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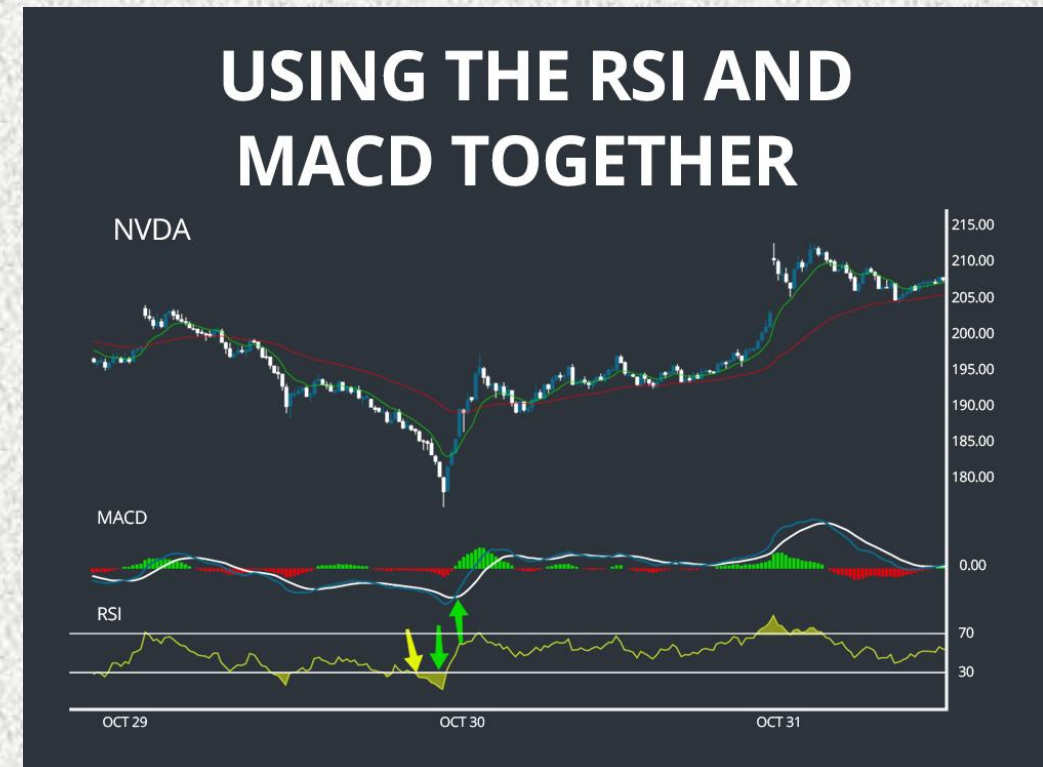


Department of Management Studies

**23BBE731 – Security Analysis and
Portfolio Management**
II / III SEMESTER

UNIT III : Technical Analysis

*Topic: Technical Indicators-
RSI,MACD*



Introduction to Technical Indicators

- Technical indicators are **mathematical calculations** based on price, volume, or open interest.
 - Help traders **forecast market direction** and measure momentum.
 - Two popular **momentum indicators**:
 - **Relative Strength Index (RSI)**
 - **Moving Average Convergence Divergence (MACD)**
- *They guide investors in identifying overbought or oversold market conditions.*



Relative Strength Index (RSI) – Overview

- Developed by **J. Welles Wilder**.
- Measures the **speed and change of price movements**.
- RSI oscillates between **0 and 100**.
- Key Levels:
 - **Above 70 → Overbought** (Possible Sell Signal)
 - **Below 30 → Oversold** (Possible Buy Signal)
- Formula:

$$RSI = 100 - \left(\frac{100}{1 + RS} \right)$$

where $RS = \frac{\text{Average Gain}}{\text{Average Loss}}$

- *RSI helps identify potential trend reversals.*

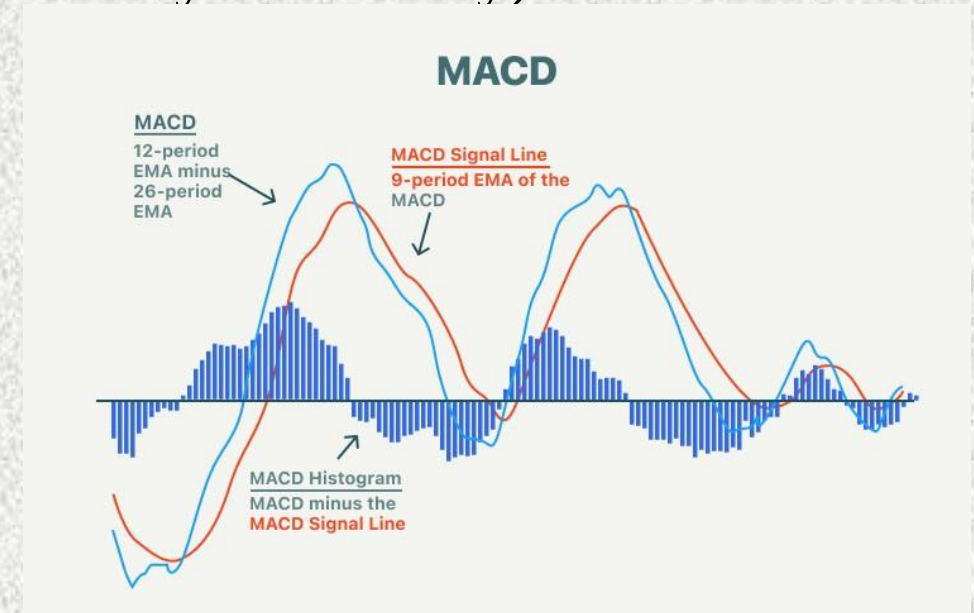


RSI – Application and Interpretation

- **Bullish Divergence:** Price makes a new low, RSI makes a higher low → Uptrend signal.
 - **Bearish Divergence:** Price makes a new high, RSI makes a lower high → Downtrend signal.
 - Used in **swing trading** to confirm entry and exit points.
 - Often combined with **Moving Averages** for reliability.
- *RSI refines decision-making by showing internal strength of price moves.*

Moving Average Convergence Divergence (MACD) – Overview

- Developed by **Gerald Appel**.
- Shows relationship between **two EMAs** (typically 12-day and 26-day).
- Components:
 - **MACD Line** = $\text{EMA}(12) - \text{EMA}(26)$
 - **Signal Line** = 9-day EMA of MACD Line
 - **Histogram** = $\text{MACD Line} - \text{Signal Line}$



MACD – Interpretation

- ✓ **MACD > Signal Line:** Bullish trend (Buy signal).
 - ✓ **MACD < Signal Line:** Bearish trend (Sell signal).
 - ✓ **Zero Line Cross:** Indicates shift in momentum.
 - ✓ Works best in **trending markets**.
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- *Combines elements of both momentum and trend-following strategies.*

RSI vs. MACD – Comparison Table

Feature	RSI	MACD
Purpose	Measures price momentum	Measures trend strength
Range	0–100	Oscillates above/below zero
Type	Oscillator	Trend-following
Key Signal	Overbought/Oversold	Crossovers
Ideal Use	Range-bound markets	Trending markets

Importance of RSI and MACD

- Helps detect **trend reversals** and **momentum shifts**.
 - Used to confirm **entry and exit points**.
 - Reduces emotional trading decisions.
 - Can be integrated into **automated trading algorithms**.
- ☐ *Widely used by traders globally for reliable forecasting.*

Mapping with Design Thinking

Design Thinking Stage

Empathize

Application in RSI & MACD

Understand investor need for clarity amid price noise.

Define

Problem: Misjudging entry/exit timing due to volatility.

Ideate

Develop mathematical tools (RSI, MACD) for pattern recognition.

Prototype

Visualize signals using chart overlays.

Test

Validate indicator effectiveness through backtesting.

Generative AI Connection

- ✓ AI algorithms enhance RSI & MACD signals by analyzing complex price behavior.
- ✓ Machine Learning models detect false signals and optimize thresholds (e.g., dynamic RSI levels).
- ✓ Generative AI can produce visual predictions and simulate “what-if” trading scenarios.
- ✓ AI-driven bots combine RSI & MACD for automated signal generation.
- *AI empowers traders to move from reactive to predictive analysis.*

Real-World Application

- ✓ **RSI (14-period) and MACD (12,26,9)** are default in trading platforms.
- ✓ Example: RSI below 30 + MACD crossover = Strong Buy Confirmation.
- ✓ Used in **stocks, forex, crypto**, and **index trading**.
- *A balanced approach improves accuracy in technical setups.*



Summary

- RSI → *Measures strength of price movement.*
- MACD → *Measures relationship between moving averages.*
- Together, they form the **foundation of momentum-based trading systems.**



References

- ❑ <https://www.investopedia.com/terms/m/macd.asp>
- ❑ <https://corporatefinanceinstitute.com/resources/capital-markets/rsi/>
- ❑ <https://www.wallstreetmojo.com/macd-vs-rsi/>

Thank you!