistically based analysis of price, time, and volume

Mix & Match

- No Indicator will work on one product all the time
- Ideally should use 2-3 indicators at one time
- Common Strategies
 - One to identify trend (If any) and then take another to take position
 - One to enter into position another to close position
 - Envelop of MA's (21 day top to 21 day bottom)
 - Stochastic with ADX
 - RSI with Bollinger
 - RSI with Moving Averages
 - 3 different indicators, work if 3 give same signal
- Back test it before using
- Don't Marry a indicator, If not working move on to next