

Application of technical analysis on the Forex online trading (Case study)

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Abstract - Forex market (Foreign Exchange Market or FX) is the on-line market with a set of operations related to the purchase of one foreign currency for another. On the currency market pricing has a global character, as investors from around the world at the same time enter into on-line contracts primarily through brokerage platforms. Forex, unlike conventional stock market, has no particular limitations, so the trading of the currencies takes place on-line, literally in all places and at all times. Technical analysis (T.A.) is a form of market analysis of securities based on the study of price and trading volume in the past, with the aim of formulating a view on future developments. Using appropriate methods, the aim of technical analysis is to identify pricing trends in the stock market, futures or currencies.

The aim of this study was to analyze the real example, through a case study, and test the applicability of different methods of TA. Also, the aim was to analyze the effects of various methods measured through financial result – profit in the process of trading.

I. INTRODUCTION

Forex market (Foreign Exchange Market or FX) is an online stock exchange, where supply and demand for foreign currencies is met, i.e. where foreign currencies are sold to participants [1]. Forex is characterized by a large number of participants, a lot of different types of currency trading and non stop working hours during working days. Large number of participants and continuous operating hours provide high liquidity of the market. Participants in this market are large commercial banks, investment funds, insurance and pension funds, individual investors. Due to the size of individual transactions and high financial requirements, until recently, the currency market was not available to "small" investors, so the trade was made between banks, dealers, and occasionally large speculators. Today, with the help of leverage, one can enter into the large positions with a relatively small amount of capital, so this market has become more liquid than ever and available to large numbers of participants [1, 2]. The Forex market currencies are traded in pairs, each pair consisting of two different foreign currencies. The dollar is the most traded currency. Regardless of whether buying or selling, the dollar participates in the 89% of all transactions in the foreign exchange market. The euro is the second most traded currency with 37%, while the yen is in the third place with 20% [3, 4].

There are different types of analysis of market trends [5, 6, 7]. In this paper, the technical analysis is applied to Forex market data.

The aim of this study was to test the specific examples of all methods of technical analysis, and the comparative analysis in the real trading. Special emphasis in this paper is placed on an active approach to Forex, in the long run, and with no discontinuity. The effect of all types of the results to individual decisions will be explained in detail in the paper.

This paper is organized as follows: After introduction, in second section is explained purpose of technical analysis and shown five methods that we used the most in our case study for the recognition and use of price formation. In this section we analyzed the basic terms for trading in the Forex market, such as time of trading, the calculation of rates and types of orders. Third section brings our journal of trading, where is demonstrated difference between used methods and realized profit based on it. We presented daily trading, in which the practical knowledge of technical analysis is applied to trading in Forex. We offered our opinion concerning electronic trading on the stock markets and technical analysis in general. The forth section is reserved for conclusion and future research.

II. TECHNICAL ANALYSIS

Technical Analysis (TA) is a form of market analysis of securities based on the study of price and trading volume [7]. Using appropriate methods, the aim of technical analysis is to identify pricing trends of the stocks, futures or currencies [8]. TA analysis is a process based on the past prices of stocks, futures and currencies, with the aim of formulating a view on future developments. Technical analysis is based on the assumption that all the information from the previous period is relevant to the behavior of the participants, and can be used in the present and future. TA concludes that the future behavior of market participants can be drawn from their behavior in the past [9, 10].

Although there are many technical analysis tools used in the Forex market, this paper describes those who are considered "important" and are commonly used in TA. It is very important that the analysis of the market is reduced to a small number of important tools, because their excessive number may offer misleading, giving a large number of false signals. The aim of TA is to give a

clear picture of price movements in short time, avoiding the use of complicated and complex methods based on mathematics. The reason for this approach is that financial markets are very dynamic, changes occur in short periods of time, and speed decision-making is of great importance.

Technical analysis is quite subjective and open to different interpretations. Although the interpretation of the charts is a standard, if two different technical analysts are watching the same chart, they will often see different shapes and draw different conclusions. They will, in their own way, have a logical explanation for everything that is happening, but they will make their conclusions in different way [1, 6, 9].

The main disadvantage of technical analysis is that it is often delayed, because while we analyze a trend there is a possibility that its greater part has already passed, thus changing the relation between risk and earnings. The other thing is the reliability of indicators, which in different range of currency pairs and different time periods do not show the same results. What is the most important is to track market trends with the use of standard indicators. This is used by most retailers, and it allows to predict in which direction the market is going and to facilitate decision making [5, 7].

In this work, the following formations and methods were used. Firstly, we used formations of trend changes and formations of trend extension. Formations of trend changes that were used are: Head and shoulders, Jump start strategy, two-peak formation, double bottom, triple peak and triple bottom, rounded top and rounded bottom. The used formations of trend extension were: Symmetrical triangle, Ascending triangle, Descending triangle, Flag formation, Pennant formation, Signal 1-2-3 formation. Then, the Gaps were analyzed. Afterwards, we used Japanese candlesticks formations: Japanese candlesticks, Long day, Short candle, Marubozzu, Spinning Tops, Doji, Hammer and Hanging Man, Engulfing formations, Harami, Morning Star, Evening Star, Three White Soldiers [11, 12].

Fibonacci method was used, as well as Elliott wave analysis. Indicators of future price movement that were used in the study are: Moving Average, Exponential Moving Average - EMA, Bollinger Bands, MACD, Relative Strength Index (RSI), Parabolic SAR, The Average Directional Index ADX and Stochastic Indicator [11, 12].

2.1. The most used TA methods

In our research we used more than ten different TA methods, but the next five are the most used. These methods are explained in short:

a) Head and Shoulders

Head and shoulders formation is very famous one. It can be recognized by the following movements in the market: "The primary trend" - it is very important to define the primary trend in its growing. If this first trend is not recognized, we should not expect the formation of the contours of the head and shoulders. "Head and shoulder"

formation in real trading of the currency pair EUR / USD is shown in the Figure 1.

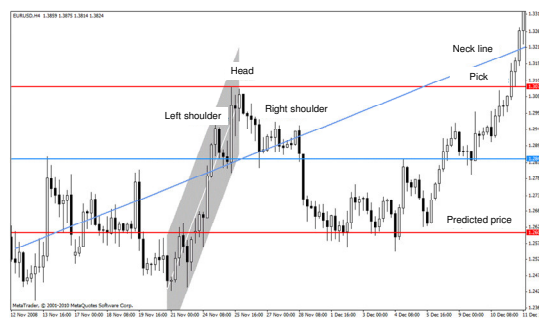


Figure 1. Head and shoulders formation, shown in real trading EUR / USD

"Left Shoulder" - during the uptrend, the price reaches the peak at one point and then begins to fall, forming a left shoulder contours. However, the fall in prices during this period does not jeopardize the primary trend. "Head" - from the lowest point of "left shoulder" a sharp rise begins, to the highest point where the performance of the primary trend breaks: this is top "head". After reaching the peak, the price suddenly drops breaking through trend channel, to the lowest point, which is in the bottom level of "shoulders". That point also represents the starting point of the "right shoulder" and it can often dramatically threaten the primary trend.

"Right Shoulder" - is another cost recovery, but its peak is lower than the top of the "head," and most often can be found at the top level of the "left shoulder."

"The neck line" - a line in the graph drawn by connecting the two lowest points of the break between the shoulder and the head. This line can have a positive or negative slope, or it may be horizontal.

"Scope" - is a mandatory part of this outline. It can be measured using indicators or one can only analyze the amount of volume; "Break of the neckline" - the "head and shoulders" formation can not be considered complete, up to the moment of completion of a declining trend while the right shoulder does not break the neck line. The support line transforms into the resistance line - and that happens after the "break of the neckline".

"Price target" - after breaking support line ("neckline") the planned price decline will be revealed by measuring the distance between the "neckline" and top "head". This distance is then subtracted from the "neckline" in order to obtain the lowest expected price.

b) Pivot line

Pivot lines are used to identify important support and resistance levels. Pivot line and its levels of support / resistance are areas where the changes in the direction of prices can happen. They are particularly useful for "short-term" traders who wish to take advantage of small changes in price. Pivot lines can be very useful, since many currency pairs generally vary between these levels. Pivot line is used by traders who trade in the range-bound, as well as retailers who are waiting for breakout of the market. When trading in a range, a trader uses

pivot line to identify sharp trade points, and then places an order for purchase near the line of support, as well as an order for sale near the line of resistance.

Every day, the market has an opening price, closing, highest price and lowest price for the day. These are the basic information needed to calculate the pivot levels, Figure 2. Since many traders follow pivot levels, the market often reacts to them. This gives us the opportunity for successful trading.



Figure 2. Trading with Pivot line

Advices for trading using the Pivot lines are as follows:

- If the cost is at PP, expect a move to R1 or S1
- If the price is at R1, expect movement to R2 or back towards PP,
- If the price is at S1, expect movement in S2 or back towards PP,
- If the price is at R2, expect movement on the R3 or back towards R1,
- If the price is at S2, expect to move back to S3 or S1,
- If there is no significant impact of news on the market, the price will usually move from PP to S1 or R1,
- If there is a significant impact on the market news, prices will go through the R1 or S1, and will reach or R2 or S2, and even R3 or S3,
- R3 and S3 are a good indicator for the highest achievement during the volatile days but can occasionally be exceeded,
- Pivot lines work well on the "sideways" markets because prices will be most likely in the range between the R1 and S1 line.

In addition to a strong trend, prices will fly through the pivot line and will continue to move forward.

c) Channel

Forex trading in a channel occurs when the price over time oscillates between two parallel lines that are formed around the trend, Figure 3.

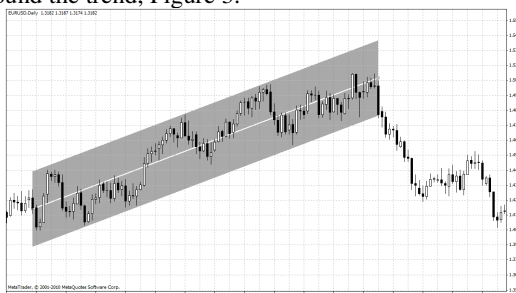


Figure 3. The formation of channels and the movement of prices in the channel.

When the price touches the line of resistance (upper line of the channel), it can be used to enter into the short position, i.e. selling. Otherwise, if the price touches the support line one should enter into the long position, i.e. purchase because we expect that the price will grow.

d) Gap

Gap is an empty space between two neighboring candles. The upper gap occurs when the highest price in one period (High) is lower than the lowest price in the next period (Low), while the lower gap occurs when the lowest price of the first period is higher than the highest price in the next period.

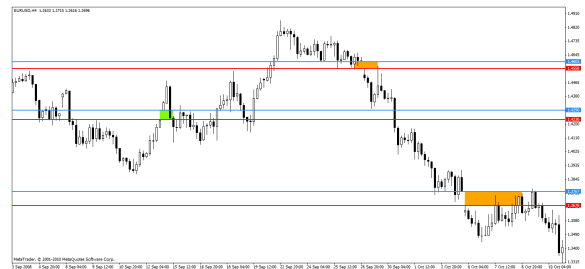


Figure 4. The gap in real trading

It should be noted that one of the rules for trading currencies is that each gap tends to close with a probability of 80%. In Figure 4, examples are shown for the upper and lower gap, and its complete "closing" in the future, in two of the three cases, for the currency pair EUR / USD.

e) Fibonacci

Italian mathematician Fibonacci became famous when he discovered a simple series of numbers that create indicators for describing the natural proportions of the Universe. These indicators derive from the following sequence of numbers: 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144... Each number represents the sum of the two preceding numbers: $1 + 1 = 2$, $1 + 2 = 3$, $2 + 3 = 5$, $3 + 5 = 8$ and so on. Properties that we observe in Fibonacci numbers are as follows:

- If we divide any number from that row with the following number, we will get the result of a number of 0.618. For example, if we divide 34 by 55, we get the result 0.618.
- If we divide every second number, we will get the result 0.382. For example, if we divide 34 with 89 = 0.382. These indicators are called the "golden mean".

Exactly these indicators are important when using Fibonacci levels:

- Fibonacci Retracement levels: 0.236, 0.382, 0.500, 0.618, 0.764
- Fibonacci Extension Levels: 0, 0.382, 0.618, 1.000, 1.382, 1.618.

Fibonacci Retracement levels are used by traders as a place where their position will be opened for trading. Retracement Fibonacci levels act as support and

resistance levels, depending on whether the main trend is increasing or decreasing, Figure 5.



Figure 5. Rejection rates from one of the Retracement levels

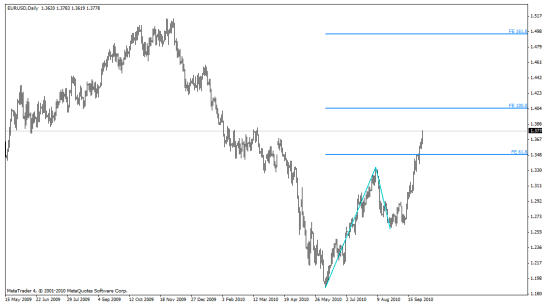


Figure 6. Assessment of Extension level of reached price

Fibonacci Extension levels are used to define levels for gaining a profit, or as a place where the trend is expected to stop, Figure 6. Extension levels are equal in their importance with Retracement levels, because if the trader fails to close the position in time, it risks losing the gain that came from a well-chosen Retracement levels.

III. JOURNAL OF TRADING

The practical application of knowledge of TA is shown in the following Journal of Trading. The diary was made between 1.11.2010. and 02.12.2010. and is mostly linked to the currency pair EUR / USD. After initial growth, which is a logical continuation of the upward trend in October, a large depreciation of the euro followed against the U.S. dollar (about 1200 pip) with a slight consolidation of the market during the mid-month. During trading it was observed that the price movement often does not follow the given pattern. Price was often stopped on the pip or two of taking profits or immediately after the opening position and then changed direction, making less profit or even a loss. Afterwards, the line is strongly pushing its way to taking profits and went far beyond the level that we set forth. Tables I-VI show data from the above mentioned currency trading based on different TA methods.

TABLE I. TRADING WITH PIVOT LINES – PIVOT LEVELS, CHART: 5 MIN, TYPE: BUY LIMIT.

Opening		S / L	Closing	
Time:	9.11.2010 9:50	1,3890	Time:	9.11.2010 10:09
Price:	1,3900	T / P	Price:	1,3918
Volume:	1 lot	1,3918	Profit:	18 pips

The trading platform used in on-line trading was MetaTrader 4. The total number of orders was 38. Currency pairs for trading were mostly EUR/USD, and AUD/USD. In the following section, we will show some of the trading orders, technical analysis applied to those orders, and profit/loss statements, Tables I-VI.

TABLE II. TRADING WITH FIBONACCI LEVELS – CHART: 5 MIN, TYPE: BUY.

Opening		S / L	Closing	
Time:	9.11.2010 12:02	1,3947	Time:	9.11.2010 13:07
Price:	1,3961	T / P	Price:	1,3947
Volume:	1 lot	1,3973	Profit:	14 pips

The market experienced a sharp jump after which a mild fall appeared, and then rise again. By using Fibonacci levels we determined the price growth and its stopping at 1.3976. As a profit point we put the level of 1.3973. Price has reached 1.3972 and came back, activating the S / L, Table II.

TABLE III. TRADING WITH MACD – CHART: 5 MIN, TYPE: SELL.

Opening		S / L	Closing	
Time:	4.11.2010 23:18	1,4221	Time:	4.11.2010 0:02
Price:	1,4213	T / P	Price:	1,4221
Volume:	1 lot	1,4207	Loss:	8 pips

We observed downward 1-2-3 formation, confirming with the MACD and ADX indicator, where the sellers are predominant. The price was, in a few moments, very close to T/P line, but it was not touched. This was followed by a sudden rise in the price by about 40 pips at 1.4250, which led to the loss, Table III.

TABLE IV. TRADING WITH HEAD AND SHOULDERS – CHART: 15 MIN, TYPE: SELL.

Opening		S / L	Closing	
Time:	24.11.2010 22:41	1,4221	Time:	2.12.2010 14:59
Price:	0,9816	T / P	Price:	0,9706
Volume:	0,1 lot	0,9525	Profit:	110 pips

For trading was used the currency pair AUD / USD. On hourly chart formations were observed head and shoulders, while the 15minuts chart formed symmetrical triangle. We have waited for the breakout of the triangle on the bottom of the confirmation of a downward trend. After breaking the bottom line, there is a strong trend of continuation, and the S / L moved to 0.9706. In a period of several days, price has reached a level of 0.9538 (only 13 pips from the T / P) and the price has then returned in a different direction and at the level of the new S / L the account was closed, Table IV.

TABLE V. TRADING WITH DOUBLE TOP FORMATION , CHART: 5 MIN, TYPE: SELL.

Opening		S / L	Closing	
Time:	24.11.2010 16:25	1,3367	Time:	24.11.2010 16:50
Price:	1,3367	T / P	Price:	1,3352
Volume:	2x 0,5 lot	1,3335	Profit:	15+13 pips

Double top formation, the account was opened on the size of one lot. At the level of 1.3352 half of the orders were executed, and half have been left to possible activation by T/P. Price has failed to achieve projected value, so the account was closed at 1.3355, Table V.

TABLE VI. TRADING WITH MACD – CHART: 5 MIN, TYPE: BUY.

Opening		S / L	Closing	
Time:	1.11.2010 1:49	1,3962	Time:	1.11.2010 1:49
Price:	1,3972	T / P	Price:	1,3978
Volume:	1 lot	1,3978	Profit:	6 pips

MACD line crossed the slow signal line, joining the Long position. S / L set to the previous five-minute minimum. T/ P below the R2 pivot line, Table VI.

The overall results are shown in Table VII-IX, and in Figure 7. In Table VII, the data from the online trading on Forex is shown; while in Table VIII the success rate is shown. Taking the total number of 38 orders, maximum loss and profit per unit of trading is shown in Table IX. Of 38 positions, the 32 completed as positive with a gain of 622 pips, the other 6 positions have brought a loss of 70 pips. Profit at the end of monthly trading was 552 pips.

TABLE VII. THE TOTAL NUMBER OF TRADING OPERATIONS.

The total number of positive tradings:	32	622 pips
The total number of negative tradings:	6	70 pips
Sum:	38	552 pips

TABLE VIII. SUCCESS RATE.

Position Type	Number	Success rate
Long positions:	14	71,42%
Short positions:	24	91,66%
Total:	38	84,21%

TABLE IX. MAXIMUM LOSS AND PROFIT PER UNIT OF TRADING.

The maximum loss on a single trading:	-18 pips
The maximum gain on a single trading:	110 pips
Average trading:	14,53 pips

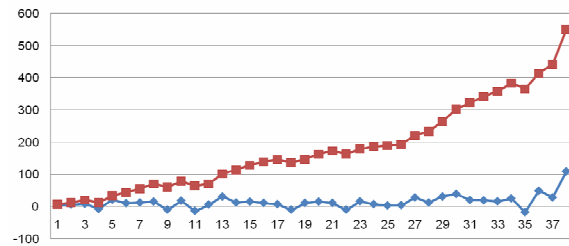


Figure 7. Journal of Trading; Blue line - number of pips per trading; Red line - total number of pips.

In Figure 7, the course of trading is graphically presented, with parallel changes in the number of earned / lost pips, for summary and individual trading (number of pips per trading and the total number of pips).

IV. CONCLUSION

In this paper is presented implementation of the several Technical analysis methods, based on real environments. All trading was realized on Forex online trading, during one month.

The journal of trading was made between 1.11.2010. and 2.12.2010. and its mostly related to the currency pair EUR / USD. After initial growth, which is a logical continuation of the upward trend in October 2010, a decline in the value of the euro against the U.S. dollar happened (about 1200 pips) with a mild consolidation of the market during the mid-month. During trading it was observed that the price movement often takes place with the specified pattern. Price sometimes stopped for a pip or two of taking profit, or soon after the opening position, and then changed direction, making less profit than expected or even a loss, while others put a strong line break to take profits and went far beyond the traced level.

In the opening of positions, the most attention was given to recognize the formation and continuation of a trend change formations, pivot lines, gaps, Fibonacci levels and the use of standard indicators, and a choice between market and entry orders. When closing the position, depending on the situation, a combination of Stop Loss and Take Profit orders is made, and in some situations where an estimated price movements could increase in the expected direction, we set Trailing Stop (of the size in the most appropriate time). The profit at the end of monthly trading of 552 pips shows that TA can be very useful for making decisions on the Forex online trading.

Our future work will be addressed to more intensive research based on some new methods, and comparison between different methods from the point of efficiency.

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