STOCK MARKET ANALYSIS

Sayannil Das

July 2021

Mentor: Avin Rai

Contents:

Trivia:

*Through this **Summer of Science** report, I wish to cover everything I learned about the Stock Market and address important techniques and tricks each trader must have. This is a continuation of my Mid-Term Report. I used **Zerodha Varsity** as my base source and several online websites like **Investopedia**, **CFI** and **Wiki Accounting** for learning methods, but with the exception of a few definitions and pictures the entire module is typed by me. The charts are made by using SmartArt in MS Word.*

Links:

(1) https://zerodha.com/varsity/
(2) https://www.investopedia.com/
(3) https://www.wikiaccounting.com/
(4) https://corporatefinanceinstitute.com/

CHAPTER 1: INTRODUCTION

Technical Analysis deals with charting information and predicting their outcome from looking at their charts. Fundamental Analysis is a holistic approach to study a business. When an investor wishes to invest in a business for the long term (say 3 – 5 years) it becomes extremely essential to understand the business from various perspectives.

Assumptions:

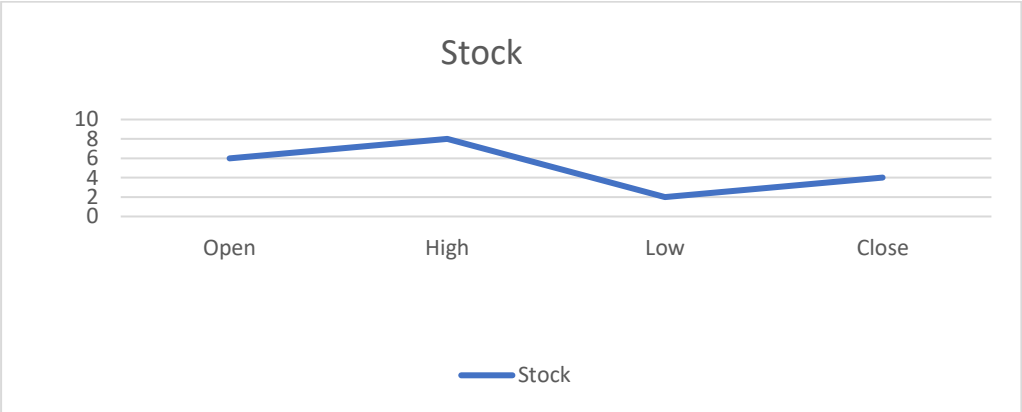
1. **Market discounts everything**
   All known and unknown information in the public domain is reflected in the latest stock price.

2. **The 'how' is more important than 'why**

3. **Price moves in trend**
   All major moves in the market are an outcome of a trend.

4. **The most repetitive past tends to repeat itself**
   It is not bound by its scope. The concepts of TA can be applied across any asset class as long as it has a time series data.

Concept of OHLC *(from midterm report)*



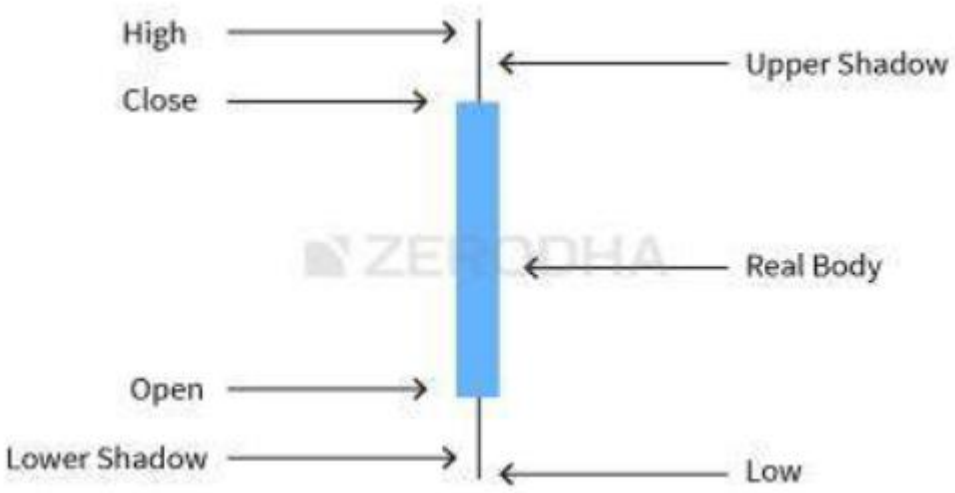
It means '**Open** price **High** price **Low** price **Close** price' in a timespan.

A **risk taker** will buy on that day and a **risk averse** will buy on the next day.

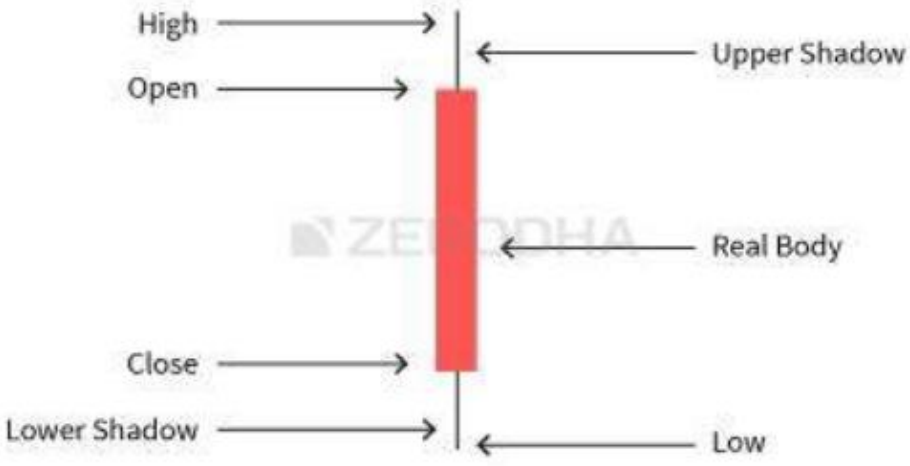
CHAPTER 2: THE JAPANESE CANDLESTICK METHOD

It is an easier and more accurate version of showing stock market charts. There are 2 types of Candles: Bullish and Bearish Candle.

In a Bullish Candle the Close is higher than the Open.



In a Bearish Candle the Open is higher than the Close.



Anatomy of a Candle:

1. The Central real body – The real body, rectangular in shape connects the opening and closing price
2. Upper shadow – Connects the high point to the close
3. Lower Shadow – Connects the low point to the open

SUBPART 2.1: SINGLE CANDLESTICK PATTERNS

1. The Marubozu

Marubozu has candlesticks with no upper and lower shadow. Like this:

In a bullish Marubozu Open = Low and High = Close. Similarly, a bearish Marubozu has Open = High and Low = Close.

Inferences from a Marubozu is that the trades didn't vary too much and there are 2 options for each type of Marubozu.

Bullish: Risk taker will buy on the same day and if it goes well. Risk averse will buy on the next day after ensuring it's still bullish. Risk averse will have to pay more since the prices will rise on seeing the pattern. But if the trend reverses then the risk averse will be at profit.

Bearish: In this case if a trend follows risk taker will lose money and the risk averse will gain money and vice versa.

Advisable to trade only in short marubozu's or else the risk will be too great to take.

2. <u>The Spinning Top</u>

They look like this:

Features include a short real body and equal length shadows. Spinning tops are basically the speed breakers in an Uptrend/ Downtrend. They can either be turned in either direction and choosing the upward trend needs more parameters to consider.

They show the indecision of the market and how it's divided amongst the bears and the bulls.

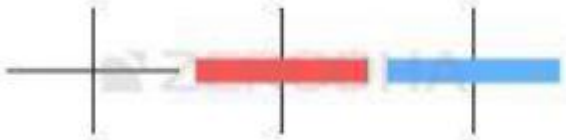
Example of a downtrend and its strategy:

This is an example of conversion to a minimal. Risk takers would buy seeing a Spinning top and some insight about bulls in the market on that day and profit.

Advice is that since the risk is 50%, investment of 50% of total stocks would be viable.

3. The Dojis

They are characterised by having long shadows and nearly no real body at all.



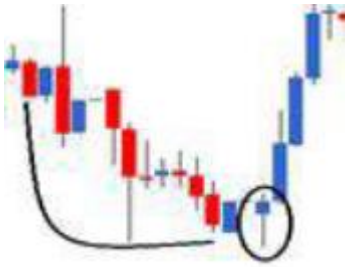
The Dojis are similar to the spinning tops but the spinning top stars to appear in a trend the dojis appear at the extrema of the curve showing the indecision of the market.

The open and close prices are close hence colour of the doji doesn't matter.
Example:

This shows the immediate next move of the market is to shift trends.

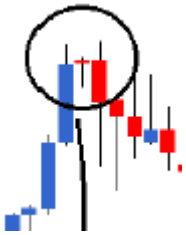
4. Paper Umbrellas

This is a Hammer. Hammers show an upward curve in the stock prices (a minimal). Example:



This is a Hanging Man. They show a downward curve in price.

Example:



NOTE: **Types of stocks**

Pink Sheet Stocks: The term pink sheets refer most commonly known as penny stocks, which are traded at $5 per share or less. They're also called over-the-counter stocks because that's how they are traded. One won't find them on any major exchange, and they're often smaller companies.

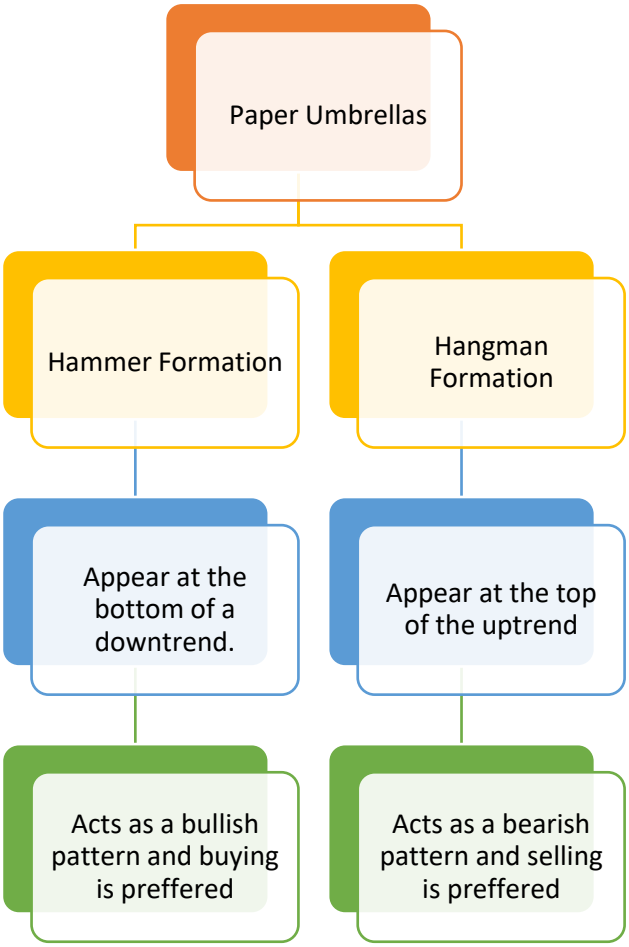
Blue-chip stocks: They are stocks of large, stable companies with a long history of stable earnings and dividends.

Growth Stocks: They are stocks of growing companies or companies in growing industries. They have high returns but they are riskier to invest as all the earnings are re-invested here.

Defensive stocks: It is stock which provides constant dividends and stable earnings regardless of the overall state of stock market. They tend to remain stable in various phases of business cycle.

Income Stocks: These stocks pay out a much larger portion of their profits in form of quarterly dividends than other stocks do. These are slower-growth companies.

Value Stocks: Trades at lower price related to its fundamentals such as dividends, earnings or sales making it appealing to value investors.



5. The Shooting Star

Looks like an inverted Paper Umbrella. Hence it will have trends exactly opposite to it. Means a Red Shooting Star will be preferred to be bought (like a Hammer) and a Blue Shooting Star will be preferred to be sold (like a Hangman).

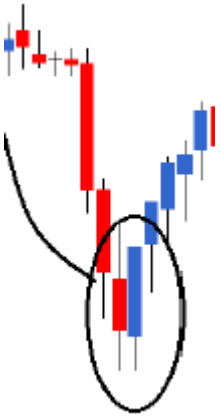
SUBPART 2.2: MULTIPLE CANDLESTICK PATTERNS

1. The Engulfing Pattern

The engulfing pattern is the first multiple candlestick pattern that we need to look into. The engulfing pattern needs 2 trading sessions to evolve. In a typical engulfing pattern, a small candle on day 1 and a

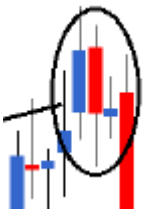
relatively long candle on day 2 which appears as if it engulfs the candle on day 1.

In a Bullish engulfing pattern like this one it's advised to go long and vice versa for a Bearish engulfing pattern.



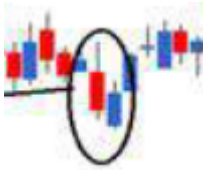
2. The Engulfing Pattern with a Doji

It has been seen that when a Doji has been introduced to the Engulfing pattern it reverses its trend.

Example: 

3. The Piercing Pattern

In a bullish engulfing pattern, the P2's blue candle engulfs P1's red candle completely. However, in a piercing pattern P2's blue candle partially engulfs P1's red candle, however the engulfing should be between 50% and less than 100%. It will follow the same trend as bullish engulfing pattern. But it will have nearly no effect on the price on a slightly larger sense. Example:



4. The Dark Cloud Cover

In a bearish engulfing pattern, the P2's red candle engulfs P1's blue candle completely. However, in a piercing pattern P2's red candle partially engulfs P1's blue candle, however the engulfing should be between 50% and less than 100%. It will follow the same trend as bearish engulfing pattern. But it will have nearly no effect on the price on a slightly larger sense.

5. The Harami Pattern

1. Day 1 (P1) of the pattern forms a long candle and day 2(P2) of the pattern forms a small candle which appears as if it has been tucked inside the P1's long candle

2. A bullish harami candle pattern is formed at the lower end of a down trend. P1 is a long red candle, and P2 is a small blue candle. The idea is to initiate a long trade near the close of P2 (risk taker). A risk averse trader will initiate the long trade near the close of the day after P2 only after ensuring it forms a blue candle day. Vice versa for bearish.

3. The stop loss on a bullish harami pattern is the lowest low price between P1 and P2. Vice versa for bearish.

Example of a bearish Harami:

6. The Gap Openings

Gap Openings just shows the enthusiasm of the bulls and bears to buy and sell shares in the market. That is why their prices rise and fall unexpectedly and is seen as a discontinuity in the graph.

Example of Gap Up Opening:

7. The Morning & Evening Star

1. Star formation occurs over three trading sessions. The candle of P2 is usually a doji or a spinning top

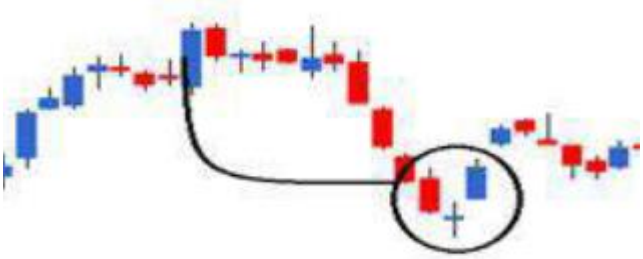
2. If there is a doji on P2 in a star pattern, it is called a doji star (morning doji star, evening doji star) else it is just called the star pattern (morning star, evening star)

3. Morning star is a bullish pattern which occurs at the bottom end of the trend. The idea is to go long on P3 with the lowest low of the pattern being the stop loss for the trade

4. Evening star is a bearish pattern, which occurs at the top end of an uptrend. The idea is to go short on P3, with the highest high of the pattern acting as a stop loss.

5. The star formation evolves over a 3 days period; hence both the risk averse and risk taker are advised to initiate the trade on P3.

Example of a Morning Star:



CHAPTER 3: MARKET INDICATORS

Indicators are some independent trading systems created by successful traders.

Indicators are of 2 types:

(1) Leading: Predict where the price is headed.
(2) Lagging: Offer a historical report of background conditions that resulted in the current price being where it is.

1. Trade of Volumes

This is an indicator of the type of trade on that day. If the volume is low, it is best to avoid trading on that day because high volumes indicate presence of smart money.

2. Support and Resistance System

They are basically price points on the chart. Support is below the PP and Resistance is above PP.

To identify S&R, place a horizontal line in such a way that it connects at least 3 price action zones, well-spaced in time. The greater number of price action zones (well-spaced in time) the horizontal line connects, the stronger is S&R.

Q: How to make the Support Line and Resistance Line?

(1) **Identify all the swings: highs and lows**

(2) **Maximum price action zone is a line**

If it is below current price, it is support line or else it's resistance line. If more than 2 such areas are coinciding at a price, that's a line.

3. System of Moving Averages

Simple Moving Averages (SMA) give equal weightage to all the stock prices in the graph.

Exponential Moving Averages (EMA) gives newer data an exponential weightage than the older ones.

The outlook is bullish when the current market price is greater than the EMA. The outlook turns bearish when the current market price turns lesser than the EMA.

4. The Relative Strength Index

RSI is a leading momentum indicator which helps in identifying a trend reversal. RSI indicator oscillates between 0 and 100, and based on the latest indicator reading, the expectations on the markets are set.

It's calculated by:

$$RSI = 100 - \frac{100}{1 + RS}$$

$$RS = \text{Average Gain} / \text{Average Loss}$$

Some ways to interpret RSI:

- If the RSI is fixed in an overbought region for a prolonged period, look for buying opportunities instead of shorting. The RSI stays in the overbought region for a prolonged period because of an excess positive momentum.

- If the RSI is fixed in an oversold region for a prolonged period, look for selling opportunities rather than buying. RSI stays in the oversold region for a prolonged period because of an excess negative momentum
- If the RSI value starts moving away from the oversold value after a prolonged period, look for buying opportunities. For example, the RSI moves above 30 after a long time may mean that the stock may have bottomed out, hence a case of going long.
- If the RSI value starts moving away from the overbought value after a prolonged period, look for selling opportunities. For example, RSI moving below 70 after a long time. This means the stock may have topped out, hence a case for shorting.

5. Moving Average Convergence and Divergence

A standard MACD is calculated using a 12 day EMA and a 26 day EMA.

And for this: MACD value = [12 day EMA – 26 day EMA]

When the MACD is negative, it means the 12 day EMA is lower than the 26 day EMA. Therefore, the momentum is negative. Higher the magnitude of the MACD, the more strength in the downward trend. And vice versa.

6. Bollinger Bands

It's a method used to determine overbought and oversold level of stocks in the market.

The BB has 3 components:

1. Middle line is the 26 day simple moving average of the closing prices

2. An upper band: This is a + standard deviation of the middle line

3. A lower band: This is a - standard deviation of the middle line

7. Fibonacci Retracements

Divide any number in the series by the previous number; the ratio is always approximately 1.618. This ratio is considered as the Golden Ratio, also referred to as the Phi.

Fibonacci retracements are levels (61.8%, 38.2%, and 23.6%) up to which a stock can possibly retrace before it resumes the original directional move. These are proven rates.

NOTE: According to Jordan Belfort the lucky numbers for trading are 7, 9 and 15.

8. Dow Theory

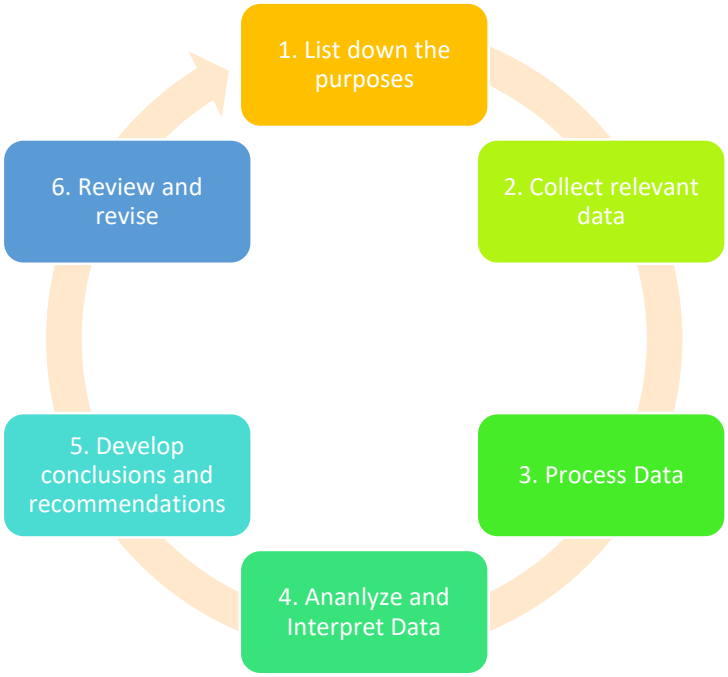
Dow Theory was used in the western world. It works on 9 basic tenets. Market can be viewed in 3 basic phases – accumulation, mark up, and distribution phase.

The accumulation phase is when the institutional investor (smart money) enters the market, mark up phase is when traders make an entry, and the final distribution phase is when the larger public enter the market. What follows the distribution phase is the mark down phase, following which the accumulation phase will complete the circle. The double and triple formations are reversal patterns, which are quite effective.

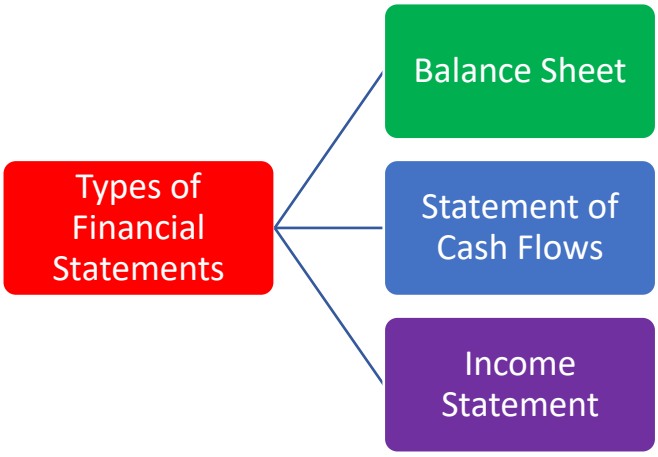
CHAPTER 4: FINANCIAL STATEMENTS

Financial statements are the output of the accounting process, a formal way of communicating financial information that can be used by a variety of parties in making decisions about a business. For example, it can be used by variety of users externally or even internally in getting know about various aspects of progress, present condition, futuristic goals. Financial statements are a critical source of information for most business decisions.

- Basic things ensured by Financial Statements:



- Types of Financial Statements:



1. **Income Statement**
   The income statement is one of the financial statements of an entity that reports three main financial information of an entity for a specific period of time. That information included revenues, expenses, and profit or loss for the period of time.

   The income statement is sometimes called the statement of financial performance because this statement lets the users assess and measure the financial performance of an entity from period to period of the similar entity, competitors, or the entity itself.

E.g.

Revenue	Merchandise Sale	25,800
	Revenue from Training	5,000
	Total Revenue	30,800
Expenses	Procurement Costs	8,000
	Wages	700
	Rent	1,000
	Interest Paid	500
	Transportation	300
	Utilities	150
	Total Expenses	10,650
Gains	Income from sale of van	2,000
Losses	Settlement cost of consumer lawsuit	800
Net Income	(Revenue + Gains) - (Expenses + Losses)	21,350

Investopedia

2. **Balance Sheet**

- A Balance Sheet is sometimes called the statement of financial position. It shows the balance of assets, liabilities, and equity at the end of the period of time. The balance sheet is sometimes called the statement of financial position since it shows the values of the entity's net worth.
- It is different from the income statement since the balance sheet reports account's balance at the reporting date. In contrast, the income statement reports that the account's transactions during the reporting period.
- If the user of financial statements wants to know the entity's financial position, then the balance sheet is the statement the user should looking for.

E.g.

ASSETS		LIABILITIES	
Current assets		Current liabilities	
Cash and cash equivalents	$ 2,200	Short-term loans payable	$ 5,000
Short-term investments	10,000	Current portion of long-term debt	15,000
Accounts receivable - net	39,500	Accounts payable	20,900
Other receivables	1,000	Accrued compensation and benefits	8,500
Inventory	31,000	Income taxes payable	6,100
Supplies	3,800	Other accrued liabilities	4,000
Prepaid expenses	1,500	Deferred revenues	1,500
Total current assets	89,000	Total current liabilities	61,000
Investments	36,000	Long-term liabilities	
Property, plant & equipment - net		Notes payable	20,000
Land	5,500	Bonds payable	375,000
Land improvements	6,500	Deferred income taxes	25,000
Buildings	180,000	Total long-term liabilities	420,000
Equipment	201,000	Total liabilities	481,000
Less: accumulated depreciation	(56,000)		
Property, plant & equipment - net	337,000	Commitments and contingencies (see notes)	
Intangible assets		STOCKHOLDERS' EQUITY	
Goodwill	105,000		
Other intangible assets	200,000	Common stock	110,000
Total intangible assets	305,000	Retained earnings	220,000
		Accum other comprehensive income	9,000
Other assets	3,000	Less: Treasury stock	(50,000)
		Total stockholders' equity	289,000
Total assets	$ 770,000	Total liabilities & stockholders' equity	$ 770,000

3. Statement of Cash Flows

The cash flow statement is one of the financial statements that show the movement of the entity's cash during the period. This statement helps users understand how is the cash movement in the entity. There are three sections in this statement. They are cash flow from the operation, cash flow from investing, and cash flow from financing activities.

CASH FLOWS FROM OPERATING ACTIVITIES	
Net income	$ 12,950
Adjustments to reconcile net income to	
net cash provided by operating activities:	
Depreciation on fixed assets	2,000
(Increase) decrease in current assets:	
Accounts receivable	(300)
Inventory	(39,800)
Prepaid expenses	(1,000)
Increase (decrease) in current liabilities:	
Accounts payable	49,000
Accrue expenses and unearned revenues	1,450
NET CASH PROVIDED BY OPERATING ACTIVITIES	24,300
CASH FLOWS FROM INVESTING ACTIVITIES	
Purchase of property and equipment	(101,000)
NET CASH USED IN INVESTING ACTIVITIES	(101,000)
CASH FLOWS FROM FINANCING ACTIVITIES	
Proceeds from line of credit	-
Payments on line of credit	10,000
Proceeds from long-term debt	99,500
Payments on long-term debt	-
NET CASH PROVIDED (USED) IN FINANCING ACTIVITIES	109,500
NET INCREASE (DECREASE) IN CASH	32,800

E.g.

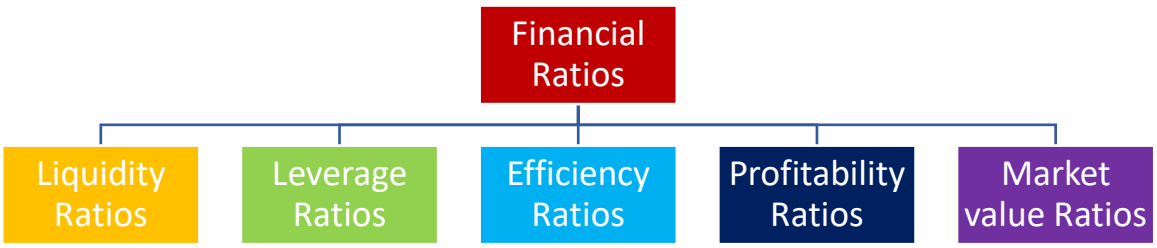
CHAPTER 5: FINANCIAL RATIOS

Financial ratios are created with the use of numerical values taken from financial statements to gain meaningful information about a company. The numbers found on a company's financial statements – balance sheet, income statement, and cash flow statement – are used to perform quantitative analysis and assess a company's liquidity, leverage, growth, margins, profitability, rates of return, valuation, and more.

Financial Ratios give 2 purposes:

1) Track company performance
2) Make comparative judgments

5 Types of Financial ratios:



- **Liquidity Ratios**

Measure a company's ability to repay both short- and long-term obligations.

The 4 ratios in it are:

(1) The current ratio measures a company's ability to pay off short-term liabilities with current assets:

Current ratio = Current assets / Current liabilities

(2) The acid-test ratio measures a company's ability to pay off short-term liabilities with quick assets:

Acid-test ratio = (Current assets – Inventories) / Current liabilities

(3) The cash ratio measures a company's ability to pay off short-term liabilities with cash and cash equivalents:

Cash ratio = Cash and Cash equivalents / Current Liabilities

(4) The operating cash flow ratio is a measure of the number of times a company can pay off current liabilities with the cash generated in a given period:

Operating cash flow ratio = Operating cash flow / Current liabilities

- **Leverage Ratios**

Measure the amount of capital that comes from debt. In other words, leverage financial ratios are used to evaluate a company's debt levels.

The 4 ratios in it are:

(1) The debt ratio measures the relative amount of a company's assets that are provided from debt:

Debt ratio = Total liabilities / Total assets

(2) The debt to equity ratio calculates the weight of total debt and financial liabilities against shareholders' equity:

Debt to equity ratio = Total liabilities / Shareholder's equity

(3) The interest coverage ratio shows how easily a company can pay its interest expenses:

Interest coverage ratio = Operating income / Interest expenses

(4) The debt service coverage ratio reveals how easily a company can pay its debt obligations:

Debt service coverage ratio = Operating income / Total debt service

- **Efficiency Ratios**

Also known as activity financial ratios, are used to measure how well a company is utilizing its assets and resources.

Efficiency ratios include:

(1) The asset turnover ratio measures a company's ability to generate sales from assets:

Asset turnover ratio = Net sales / Average total assets

(2) The inventory turnover ratio measures how many times a company's inventory is sold and replaced over a given period:

Inventory turnover ratio = Cost of goods sold / Average inventory

(3) The accounts receivable turnover ratio measures how many times a company can turn receivables into cash over a given period:

Receivables turnover ratio = Net credit sales / Average accounts receivable

(4) The days sales in inventory ratio measures the average number of days that a company holds on to inventory before selling it to customers:

Days sales in inventory ratio = 365 days / Inventory turnover ratio

- **Profitability Ratios**

Measure a company's ability to generate income relative to revenue, balance sheet assets, operating costs, and equity.

(1) The gross margin ratio compares the gross profit of a company to its net sales to show how much profit a company makes after paying its cost of goods sold:

Gross margin ratio = Gross profit / Net sales

(2) The operating margin ratio compares the operating income of a company to its net sales to determine operating efficiency:

Operating margin ratio = Operating income / Net sales

(3) The return on assets ratio measures how efficiently a company is using its assets to generate profit:

Return on assets ratio = Net income / Total assets

(4) The return on equity ratio measures how efficiently a company is using its equity to generate profit:

Return on equity ratio = Net income / Shareholder's equity

- **Market Value Ratios**

Used to evaluate the share price of a company's stock.

These include:

(1) The book value per share ratio calculates the per-share value of a company based on the equity available to shareholders:

Book value per share ratio = (Shareholder's equity – Preferred equity) / Total common shares outstanding

(2) The dividend yield ratio measures the amount of dividends attributed to shareholders relative to the market value per share:

Dividend yield ratio = Dividend per share / Share price

(3) The earnings per share ratio measures the amount of net income earned for each share outstanding:

Earnings per share ratio = Net earnings / Total shares outstanding

(4) The price-earnings ratio compares a company's share price to its earnings per share:

Price-earnings ratio = Share price / Earnings per share

CHAPTER 6: DCF ANALYSIS

It means Discounted Cash Flow. It is a valuation technique. The intrinsic value as per the DCF method is the evaluation of the 'perceived stock price' of a company, keeping all the future cash flows in perspective.

Time Value of Money signifies that the value of money changes with time.

E.g., $10 to be received today ≠ a promise of $10 to be given 2 years from now.

Hence there's a present (PV) and a future (FV) value of money.

In both the cases, as there is a passage of time, the money has to be adjusted for the opportunity cost. This adjustment is called Compounding when we have to calculate the future value of money. It is called "Discounting" when we have to calculate the present value of money.

Formulae:

*FV = PV * (1+opportunity cost rate) ^ number of years*

PV = FV / (1+discount rate) ^ number of years

The Terminal Value (TV) is the sum of all the future free cash flow, beyond a number of years, also called the terminal year.

*TV = FCF * (1+Terminal Growth Rate) / (Discount Rate–Terminal growth rate)*

Also (from the Balance Sheet),

net debt = current year total debt – cash & cash balance

Net Debt would normally be a negative figure.

So, *shares = free cash flow - |net debt|*

And, *share price = shares / total number of shares*

And with a 10% leeway we create an intrinsic value band. I.e.,

[(share price) *0.9, (share price) *1.1]

Still, we must consider certain aspects,

- If the stock price is below the lower intrinsic value band, then we consider the stock to be undervalued, hence one should look at buying the stock
- If the stock price is within the intrinsic value band, then the stock is considered fairly valued. While no fresh buy is advisable, one can continue to hold on to the stock if not for adding more to the existing positions.
- If the stock price is above the higher intrinsic value band, the stock is considered overvalued. The investor can either book profits at these levels or continue to stay put. But should certainly not buy at these levels.

Lastly,

I would like to thank the Maths and Physics Club of IIT Bombay to conduct this wonderful and informative session of Summer of Science this year.