USEFULNESS OF TECHNICAL ANALYSIS IN THE FOREX MARKET: THE EUR/USD PAIR

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Abstract

Financial forecasting is a topic of great interest to the economic and academic community. The ability to predict currency market movements in advance has financial benefits for investors as well as companies. Technical analysis is one of the most well-known methodologies that investors use in financial markets, with the purpose of predicting the direction of asset prices through the analysis of their price history (Hudson & Urquhart, 2021). Therefore, to prepare this study, we sought to study the applicability and usefulness of technical analysis in the foreign exchange market, using, for this purpose, some of the most used tools among investors, namely, trends, supports and resistances, Fibonacci retracements and graphic patterns (Chen, 2010 e Dumiter & Turcaș, 2023). The tools available for technical analysis were applied to the EUR/USD currency pair in 2019. In this study, it was possible to validate the technical analysis tools covered and prove the applicability and usefulness of technical analysis in the foreign exchange market. The tools available for technical analysis, trends, trend and channel lines, support/resistance zones and Fibonacci retracements have demonstrated their validity, as they are useful in predicting possible trend reversal/continuation zones. Reversal chart and candlestick patterns demonstrated their validity, since when found on the charts of the pairs under study, it was possible to verify their effectiveness in predicting trend reversal. Graphic continuation patterns also demonstrated their validity in predicting trend continuation, since after its break, the trend direction prevailed.

Keywords: Forex Market; Technical analysis; Fundamental analysis; Financial markets; Volatility.

JEL Classification Codes: E12, E4O.

1. Introduction

Given the volatility and constant evolution of capital markets, it is increasingly important for investors to have access to all financial information in the shortest possible time, so that they can make a decision quickly without exposing themselves to large losses (Lukanima, 2023). Technical analysis is widely used among investors, as it allows them to monitor the market in a timely manner and supports them in making decisions at the right time (Pramudya, 2020). This technique studies the market by focusing its study on the price of the asset, as it argues that the price encompasses all information about it (Edwards et al., 2018). Therefore, investors focus their studies on asset prices, not wasting time on other types of information, since this is already reflected in their prices (Peñalvo et al., 2022). The objective of this research is to analyze the applicability and usefulness of technical analysis in the foreign exchange market. For this purpose, the main tools of technical analysis will be applied, namely, trends, supports and resistances, graphic patterns, candlestick patterns, price breaks and Fibonacci retracements, to the EUR/USD exchange rate quotes represented in charts. candles obtained from the Tradingview Platform. To achieve this objective, the following steps were taken: 1) select the pair with the highest market volatility, EUR/USD; 2) analyze the historical movements of the EUR/USD pair, from May 3, 1993 until December 31, 2018, in order to find old important support/resistance zones, as well as predominant trends; 3) analyze the pair's movements and the impact of former support/resistance zones in the year under study; 4) analyze the trend, chart patterns, candlestick patterns Fibonacci retracements and price breaks and, 5) in the case of candlestick patterns, analyze reversal patterns. The tools will be applied to the currency pair to test the applicability and reliability of each one in predicting future asset price movements. Numa primeira fase são analisados os movimentos históricos do par, desde 3 de maio de 1993 até 31 de dezembro de 2018, a fim de encontrar antigas zonas importantes de suporte/resistência, assim como as tendências predominantes. The results of this study demonstrate that technical analysis is useful in the decision-making process for investors involved in the foreign exchange market.

2. Literature Review

Financial markets are structures for buying and selling securities transactions, such as shares and bonds, national currencies, commodities, and other goods and assets (Burton et al., 2015). Financial markets play a real role in financing the economy (Nguyen & Su, 2021). Surplus resources generated by companies and workers are used and their respective applications guarantee the smooth functioning of the economy and its development (Burton et al., 2015 and Prabhu, 2021). The foreign exchange market, internationally known as "Foreign Exchange Market", "Forex" or "FX" is the largest financial market in the world (Fischer et al., 2024). It was created at the beginning of the seventies of the last century, replacing the fixed rate exchange rate regime (Bretton-Woods agreement) for an exchange rate regime with floating rates, depending on demand and supply (Ilzetzki et al., 2022). Financial market analysts' investment decisions are essentially based on two techniques: technical analysis and fundamental analysis (Picasso et al., 2019). If, on the one hand, technical analysts believe that asset market prices follow trends and seek to identify future market price movements, on the other hand, fundamental analysts seek to determine the intrinsic value of an asset (Chen, 2010). The present study is based on technical analysis, since, in accordance with reference authors such as Murphy (1999), Chen (2010), Nti et al. (2020) and others, technical analysis contemplates in a single indicator, "the price", economic information, news, beliefs, myths, among other elements. Technical analysis, according to Chen (2010) and Pramudya & Ichsani (2020), is the graphic study of how past and present behaviours affect the price of a given asset in a specific financial market, helping to determine its future direction. The price reflects various information, be it economic, news, beliefs, myths, among others, therefore from a purely technical point of view, it would be advisable for an investor who trades through technical analysis doesn't read news, so that his study do not be influenced by fundamental data (Chen, 2010). Technical analysis is used with the aim of highlighting historical patterns of price behaviour, in order to predict future price movements and optimize investors' investment decisions (Nti et al., (2020). This analysis argues that prices move in trends, and that past patterns are repeated in the future, and they reflect all economically relevant information about

an asset (Murphy, 1999 and Pring, 2014). In technical analysis, techniques and tools are used, such as trends, supports and resistances, reversal and continuation graphic patterns, candlestick patterns, price breaks and Fibonacci retracements, which will be applied in this study (Murphy, 1999; Nekritin & Peters, 2012 and Dongrey, 2022).

3. Methodology

This work aims to demonstrate the applicability and usefulness of technical analysis in the foreign exchange market. For this purpose, the quotes of the EUR/USD exchange rate pair were collected between January 1st and December 31st 2019. The option for this period of time aims to: i) avoid the impact of the Covid-19 effect, and ii) the impact of the inflationary crisis caused by the war between the Russian Federation and Ukraine. The exchange rate pair to be analyzed was EUR/USD, since, as argued by King et al. (2011) and Plíhal & Lyócsa (2021), is the pair with the greatest volatility and economic interest. In order to facilitate the study and achieve the proposed objectives, this paper used secondary data extracted from the Tradingview platform. To achieve the objective of this study, we used some of the main technical analysis tools, namely trends, supports and resistance, Fibonacci retracements and graphic patterns, with the aim of analyzing their applicability and reliability in the foreign exchange market. Therefore, the following procedures were taken into account in the analysis carried out: i) In the first phase, for a brief overview of the pair's past movements, a weekly timeframe was used, analyzing all the data available on the platform, since May 3, 1993 to December 31, 2018, for the purpose of finding important trends and support/resistance zones. In the year under study, a daily timeframe was used for a more detailed analysis and application of the tools studied; ii) The technical analysis tools were analyzed and discussed individually, with the aim of demonstrating their applicability and usefulness in the foreign exchange market, in this specific case, the EUR/USD currency pair, during 2019; iii) The charts to be analyzed during that period refer to the candlestick charts.

In this sense, and in order to achieve the central objective of this study, the following steps were defined: a) Select the currency pair with the highest market volatility, EUR/USD; b) Analyze the historical movements of the currency pair, from May 3, 1993 to December 31, 2018, in order to find old important support/resistance zones, as well as the predominant trends; c) Analyze the pair's movements and the impact of former support/resistance zones in the year under study; d) Analyze the trend, graphic patterns, candlestick patterns, Fibonacci retracements and price breaks and, e) in the case of candlestick patterns, analyze reversal patterns.

4. Results

The EUR/USD pair has been on a downward trend since 2008. In this weekly chart, with a general perspective of the pair's movements, it was possible, as seen in Figure 1, to identify some support/resistance zones that the price has been reaching respect since 1993 (blue lines), only identified within the pair's price fluctuation range during 2019 (white lines). Support/resistance zones were identified on the chart based on the definition of Nekritin and Peters (2012) and Sheimo (2020), as they are zones of indecision where the price has had difficulty breaking them and reversing the trend in recent decades. It is possible, even on this chart, to identify a descending trend line (red line), which will not be relevant for the year 2019, as it passes well above the oscillation range during the period under analysis.

Figure 1 - EUR/USD Global Framework

Source: Own elaboration on the Tradingview platform

In the year under study, it is possible to define two trends, which according to Chen (2010) and Lee et al. (2021) is the most important to analyze in a graph. In Figure 2 it is possible to observe a downward trend that lasts until October and an upward trend that starts in October and lasts until the end of the year (Adegboyeet al., 2021). In the downward trend it was possible to identify two trend lines and a channel line (Ranade, 2020). At the beginning of June, LTD 1 breaks, which begins to act as support for the price, in this case as a channel line, a common phenomenon already mentioned by the same authors. After the breakout, a second descending trend line (LTD 2) is defined, which acts as resistance to the price, causing the price to oscillate once again in another descending channel between LTD 2 and LTD 1. With the breakout of LTD 2 in October , the price begins an upward movement until the end of the year, creating an upward trend.

Figure 2 - EUR/USD Trends

Source: Own elaboration on the Tradingview platform

When breaking LTD 1, Figure 3 shows the formation of a pattern, Head & Shoulders, a bearish reversal pattern, which, according to Murphy (1999) and Alanazi (2020), is one of the most reliable. In this case it "fulfills" its task and reverses the price, ending a small pullback that occurred in the face of the downward trend (Hu et al., 2023). As discussed in the literature review, after the complete pattern, the price is observed to decline, make a small correction and find resistance at the neckline and impulsively descend. It is possible to observe how the volume is high in the first shoulder and in the head, and in the second shoulder the volume is low, a premise highlighted by Pring (2014) and Shannon (2023), as quite important in the Head & Shoulders pattern.

Figure 3 - Head & Shoulders EUR/USD

Source: Own elaboration on the Tradingview platform

In addition to the Head & Shoulders pattern, it was possible to observe two double bottoms and a double top (as shown in Figure 4). The first double bottom, bullish reversal pattern, appears at the 1.11325 resistance zone, where the price fails to break the support twice, forming the pattern characterized by two lows at the same price level and a peak between the lows (Chen, 2010 and Alanazi, 2020). The price finds some indecision breaking the peak line (Trembiński & Stawska, 2020), however it manages to break it and start a small upward movement (Fernández & Crespo, 2022). Towards the end of the year, during an upward movement, a double top appears, characterized by two peaks at the same price level and a valley between

them (Chen, 2010 and Souza et al., 2021). After the pattern breaks the valley line, it easily descends to resistance at the price level of 1.09889. In the 1.09889 zone the price fails to break it twice, forming a double bottom again (Liu & Si, 2022 and Akbarzadeh & Soleimani, 2023). The price finds it difficult to break the peak line between the lows but ends up doing so and rises significantly (Yong et al., 2020 and Fernández & Crespo, 2022). In these last two patterns, it is possible to observe how the double top valley line coincides with the double bottom peak line (Ponsi, 2017 and Knight et al., 2024).

Figure 4 - EUR/USD Double Bottom and Double Top

Source: Own elaboration on the Tradingview platform

The most relevant candle reversal patterns found in the year under study are shown in Figure 5, with red showing bearish reversal patterns and green showing bullish reversal patterns. It is possible to observe that, after bearish reversal patterns, the price tends to fall as expected, as well as the opposite in bullish reversal patterns (Murphy, 1999 and Cohen, 2021). According to Pring (2014) and Guilizzoni & Eizaguirre (2022), a candlestick pattern has a better chance of being successful if it appears in a reversal zone - support/resistance zones, trend or channel lines, Fibonacci retracement zones, or chart pattern boundaries. - just as if it is preceded by a trend.

Figure 5 - EUR/USD Candlestick Patterns

Source: Own elaboration on the Tradingview platform

When LTD 1 is broken, and the first downward impulse ends, the Fibonacci retracement method is applied to discover possible trend retracement zones (Chen, 2010 and Tsinaslanidis et al., 2022). In this specific case, it is possible to observe in Figure 6 that the most important areas of the Fibonacci Retracement influence the price and act as resistance/support. The zone that ends the retracement is 61.80% when the price resumes its downward movement prevalent since the beginning of the year (Ramli et al., 2020 and Kung, 2022).

Figure 6 - Fibonacci Retracement I EUR/USD

Source: Own elaboration on the Tradingview platform

When the LTD 2 rupture occurs, the Fibonacci retracement method is applied again, and once again it can be seen in Figure 7 how the retracement zones act as support/resistance, thus locating possible market entry zones for the investor (Chen , 2010, Walker, 2021 and Jain et al., 2022). In this specific situation the price breaks the downward trend, finds support in the 23.60% zone, rises to higher levels until the end of the year, with resistance in the 61.80% zone.

Figure 7 - Fibonacci Retracement II EUR/USD

Source: Own elaboration on the Tradingview platform

5.   **Conclusion**

Technical analysis studies the past behavior of assets to assist investors in their investment decisions. It does not allow us to know with certainty what will happen in the future, but it allows, with greater assertiveness, the analyst to calculate the future trend of an asset. In this study it was found that the analysis carried out on trends, trend lines and channel lines proved to be effective. Using these tools, it was possible to observe how prices move according to trends and respect trends and channel lines (Chen, 2010 and Das et al., 2022). The use of these tools made it possible to identify the predominant trend and locate possible reversal/continuation zones, in which good investment opportunities may arise (Pring, 2014 and Tsinaslanidis et al. 2022). The support/resistance zones and Fibonacci retracements proved to be valid in the analysis of the studied pair, since they allowed us to predict possible support/resistance zones. It was possible to observe, as described by Abe (2018) and Jain et al. (2022), that old support/resistance zones continue to affect the price past a few years. Regarding the Fibonacci retracement method, as discussed by Chen (2010) and Lusindah & Sumirat (2021), it was possible to observe how the retracement zones act as support/resistance. In general, chart patterns and candlestick patterns proved to be valid. According to Chen (2010)

and Khan et al. (2022), reversal patterns indicate that a trend reversal is close, as can be seen in the patterns found in this study and when complete, they reversed the trend. Continuation patterns indicate that the asset is resting, but that after the structure breaks, the price follows the initial movement, as supported by Kahn (2010) and Nti et al. (2020).The reversal candle patterns studied also met the assumptions defined by Murphy (1999) and Alanazi (2020): after the high or low pattern, the trend reversed. Regarding price breaks, it was only possible to find one breakout break in the sample under study, which was found to be valid. The breakout respected the premises described by Pring (2014) and Trembiński & Stawska (2020), after a lateral movement, it breaks an important support zone, without being filled and reversing the trend. In conclusion, this study contributes to the literature in the area of foreign exchange markets, since it was possible to demonstrate the validity of the tools under study and verify that technical analysis can and should be used in the analysis of investors in the foreign exchange market to support their decisions, however, investors should be sensitive to other financial information about the asset, so that it is not exposed to unnecessary risks.

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