Introduction to Technical Analysis & Derivatives

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What is Technical Analysis

- Technical analysis- study of price movements & security analysis discipline for forecasting the direction of prices through the study of past market data, primarily price and volume.

- Technical Analysts look at the CHARTS to make a prediction about the FUTURE!

Tenets of Technical Analysis

- Most technical analysis is focused on determining whether or not a current trend will continue and, if not, when it will reverse
- Prices Move in Trends
- Trends (History) tend to Repeat themselves

Lengths of Trends

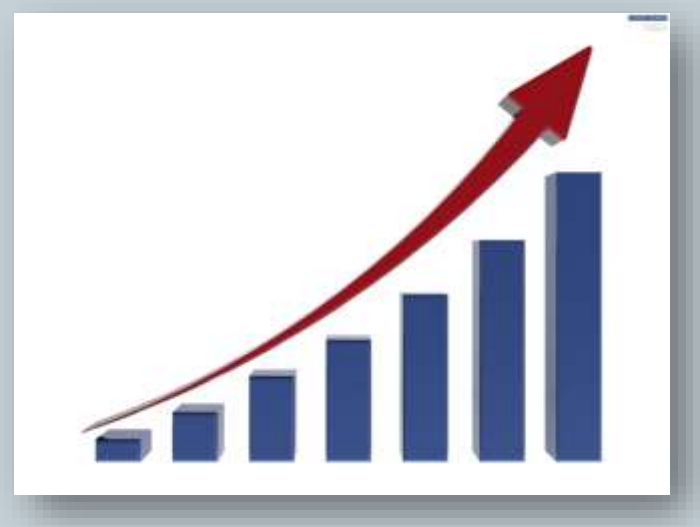
- Long term
  - 9 months or longer
- Intermediary
  - 3 months to a 9 months, but no longer than a year
- Short term
  - Days to weeks, but no longer than 3 months

Chart Types

- **Charts-** subjective form of technical analysis where technicians attempt to identify areas of **support** and **resistance** on a chart by looking at specific patterns.
- These patterns, underpinned by psychological factors, are designed to predict where prices are headed, following a breakout or breakdown from a specific price point and time.

Chart Types

- Bar Chart
- Line Chart
- Japanese Candle Chart



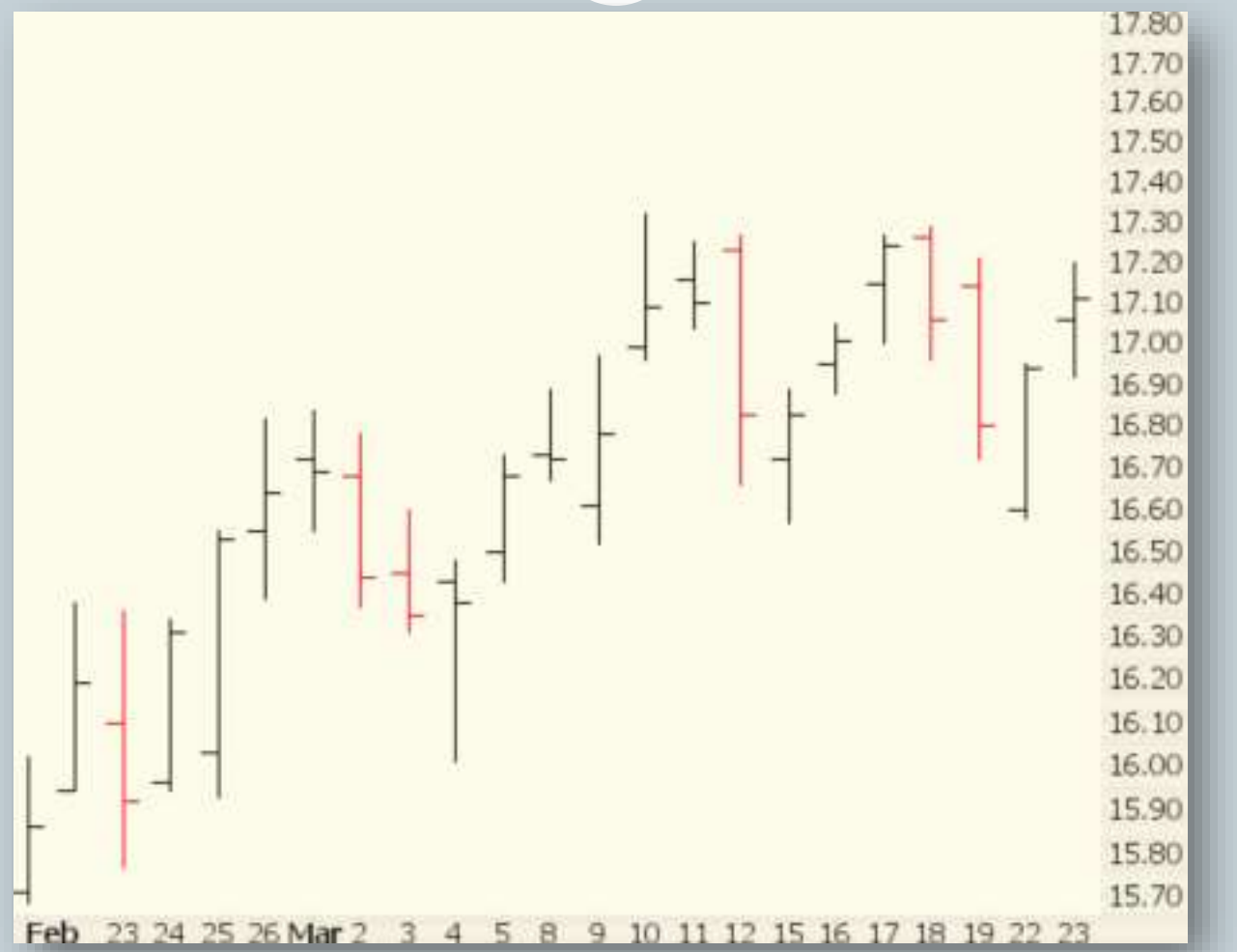
Bar Chart

- Multiple price bars, with each bar illustrating how the price of an asset or security moved over a specified time period.
- Each bar typically shows **Open, High, Low & Closing (OHLC)** prices, although this may be adjusted to show only the high, low & close (HLC).

Bar Chart

- The **vertical line** on a price bar represents the **high & low prices** for the period.
- The **left & right horizontal lines** on each price bar represent the **open & closing prices**.
- Bar charts can be colour coded where if the close is above the open it may be colored black or green, and if the close is below the open the bar may be colored red.

Bar Chart


17.80
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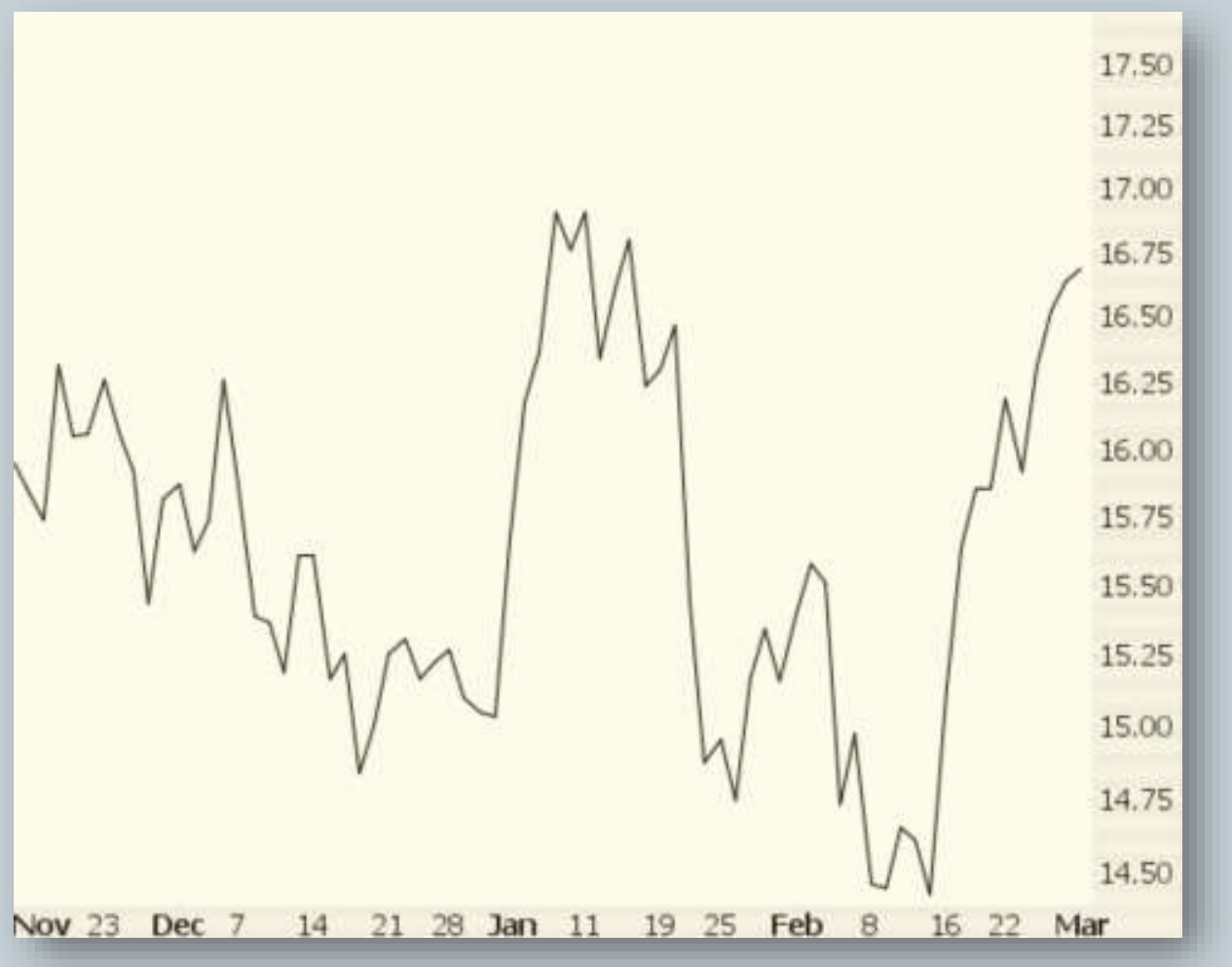
Feb 23 24 25 26 Mar 2 3 4 5 8 9 10 11 12 15 16 17 18 19 22 23

Line Chart

- Graphical representation of an asset's historical price action that connects a series of data points with a continuous line (straight line segments; single line).
- This is the most basic type of chart used in finance, and it typically only depicts a security's **closing price** over time.
- Line charts can be used for any timeframe, but they most often use day-to-day price changes.

Line Chart


17.50
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Nov 23 Dec 7 14 21 28 Jan 11 19 25 Feb 8 16 22 Mar

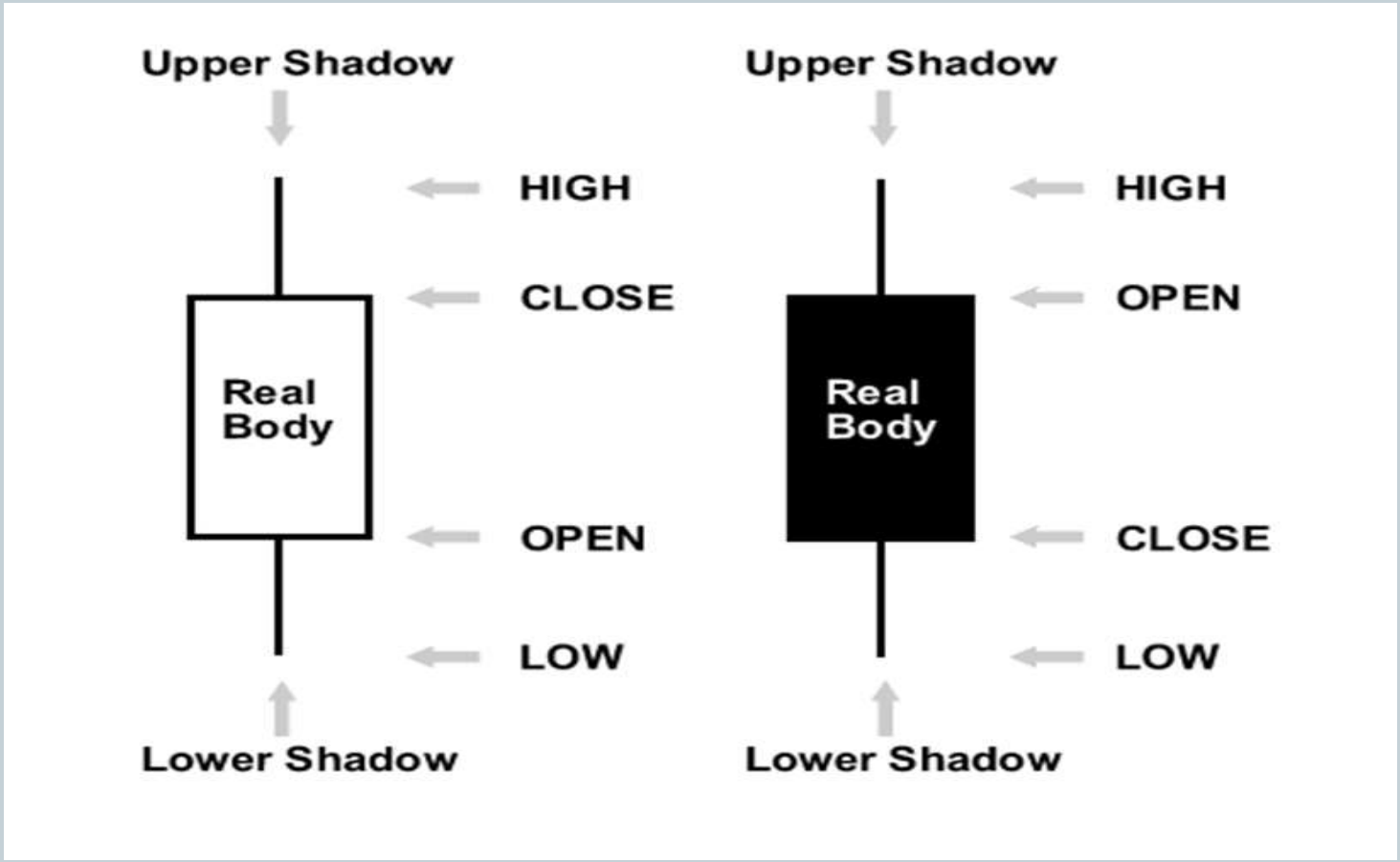
Candlestick Chart

- Candlestick charts originated in Japan over 100 years.
- Traders use candlestick charts to **determine possible price movement** based on past patterns.
- Candlesticks are useful when trading as they show four price points **OHLC** throughout the period the trader specifies.

Candlestick Chart

- The real body represents the price range between the open and close of that day's trading.
- When the real body is **filled in or black** (also red), it means the **close was lower than the open**.
- If the **real body is white** (or green), it means the **close was higher than the open**.

Candlestick Chart



Candlestick Chart

Directions a Trend can take

- Up Trend
- Down Trend
- Horizontal Trend/Sideways or No Trend

Uptrend

- A series of higher peaks and higher troughs on a price chart.

Down Trend

- A series of lower peaks and lower troughs on the price chart

Horizontal Trend/Sideways or No Trend

- A series of relatively similar peaks and troughs.

Support

- Support is an imaginary price level that is difficult for a stock to move below because there are so many investors willing to buy at that level. It may be a horizontal or diagonal price level.

Support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35.50
35.00
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Aug
Sep
Oct
Nov
Dec

Resistance

- Resistance is the opposite of support. It is an imaginary price level that is difficult for a stock to penetrate on the upside.
- It may be either a horizontal or diagonal price level.
- Resistance is created when the bears gain enough momentum to overwhelm the bulls and stop or reverse upward movement.

Resistance


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61
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8 16 Mar 8 15 22 Apr 12 19 May 17 Jun 14 21 Jul 12 19 26


102.50
100.00
97.50
95.00
92.50
90.00
87.50
85.00
82.50
80.00
77.50
75.00
72.50
70.00
ug 27 Sep 17 24 Oct 8 15 22 Nov 12 19 26 Dec 10 17 24 Jan 14

Technical Indicators

- Technical Indicators- are a statistical form, where technicians apply various **mathematical formulas** to prices and volumes.
- Most common technical indicators- moving averages, which smooth price data to help make it easier to spot trends.

Technical Indicators

- More complex **Moving Average Convergence Diagram (MACD)**- interplay between several moving averages.
- Many trading systems are based on technical indicators since they can be quantitatively calculated.

How do we Conduct Technical Analysis?

Simple Moving Averages (SMA)

- The **mean/average stock price** over a certain period of time (generally closing prices).

Simple Moving Averages (SMA)

- SMA is the easiest moving average to construct.
- It is simply 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.

Simple Moving Averages (SMA)

- **SMA=*A*1+*A*2+…+*An*/*n***
- where: *An*=the price of an asset at period
- *n*=the number of total periods
- For instance, consider shares of Nike closed at $10, $11, $12, $11, $14 over a 5 day period.
- SMA of Nike's shares =$10 + $11 + $12 + $11 + $14 divided by 5, equaling $11.6.

Exponential Moving Averages (EMA)

- A type of moving average that is similar to a simple moving average, except that **more weight** is given to the **latest data** which is considered to be more relevant than older data.
- This type of moving average **reacts faster to recent price changes** than a simple moving average.

Exponential Moving Averages

- Computing the EMA involves applying a **multiplier** to the SMA.
- The formula for calculating the weighting multiplier (if 10 day is taken as the time period):
- **Weighted multiplier** = 2÷(selected time period+1)

=2÷(10+1)

=0.1818=18.18%

Exponential Moving Averages

- $\boldsymbol{EMA = \text{Price}(t) \times k + EMA(y) \times (1 - k)}$

where:

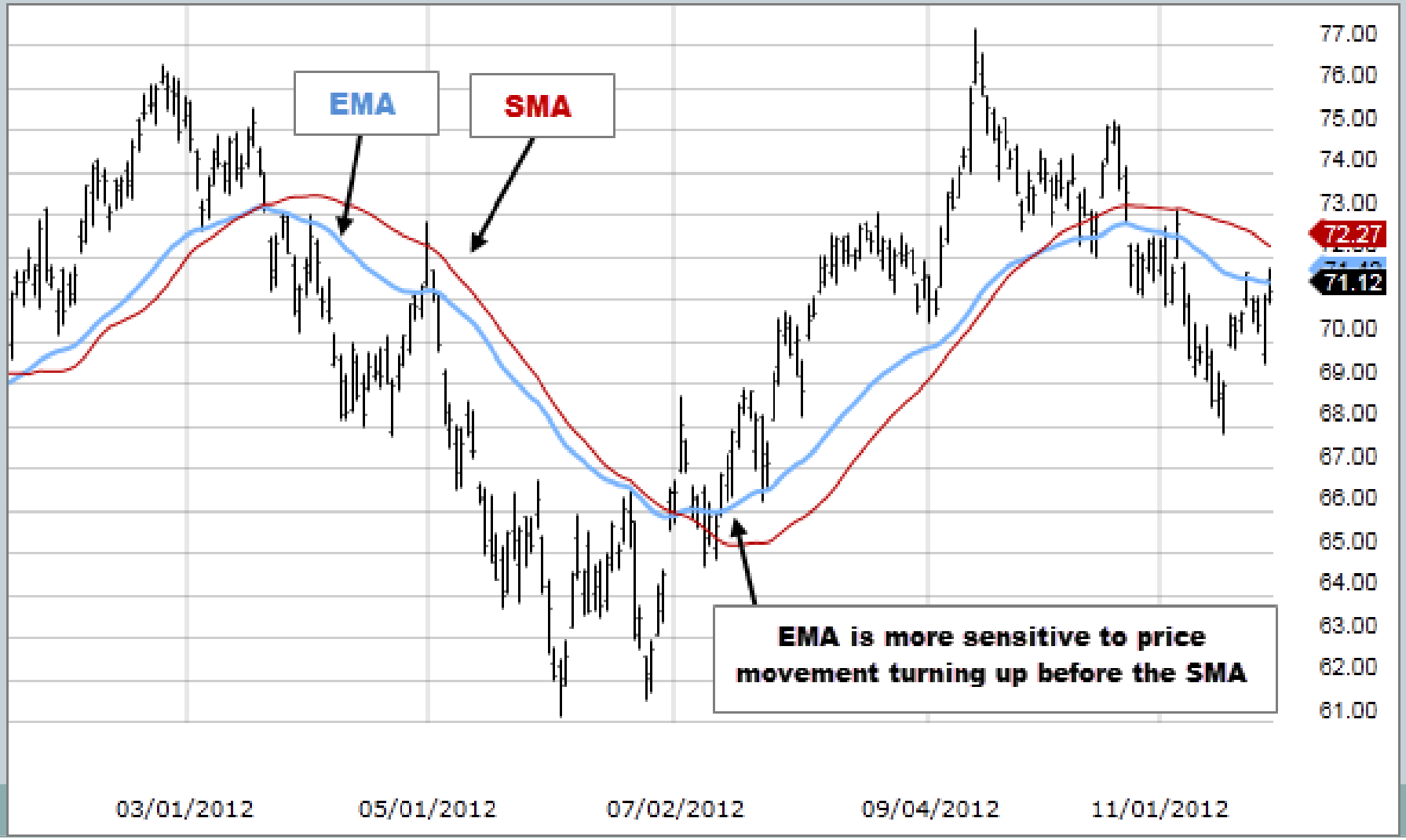
t=today (closing price);

y=yesterday/previous day (closing price);

N=number of days in EMA;

k (multiplier)=$2 \div (N+1)$

Exponential Moving Averages (EMA)



Bollinger Bands

Bollinger Bands

- Bollinger Bands- type of price envelope developed by **John Bollinger**.
- 3 different lines are drawn, with one below and one above the security price line.
- Its specific period moving average is denoted as midline to form an 'envelope'.
- Price envelopes define upper and lower price range levels.

Bollinger Bands

- Bollinger Bands are envelopes plotted at a **standard deviation level** above and below a simple moving average of the price.
- Because the distance of the bands is based on **standard deviation**, they adjust to **volatility swings** in the underlying price.

Bollinger Bands

- Shows the levels of **different highs and lows** that a security price has reached in a particular duration and also its **relative strength**, where highs are near to the upper line and lows are near to lower line.
- Price points near the edges of the 'envelope' formed can help us recognize a pattern at a particular moment.
- **Standard deviation is a measure of volatility**, when the markets become more **volatile the bands widen**; during **less volatile** periods, the **bands' contract**.

Bollinger Bands

- **Squeeze-** a central concept of Bollinger Bands.
- When the bands come close together, **constricting the moving average**, it is called a squeeze. A squeeze signals a **period of low volatility** and is considered by traders to be a potential sign of future increased volatility and possible trading opportunities.

Bollinger Bands

- On the contrary, the **wider apart** the **bands move**, the more likely the chance of a **decrease in volatility** and the greater the possibility of exiting a trade. These conditions are **not trading signals**. The bands **do not indicate when the change** may take place or in **which direction** the price could move.

Indicators

- Moving Average Convergence Divergence (MACD)
- Relative Strength (RSI)

MACD

- Moving Average Convergence Divergence indicator is used to measure **momentum oscillator** primarily used to trade trends.
- Shows the relationship between **two EMA** of a security's price.
- MACD line is calculated by **subtracting** the **26-period EMA** from the **12-period EMA**.

MACD

- A **9-day EMA** of the MACD line is called the **signal line**, which is then **plotted on top** of the MACD line, which can function as a trigger for buy or sell signals.
- Traders may buy the security when the MACD line crosses above the signal line and sell—or short—the security when the MACD line crosses below the signal line.

MACD

- MACD indicators can be interpreted in several ways, but the more common methods are Crossovers, Divergences and rapid rises/falls.
- MACD Line- Fast Line
- Signal Line- Slow line
- Zero line- Base line & center line
- MACD Histogram-Bars above & below the zero line

MACD

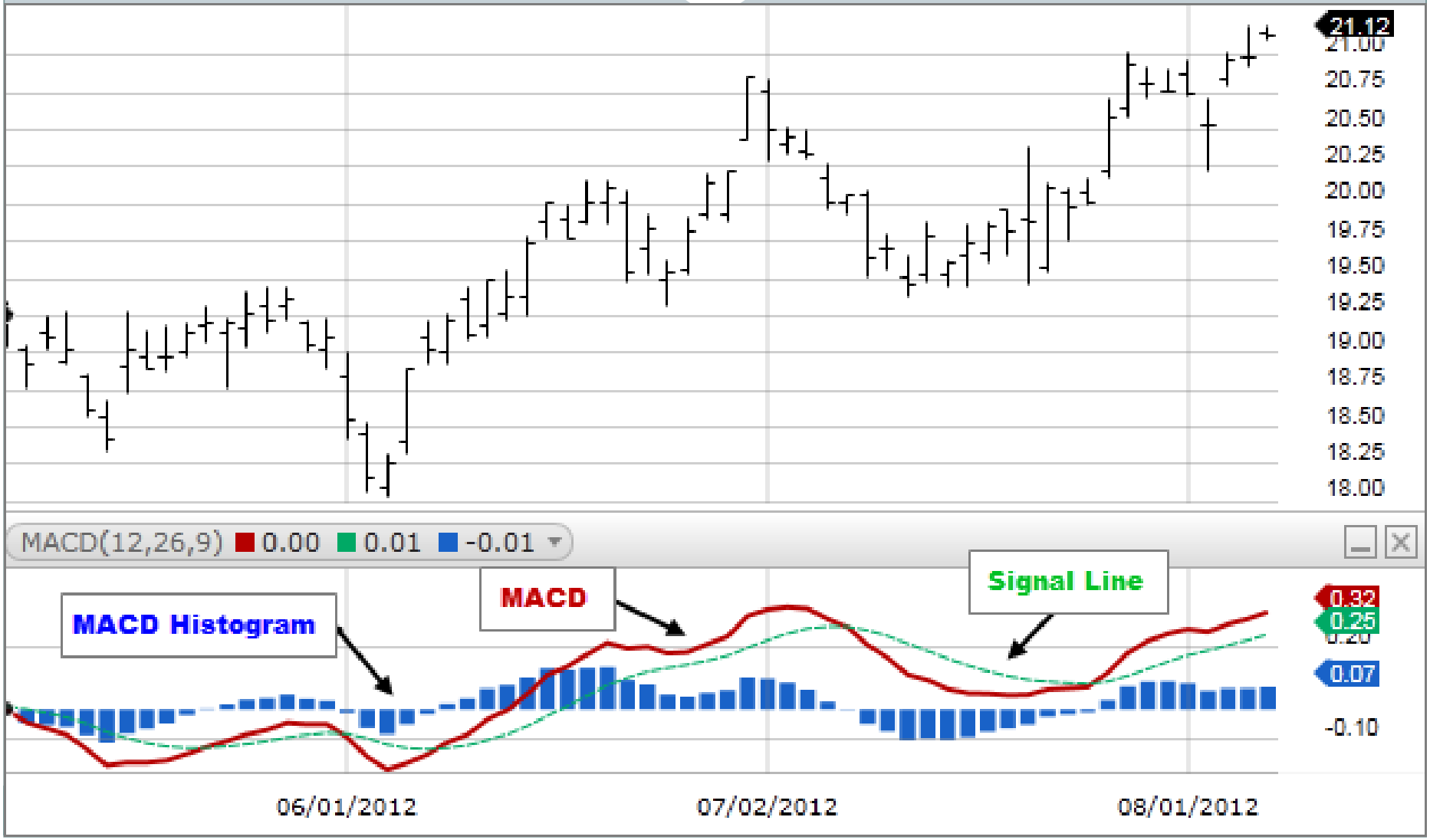
- MACD calculation= 12 day EMA – 26 day EMA
- Signal Line= 9 day EMA of MACD Line
- MACD Histogram= MACD Line – Signal Line
- MACD default setting= 12, 26, 9
- Working of MACD- mainly 2 types of line; MACD Line & Signal Line
- They move above and below the Zero line, shows the trend to buy & sell

MACD

- 2 types of Crossovers:

1. **Positive Crossover/Bullish Crossover-** when MACD line crossed/intersect Signal line from below and is above it (bullish trend) and signals buying in the market
2. **Negative Crossover/Bearish Crossover-** when MACD line crossed/intersect Signal line from above and is below it (bearish trend) and signals selling in the market

MACD


21.12
20.75
20.50
20.25
20.00
19.75
19.50
19.25
19.00
18.75
18.50
18.25
18.00
MACD(12,26,9) 0.00 0.01 -0.01
MACD Histogram
MACD
Signal Line
0.32
0.25
0.07
-0.10
06/01/2012
07/02/2012
08/01/2012

MACD

- If, **Positive crossover** is **above the Zero line- Strong Bullish** trend signal
- If, **Negative crossover** is **below the Zero line- Strong Bearish** trend signal

MACD Application

- Observe the Crossovers

MACD Application

- Observe the Crossovers

MACD Application

- Observe the Crossovers

Relative Strength Indicator

- A technical **momentum indicator** that compares the magnitude of recent gains to recent losses in an attempt to determine **overbought** and **oversold** conditions of an asset.
- RSI = 100 - 100/(1 + RS*)
- *Where RS = Average of x days' up closes / Average of x days' down closes

Relative Strength Indicator Application

- Observe when the RS crosses above the 70 line and below the 30 line

Relative Strength Indicator Application

- Observe when the RS crosses above the 70 line and below the 30 line

Relative Strength Indicator Application

- Observe when the RS crosses above the 70 line and below the 30 line

Derivatives

- Derivatives are **financial contracts** that **derive** their **value from an underlying asset**, a **real asset** (gold) or a **financial asset** (interest rate).
- Like- stocks, indices, commodities, currencies, exchange rates, or the rate of interest. These financial instruments help you make profits by betting on the future value of the underlying asset.

Derivatives

- Derivatives **don't have** its own **physical existence** but its value depends/derived from the underlying asset.
- Classification of Derivatives
- **Commodity Derivatives & Financial Derivatives-** In commodity derivatives the underlying asset is a **physical** or real asset like wheat, pulses, rice or even metals gold, silver, etc. Financial derivatives-bonds, equity, debentures, etc.

Derivatives

- **Elementary Derivatives & Complex Derivatives-** Elementary/basic derivatives are those which are simple and easy to understand- **futures & options**. Complex derivatives have complex provision and features which make them difficult to understand- **exotic options, synthetic futures**.

Derivatives

- **Exchange traded Derivatives & Over The Counter (OTC) Derivatives-** Exchange-traded derivatives are standardized, regulated and settled via a clearing house (Stock Index futures, Stock index options, etc.), while OTC derivatives are customized (specific to the need of the parties), negotiated privately and involve counterparty risk. OTC refers to a transaction conducted directly between two parties, without the supervision of an exchange.

Derivatives

- Types of Derivatives
- **Forwards-** A forward contract is a private bilateral agreement between two parties to buy & sell a specified asset at a specified price on a specified future date.
- These contracts only trade OTC.
- When a forward contract is created, the buyer and seller may customize the terms, size, and settlement process.

Derivatives

- Example of Forwards

The predetermined quantity of rice to be sold is 500 kgs. and the price at which the rice will be sold is ₹20 per kg. Hence, the price of forward contract is ₹10,000 (500 * 20), which derives its value from the underlying – rice. The contract will be fulfilled on a future date – two months from now.

Derivatives

- **Futures-** Futures contract, or simply futures, is an bilateral agreement between two parties for the purchase and delivery of an asset at an agreed-upon price at a **future date**.
- Futures are **standardized contracts** that **trade on an exchange**.
- Allow the traders to **lock in the price** of the underlying asset or commodity.

Derivatives

- Example of Futures
- On Nov. 16, 2023, Company AB buys a futures contract for oil at a price of Rs.62.09 per barrel from firm XY that expires on Dec. 19, 2023. The company does this because it needs oil in December and is concerned that the price will rise before the company needs to buy. Assume oil prices rise to Rs.80.23 per barrel by Dec. 19, 2023. Company AB can accept delivery of the oil from the seller of the futures contract

Derivatives

- **Options**- similar to a futures contract, is an agreement between two parties to buy or sell an asset at a predetermined future date for a specific price.
- But with an **Option**, the buyer (holder) is not obliged to exercise their agreement to buy or sell. It is an opportunity only, not an obligation, as futures are.
- **Options** contract gives a **right** to the **buyer**.

Derivatives

- The **seller** has the obligation but **no right**.
- In case of Options, the buyers and sellers are **not equal**.
- Buyer has a privilege position.
- Buyer has a right but no obligation, he pays a price called Options Premium to the seller as a compensation for the obligations he undertakes.
- Specified price also called **Strike price**/exercise price

Derivatives

- Types of Options
- **Call Options**- a call option gives the holder the **right, but not the obligation, to buy** the underlying security at the strike price on or before expiration.
- A call option will therefore become more valuable as the **underlying security rises in price**.

Derivatives

- **Put Options-** a put gives the holder the **right, but not the obligation, to sell** the underlying stock at the strike price on or before expiration.
- A long put, therefore, is a short position in the underlying security, since the put gains value as the underlying's price falls (they have a negative delta).
- Puts can be purchased as a sort of insurance, providing a price floor for investors to hedge their positions.