

The Role of Japanese Candlesticks in Analyzing the Price Movement of the Saudi General Index during the Period (2018-2021)

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ABSTRACT:

The aim of this study is to cover various aspects of technical analysis in general, with a focus on the pattern of Japanese candlesticks as a model for analyzing the price movement of financial market indices. This is done through the use of monthly data for the prices of the Saudi General Index and monitoring its developments during the period from 2021 to 2018.

We concluded that Japanese candlestick charts are among the most accurate tools of technical analysis compared to other analytical tools. They are distinguished from other charting methods by the additional amount of information they provide to traders. Moreover, if read correctly, they can send a specific message that can be used as guidance and relied upon in forming a specific viewpoint regarding the analysis of price movements for financial market indices.

Keywords: Price movement, Technical analysis, Japanese candlesticks, Saudi General Index.

JEL Classification: E44, G15, G29.

INTRODUCTION

Financial market indices are considered a tool for market analysis on one hand and a comprehensive measure for predicting its future development on the other hand. They reflect the general direction of securities price movements, making these indices a reference level for investors interested in the financial market and financial assets.

Financial markets have a set of indices that express and reflect their performance simultaneously. These indices are one of the most important means by which investors in local and international financial markets guide their investment decisions and implementations. Increasingly, these indices are used in evaluating the financial market's performance, understanding performance trends, and comparing it with other financial markets' performance, in addition to the information these indices provide, which is used in measuring the market's achievement of its goals.

Anyone entering the world of financial markets must use many tools to make the right decisions, and among these tools, the most effective and best are Japanese candlestick charts (Japanese candlestick pattern, Japanese candlestick models) due to their significant credibility.

Japanese candlesticks are among the most important, commonly used, and effective technical tools in financial circles. This is because of their simple composition and the important information they provide about stocks specifically and the market in general. They are also used as a tool that enables the prediction of future price trends.

Despite the late arrival of Japanese candlesticks to global markets, they have achieved widespread and significant popularity. They have become today the most famous type of charts (models) altogether, being an essential part in all international technical analysis certifications and tests. They have also succeeded in integrating significantly with other branches of technical analysis, a feature that contributed to their success and popularity, in addition to the unique characteristics and models that distinguish Japanese candlesticks from other branches of technical analysis and their tools.

As a result of this spread and these features, Japanese candlesticks have reached Arab markets and gained wide popularity, especially in the Saudi financial market, which is one of the largest Arab financial centers and includes several indices, among them the Saudi General Index, which encompasses many companies with different orientations.

Study problem

The problem of this study can be formulated in the following main question:

Based on Japanese candlestick models, what are the expected levels of price movement for the Saudi General Index during the period between 2018 and 2021?

Study Hypothesis:

The hypotheses of this study are that Japanese candlesticks are a type of technical analysis followed by many traders and market observers. They are considered a good way to read data and analyze the results contained therein. They are a tool that enables us to predict the future state of price movement for financial market indices without considering other analytical conditions.

Study importance

This study's significance stems from the importance of predicting stock prices for investors in financial markets, which is based on confirming the market's condition using many technical methods, including Japanese candlesticks, as they are effective tools in financial markets relied upon by analysts, investors, and speculators to achieve profits and understand price trends, with a focus on the Saudi General Index.

Study objectives

The aim of this study is to clarify the method of analysis using different shapes and models of Japanese candlesticks in monitoring and reading the price movement of financial market indices, considering the Saudi financial market through an analytical study of the general index traded therein and following its developments within the specified time frame.

Study Approach

The study primarily adopted a descriptive approach to highlight the basic concepts related to the topic, in addition to using an analytical approach to analyze the various changes in the prices of the Saudi General Index during the period 2018-2021, using Japanese candlestick patterns.

Study Structure

To address the problem of this study and test its hypotheses, it is divided into three parts. The first part discusses the basics of Japanese candlesticks. Through its second part, it delves into the most important models of Japanese candlesticks and their uses. In the third part, a technical analysis of the Saudi General Index by Japanese candlestick patterns is conducted, concluding this study with a set of conclusions and recommendations.

1. Basics of Japanese Candlesticks

The method of Japanese candlesticks is one of the techniques focused on monitoring and recording the price movements of financial indices. Its concept relies on all the information that charts and histograms consider, in addition to the opening price which the Japanese paid great attention to in order to understand stock price movements and their future directions. This is aimed at achieving the right timing for investment decisions and minimizing losses as much as possible.

1.1 Origin and Development of Japanese Candlesticks

The origin of Japanese candlesticks dates back to Munehisa Homma, also known as Sokyu Homma, who was born in 1724 and died in 1803. Homma was a rice trader, and at that time, rice trading was widespread among the Japanese people and was the most common market.

Homma is considered the founder of Japanese candlesticks or, as some claim, the spiritual father of technical analysis, as he was the first to use past price movements to predict future prices (Al-Omari, 2018, p. 07). Around 1710, futures markets for rice appeared and spread and this system used vouchers to be later redeemed. Homma innovated a technical technique to represent rice prices in a simple and smooth manner to help him choose the best times to buy and sell rice.

This technique was later named Japanese candlesticks, where he found that certain patterns recur periodically and have the same impact on future rice movements after he recorded the highest and lowest price and the opening and closing price in the session (Patrick, 1997, p. 24).

The pattern of Japanese candlesticks helped Homma achieve tremendous profits, after applying those candlesticks to rice trading; he succeeded in making a profit in one hundred consecutive deals. Since then, Homma's fame spread throughout Japan, and he was considered a market god, becoming a financial advisor to the government. It is noted that Homma managed to make a profit of up to ten billion dollars in one day of trading. Homma found that by following the general trend of rice, he could achieve huge profits. Therefore, he always advised that the secret of his success lies in following the general trend and identifying early reversal zones using Japanese candlesticks, which he saw as strongly respected by price movement. Of course, even today, there is no investor who is not advised to continuously follow the general trend and not to oppose it or move against it. This is considered the secret to success in trading in the financial markets.

1.2 The Concept of Japanese Candlesticks

Japanese candlesticks are an ancient method of monitoring and recording price movements in various financial markets to read the supply and demand situation, measuring the strength of each in the markets. Over three hundred years ago, the Japanese began trading rice futures at the Dojima Rice Exchange, where rice was the main commodity at that time. The Japanese recorded the daily price movements in a chart form resembling a candle, consisting of a rectangle with an upper and lower wick. The top of the lower wick represents the highest price in the observed time period, and the lowest point of the lower wick represents the lowest price traded during that period. The opening and closing prices are represented either by the top or bottom line of the rectangle, where the rectangle is called the body and the wick is called the shadow. The Japanese symbolized days of rising prices (closing price higher than opening price) with a white candle representing joy from profits, and days of falling prices (closing price lower than opening price) with a black candle expressing sadness from losses (Sharifi & Bashawnda, 2018, p. 171). The method of Japanese candlesticks is one of the charting techniques, closely resembling the bar chart, as it contains all the data found in a column including the highest and lowest prices, closing price, and opening price (Kafi, 2009, pp. 349-350). It's a type of technical analysis that relies on drawing a relationship between changes in stock price and changes in time. The vertical line represents the change in price, and the horizontal represents the change in time, resulting in columns resembling candles, hence the name Japanese candlesticks.

Candlesticks provide traders with a better understanding of price movement and a clearer reading of price patterns formed through candles, which helps in determining trends, trends, exit and entry points, and profit-taking. The Japanese candlestick method aligns with the principles of technical analysis in the following ways (Mark, 1994, p. 230):

- Both methods focus on the price movement in terms of what this movement is and where it goes, ignoring the reasons leading to this movement, which might be related to news or company profits;
- Reflecting all market information in the stock price;
- The market may not express the true value of stocks.

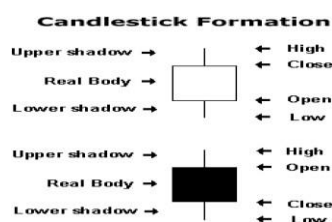
Although the Japanese candlestick method provides signals to determine the nature of reversals, analysts recommend using it alongside other technical analysis methods to strengthen the analysis and make the use of analysis more indicative of market movement. Analysts agree on three ideas on how the Japanese candlestick method can be combined with technical analysis tools, whether in bullish or bearish reversals.

In light of the above, Japanese candlesticks can be defined as a type of technical analysis followed by many traders and market watchers. Japanese candlesticks are a study of price movement to predict future movement through the price movement itself, without considering other analytical conditions. A candle represents the price movement during a specific time period, and typically, Japanese candlesticks are studied on time intervals chosen according to the time period of the curve. A candle consists of the opening and closing prices, along with the highest and lowest prices. Conventionally, a price increase is drawn through an empty candle colored white or green, and a price decrease is drawn through a filled candle colored black or red. However, colors can be adjusted according to the user's preference.

1.3 The Structure of Japanese Candlesticks

Japanese candlesticks consist of two main parts as shown in the following figure:

Figure 01: The Structure of Japanese Candlesticks



Source: (Nison, 1991, p. 24)

1.3.1 The Real Body of the Candle

It consists of an upper and a lower line, one represents the opening and the other represents the closing. The opening refers to the opening price of the stock at the beginning of the time period represented by this candle, and similarly, the closing represents the closing price of the stock at the end of the period represented by this candle. The shape of the candle's body can be in two states (Attiya, 2011, p. 295):

- **The first case:** The opening price is lower than the closing price, meaning the stock's closing has risen above its opening price, and the candle's color is white (green), representing joy from profits;
- **The second case:** The opening price is higher than the closing price, meaning the stock's closing has dropped below its opening price, thus the candle's color is black (red) and this candle is called a bearish candle, indicating a price decrease.

1.3.2 The Shadows (Wick)

Divided into an upper shadow representing the highest price the stock reached during this period, called the candle's head, and a lower shadow representing the lowest price the stock reached during this period, called the candle's tail.

1.4 The Mechanism of Japanese Candlesticks

The Japanese candlestick method works by recording the daily price movement of stocks in a chart form resembling a candle, where the candle is represented by a rectangle with an upper and lower wick. During the intended time period, the highest price is indicated by the upper wick, while the lower wick indicates the lowest price. The upper line refers to the highest price between the opening and closing prices, while the lower line refers to the lowest price between the opening and closing prices. In summary, the candle represents the four price variables.

The implications differ depending on whether the candle is white (green) or black (red). If the candle is white, it indicates joy or optimism about profiting, and a white candle is formed when the closing price is higher than the opening price on a trading day (or hour, week, month) when prices rise. A black candle is formed when the closing price is lower than the opening price, indicating the possibility of incurring losses.

The terms bullish and bearish (expectation of a rise and expectation of a fall) are often referred to as bull market and bear market, respectively. This nomenclature was given to sellers and buyers in financial markets, as the conflict between the two sides somewhat resembles the struggle between bulls and bears for control of the market and determining its price direction, with the market representing the arena of this conflict. Buyers are represented by bulls, the team that causes prices to rise, against the competing sellers (bears) who continually pressure prices. The first team (buyers) focuses on formulating plans to make profits through bullish speculations, as opposed to sellers who bet on making profits through bearish speculations (Gann, 1976, p. 301).

The relationship between the two sides of the transaction is not fixed, and roles can be reversed, with buyers becoming sellers at a certain moment and vice versa. Each side always seeks to emerge from this conflict by maintaining their presence in the market (Sharp, 1989, p. 386).

Japanese candlesticks depict the struggle between sellers and buyers during a specific time period, and several types of candles can reflect the conflict between the two sides:

- If the candle is a long white one, it indicates that buyers dominated the trading for most of the time, whereas if the candle is a long black one, it means that sellers dominated the trading for most of the time;
- A small candle symbolizes a stagnation in trading activity, meaning that stock prices are still at the starting point;
- If a candle has a long lower shadow, it indicates that sellers dominated the trading for part of the time and buyers prevailed for the remaining part, and vice versa if a candle has a long upper shadow, meaning that buyers dominated the trading for part of the time against sellers' dominance for the remaining part;
- Long upper and lower shadows indicate that the struggle between sellers and buyers is still ongoing.

2. Key Japanese Candlestick Patterns and Their Uses

Japanese candlesticks can take various forms, each reflecting trading behavior over a specific period and providing an anticipated outlook for future price movements. These can be individual or composite, and the name of each price pattern or specific candlestick shape changes with the trend direction. A candlestick shape takes one name in an upward trend and another in a downward trend. There are many types of Japanese candlesticks (BARON, 2004, p. 121). Here, we will study the most important models of Japanese candlesticks, which we divide into three types:

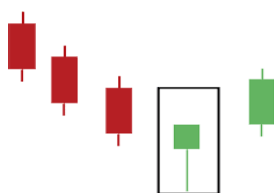
2.1 Bullish Japanese Candlestick Patterns

These are candlesticks that occur and indicate a potential rise in price over the coming period. Bullish candlestick patterns serve as an alert for price followers, after which the technical analyst begins to monitor liquidity flows to see confirmation through incoming liquidity to validate the pattern that suggests the potential for an upward trend. Among the most important are:

2.1.1 Hammer Pattern

The Hammer candlestick is characterized by a relatively long lower wick (tail) but has no upper shadow, meaning the closing price equals or is very close to the highest price of the candle, so the upper shadow does not appear. The longer the lower shadow, the better it is for proving the candlestick's significance. Also, the opening and closing prices should not be equal, and preferably, the closing price is higher than the opening price, as shown in the following figure:

Figure 02: Hammer Pattern



Source: (Al Ittijah, 2017, p. 03)

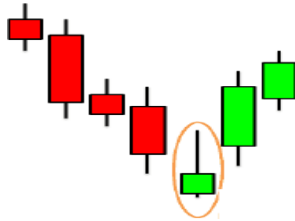
For the Hammer candlestick to be more credible, it must come at the end of a downward price movement, i.e., after a price drop. If the Hammer candlestick appears after a long upward trend, it may not be effective or could even turn into a negative candlestick.

2.1.2 Inverted Hammer Pattern

Consists of a small body hanging from a long upper line, i.e., a candlestick with a small lower body and a relatively long upper wick, its length at least twice the body's length, indicating a trend reversal and the start of price increases (Muhailmi, 2006, p. 225). In the Inverted Hammer case, it is preferable that it appears after a period of declining prices,

because if it appears after a significant upward price movement, it may not succeed, or conversely, it might become a bearish candlestick pattern.

Figure 03: Inverted Hammer Pattern

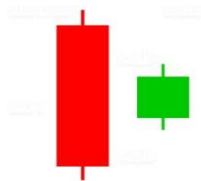


Source: (Al Ittijah, 2017, p. 03)

2.1.3 Bullish Harami Pattern

A bullish candlestick composition, where the first candle is a long bearish one, followed by a new small bullish candle. The condition is that the small bullish candle is within the trading range of the body of the bearish candle, meaning the high and low of the small bullish candle are within the body of the long bearish candle. It is important to note that this candle might need some confirmation through a new bullish candle that closes above the opening of the first bearish candle. Generally, it is a good candlestick indicating a potential price reversal and can occur during upward trends or after the end of a downward trend.

Figure 04: Bullish Harami Pattern

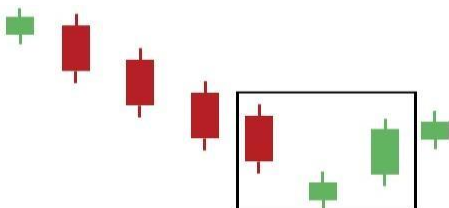


Source: (Al Ittijah, 2017, p. 05)

2.1.4 Morning Star Pattern

Very important in technical analysis and appears after a period of declining prices. It consists of a combination of three internal candles, with the first being a bearish candle, preferably long. Then comes a small bullish candle that opens and closes below the close of the first bearish candle. Finally, another bullish candle forms, long and closes at levels near the opening of the first bearish candle. The closing of the third candle above the opening of the first candle strengthens this pattern (Dusoulie, 2009, p. 69). This candlestick comes at the end of a bearish trend or the end of a bearish correction and cannot be relied upon if it occurs within a continuous upward trend. Generally, this candlestick is strong, especially if it appears at a support level that was broken but where the price in the last third candle trades above the support again.

Figure 05: Morning Star Pattern



Source: (Al Ittijah, 2017, p. 06)

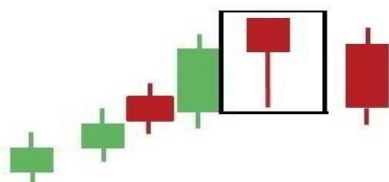
2.2 Bearish Japanese Candlestick Patterns

These are candles or a combination of candles that form on the chart, indicating that the price may decrease in the upcoming period. According to technical analysis, these candlesticks are alert models that require price followers to monitor liquidity flows afterward, to consider the probabilities of a reversal towards a decline. Among the most important are:

2.2.1 Hanging Man Pattern

The Hanging Man candlestick looks identical to the Hammer candlestick; the only difference is its occurrence. While the Hammer appears after a downward trend, the Hanging Man appears after an upward trend. It is taken as a signal of buying saturation, hence a reversal may be imminent. Its lower shadow is relatively long compared to the upper shadow, and the price decreases during the formation of the candle's body. However, the candle's body should be small compared to the lower shadow, and the absence of an upper shadow increases the candle's credibility, but in all cases, the upper shadow must be small. This candlestick only comes at the end of an upward trend and should not be relied upon during or at the end of a downward trend, as it may turn into a less ideal Hammer pattern.

Figure 06: Hanging Man Pattern

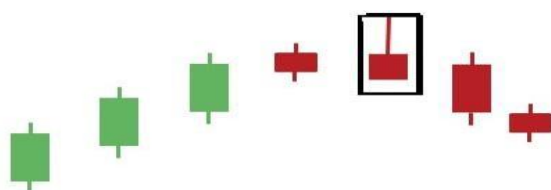


Source: (Al Ittijah, 2017, p. 08)

2.2.2 Shooting Star Pattern

This pattern is a candlestick where the price has decreased, and its upper shadow is very large compared to the lower shadow, which preferably should be non-existent. The candlestick's body is small compared to the upper shadow, and there must have been a decrease in price, meaning the opening is higher than the closing. This candlestick only comes after an upward trend, as it is weak if it occurs during an upward trend and if it appears after a downward trend, it may be an imperfect Inverted Hammer pattern, so this model should only be relied upon after upward trends.

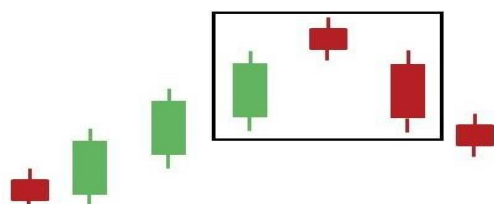
Figure 07: Shooting Star Pattern



Source: (Al Ittijah, 2017, p. 08)

2.2.3 Evening Star Pattern

Among the negative Japanese candlestick models, which form at the end of upward trends, the model consists of three internal candles. The first is a long bullish candle, followed by another candle that opens and closes higher than the close of the first candle, but the second candle preferably closes on a decrease. Typically, the second candle is relatively small, as if it's hanging on the chart far from the bullish candle. Finally, another long bearish candle forms (Evening, 2016). The third bearish candle is preferably very long, closing below the opening of the first bullish candle. However, the model can also be relied upon if the third candle closes within the body of the first bullish candle, meaning the close of the third candle is lower than the close of the first bullish candle.

Figure 08: Evening Star Pattern

Source: (Al Ittijah, 2017, p. 10)

2.3 Neutral Japanese Candlestick Patterns

Neutral candlesticks or neutral Japanese candlestick patterns mostly indicate confusion among traders. These candles are frequently found in stocks with low trading volumes and do not suggest a clear direction. However, when these candles appear in strong upward trends, they should be monitored as they may signal that traders are beginning to look for reasons to support the continuation of upward trends. The same applies if they appear during strong downward trends, indicating that some traders are starting to consider the prices favorable for buying, but they have not made a final decision and a trend reversal would require other candles and patterns.

Neutral candlestick patterns are often misunderstood by many technical analysts, who consider them a signal for a trend reversal. In reality, if neutral candles appear alone, they only mean that traders are starting to think, and there is confusion among them that should be monitored, with their impact appearing later. Neutral candles often form during corrective waves, indicating that the price is taking a break before continuing in the upward direction. Neutral candles also appear after downward and upward trends to indicate a reversal. Hence, neutral candles are considered more alert candles than those indicating upcoming price directions. They include:

2.3.1 Doji Pattern

A very famous candle that appears frequently in financial markets, especially in emerging markets when trading volumes are low at certain moments or during sessions. The opening is equal or very close to the closing, with a small difference between the highest and lowest points, forming a shape resembling a plus sign (+), where the opening price is at the same level as the closing price, meaning there is no difference between the opening and closing prices. The appearance of a Doji indicates that the market has entered a vague stage, and traders are unsure whether to continue the price direction, serving as evidence of a balance between demand and supply forces (Muhailmi, 2006, p. 222). It's worth noting that when a Doji candle appears, one should monitor the upcoming movement and the forthcoming candlestick patterns, especially if a change in trading volumes and values is observed.

Figure 09: Doji Pattern

Source: (Al Ittijah, 2017, p. 12)

Another type of Doji candle exists where the opening is equal to the closing and the highest and lowest points, forming a shape on the chart like a minus sign (-). This candle is treated just like the Doji candle, as a warning sign and not a confirmation of a specific direction.

Figure 10: Doji Pattern

Source: (Al Ittijah, 2017, p. 12)

2.3.2 Marubozu Pattern

This pattern indicates a failure in achieving trends, with an upward candle where the opening is equal to the lowest and the closing is equal to the highest in the first candle, and the first candle is long and bullish. Then, another candle forms where the opening is equal to the highest and the closing is equal to the lowest, and its length is very close to that of the first candle. This candle indicates that an upward trend has failed, but there is no proof that a downward trend will start. Thus, it is considered one of the neutral candles.

Figure 11: Marubozu Pattern

Source: (Al Ittijah, 2017, p. 13)

Another variant of this model exists where the first candle is bearish, and the second candle is bullish, indicating the failure of a downward trend but without proving an upward trend. It is also treated as a neutral, alert candle, as shown in the following figure:

Figure 12: Marubozu Pattern

Source: (Al Ittijah, 2017, p. 13)

3. Technical Analysis of the Saudi General Index Using Japanese Candlestick Patterns During the Period (2018-2021)

The trading market in the Kingdom of Saudi Arabia holds significant importance, with many investors from various parts of the country engaging in investment and trading activities in the market. It has been noted that the Saudi market recently suffered from a significant and noticeable decline, leading the Saudi Stock Exchange (Tadawul) to launch one of the important indices that brought a clear change in the Saudi market after a period of collapse. This index is known as TASI (Tadawul All Share Index), which has become one of the indices listed on the Saudi trading market, simultaneously rejuvenating the market in the Kingdom as well as causing a qualitative leap in stocks. Consequently, there was a significant merger in terms of collective rises, resulting in the General Index's surge to approximately 11,200 points, one of the highest trading levels.

3.1 Introduction to the Saudi General Index (TASI)

The TASI index, short for Tadawul Saudi Stock Index, was created to be fully compliant with the unified Islamic Sharia principles adopted by the Sharia Advisory Committee. The Saudi General Index serves as a guiding tool for investors and participants in the Saudi trading market, thereby facilitating explicit investment decisions in various Sharia-compliant products. The importance of the index has prominently emerged due to its various unique and different uses, allowing asset managers to measure the performance of their investment portfolios. Furthermore, investors in the Saudi market use

it to direct investment decisions in accordance with Islamic Sharia, making it an important tool in the Saudi financial market. From here, it is evident that it is one of the most prominent and important indices that should be developed in the Kingdom of Saudi Arabia (Tasi-Index, 2022).

The Saudi General Index has played a significant role through its ability to serve a wide and extensive range of different uses that have attracted considerable local interest in the Kingdom of Saudi Arabia. The shares of the companies listed on it, totaling 215 companies, have achieved a range of satisfactory and unexpected results. Below are its most prominent uses:

- Allows asset managers to measure the performance of Sharia-compliant investment portfolios;
- Serves as a tool for investors and market participants on a large and broad scale;
- Directs investment decisions in full accordance with all Islamic Sharia principles;
- Acts as a basis for financial products such as derivatives and exchange-traded funds.

3.2 Technical Analysis of the Saudi General Index's Trading Prices Using Japanese Candlesticks in 2018

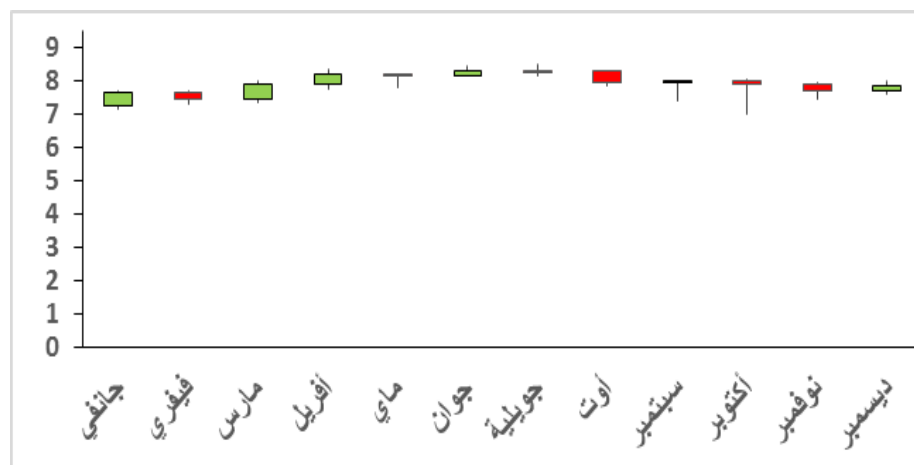
Table 01: Trading Prices of the Saudi General Index During 2018.

Unit: Points

	Closing	Opening	Highest	Lowest	Change%
January	7,650.12	7,226.32	7,702.25	7,148.79	5.86%
February	7,418.80	7,650.12	7,671.48	7,310.84	-3.02%
March	7,870.87	7,418.80	7,985.75	7,336.41	6.09%
April	8,208.87	7,870.87	8,345.19	7,747.47	4.29%
May	8,161.08	8,208.87	8,208.87	7,811.12	-0.58%
June	8,314.19	8,161.08	8,461.00	8,154.36	1.88%
July	8,294.83	8,314.19	8,502.92	8,167.37	-0.23%
August	7,948.25	8,294.83	8,313.57	7,826.34	-4.18%
September	7,999.54	7,948.25	8,007.33	7,407.27	0.65%
October	7,907.01	7,999.54	8,062.28	7,001.94	-1.16%
November	7,702.99	7,907.01	7,924.48	7,464.04	-2.58%
December	7,826.73	7,702.99	7,975.24	7,589.23	1.61%

Source: (Investing, 2022)

Figure 13: Graphical Representation of the Saudi General Index's Price Movement Using Japanese Candlesticks in 2018.



Source: Prepared by the researcher using Excel.

From the data above, we notice that at the beginning of 2018, the Saudi General Index experienced ascending sessions, especially during the first month of the year, forming a green ascending candlestick pattern. This indicates that buyers dominated trading and pushed the price up during the trading process. Before the session closed, sellers pushed the price back to the opening level, highlighted by the closing price reaching 7,650.12 points compared to the opening price of 7,226.32 points.

Subsequently, an ascending ladder pattern appeared in February and March through two consecutive candlesticks. The first one saw a price decrease of 3.02%, but it was followed by a candlestick that opened below the closing price of the preceding declining candlestick, only to rise again and close at levels higher than the opening of the declining candlestick. The index recorded a slight increase to 8,208.87 points in April, with the upward trend forces still present in May forming a Dragonfly Doji pattern, a positive candlestick by nature due to the close and open prices being close to each other.

The graphical representation also shows the formation of an Inverted Hammer candlestick in June, indicating market optimism. The long upper shadow suggests that buyers dominated the trading session. The green color indicates that the index's price increased from the opening price, but this increase was almost negligible, as observed from the table where the opening price was estimated at 8,161.08 points and the closing price at 8,314.19 points.

In July, traders experienced confusion and an inability of both buyers and sellers to dominate the market in the trading session, forming a strong buying pressure clearly visible in the Doji candlestick, suggesting a sharp decline in the next phase. A red candlestick model formed in August, clarifying that the opening price (8,314.19 points) was higher than the closing price (8,294.83 points), indicating a sharp price collapse and closing at a 4.18% decrease. The index knew negative sessions in the following months with the appearance of the Hanging Man candlestick in October and November, confirming the downward trend and setting a new direction for traders, altering their behavior from buying to selling. Then, the index recorded a slight increase to 7,826.73 points in December, confirmed by the appearance of an Inverted Hammer candlestick in the graphical representation, appearing after a period of price decline.

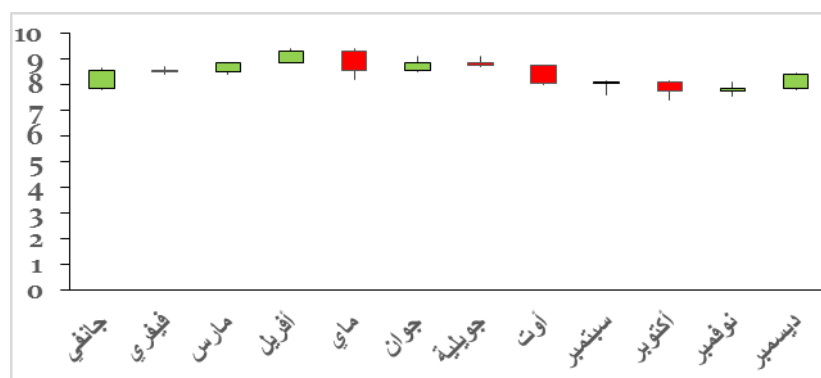
3.3 Technical Analysis of the Trading Prices of the Saudi General Index Using Japanese Candlesticks in 2019

Table 02: Trading Prices of the Saudi General Index During 2019.

Unit: Points.

	Closing	Opening	Highest	Lowest	Change%
January	8,559.95	7,826.73	8,635.59	7,765.84	9.37%
February	8,492.70	8,559.95	8,677.73	8,375.44	-0.79%
March	8,819.44	8,492.70	8,826.71	8,410.81	3.85%
April	9,304.20	8,819.44	9,364.83	8,816.91	5.50%
May	8,516.48	9,304.20	9,403.05	8,189.98	-8.47%
June	8,821.76	8,516.48	9,084.75	8,495.80	3.58%
July	8,732.62	8,821.76	9,090.40	8,704.17	-1.01%
August	8,019.77	8,732.62	8,719.61	8,013.69	-8.16%
September	8,091.76	8,019.77	8,122.08	7,589.50	0.90%
October	7,744.08	8,091.76	8,128.37	7,396.60	-4.30%
November	7,859.06	7,744.08	8,084.89	7,558.08	1.48%
December	8,389.23	7,859.06	8,439.75	7,808.54	6.75%

Source: (Investing, 2022)

Figure 14: Graphical Representation of the Saudi General Index Price Movement Using Japanese Candlesticks in 2019

Source: Prepared by the researcher based on Excel.

From the graphical curve, it is observed that the value of the trading prices of the Saudi General Index in 2019 was trending upwards, recording a horizontal ascending path with varying prices, as indicated by the formation of the green candlestick. This candlestick shows that the opening price (7,826.73 points) is lower than the closing price (8,559.95 points), meaning that the index's price was rising, indicating buyers were stronger in the January trading session and dominated it, forming a strong buying pressure clearly visible in the Doji candlestick during February. In March, a small green candlestick appeared, meaning weak trading by sellers due to buyers controlling the situation, leading to a price increase, albeit at a weak rate, with the opening price at 8,492.70 points.

The index's trading prices experienced fluctuations between rises and falls with close values in highs and lows during March and April, clearly shown in the descending ladder model through a relatively long bullish candlestick, signaling a price rise in April, followed by a bearish candlestick, opening higher than the close of the previous bullish candlestick but decreasing and closing below the opening of the preceding bullish candlestick. Thus, the second bearish candlestick is longer than the bullish one, indicating sellers had control but for a short period, while buyers regained control throughout May, as shown by the Inverted Hammer candlestick, and then the index recovered and continued to rise, starting at 9,304.20 points at the beginning of the month and then dropping to 8,516.48 points in July, due to sellers dominating the trading, as shown by the appearance of the Shooting Star candlestick indicating a price decrease, i.e., the opening was higher than the closing.

By August, the index experienced negative sessions with a value decrease of 8.16%, shown by a long red bearish candlestick on the curve, resulting from the heavy selling of this stock leading to its decline, reflecting the market's downturn, as observed in the closing price that dropped to 8,019.77 points. Then, it recorded a slight increase to 8,091.76 points in September, where the Hammer candlestick was formed, usually appearing at the end of a downward price movement. In October, the appearance of the Hanging Man candlestick indicated a downward trend as sellers directed the price downwards, with the price dropping to 7,744.08 points. However, at the end of the session, buyers appeared and tried to influence the price with a large volume of trades, indicating the situation was beginning to change and the index recovered part of its value, increasing its price during November. In the last month, December, neither sellers nor buyers could fully control the situation, but trading remained in a small volume, and the price slightly increased after modest attempts by sellers to press the market and continue lowering prices, but it seems that slight support caused to save the situation, where a short green candlestick with a short tail was formed, representing a rising market price condition during that month.

3.4 Technical Analysis of the Trading Prices of the Saudi General Index Using Japanese Candlesticks in 2020

Table 03: Trading Prices of the Saudi General Index During 2020.

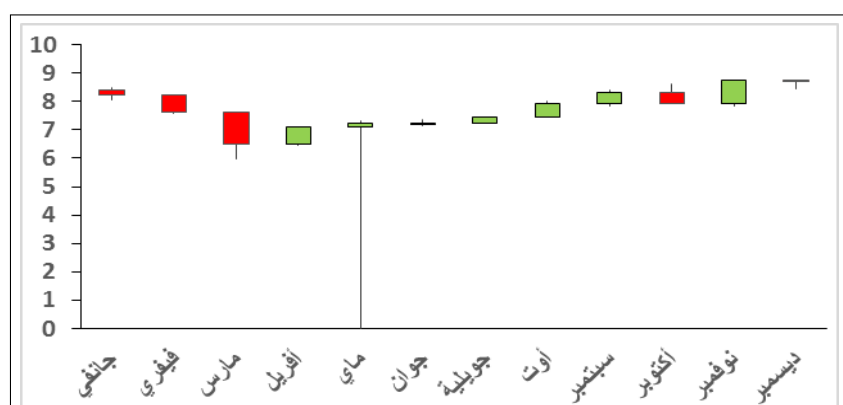
Unit: Point

	Closing	Opening	Highest	Lowest	Change%
January	8,246.59	8,389.23	8,490.38	8,076.79	-1.70%

February	7,628.34	8,246.59	8,194.73	7,561.50	-7.50%
March	6,505.35	7,628.34	7,571.19	5,959.69	-14.72%
April	7,112.90	6,505.35	7,112.90	6,444.71	9.34%
May	7,213.03	7,112.90	7,338.96	6,448.66	1.41%
June	7,224.09	7,213.03	7,381.98	7,129.25	0.15%
July	7,459.21	7,224.09	7,463.16	7,213.99	3.25%
August	7,940.70	7,459.21	8,017.28	7,459.77	6.45%
September	8,299.08	7,940.70	8,390.25	7,861.61	4.51%
October	7,907.72	8,299.08	8,614.50	7,907.72	-4.72%
November	8,747.09	7,907.72	8,747.09	7,842.69	10.61%
December	8,689.53	8,747.09	8,765.80	8,464.32	-0.66%

Source: (Investing, 2022)

Figure 15: Graphical Representation of the Saudi General Index Price Movement Using Japanese Candlesticks in 2020



Source: Prepared by the researcher based on Excel

At the beginning of 2020, we notice that the TASI index presented negative trading activities with repeated negative closures, reaching its lowest value in March at 6,505.35 points. This led to the appearance of downward trends during the first quarter of the year, with additional confirmation of this pattern provided by the long red candlestick formed at the end of March, forming the Hanging Man model. This candle suggests that the market is in a poor state, dominated by a selling wave or selling pressure due to the sudden decrease in stock prices, in addition to the long lower shadow, indicating that sellers were dominating the trading session, leading to the lowest price levels.

However, the following months witnessed different sessions dominated by positive trading activities. The prices experienced rising sessions with varying values until September of the same year, as a natural result of forming a series of green candlesticks. Their formation directly indicates rising prices and the continuation of the positive trend, with prices rising until they reached a high of 8,299.08 points at the end of September. However, the appearance of the Shooting Star candlestick in October suggests a potential reversal in trading direction. This candlestick forms when it opens with a gap higher at the opening and rises during the trading session, with the close being far from the highest price. The resulting candlestick has a long upper shadow and a small real body. The long upper shadow indicates that buyers controlled the session and pushed prices higher. In general, sellers were delayed in pushing prices down from their highest point, and the weak close created a long upper shadow. This model represents a pessimistic reversal of the trend, which indeed occurred as the price decreased by 4.72% by the end of October.

As observed from the graphical representation, a green candlestick formed in November, with a medium real body and a short lower shadow. This provides important insights into the market condition for that month. The green real body indicates an optimistic market condition (upward trend) dominated by a buying pressure or wave, leading to a price rise to 8,747.09 points. The prices then experienced a slight decline due to sellers dominating the trading, clearly shown in the Doji candlestick, confirming that trading volumes were low during December.

3.4 Technical Analysis of the Trading Prices of the Saudi General Index Using Japanese Candlesticks During 2021

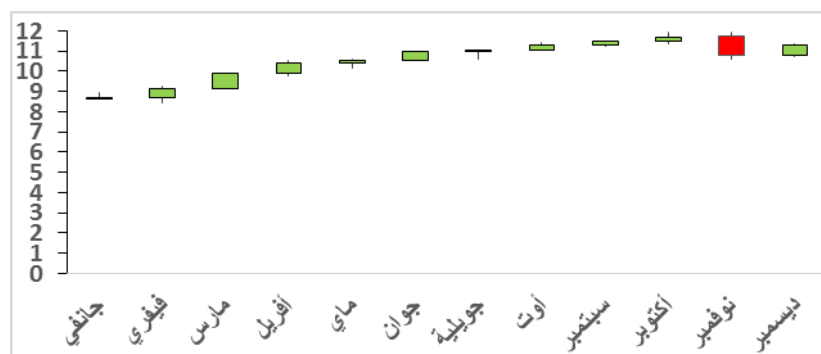
Table 04: Trading Prices of the Saudi General Index During 2021

Unit: Point

	Closing	Opening	Highest	Lowest	Change%
January	8,702.55	8,689.53	8,955.44	8,600.56	0.15%
February	9,144.99	8,702.55	9,263.16	8,464.47	5.08%
March	9,907.82	9,161.80	9,909.64	9,132.03	8.34%
April	10,418.98	9,908.07	10,540.17	9,767.01	5.16%
May	10,551.23	10,406.06	10,571.98	10,170.53	1.27%
June	10,984.15	10,560.85	11,009.70	10,552.67	4.10%
July	11,012.71	10,987.13	11,063.86	10,589.38	0.26%
August	11,319.24	11,041.85	11,402.65	11,032.67	2.78%
September	11,495.76	11,315.66	11,495.76	11,239.29	1.56%
October	11,704.14	11,494.11	11,954.88	11,330.63	1.81%
November	10,761.80	11,708.62	11,936.00	10,599.73	-8.05%
December	11,281.71	10,809.19	11,365.33	10,753.02	4.83%

Source: (Investing, 2022)

Figure 16: Graphical Representation of the Price Movement of the Saudi General Index Using Japanese Candlesticks in 2021



Source: Prepared by the researcher based on Excel.

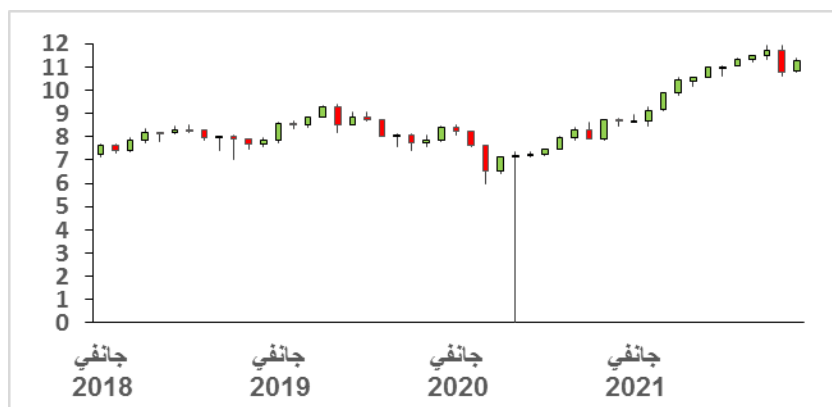
From the previous graph, it is observed that there was a continuous rise in the stock prices of the Saudi General Index from the beginning of 2021, leading to an upward trend until October. This is a natural result of the formation of a series of green candlesticks, especially the green Marubozu candlestick that formed in March, a high-confidence candle indicating a direct rise in prices and the continuation of the positive trend, with prices increasing by 8.34% that month. However, the appearance of the Dragonfly Doji candlestick in July, considered an ascending candlestick, can be relied upon during an upward trend when the price begins to fluctuate within a limited range. The appearance of this candlestick indicates that the forces of the upward trend are still present, but in the downward directions. Then, sessions continued to rise with close values in the following months of the year, reaching their highest levels at the end of October, estimated at 11,704.14 points, indicating that buyers were dominating the trading by leading the price higher during the trading session.

Also noticeable is the formation of two candlesticks, the first a long red (bearish) candlestick and the second a small white (bullish) candlestick. The small ascending candlestick is within the trading range of the bearish candlestick's body, meaning the highest and lowest prices of the small ascending candlestick are within the body of the long bearish candlestick. This resulted in the appearance of the Bullish Harami model in November and December through two consecutive candlesticks, the first of which saw a price decrease of 8.05% due to sellers' dominance and their insistence on reducing the price in November. However, with significant attempts and the continued pressure of buyers on the

market, the index began to record an increase, reaching 11,281.71 points, as shown through the green candlestick with a short wick representing December.

Based on the foregoing and relying on Japanese candlestick patterns, the price movement of the Saudi General Index for the period between 2018 and 2021 can be represented through the following figure:

Figure 17: Graphical Representation of the Price Movement of the Saudi General Index Using Japanese Candlesticks During the Period 2018-2021



Source: Prepared by the researcher based on Excel

CONCLUSION

Technical analysis is a methodical and scientific approach that relies on professional experience and is heavily based on available market data and information, from earnings and sales data to growth rates. Hence, the technical analyst focuses on studying available market information to construct charts that reveal specific patterns of price movement of financial market indices, to determine the right timing for investment decisions. Japanese candlesticks form part of this technical analysis, as they are effective tools in financial markets for monitoring price movements and predicting future trends to enhance the chances of profiting from the financial market.

Through our analysis of the Saudi General Index stocks under study, we found that technical analysis techniques, especially Japanese candlesticks, have a significant degree of credibility. They enabled us to know the appropriate timing and signals indicating selling or buying. These signals appear shortly before the event, allowing us to time operations accurately and remarkably. They are tools that enable us to predict the future state of price movement directions of financial market indices, maximizing potential profits. This proves the hypothesis to be true.

After the technical analysis of the Saudi General Index stocks during the period 2018-2021 using Japanese candlesticks, we reached several conclusions:

- Technical analysis of financial indices is one of the most important means by which investors are guided, acting as a mirror reflecting the performance of financial markets through price movement predictions;
- Japanese candlesticks are among the most accurate technical analysis tools compared to other analytical tools, distinguished by the additional information they provide to traders;
- If Japanese candlestick charts are read correctly, they can convey specific messages that can be relied upon to form a particular viewpoint regarding price movement;
- There are various Japanese candlestick models, whether they are pessimistic or optimistic reversal models, meaning if the stock price is heading upwards, it will reverse and head downwards and vice versa. This itself is a pattern that traders can use as guidance when analyzing the price movement of the Saudi General Index;
- Through the technical analysis of the trading prices of the Saudi General Index using Japanese candlestick charts, it was concluded that its trades are characterized by fluctuations between rises and falls, with close

values in highs and lows for the most part, making the Saudi financial market a highly opportunistic yet risky market.

Based on the results obtained, we present the following suggestions and recommendations:

- Investors in financial markets should pay attention to the solid foundations upon which investment decisions should be based;
- It is essential to know how to link Japanese candlesticks and their models with the fundamentals of technical analysis, its models, and indicators, to obtain the strongest technical signals;
- Japanese candlesticks should be used with other basic technical analysis tools to increase their effectiveness in analyzing the price movement of financial market indices;
- It is necessary to educate the investment community on scientific methods and principles, deepen awareness and knowledge on investment-related issues, and disseminate Japanese candlestick models through conferences, seminars, and scientific meetings, as this has a significant impact on raising the level of investment awareness.

Bibliography

1. Al Ittijah. (2017). *Explanation of the Main Japanese Candlesticks Influencing Price Movement of Stocks in Financial Markets*. Retrieved 04 09, 2024, from Global Trade Fundamentals: <https://www.ettijah.com/download/JapaneseCandlestickPatterns.pdf>
2. Al-Omari, M. F. (2018). *Japanese Candles - Basics, Models, and Advanced Applications*. Saudi Arabia: King Fahd Library.
3. Attiya, M. A. (2011). *Investing in the Stock Market*. Egypt: University Education Publishing House.
4. BARON. (2004). *Chandeliers japonais*. Paris: édition d'Organisation.
5. Dusoulter. (2009). *Investir et gagner sur le marché des devises*. Paris: Maxima.
6. Evening. (2016). *HTM Format*. Retrieved 04 09, 2024, from Evening Star: <http://www.investopedia.com>
7. Gann. (1976). *How to Make Profits in Commodities*. WA : Lambert Ann Publishing.
8. Investing. (2022). *Indices-Tasi*. Retrieved 04 09, 2024, from Investing: <https://sa.investing.com/indices/tasi-historical-data>
9. Kafi, M. Y. (2009). *Stock Exchange*. Syria: Raslan Institution.
10. Mark, D. (1994). *The New Science of Technical Analysis*. New York: John Wiley and Sons Inc.
11. Muhailmi, A. A. (2006). *Technical Analysis of Financial Markets*. Cairo: Dar Al-Balagh.
12. Nison. (1991). *Japanese Candlestick Charting Techniques*. New York: Mc Graw-Hill.
13. Patrick. (1997). *Analyse technique, approche pragmatique*. Paris: Economica.
14. Sharifi, I., & Bashawnda, R. (2018). The Impact of Using Japanese Candlesticks on the Speculative Behavior in the International Foreign Exchange Market: A Case Study of the British Pound/U.S. Dollar (GBP/USD) Pair. *Namaa Journal of Economics and Commerce*.
15. Sharp. (1989). *The Lore and Legends of Wall Street*. Dow Jones Irwin: Home Wood, Illinois.
16. Tasi-Index. (2022). *Indices-Tasi*. Retrieved 04 09, 2024, from Tasi-Index: <https://almrj3.com/what-is-the-tasi-index/>