

## The Accuracy of Relative Strength Index (RSI) Indicator in Forecasting Foreign Exchange Price Movement

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### ABSTRACT

This study aims to measure the accuracy of the Relative Strength Index (RSI) Indicator in predicting the direction of foreign exchange (forex) price movements. To achieve the research objectives, six foreign exchange currencies that fall into the major pair category were determined as samples. RSI data is collected from the Foreign Exchange Market which can be accessed via tradingview.com during the research period, January – September 2021. The data is analyzed using SPSS software with the Mann Whitney U Test which can prove statistically whether there is a significant difference between the predictions of forex price movements with the reality price movement. Thus, this study provides evidence of the accuracy of the Relative Strength Index (RSI) Indicator in predicting the direction of forex price movements. The findings of this study can be a reference for practitioners such as forex traders or business people who deal with foreign currencies in choosing technical analysis methods that can help make the right decisions.

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### 1. Introduction

Along with the development of the global economy, the investment awareness of the Indonesian people is also increasing. Indonesian people are proven to have a high interest in investment to improve the country's economy Pramudya (2020) Conceptually, investment is the activity of allocating resources at this time, with the hope of getting benefits in the future. The large number of available investment instruments gives investors more choices. However, it should be understood that not all investment instruments are suitable for all investors. There are many kinds of investment, that are: obligation, deposit, gold, furniture, mutual funds, peer to peer landing, stock, foreign exchange, etc.

Nowadays foreign exchange (Forex) investment is becoming a trend because it is considered to have a fairly high return on profits. Foreign Exchange means the exchange rate between one currency and another. While trading means the activity of buying and selling financial products in the form of currency according to the prices and exchange rates prevailing in the global market at that time. Investment in the form of forex trading is considered more profitable in terms of business for some people, so it is in great demand Dichiara (2012). Forex consider as the largest financial market in the world, it is

estimated \$4 trillion in currency transacted daily. Unlike other financial markets, FOREX is not linked to a stock exchange rather, it is an over-the-counter (OTC) market. Foreign exchange currencies are traded in pairs, with the most common traded pair are the EURUSD, USDJPY, USDCAD, GBPUSD, USDCHF, USDJPY, XAU-USD, etc.

Forex trading considered has a complicated forecasting analysis.

1. Forex has a more complicated price analysis than other types of investments. It requires a high understanding of fundamental analysis and the price analysis process. That way, forex traders are required to have an understanding of the global market calendar, political and economic events, and world trends that can greatly affect forex prices.

2. High Volatility. Volatility is the level of fluctuation that can occur in forex. Forex can spike very sharply in price, but it can also be in free fall and be very weak. This volatility is very risky in forex. Forex investors can indeed earn big profits, but they can also lead to big losses and even bankruptcy if they can't forecast this investment properly.

To avoid losses caused by forex, traders also need mastery of money management, the ability

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to analyze potential forex price movements appropriately and also need to understand the theory of behavioral finance and financial literacy. These two theories are related and can affect the outcome of an investment. According to Sattar (2020), every individual has a psychological behavior that will cause them to take certain actions against an event. This behavior also influences the way a person uses and interprets this information in making decisions. If the wrong emotional behavior is carried over in investment decisions, the impact will be very negative on their wealth. This is a form of one of the biases in behavioral finance. To overcome these biases, there are two things investor must do to. First, in terms of investment, investor must take a measurement by learning to analyze before making investment decisions. This includes the selection of appropriate indicators to support the analysis results. Second, make an investment plan. Making an investment plan includes: choosing what investment instrument to invest in, determining the conditions at any time that determine whether to buy or sell the investment product that has been selected and determine how to analyze the investment and how the strategy should be done to build a good portfolio.

Financial literacy refers to a person's ability to comprehend financial concepts and have money management abilities that enable a person to make good financial decisions. Financial literacy is understanding of personal finance concepts that results in the ability to make effective decisions about money. Understanding financial literacy is a process that regulates how well an individual's ability to understand financial concepts, apply and manage finances, Lusardi (2009). The principle of financial literacy include: financial planning, budgeting, saving, managing debt, paying bills and investing. In this research, the researcher will focus on investing principle. Before making an investment, a right decision is needed where every decision can affect the investment results, so it requires financial management skill by learning financial literacy. One of the importance of having financial literacy is to make good investments. An individual must learn about key components in regards to invest. Some of the components that should be learned are to ensure kinds of investment to invest in, price levels, risk management and investment analysis.

In forex trading, there are two types of analysis, that are: fundamental analysis and technical analysis. According to Rousis & Papathanasiou (2018) technical analysis is a tool to support analysts by giving indications with high potential returns at the beginning of a trend. The technical analysis focuses on price movements since prices are a reflection of transactions between supply and demand, if the market show a high demand, prices will tend to rise, if it shows high supply, prices will tend to fall, hence, technical analysis is important in guiding transaction decision Behshad Yassini (2019). Technical analysis is supported with trendline, support & resistance, Fibonacci and RSI indicator.

There are four technical indicators that are most often used, namely the Moving Average Convergence Divergence (MACD), Moving Average (MA) Indicator, Stochastic Indicator and the Relative Strength Index (RSI) Indicator. Out of those indicators, it is not mandatory to use all indicator at one time. Also, it is not really efficient to use all indicator at once because each indicator might show a different signal, which will make the trader confuse.

Bollinger (1992) stated in his research that avoiding using multi-indicators increasing a successful trading. Bollinger Bands are a good indicator, this indicator gives an absolute buy and sell signal so the forecast will become powerful. Another research that written by Hari & Dewi (2018) stated that a successful rate of return is when traders use both combination of Moving Average Indicator and RSI Indicator. Both indicators can predict better result rather than using another single indicator.

In this research, the researcher will focus on RSI indicator. RSI is an indicator that developed by Welles Wilder. This indicator shows the direction of the trend or a reversal Pramudya (2020). The author will research about the accuracy of RSI indicator in forecasting forex price movement to help trader making a trading plan before make a trading decision. Therefore, with this research, it is hoped that traders can make an accurate analysis using RSI indicator so traders will make a good amount of profit.

Relative strength index (RSI) is most typically utilized to detect when a currency price is either overbought or oversold. The RSI is a most frequently used technical indicator that indicates overbought conditions when the RSI value over 70 which indicates sell signal and oversold conditions indicates buy signal when the RSI value is below 30 Sahin & Ozbayoglu (2014). According to Roudgar (2012) the "sell" rules is traders have to wait until the RSI value touch above 70. To make another confirmation, wait until the RSI reverse itself downwards, after bearish candlestick appear in the chart, traders can order sell immediately and vice versa. The "buy" rules is traders have to wait until the RSI value touch below 30. To make another confirmation, wait until the RSI reverse upwards, after bullish candlestick appear in the chart, traders can order buy immediately.

According to Sahin (2014) The RSI indicator is one of a popular indicator because this indicator shows the saturation point of a price so this indicator can help traders to determine the best time to open a position. However, research that discusses and tests the accuracy of the Relative Strength Index Indicator (RSI) if this indicator is used without a combination of other indicators in detail is still very rare. Therefore, this study aims to fill the gap in the literature by measuring the accuracy level of RSI Indicator so it can help traders to choose the accurate indicator to make a profitable trading decision. Furthermore, this research is expected to be useful for traders as input and evaluation of forex trading. Hopefully this research could provide study material for future researchers who intend to research the same objects.

### Relative Strength Index (RSI) Indicator in Forecasting Foreign Exchange Price Movement

The RSI indicator is one of the famous technical analysis indicator that traders usually use to measure the volatility of an asset's price. According to Pramudya (2020), this indicator is displayed as an oscillator with values range from 0 to 100 which is used to evaluate whether the asset is in an oversold or overbought position. When the value of the RSI indicator shows more than 70, it means the market is in overbought condition, the price is predicted to move downwards (set up sell) and when it is below 30 which means the market is in oversold condition, the price is predicted to move upwards (set up buy).

This study will prove whether the RSI indicator is accurate or inaccurate if it is used alone without other price indicators in forecasting foreign exchange price movements. Therefore the hypothesis is:

Ho: There is no significant difference between the forecasted price movement and reality price movement by using the Relative Strength Index (RSI) Indicator (Accurate)

## 2. Research Methods

This research is a quantitative research. According to Nassaji (2015) quantitative data is a type of data that can be measured, counted or calculated as a number. The data collection technique used in this study is documentation techniques in the form of charts of several forex currency pairs on the Foreign Exchange Market with a research period of January - September 2021. The object that will be used for data analysis in this study is the Relative Strength Index (RSI) which is one of the most popular technical analysis indicators used to predict future forex prices.

To answer this research hypothesis, a nonparametric test was carried out with the Mann Whitney U Test which can prove whether there is a difference between predictions and the reality of forex price movements or not. The data is obtained through forex charts on the tradingview.com website. The currency analyzed in this study is a currency that is included in the Major Pair category which consists of: EUR/USD, USD/JPY, GBP/USD, AUD/USD, USD/CHF, USD/CAD.

The data analysis technique procedure are:

- This study will use the RSI Indicator. If there is an overbought where the graph shows a value above 70, it is predicted that the price of a currency will rise. If there is an oversold graph showing a value below 30, it is predicted that the price will fall.
- The next step is to make observations with the tradingview website and take notes all currencies categorized as major pairs showing overbought and oversold.
- After overbought and oversold occur, a comparison will be made on the forecast of

currency price movement and the reality price movement.

d. Perform a non-parametric test with the Mann Whitney U Test with the help of SPSS 26 for windows to find out whether there is a significant difference between the forecasted price and the reality price.

e. The test criteria is if the value of Asymp.Sig. (2-tailed) < 0.05 then there is a significant difference between the forecasted forex price and the reality price. If the value of Asymp.Sig. (2-tailed) > 0.05 then there is no significant difference between the forecasted forex price and the reality price.

## 3. Results and Discussion

This data is collected from the Foreign Exchange market which can be accessed through tradingview.com. On the website, the author collects data from the six predetermined samples, that are EUR/USD, USD/JPY, GBP/USD, AUD/USD, USD/CHF, USD/CAD. In a predetermined period the author collects RSI data that shows overbought (more than 70) and oversold (less than 30) values, but if within a certain time the RSI does not show overbought and oversold values, then the author will use the existing RSI values only (40-60), it means the price is expected to remain in the same range which can be called sideways.

After observing and taking notes the RSI value, the results of the comparison between the forecasted price movement and the actual price movement are recorded which are shown in the following table:

Table 1. EUR/USD RSI Data

Pair	Month	RSI Value	Forecasted Price Movement	Actual Price Movement
EUR/USD	January	75.35	Downtrend	Downtrend
	February	29.41	Uptrend	Uptrend
	March	51.67	Sideways	Sideways
	April	36.37	Sideways	Uptrend
	May	29.48	Uptrend	Uptrend
	June	27.08	Uptrend	Downtrend
	July	27.74	Uptrend	Uptrend
	August	50.56	Sideways	Sideways
	September	62.84	Sideways	Downtrend

Source: Tradingview.com

Table 2. GBP/USD RSI Data

Pair	Month	RSI Value	Forecasted Price Movement	Actual Price Movement
GBP/USD	January	58.53	Sideways	Sideways
	February	77.66	Downtrend	Downtrend
	March	62.37	Sideways	Sideways
	April	54.70	Sideways	Uptrend
	May	62.02	Sideways	Uptrend
	June	72.01	Downtrend	Downtrend
	July	29.87	Uptrend	Uptrend
	August	54.23	Sideways	Sideways
	September	29.24	Uptrend	Uptrend

Source: Tradingview.com

Pair	Month	RSI Value	Forecasted Price Movement	Actual Price Movement
USD/CAD	January	41.25	Sideways	Sideways
	February	51.86	Sideways	Sideways
	March	46.93	Sideways	Sideways
	April	51.48	Sideways	Downtrend
	May	23.82	Uptrend	Sideways
	June	29.58	Uptrend	Uptrend
	July	65.44	Sideways	Sideways
	August	50.75	Sideways	Sideways
	September	50.36	Sideways	Sideways

Source: Tradingview.com

Table 3. AUD/USD RSI Data

Pair	Month	RSI Value	Forecasted Price Movement	Actual Price Movement
AUD/USD	January	72.61	Downtrend	Downtrend
	February	73.54	Downtrend	Downtrend
	March	72.99	Downtrend	Downtrend
	April	47.54	Sideways	Uptrend
	May	55.90	Sideways	Sideways
	June	27.41	Uptrend	Downtrend
	July	33.01	Sideways	Downtrend
	August	26.83	Uptrend	Uptrend
	September	51.80	Sideways	Downtrend

Source: Tradingview.com

Table 4. USD/JPY RSI Data

Pair	Month	RSI Value	Forecasted Price Movement	Actual Price Movement
USD/JPY	January	29.49	Uptrend	Uptrend
	February	71.97	Downtrend	Uptrend
	March	70.77	Downtrend	Uptrend
	April	80.31	Downtrend	Downtrend
	May	56.34	Sideways	Sideways
	June	55.14	Sideways	Uptrend
	July	43.45	Sideways	Sideways
	August	37.99	Sideways	Sideways
	September	70.40	Downtrend	Uptrend

Source: Tradingview.com

Table 5. USD/CAD RSI Data

Table 6. USD/CHF RSI Data

Pair	Month	RSI Value	Forecasted Price Movement	Actual Price Movement
USD/CHF	January	29.98	Uptrend	Uptrend
	February	56.98	Sideways	Sideways
	March	65.55	Sideways	Sideways
	April	70.67	Downtrend	Downtrend
	May	29.37	Uptrend	Sideways
	June	28.40	Uptrend	Uptrend
	July	70.32	Downtrend	Downtrend
	August	29.64	Uptrend	Uptrend
	September	49.98	Sideways	Uptrend

Source: Tradingview.com

Then the author performed the Mann Whitney U test using SPSS 26 to test statistically the difference between the forecasted price movement and the reality price movement of foreign exchange. The results of the test are as follows:

Table 7. The Result of Mann Whitney U Test

		Ranks		
Group		N	Mean Rank	Sum of Ranks
Value	Move as forecasted	37	26.80	991.50
	Move not as forecasted	17	29.03	493.50
Total		54		

#### Test Statistics<sup>a</sup>

	Value
Mann-Whitney U	288.500
Wilcoxon W	991.500
Z	-.524
Asymp. Sig. (2-tailed)	.600

a. Grouping Variable: Group

(Source: Processed Data)

The results of the test show that the mean rank of price moves as forecasted is 26,80 and the mean rank of price not moves as forecasted is 29,03. The Mann-Whitney U value is 288,500 and the significance value is 0,600. From these results it can be concluded that the significant value is  $0,600 > 0,05$ , which means  $H_0$  is accepted. This means that the use of RSI is accurate in forecasting the foreign exchange price movements.

The results of this study is in accordance with the RSI theory that written by Kermanshahi (2014), whenever traders wanted to determine if a currency was overbought or oversold, RSI is the ideal indicator to use. Overbought indicates an uptrend in the market where traders buy the currency for a long period of time. Oversold indicates a downtrend, where it signifies that trader have been selling a currency for a long time, and the market is about to change its direction. So that it means the actual price movement is in accordance with the forecast if the forecast is done by using RSI Indicator, this is in line with Hari & Dewi's (2018) statement that RSI is a technical analysis oscillator that represents price increases and decreases to determine price strength which can show the signal when is the right time to open sell or open buy position.

Previous research written by Klimavicius (2010) found that technical analysis indicators can assist traders to figure out if the price is moving in trends at a certain point of time. Charts, trends, and support and resistance levels are significant components of FOREX trading, and choosing a time frame, defining risks, defining trade entry and exit levels, and picking indicators are the key elements in creating a forex trading strategy using technical analysis. The Relative Strength Index (RSI) Indicator was used to create a trading strategy. Then the he trading execution was tested in the real FOREX trading market using MetaTrader, and the study proved that the strategy was profitable. This findings also supported by Park & Irwin (2011), and Sahin & Ozbayoglu (2014) by declaring that RSI Indicator is the most well known technical indicator which can indicates when the price meet oversaturation level. Oversaturation occurs when there is a high proportion of currency price

movements in one direction, it indicates an extreme sign, then the price will most likely reverse direction.

Another research from Jain (2019) found that RSI Indicator test is suitable for all trader while trading in the foreign exchange market and it can be concluded that the RSI Indicator is an excellent indicator for predicting forex price movements as proved by the author's analysis. This finding also supported by Alhilfi (2019), the research's result show that the use of RSI Indicator help trader to minimize risk of the currency price fluctuation, beside of that if compared to other indicator, RSI is a good indicator for its simplicity in forecasting the price movement.

However, Kiiski (2009) stated that RSI value more than 70 and less than 30 shows overbought and oversold value, but it will be a stronger buy and sell signal if the value is more than 80 and less than 20. Imano (2019) state to get consistent profits, traders must use the technical indicators that provide the right signals so that price movements do not deviate from the forecasts. After examining the strategy tester, the RSI and MA indicators are able to provide accurate buy and sell signals so that they can generate consistent profits for traders when these used together as a combination. Another research found RSI Indicator will be profitable if combine with MACD Indicator. These indicators work well to predict the market movement and can make significant profit Chong (2014)

Different research written by Yazdi (2013) found that RSI is a good technical indicator to show a confirmation for any entry in Foreign Exchange Market. But this indicator is not profitable for all currencies, it will work effectively and had better result if it used to trade EUR/USD pair only.

Various research results about RSI Indicator state the effectiveness of RSI Indicator in defining a price saturation. However, this cannot be believed to apply to all foreign exchange currencies. This study provides empirical evidence that the RSI Indicator can work effectively, especially in currencies that are categorized into major pairs, the RSI Indicator is proven to be statistically significant accurate in predicting the direction of foreign exchange price movements.

The finding of this research is related to the theory of financial behavior and also financial literacy. Ricciardi (2008) state that Financial market movement always affected by behavioral finance. At this point traders and investors need to understand about behavioral finance, so that investors can recognize the various biases that occur, and understand that financial market participants and other economic activities are often irrational. Thus, a trader or investor can control themselves in the midst of fluctuations that occur so that they can still achieve their financial goals.

This is also in line with Lusardi & Mitchell (2013) which state that a person financial literacy is able to help individual in making decisions related to investment decisions. One aspect of

financial literacy is knowledge related to investment, such as knowledge of investment risks, market interest rates, and market analysis. At this point, the research result that RSI Indicator is accurate to forecast the forex market movement can help trader to increase their market analysis knowledge and also risk management. So that this can improve the ability of investors to apply various financial skills in the investment field.

#### 4. Conclusion

Technical analysis is one of the most popular approaches for studying the FOREX market. The technical analysis strategy is used by traders to analyze the market. In this strategy, traders are facilitated by a variety of indicators. Traders can use these indicators to get various signals to determine the right time to open a position. The aim of the study was to examine if it is possible to make profits by opening a position at the right time using Relative Strength Index strategy on the foreign exchange markets. Mann Whitney U Test were used to identify the performance of the Relative Strength Index (RSI) Indicator.

Based on the test, the results of data collection and analysis about the accuracy of the RSI Indicator in forecasting foreign exchange price movement, it can be concluded that the right buying decision on forex is when the RSI indicator shows a value less than 30, while the right selling decision is when the RSI indicator shows a value of more than 70.

This study provides empirical evidence of the accuracy of the RSI Indicator in forecasting of foreign exchange price movements. The Mann Whitney U Test show that there is no statistically significant difference between the forecasted price movement and the reality price movement

The researcher would like to provide suggestions that can be useful for practitioner and for further research. It is hoped that this research can be used by forex traders, investors and speculators and financial accountants to be an additional indicator in considering decision making to minimize risk. For further researchers, the analysis of forex price movements can be combined with other technical indicator that can strengthen the forecast results. It is hoped that this research can be a reference for further research because there is still limited research about technical analysis indicators in forecasting forex price movements.

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