International Federation of Technical Analysts

Certified Financial Technician (CFTe) I & II Syllabus & Reading Material

(Last updated: 9 January 2025)

CFTe Level I
CORE READING MATERIAL

I. Edwards, Robert D. and Magee, John, ***Technical Analysis of Stock Trends, 9th (or current) Edition*** (2001-2008), John Magee Inc., Chicago Illinois ©2001, ISBN 1-57444-292-9

Chapters:

1. The Technical Approach to Trading and Investing
2. Charts
3. The Dow Theory
4. The Dow Theory in Practice
5. The Dow Theory's Defects
6. Important Reversal Patterns
7. Important Reversal Patterns – Continued
8. Important Reversal Patterns – The Triangles
9. Important Reversal Patterns – Continued
10. Other Reversal Phenomena
11. Consolidation Formations
12. Gaps
13. Support and Resistance
14. Trendlines and Channels
15. Major Trendlines
16. Technical Analysis of Commodity Charts
17. A Summary of Some Concluding Comments
    17.2 Advancements in Investment Technology
18. The Tactical Problem
    18.1 Strategies and Tactics for the Long-Term Investor
20. The Kind of Stocks we Want: The Speculator's View Point
    20.1 The Kind of Stocks we Want: The Long-Term Investor's View Point
23. Choosing and Managing High-Risk Stocks: Tulip Stocks, Internet Sector and Speculative Frenzies
24. The Probable Moves of Your Stocks
25. Two Touchy Questions
27. Stop Orders
28. What is a Bottom - What is a Top?
29. Trendlines in Action
30. Use of Support and Resistance

CFTe Level I (Continued)
CORE READING MATERIAL

33. Tactical Review of Chart Action
34. A Quick Summation of Tactical Methods
36. Automated Trendlines: The Moving Average
38. Balanced and Diversified
39. Trial and Error
40. How Much Capital to Use in Trading
41. Application of Capital in Practice
42. Portfolio Risk Management
43. Stick to Your Guns

II. Murphy, John J.: ***Technical Analysis of the Financial Markets,*** New York Institute of Finance, New York, NY, ©1999, ISBN 0-7352-0066-1

Chapters:

1. Philosophy of Technical Analysis
2. Dow Theory
3. Chart Construction
4. Basic Concepts of Trend
7. Volume and Open Interest
14. Time Cycles

III. Pring, Martin J.: ***Technical Analysis Explained, 4th (or current) Edition***, McGraw Hill Book Company, New York, NY, ©2001, ISBN 0-07-138193-7

Chapters:

2. Financial Markets and the Business Cycle
4. Typical Parameters for Intermediate Trends
12. Individual Momentum Indicators II
16. The Concept of Relative Strength
18. Price: The Major Averages
20. Time: Longer-Term Cycles
22. General Principles
26. Sentiment Indicators

CFTe Level I (Continued)
CORE READING MATERIAL

IV. *Le Beau Charles, Lucas David****: Technical Traders Guide to Computer Analysis of the Futures Market***

Chapters:

1. System Building
2. Technical Studies
4. Day Trading

V. Nison Steve: ***Candlestick Charting Techniques,*** Second Edition

Chapters:

1. Introduction
2. A historical background
3. Constructing the candlestick lines
4. Reversal patterns
5. Stars
6. More Reversal Patterns
7. Continuation Patterns
8. The Magic Doji
9. Putting it all Together

VI. Du Plessis Jeremy*: **The Definitive Guide to Point and Figure***

Chapters:

1. Introduction to Point and Figure Charts
2. Characteristics and Construction
3. Understanding Point and Figure Charts
4. Projecting Price Targets
5. Analysing Point and Figure Charts

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CFTe Level I (Continued)
CORE READING MATERIAL

VII. Constance M. Brown: ***Trading Markets Dynamics Using Technical Analysis*** *(added: 1 February 2023)*

Chapters:

1. Universe of Markets
2.1 Cycle Principles

Required additional IFTA reading material (see Appendices):

1. Elliott Wave Theory (Appendix A–Provided when candidate registers for CFTe I.)
2. Breadth Indicators (Appendix B– Provided when candidate registers for CFTe I.)
3. Time Cycles Analysis (Appendix C– Provided when candidate registers for CFTe I.):
   Note: The questions on the exam for this topic will be pulled from Murphy, John J. recommended reading listed above.
4. Point and Figure Techniques (Appendix D–Provided when candidate registers for CFTe I.)

RECOMMEDED (ADDITIONAL) READING:

VII: Elder, Alexander Dr.: ***Trading for a Living, Psychology, Trading Tactics, Money Management***

Chapters:

1. Individual Psychology
2. Mass Psychology
3. Classical Chart Analysis
4. Computerized Technical Analysis
5. The Neglected Essentials
6. Stock Market Indicators
7. Psychological Indicators
10. Risk Management

Certified Financial Technician (CFTe) I & II Syllabus & Reading Material
(Last updated: 9 January 2025)

CFTe Level II
CORE READING MATERIAL

I. *Edwards, Robert and Magee, John*, **Technical Analysis of Stock Trends,** *9th Edition*

II. *Martin J. Pring:* ***Technical Analysis Explained***

Chapters:

1. The Market Cycle model
2. Financial Markets and the Business Cycle
16. The concept of Relative Strength
18. Price: The Major Averages
19 Price: Group Rotation
20. Time: Longer-Term Cycles

III. Le Beau Charles, Lucas David: ***Technical Traders Guide to Computer Analysis of the Futures Market***

Chapters:

1. System Building
2. Technical Studies
4. Day Trading

IV. Steve Nison***: Beyond Candlesticks: New Japanese Charting Techniques Revealed*** **(Wiley Finance, Nov 10, 1994)**

Chapters:

2. The Basics
3. Patterns
4. Candles and the Overall Technical Picture
5. How the Japanese use Moving Averages
6. Three-Line Break Charts
7. Renko Charts
8. Kagi Charts

CFTe Level II (Continued)
CORE READING MATERIAL

V. Jeremy Du Plessis: ***The Definitive Guide to Point and Figure***

Chapters:

1. Introduction to Point and Figure Charts
2. Characteristics and Construction
3. Understanding Point and Figure Charts
4. Projecting Price Targets
5. Analysing Point and Figure Charts

VI. Yukitoshi Higashino, MFTA: ***Primer on ICHIMOKU*** (Appendix E–Attached Below)

VII. *J. Peter Steidlmayer and Steven B. Hawkins:* ***SteidlMayer On Markets. Trading with Market Profile.*** *Second Editon*

Chapters:

6. Understanding Market Profile
7. Liquidity Data Bank, On Floor information, and Volume @ Time
8. The Steidlmayer Theory of Markets
9. The Steidlmayer Distribution
10. The You
11. Anatomy of a trade
12. Profile of a Successful Trader
13. Trading, Technology, and the Future

VIII. *A.J. Frost, Robert R. Prechter****:*** **Elliott Wave Principle: Key To Market Behavior**

Chapters:

1. The Broad Concept
2. Guidelines of the Wave Formation
3. Historical and Mathematical Background of the Wave Principle
4. Ratio Analysis and Fibonacci Time Sequence.

CFTe Level II (Continued)
CORE READING MATERIAL

IX. Charles D. Kirkpatrick, Julie R. Dahlquist: ***Technical Analysis: The Complete Resource for Financial Markets Technicians***

Chapters:

3. History of Technical Analysis
4. The Technical Analysis Controversy
5. An overview of Markets
7. Sentiment
8. Measuring Market Strength
9. Temporal Patterns and Cycles
10. Flow of Funds
13. Breakouts, Stops, and Retracements
18. Confirmation
19. Cycles
21. Selection of Markets and Issues: Trading and Investing
22. System Testing and Management

X. Constance M. Brown: ***Technical Analysis for the Trading Professional***, Second Edition (Added 7 March 2019; This material will be covered beginning in October 2019.)

Chapters:

1. Oscillators Do Not Travel Between 0 and 100
   This chapter introduced range rules for RSI. The ability to define a trend based on the displacement of the oscillator was a very new concept for the use of oscillators. In bull markets a 14-period RSI will track 40 to 80+. In bear markets and the transition into a bear market, the oscillator travels from 68 to 30 or lower.
2. Dominant Trading Cycles Are Not Time Symmetrical
   Rhythmical fluctuations can be more than just a fixed interval. This chapter will introduce cycle historians Samuel Benner and Edward Dewey showing an extension of their work into modern times.
10. Using Oscillators with the Elliott Wave Principle
    The chapter over the years has had the most feed-back. Readers have stated they did not 'get it' until reading this real-time walk-through of how to develop Elliott Wave interpretations as a market evolves over a time interval. It also shows the reader the steps that follow after the wave scenario has been lost and how to resync with a market.

CFTe Level II (Continued)
CORE READING MATERIAL

12. The Composite Index
    RSI is the most widely used oscillator according to an industry survey from the magazine '*Technical Analysis Stocks and Commodities*'. It has a fatal flaw. RSI will fail to diverge before a major trend reversal. The Composite Index is a formula that teaches the reader that one can embed the momentum formula inside of an RSI and solve this problem. The chapter explains the solution and how it is used with RSI to avoid this very common and costly indicator problem.

XI. Constance M. Brown: ***Trading Markets Dynamics Using Technical Analysis*** *(added* 1 February 2023)

Chapters:

2. Cycle Principles
3. Correlation
5. Oscillators
6. Fibonacci

XII. Laurence A. Connors & Linda Bradford Rachke: ***STREET SMARTS*: High Probabilty Short Term Strategies** (added 11 August 2023. This material will be covered beginning in April 2024.)

XIII. *IFTA's Ethical and Professional Standards* (Appendix F–Attached Below)

XIV. *Basic of Statistic for Quatitative Analysis* (Appendix G–Attached Below)

RECOMMEDED (ADDITIONAL) READING:

X. David Linton: ***Cloud Charts: Trading Success with the Ichimoku Technique*** **[Hardcover]**

Chapters:

8 . Cloud Chart Construction
9. Interpreting Cloud Charts
10. Multiple Time Frame Analysis
11. Japanese Patterns Techniques
12. Clouds Charts with other techniques
13. Ichimoku indicator techniques
14. Back-testing and Cloud Trading Strategies
15. Cloud Market Breadth analysis
16. Conclusion

Appendix E

Primer on ICHIMOKU
(IFTA Required CFTe II Reading Material)

Yukitoshi Higashino, MFTA
NTAA Director
Nippon Technical Anlaysts Association (NTAA)

Preface

"Ichimoku Kinko Hyo", commonly referred to as just "Ichimoku", is a technical analysis method developed by Goichi Hosoda (1898–1982), a Japanese financial market journalist, through his many years of research in financial markets. Even 30 years after Hosoda's death, Ichimoku is still widely used by traders and investors as an effective tool for analyzing markets and trade in Japan. Although Ichimoku is becoming more popular among an increasing number of traders and investors around the world, it does not seem to be used as widely and as effectively as it is in Japan. The causes of this are multifold. First, Ichimoku is an integrated set of multifaceted market analysis principles and techniques, including price projection, time projection, and wave analysis, among others. The wide variety of techniques and concepts included in the Ichimoku theory make it highly challenging to fully master. And obviously, a language barrier exists. Japanese is a tricky language for many Westerners (on a side note, in my humble opinion, with its simple pronunciation system it can be a very friendly language, making it one of the best choices when deciding to learn a new language). Japanese vocabulary and grammatical structure are very different from English, making translation from Japanese into English quite difficult. It is an especially challenging task to find the right English translations of many Japanese words used in the original Ichimoku theory. Unless one has a good understanding of the theory, it is practically impossible to adequately translate Ichimoku educational materials into English.

Using NTAA's educational material as the base, I have prepared this primer on Ichimoku, with the aim of effectively introducing Ichimoku to English-speaking learners. To make this primer "study-friendly", I have made an attempt to use plain English words instead of being "loyal" to the Japanese words in the original theory. Ichimoku theory puritans may say that the original theory has been outrageously simplified in this work and that a lot of important things are missing. They may even say that such oversimplified Ichimoku is not real Ichimoku. There is an element of truth in such a criticism. To be very clear, this is just a primer on Ichimoku and not comprehensive educational material describing all the tenets of the theory. Learners should treat this work as such. Nevertheless, I believe this document will push the interested in the correct direction and hopefully inspire people to seek out all its more complex aspects.

I hope this primer helps my IFTA colleagues learn the very basics of this unique technical analytical method developed in Japan.

Introduction

To know the next market direction, one only needs to know which side—buyers or sellers—is winning or losing. The market moves in the direction of the break in equilibrium between the buyers and sellers. The chart developed by Hosoda allows one to instantly grasp the equilibrium state of the market. This is why it was named "Ichimoku Kinko Hyo", which literally means "One Glance Equilibrium Chart" in Japanese.

The three basic principles of the Ichimoku theory are "time", "wave structure", and "price level".

In Ichimoku, analysis is focused on the underlying "powers" in the market. Overpriced stocks fall, and underpriced stocks rise. No market continues rising or falling infinitely. Stock prices often rise when the economy is in bad shape and fall when the economy is in good shape. This is a common economic phenomenon that reflects movements of money in the system. Ichimoku is a method for rationally gauging the state of the financial markets that fluctuate, reflecting the underlying powers.

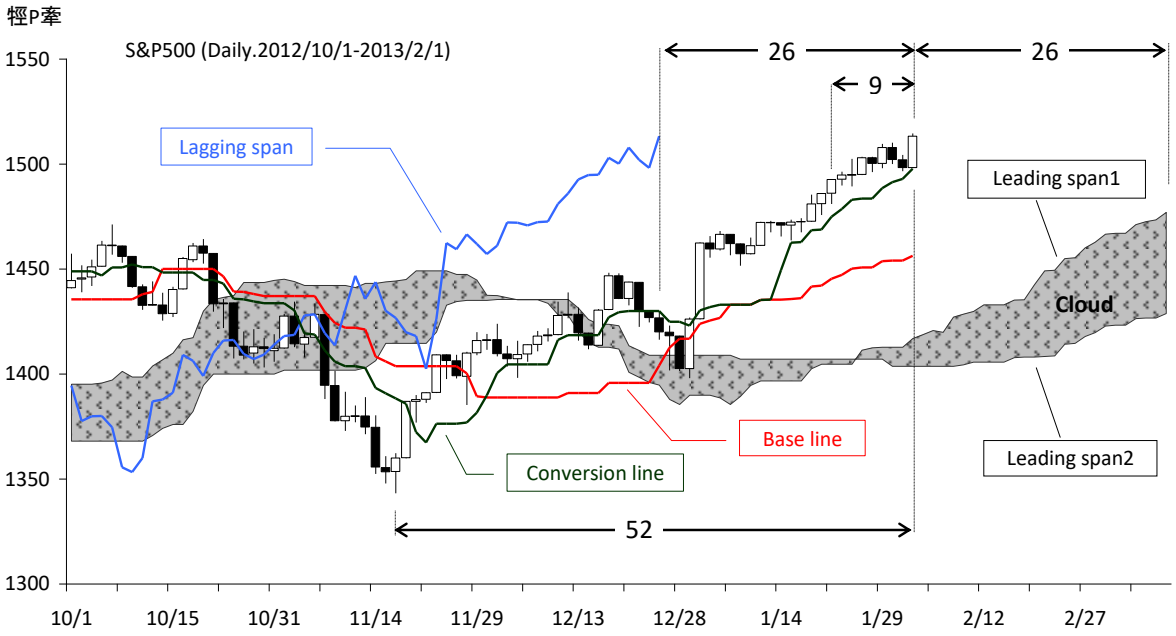
The market can only move or stay flat. When it moves, it can only rise or fall. It is as simple as this. But many traders/ investors fail to make money, frequently because they make the process of market analysis overly complicated. Another reason is that their trading/investment process lacks rigor. We should not take action based on subjective market analysis or a wishful projection. We should not act on unverified rumors, nor should we be influenced by the market atmosphere. When we take an action based on a projection, it has to be measurable. We often hear people saying that we should "buy on weakness" or "sell on strength". In most cases, however, their answers are vague and do not state at exactly what price. Ichimoku provides an objective base for taking trading/investment action. It tells us at what price to buy or sell and when. Projections made with Ichimoku are always measurable.

One of the important traits of Ichimoku is its "time" study. Most market players focus on price moves and tend to make light of the time factor. In Ichimoku, while price moves are important, the time factor is more important; without a solid "time" study, one cannot have a true understanding of the markets.

2. Composition of the Ichimoku Chart

Ichimoku consists of a candle chart and five lines, as shown in Fig. 1.
(1) Conversion line – (highest high + lowest low)/2 in the last nine periods (including the current period)
(2) Base line – (highest high + lowest low)/2 in the last 26 periods (including the current period)
***** Base line and Conversion line are plotted in the current period.
(3) Leading Span 1 – (Conversion line + Base line)/2
(4) Leading span 2 – (highest high + lowest low)/2 in the last 52 periods (including the current period)
*****Leading spans 1 and 2 are plotted 26 periods ahead (including the current period).
(5) Lagging-span – Current price plotted 26 periods back (including the current period)
***** It becomes a line that runs parallel to the current price line.
(6) Cloud – The space between Leading span 1 and 2

(Fig. 1) Composition of ICHIMOKU chart



3. The Five Basic Lines and Their Uses/Functions

(1) Base line and Conversion line
The Conversion line is the midpoint of the high-low range in the last nine periods (including the current period), and the Base line is that of the last 26 periods. They may look similar to moving averages but are different. They may be called "moving midpoints". In Ichimoku, midpoints are thought to represent better equilibrium points in the market than moving averages. In moving averages, closing prices are treated as king. Regardless of the volatility or the price swing in a given period, the closing price is the only thing that is counted. That is, even if the price swings vary widely in a period, it is not reflected. Ichimoku dismisses this and instead uses the midpoint indicators, which reflect the whole price range in a given period.

When the Conversion line crosses above the Base line, a bullish signal is generated, indicating that one should start looking to buy the market. When the Conversion line crosses below the Base line, it is a bearish crossover, signaling that one should start looking to sell the market. This is the basic rule.

When implementing this, one should bear in mind the following points:

(a) The direction of the Base line should be taken as the direction of the market. Even if the Conversion line has crossed above the Base line, it is not really bullish if the Base line fails to turn up. More often than not, a rally not accompanied by an upturn in the Base line ends up short-lived. By the same token, even if the Conversion line has crossed below the Base line, it is not really bearish if the Base line keeps trending upward. More often than not, a downswing not accompanied by a downturn in the Base line also ends up short-lived.
(b) The Base line often serves as support when the price corrects downward in a bull market. It serves as resistance when the price corrects upward in a bear market.
(c) In a strongly bullish or bearish market, the Conversion line often serves as support or resistance, and that is often enough to terminate any corrective moves.

(2) "Cloud" (Space between Leading span 1 and Leading span 2)
The cloud-like area formed by the Leading span 1 and the Leading span 2 is called the "Cloud" ("kumo" in Japanese).

Following are the principal points of the Cloud:

(a) The Cloud is used to determine the market direction. When the price is above the Cloud, it is judged that the market is in a longer term bull market. When the price is below the Cloud, it is judged that the market is in a longer term bear market.
(b) The Cloud serves as longer term support in a bull market and longer term resistance in a bear market. A break through the Cloud signals a change in the longer term market trend. A break above the Cloud signals that the longer term trend has turned from bearish to bullish. A break below the Cloud signals that the longer term trend has turned from bullish to bearish.
(c) The degree of thickness of the Cloud indicates the degree of strength of the support or resistance it provides. When the Cloud is thin, it is weak as a support/resistance zone. The price can break through it with relative ease. When the Cloud is thick, it serves as a strong support/resistance zone. In a bull

market, down corrections often stop in the Cloud. In a bear market, upward corrections often stop in the Cloud.

(d) Changes in the shape of the Cloud provide useful insights into what is happening in the market. As the result of the two lines constituting the Cloud (the Leading span 1 and the Leading span 2) interacting with each other in various ways (e.g., approaching each other, diverging, crossing, moving in parallel to each other), the shape of the Cloud changes constantly. For instance, it is observed in many markets that when the Cloud "twists", as the two lines constituting the Cloud (the Leading span 1 and the Leading span 2) cross each other, a trend change takes place at relatively high frequencies. So is the case when the Base line and the Leading span 2 approach each other. There are many other interesting observations, but discussing them at length here would not fit to the purpose of this primer. Readers of this primer are encouraged to make your own discoveries by observing the changing shapes of the Ichimoku Cloud in the markets you trade in or analyze.

(3) Lagging span

The lagging span is drawn by plotting the current closing price 26 periods back.

Much information can be obtained from the relationships between the Lagging span and the other four lines. While there are many ways to use the Lagging line, the most common ways to judge the market direction using the Lagging span are as follows:

(a) Lagging span vs. Current price (of 26 periods ago)

If the Lagging span is above the current price (of 26 periods ago), it is bullish. If the Lagging span is below the current price (of 26 periods ago), it is bearish.

(b) Lagging span vs. Cloud

If the Lagging span is above the Cloud, the longer term trend is upward. If the Lagging span is below the Cloud, the longer term trend is downward.

(4) Three Conditions to Make a Safe Bull (Bear) Call

According to the Ichimoku theory, when the following three conditions are in place, one can safely judge that the market is in a bullish (bearish) state.

(a) The Conversion line is above (below) the Base line, which is trending up (down) or at least flat.

(b) The Lagging span is above (below) the current price (of 26 periods ago).

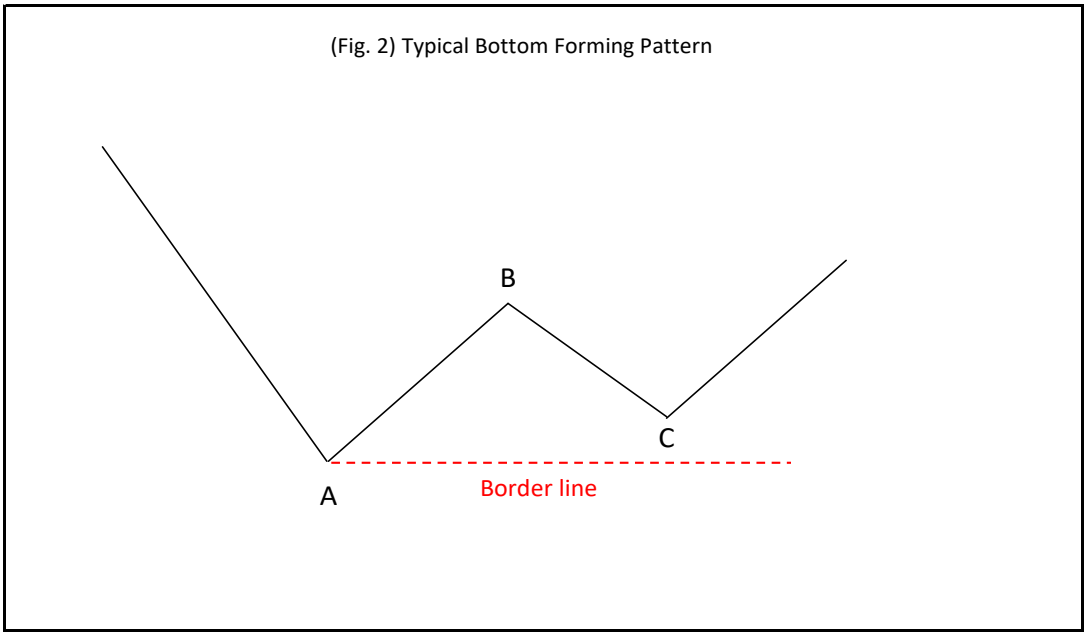
(c) The price is above (below) the Cloud.

(5) Typical Bottoming-out (or Top-forming) Pattern

Fig. 2 illustrates a typical bottoming-out pattern, with the price starting to rise sharply after hitting the second bottom (C) without falling below the previous low (A). (The horizontal line drawn from the first bottom is called "Border line" in the Ichimoku terminology.)

In terms of Ichimoku, the following are the typical bottoming-out patterns. (Markets do not always follow this, so readers should treat it as just a reference example.)

(Fig. 2) Typical Bottom Forming Pattern

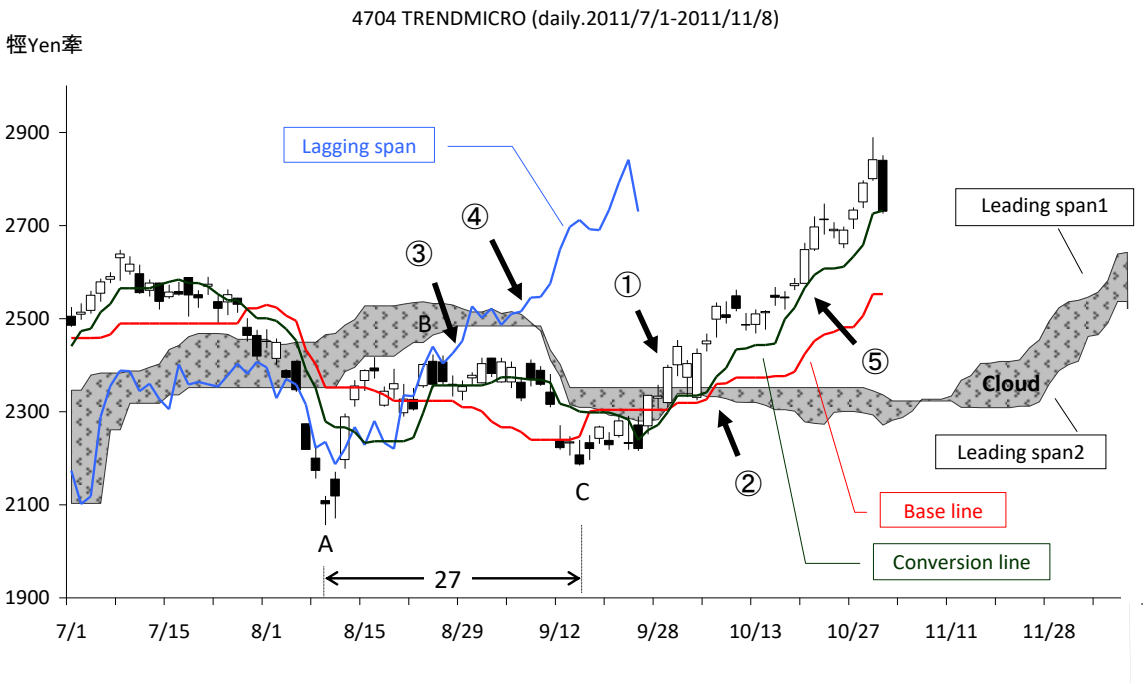


- The second bottom (C) is formed within 26 days of the first bottom (A).
- Within several days of the second bottom (C) forming, the Conversion line crosses above the Base line, the Lagging span crosses above the current price (of 26 days ago), and the price crosses above the Cloud.
- After the price crosses above the Cloud, the price starts rising at an accelerated rate. The price may correct downward, but it gets supported by the Cloud and resumes the rally within nine days.
- It is ideal if a breakaway gap develops after the price hits the second bottom (C) and even better if consecutive gaps appear.
- Ideally, the price does not fall below the Base line.

The reverse applies in the case of a top-forming pattern. These are some typical examples.

Fig. 3 is the daily chart of Trendmicro, a Japanese Internet security company, from July to early November 2011.

(Fig. 3) Example - Typical bottom



In September, a secondary low (C) was formed without the price falling below the previous low (A).

In early October, the Conversion line crossed above the Base line, and the price crossed above the Cloud (①).

Then, the Base line started trending upward (②).

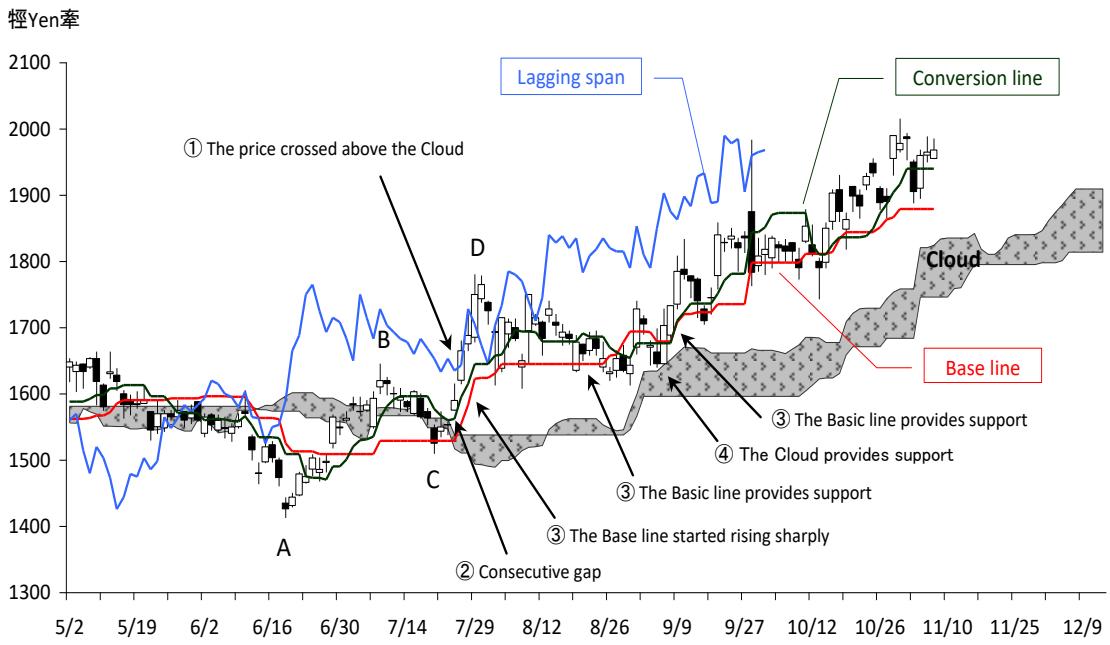
Subsequently, the Lagging span, which occured in late August, crossed above the current price line (③). Now, the three conditions have occurred under which one can safely judge that the market is in an uptrend.

In mid-October, the Lagging span, which occured in early September, crossed above the Cloud, further confirming that the market was in an uptrend (④).

The subsequent rally was strong, and the price was supported by the Conversion line (⑤).

Fig. 4 is the daily chart of Japan Tobacco, a Japanese tobacco company, from May to early November 2011.

(Fig. 4) Example - Base line providing support in uptrending market



In late July, supported by the Base line, the secondary low (C) was formed without the price falling below the previous low (A).

The price crossed above the Cloud, gapping above the upper boundary of the Cloud (①). This was seen as a breakaway gap—a bullish signal.

The price gapped up again, forming successive gaps (②). This was strongly bullish.

The Base line started rising sharply (③).

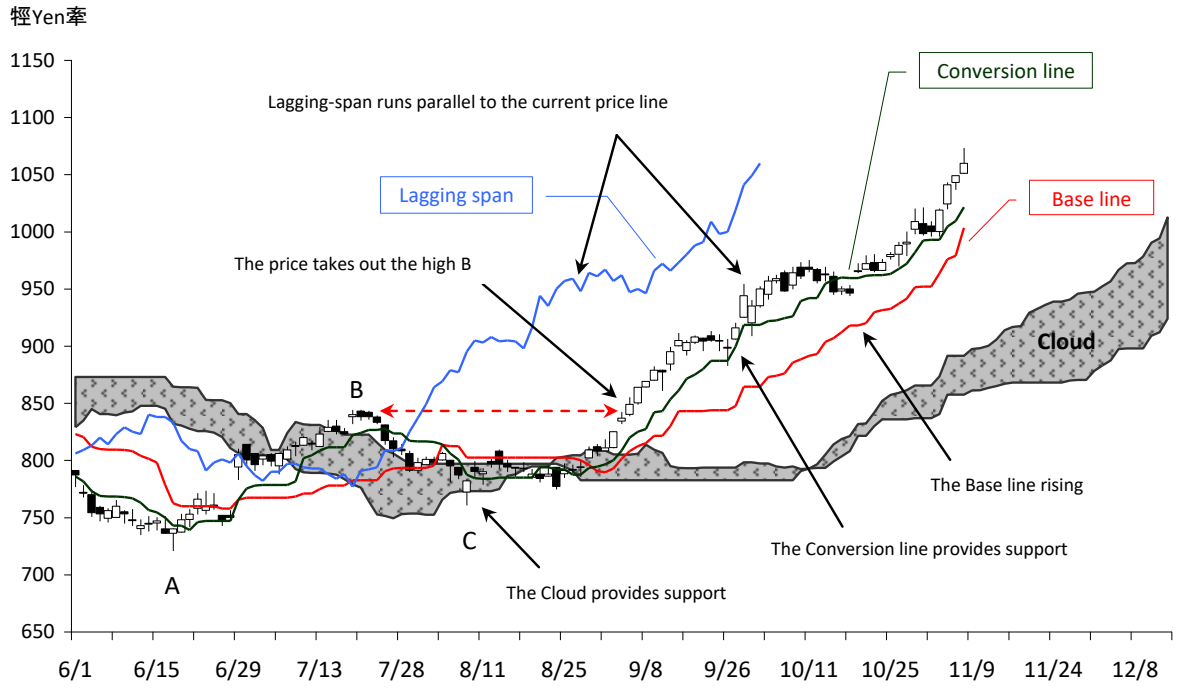
During the subsequent period, except for the period from late August to early September, the Base line served fairly well as support (on a closing basis).

From late August to early September, although the price fell below the Base line, it rebounded immediately as it approached the Cloud. There was no need to be concerned about a possible trend reversal at this stage, since the Cloud started to become thick in early September, indicating that it would provide strong support (⇦).

Fig. 5 is the daily chart of Toho Holdings, a Japanese wholesaler of medicine and medical tools and equipment, from June to early November 2011.

(Fig. 5) Example - Conversion line providing support in strongly bullish

8129 TOHO Holdings (daily.2011/6/1-2011/11/8)



The price started rising sharply after forming a higher low at C (higher than the low at A) and breaking above the Cloud. During the rally, the price was supported by the Conversion line.

Prior to this, the market hit a temporary high at B. This was because the Lagging span was hitting the Cloud.

4. Waves Structure Principles

Hosoda, in his book on Ichimoku, explained his wave theory in detail, spending many pages on this subject alone. While it may be interesting to advanced Ichimoku students, I do not think that discussing it at length is within the scope of this primer, so, I will just briefly explain his wave theory without going into great detail.

Hosoda classified the wave patterns that appear in financial markets into a number of groups according to their wave structure, and he gave them unique names. They are designed to help understand price levels, time levels, and the direction of the market.

I wave: A single rectilinear or straightish (normally sharp) thrust up or down without notable corrective moves.

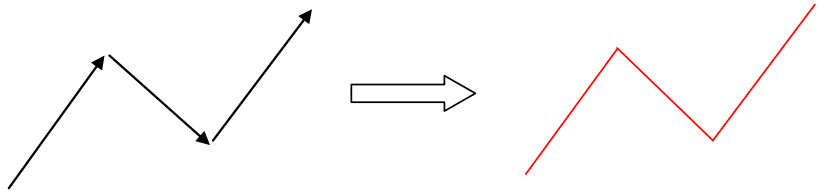
V wave: A wave consisting of two successive I waves, a sharp thrust up followed by a sharp thrust down, or a sharp thrust down followed by a sharp thrust up.

N wave (Fig. 7): An up-down-up or down-up-down wave. This is the wave pattern most commonly seen in the market.

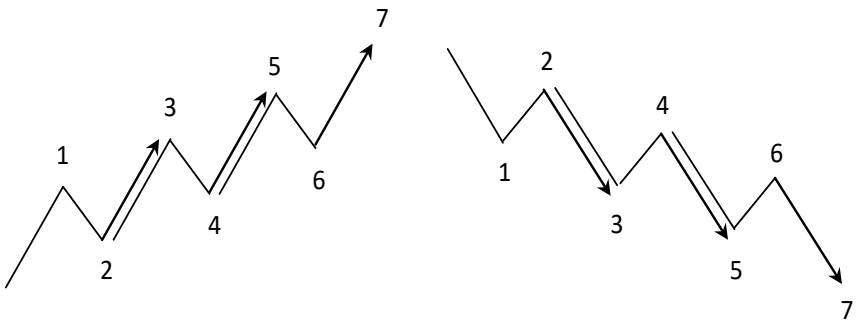
An uptrend is made up of a series of N waves forming higher highs and higher lows. A downtrend is made up of a series of N waves forming lower lows and lower highs.

When the price falls below the previous low, the uptrend terminates. In a downtrend, lower lows and lower highs are formed.

(Fig. 6) N wave

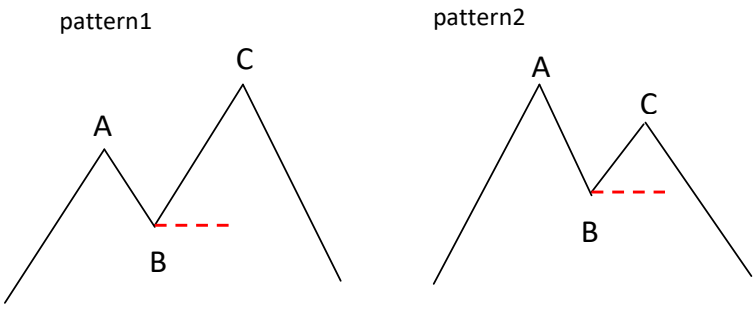


(Fig. 7) Consecutive N waves

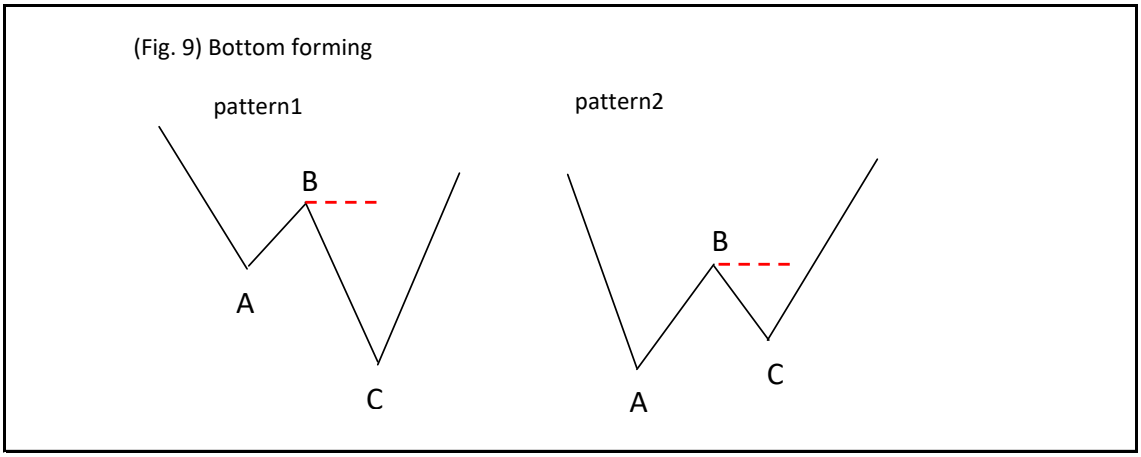


An uptrend terminates when the price falls below the previous low. It is confirmed that the market has hit a top when a lower high is formed. (Fig. 8)

(Fig. 8) Top forming



A downtrend terminates when the previous high is broken. It is confirmed that the market has hit a bottom when a higher low is formed. (Fig. 9)

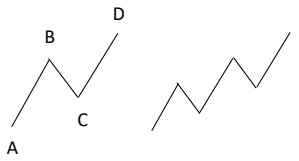
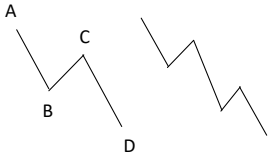
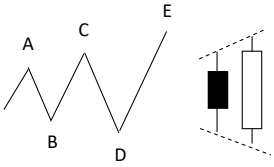
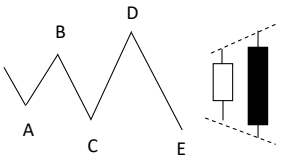
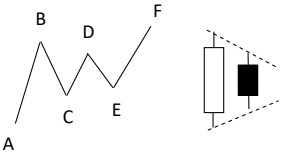
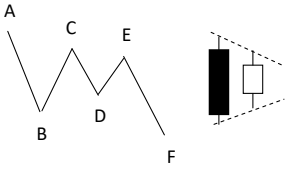
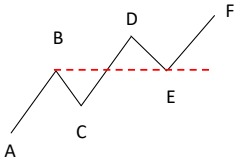
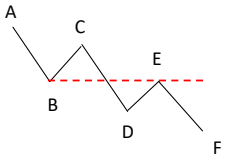
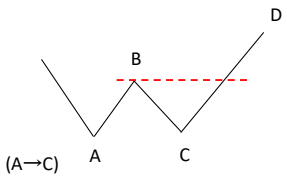
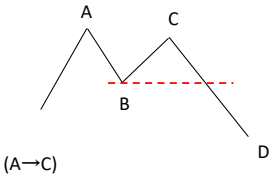


Y wave: A wave pattern characterized by widening price movements (with the price forming higher highs and lower lows), similar to the expanding triangle pattern. Candlestick-wise, the engulfing pattern is formed. This is a reversal pattern.

P wave: A wave pattern characterized by narrowing price movements (with the price forming lower highs and higher lows), similar to the normal triangle pattern. Candlestick-wise, the harami pattern develops.

S wave: A wave pattern that appears in the middle of a large (up or down) trend. In an uptrend, a higher low is formed near the second last high. In a downtrend, a lower high is formed near the second last low.

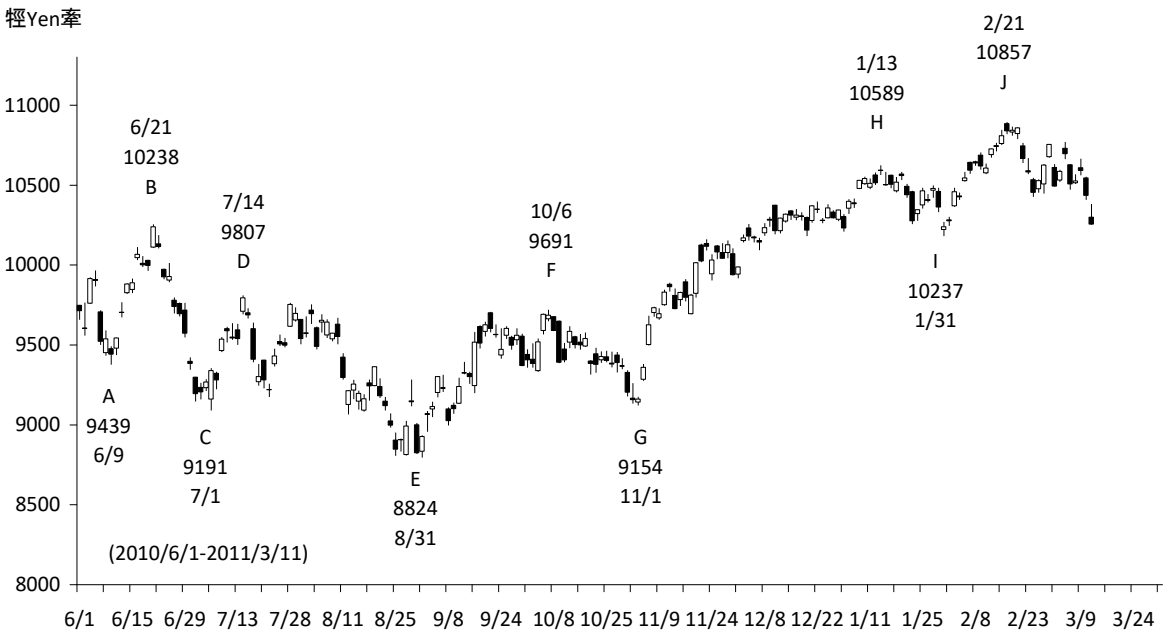
(Fig.10) Waves

	Up	Down
N wave		
Y wave		
P wave		
S wave		
Bottom / Top forming		

Example:

Fig. 11 is a daily chart of the Nikkei Stock Average from June 2010 to March 2011.

(Fig.11) Daily chart of NIKKEI Stock Average

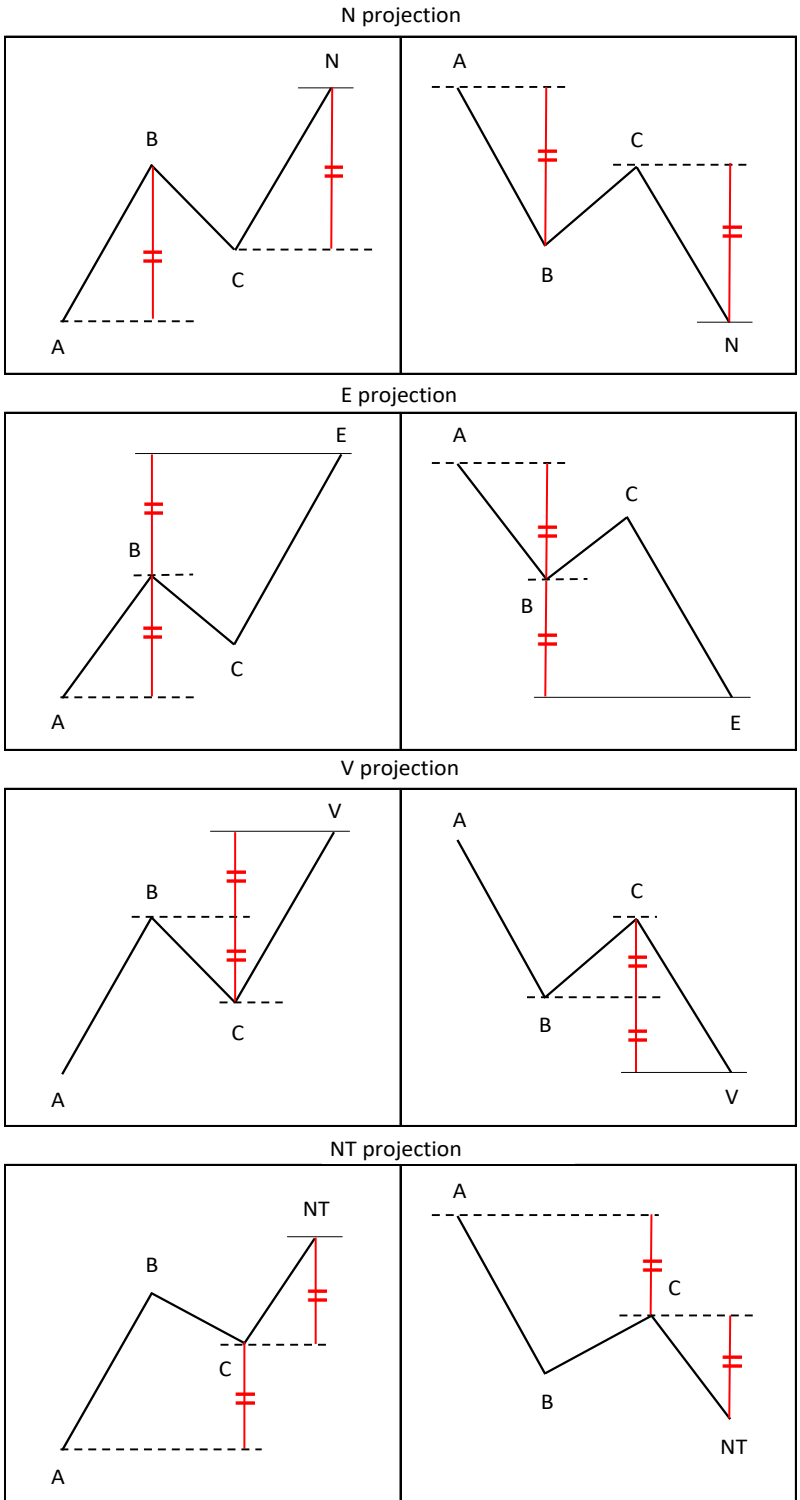


The wave from A to B is an "I wave".
The wave from B to C is also an "I wave".
The wave from A to C is a "V wave".
The wave from B to E is an "N wave".
The wave from E to J is an "N wave" structured upward. The uptrend would terminate if the price fell below the low I.

5. Price Projection

In Ichimoku, there are six principal projection methods, as shown below in Fig. 12. The first four are the principle ones. .

(Fig.12) Price Projection



- N projection – Up: N = C + (B – A) Down: N = C – (A – B)
  ***** These two equations are effectively the same, but I show both as I believe this makes it intuitively easier to understand for readers. The same applies to the following:

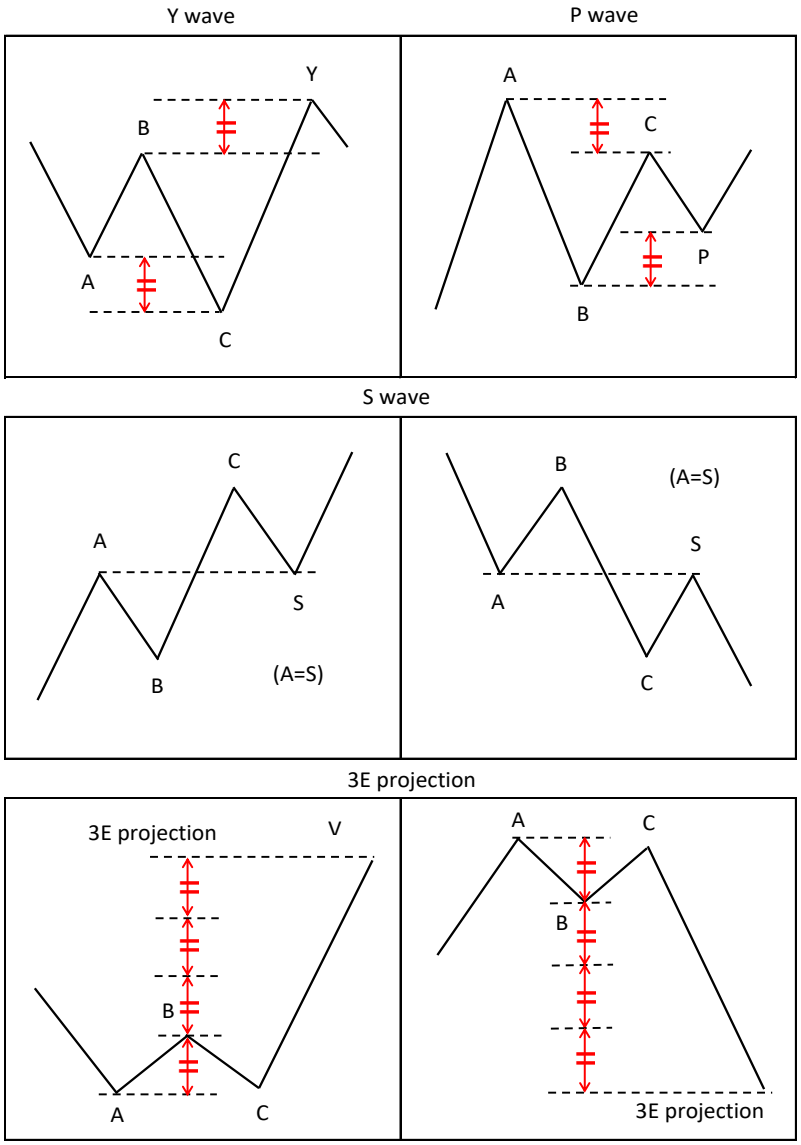
  Up: Add the distance of the last upleg to the last low
  Down: Subtract the distance of the last downleg from the last high

- E projection – Up: E = B + (B – A) Down: E = B – (A – B)
  Up: Add the distance of the last upleg to the last high
  Down: Subtract the distance of the last downleg from the last low

- V projection – Up: V = B + (B – C) Down: V = B – (C – B)
  Up: Add the distance of the last downleg to the last high
  Down: Subtract the distance of the last upleg from the last low

- NT projection – Up: NT = C + (C – A) Down: NT = C – (A – C)
  Up: Add the distance between the last two lows to the last low.
  Down: Subtract the distance between the last two highs from the last high

(Fig.13) Price Projection



- Y projection (to be used in Y waves) – Y = B + (A – C)
  Add the distance between the last two lows to the last high

- P projection (to be used in P waves) – P = B + (A – C)
  Add the distance between the last two highs to the last low

- S projection (to be used in S waves) – S = A
  Up: The level of the second last high itself
  Down: The level of the second last low itself

To project higherdegree targets, using the four principle projection methods (N, V, E and NT projection), whole number multiples of the distances used above (i.e., distances between previous highs and lows) are used. When the market is about to make a big move up, those distances typically are multiplied by four to project targets (and added to or subtracted from the pivot point).

According to the original Ichimoku theory, to calculate the target prices for indices, closing prices should be used; to calculate the target prices for individual stocks, intraday highs and lows should be used.

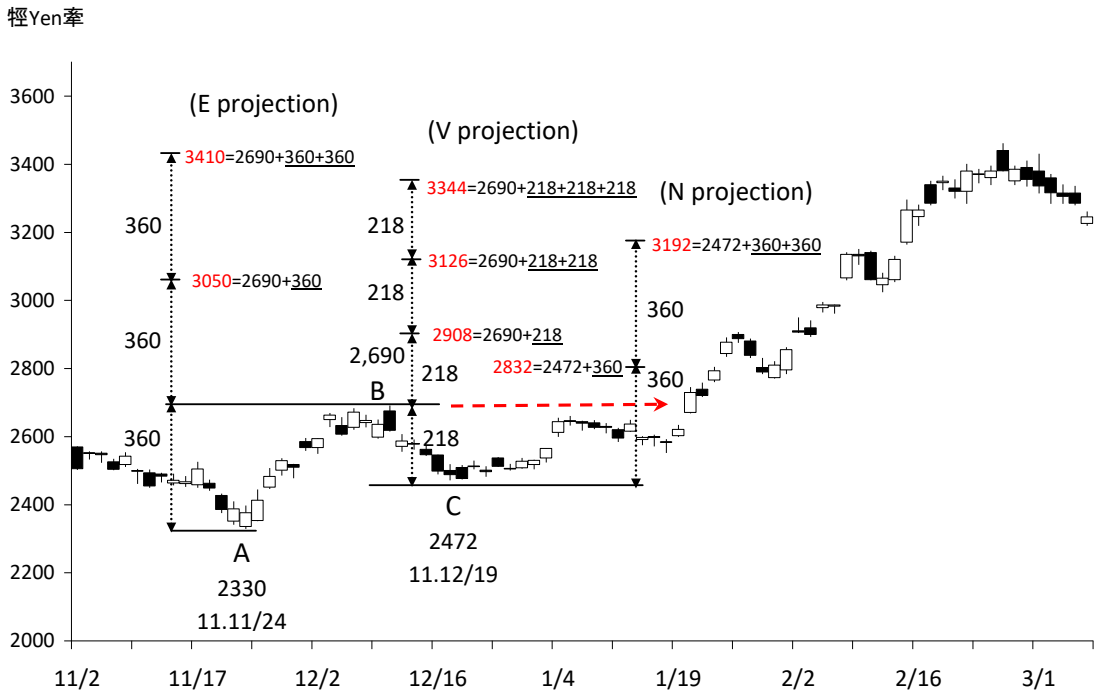
Readers are reminded, however, that in the Ichimoku theory, the time factor is more important than the price factor. One should avoid being excessively obsessed with the price targets.

Let me show a couple of examples.

Fig. 14 is the daily chart of Toyota, Japan's largest car manufacturer, from October 2011 into 2012. It hit the first bottom at 2,330 (A), followed by an intermediate top at 2,690 (B). The secondary bottom was formed at 2,472 (C).

(Fig. 14) Example of Price Projection - Toyota

(daily.2011/11/2-2012/3/7)



Although one cannot confirm that the secondary bottom was formed at C before the price takes out the high B, one can start calculating the targets assuming that the low C would hold.

- N projection: The targets can be calculated by adding the distance of the previous upleg (from A to B), or its whole number multiples, to the low at C.

N1 = C + (B – A)	= 2,472 + (2,690 – 2,330)	= 2,832
N2 = C + (B – A) x 2	= 2,472 + (2,690 – 2,330) x 2	= 3,192
N3 = C + (B – A) x 3	= 2,472 + (2,690 – 2,330) x 3	= 3,552

- E projection: The targets can be calculated by adding the distance of the previous upleg (from A to B), or its whole-number multiples, to the high at B.

  E1 = B + (B – A) = 2,690 + (2,690 – 2,330) = 3,050
  E2 = B + (B – A) x 2 = 2,690 + (2,690 – 2,330) x 2 = 3,410
  E3 = B + (B – A) x 3 = 2,690 + (2,690 – 2,330) x 3 = 3,770

- V projection: The targets can be calculated by adding the distance of the previous downleg (from B to C), or its whole-number multiples, to the high at B.

  V1 = B + (B – C) = 2,690 + (2,690 – 2,472) = 2,908
  V2 = B + (B – C) x 2 = 2,690 + (2,690 – 2,472) x 2 = 3,126
  V3 = B + (B – C) x 3 = 2,690 + (2,690 – 2,472) x 3 = 3,344

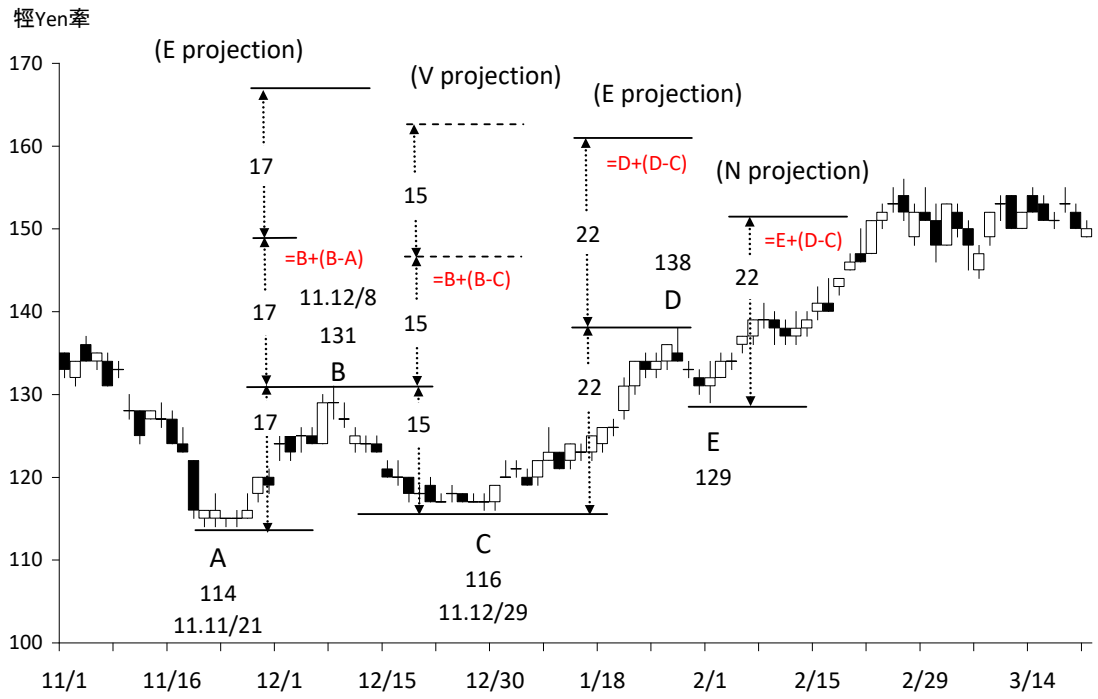
- NT projection: The targets can be calculated by adding the distance of the previous downleg (from A to C), or its whole-number multiples, to the low at C.

  V1 = C + (C – A) = 2,472 + (2,472 – 2,330) = 2,614
  V2 = C + (C – A) x 2 = 2,472 + (2,472 – 2,330) x 2 = 2,756
  V3 = C + (C – A) x 3 = 2,472 + (2,472 – 2,330) x 3 = 2,898

The NT projection is not displayed on the chart, as it was not adequate to use this projection method in this particular case.

Fig. 15 is a daily chart of Sojitsu, an integrated Japanese trading company, from October 2011 into 2012. It hit the first low at 114 (A) and an intermediate top at 131 (B9), followed by a secondary low at 116 (C). Then it rallied and formed an intermediate top at 138 (D), followed by a brief dip that terminated at 129 (E).

(Fig. 15) Example of Price Projection - Sojitsu
(daily.2011/11/1-2012/3/22)



I will not show all the target values projected by all the projection methods discussed above, only the ones that looked relevant in this particular case.

The target prices projected by the E projection method using the first low (A) and the first intermediate high (B) are:

E1 = B + (B – A)	= 131 + (131 – 114)	= 148
E2 = B + (B – A) x 2	= 131 + (131 – 114) x 2	= 165
E3 = B + (B – A) x 3	= 131 + (131 – 114) x 3	= 182

The target prices projected by the V projection method using the first intermediate high (B) and the secondary low (C) are:

V1 = B + (B – C) = 131 + (131 – 116) = 146
V2 = B + (B – C) x 2 = 131 + (131 – 116) x 2 = 161
V3 = B + (B - C) x 3 = 131 + (131 - 116) x 3 = 176

The targets projected by the E projection method using the second low (C) and the second intermediate high (D) are:
E1 = D + (D – C) = 138 + (138 – 116) = 160
E2 = D + (D – C) x 2 = 138 + (138 – 116) x 2 = 182
E3 = D + (D – C) x 3 = 138 + (138 – 116) x 3 = 204

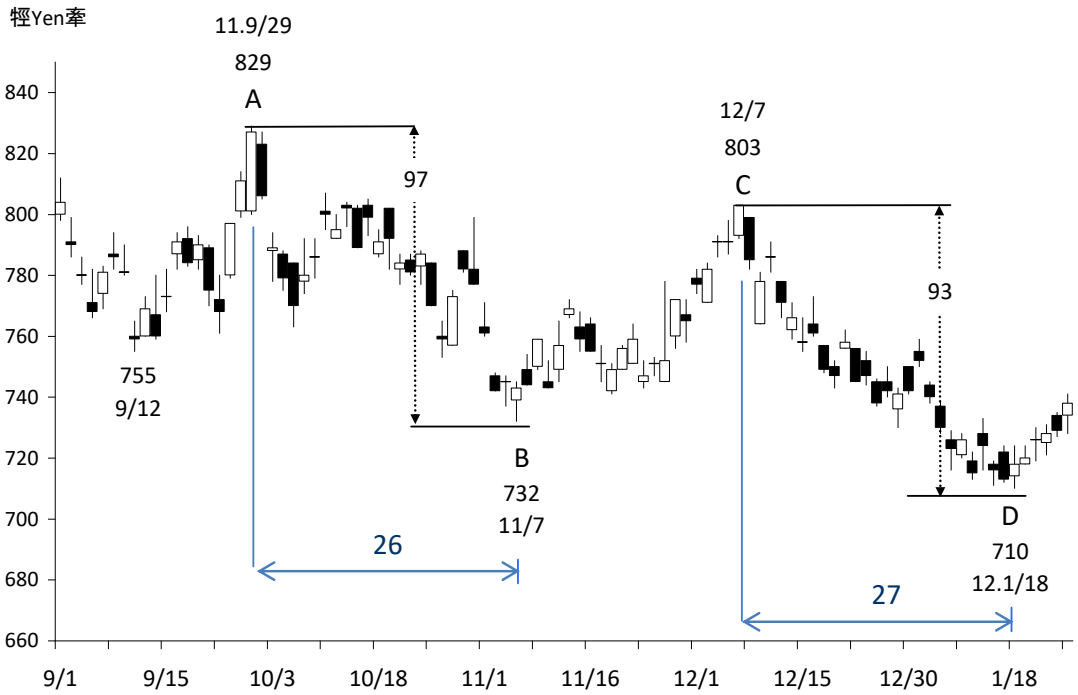
The targets projected by the N projection method using the second low (C), second intermediate high (D), and third low (E) are:
N1 = E + (D – C) = 129 + (138 – 116) = 151
N2 = E + (D – C) x 2 = 129 + (138 – 116) x 2 = 173
N3 = E + (D – C) x 3 = 129 + (138 – 116) x 3 = 195

One should be alert for cluster areas of projected target prices. In this particular case, one can see that there are cluster zones at 146–151 and 160–165.

Fig. 16 is a daily chart of Nippon Kayaku, a diversified chemical company based in Japan, from September to December 2012.

(Fig. 16) Price Projection - Nippon Kayaku

(daily.2011/9/1-2012/1/25)



I am including this to show how the price projection must be done together with the time projection.

The first target price projected by the N method using the first high at 829 (A), the first intermediate low at 732 (B), and the secondary high at 803 (C) was 706 (C – (A – B)). Actually, the market hit bottom when it approached the said target price at 710. It took place during a projected time window for a trend reversal. There were 26 trading days between the first high (A) and the second low (B). The time zone centering on the day 26 trading days after the second top (C) was the projected time window. The actual bottom was just one day off.

I will discuss time projection in more detail in the next section.

6. Time Projection

One striking characteristic of the Ichimoku theory is the degree of importance it places on the time factor. Hosoda taught, "It is not that time merely passes as prices fluctuate in the market. Time influences the market. The market is dictated by time."

🕛 Reversal Dates
a) Reversal
In principle, projected "Reversal dates" are the dates on which the market is projected to "reverse" directions at relatively high probabilities.

b) Acceleration
The market does not always "reverse" on a Reversal date, however. In a strongly (up or down) trending market, the existing move sometimes simply "accelerates", instead of "reverses", on a reversal date. This happens more often in a downtrending market, than in an uptrending market. Suppose there is a market that has been moderately declining into a Reversal date. If it cannot reverse direction during that time window, oftentimes it starts falling sharply.

c) Extension
Comparatively speaking, this does not happen as often in an uptrending market as in a downtrending market. In an uptrending market, the market sometimes reverses directions after the projected Reversal date, with a delay, due to a phenomenon called "extension" (of a reversal time window).

Apart from the reversal and acceleration phenomena, volatility tends to rise on Reversal dates.

According to the Ichimoku theory, "acceleration" and "extension" are caused by the interaction of the Base line, Conversion line, and Lagging line.

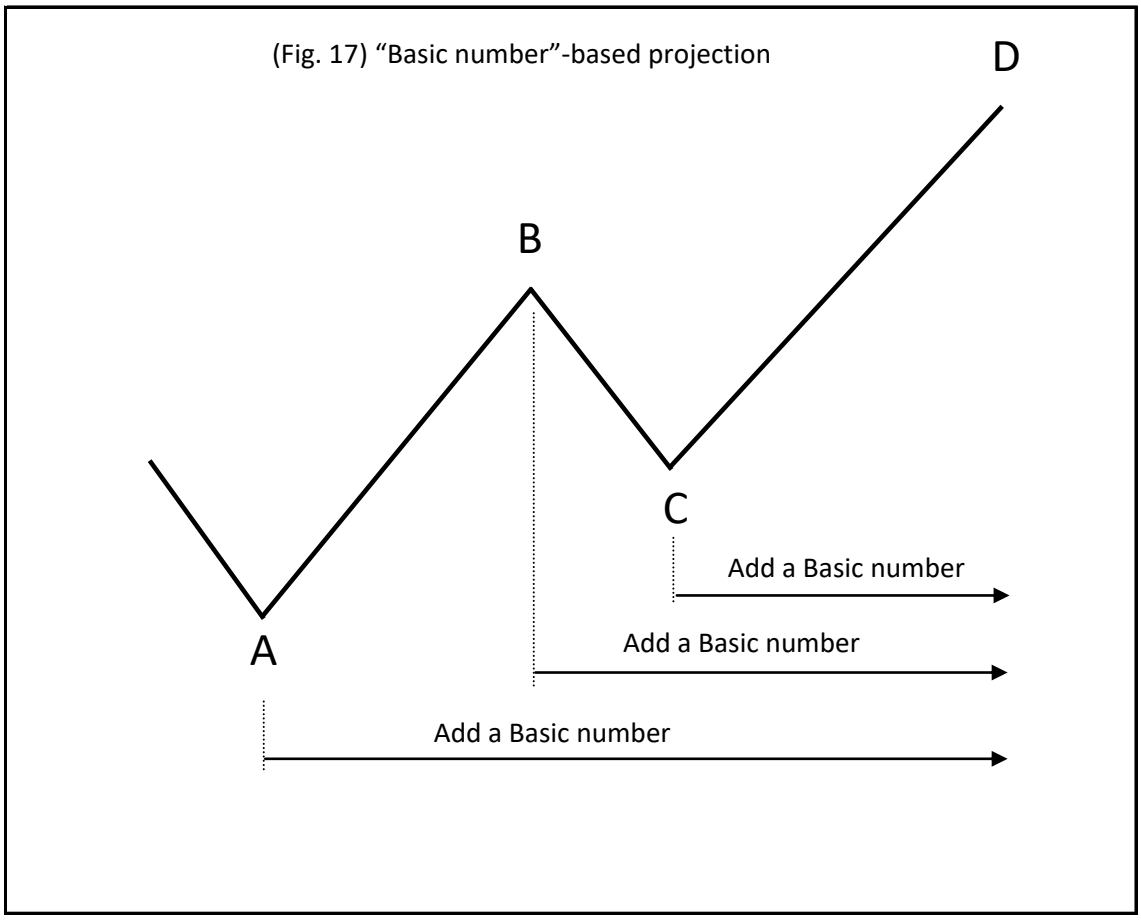
🕛 Reversal date projection
Ichimoku calculates "Reversal dates" in the following two ways. These two methods can be used separately or simultaneously.

a) "Basic number"-based projection
b) "Time parity"-based projection

🕐 "Basic number"-based projection

Reversal dates are projected by adding what are called the "Basic numbers" in the Ichimoku theory (e.g., 9, 17, 26) to the dates on which the market reversed direction in the past into the future. Fig. 17 illustrates this.

(Fig. 17) "Basic number"-based projection



Following are the "Basic numbers" to be used with daily data according to the original Ichimoku theory. After many years of research, Hosoda concluded that these were the most useful default parameters.

(Fig. 18) "Basic numbers" to be used with daily data

Basic number	Comments
9	Useful for calling intermediate tops/bottoms
17	Useful for calling intermediate tops/bottoms
26	Useful in up markets
33	Particularly useful in down markets
42	Very important in both up and down markets
51	–
65	More useful in up markets than in down markets
76	More useful in up markets than in down markets
129	More useful in up markets than in down markets
172	More useful in up markets than in down markets

Some Ichimoku researchers claim that they have found that 5, 13, and 21 should be added as Basic numbers when dealing with weekly data.

Advanced Ichimoku practitioners use the Basic numbers in conjunction with the wave analysis in accordance with the wave structure principles discussedearlie, which helps gauge which Basic numbers are likely to be most effective.

"Time parity"-based projection

In this method, Reversal dates are projected by adding the same time distance (the number of days) between two key dates in the past (on which the market reversed direction in the past) to the pivot date (a key date on which the market hit a major top or bottom) from which to project into the future. This takes advantage of the phenomenon that the market often reverses direction when the same amount of time has passed from a key reversal date in the past as the amount of time between past major events in the markets.

(Fig. 19) Time parity projection

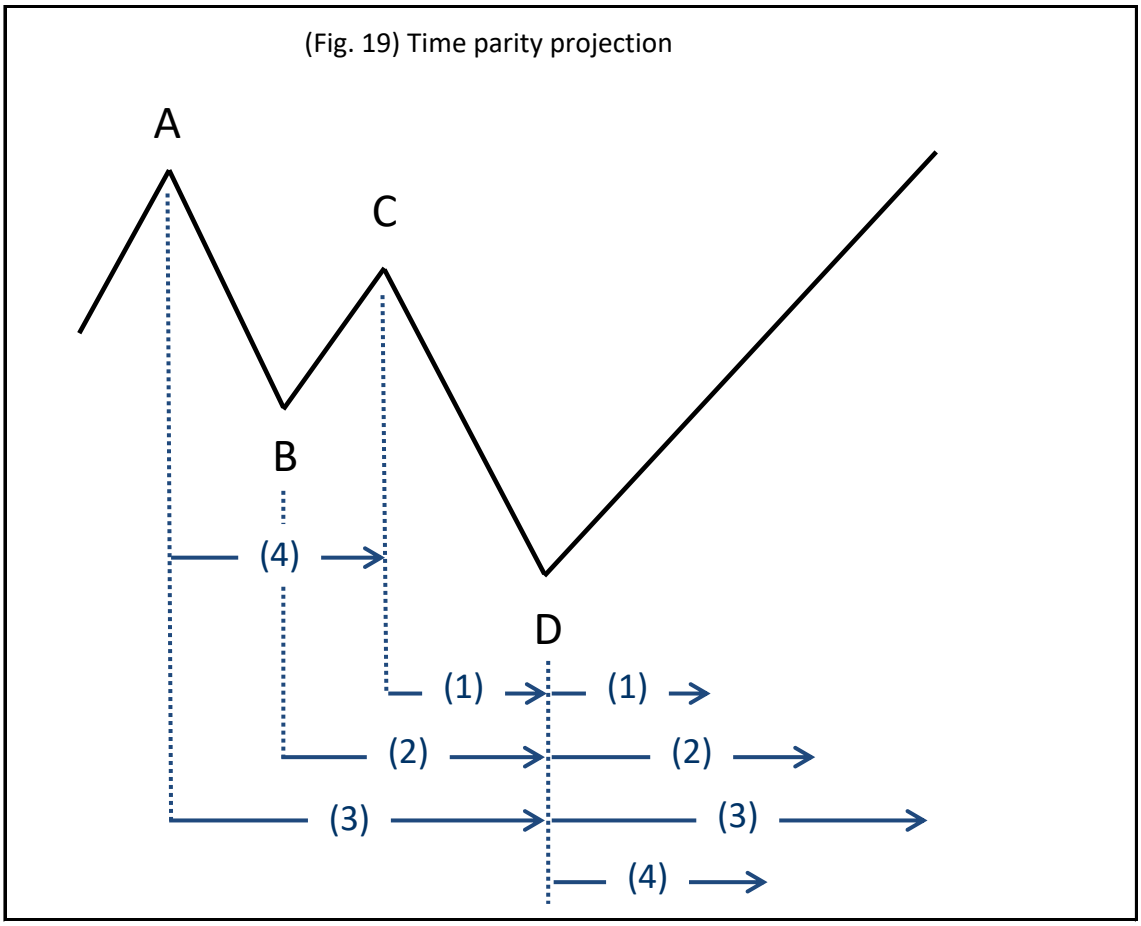
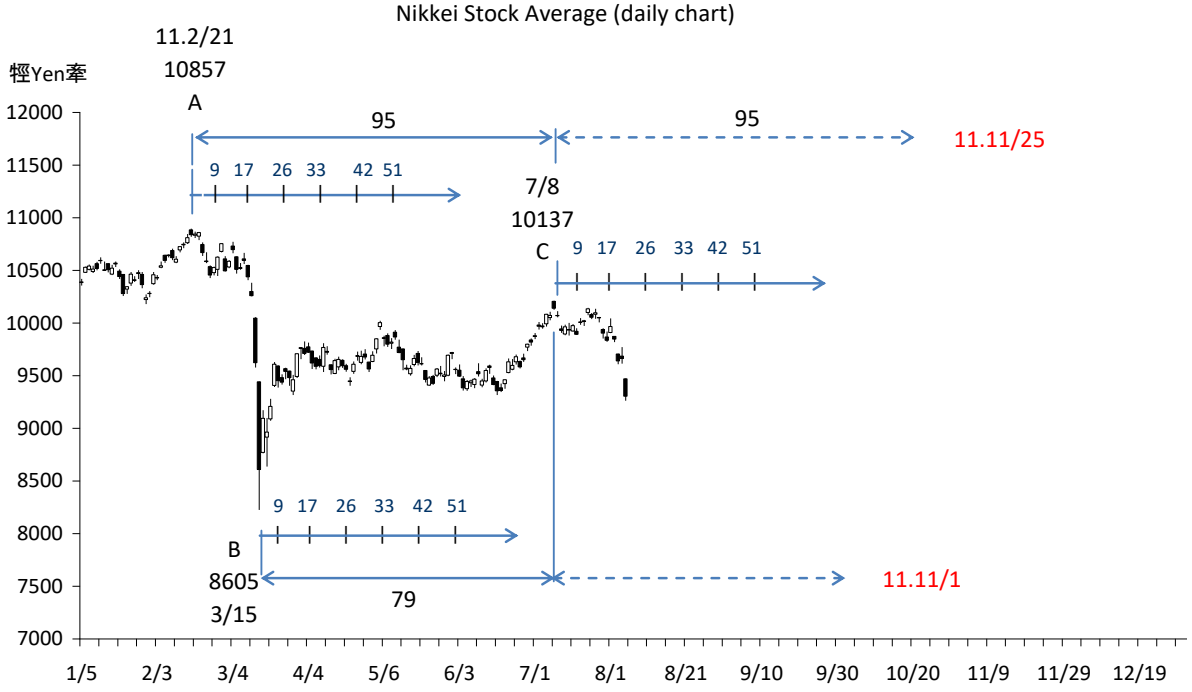


Fig. 19 illustrates this.
(1) Add the time distance (the number of the days) between the high C and the low D to the date of the low D into the future
(2) Add the time distance (the number of the days) between the low B and the low D to the date of the low D into the future
(3) Add the time distance (the number of the days) between the high A and the low D to the date of the low D into the future
(4) Add the time distance (the number of the days) between the high A and the high C to the date of the low D into the future

Fig. 20 is a daily chart of the Nikkei Stock Average in 2011. The Basic numbers (9, 17, 26, 33, 42, 51) are counted from the top A, bottom B, and the top C, to show how the market behaved on the projected dates. Also, it is shown how Time parity-based projections were made using the dates of the same major market events (top A, bottom B, and top C).

The Nikkei hit an intermediate top near 9 days (a Basic number) after the top A and started plunging into a major low B, which was projected by the Basic number 17. Near the point 51 days (a Basic number) after the top A, an intermediate top was formed. And the Nikkei hit the major top C 79 days (close to a Basic number 77) after the major low B.
Time parity-based Reversal date projections were conducted in the following manners:

(Fig. 20) Example of Time Projection
Nikkei Stock Average (daily chart)



- There were 95 trading days between the top A (February 21) and the top C (July 8). Adding this number of days (95) to the date of the top C, a Reversal date was projected at November 25.

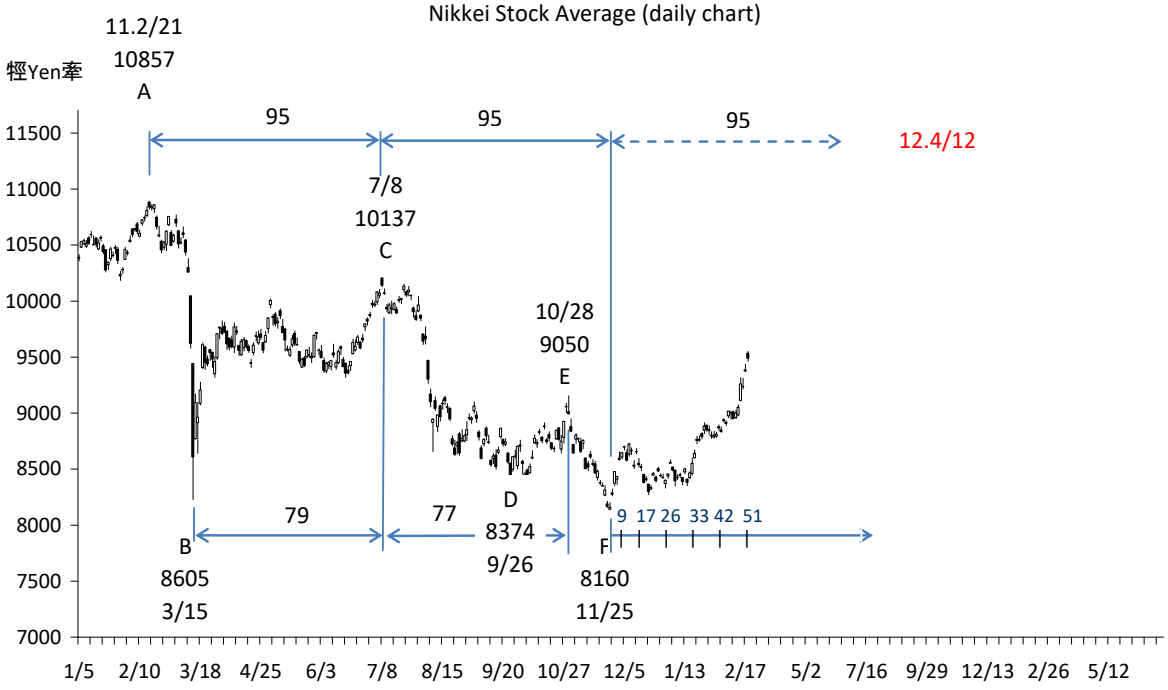
- There were 79 trading days between the low B and the top C. Adding this number of days (79) to

the date of the top C, a Reversal date was projected at November 1.

Fig. 21 shows what actually happened subsequently:

(Fig. 21) Example of Time Projection & Results

Nikkei Stock Average (daily chart)



- On October 28 (Fri), just two trading days off from the projected Reversal date of November 1 (Tue), the market hit a considerable intermediate top (E).

- On November 25, the exact projected Reversal date, the Nikkei hit a major low (F).

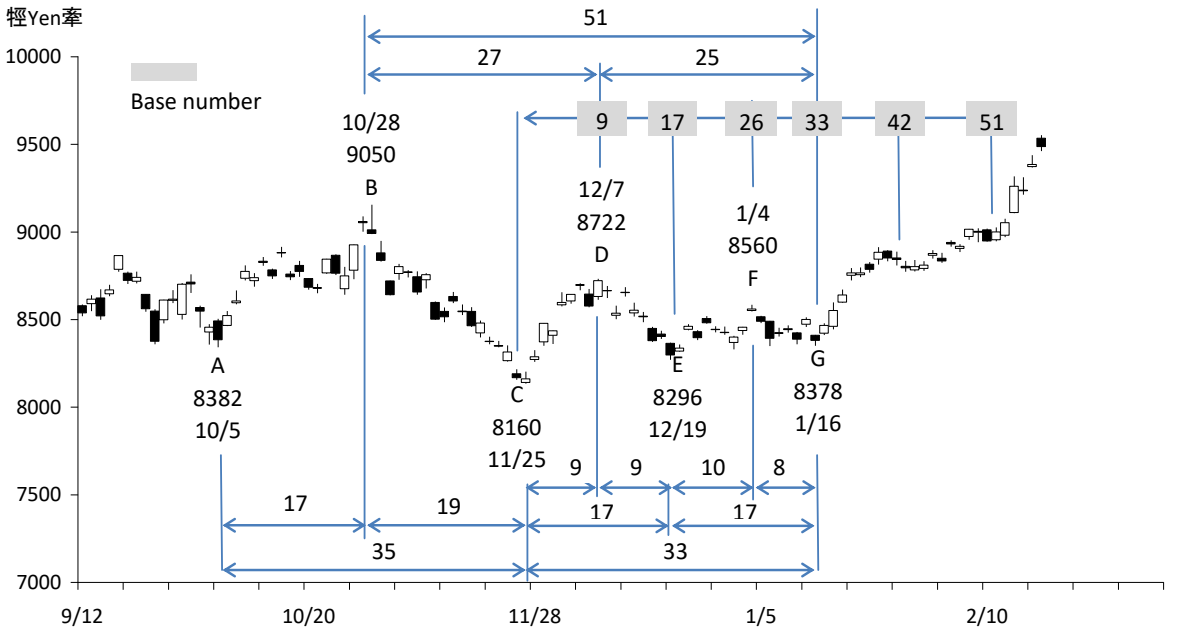
Fig. 22 is a daily chart of Nikkei Stock Average. The basic numbers are counted from the date of the low C. The market hit a considerable intermediate top D 9 days (a Basic number) after the low C, a considerable low E at 17 days (a Basic number) after the low C, an intermediate top F 26 days (a Basic number) after the said low, and terminated consolidation at G 33 days (a Basic number) after the said low. The time zones projected with the Basic numbers 42 and 51 also corresponded with interesting market actions.

The circled numbers are the number of days between the dates of notable highs and lows hit during the period. One would notice that the Time parity-based projection worked well to call market turns. Also, the one would notice that the numbers are close to the Basic numbers. To be sure, separately run Basic number-based projection and Time parity-based projection often converge.

The above may or may not be enough to show why Hosoda and many dedicated Ichimoku practitioners believe "time influences the market, and the market is dictated by time."

(Fig. 22) Basic numbers & Time parity projection

Nikkei Stock Average (daily chart)



We will never be able to win in the market as long as we attempt to follow rumors or unfounded expectations in the market, thinking that this is the way to make money. It is imperative to try to find unknown market

drivers, rather than chasing known ones. We should not think about the market based on news or other factors that are already known. It should be the other way round. We should evaluate, and make a judgment on, publicly known factors based on how the market is behaving. At the end of a major bull market, the market is full of positive news and stories. At the end of a major bear market, negative news and stories abound. When the market stops reacting to such positive or negative news or stories, it is the very moment when we should enter the market, of course, from the other side of the other players in the market. We have to do it swiftly and decisively. If we rely on our judgment alone, we will feel uneasy at the decisive moment; oftentimes past failures prevent us from focusing on the present. This prevents us from what we have to do as professional market players. Ichimoku is a great tool to help us focus on the present, develop a flair for playing the market, and do what we must as a professional trader/investor.

Created for IFTA colleagues based on the educational material of Nippon Technical Analysts Association (NTAA).

Appendix F

IFTA's Ethical and Professional Standards

(IFTA Required CFTe II Reading Material)

Maha Saeed, CETA, CFTe

Code of Ethics and Standards of Professional Conduct:

The "Principles of Ethics" within the IFTA Code of Ethics and Standards of Professional Conduct serve as foundational guidelines shaping the conduct of investment professionals. Acting with integrity, prioritizing client welfare, maintaining independence, promoting market integrity, and continuously improving professional competence are key principles emphasized. Adhering to these principles not only upholds the integrity of the investment profession but also fosters trust with clients, employers, and the broader financial community. Embracing these ethical standards contributes to a more robust and trustworthy financial ecosystem, benefiting all stakeholders involved.

Evolution of Financial Regulation: Safeguarding Investors and Promoting Market Integrity:

The necessity for regulation in financial markets stems from the imperative to protect investors, set standards, and resolve disputes, given the inherent risk of financial losses. While rules and codes of conduct have historically existed, enforcement has been inconsistent. As markets evolved, self-regulation emerged, with exchanges setting standards and overseeing compliance. However, global market expansion necessitated universally accepted standards, leading to a shift towards statutory regulation and the establishment of independent regulatory bodies in many countries. International cooperation among regulators, facilitated by organizations like IOSCO, has furthered harmonization and the development of common standards, such as anti-money laundering rules. This collaborative approach ensures greater investor protection and market integrity across borders, mitigating risks and fostering confidence in financial systems globally.

- Case Study 1:

<u>The Enron Scandal and the Sarbanes-Oxley Act:</u>

The Enron scandal in 2001, which led to the bankruptcy of the energy company Enron Corporation, highlighted the need for stronger financial regulation to protect investors and maintain market integrity. The scandal involved widespread accounting fraud, insider trading, and other financial irregularities that resulted in significant financial losses for investors. The scandal led to a loss of confidence in the stock market and the accounting profession, prompting calls for regulatory reform.

In response to the Enron scandal, the U.S. Congress passed the Sarbanes-Oxley Act in 2002, which introduced sweeping reforms to corporate governance, accounting, and financial disclosure practices. The Act established stricter standards for financial reporting, auditing, and corporate governance, and created the Public Company Accounting Oversight Board (PCAOB) to regulate the auditing profession. The Act also imposed harsh penalties

for corporate fraud and insider trading and enhanced the powers of the Securities and Exchange Commission (SEC) to oversee and regulate the securities industry.

The Enron scandal and the subsequent passage of the Sarbanes-Oxley Act demonstrate the importance of effective financial regulation in safeguarding investors and promoting market integrity. The scandal highlighted the risks of inadequate regulation and the need for stronger oversight mechanisms to prevent financial fraud and protect investors. The Sarbanes-Oxley Act represents a significant step towards enhancing transparency, accountability, and investor protection in the stock market, and has served as a model for regulatory reform in other countries.

By examining the Enron scandal and the Sarbanes-Oxley Act, academics and policymakers can gain insights into the evolution of financial regulation and its impact on stock markets trading. The case study underscores the importance of effective regulation in maintaining investor confidence, preventing financial fraud, and promoting market integrity, and highlights the need for ongoing regulatory vigilance and adaptation to emerging risks and challenges in the financial sector.

- Case Study 2:

<u>The 2008 Global Financial Crisis and the Dodd-Frank Act:</u>

The 2008 global financial crisis exposed major weaknesses in financial regulation and oversight that allowed excessive risk-taking and predatory lending practices to threaten the stability of the entire global financial system. The crisis began with the bursting of the U.S. housing bubble and subprime mortgage crisis, but quickly spread to other asset classes and financial institutions around the world. Key factors that contributed to the crisis included:

- Lack of regulation and oversight of the "shadow banking" system, including investment banks, hedge funds, and the derivatives market.
- Predatory lending practices by mortgage originators, who issued high-risk loans to unqualified borrowers.
- Securitization of subprime mortgages into complex derivatives that spread risk throughout the financial system.
- Excessive leverage and risk-taking by financial institutions.
- Failure of credit rating agencies to properly assess the risks of mortgage-backed securities.

In response to the crisis, the U.S. Congress passed the Dodd-Frank Wall Street Reform and Consumer Protection Act in 2010. Dodd-Frank represented the most sweeping financial regulatory reform since the Great Depression, aiming to promote financial stability and protect consumers by:

- Establishing the Financial Stability Oversight Council to identify and mitigate systemic risks.
- Imposing stricter capital requirements and oversight on large banks and financial institutions.
- Creating the Consumer Financial Protection Bureau to enforce consumer protection laws.
- Regulating the derivatives market and banning proprietary trading by banks.

- Requiring securitizers to retain some risk in the mortgage-backed securities they sell.

While Dodd-Frank faced criticism from some as overly burdensome, most experts agreed that it was a necessary response to the crisis to close regulatory gaps, rein in excessive risk-taking, and protect taxpayers from future bailouts of "too big to fail" financial institutions. The 2008 crisis and Dodd-Frank Act demonstrate how major financial scandals and crises can spur legislative action to strengthen financial regulation and oversight. By adapting to emerging risks and closing regulatory loopholes, policymakers aim to safeguard investors, promote market integrity, and maintain the stability of the global financial system in the face of future challenges.

Transition from Market Autonomy to Statutory Oversight:

As capital and financial markets gained prominence in driving economic growth, ensuring public trust and market confidence became imperative. Recognizing the potential repercussions of market instability, countries enacted laws and regulations governing financial services. Various regulatory frameworks emerged, emphasizing the authorization of firms and adherence to minimum standards for operation. Regulatory bodies assess applicants for fitness and propriety, focusing on activities, financial standing, and management suitability. This shift from self-regulation to statutory oversight aims to bolster financial stability, preserve systemic integrity, and safeguard consumer interests. It signifies a departure from market-led regulations to independent statutory frameworks, overseen by governmental regulatory authorities, to uphold market integrity and instill confidence in financial systems.

- Case Study 1:

<u>The UK Financial Services Authority and the 2008 Financial Crisis:</u>

Prior to the 2008 global financial crisis, the United Kingdom relied on a system of self-regulation in financial services known as "light touch" regulation. The Financial Services Authority (FSA) was the single statutory regulator for financial services, but it took a largely hands-off approach, deferring to the industry's own codes of conduct and allowing firms to regulate themselves.

The FSA's light touch approach was exemplified by its regulation of Northern Rock, a mortgage lender that grew rapidly by relying on short-term wholesale funding. Despite warning signs, the FSA did not intervene until Northern Rock faced a liquidity crisis and bank run in 2007. The FSA's failure to properly supervise Northern Rock and other firms contributed to the severity of the financial crisis in the UK.

In the wake of the crisis, the UK government conducted a review that led to the abolition of the FSA in 2013. It was replaced by two new regulatory bodies with enhanced statutory powers:

- The Financial Conduct Authority (FCA) - Responsible for regulating conduct in retail and wholesale financial markets, ensuring firms treat customers fairly.
- The Prudential Regulation Authority (PRA) - A subsidiary of the Bank of England focused on prudential regulation and supervision of banks, building societies, credit unions, insurers and major investment firms.

The new regulatory framework represented a major shift away from self-regulation and light touch oversight. The FCA and PRA were given stronger legal powers to authorize firms, set rules, and take enforcement action. They were also granted more resources and expertise to proactively monitor risks in the financial system. The transition from the FSA to the FCA and PRA demonstrated the need for robust statutory regulation to maintain financial stability and protect consumers. It signaled the end of the era of market autonomy and the rise of independent regulatory bodies with clear mandates to uphold market integrity. The UK's experience highlighted the importance of empowering regulators with the right tools and incentives to effectively oversee increasingly complex and interconnected financial markets.

Enhancing Market Stability and Integrity:

Financial regulation serves multifaceted objectives aimed at bolstering market confidence, fostering economic growth, mitigating risks, protecting consumers, and combating financial crime. By establishing standards and oversight mechanisms, regulation instills credibility and reliability in financial markets, encouraging investment and efficient capital allocation. Moreover, it creates an environment conducive to economic development and wealth generation, facilitating business financing and entrepreneurship. Regulatory oversight also curtails the likelihood of market failures and systemic risks, safeguarding against excessive risk-taking and institutional collapses. Additionally, consumer protection measures ensure transparency, fairness, and recourse avenues for investors, enhancing trust and participation in financial activities. Lastly, robust regulatory frameworks and enforcement efforts deter financial crimes, such as money laundering and market manipulation, preserving market integrity and reducing vulnerabilities to illicit activities.

- Case Study 1:

<u>The Flash Crash of 2010 and the Need for Circuit Breakers:</u>

On May 6, 2010, the U.S. stock market experienced a sudden and severe drop in prices, with the Dow Jones Industrial Average plunging nearly 1,000 points in a matter of minutes before partially recovering. This event, known as the Flash Crash, highlighted the vulnerability of stock markets to rapid and extreme price fluctuations driven by automated trading algorithms and high-frequency trading strategies.
The Flash Crash exposed the need for regulatory measures to mitigate the risks of such events and maintain orderly market conditions. In response, the U.S. Securities and Exchange Commission (SEC) and the Commodity Futures Trading Commission (CFTC) implemented a series of reforms, including the adoption of market-wide circuit breakers.
Circuit breakers are automatic trading halts that are triggered when a stock index reaches a certain threshold of price decline within a specified time period. These measures are designed to provide a cooling-off period during times of extreme market volatility, allowing investors to assess the situation and preventing a full-blown market crash. The implementation of circuit breakers has been credited with helping to stabilize markets during subsequent periods of heightened volatility, such as the COVID-19 pandemic in 2020.
The Flash Crash case study demonstrates how financial regulation can enhance market stability and integrity by mitigating systemic risks and protecting investors from extreme price fluctuations. By establishing circuit breakers and other safeguards, regulators aim to create an environment that fosters confidence in stock markets and encourages long-term investment. This case study also highlights the importance of ongoing

regulatory adaptation to address emerging challenges posed by technological advancements in trading, such as the rise of high-frequency trading and algorithmic trading strategies.

Financial Crime:

Financial crime encompasses various illicit activities that pose significant threats to the integrity of financial systems. Money laundering, a prominent example, involves disguising the origins of criminal proceeds through complex processes like placement, layering, and integration within the financial system. Similarly, terrorist financing involves concealing funds to support illicit activities, often in smaller, harder-to-detect transactions.

Identity theft and cybercrime are also prevalent, with criminals exploiting personal data and technology to perpetrate fraud and cyber-enabled crimes. To counter these threats, financial institutions must implement robust controls and adhere to regulations aimed at detecting and preventing such criminal activities. This necessitates ongoing vigilance and compliance efforts to safeguard against the evolving tactics of criminal organizations seeking to exploit vulnerabilities in the financial sector.

- Case Study 1:

<u>The HSBC Mexico Money Laundering Scandal:</u>

In 2012, HSBC Holdings, a global banking giant, was fined $1.9 billion by U.S. authorities for violating sanctions and enabling money laundering by Mexican drug cartels. The scandal highlighted the weaknesses in HSBC's anti-money laundering (AML) controls, which allowed criminals to launder millions of dollars through the bank's accounts.

The investigation revealed that HSBC's Mexico unit had failed to implement adequate AML measures, allowing drug traffickers to deposit large amounts of cash into accounts without proper scrutiny. The bank's lax controls also enabled the transfer of funds to accounts in the United States, where they were used to purchase assets and finance illegal activities.

The HSBC scandal underscored the critical need for robust AML regulations and oversight to prevent financial crimes. The case demonstrated how weaknesses in AML controls can be exploited by criminal organizations, posing significant threats to the integrity of financial systems. The scandal led to a major overhaul of HSBC's AML practices and increased regulatory scrutiny of the banking industry as a whole.

The case study highlights the importance of financial institutions implementing robust controls and adhering to regulations aimed at detecting and preventing financial crimes. It also underscores the need for ongoing vigilance and compliance efforts to safeguard against the evolving tactics of criminal organizations seeking to exploit vulnerabilities in the financial sector.

- Case Study 2:

<u>The Bernard L. Madoff Investment Securities LLC Ponzi Scheme:</u>

The Bernard L. Madoff Investment Securities LLC Ponzi scheme, uncovered in 2008, is one of the most notorious financial frauds in history. Madoff, a financier and investment advisor, ran a Ponzi scheme that defrauded thousands of investors out of approximately $65 billion over several decades. The scheme involved promising investors consistent returns, regardless of market conditions, and delivering false statements showing their investments were performing well. In reality, Madoff was using money from new investors to pay returns to earlier investors, while also funding his own lavish lifestyle.

The Madoff Ponzi scheme highlighted the need for robust regulatory oversight and effective fraud detection mechanisms to prevent such crimes. The scheme was able to persist for so long due to a lack of effective regulation and oversight, as well as a failure of auditors and regulators to detect the fraud. The scandal led to widespread outrage and calls for greater regulatory scrutiny of the financial industry.

In response to the Madoff scandal, regulatory bodies such as the U.S. Securities and Exchange Commission (SEC) implemented reforms aimed at improving fraud detection and prevention. These reforms included enhancing auditing standards, increasing transparency and disclosure requirements, and strengthening whistleblower protections.

This case study demonstrates the importance of financial regulation in combating financial crime, particularly in the context of investment fraud and Ponzi schemes. It underscores the need for robust regulatory oversight, effective fraud detection mechanisms, and strong auditing standards to prevent such crimes and protect investors. The Madoff scandal serves as a cautionary tale about the dangers of unchecked greed and the importance of regulatory vigilance in maintaining the integrity of financial markets.

The Money Laundering:

Money laundering involves disguising the origins of illegally obtained funds to legitimize their appearance. It typically unfolds in three stages: placement, layering, and integration. During placement, illicit cash is introduced into the financial system, aiming to avoid suspicion about its source. The layering stage entails complex transactions to obscure the money's origins, such as moving funds across accounts or engaging in securities trading. This creates a convoluted money trail difficult to trace back to its criminal roots. Integration marks the final phase, where laundered funds re-enter the legitimate economy, appearing as though they come from legal sources. Effective anti-money laundering measures focus on identifying suspicious activity early in the process, employing methods like customer due diligence and transaction monitoring to prevent integration of illicit funds into the financial system.

- Case Study 1:

<u>The Danske Bank Estonia Money Laundering Scandal:</u>

In 2018, Danske Bank, a Danish financial institution, was embroiled in a massive money laundering scandal involving its Estonian branch. An investigation revealed that from 2007 to 2015, the bank's Estonian branch had facilitated the laundering of approximately €200 billion in illicit funds, primarily from Russia and other former Soviet states. The scandal highlighted significant weaknesses in Danske Bank's anti-money laundering controls, including inadequate customer due diligence, insufficient transaction monitoring, and a lack of effective reporting of suspicious activities.

This case study demonstrates how criminals can exploit vulnerabilities in financial institutions to launder money through stock markets trading. The layering stage of money laundering was facilitated by the bank's lack of proper oversight, allowing funds to be moved across accounts and invested in securities to obscure their origins. The integration phase was enabled by the bank's failure to detect and report suspicious transactions, enabling illicit funds to re-enter the legitimate economy through stock market investments.

- Case Study 2:

The FinCEN Files Leak:

The FinCEN Files leak in 2020 provides another compelling case study showcasing the scale and complexity of money laundering operations despite existing anti-money laundering compliance measures. The leak exposed a vast network of financial corruption, revealing over $2 trillion in suspicious transactions that were allowed to proceed due to failures in global banking systems. The case underscored the importance of thorough customer due diligence and rigorous enforcement of Know Your Customer (KYC) protocols to detect and prevent money laundering activities. By analyzing the FinCEN Files leak, scholars can explore the challenges faced by regulatory authorities in combating money laundering on a global scale, emphasizing the critical role of transparency, information sharing, and regulatory enforcement in disrupting illicit financial flows and preserving the integrity of the financial system.

Terrorist Financing: Similarities and Differences in Scale:

The methods employed to move funds for terrorist activities bear striking resemblances to those used in laundering proceeds from criminal enterprises. Both utilize legitimate financial channels and layering techniques to obscure money trails. However, while terrorist acts may require smaller sums compared to crimes like drug trafficking, this lesser scale poses challenges in identifying and tracking illicit funds amid legitimate transactions. Additionally, funds originating from lawful sources, such as charitable donations, further complicate detection, as it's difficult to pinpoint when they transition to terrorist financing. The decentralized nature of terrorist cells allows for minimal funding requirements, making it easier to exploit technically legitimate transactions. This distinction in scale presents unique challenges for authorities and financial institutions, requiring nuanced approaches to detection and prevention beyond traditional anti-money laundering efforts.

- Case Study:

The 2013 Boston Marathon Bombing:

The 2013 Boston Marathon bombing, carried out by brothers Tamerlan and Dzhokhar Tsarnaev, highlights the challenges in detecting and disrupting terrorist financing activities, particularly when involving small sums of money and lone wolf operatives. The Tsarnaev brothers financed their terrorist plot primarily through legal means, including government welfare benefits, financial aid for college, and small businesses. They spent around $15,000 on bomb-making materials, firearms, and other supplies, all of which were purchased with cash to avoid detection. Despite being on the radar of U.S. intelligence agencies, the brothers were able to carry out

their attack without raising any red flags in the financial system due to the relatively small sums of money involved and their reliance on cash transactions.

- Case Study:

In the Danske Bank Estonia Money Laundering Scandal:

It was revealed that from 2007 to 2015, Danske Bank's Estonian branch facilitated the laundering of approximately €200 billion in illicit funds, primarily from Russia and other former Soviet states. The scandal highlighted significant weaknesses in Danske Bank's anti-money laundering controls, including inadequate customer due diligence, insufficient transaction monitoring, and a lack of effective reporting of suspicious activities.

This case study demonstrates how criminals can exploit vulnerabilities in financial institutions, including those involved in stock markets trading, to launder money through complex processes like placement, layering, and integration. The layering stage of money laundering was facilitated by the bank's lack of proper oversight, allowing funds to be moved across accounts and invested in securities to obscure their origins. The integration phase was enabled by the bank's failure to detect and report suspicious transactions, enabling illicit funds to re-enter the legitimate economy through stock market investments.

The Danske Bank scandal underscores the importance of robust anti-money laundering measures in the stock markets trading sector. Effective customer due diligence, transaction monitoring, and reporting of suspicious activities are crucial to prevent the integration of illicit funds into the financial system. Regulators and financial institutions must remain vigilant in combating money laundering and terrorist financing to maintain the integrity of stock markets trading and protect investors from illicit financial activities.

Emerging Financial Crime Threats: Identity Fraud and Cybercrime:

In addition to money laundering and terrorist financing, financial institutions must contend with the rising challenges posed by identity fraud and cybercrime. Identity fraud involves the illicit use of personal information to obtain goods or credit under false pretenses, often through synthetic identities created from stolen or purchased data. Cybercrime, meanwhile, encompasses a broad spectrum of illicit activities facilitated by technology, ranging from hacking attacks to online fraud schemes. Today's cybercriminal networks are highly sophisticated and operate on a global scale, perpetrating crimes like data breaches and ransomware attacks that pose significant risks to the economy. To combat these threats, financial firms must implement robust cybersecurity measures, anti-fraud protocols, and identity verification procedures. Additionally, regulatory frameworks are continually evolving to address the dynamic nature of these crimes and safeguard financial systems against exploitation.

- Case Study:

Equifax Data Breach and the Impact on Financial Systems:

In 2017, Equifax, one of the largest credit reporting agencies in the United States, experienced a massive data breach that exposed the personal information of over 147 million individuals. Cybercriminals exploited vulnerabilities in Equifax's systems to gain unauthorized access to sensitive data, including names, Social Security numbers, birth dates, and addresses. This breach highlighted the severe consequences of inadequate cybersecurity measures and the far-reaching implications of identity theft for individuals and financial institutions.

The Equifax data breach serves as a pertinent case study illustrating the risks posed by cybercrime and identity fraud to financial systems, including stock markets trading. The illicit use of personal information obtained through data breaches can lead to identity fraud, where criminals create synthetic identities to engage in fraudulent activities, including stock market manipulation and illicit trading practices. The breach underscored the importance of robust cybersecurity measures, anti-fraud protocols, and identity verification procedures to protect individuals and financial institutions from the impacts of cybercrime.

This case study demonstrates the critical need for financial firms to implement stringent cybersecurity measures and anti-fraud protocols to safeguard against identity fraud and cybercrime in stock markets trading. By learning from incidents like the Equifax data breach, financial institutions can enhance their defenses, protect investor information, and maintain the integrity of financial systems amidst evolving threats in the digital age.

Insider Trading and Market Abuse:

Insider trading occurs when someone trades securities while in possession of material non-public information that could impact the price. It involves insiders like company employees or those who obtain confidential information misusing it for personal benefit. Market abuse is broader, covering insider trading as well as other manipulative behaviors like disseminating false information, using fictitious trades, or engaging in practices that distort market pricing and activity unfairly. Both insider trading and certain forms of market abuse are illegal and can incur civil penalties from regulators as well as potential criminal prosecution. Regulations define what constitutes inside information, covered instruments, disclosure requirements, and prohibited market manipulation tactics.

- Case Study:

<u>Albert H. Wiggin Insider Trading Case:</u>

After the Wall Street Crash of 1929, it was revealed that Albert H. Wiggin, the respected head of Chase National Bank, had shorted more than 40,000 shares of his own company. Using companies owned by his family to hide the trades, Wiggin built up a position that actually gave him a vested interest in running his company into the ground. At the time, there were no specific rules against short-selling stocks of your own company. So, in the aftermath of the 1929 crash, when many different investors exited their positions of Chase National Bank stock at the same time, Wiggin legally made over $4 million.

This case study exemplifies insider trading, where an individual with privileged knowledge uses that information to gain an unfair advantage over other investors. Albert H. Wiggin's actions of short-selling his own company's

stock based on non-public information demonstrate the unethical nature of insider trading and the potential harm it can cause to market integrity and investor trust.

The Albert H. Wiggin Insider Trading Case serves as a historical example of how insider trading can distort market pricing and activity unfairly, leading to personal gain at the expense of other investors. It underscores the importance of regulations and enforcement mechanisms to prevent insider trading and market abuse, ensuring a level playing field for all market participants and maintaining the integrity of stock markets trading.

Insider Trading:

Insider trading is the unlawful act of trading securities based on confidential information not yet disclosed to the public, which could impact the securities' prices upon revelation. This practice exploits privileged "inside" knowledge unavailable to ordinary investors. To establish guilt in insider trading cases, regulators must define insiders, identify qualifying inside information, and outline scenarios constituting the offense. Inside information pertains specifically to certain securities or their issuer, is precise, non-public, and likely to affect security prices if disclosed. Insiders include individuals with access to such information due to their position, relationship, or employment with the company. They are prohibited from trading securities based on insider information or sharing it improperly. Actions like buying or selling affected securities, altering trades upon receiving inside information, or disclosing such information improperly constitute insider trading. This prohibition typically extends to various financial instruments like stocks, bonds, options, and derivatives.

- Case Study 1:

<u>The Martha Stewart Insider Trading Scandal:</u>

In 2001, Martha Stewart, the founder of Martha Stewart Living Omnimedia, was accused of insider trading based on confidential information she received about the ImClone Systems drug Erbitux. Stewart sold her shares in ImClone a day before the FDA announced it would not approve the drug, allowing her to avoid significant losses. She was convicted of conspiracy, obstruction of an agency proceeding, and making false statements to federal investigators. Stewart was sentenced to a minimum of five months in prison and fined $30,000.

This case exemplifies insider trading, where an individual with privileged knowledge uses that information to gain an unfair advantage over other investors. Stewart's actions of selling her ImClone shares based on non-public information demonstrate the unethical nature of insider trading and the potential harm it can cause to market integrity and investor trust.

- Case Study 2:

<u>The Ivan Boesky Insider Trading Scandal:</u>

In the 1980s, Ivan Boesky, a prominent Wall Street arbitrageur, was involved in one of the largest insider trading scandals in U.S. history. Boesky illegally obtained confidential information from investment bankers and

corporate insiders, allowing him to make over $200 million in profits. He was sentenced to three years in prison in 1987 and fined $100 million.

Boesky's case highlights the severity of insider trading and the consequences faced by those who engage in such practices. His actions of exploiting market inefficiencies and profiting from confidential information undermine the fairness and integrity of the stock market, harming ordinary investors who do not have access to the same privileged information.

These case studies demonstrate the importance of regulations and enforcement mechanisms to prevent insider trading and maintain a level playing field for all market participants. They underscore the need for transparency, accountability, and ethical conduct in the financial industry to protect the interests of investors and promote the efficient functioning of stock markets.

Insider Dealing, Disclosure Failures, and Market Manipulation:

Market abuse encompasses various improper behaviors that disrupt the fair and efficient functioning of financial markets. Insider dealing involves trading securities based on non-public information, violating fairness principles. Disclosure failures occur when issuers fail to promptly disclose material information affecting their publicly traded securities, breaching transparency requirements. Maintaining updated insider lists and reporting personal transactions are further obligations for company insiders. Market manipulation is another major offense, involving spreading false information or employing deceptive tactics to influence market prices artificially. This includes fictitious trades, false rumors, and coordinated trading aimed at distorting supply, demand, or prices. Regulators globally implement surveillance and enforcement measures to combat market abuse, including disclosure mandates, restricted trading practices, and reporting requirements. Both regulators and exchanges enforce sanctions against violators to uphold market integrity and investor confidence.

- Case Study:

<u>Martha Stewart Insider Trading Scandal:</u>

In 2001, Martha Stewart, the founder of Martha Stewart Living Omni media, was accused of insider trading based on confidential information she received about the ImClone Systems drug Erbitux. Stewart sold her shares in ImClone a day before the FDA announced it would not approve the drug, allowing her to avoid significant losses. She was convicted of conspiracy, obstruction of an agency proceedings, and making false statements to federal investigators. Stewart was sentenced to a minimum of five months in prison and fined $30,000.

This case study exemplifies insider trading, where an individual with privileged knowledge uses that information to gain an unfair advantage over other investors. Stewart's actions of selling her ImClone shares based on non-public information demonstrate the unethical nature of insider trading and the potential harm it can cause to market integrity and investor trust.

The Martha Stewart Insider Trading Scandal also highlights the importance of disclosure requirements and transparency in financial markets. Failure to promptly disclose material information, as seen in Stewart's case,

can lead to allegations of insider trading and market manipulation. Regulators globally implement surveillance and enforcement measures to combat market abuse, including disclosure mandates and reporting requirements, to uphold market integrity and investor confidence.

This case study serves as a real-world example of the consequences of insider dealing, disclosure failures, and market manipulation in stock markets trading. It underscores the significance of regulatory oversight and enforcement mechanisms in maintaining fair and efficient financial markets and protecting investors from fraudulent practices.

Integrity and Ethical Standards in Finance:

In the financial services industry, integrity and ethical conduct are indispensable for maintaining trust among stakeholders. While regulations provide a basic framework, ethical considerations should stand apart, as mere compliance doesn't guarantee ethical behavior. Individuals must consciously assess the ethical implications of their actions, considering transparency, honesty, legality, and fairness to all parties involved. Professional bodies like the International Federation of Technical Analysts (IFTA) play a crucial role in promoting ethical standards beyond regulatory requirements. They establish codes of conduct covering personal accountability, client focus, conflict management, and continuous professional development. These principles also emphasize diversity, environmental responsibility, and the duty to report misconduct. Adhering to such ethical standards fosters confidence, credibility, and trust in financial markets, contributing to their smooth operation and benefitting the broader economy. Firms and individuals alike must prioritize cultivating an ethical culture to uphold these essential values.

Fostering Ethical Thinking in Finance:

Navigating ethical dilemmas in the financial sector demands more than mere adherence to rules; it requires a cultivated mindset of ethical awareness. Despite the industry's rational nature, numerous instances of unethical behavior underscore the necessity of actively prioritizing ethical thinking. This entails introspection before decision-making, questioning the fairness and transparency of actions. Ethical awareness must become ingrained through continuous reflection on the moral implications of professional conduct. An ethical culture cannot be imposed solely through rules; it must stem from internalized values and integrity. Leaders play a pivotal role in fostering environments where ethical concerns can be openly addressed, creating a foundation of trust and accountability. Ultimately, the finance industry's credibility hinges on individuals consistently exhibiting ethical behavior, transcending mere compliance with legal mandates.

- Case Study:

<u>The Enron Scandal: A Failure of Ethical Thinking</u>:

The Enron scandal, which unfolded in 2001, serves as a prime example of the consequences of a lack of ethical thinking in the finance industry. Enron, once a highly respected energy company, engaged in fraudulent accounting practices and unethical business dealings that ultimately led to its downfall. The scandal highlighted several key failures in ethical thinking:

1. **Prioritizing short-term profits over long-term sustainability**: Enron's leadership, driven by greed and a desire for personal gain, focused on inflating the company's stock price and reporting impressive financial results, even if it meant engaging in unethical practices.
2. **Lack of transparency and disclosure**: Enron's financial statements were intentionally misleading, obscuring the company's true financial position and risks from investors and regulators.
3. **Failure to question the morality of actions**: Enron's employees, including accountants and financial professionals, failed to question the ethical implications of their actions, prioritizing loyalty to the company over their professional responsibilities.
4. **Absence of ethical leadership**: Enron's leadership failed to foster a culture of ethical thinking, instead creating an environment that rewarded unethical behavior and discouraged dissent.

The Enron scandal led to significant losses for investors, employees, and the wider economy, and highlighted the need for a fundamental shift in the finance industry's approach to ethics. It underscored the importance of cultivating ethical awareness, prioritizing transparency, and accountability, and creating environments that encourage ethical thinking and behavior.
By studying the Enron case and similar scandals, finance professionals can learn valuable lessons about the importance of ethical thinking in the industry. Fostering ethical awareness, questioning the morality of actions, and prioritizing long-term sustainability over short-term gains are crucial steps in creating a more ethical finance industry that serves the interests of all stakeholders.

Ethical Decision-Making Principles:

In navigating ethical dilemmas within professional contexts, employing a structured approach can help ensure integrity and fairness. A fundamental checklist for ethical decision-making involves evaluating whether the decision is characterized by openness, honesty, transparency, and fairness to all stakeholders. Openness entails avoiding concealment and ensuring that all parties involved are fully informed. Honesty goes beyond legal compliance to encompass acting in good faith and with integrity. Transparency requires clarity and understanding in all aspects of the decision-making process. Most crucially, fairness ensures equitable treatment for all involved, avoiding undue advantage or harm. Consistently applying these principles serves as a guide for ethical analysis, fostering a culture of ethical thinking and behavior in professional settings.

- Case Study:

<u>Martha Stewart Insider Trading Scandal: Application of Ethical Decision-Making Principles:</u>

In 2001, Martha Stewart, the founder of Martha Stewart Living Omnimedia, was embroiled in an insider trading scandal related to her sale of ImClone Systems stock based on non-public information. This case study provides a practical application of ethical decision-making principles in the context of stock markets trading.

- **Openness**: In the Martha Stewart case, the lack of openness and transparency in her actions was evident. Stewart failed to disclose the material non-public information she possessed about the FDA's decision regarding ImClone's drug, leading to suspicions of insider trading.

- **Honesty**: Ethical decision-making requires more than mere legal compliance; it demands acting in good faith and with integrity. Stewart's actions of selling her shares based on privileged information violated the principles of honesty and integrity in financial dealings.
- **Transparency**: Transparency is crucial in ethical decision-making processes. Stewart's lack of transparency in her stock trading activities and failure to disclose the inside information she possessed exemplifies a breach of transparency in financial transactions.
- **Fairness**: Fairness ensures equitable treatment for all stakeholders involved. In the Martha Stewart case, the unfair advantage gained through insider trading violated the principle of fairness, as other investors did not have access to the same material non-public information.

By analyzing the Martha Stewart Insider Trading Scandal through the lens of ethical decision-making principles, such as openness, honesty, transparency, and fairness, finance professionals can gain insights into the importance of upholding ethical standards in stock markets trading. Consistently applying these principles serves as a guide for ethical analysis, fostering a culture of ethical thinking and behavior in professional settings, and contributing to the integrity and fairness of financial markets.

Elevating Ethical Standards in Finance:

In addition to governmental regulations, professional bodies within the financial services sector play a pivotal role in upholding ethics and integrity. These bodies, comprising industry insiders, establish codes of conduct that set ethical benchmarks surpassing mere legal compliance. These codes outline principles such as prioritizing client interests, managing conflicts of interest, upholding market integrity, fostering a culture of ethical behavior among members.

While regulations primarily focus on enforceable rules, codes of conduct emphasize doing what is morally right, not just what is legally permissible. For instance, while regulations may mandate certain disclosures, codes encourage professionals to embrace full transparency beyond minimum requirements. By joining these bodies, members commit to upholding ethical standards outlined in the codes and can face disciplinary action for violations. This self-regulation raises industry standards and bolsters public confidence in professionals' commitment to ethical conduct, establishing ethics as a cornerstone of professionalism alongside knowledge and competence.

Promoting Ethical Conduct in Technical Analysis:

The IFTA's Code of Conduct outlines fundamental principles that transcend mere regulatory compliance, setting ethical standards for its members. These encompass personal accountability, client-centric practices, conflict management, market respect, continuous professional development, and awareness of one's competencies. Members are held to high standards of integrity, honesty, and conduct that preserves the industry's reputation. Client focus mandates fair treatment, confidentiality, and responsible use of client information. Conflict management involves transparent handling of conflicts while upholding regulatory requirements. Respecting market integrity necessitates adherence to proper conduct and confidentiality standards. Continuous professional development is emphasized, along with understanding one's limitations and seeking assistance when necessary. The code further promotes respect, diversity, environmental consciousness, and a culture of

accountability. Collectively, these principles establish a robust ethical framework guiding members' conduct, fostering a culture of integrity and responsibility beyond regulatory mandates.

Principles of Ethics

- ***Acting with Integrity:***

Within the IFTA Code of Ethics and Standards of Professional Conduct, upholding honesty, fairness, and ethical behavior in every professional interaction stands as a fundamental principle. This mandate demands transparency, requiring professionals to operate with high moral standards and an unwavering commitment to ethical norms. Integral to this principle is the embodiment of integrity in action, necessitating a harmonization of words and deeds. Furthermore, professionals are tasked with maintaining confidentiality to safeguard sensitive information and to steer clear of conflicts of interest that might compromise their impartiality. As designated Technical Analysts (IFTA Colleagues), individuals are held to the highest standards of professional conduct, which extend to strict adherence to the laws and regulations governing their professional activities.

This commitment entails a comprehensive dedication to upholding ethical standards not only in their overt actions but also in the subtleties of their decision-making processes. By prioritizing transparency and adhering to legal regulations, professionals cultivate an environment of trust and credibility within their professional spheres. This mandate not only serves to maintain the integrity of the profession but also ensures that clients and stakeholders can place their confidence in the ethical framework guiding the actions of Technical Analysts within the IFTA community.

- ***Placing Clients' Interests First:***

Emphasizing the paramount importance of prioritizing client welfare above personal gain or other conflicting interests lies at the core of ethical conduct within the IFTA's guidelines. This principle underscores the fiduciary duty that investment professionals owe to their clients, necessitating a commitment to act in the clients' best interests at all times. To fulfill this obligation, professionals must provide personalized advice tailored to the specific needs, goals, and risk tolerances of each client. Moreover, they are tasked with the crucial responsibility of managing conflicts of interest, ensuring that their recommendations are free from undue influence and bias. Transparent communication serves as a cornerstone in this endeavor, enabling professionals to maintain open dialogue with clients and empower them to make informed decisions that align with their financial objectives. By adhering to this principle, investment professionals demonstrate integrity and dedication to serving the long-term interests of their clients, fostering trust and confidence in their professional relationships.

Furthermore, prioritizing client welfare entails a proactive approach to identifying and mitigating potential conflicts of interest that may arise in the course of client interactions. Professionals must navigate these conflicts with diligence and care, ensuring that their recommendations are not compromised by personal interests or external pressures. By fostering transparency and openness in their dealings, professionals can uphold the trust placed in them by clients and reinforce their commitment to acting with integrity. This principle underscores the ethical imperative of placing client interests above all else, safeguarding their financial well-being and upholding the integrity of the investment profession. Through personalized advice, conflict management, and transparent communication, investment professionals can ensure that their clients'

best interests remain at the forefront of their decision-making processes, thereby fostering enduring relationships built on trust and mutual respect.

- Case Study:

Bernie Madoff Ponzi Scheme: Violation of Client Interests and Ethical Conduct:

Bernie Madoff, a prominent investment advisor, orchestrated one of the largest Ponzi schemes in history, defrauding thousands of investors out of billions of dollars. Madoff's scheme involved promising consistent returns to clients while using new investors' funds to pay returns to earlier investors, creating the illusion of a successful investment strategy. This fraudulent scheme lasted for decades, deceiving clients, regulators, and the wider financial community.

- **Placing Clients' Interests First**: In the Bernie Madoff case, the paramount importance of prioritizing client welfare above personal gain was blatantly disregarded. Madoff's actions were driven by greed and self-interest, leading to severe financial losses for his clients who trusted him with their investments.
- **Fiduciary Duty**: Investment professionals owe a fiduciary duty to act in the best interests of their clients. Madoff's scheme violated this fundamental principle by prioritizing his own financial gain over the well-being of his clients, resulting in devastating consequences for those who invested with him.
- **Conflict Management**: Madoff failed to manage conflicts of interest appropriately, as his fraudulent scheme was driven by personal enrichment at the expense of his clients. The lack of transparency and honesty in his dealings further exacerbated the ethical violations inherent in the Ponzi scheme.
- **Transparent Communication**: Transparency and open communication with clients are essential components of ethical conduct in the investment profession. Madoff's lack of transparency and the dissemination of false information to clients exemplify a breach of trust and integrity in client relationships.

The Bernie Madoff Ponzi Scheme serves as a stark example of the ethical breaches that can occur in the financial industry when client interests are not prioritized, conflicts of interest are mismanaged, and transparency is lacking. By studying this case, finance professionals can learn valuable lessons about the importance of upholding ethical standards, placing clients' interests first, and fostering trust and integrity in their professional relationships.

- ***Maintaining Independence:***

Highlighting the significance of maintaining objectivity, impartiality, and freedom from undue influence in decision-making processes underscores a critical aspect of professional conduct within the IFTA framework. These imperative mandates that professionals navigate their roles with a commitment to impartiality, ensuring that external pressures or biases do not unduly sway their judgment. It necessitates a vigilant avoidance of conflicts of interest, as well as a conscientious effort to identify and mitigate any biases that may potentially compromise the integrity of their decisions. By upholding these principles, professionals can make informed and unbiased judgments that prioritize the welfare of their clients, fostering an environment of trust and reliability in their professional relationships.

The obligation to remain objective and free from undue influence extends beyond mere adherence to rules; it embodies a deeper commitment to ethical conduct and client-centric practices. Professionals are tasked with conducting thorough analyses and assessments, drawing on their expertise and knowledge to deliver recommendations that are grounded in objectivity and serve the best interests of their clients. By upholding these principles of impartiality and independence, professionals not only safeguard the integrity of their decision-making processes but also reinforce the trust and confidence that clients place in their abilities to navigate the complexities of financial markets with integrity and professionalism.

- ***Promoting Market Integrity:***

Emphasizing the imperative for fair, transparent, and ethically sound practices within financial markets underscores a cornerstone principle within the IFTA ethos. Investment professionals are entrusted with a pivotal role in cultivating an environment characterized by trust, confidence, and operational efficiency through their unwavering commitment to ethical conduct and strict adherence to regulatory frameworks. This emphasis on ethical behavior is not merely a regulatory obligation but a moral imperative that underpins the integrity and credibility of financial markets, ensuring that all participants operate on a level playing field.

At the heart of this principle lies the recognition that ethical conduct is indispensable for the proper functioning of financial markets. Investment professionals serve as custodians of market integrity, leveraging their expertise to uphold fairness and transparency in all transactions. By embracing ethical practices and adhering to regulations, professionals not only fulfill their fiduciary responsibilities but also contribute to the sustainability and resilience of financial markets, thereby fostering an environment conducive to long-term growth and prosperity.

- ***Improving Professional Competence:***

Underscoring the significance of continuous learning, skill development, and knowledge enhancement for investment professionals serves as a cornerstone within the IFTA's framework. This emphasis reflects an acknowledgment of the dynamic nature of the financial landscape, wherein staying abreast of industry developments is not only advantageous but imperative for professional growth and effectiveness. By embracing a commitment to ongoing education and skill refinement, practitioners position themselves to navigate the evolving complexities of the financial markets with proficiency and agility. Furthermore, this dedication to continuous improvement enables professionals to remain responsive to shifting trends, emerging technologies, and regulatory changes, thereby enhancing their capacity to provide informed and strategic counsel to clients.

The pursuit of knowledge and skill enhancement is not merely a professional obligation, but a proactive endeavor aimed at optimizing client outcomes and advancing the broader interests of the financial industry. Investment professionals who prioritize continuous learning not only deepen their expertise but also cultivate a culture of innovation and excellence within their respective spheres. By fostering a community of practitioners committed to lifelong learning, the IFTA reinforces the ethos of professionalism and underscores the pivotal role of education in driving positive change and elevating industry standards. Ultimately, this collective dedication to knowledge acquisition and skill development contributes to the resilience, adaptability, and long-term sustainability of the financial sector.

- ***Professionalism:***

Maintaining an unwavering commitment to excellence, integrity, and ethical conduct across all facets of their work is a fundamental expectation within the IFTA's framework. This mandate underscores the necessity for investment professionals to continually hone their skills, expand their knowledge base, and stay abreast of industry developments to ensure they deliver the highest caliber of service to their clients. Moreover, this commitment extends beyond technical proficiency to encompass the cultivation of integrity and ethical behavior as guiding principles in every professional endeavor. By upholding these standards, professionals not only safeguard their own reputation but also contribute to the overall credibility and trustworthiness of the profession.

Central to this ethos is the imperative for professionals to conduct themselves with unwavering honesty, transparency, and accountability in all their interactions. By exemplifying these qualities, practitioners not only inspire trust and confidence among their clients but also uphold the integrity of the profession as a whole. Furthermore, this commitment to ethical behavior serves as a cornerstone for building enduring relationships based on mutual respect and integrity. Through their adherence to these principles, investment professionals not only elevate their own standing within the industry but also contribute to a culture of professionalism and trust that is essential for the continued success and sustainability of the financial sector.

- ***Integrity of Capital Markets:***

The emphasis on preserving fairness, transparency, and ethical conduct within financial markets constitutes a pivotal aspect of the IFTA's mandate. This focal point underscores the imperative of curbing practices such as market manipulation and insider trading, which undermine the integrity of market mechanisms. By upholding these ethical standards, professionals contribute to the establishment of a level playing field wherein all participants can engage in transactions with confidence, knowing that market dynamics are governed by principles of fairness and transparency. Moreover, this commitment serves as a bulwark against actions that distort market prices or confer unfair advantages upon certain individuals, thereby safeguarding the integrity and efficiency of market operations.

Integral to the notion of upholding market integrity is the recognition of its broader implications for fostering trust, confidence, and efficiency within financial markets. Trust forms the bedrock upon which market interactions are built, underpinning investor confidence and facilitating capital flows. By maintaining ethical conduct and promoting transparency, professionals engender a sense of trust among market participants, which in turn enhances market efficiency by reducing information asymmetries and facilitating price discovery mechanisms. Ultimately, the preservation of market integrity not only safeguards the interests of investors but also contributes to the overall stability and vibrancy of financial markets, serving as a cornerstone for sustainable economic growth.

- ***Duties to Clients and Employers:***

Emphasizing obligations towards both clients and employers underscores a foundational principle within the IFTA's ethical framework. This principle underscores the importance of prioritizing the best interests of clients above all else, requiring investment professionals to demonstrate unwavering loyalty, diligence, and care in

their interactions. It mandates a commitment to providing tailored and informed advice that aligns with the unique objectives and risk tolerances of each client, ensuring that their financial well-being remains paramount. Simultaneously, professionals are entrusted with safeguarding the interests and assets of their employers, serving as stewards of organizational integrity and reputation. This obligation demands a vigilant adherence to ethical standards and regulatory requirements, as well as a proactive approach to managing potential conflicts of interest to mitigate risks and uphold the trust placed in them by both clients and employers.

Moreover, this emphasis on acting in the best interests of clients and employers underscores the broader significance of fiduciary responsibility within the investment profession. Investment professionals serve as fiduciaries entrusted with the stewardship of their clients' financial futures, necessitating a duty of care that transcends mere compliance with regulations. By prioritizing transparency, honesty, and integrity in their dealings, professionals not only fulfill their ethical obligations but also cultivate enduring relationships built on trust and mutual respect. This commitment to ethical conduct not only serves to protect the interests of clients and employers but also contributes to the overall credibility and integrity of the investment profession as a whole.

Investment Analysis:

Addressing responsibilities and best practices in conducting research, analysis, and making investment recommendations. Professionals must exercise independent judgment and provide clear, accurate, and unbiased information to clients.

- ***Conflicts of Interest:***

Stressing the significance of identifying, disclosing, and effectively managing conflicts of interest inherent in investment activities is pivotal within the IFTA's ethical framework. This principle underscores the critical responsibility of professionals to prioritize the interests of their clients above all other considerations. It necessitates a proactive approach to recognize and address potential conflicts that may arise, whether stemming from personal interests or external pressures. By maintaining a steadfast commitment to client welfare and integrity, professionals can navigate these challenges with diligence and transparency, ensuring that their recommendations remain untainted by conflicting influences. Moreover, by fostering open communication and transparency, professionals can instill confidence in clients, demonstrating a dedication to ethical conduct and the preservation of client trust.

Furthermore, the ethical guidelines outlined by the IFTA underscore the imperative for Technical Analysts to uphold the highest standards of accuracy and integrity in their communications and analyses. This mandate entails a commitment to refraining from making inaccurate or misleading statements, thereby safeguarding the integrity of market information and maintaining investor confidence. Technical Analysts must ensure that any statements regarding market positions are grounded in robust evidence and consistent with established technical analysis knowledge. Additionally, they are tasked with diligently documenting any new developments or modifications to existing techniques, ensuring transparency and accountability in their analytical processes. By adhering to these standards, Technical Analysts demonstrate their commitment to professional excellence and ethical conduct, thereby upholding the integrity and credibility of the investment profession.

- Case Study:

Martha Stewart Insider Trading Scandal: Conflicts of Interest and Ethical Violations:

In the Martha Stewart Insider Trading Scandal, Martha Stewart, a prominent figure in the business and media industry, was accused of insider trading based on non-public information she received about the FDA's decision regarding ImClone's drug, Erbitux. Stewart sold her shares in ImClone before the negative news was made public, avoiding significant financial losses. This case study exemplifies conflicts of interest and ethical violations in the context of stock markets trading.

- **Prioritizing Personal Gain over Client Interests**: Martha Stewart's actions in the insider trading scandal highlighted a conflict of interest where personal financial gain was prioritized over the interests of other investors. By selling her shares based on privileged information, Stewart compromised the integrity of the financial markets and violated ethical principles.
- **Lack of Transparency and Integrity**: Stewart's involvement in insider trading and subsequent attempts to cover up the incident by providing false information raised serious concerns about transparency and integrity in financial dealings. The lack of disclosure and honesty in her actions further exacerbated the ethical violations inherent in the scandal.
- **Client Trust and Professional Responsibility**: As a public figure and business leader, Martha Stewart's actions eroded trust in the financial markets and highlighted the importance of upholding ethical standards and managing conflicts of interest. Investment professionals have a critical responsibility to prioritize client welfare and act with integrity in all financial transactions.

By examining the Martha Stewart Insider Trading Scandal through the lens of conflicts of interest and ethical guidelines, finance professionals can gain insights into the ethical challenges faced in the industry and the importance of maintaining transparency, integrity, and client trust in stock markets trading. This case study underscores the ethical imperative of placing client interests above personal gain and external pressures, safeguarding client welfare and upholding the integrity of the investment profession.

Responsibilities as an IFTA Member or Candidate

The responsibilities incumbent upon individuals as an IFTA Member or Candidate encompass a comprehensive set of ethical obligations and standards that extend beyond mere adherence to regulations. As stewards of the institute's reputation and values, members and candidates are entrusted with upholding the highest levels of professionalism, integrity, and ethical behavior in all facets of their engagements. This entails not only complying with the institute's Code of Ethics and Standards of Professional Conduct but also actively promoting a culture of ethical conduct and excellence within the investment community. By embodying these principles, members and candidates contribute to the advancement of the profession, fostering trust, credibility, and integrity in the global financial markets.

- ***Maintaining Ethical Conduct and Professionalism:***

Upholding confidentiality, steering clear of unethical behavior, and accurately representing one's affiliation with the institute are integral facets of ethical conduct within the investment industry as delineated by the

IFTA's guidelines. Confidentiality stands as a cornerstone principle, requiring professionals to safeguard sensitive information entrusted to them by clients and employers. This obligation necessitates the maintenance of strict confidentiality protocols to protect the privacy and interests of stakeholders. Furthermore, avoiding unethical behavior encompasses a broad spectrum of conduct, ranging from refraining from engaging in deceptive practices to abstaining from actions that may compromise professional integrity. By adhering to these principles, professionals cultivate an environment of trust and reliability, ensuring that clients and stakeholders can have confidence in the integrity of their interactions.

Moreover, accurate representation of one's relationship with the institute underscores the importance of transparency and honesty in professional dealings. Professionals are expected to provide truthful and accurate information regarding their affiliation with the institute, thereby enhancing transparency and fostering trust within the investment community. This commitment to transparency extends to all aspects of professional conduct, from accurately representing qualifications and credentials to disclosing any potential conflicts of interest that may arise. By upholding these responsibilities, professionals demonstrate their dedication to ethical behavior, integrity, and professionalism, thereby contributing to the maintenance of high ethical standards within the investment industry. Through their adherence to these principles, professionals uphold the reputation of the institute and bolster confidence in the integrity of the investment profession as a whole.

- ***Confidentiality and Client Rights:***

The principle of Confidentiality and Client Rights underscores the paramount importance of safeguarding client confidentiality, privacy, and rights throughout all professional engagements. It serves as a cornerstone of trust in the practitioner-client relationship, necessitating a commitment to maintaining the privacy and confidentiality of sensitive information shared during consultations. Practitioners are entrusted with ensuring that client information remains strictly confidential, thereby upholding the integrity of the client-practitioner relationship and fostering an environment of trust and confidence. Moreover, this principle encompasses a dedication to respecting and upholding client rights, including the right to autonomy, informed consent, and confidentiality, empowering clients to make informed decisions about their financial affairs while safeguarding their privacy and personal information.

Furthermore, the principle of Confidentiality and Client Rights underscores the ethical obligation of practitioners to adhere to stringent confidentiality protocols and privacy standards in all professional interactions. Practitioners must exercise discretion and professionalism in handling client information, ensuring that it is protected from unauthorized access or disclosure. Additionally, they must respect and uphold the rights of clients to confidentiality and privacy, refraining from disclosing confidential information without proper authorization or consent. By prioritizing confidentiality and respecting client rights, practitioners not only fulfill their ethical responsibilities but also cultivate strong, trusting relationships with clients based on mutual respect, integrity, and professionalism.

- ***Alignment with Industry Standards:***

The principle of Alignment with Industry Standards underscores the importance of integrating ethical guidelines from esteemed organizations such as the EWI to augment ethical competency and professionalism within the financial sector. It emphasizes the recognition and adoption of established ethical frameworks and

guidelines developed by reputable institutions, serving as a benchmark for ethical conduct and behavior. By aligning with industry standards set forth by organizations like the EWI, practitioners demonstrate a commitment to upholding the highest ethical principles and standards in their professional endeavors. Moreover, this principle emphasizes the significance of continuous learning and improvement, as practitioners strive to enhance their ethical competency and stay abreast of evolving ethical norms and best practices within the industry.

Furthermore, the principle of Alignment with Industry Standards highlights the proactive stance taken by practitioners to integrate ethical guidelines into their professional practices, thereby promoting a culture of ethical conduct and professionalism within the financial sector. By aligning with established industry standards, practitioners not only uphold the integrity of the profession but also contribute to the overall credibility and trustworthiness of the financial industry. Additionally, adherence to industry standards helps foster consistency and transparency in ethical practices across various organizations and sectors, thereby enhancing confidence and trust among clients, stakeholders, and the broader public. Through alignment with industry standards, practitioners reaffirm their commitment to ethical behavior and professionalism, ultimately contributing to the advancement and sustainability of the financial profession as a whole.

- ***Enforcement of Ethical Standards:***

The principle of Enforcement of Ethical Standards underscores the critical role of disciplinary measures in maintaining ethical standards and upholding the credibility of certified professionals. It emphasizes the importance of holding individuals accountable for breaches of ethical conduct and ensuring that appropriate actions are taken to address such violations. Disciplinary measures, such as the suspension of certification or revocation of membership, serve as deterrents against unethical behavior and reinforce the significance of adhering to ethical guidelines. By enforcing ethical standards through disciplinary actions, regulatory bodies and professional organizations demonstrate their commitment to maintaining integrity and trust within the profession, thereby safeguarding the interests of clients and the broader public.

Furthermore, the principle of Enforcement of Ethical Standards highlights the proactive approach taken by regulatory bodies and professional organizations to monitor and enforce compliance with ethical guidelines. Through rigorous enforcement mechanisms, such as investigations and disciplinary hearings, these entities ensure that certified professionals uphold the highest standards of ethical conduct. Moreover, disciplinary measures are implemented with the overarching goal of promoting accountability and transparency within the profession, fostering a culture of integrity and trust among practitioners. By enforcing ethical standards consistently and fairly, regulatory bodies and professional organizations contribute to the preservation of the profession's credibility and reputation, ultimately enhancing public confidence in the ethical behavior and professionalism of certified professionals.

- ***CFTe, MFTA, and CEWA Certification Ethics:***

The ethical standards governing the CFTe, MFTA, and CEWA certifications emphasize the paramount importance of integrity, professionalism, and adherence to ethical principles in the practice of technical analysis. These certifications underscore the commitment of professionals to upholding the highest standards of conduct and competence in their roles. They serve as a testament to the dedication of individuals to ethical

behavior, transparency, and accountability in their interactions with clients, colleagues, and the broader financial community. By obtaining these certifications, practitioners demonstrate their commitment to excellence and ethical conduct, thereby enhancing their credibility and contributing to the integrity of the technical analysis profession.

Professional Ethics Standards:

The certifications underscore the imperative of prioritizing ethical principles and upholding the utmost standards of professional conduct among certified individuals. Through these certifications, individuals pledge their dedication to integrity, transparency, and accountability in all aspects of their professional endeavors. By emphasizing ethical behavior and the maintenance of high standards of conduct, the certifications serve as a hallmark of excellence and trustworthiness in the field. Certified individuals commit to fostering a culture of integrity and ethical conduct, thereby enhancing the credibility and reputation of their profession while instilling confidence among clients, colleagues, and stakeholders alike.

- ***Code of Conduct Adherence:***

Certified professionals are obligated to adhere strictly to the specific Code of Ethics and Standards pertinent to their certification, with any breaches of these standards subject to disciplinary measures. These codes serve as guiding principles, outlining the ethical responsibilities and professional conduct expected from individuals holding the certification. Violations of these codes are taken seriously, with disciplinary actions enforced to uphold the integrity and credibility of the certification. This stringent adherence to ethical guidelines ensures that certified professionals maintain the highest levels of integrity, trustworthiness, and competence in their practice, thereby safeguarding the interests of clients and the broader professional community.

Ethical Guidelines:

- ***Respect for Autonomy and Truthfulness:***

The principle of Respect for Autonomy and Truthfulness embodies a multifaceted approach to client interactions within the professional realm. It underscores the fundamental importance of self-determination, affirming clients' rights to make informed decisions about their financial affairs autonomously. This principle emphasizes the practitioner's obligation to empower clients by providing them with comprehensive information, guidance, and support to make choices aligned with their individual preferences and goals. Moreover, it encompasses a commitment to honesty, requiring practitioners to communicate transparently and truthfully with clients, ensuring that they have accurate and reliable information upon which to base their decisions. Additionally, confidentiality plays a pivotal role within this principle, as practitioners are entrusted with safeguarding the privacy and sensitive information shared by clients during consultations, thereby fostering an environment of trust and respect.

Furthermore, the principle of Respect for Autonomy and Truthfulness underscores the ethical imperative of maintaining the highest levels of integrity and professionalism in client interactions. Practitioners must prioritize honesty and transparency, ensuring that clients are fully informed about the risks, benefits, and implications of various financial decisions. This entails providing objective and unbiased guidance, free from any

conflicts of interest or undue influence. Moreover, practitioners must uphold the confidentiality of client information, respecting their privacy rights and maintaining the trust placed in them. By adhering to these principles, practitioners not only fulfill their ethical obligations but also cultivate strong, trusting relationships with clients built on mutual respect, honesty, and integrity, thereby enhancing the overall quality of client service and promoting confidence in the profession.

- ***Beneficence and Nonmaleficence:***

The principle of Beneficence and Nonmaleficence encapsulates the ethical obligation of professionals to prioritize the well-being of their clients above all else. It underscores the imperative to act in the best interests of clients, emphasizing the responsibility to promote their welfare and enhance their financial outcomes. This principle entails a commitment to providing competent and ethical services, ensuring that practitioners possess the necessary knowledge, skills, and expertise to effectively address clients' needs and objectives. Moreover, it involves a proactive approach to preventing harm, whereby practitioners strive to mitigate risks and adverse outcomes associated with financial decision-making, thereby safeguarding the interests and security of their clients.

Furthermore, the principle of Beneficence and Nonmaleficence underscores the ethical imperative of maintaining a fiduciary duty towards clients, characterized by a duty of care and loyalty. Practitioners are entrusted with the responsibility to prioritize client interests above their own, refraining from actions that could potentially harm or disadvantage clients. This entails providing honest and transparent advice, managing conflicts of interest effectively, and exercising sound judgment to ensure that clients' financial well-being remains paramount. By adhering to these principles, practitioners not only uphold the integrity of the profession but also foster trust and confidence in their relationships with clients, thereby fulfilling their ethical obligations and promoting the overall welfare of those they serve.

- ***Justice and Equity:***

The principle of Justice and Equity epitomizes the ethical imperative to ensure fairness and impartiality in financial analysis and advisory roles. It encompasses a commitment to upholding principles of fairness and equality, ensuring that all clients are treated equitably and provided with access to the same level of quality service and support. Practitioners are tasked with safeguarding against biases and discrimination, striving to ensure that all clients receive fair and just treatment regardless of their background, circumstances, or financial status. Moreover, this principle emphasizes the importance of promoting equitable distribution of resources, advocating for the allocation of financial resources in a manner that benefits clients and society as a whole, while also adhering to ethical practices and standards.

Furthermore, the principle of Justice and Equity underscores the ethical obligation of practitioners to uphold the highest standards of integrity and transparency in their financial analysis and advisory roles. Practitioners must adhere to ethical practices, ensuring that their recommendations and decisions are based on objective analysis and sound judgment, free from undue influence or bias. Additionally, they are responsible for promoting transparency and accountability in their interactions with clients and stakeholders, providing clear and accurate information to enable informed decision-making. By embracing principles of justice and equity,

practitioners not only uphold the integrity of the profession but also contribute to the creation of a fair and just financial environment that benefits clients, society, and the broader economy.

Enforcement and Oversight:

The principle of Enforcement and Oversight encompasses the systematic monitoring and regulation of ethical standards within professional domains. It involves the establishment of robust mechanisms for enforcing adherence to ethical guidelines and overseeing compliance among practitioners. This principle underscores the importance of regulatory bodies and governing institutions in ensuring that ethical standards are upheld, and violations are addressed promptly and effectively. Through proactive enforcement measures, such as audits, investigations, and disciplinary actions, regulatory bodies play a crucial role in maintaining integrity and trust within the profession, thereby safeguarding the interests of clients and the public. Additionally, oversight mechanisms serve to promote accountability and transparency, fostering a culture of ethical behavior and professionalism among practitioners while upholding the credibility and reputation of the profession.

- ***Disciplinary Measures:***

The principle of Disciplinary Measures serves as a crucial component in maintaining ethical standards and ensuring accountability within professional domains. It involves delineating clear consequences for ethical violations, establishing a framework of sanctions to address misconduct effectively. These disciplinary measures are designed to uphold the integrity of the profession and deter practitioners from engaging in unethical behavior. Sanctions may include warnings, fines, suspension of certifications, or, in severe cases, revocation of certifications. By outlining these consequences, regulatory bodies and professional organizations create a system of accountability where practitioners are held responsible for their actions, thereby fostering a culture of ethical conduct and professionalism.

Furthermore, disciplinary measures play a pivotal role in preserving the credibility and trustworthiness of certified professionals. They serve as a deterrent against unethical behavior and underscore the seriousness with which violations of ethical standards are regarded. Through transparent and consistent application of disciplinary measures, regulatory bodies and professional organizations demonstrate their commitment to upholding the highest standards of integrity and ethics within the profession. Moreover, these measures help protect the interests of clients and the public by ensuring that practitioners adhere to ethical guidelines and maintain the trust placed in them. Ultimately, the enforcement of disciplinary measures reinforces the importance of ethical conduct and accountability, contributing to the overall reputation and credibility of certified professionals and the profession.

- ***Regulatory Compliance:***

The principle of Regulatory Compliance underscores the critical importance of ensuring that technical analysts adhere to regulatory requirements and industry standards to uphold integrity and professionalism within the field. It entails a comprehensive approach to navigating and complying with the myriads of regulations and standards governing the financial industry. Technical analysts are tasked with staying abreast of evolving regulatory frameworks and industry guidelines, ensuring that their practices align with legal mandates and industry best practices. By meticulously adhering to regulatory requirements, analysts mitigate risks associated

with non-compliance, thereby safeguarding the interests of clients and the broader financial ecosystem while upholding the integrity and reputation of the profession.

Furthermore, regulatory compliance serves as a cornerstone of ethical conduct and responsible stewardship within the financial sector. It necessitates a proactive commitment to transparency, accountability, and adherence to established norms and regulations. Technical analysts play a pivotal role in maintaining market integrity and investor confidence by ensuring compliance with regulatory mandates and industry standards. By prioritizing regulatory compliance, analysts demonstrate their dedication to ethical behavior and professionalism, fostering trust and credibility among clients, stakeholders, and regulatory authorities. Moreover, a culture of regulatory compliance enhances the resilience and stability of financial markets, contributing to the overall health and sustainability of the global economy.

- ***Continuous Education:***

The principle of Continuous Education underscores the significance of promoting ongoing education and training initiatives aimed at enriching ethical awareness and compliance among technical analysts within the financial advisor industry. It emphasizes the dynamic nature of the financial landscape, wherein practitioners must continuously update their knowledge and skills to navigate evolving ethical challenges and regulatory requirements effectively. Continuous education initiatives provide technical analysts with opportunities to deepen their understanding of ethical principles, regulatory frameworks, and industry best practices. By participating in relevant training programs, workshops, and seminars, analysts can enhance their ethical awareness, cultivate a culture of compliance, and develop the competencies necessary to address emerging ethical dilemmas within their professional roles.

Moreover, continuous education initiatives play a pivotal role in fostering a culture of lifelong learning and professional development within the financial advisor industry. By investing in ongoing education, technical analysts demonstrate a commitment to personal growth, excellence, and ethical conduct. These initiatives not only equip practitioners with the knowledge and skills needed to navigate complex ethical challenges but also empower them to uphold the highest standards of integrity and professionalism in their interactions with clients and stakeholders. Additionally, continuous education fosters a sense of accountability and responsibility among technical analysts, instilling a mindset of continuous improvement and ethical leadership within the industry. Through ongoing education and training, practitioners can strengthen their ethical competencies, contribute to a culture of ethical excellence, and uphold the trust and confidence of clients and the broader financial community.

Appendix G

Basic of Statistic for Qauntitative Analysis

(IFTA Required CFTe II Reading Material)

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1.1 Definitions

Statistics is the branch of mathematics that deals with the collection, analysis, interpretation, presentation, and organization of data. It is a field of study that is concerned with understanding and drawing conclusions from data using mathematical models and methods. It is a crucial tool in many fields such as business, economics, medicine, psychology, and engineering, among others, for making sense of complex phenomena and making informed decisions.

Talking about Quantitative Analysis, Statistics provides methods for estimating population parameters from sample data, testing hypotheses, and making decisions or predictions based on data. Additionally, statistics allows for the quantification of uncertainty and the assessment of the reliability of conclusions drawn from data.

We begin by giving some basic definitions:

Population: a population refers to the entire group of individuals or objects that possess some common characteristics or features and that are of interest for a particular study or analysis. It is the set of all elements that have some chance of being selected for observation or measurement, and from which a sample may be drawn.
For example, the population of all registered voters in a particular country would be the entire group of individuals who are eligible to vote in that country. The population of all cars manufactured by a particular company each year would be the entire group of cars produced by that company during that year. It's important to note that it is usually not possible or practical to study or measure the entire population, so a sample, a smaller subset of the population is selected to represent the population.
In quantitative analysis, a population is a set of all possible observations, measurements, or units of interest that possess some common characteristics or features that are relevant to the research question or hypothesis being studied. It is the complete set of observations, measurements, or units of interest from which a sample is drawn. In an econometrics study, the population could be all individuals in the labor force, from which a sample of individuals is selected to represent the population. In a medical study, the population could be all patients with a certain disease, from which a sample of patients is selected to be studied.

It is important to note that population parameters, such as mean, variance, etc., are unknown, but can be estimated from sample statistics. Additionally, sample statistics, such as sample mean and sample variance, are used to make inferences about the population.

Statistical unit: also known as a *sampling unit*, is the individual or object that is selected for observation or measurement in a study or analysis. It is the basic element of a sample, and the properties or characteristics of the statistical unit are used to make inferences about the population.
For example, in a survey of consumer opinions, a statistical unit could be an individual consumer. In a study of manufacturing processes, a statistical unit could be a manufactured product or part. In a medical study, a statistical unit could be a patient.
It is important to note that the definition of the statistical unit can vary depending on the research question or hypothesis being studied and the type of data being collected. It should be clearly defined and specified in the study design to ensure that the sample is representative of the population and that the data collected is accurate and relevant.

Statistical variable: is a characteristic or attribute of a *statistical unit* that can take on different values. It is a measurable characteristic or property of an individual or object that is of interest in a study or analysis.
Statistical variables can be classified into two main categories:

- *Quantitative variables*: are variables that can take on numerical values, such as age, income, weight, etc. They can be further sub-divided into continuous variables (can take any value within a range) and discrete variables (can take only certain values).
- *Categorical variables*: are variables that can be divided into categories or groups, such as gender, race, education level, etc. They can be further sub-divided into nominal (the categories have no inherent order) and ordinal (the categories have an inherent order).

It is important to note that the choice of statistical variable depends on the research question or hypothesis being studied and the type of data that is collected. It should be clearly defined and specified in the study design to ensure that the sample is representative of the population and that the data collected is accurate and relevant.

Here is an example of population, statistical unit and statistical variable in finance:

Population: all publicly traded companies listed on the S&P500 Index.
Statistical unit: each individual publicly traded company listed on the S&P500 Index.
Statistical variable: the trend of stock prices for each individual publicly traded company listed on the S&P500 Index. The trend can take on three possible values: an uptrend (the stock price is increasing) a downtrend (the stock price is decreasing) or a trading range (the stock moves sideways). It can be classified as a categorical variable, a binary variable (if just uptrend or downtrend) or ordinal (if we use the neutral trend).

A sample of companies can be selected from this population, and the trend of stock prices for each company in the sample can be analyzed to make inferences about the population of all publicly traded companies listed on

the S&P500 Index. One could use statistical methods like trend analysis, linear regression, etc., to identify and classify the trend of the stock prices, which could be useful for investors, analysts, or traders.

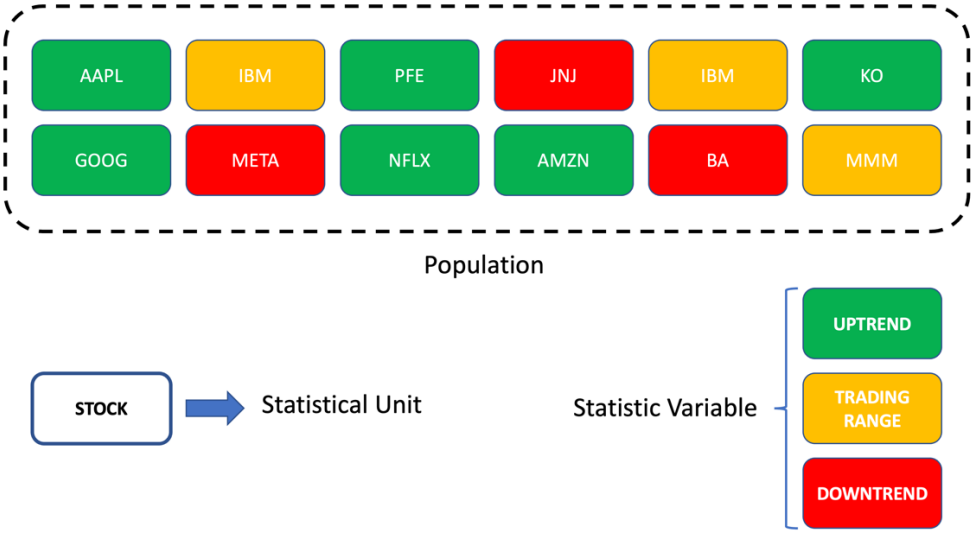

Fig.1: Population, Statistical Unit and Statistical Variable.

Descriptive statistics: is a branch of statistics that deals with describing and summarizing data. It involves using various measures, such as measures of central tendency (e.g., mean, median, mode) and measures of dispersion (e.g., range, variance, standard deviation), to give a general idea of what the data looks like and to identify patterns or trends in the data. Descriptive statistics can be used to present data in a clear and informative way, but it does not make any inferences about the underlying population from which the data was collected.

Inferential statistics: is a branch of statistics that deals with making inferences about a population based on a sample of data. It allows us to draw conclusions about a population based on a sample of data, and to make predictions about future events based on past observations. It uses probability theory, statistical models, and various estimation techniques to make these inferences. Inferential statistics is a powerful tool for understanding complex data and making data-driven decisions, but it requires careful attention to the assumptions made about the population and the sample.

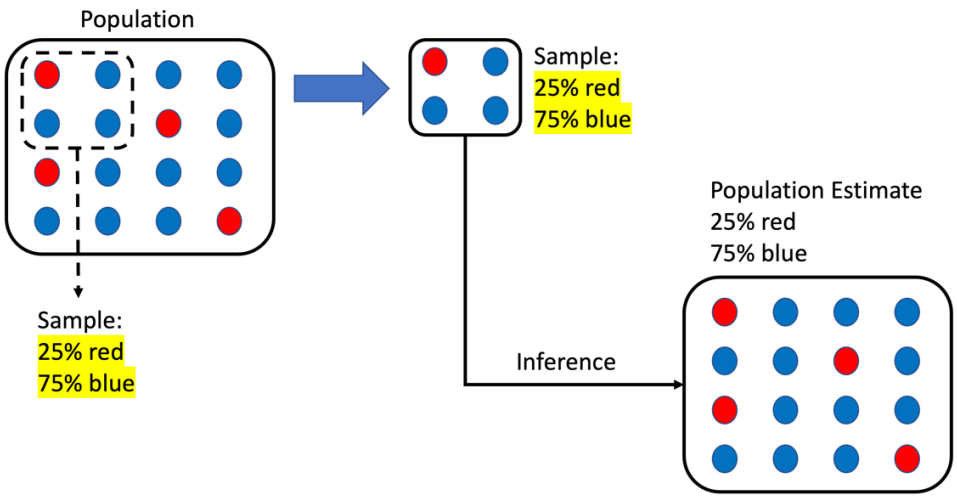

Fig.2: Example of use of Inferential Statistics.

In the example shown in figure 2 we can see a population from which we draw and study a sample. From this sample we can conclude that the proportion between blue and red samples is 25% red and 75% blue. On this basis we estimate a projection of 12 blue and 4 red which, in this case, is exactly the initial dataset.

An example in which inference statistics could fail are the exit polls after a vote. Exit polls are subject to a number of sources of error, including sampling error, nonresponse bias, and measurement error. Additionally, exit polls are often conducted quickly after voting ends and are based on self-reported data, which can lead to inaccuracies. For these reasons, exit polls are generally considered to be less precise than other types of surveys. People tend to lie when asked about some topics such as politics, religion, sexual orientation, salary (intimate and personal sphere). In this case, the results obtained by inferring this information could be completely wrong. A striking example is that of Brexit for British citizens (Fig.3).

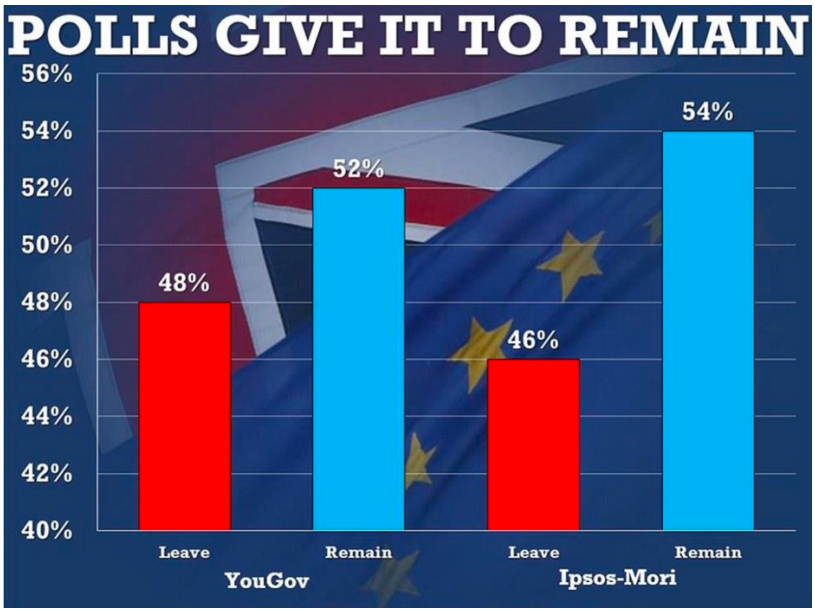

Fig.3: Exit Polls for Brexit. Leave won. Source dailymail.co.uk

Arithmetic Average or Mean: is a measure of central tendency that is calculated by adding up a set of values and then dividing by the number of values in the set.
The formula to calculate the mean is:

$$mean = \frac{\sum_{i=1}^{n} x_i}{n}$$

where x is a set of n observations.

The mean is a commonly used measure of central tendency and gives a sense of the "average" value within a dataset. It is used in many applications such as calculating the average salary of a company's employees or the average temperature of a city in a month etc.

Let's say that we want to calculate the mean closing stock price for a particular company over a period of time, such as the last 5 days.
We would first gather the closing stock prices for each day over the last 5 days. For example:

Day 1: $100
Day 2: $110
Day 3: $120
Day 4: $130
Day 5: $140

To calculate the mean of these prices, we would add up all of the closing prices and divide by the number of days:

mean = 100+110+120+130+140 / 5 = $120

Therefore, the mean closing stock price for the company over the 5 days is $120.

It's worth noting that the mean is not affected by the number of data points, the formula is the same whether you have 5 or 500 data points, the only thing that changes is the numerator of the fraction, which is the sum of the data points.

Geometric Average or Mean: is a measure of central tendency that is calculated by taking the nth root of the product of n numbers. It is used to calculate the average rate of return of an investment. In contrast to the arithmetic mean, the geometric mean considers the compounding effect of returns over time and is generally considered to be a more appropriate measure of central tendency when working with data that are growing at a non-constant rate.

The formula to calculate the geometric average is:

$$GM = \sqrt[n]{x_1 * x_2 *\ldots* x_n} = \sqrt[n]{\prod_{i=1}^{n} x_i}$$

Here's an example of how to calculate the geometric mean of 5 closing stock prices:

Period 1: $50
Period 2: $100
Period 3: $500
Period 4: $1000
Period 5: $800

To calculate the geometric mean of these prices, we would multiply the prices together and then take the fifth root of the product:

$$GM = \sqrt[5]{50 * 100 * 500 * 1000 * 800} = \$288.54$$

Therefore, the geometric mean of the closing stock prices for the company over the 5 days is $288.54.
Consider that the geometric mean is always less than or equal to the arithmetic mean for positive numbers, so it tends to be less than the arithmetic mean for datasets with large positive and negative fluctuations.

Let's consider an example to illustrate the application of the geometric mean to asset returns. The geometric mean formula can be worked out as follows:

$$\mu = [(1 + R_1)(1 + R_2)\ldots(1 + R_n)]^{1/n} - 1$$

where:

- μ represents the geometric mean of returns
- R_1, R_2, ..., R_n are the returns of an asset or other observations
- n is the total number of returns or observations
- The expression (1 + R1) represents the factor by which the asset's value changes in the first period. Similarly, (1 + R2) represents the factor by which the asset's value changes in the second period, and so on.
- The product of these factors captures the cumulative effect of the returns.
- Raising the product to the power of 1/n accounts for the compounding nature of the returns over n periods.
- Subtracting 1 from the result adjusts for the initial value of 1 added to each return factor.

Suppose you have invested in three different stocks over a period of three years. The annual returns for each stock are as follows:

Stock A: Year 1: 10%, Year 2: 15%, Year 3: 8%
Stock B: Year 1: 5%, Year 2: 12%, Year 3: 9%
Stock C: Year 1: 8%, Year 2: 10%, Year 3: 6%

Let's apply the formula:

Stock A: [(1 + 0.10)*(1 + 0.15)*(1 + 0.08)]^(1/3) – 1 = 0.1096 = 10.96% annual return
Stock B: [(1 + 0.5)*(1 + 0.12)*(1 + 0.09)]^(1/3) – 1 = 0.086 = 8.6% annual return
Stock C: [(1 + 0.08)*(1 + 0.10)*(1 + 0.06)]^(1/3) – 1 = 0.079 = 7.9% annual return

By following these steps, you can calculate the geometric mean and overall returns for each stock based on their respective annual returns. The geometric mean provides a representative measure of the compounded annual growth rate, allowing you to assess the performance of different assets over time.

Harmonic Average or Mean: it is another measure of central tendency that is calculated by taking the reciprocal of the arithmetic mean of the reciprocals of the data set. It is commonly used when working with data that are rates or ratios, such as speed or frequency. The harmonic mean is less affected by outliers than the arithmetic mean and is generally considered to be a more appropriate measure of central tendency when working with data that are rates or ratios.

The formula to calculate the harmonic average is:

$$HM = \frac{n}{\frac{1}{x_1} + \frac{1}{x_2} + \ldots + \frac{1}{x_n}}$$

Here's an example of how to calculate the harmonic mean of 5 rates:

Rate 1: 2
Rate 2: 3
Rate 3: 1
Rate 4: 4
Rate 5: 5

To calculate the harmonic mean of these rates, we would calculate the reciprocal of each rate and then take the arithmetic mean of the reciprocals:

$$HM = \frac{5}{\frac{1}{2}+\frac{1}{3}+\frac{1}{1}+\frac{1}{4}+\frac{1}{5}} = 2.19$$

The harmonic mean is commonly used to calculate the average rate of things such as speed, frequency, or velocity. In this example, the harmonic mean of rates gives an average that represents the rate of something that is consistent over time. It's useful if the rates are fluctuating over time.

Simple Moving Average (SMA): A simple moving average (SMA) is a statistical measure that calculates the average of a set of data over a specified number of time periods. In technical analysis, a simple moving average

is often used to smooth out short-term fluctuations and to highlight longer-term trends. It is calculated by adding up the closing prices of a security over a specified number of periods and dividing the total by the number of periods. The resulting average is then plotted on a chart to help traders identify trends and make trading decisions.

The pros of using simple moving averages in technical analysis include:

- They are easy to calculate and understand: Simple moving averages are straightforward to compute, and the resulting data can be easily plotted on a chart.
- They can help to identify trends: simple moving averages can help traders identify trends by smoothing out short-term fluctuations in price. Longer-term averages are useful for identifying long-term trends, while shorter-term averages can be used to identify short-term trends.
- They are widely used: simple moving averages are a common tool in technical analysis and are used by many traders, making it easier to find information and analysis based on them.

The cons of using simple moving averages in technical analysis include:

- They can be slow to react: simple moving averages use historical data, which means that they may be slow to react to new trends. This can be an issue if a security's price starts to move significantly in one direction before the moving average has had a chance to adjust.
- They can be misleading in a choppy market: in a market that is not trending, but instead moving in a choppy manner, simple moving averages can produce many false signals.
- They can be affected by outliers: simple moving averages can be affected by outliers, which can skew the average and create false trends.
- All values in the series are weighted equally, so that a value far in the past has the same weight as the last one.

Here's an example of how to calculate a 10-period simple moving average for a stock and how to update it as new data becomes available:

These are the closing prices for the first 10 days:

$10, $12, $15, $11, $13, $16, $12, $14, $17, $13

To calculate the 10-period simple moving average, we add up all the closing prices and divide by 10:

($10 + $12 + $15 + $11 + $13 + $16 + $12 + $14 + $17 + $13) / 10 = $13.50

When a new closing price for the 11th day becomes available (for example $15) we have to update the moving average, removing the oldest price from the sum and adding the new price:

($12 + $15 + $11 + $13 + $16 + $12 + $14 + $17 + $13 + $15) / 10 = $13.60

This process can be repeated as new data becomes available, with the oldest price being removed and the newest price being added to the sum each time.

In this example, the moving average changed from $13.50 to $13.60. This change can be plotted on a chart, and traders can use this to identify trends and make trading decisions.
In Fig.4 a graphical example of a 20 periods simple moving average on AAPL stock.

Fig.4: 20 periods simple moving average on AAPL daily.

Exponential Moving Average (EMA): an exponential moving average is a type of moving average that gives more weight to the recent data and less weight to the older data. This is different from a simple moving average (SMA), which gives equal weight to all the data.
In technical analysis, an exponential moving average is often used to smooth out short-term fluctuations and to highlight longer-term trends, like the SMA. However, the EMA reacts more quickly to recent price changes, making it a more responsive indicator.

The EMA is calculated by applying a percentage of the current period's closing price to the previous period's EMA. The percentage is determined by the "*smoothing constant*" or "*multiplier*", which is usually set at a value between 0 and 1. The higher the smoothing constant, the more weight is given to the most recent data.

For example, let's say we want to calculate a 10-day EMA for a stock. The first EMA value is calculated by taking a 10-day SMA of the closing prices. Then, for each subsequent period, the EMA is calculated using the following formula:

$$EMA = EMA_{i-1} + (Close - EMA_{i-1}) * \frac{2}{n+1}$$

So, for a 10-day EMA, the smoothing constant would be (2 / (10 + 1)) = 0.1818

The EMA can be plotted on a chart and used to identify trends and make trading decisions.
The EMA is sensitive to the recent price changes, and it can result in more volatility compared to SMA. Some traders prefer to use EMA because it gives them a more current picture of the trend of the market, others prefer to use SMA because it is less volatile and provides a more stable picture of the trends.

Fig.5: 20 periods exponential moving average on AAPL daily.

In Fig.6 is possible to see the comparison between a SMA(20) and an EMA(20) applied to APPL stock.

Fig.6: 20 periods simple vs exponential moving average on AAPL daily.

Median: the median is a measure of central tendency in a dataset of n values. It is the middle value when the data is arranged in numerical order.

- If the data has an odd number of observations, the median is the middle value:

$$median_{place} = \frac{n+1}{2}$$

- If the data has an even number of observations, the median is the average of the two middle values:

Mean of elements in positions: $\frac{n}{2}, \frac{n}{2}+1$

The median is often used as an alternative to the mean, particularly when the data has outliers or is not normally distributed.

For example, if we have the dataset [1,2,3,4,5], the median is 3. If we have the dataset [1,2,3,4,5,6], the median is (3+4)/2 = 3.5

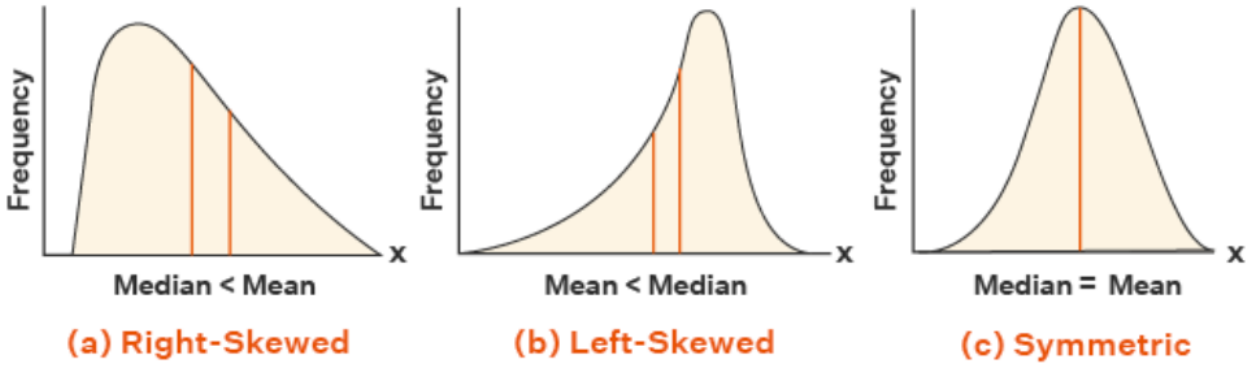

Fig.7: difference between median and mean.

A distribution of values is defined as "right-skewed" if the median is smaller than the mean, "left-skewed" if the median is greater than the mean and "symmetrical" if median and mean are equal.

Quantiles: quantiles are values that divide a set of observations into equal parts. They help us understand the distribution of data by breaking it down into several parts and providing information about each part.

- **Quartiles** are specific types of quantiles that divide a set of observations into four equal parts.

  For example, consider the following set of numbers: 2, 4, 5, 6, 8, 9.

  The first quartile (Q1) is 4.75, meaning 25% of the numbers are less than or equal to 4.75 and 75% are greater than 4.75.
  The second quartile (Q2), also known as the median, is 6, meaning 50% of the numbers are less than or equal to 6 and 50% are greater than 6.
  The third quartile (Q3) is 8, meaning 75% of the numbers are less than or equal to 8 and 25% are greater than 8.

  The interquartile range (IQR) is the difference between Q3 and Q1 and represents the range of the middle 50% of the data. In this example, the IQR is 8-4.75 = 3.25.

- Deciles are values that divide a set of observations into 10 equal parts. A kth decile is a value such that 10k% of the observations are less than or equal to that value.

  Considering again the previous set of numbers: 2, 4, 5, 6, 8, 9:

  The 5th decile (or the 50th percentile) is 6, meaning 50% of the numbers are less than or equal to 6 and 50% are greater than 6.
  The 2nd decile is 4, meaning 20% of the numbers are less than or equal to 4 and 80% are greater than 4.

The 8th decile is 8, meaning 80% of the numbers are less than or equal to 8 and 20% are greater than 8.

- **Percentiles** are values that divide a set of observations into 100 equal parts. A kth percentile is a value such that k% of the observations are less than or equal to that value.

  Consider again the previous set of numbers: 2, 4, 5, 6, 8, 9:

  The 50th percentile, also known as the median, is 6, meaning 50% of the numbers are less than or equal to 6 and 50% are greater than 6.
  The 25th percentile is 4.75, meaning 25% of the numbers are less than or equal to 4.75 and 75% are greater than 4.75.
  The 75th percentile is 8, meaning 75% of the numbers are less than or equal to 8 and 25% are greater than 8.

  Percentiles can be calculated in several ways, including:

  - Using rank-based methods: For example, if you have a set of n observations and you want to find the pth percentile, you will find the value corresponding to the rank (n*p/100). If the rank is not an integer, you can use linear interpolation to estimate the value of the percentile.
  - Using cumulative frequency methods: You can calculate percentiles by creating a cumulative frequency distribution table, finding the cumulative frequency that is closest to (n * p / 100), and then finding the corresponding value from the original data set.

  In technical analysis, percentiles can be used to measure the strength of price movement and identify potential turning points in the market.

A common graphical representation for quantiles is a box plot (also called a whisker plot). It is a graph that displays the summary of a set of numerical values based on five number summary "minimum", first quartile (Q1), median (Q2), third quartile (Q3), and "maximum". The box represents the interquartile range (IQR) which is the range of the middle 50% of the data, with the median (Q2) marked as a line inside the box. The "whiskers" extend from the box to the minimum and maximum values, excluding outliers which are plotted as individual points outside the whiskers. The box plot provides a compact way to visually assess the variability and skewness of a distribution.

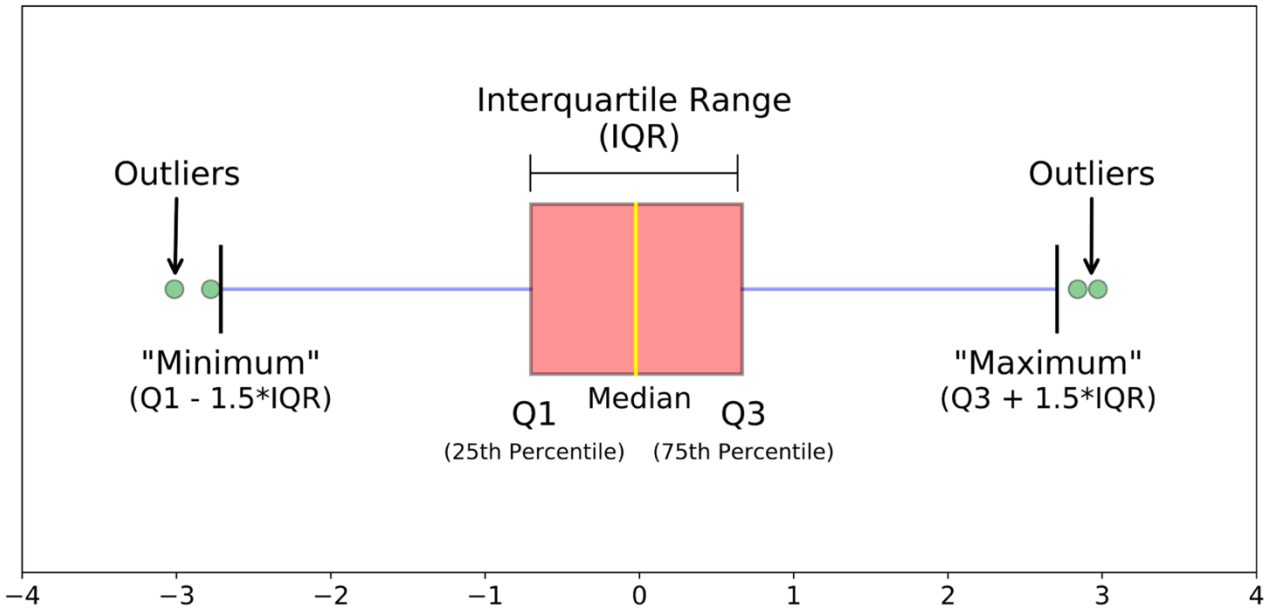

Fig.8: box plot architecture.

Standard Deviation: a *dispersion index* is a statistical measure that describes the spread or variability of a set of values. It indicates the extent to which the values in a data set differ from each other. Some commonly used dispersion indices include the range, variance, and standard deviation. These measures are used to describe the spread of data and help to summarize the distribution of values within a data set. The choice of a dispersion index will depend on the type of data being analyzed and the questions being asked about that data.

The standard deviation is a statistical measure of how far the individual data points in a set deviate from the mean, or average, value of that set. It gives an idea of how spread out the values are.

A low standard deviation indicates that the data points tend to be close to the mean, while a high standard deviation indicates that the data points are more spread out.

The standard deviation is represented by the symbol σ (sigma) and is calculated using the formula:

$$\sigma = \sqrt{\frac{(x_1 - \mu)^2 + \ldots + (x_n - \mu)^2}{n - 1}}$$

where x is an individual data point, μ is the mean of the data, Σ represents the sum over all data points, and n is the number of data points in the set.

Suppose we have a sample of n = 10 data points with the following values: 3, 5, 6, 7, 8, 9, 9, 10, 11, 12.

First, we calculate the mean (μ) of the sample: (3 + 5 + 6 + 7 + 8 + 9 + 9 + 10 + 11 + 12) / 10 = 9
Next, we find the deviation of each data point from the mean: 3 - 9 = -6, 5 - 9 = -4, 6 - 9 = -3, 7 - 9 = -2, 8 - 9 = -1, 9 - 9 = 0, 9 - 9 = 0, 10 - 9 = 1, 11 - 9 = 2, 12 - 9 = 3
We then square each deviation: (-6)^2 = 36, (-4)^2 = 16, (-3)^2 = 9, (-2)^2 = 4, (-1)^2 = 1, 0^2 = 0, 0^2 = 0, 1^2 = 1, 2^2 = 4, 3^2 = 9
Finally, we average the squared deviations and take the square root of the result to get the standard deviation (σ): (36 + 16 + 9 + 4 + 1 + 0 + 0 + 1 + 4 + 9) / 10 = 9.0 √9.0 = 3
So, the standard deviation of this sample is 3.

Variance: variance in statistics is a measure of how far a set of numbers is spread out from its average (mean). It represents the average of the squared deviations of the data points from the mean.

$$\sigma^2 = \frac{(x_1 - \mu)^2 + \ldots + (x_n - \mu)^2}{n - 1}$$

Normal Distribution: the normal distribution, also known as the Gaussian distribution, is a continuous probability distribution that is defined by a bell-shaped curve. It is a symmetrical distribution with a single peak that represents the mean of the data set, and its spread represents the standard deviation. The normal distribution is widely used in various fields such as statistics, economics, and engineering to model real-world data sets that have a large number of observations.

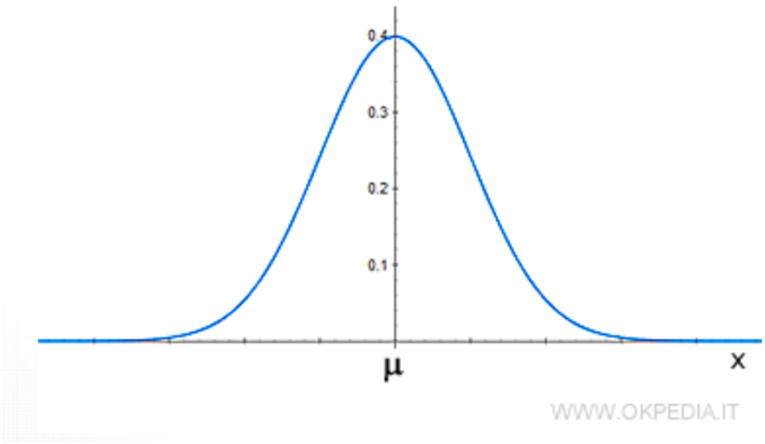

Fig.9: normal distribution.

In a normal distribution, the mean and median coincide, and 68% of the data is within one standard deviation.
The normal distribution represents the distribution of the probability of a statistical phenomenon around the mean.
The highest probabilities of a phenomenon are concentrated around the mean. The probabilities decrease as you move away from the mean to the right or left.
As one moves away from the mean value, the curve gets closer and closer to the abscissa axis without ever touching it.

1. The highest frequency/probability coincides with the central mean value and decreases as you move to the right or left.
2. Moving away from the mean, the curve gets closer and closer to the horizontal axis of the x-axis, never touching it.
3. The total area under the normal curve equals one because it includes all probabilities of the event.

As can be seen in Figure 10, the percentage of data between the mean minus one standard deviation and the mean plus one standard deviation is 68.27%, while the percentage of data between the mean minus two standard deviations and the mean plus two standard deviations is 95.45%. If we use three standard deviations we get 99.73% of the data.

Fig.10: normal distribution and Bollinger Bands.

One of the most popular applications of the normal distribution assumption on price data is Bollinger Bands. The upper band is constructed by adding two standard deviations to the 20-period moving average of the closes, while the lower band by subtracting two standard deviations from the same average. Assuming the price distribution is normal, we assume that 95% of the data will be between the upper and lower bands and just under 5% beyond the bands.

The prices of an asset class, such as a stock, are typically distributed according to a probability distribution the is not normal. Common distributions used to model stock prices include the lognormal distribution and the exponential distribution. The choice of distribution depends on the specific characteristics of the asset class being modeled and the assumptions being made about its behavior.
The assumption of a lognormal distribution for stock prices is based on the idea that the logarithm of stock prices tends to follow a normal distribution. This is because the logarithm of a stock price eliminates the skewness and kurtosis that is often present in the raw stock price data.
Bollinger Bands, on the other hand, assume a normal distribution of stock prices around a moving average, rather than the logarithm of stock prices. This is because Bollinger Bands are used as a technical analysis tool for determining the volatility of a stock price and do not necessarily reflect the underlying distribution of the

stock price itself. The normal distribution assumption allows for a simple mathematical calculation of the standard deviation of stock prices, which is used to calculate the upper and lower bounds of the Bollinger Bands.
In both cases, the assumptions are based on empirical evidence and practical considerations and may not always perfectly reflect the true distribution of stock prices. However, these assumptions provide useful simplifications for analyzing stock prices and making investment decisions.

When we talk about prices, we usually talk about "big tail" distribution. Compared to a normal distribution, a fat-tailed distribution has a more pronounced tail on one or both sides of the distribution, indicating that there is a higher likelihood of observing extreme events (such as large price movements) compared to a normal distribution (examples of fat-tailed distributions include the student-t, Cauchy, and Pareto distributions).
The distinction between normal and fat-tailed distributions is important in finance, as it has implications for risk management and portfolio optimization. For example, if stock prices are assumed to follow a normal distribution, the risk associated with holding a portfolio of stocks can be estimated based on the standard deviation of the portfolio's returns. However, if stock prices follow a fat-tailed distribution, the risk of large losses may be under-estimated using this approach, as extreme events (such as large price movements) are more likely to occur. This highlights the need for taking into account the potential for fat-tailed distributions in financial models and incorporating appropriate risk management strategies to mitigate the potential impact of extreme events.

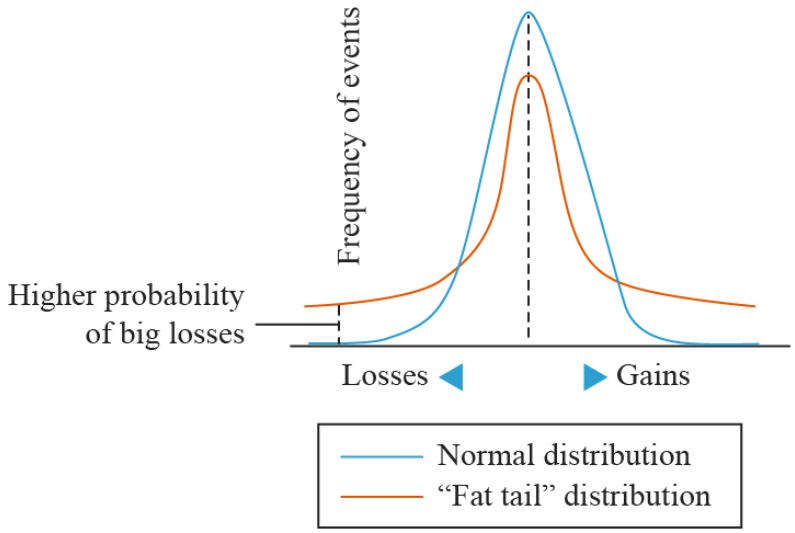

Fig.11: normal distribution vs fat-tailed dustribution.

Log-Normal Distribution: the log-normal distribution is a continuous probability distribution in which the logarithm of a random variable follows a normal distribution. It is often used to model stock prices, currency exchange rates, and other financial variables, as well as various physical quantities, such as sizes of particles or lengths of biological cells.

Formally, a random variable X is said to be log-normally distributed if its natural logarithm, ln(X), follows a normal distribution. If X has mean μ and standard deviation σ, then the mean and standard deviation of ln(X) are given by:

mean(ln(X)) = ln(μ)
standard deviation(ln(X)) = σ

The log-normal distribution is characterized by the following cumulative distribution function:

$F(x) = 1/x * \Phi((\ln(x) - \ln(\mu)) / \sigma)$

where Φ is the cumulative distribution function of the standard normal distribution, and x is the random variable.

The log-normal distribution has several important properties:

- Positive Skewness: The log-normal distribution is positively skewed, meaning that it has a longer tail to the right than the normal distribution.
- Non-Linear Transformation: The log-normal distribution is the result of a non-linear transformation of a normal distribution.
- Log-Linearity: The logarithm of a log-normally distributed variable is linear, which makes it amenable to statistical analysis and modeling.
- Non-Negativity: The log-normal distribution is non-negative, which is a property that is often required for financial and physical quantities.

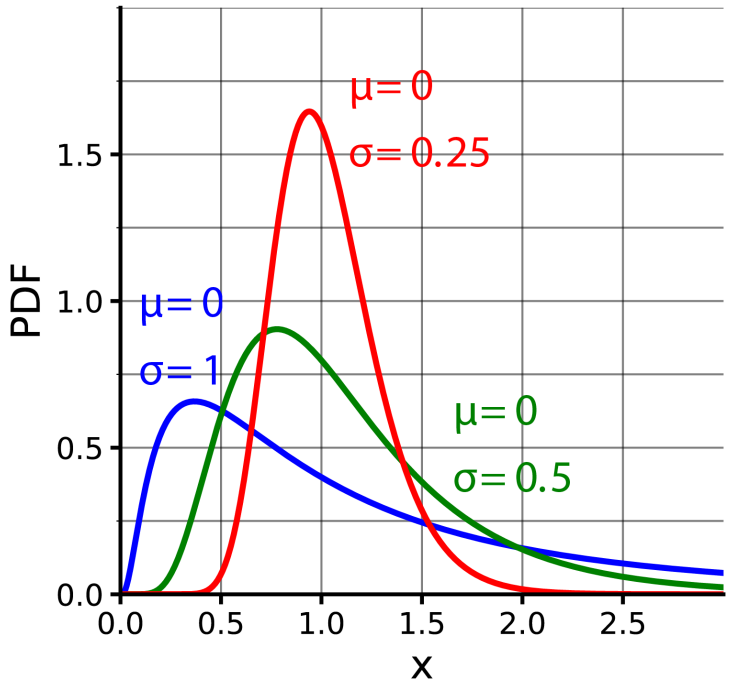

Fig.12: Probability Density Function for a Log-Normal Distribution.

The log-normal distribution is widely used in finance, economics, and other fields, as it provides a useful tool for modeling variables that are positively skewed and non-negative. However, it is important to note that not all financial variables follow a log-normal distribution, and other distributions may be more appropriate in some cases. It is also important to carefully consider the assumptions being made when using the log-normal distribution and to check the validity of these assumptions with empirical evidence.

Kurtosis: a statistical measure that describes the shape of a probability distribution. It measures the degree of peakedness or flatness of a distribution relative to the normal distribution, which has a kurtosis of 0.
A distribution with a kurtosis greater than 0 is referred to as *leptokurtic*, meaning it has a higher peak and thicker tails compared to the normal distribution.
A distribution with a kurtosis less than 3 is referred to as *platykurtic*, meaning it has a flatter peak and thinner tails compared to the normal distribution.

Kurtosis can be calculated using the following formula:

Kurtosis = μ_4 / σ^4

where μ_4 is the fourth central moment of the distribution and σ^2 is the variance of the distribution.

In finance, kurtosis is important in risk management, as it provides information about the potential for large losses in a portfolio. For example, if a distribution has a high kurtosis, it may indicate that there is a higher likelihood of observing extreme events (such as large price movements) compared to a normal distribution. This highlights the need for taking into account the kurtosis of financial variables in risk management and portfolio optimization strategies.
It is important to note that different definitions of kurtosis exist, and care should be taken to use the appropriate definition when analyzing a distribution. The most commonly used definition of kurtosis is the excess kurtosis, which measures the deviation of the kurtosis from the normal distribution's kurtosis of 0.

In summary: the more a phenomenon is concentrated around its average, the more regular its growth will be.

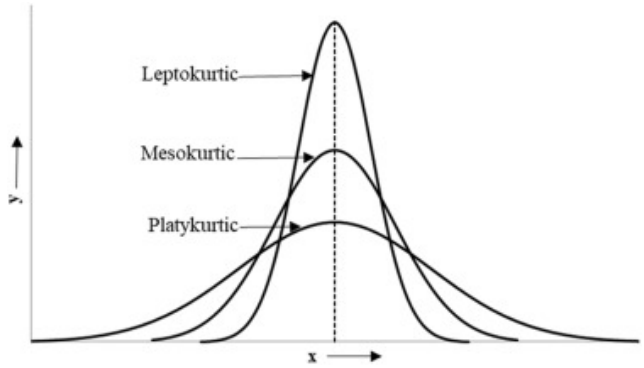

Fig.13: Kurtosis definition.

Skewness: the skewness index (δ) measures the lack of symmetry (skewness) of the probability distribution with respect to its mean.

- Negative asymmetry (δ < 0): the left tail is longer; the mass of the distribution is concentrated on the right of the figure.
- Positive asymmetry (δ > 0): the right tail is longer; the mass of the distribution is concentrated on the left of the figure.
- If δ = 0 the distribution is symmetric.

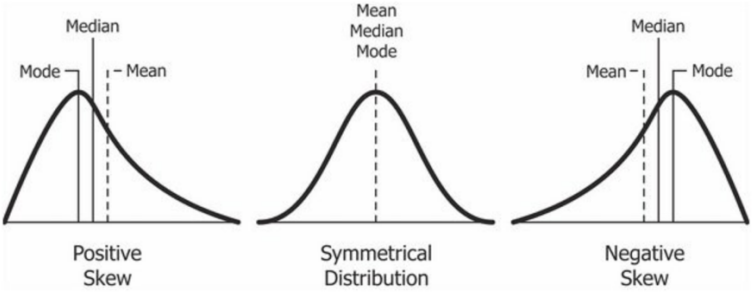

Fig.14: Positive and Negative Skewness.

Covariance: when two different characters A and B are observed, referring to the same population, of which we know the numerical values $\{x_1 \dots x_s\}$ e $\{y_1 \dots y_t\}$, we can refer to statistical indices such as the covariance which can describe how the two sets of data vary from each other.

$$cov(A,B) = \frac{(x_1 - \mu_A)(y_1 - \mu_B) + (x_s - \mu_A)(y_t - \mu_B)}{n-1}$$

where μ_A e μ_B are the sample averages of the two series of data.

- A positive covariance indicates that it is reasonable to expect an increase in the second quantity as the first increases or a decrease in the second as the first decreases.
- A negative covariance indicates that the data have on average "discordant" behavior.
- A covariance of close to zero indicates that the data are not directly related to each other.

Here is an example of how covariance can be calculated: suppose we have daily returns for Stock A and Stock B for 10 days.

Day Stock A Stock B
1 0.05 0.03
2 -0.02 0.02
3 0.01 0.04
4 0.03 0.01
5 0.04 0.02
6 -0.01 0.06
7 0.02 0.05
8 0.03 0.04
9 0.01 0.03
10 -0.02 0.01

The expected returns for Stock A and Stock B can be calculated as follows:

μ_A = (0.05 - 0.02 + 0.01 + 0.03 + 0.04 + -0.01 + 0.02 + 0.03 + 0.01 - 0.02) / 10 = 0.022
μ_B = (0.03 + 0.02 + 0.04 + 0.01 + 0.02 + 0.06 + 0.05 + 0.04 + 0.03 + 0.01) / 10 = 0.038

The covariance between the returns of Stock A and Stock B can be calculated as follows:

$cov(A,B) =$ (0.05 - 0.022)(0.03 - 0.038) + (-0.02 - 0.022)(0.02 - 0.038) + (0.01 - 0.022)(0.04 - 0.038) + (0.03 - 0.022)(0.01 - 0.038) + (0.04 - 0.022)(0.02 - 0.038) + (-0.01 - 0.022)(0.06 - 0.038) + (0.02 - 0.022)(0.05 - 0.038) + (0.03 - 0.022)(0.04 - 0.038) + (0.01 - 0.022)(0.03 - 0.038) + (-0.02 - 0.022)(0.01 - 0.038) / 9

= (0.028)(-0.008) + (-0.042)(-0.018) + (-0.002)(0.002) + (0.008)(-0.018) + (0.018)(-0.016) + (-0.032)(0.022) + (0.000)(-0.002) + (0.008)(0.002) + (-0.002)(-0.016) + (-0.044)(-0.018) / 9

= -0.00023 + 0.00756 + 0.000004 + -0.000144 + -0.000288 + 0.00704 + 0.000000 - 0.000016 + 0.000032 + 0.00792 / 9

= 0.00089

So, the covariance between the returns of Stock A and Stock B is 0.00089, which indicates a relatively weak positive relationship between the two stocks.

The covariance can be used to estimate the risk of the portfolio by taking into account the relationship between the two stocks. A positive covariance between the returns of Stock A and Stock B indicates that the two stocks tend to move in the same direction, while a negative covariance indicates that the two stocks tend to move in opposite directions. The magnitude of the covariance provides information about the strength of the relationship.
In the previous example, the covariance between the returns of Stock A and Stock B can be used to estimate the risk of the portfolio and to make informed investment decisions. A higher covariance between the returns of the two stocks would indicate a higher level of risk in the portfolio, while a lower covariance would indicate a lower level of risk.

Correlation: given the following data series A = $\{x_1 \dots x_s\}$ e B = $\{y_1 \dots y_t\}$, we can define correlation coefficient:

$$corr(A,B) = \frac{cov(A,B)}{\sigma_A \sigma_B}$$

Where $cov(A,B)$ is the covariance between A and B, and σ_A e σ_B are the sample standard deviation of A and B.

The correlation coefficient is a measure of the strength and direction of the relationship between two variables. It ranges from -1 to 1 and indicates the following:

- A correlation of 1 indicates a perfect positive linear relationship, meaning that as one variable increases, the other variable also increases by a constant amount.
- A correlation of -1 indicates a perfect negative linear relationship, meaning that as one variable increases, the other variable decreases by a constant amount.
- A correlation of 0 indicates no linear relationship between the two variables.

The correlation coefficient is a useful tool for traders and investors as it helps them assess the relationship between two financial assets, such as stocks, bonds, or commodities, and make informed investment decisions. For example, if two stocks have a weak correlation, it may be beneficial to diversify a portfolio by investing in both stocks to reduce the risk.

Here we can calculate the correlation between Stock A and Stock B, using the example from the previous answer:

First, we need to calculate the standard deviations of the returns for Stock A and Stock B:

StdDev(r_A) = sqrt(((0.05 - 0.022)^2 + (-0.02 - 0.022)^2 + (0.01 - 0.022)^2 + (0.03 - 0.022)^2 + (0.04 - 0.022)^2 + (-0.01 - 0.022)^2 + (0.02 - 0.022)^2 + (0.03 - 0.022)^2 + (0.01 - 0.022)^2 + (-0.02 - 0.022)^2) / 9) = 0.0159 StdDev(r_B) = sqrt(((0.03 - 0.038)^2 + (0.02 - 0.038)^2 + (0.04 - 0.038)^2 + (0.01 - 0.038)^2 + (0.02 - 0.038)^2 + (0.06 - 0.038)^2 + (0.05 - 0.038)^2 + (0.04 - 0.038)^2 + (0.03 - 0.038)^2 + (0.01 - 0.038)^2) / 9) = 0.0165

Then, the correlation between Stock A and Stock B can be calculated as follows:

Corr(A, B) = Cov(A, B) / (StdDev(r_A) * StdDev(r_B)) = 0.00089 / (0.0159 * 0.0165) = 0.360

So, the correlation between Stock A and Stock B is 0.360, which indicates a relatively weak positive relationship between the two stocks.

When we study correlations, we must keep in mind the risk of studying "spurious correlations". We are talking about apparent correlations that exist between two variables only due to the influence of a third variable, rather than a direct causal relationship between the two variables. In other words, these correlations may appear to be meaningful or significant, but they are actually coincidental and do not reflect any real underlying relationship between the variables.

Spurious correlations can arise in financial data due to a variety of factors such as non-random sampling, omitted variables, or confounding variables. They can also arise due to random fluctuations in the data, especially when working with large datasets.
It is important for traders and investors to be aware of spurious correlations and to carefully analyze the data and relationships between variables before making investment decisions. This can be achieved by using appropriate statistical methods, such as regression analysis, to control for confounding variables and to isolate the relationship of interest.

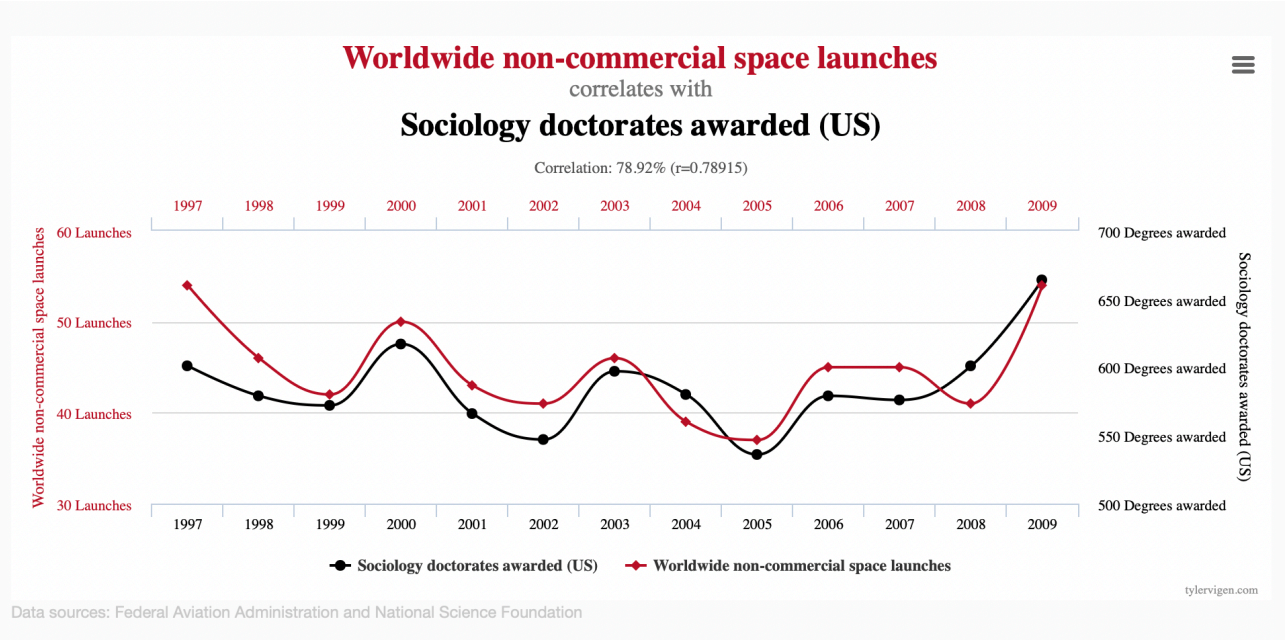

Fig.15: Spurious Correlations.

Correlation refers to a statistical relationship between two or more variables, where changes in the value of one variable are associated with changes in the value of another variable.
"Causation" refers to a causal relationship, where one event is the direct cause of another. A causal relationship is established when it is shown that a change in the value of an independent variable directly leads to a change in the dependent variable, and that the relationship cannot be explained by any other factors.
It is important to note that correlation does not imply causation. Just because two variables are correlated does not mean that one is causing the other. Taking a different example from that of Fig.15, there may be a strong correlation between the number of ice cream sales and the number of drowning deaths, but it does not mean that eating ice cream causes drowning. Other factors, such as hot weather, may be causing both ice cream sales and drowning deaths to increase.

Linear Regression: Linear regression is a straightforward tool used in finance to understand the relationship between two variables. Think of it as drawing the best straight line through a set of data points to see how one variable (like a stock's price) changes in relation to another (like its trading volume).

Key Components:

1. *Dependent Variable (y)*: The outcome you want to predict (e.g., stock price).
2. *Independent Variable (x)*: The factor you use to make the prediction (e.g., trading volume).

The Basic Idea:

Linear regression finds the best-fitting straight line (called the *regression line*) that connects the data points. This line helps you predict the dependent variable based on the independent variable.

The Simple Equation:

$$y = \beta_0 + \beta_1 x$$

- β_0 (*Intercept*): The value of y when x is zero. It's where the line crosses the y-axis.
- β_1 (*Slope*): How much y changes for each one-unit change in x. It shows the direction and strength of the relationship.

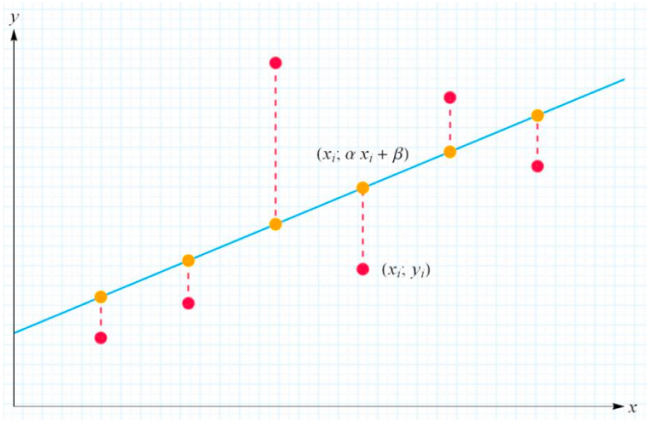

Fig.16: Linear Regression.

The parameters β0 and β1 are estimated from the data using a method such as ordinary least squares. The goal is to find the values of β0 and β1 that minimize the sum of the squared differences between the observed y values and the values predicted by the equation. These estimates can then be used to make predictions about the dependent variable given a new value of the independent variable.

it is shown that the coefficients β_1 and β_0 (also known as α and β) can be calculated using the following formulas:

$$\beta_1 = \frac{cov(A,B)}{\sigma_A^2} \qquad \beta_0 = \mu_B - \beta_1 \mu_A$$

Where:

μ_A: *mean of distribution A*
μ_B: *mean of distribution B*
σ_A: *variance of distribution A*
$cov(A,B)$: *covariance between A and B*

Linear Regression in Stock Prediction: an example

Imagine you're analyzing a company's stock and want to predict its closing price based on its daily trading volume.

Step 1: Gather Your Data

First, collect historical data for a period, say, the past 10 days:

Day	Trading Volume (Thousands)	Closing Price ($)
1	1200	45.5
2	1500	46
3	1300	45.8
4	1700	46.5
5	1600	46.2
6	1800	47
7	1400	45.9
8	1900	47.5
9	2000	48
10	1750	47.3

- Independent Variable (x): Trading Volume (Thousands)
- Dependent Variable (y): Closing Price ($)

Step 2: Plot the Data

Plotting trading volume against closing price can help visualize the relationship. Typically, you might observe an upward trend, indicating that higher trading volumes are associated with higher closing prices (this can happen while falling prices as well and it depends on context).

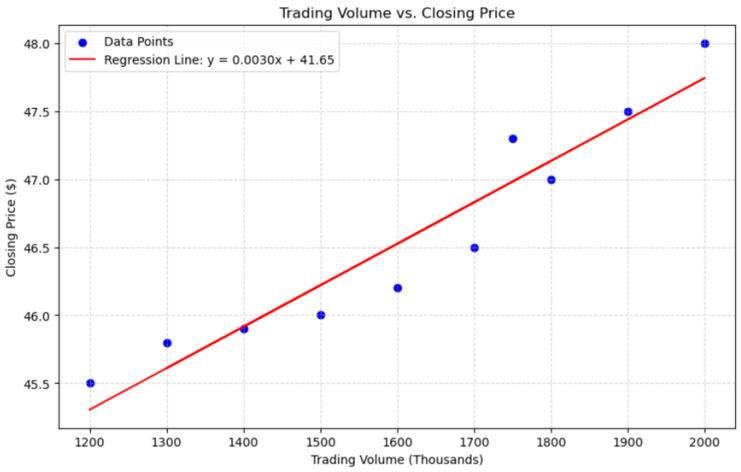

Figure 17: Scatter Plot of Trading Volume vs. Closing Price

Step 3: Calculate Averages

Calculate the mean (average) of both trading volume and closing price.

$$\mu_A = \frac{1200 + 1500 + 1300 + 1700 + 1600 + 1800 + 1400 + 1900 + 2000 + 1750}{10}$$
$$= 1615\ (Thousands)$$

$$\mu_B = \frac{45.50 + 46.00 + 45.80 + 46.50 + 46.20 + 47.00 + 45.90 + 47.50 + 48.00 + 47.30}{10}$$
$$= 46.57\ (\$)$$

Step 4: Compute Covariance and Standard Deviations

Let's assume that distribution A describes variable x and distribution B variable y. Covariance measures how two variables move together. It's calculated as:

$$cov(x, y) = \sum \frac{(x_i - \mu_x)(y_i - \mu_y)}{n - 1}$$

$$cov(x,y) = [(1200 - 1615) * (45.50 - 46.57) + (1500 - 1615) * (46 - 46.57) + (1300 - 1615) * (45.80 - 46.57) + (1700 - 1615) * (46.50 - 46.57) + (1600 - 1615) * (46.20 - 46.57) + (1800 - 1615) * (47.00 - 46.57) + (1400 - 1615) * (45.90 - 46.57) + (1900 - 1615) * (47.50 - 46.57) + (2000 - 1615) * (48.00 - 46.57) + (1750 - 1615) * (47.30 - 46.57)] / 9 = 209.94$$

Standard Deviations:

$$\sigma_x^2 = \sum \frac{(x_i - \mu_x)^2}{n-1}$$

$$\sigma_y^2 = \sum \frac{(y_i - \mu_y)^2}{n-1}$$

$$\sigma_x^2 = [(1200 - 1615)^2 + (1500 - 1615)^2 + (1300 - 1615)^2 + (1700 - 1615)^2 + (1600 - 1615)^2 + (1800 - 1615)^2 + (1400 - 1615)^2 + (1900 - 1615)^2 + (2000 - 1615)^2 + (1750 - 1615)^2]/9 = 68916.67$$

$$\sigma_x = \sqrt{68916.67} = 262.51$$

$$\sigma_y^2 = [(45.50 - 46.57)^2 + (46 - 46.57)^2 + (45.80 - 46.57)^2 + (46.50 - 46.57)^2 + (46.20 - 46.57)^2 + (47.00 - 46.57)^2 + (45.90 - 46.57)^2 + (47.50 - 46.57)^2 + (48.00 - 46.57)^2 + (47.30 - 46.57)^2] / 9$$

= 0.6979

$$\sigma_y = \sqrt{0.6979} = 0.836$$

Step 5: Determine the Correlation Coefficient (r)

The correlation coefficient measures the strength and direction of the linear relationship between two variables.

$$corr(x,y) = \frac{cov(x,y)}{\sigma_x \sigma_y}$$

$$corr(x,y) = \frac{209.94}{(262.51 * 0.836)} = 0.9566$$

Interpretation: A correlation coefficient of 0.9566 indicates a very strong positive relationship between trading volume and closing price.

Step 6: Calculate the Slope (β_1) and Intercept (β_0)

$$\beta_1 = \frac{cov(x,y)}{\sigma_x^2} \qquad \beta_0 = \mu_y - \beta_1\mu_x$$

$$\beta_1 = \frac{209.94}{68916.67} = 0.00305$$

$$\beta_0 = 46.57 - 0.00305 * 1615 = 41.65$$

Step 7: Formulate the Regression Equation**

$$y = \beta_0 + \beta_1 x = 41.65 + 0.00305 * x$$

Interpretation:

- Intercept 41.65: If the trading volume were 0 (which is unrealistic), the model predicts a closing price of 41.65 $.
- Slope (0.00305): For each additional thousand units in trading volume, the closing price increases by 0.00305 $.

Step 8: Make a Prediction**

Suppose on Day 11, the trading volume is expected to be 1,850,000 units (1,850 thousands).

$$y = 41.65 + 0.00305 * 1850 = 47.29\ \$$$

Prediction: The model estimates the closing price to be 47.29 $ on Day 11.

While linear regression provides valuable insights, it's essential to recognize its limitations and complement it with other analytical methods and market knowledge to make well-informed financial decisions.

Simple Interest: in the simple capitalization regime, the interest is calculated only on the initial capital: it is constant every year.

By investing a capital *C* at interest rate *i* after *t* years we will have:

$$C + C \cdot i \cdot t = C(1 + i \cdot t)$$

where:

C is the initial principal
C · i · t represents the total interest, the percentage of initial principal multiplied by the number of years representing the duration of the investment.

Compound Interest: in the compound capitalization regime, interest is received not only on the invested capital but also on the accumulated interest. This means that every year the interest is calculated on a higher figure than the previous year, because it includes both the capital deposited at the beginning and the interest received.

By investing a capital C at interest rate *i* after 1 years we still will have C(1 + i), but the second year the interest will be applied to all of this amount, so we will have:

$$C \cdot (1 + i) \cdot (1 + i) = C \cdot (1 + i)^2$$

After the third year, all the interest will still be applied, therefore by investing a capital C at an interest rate i, after t years we will have:

$$C \cdot (1 + i)^t$$

where:

C is the initial capital
i is the interest rate
t is the duration of the investment

With compound capitalization, interest is also calculated on the interest accrued previously, so the capital grows much faster.

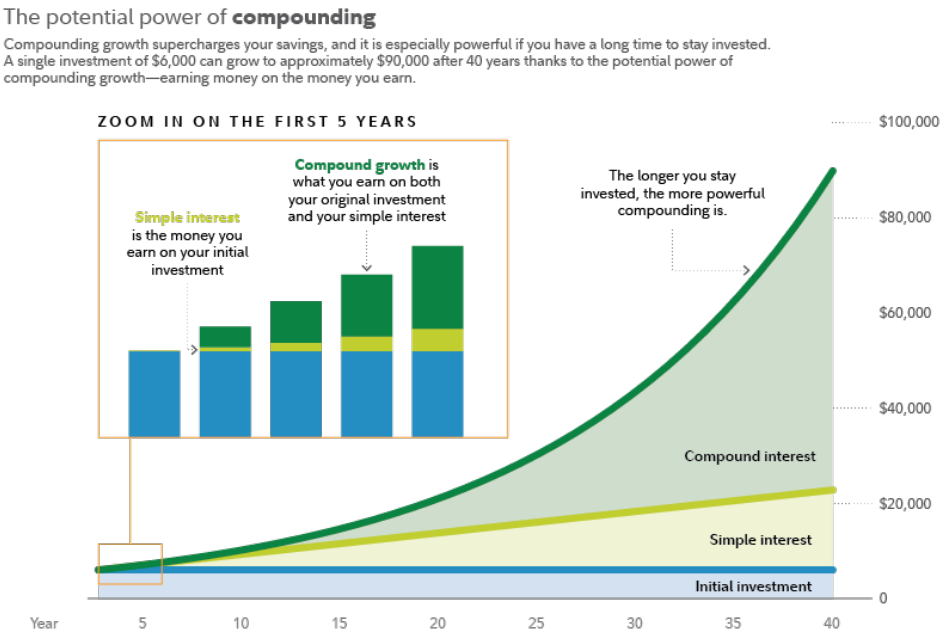

Fig.18: The potential power of compounding.

Beta: the beta of an investment is a measure of its volatility in comparison to the market. Beta is often used in finance as a tool to measure the risk of an investment. A beta of 1 means that the investment's price will move with the market, while a beta less than 1 means it is less volatile than the market and a beta greater than 1 means it is more volatile.
Beta is calculated as the covariance of the investment's returns with the market returns divided by the variance of the market returns:

$$\beta = \frac{Cov(Returns_{Investment}, Returns_{Market})}{Variance_{MarketReturns}}$$

The market is typically represented by an index such as the S&P 500. A beta of 1 for an investment means that for every 1% change in the market, the investment's price is expected to change by 1%. If an investment has a beta of 2, for example, it is expected to be twice as volatile as the market.
It's important to note that beta is a historical measure and may not accurately predict future performance. Additionally, beta values can change over time and may be affected by market conditions. It's a useful tool for understanding risk, but it's important to consider other factors as well when evaluating an investment.

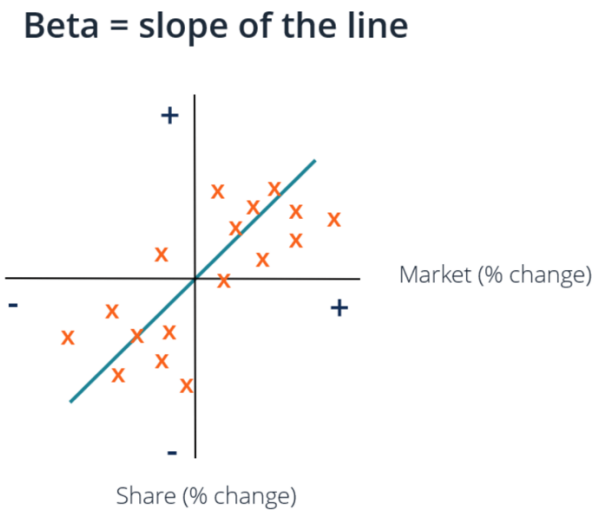

Fig.19: Graphical interpretation of Beta.

Let's consider an example to calculate the beta of a stock:

Suppose you are considering investing in Stock A in a market M and you have the following information in terms of percent returns:

	A	M
January	11%	8%
February	17%	10%
March	21%	13%
April	18%	11%
May	-8%	-3%
June	-12%	-5%

From the moment that:

$$\beta = \frac{Cov(Returns_{Investment}, Returns_{Market})}{Variance_{MarketReturns}}$$

First, we calculate the average of returns for the stock and for the market:

Avg A	0,07833333
Avg M	0,05666667

Then, for each month, we calculate the difference between the returns of the stock and the average relative return, and between the returns of the market and the average relative return.

	A	M	Deviation from mean A	Deviation from mean M
January	11%	8%	0.031666667	0.023333333
February	17%	10%	0.091666667	0.043333333
March	21%	13%	0.131666667	0.073333333
April	18%	11%	0.101666667	0.053333333
May	-8%	-3%	-0.158333333	-0.086666667
June	-12%	-5%	-0.198333333	-0.106666667

Then we multiply the two deviations obtaining:

	A	M	Deviation from mean A	Deviation from mean M	Product
January	11%	8%	0.031666667	0.023333333	0.000738889
February	17%	10%	0.091666667	0.043333333	0.003972222
March	21%	13%	0.131666667	0.073333333	0.009655556
April	18%	11%	0.101666667	0.053333333	0.005422222
May	-8%	-3%	-0.158333333	-0.086666667	0.013722222
June	-12%	-5%	-0.198333333	-0.106666667	0.021155556

To obtain the covariance we make the sum of products, and we divide it by (n-1).

Covariance = 0.009111111

To obtain the variance of the market we must square the deviations of the market, to sum these contributes and divide it by (n-1):

	A	M	Dev from mean A	Dev from mean M	Product	Squared Deviations Market
January	11%	8%	0.031666667	0.023333333	0.000738889	0.000544444
February	17%	10%	0.091666667	0.043333333	0.003972222	0.001877778
March	21%	13%	0.131666667	0.073333333	0.009655556	0.005377778
April	18%	11%	0.101666667	0.053333333	0.005422222	0.002844444
May	-8%	-3%	-0.158333333	-0.086666667	0.013722222	0.007511111
June	12%	-5%	-0.198333333	-0.106666667	0.021155556	0.011377778

Sum (squared deviations market) = 0,029533333

Variance = 0,004922222
Beta = 1.8510158

This means that Stock A is more volatile than the reference Market and can be considered as a riskier investment.