MANAGING TRADING DECISIONS USING THE TRUE STRENGTH INDEX –AN APPLIED STUDY

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ABSTRACT

The purpose of this research is to test the ability of the true strength index To time and manage trading in the financial market to select the best stocks and achieve a higher return than the Simple buy and hold strategy. And To achieve the objectives of the research, it relied on the main hypothesis, which is By using the True Strength Index to manage trading decisions buying and selling, can be achieved higher returns than the buy and hold strategy . The research community has been identified with all stocks listed on the Iraq Stock Exchange. Implementing the financial research tests requires selecting a sample from the research community that fulfills the test requirements according to a number of conditions So (38) companies were nominated to be the research sample It was distributed by (17) companies in the banking sector. and (2) companies in the insurance sector, and (4) companies in the service sector, and (7) companies in the industrial sector, and (6) companies in the hotel and tourism sector, and one company in the telecommunications sector, And one company in the agricultural sector, This sample constituted approximately (30%) of the research community of (128) companies. The research period extended from (1/2/2016) to (31/12/2021), by Using financial and statistical methods, the research reached a number of conclusions, the most important of which are Trading can be timed and managed successfully using the True Strength Index and using it with General historical information can achieve returns that exceed the returns of buy and hold.

Keywords : *True Strength Index, momentum, buy and hold strategy, exceed returns*

INTRODUCTION

A significant percentage of investment performance is contributed by analyzing and forecasting trends in the financial market To make the right investment decision in the financial market The investor needs to understand the behavior of the market and the direction of its prices, and to search for the reason for the market's behavior in a certain direction, So this required investors to develop a bird's view of the market to analyze it using tools and techniques. The most important and most common tool that an investor can apply to analyze market behavior and price trend is technical analysis. Because technical analysis provides important information about price behavior and movement, it is useful for investing in securities, as it is rich in scientific concepts, and it is a basic and real pillar of the theory of financial investment. and it's An important part of financial practice for decades and technical theory focuses on the study and analysis of market action to predict future price movement, The term "market activity" includes price, trend, volume, And The focus of the theory on market activity data is not arbitrary or coincidental. The important issues in the financial markets are two, The main and most important issue is price because the price is what the market does and everything is reflected and settled in it, so it is expressed as price. Price is a reality, The other important issue in the markets is the trend, and the trend is all that matters in the price issue." While the important issue in price issue in the financial markets is The price is predictable. And the trend is a mainstay in the theory of technical analysis if it states that markets have predictable trends and that changes in prices and trends are not random, in addition, it is quite possible to predict the expected future duration of a trend based on the market based on price activity information. And "market movement discounts everything" and Technical analysis theory includes the school of modern technical analysis also called the school of objective mathematical technical analysis and the computational component in the classification of technical analysis of a quantitative nature that depends on the analysis On the use of technical indicators and these technical indicators combined together constitute the school of modern technical analysis, and its technical indicators depend mainly on mathematical models and statistical methods and include many simple and complex criteria And its method of work is based on using the changing dynamics of price movement to analyze the underlying psychology of the market as a whole to know where and how the price changes and its direction to generate buy or sell signals of technical
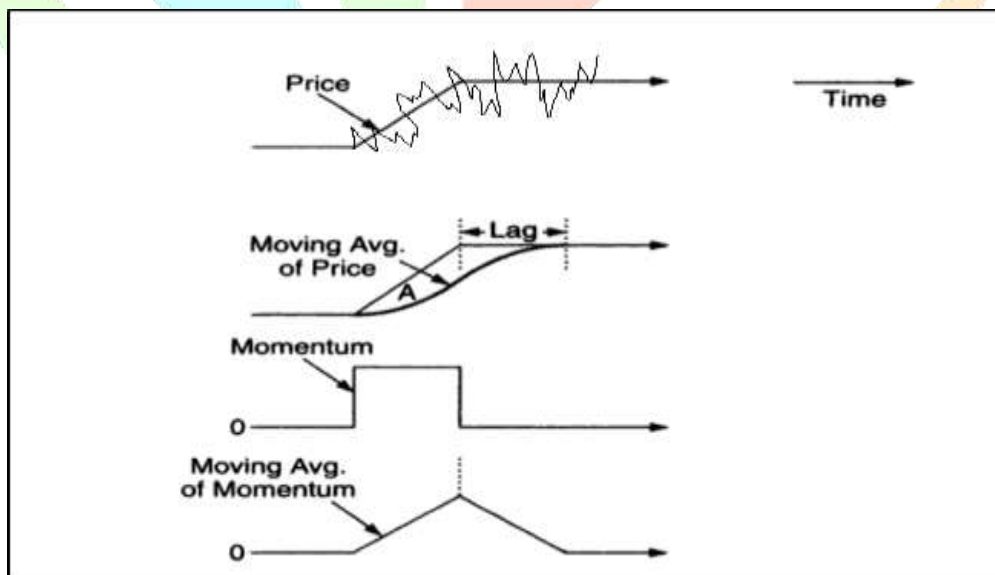
indicators, It is seen as the basis for high-frequency trading Preferably Use them as investment guides to determine the best stocks.

THEORETICAL FRAMEWORK

The Definition of The True Strength Index

It is an indicator used to determine trend strength levels (Thomsett, 2009: 268). This indicator is also called the "true momentum indicator" (Blau, 1995:5) and it is also called the "Double-Smoothed Momentum" It is based on the values of the momentum derivative rather than the values of the price because the momentum values are more sensitive than the price and the fast-moving momentum precedes the price and does not lag behind it. To avoid fast movement Far from the real price movement The derivative of the momentum values is slowed down by double smoothing for the momentum values (Kaufman, 2013:404), Smoothing is done by adjusting the momentum values using an exponential moving average smoothing technique to produce a derivative that explains the strength and direction of the current price trend and the next expected movement more easily compared to a pure price series (Thomsett, 2018:149). Figure (1) illustrates the differences between the noisy price movement and the smoothed moving average movement, but with a delay problem and the momentum movement very fast, and the momentum movement with double smoothed that combines the characteristics of cancelling the noise and reducing the high speed of the momentum.

Figure(1)

The essential differences between price movement, the movement of the moving average, the movement of momentum, and slowing the movement of the momentum with the moving average

Source : Blau, William. *Momentum, direction, and divergence*. Vol. 5. John Wiley & Sons, 1995.PP:27.

The General Concept of Momentum

in its general framework Momentum expresses the strength of prices rushing in a certain direction (Wilder,1978:53), and precisely it is an expression of the speed with which prices change and move (Kaufman, 2013:370), (Spyder, 2012:8). Momentum is defined as the ratio or difference between two prices during a fixed period of time (Chan, 2019:33) as shown by the following equations (Masonson, 2003: 400).

$$\text{Momentum} = \left(\frac{C}{Cn}\right) 100$$

Were, C is closing price , Cn is The closing price for a particular previous day. And Usually the least preferred period is n=5 .
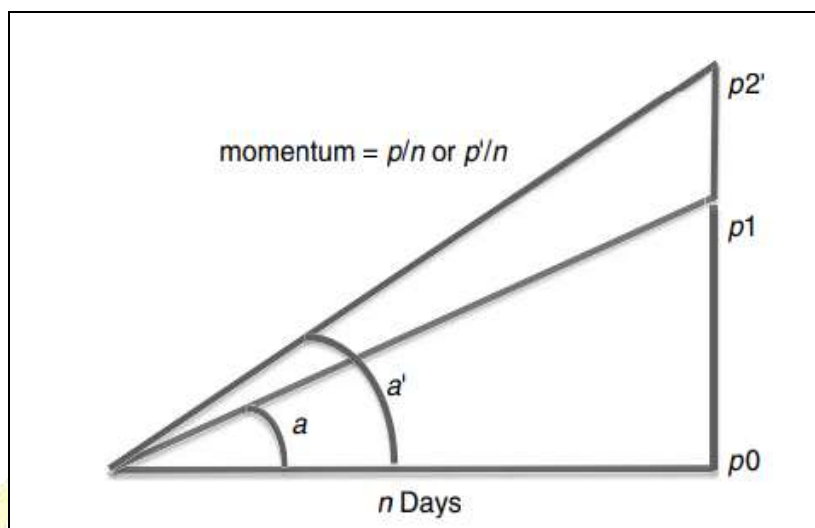
) Kaufman,2013:370) ,(Zakamulin,2017:56(

$$\text{Momentum}, M = p_t - p_{t-5}$$

Were,closing price five days is p_{t-5} , and closing price on a particular dayis p_t : ago.

$$\text{one day momentum in percent} = \frac{(p_t - p_{t-1})}{p_{t-1}} = \frac{p_t}{p_{t-1}} - 1$$

Using any mathematical formulas momentum measures the speed of progress and deceleration of prices and the acceleration of their rate of change, which indicates whether prices are increasing at a fast increasing rate or decreasing at a fast decreasing rate (Spyder,2012:8), (Khand, et.al, 2012:8),(Hassana,2009:567) Figure (2) shows how the momentum changes with an increase in price over the same time period. During n days the price moves from (p0 to p1) to form angle a and has momentum (p1 - p0), and if prices rise to point p2, the momentum will be greater and angle ′a will be greater, so if the change in price for 5 days is an increase If the price increases by 100 pips over a period of 10 days, the momentum will remain at 100 but the velocity or slope will be 10/100 = 10.

Figure(2)

Geometric representation of momentum

Source :Kaufman, Perry J. *Trading Systems and Methods,+ Website*. Vol. 591. John Wiley & Sons, 2013, p370 .

Theory of True Strength Index

Momentum theory is based on the basic idea that prices have a tendency to overreact positively or negatively to information and this creates rapid arbitrage opportunities (Mygind, 2017:14) Momentum theory states that changes in momentum presuppose changes in prices will occur (Spyder, 2012:8) because one of the main advantages of momentum is that it is fast-moving compared to price (Kaufman, 2013:370) The momentum theory also states that velocity is a measure of trend strength and means the speed of price movement in a particular direction, and Acceleration is the stability of the direction of the trend, which means the ability of the new direction of price movement to gain or not gain speed in change within a short period (Andersen, et.al, 2000: 580),which refers to the strength or weakness of the trend in the direction of its progress and determine the time in which it gains Strength or exhaustion and a reversal is likely because the movement will inevitably do because no market goes up or down forever (Mendelsohn, 2013:59) The theory states that the specific idea of momentum is to not pay atten disinterest to price noise and focus on price and how quickly it changes from day to day that arises due to transformation The basic patterns of supply and demand are driven by feelings of fear and greed behaviors, and these price changes are embodied by momentum according to the optimism or pessimism of

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market participants in order to know the probability that the price movement will continue to go the way it was going (Romeu and Umar, 2001:137). With Knowing whether the market has reached the point of overbought or oversold (Drakoln, 2008: 164) but this is most difficult things (Wilder, 1978:53) because when trying to measure price momentum means measuring a completely and imperceptible element, which is market sentiment regarding the price of security Specific or the market as a whole, in the sense of what the market thinks of pessimism or optimism regarding the future of its tools for all its participants. These measures must also include potential market participants who do not currently own securities but can enter the market at any moment and this is very difficult (Romeu and Umar, 2001:138), therefore, technicians have developed several indicators to measure momentum according to what is stated in the momentum theory (Kirkpatrick & Dahlquist, 2007: 433), (Hassana, et.al, 2009: 567) Moreover, the technicians determined the way and how the momentum changes in the price cycle, that the idea of changing the momentum is similar to the idea of the "roller coaster" as the price moves up and down just like a roller coaster and its speed is the momentum, and also is the momentum of the stock price when the price starts to rise It rises with a lot of momentum and as it reaches the top of the bull market which represents the maximum buying peak it gradually loses its momentum and then loses all its momentum when it reaches its maximum peak This positive speed gradually diminishes as prices become full value as buyers retreat somewhat and sellers increase the supply of In the securities, the momentum stops and starts to go down, as well as prices. As for the downward movement, the momentum is small at the beginning of the downward regression from the top, then the pace of its strength increases and becomes very large when it approaches the bottom of the prices, which represents the maximum selling peak, and then the momentum and direction of a new price cycle begins (Romeu and Umar, 2001:138) When long positions are liquidated and prices become cheap or excessively undervalued, new buyers are attracted to the initial trading of securities at situation The sellers are already exhausted and the bearish momentum becomes less negative, to prepare stages for a new bullish price cycle (Masonson, 2003: 401-402). Figure(3) shows how the momentum movement precedes the price movement in the right direction.
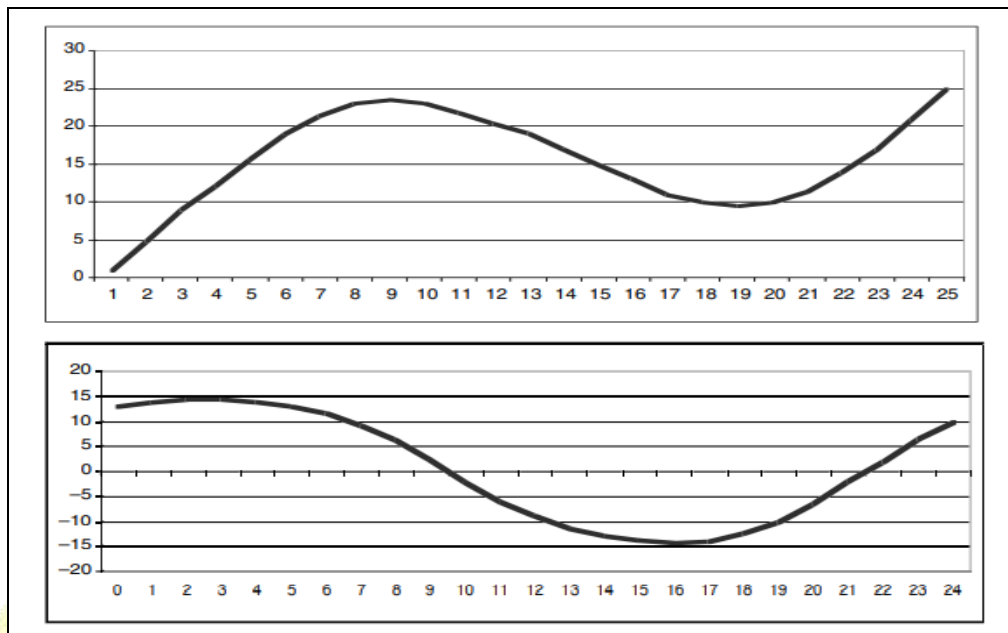
Figure (3)

Typical Momentum Indicator Movement Pattern

Source :Kaufman, Perry J. *Trading Systems and Methods,+ Website*. Vol. 591. John Wiley & Sons, 2013. P:372.

True Strength Index Equation

The True Strength Index is calculated according to the following equation: - (Blau, 1995:5)

$$TSI\,(\,close\,,r,s) = \frac{100 \times EMA(EMA(\,mtm,r)s)}{EMA(EMA(|mtm|,r)s)}$$

Were, r is Calculation period of the first momentum smoothing ≡ the period of review of the building-up of the Exponential Moving Average (EMA) , s is Second Momentum Smoothing Calculation Period ≡ Exponential Moving Average (EMA) build review period According to (Thomsett, 2009:268) r equals 13 days, and S equals 25 days , mtm: Momentum value for one day , EMA (mtm,r) ≡ (r-day EMA of mtm) exponential moving average Calculated according to the results of (mtm) for period r, EMA(EMA(mtm,r),s) ≡ s-day EMA of EMA(mtm,r) exponential moving average Calculated according to the results of EMA(mtm,r) It's a double smoothing of the momentum (mtm) values ,It is a smoothing of the momentum values. |mtm|: the absolute value of the momentum values. EMA(|mtm|,r) : (r-day EMA of |mtm|)

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exponential moving average It is calculated according to the absolute values (mtm) of the period r, It is a precursor to the absolute values of momentum. EMA(EMA(|mtm|,r),s) : s-day EMA of EMA(|mtm|,r) exponential moving average Calculated according to the results of EMA(|mtm|,r) , It's a double smoothing of the absolute momentum (mtm) values. and EMA: an Exponential moving average, calculated according to the following equation:

) Colby,2003:269.(

$$EMA = (Cp - Ep)K + Ep \dots\dots\dots\dots\dots. (68)$$

Were Cp: the closing price is replaced by the value of the momentum m ,Ep is the exponential moving average of the previous period ,and K is smoothing constant = 2/(n+1).

So the Equation of EMA can be rewritten to fit the calculation of the true strength index as follows-:

$$EMA(m_0, n) = [m_0 - EMA(m_1, n)] \frac{2}{n+1} + EMA(m_1, n)$$

Graphical Representation And Buy-Sell Signals According to The True Strength Indicator

The True Strength Indicator is displayed and represented at the bottom of the price movement chart with a separate graph and a curve that moves on a scale from (100 – to +100) (Blau, 1995:5), and the two values (25 – and +25) determine the oversold and overbought levels at these two points are expected to shift in the market. If its value is greater than or equal to +25, then it is a sell signal that indicates a downward trend in the price movement, If its value exceeds -25), this indicates the strength of the signal (Mendelsohn, 2013: 128). Figure (4) shows the realization of the buy and sell signals of the TSI on the movement of the share price of Palantir Technologies Inc.
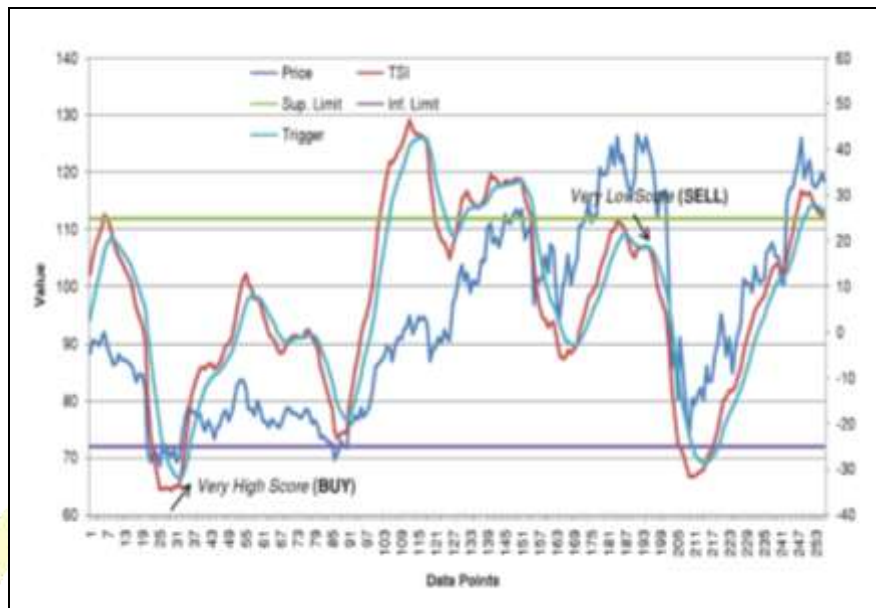
Figure (4)

Palantir Technologies Stock Analysis Using True Strength Index

Source : Gorgulho, Antonio, Rui F. M.F Neves, and Nuno C.G Horta. 2013. *Intelligent Financial Portfolio Composition based on Evolutionary Computation Strategies* .p:48.

METHODOLOGY

The Research Problem

The investment decision is an important issue in financial management, especially in the stock markets, because of the uncertainty about the future direction of the return and risk of stocks, as well as the direction of the market. When starting to invest, the problem arises which securities are the best to invest in due to the desire of investors to maximize their returns as much as possible in relation to the risk. The need arose for an effective means of evaluating securities, selecting the best of them, and addressing the problem of the huge volume of inputs, as well as the problem of the best timing for trading. According to the analysis of stock price movement information, which is widely relied upon to make investment decisions and the timing of buying and selling, according to the principle that all information is reflected in stock prices. Therefore, one of the main dimensions of the problem of this study is to test the efficacy of this solution in addressing the problem of choosing the best stocks and timing for investment. The applied problem of the research is embodied in the

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following question ,Does using the True strength index to pick the best stocks achieve a higher return than the simple buy and hold strategy?

The Research Hypothesis

The research hypotheses determined as follows .

"By using the True Strength Index to manage trading decisions buying and selling, can be achieved higher returns than the buy and hold strategy".

The Importance of Research

The importance of research focuses on the following points:-

1. The research gains its importance from the importance of testing the ability of the True Strength Index to select the best stocks and the timing of trading .
2. The research contributes to the theoretical and practical preparation of an important trading method.
3. The research gains importance by employing general historical data available to everyone in order to achieve a higher return

Research Objectives

The research aspires to achieve the following objectives:-

1. Careful study for True Strength Index .
2. -test the possibility of the True Strength Index outperforming the buy and hold strategy.
3. Testing the efficiency of the Iraqi Stock Exchange.

Society And Sample of Research

1. The research community is represented by all the stocks listed on the Iraq Stock Exchange.
2. The research sample, the implementation of the financial research tests requires the selection of a deliberate sample from the research community that fulfills the requirements of the technical analysis test and the simple hold according to the following conditions:-
3. The company should not be delisted at any time during the search period.
4. That the company is not suspended from trading, because the values of these companies were negatively affected after the launch of trading on them, and this affected the signals of the tested index.

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By applying the conditions of choosing the intentional sample to the research community, (38) companies were nominated to be the research sample, constituted approximately (30%) of the research community which (128) companies. Table (1) shows the companies of the research sample by market sectors.

Table (1)

Research sample by market segments

stock		stock	
Iraqi Land Transport	-21	banking sector	
Karkh Tourist Games City	-22	Ashur International Bank	-1
Al Maamoura Real Estate Investments	-23	Babel Bank	-2
industry sector		Baghdad Bank	-3
Baghdad for soft drinks	-24	Commercial Bank of Iraq	-4
Al Hilal Industrial	-25	Elaf bank	-5
Iraqi Dates Manufacturing and Marketing	-26	Gulf Bank	-6
Iraqi carpets and furnishings	-27	Iraqi Investment Bank	-7
Canadian for the production of veterinary vaccines	-28	Iraqi Islamic Bank	-8
Al-Mansour Pharmaceutical Industries	-29	Middle East Investment Bank	-9
National Chemical and Plastic Industries	-30	Kurdistan International Islamic Bank	-10
The hotel and tourism sector		Mosul Bank	-11
Baghdad Hotel	-31	Al-Mansour Bank	-12
Babylon Hotel	-32	The National Bank of Iraq	-13

Ishtar hotels	-33	credit bank	-14
Mansour hotels	-34	Sumer Commercial Bank	-15
National Investments	-35	United Investment Bank	-16
Palestine Hotel	-36	Tigris and Euphrates Bank	-17
telecom sector		insurance sector	
Asiacell	-37	Al Amin Insurance	-18
agriculture sector		Gulf Insurance	-19
Al-Iraqiya for the production and marketing of meat	-38	Services sector	
		Baghdad, Iraq for public transport	-20

Search Period

The time period from (1/2/2016) to (12/31/2021) was determined as time limits for the analytical research, as this period was chosen as it is the latest and according to preferred requirements for testing advanced technical analysis indicators. This requirement distances the search from bias by choosing an upward trend period in which the results of the tests may be better in favor of its hypotheses.

The Financial Equations Used In The Analytical Test.

1. Earnings per share

$$r_{it} = \frac{(p_{it}) - (p_{it-1}) + (d_{it})}{(p_{it-1})}$$

Were , (p_{it}) id closing price for the current period , (p_{it-1}) is closing price for the previous period,and $(d_{it})$is The value of dividends during the period.

2. True Strength Index

detailed explanation In the theoretical part of the research.

Statistical Equations

1. Chi-Square Yates correction

$$\chi^2_{\text{Yates}} = \sum_{i=1}^{N} \frac{(|O_i - E_i| - 0.5)^2}{E_i}$$

The chi-squared Yates correction scale will be used in order to prove the significance and validity of the results of the returns achieved using the True Strength Index indicator in order to determine whether the returns achieved by trading according to its signals are not by chance and that they are real and actually resulting from the use of the treatment and the test will be done According to the null hypothesis (H0:O=E), which states that the observed frequency is independent of the expected frequency, that is, there are no significant differences between the returns achieved by using the index ,compared to the alternative hypothesis (H1:O≠E) which It states that there are significant differences.

The Sources Writing Method

APA style 6th edition has been relied upon.

PRACTICAL TEST

This topic is devoted to presenting and discussing the results of the market timing test using the True Strength Index indicator versus the buy –hold strategy by conducting a financial analysis according to equation of r_{it} and equation of (TSI) In addition to a statistical analysis according to the chi-square Yates correction according to equation χ^2_{Yates} .

Test the market timing by using the signal of True Strength Index indicator

Table (2) shows the large discrepancy Between the cumulative returns achieved during the research period using the signals of the real strength index, and the returns achieved according to the application of the Simple buy and hold strategy ,As the average returns achieved at market time according to signals true Strength Index (3.31%) While the average return achieved according to buy and hold was negative by (-3.60%) The average excess or additional return amounted to (6.91%) ,The table also shows that the positive returns according to the Indicator signals were for (28) of the shares of the respondents, While their number was only (15), according to the

comparison strategy ,And the highest cumulative return achieved according to market timing with true strength index signals was (49.2%) And below it reached (34.4%), which is higher compared to the results of buying and holding, as it reached the highest return (19.9%) And its lowest value was (-34.9%) .

In addition to the above, the results of the Chi-square Yates correction test show a result of (6.11) when the alpha value is (0.05), And The degree of freedom is equal to (1) which is greater than the tabular value, which indicates that the returns that have been achieved by trading according to the indicators' signals are not caused by chance. And it is real and actually caused by the use of treatment In other words, because of the use of indicator signals in trading Therefore, the null hypothesis is rejected(H_0:O=E) which states that the observed frequency is independent of the expected frequency And The alternative hypothesis (H1:O≠E) is accepted.

Table (2)

Returns arising from market timing Using the True Strength Index indicator vs. a simple buy and hold strategy.

#	stock	Cumulative returns achieved according to the True Strength Index signals%	cumulative returns of the buy and hold strategy %	excess return %
.1	Ashur	1.5	-4.4	5.9
.2	Babylon	-11.0	-23.3	12.3
.3	Baghdad	21.5	-0.3	21.8
.4	Iraqi commercial	45.0	-6.8	51.8
.5	Elaf	15.5	0.6	14.9
.6	Gulf	17.0	1.2	15.8
.7	Iraqi investment	-2.0	-14.1	12.1
.8	Iraqi Islamic	52.3	-8.0	44.3
.9	Middle East Investment	6.5	-2.2	8.7
.10	Islamic Kurdistan	-3.5	-11.0	7.5

.11	Mosul	32.0	7.4	24.6
.12	Mansour	58.0	10.4	47.6
.13	Al-Ahly of Iraq	9.1	12.0	-2.9
.14	credit	26.5	5.0	21.5
.15	Sumer Commercial	36.0	13.8	22.2
.16	United Investment	12.5	-27.4	39.9
.17	Tigris and Euphrates	-8.0	-3.6	-4.4
.18	Amen	52.5	15.6	36.9
.19	Gulf	7.0	-16.3	23.3
.20	Baghdad for public transportation	20.5	-0.4	20.9
.21	Iraqi land transport	-1.0	-1.2	0.2
.22	Karkh Tourist Games	45.0	0.7	44.3
.23	Al Maamoura Real Estate Investments	20.2	-3.0	23.2
.24	Baghdad for soft drinks	-17.5	-20.0	2.5
.25	Crescent moon	5.5	20.6	-15.1
.26	Iraqi Dates Manufacturing	-17.5	17.8	-35.3
.27	Iraqi carpets	17.0	-40.0	57.0
.28	Canadian veterinary vaccines	18.2	-21.0	39.2
.29	Al-Mansour Pharmaceutical	31.0	-36.2	67.2
.30	National Chemical Industries	5.5	9.8	-4.3
.31	Baghdad	41.1	-12.0	53.1
.32	Babylon	-10.0	-26.0	16.0
.33	Istar	19.1	4.0	15.1
.34	Mansour	33.0	1.4	31.6
.35	National Investments	5.5	8.9	-3.4
.36	Palestine Hotel	32.1	-26.0	58.1

.37	Asia Cel	16.5	-23.9	40.4
.38	Iraqi Meat Production	42.0	-9.2	51.2
average		17.8	-5.5	22.8

So Based on the test results in Table (2), which proved that the timing of the market using the signals of the real strength index achieves higher returns than the simple buy and hold strategy. Therefore, the research hypothesis is accepted, which states that "By using the True Strength Index to manage trading decisions buying and selling can be achieved higher returns than the buy and hold strategy".

CONCLUSION

Trading can be timed and managed successfully using the True Strength Index and using it with General historical information can achieve returns that exceed the returns of buy and hold, and the buy and hold strategy is not the best for trading in Iraq Stock Exchange. the Iraqi market is not weakly efficient.

REFERENCES

1. Andersen, J. V., Gluzman, S., & Sornette, D. (2000). Fundamental framework for "technical analysis" of market prices. *The European Physical Journal B-Condensed Matter and Complex Systems*, *14*(3), 579-601.

2. Blau, W. (1995). *Momentum, direction, and divergence*. John Wiley & Sons.

3. Chan, J. (2019). *Automation of Trading Machine for Traders: How to Develop Trading Models*. Springer Nature.

4. Colby, R. W. (2003). *The encyclopedia of technical market indicators*. McGraw-Hill.

5. DraKoln, N.(2008). *Winning the trading game: why 95% of traders lose and what you must do to win* . John Wiley & Sons.

6. Hassana, S. A., & Mahdib, S. R. (2009).The Reality of Technical Analysis Tools of DFM for the Period.received from, https://www.ijicc.net/images/vol10iss10/101050_Hassan_2020_E_R.pdf.

7. Kaufman, P. J. (2013). *Trading Systems and Methods,+ Website* . John Wiley & Sons.

8. Khand, S., Anand, V., Qureshi, M. N., & Katper, N. K. (2019). The Performance of Exponential Moving Average, Moving Average Convergence-Divergence, Relative Strength Index and Momentum Trading Rules in the Pakistan Stock Market. *Indian Journal of Science and Technology*, *12*, 26.

9. Kirkpatrick II, C. D., & Dahlquist, J. A. (2010). *Technical analysis: the complete resource for financial market technicians*. FT press.

10. Masonson, L. N. (2003). Building Winning Trading Strategies with TradeStation. *Futures*, *32*(14).

11. Mendelsohn, L. B. (2012). *Trend Forecasting with Intermarket Analysis: Predicting Global Markets with Technical Analysis* . John Wiley & Sons.

12. Mygind, D.(2017). The value of technical analysis investigated through the perspective of momentum theory.(Master Thesis, Business School Johann Wolfgang Goe the Universität Frankfurt)

13. Romeu, R., & Serajuddin, U. (2001). *Technical analysis for direct access trading: A guide to charts, indicators, and other indispensable market analysis tools*. McGraw Hill Professional.

14.   Spyder, Zex.(2016).Technical Indicators With Formula: Stock Market Technical Analysis.

15.   Thomsett, M. C. (2009). *The Options Trading Body of Knowledge: The Definitive Source for Information about the Options Industry*. FT Press.

16.   Thomsett, M. C. (2018). *The Complete Options Trader: A Strategic Reference for Derivatives Profits*. Springer.

17.   Wilder, J. W. (1978). *The Adam Theory of Markets Or what Matters is Profit*. Trend Research.

18.   Zakamulin, V. (2017). *Market timing with moving averages: The anatomy and performance of trading rules*. Springer.

19.   http://www.isx-iq.net/