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EXCHANGE RATES: THE INFLUENCE OF POLITICAL AND ECONOMIC EVENTS. A FUNDAMENTAL ANALYSIS APPROACH

Abstract

The objective of the article is to study the influence of political and economic factors on the situation on the world foreign exchange market, substantiate the importance of fundamental analysis in forecasting currency rates. The concept and mechanisms of functioning of the world currency market, its assets and specific features in comparison with other financial platforms are considered in the article. The need for special attention to fundamental analysis during the periods of global political and economic events is grounded. Based on the analysis of the dynamics of the leading world currency pairs in recent years, the period from October 2016 to April 2017 was chosen for an analysis because that period is full of significant events in the world political and economic arena, which are powerful levers of the traders' behavior, and hence the direction of the dynamics of key currency pairs. These events are as follows:

- presidential elections in the USA;
- two increases of the Federal Reserve rate; and
- the policy of the European Central Bank, aimed at stimulating inflation.

It is substantiated that using the fundamental analysis makes it possible to assess the trend and scale of changes in the rates of the world currencies, and in combination with technical analysis is an integral tool for successful trading and forecasting the dynamics of currency pairs. The possibility of using the mechanisms of functioning of such fundamental analysis tool as artificial neural networks and the ways of their application in solving such problems has been considered.

Keywords

world currency market, exchange rate, technical analysis, fundamental analysis, political factors, economic factors, artificial neural networks

JEL Classification C53, G17

INTRODUCTION

International financial and, particularly, currency markets are extremely complex mechanisms. It is the most complicated and non-trivial task to analyze and forecast their processes. Tackling the problems enables carrying out successful and profitable activities both on the microeconomic and macroeconomic levels. The main difficulty in this case is a huge set of various factors that affect the world currency markets. These factors have different nature and degree of influence, and can never be fully taken into account. However, highlighting and forecasting the key factors enable analyzing current situation, catching trends in the market and making profit from it.

The main two groups of these factors are economic and political. In particular, the election of the 45th President of the United States became one of the most resonant 2016 political events in the world. And,

undoubtedly, the influence of the elections went far beyond the political sphere. In addition, the end of 2016 – beginning of 2017 is characterized by the oppositely directed policy of two key “playmakers” in the world foreign exchange market: the US Federal Reserve System and the European Central Bank. All these facts make the period under consideration particularly interesting from the point of view of the influence of direct and indirect factors on the behavior of traders and, as a consequence, the dynamics of the rates of the leading world currencies. The study of such cases and the generalization of the influence of economic and political factors on the world currency markets is a tangible task of present time.

1. LITERATURE REVIEW

1.1. Theoretical basis

The international currency market is the largest financial market in the world which is a unified system of financial and economic relations aimed at the prompt implementation of operations for the purchase, sale and exchange of currency units from around the world.

To compare the scale of the foreign currency market, it should be noted that the capitalization of the US stock market is about 3 times inferior to the turnover of capital which takes place daily in the FOREX market.

The main assets of the international currency market are traditionally the currencies of the world’s most dominant countries: the dollar (USA), euro (EU), pound Sterling (Great Britain), yen (Japan), and franc (Switzerland).

Foreign currency market is not similar to other types of financial marketplaces. In fact, the market in the traditional sense does not exist, unlike stock markets, which are based on the work of special exchange markets. In the international currency market, all financial transactions are made on the basis of computer and telephone networks, through which hundreds of thousands of intermediaries around the world are connected. They are brokers, banks, stock-exchanges, dealing centers, etc. Due to this architecture, the international currency market works around the clock five days a week. Trades start from the New Zealand stock-exchange, after which, according to the time, they move to Asian, European and American markets.

Traders use FOREX fundamental and technical analyses to predict future movements of currencies.

The fundamental analysis has several specific features:

1. It is based on the consideration of important data of national economies and is difficult to carry out, because similar factors can affect the situation in different ways.
2. Fundamental data are presented in the form of indices, which are regularly reviewed.
3. While assessing fundamental data, current and previous indices are compared, dynamics and economic processes for several years are analyzed.
4. It focuses on long-term transactions (year, half year, quarter). Therefore, this is a powerful tool for predicting the future situation on the market which can not be neglected.

FOREX technical analysis (technical analysis was created by Charles Dow (1851–1902)) is a method of forecasting an exchange rate. The method is based on the analysis of charts using technical indicators. It helps to determine the direction of price movement based on historical data. The advantage of the analysis is the possibility of its application in short-term and medium-term forecasts, from transactions within a day to transactions lasting several weeks. The analysis is based on three axioms:

1. Movement on the market considers every aspect.
2. Prices move in a certain direction (ascending, “bullish”; downward, “bearish”; lateral, “flat”).
3. The market has a good memory (history repeats itself).

FOREX technical analysis allows determining the most advantageous entry point to the market.

Technical analysis tools are graphical ways of displaying information (Japanese candlestick charts, bars, line charts and other less popular types), as well as technical indicators based on historical price data.

The use of indicators in conjunction with other market analysis tools makes it possible to work more efficiently. So the optimal variant of the analysis is the combination of fundamental and technical analyses. The aim of the fundamental analysis is the search for the cause of the occurrence of a situation, in contrast to the technical analysis, which does not determine the reasons, but considers what happens to the rate. Conducting fundamental and technical analyses should be an obligatory part of the work of each trader. Only in this way the algorithm of actions can be determined and the right decision can be made. It is not easy, though significantly increases the chances of a stable profit from trading in the foreign exchange market.

1.2. Overview of researches devoted to the technical and fundamental analyses

The Internet and specialized publications are full of technical analysis of exchange rates. However, it gives an extremely one-sided insight, and it is often unable to foresee the turning points, especially during the period of radical events in the world political and economic arena. Therefore, the fundamental analysis is also important, as well as the justification of the possibility of using artificial neural networks in forecasting fluctuations in exchange rates.

While studying these problems, attention should be paid to the works that:

- disclose international settlements and currency transactions (De Grauwe, Dewachter, & Embrechts 1993; Shemet, 2009);
- deal with basic issues of international finance (Jones & Netter, 2008; Rogach, 2003); and
- illustrate the international business environment (Vergun, 2007; Meier, 2002).

The issues of technical analysis in the international currency market were considered

(Likhovidov, 1999; Rogovskaya-Ischuk, 2009; Murphy, 2004; Jorion, 1995; Hsieh, 1989; Brooks, 1996). The works by Mezentsev (2001) reveal the problems of modeling crisis phenomena in the foreign exchange market. General issues of the functioning of foreign exchange markets were studied by many researchers (Pakhomova, 2015; Pruskyi, 2006; Yakimkin, 2005) who describe the FOREX market in more detail.

However, the authors of the publications focus on the mathematical tools in the technical analysis, while the fundamental analysis is used primarily in theoretical and heuristic views. In particular, the mechanisms of applying artificial neural networks are disclosed by Baestaens, Van Den Bergh, and Wood (1994), Lam (2004), Onder, Firat, and Hepsen (2013), Galeshchuk (2016), Mozolevskaya (2017), Levitskaya and Romanov (2017). However, the use of neural networks to forecast currency fluctuations exclusively from a technical point of view does not give an acceptable result, since, for example, deviations of 1-2%, which are completely permissible for such calculations, correspond to deviations of the currency pair by 100-200 points which can lead to huge losses.

Successful activities in the foreign exchange market involve the combination of fundamental and technical analyses. Therefore, the idea arises of creating neural networks that take into account not only technical but also fundamental factors, which will significantly improve the accuracy of forecasting. But in this case there is a need of a more thoughtful and prepared learning sample, in which atypical cases are sorted by groups of fundamental analysis factors.

Special attention deserves consideration of cases when the situation in the market develops according to the scenario that goes against forecasts, and it is necessary to identify the causes for such differences.

2. METHODOLOGY

The objective of the article is to study the influence of political and economic factors on the situation on the world foreign exchange market, and to sub-

stantiate the importance of fundamental analysis in forecasting currency rates.

The data from quotations of the international currency market FOREX became materials for the article. Based on the analysis of the dynamics of the leading world currency pairs in recent years, the period from October 2016 to April 2017 was chosen, since at that time a number of currency fluctuations that are not amenable to technical analysis were observed. In particular, that period was full of significant events in the world political and economic arena which are powerful levers of the traders' behavior, and hence the direction of the dynamics of key currency pairs, namely:

1. US presidential elections and the inauguration of Donald Trump.
2. An increase in the Federal Reserve interest rate from 0.5% to 0.75% on December 14, 2016 and to 1% on March 15, 2017 as the signal of expectation of further US economic growth and an increase in the attractiveness of the dollar for investment.
3. Zero interest rate of the European Central Bank, unchanged since March 2016, in conjunction with the asset purchase program as evidence of unjustified inflation expectations and stimulating the growth of the European economy.
4. Political and judicial processes related to the procedure for the exit of Great Britain from the European Union which had a powerful impact on the quotes of the British pound.

The results of the study can be generalized and extrapolated to the assessment of the influence of such factors on the situation in the world currency markets as a whole.

In the process of research, general scientific methods of cognition of economic phenomena and processes have been used. The object of the study is the operations in the world foreign currency market. The subject is the trends of the world currency market and their driving forces.

3. RESULTS

3.1. Analysis of the influence of factors that are subject to investigation within the fundamental analysis

Fundamental analysis distinguishes four groups of factors, which mainly influence the market:

- economic factors;
- circumstances of force majeure;
- political factors;
- rumors and expectations.

Political and economic events in the US and the EU in October 2016 – April 2017 may be considered as the impact of these factors.

In early October 2016, just before presidential election in the United States, the rate of the pair EUR/USD was about 1,1100–1,1200 (see Figure 1).

Most experts agreed on the opinion that Trump's victory, with his rather radical statements during the pre-election campaign, would negatively affect the position of the US currency.

Prospects for the dollar index looked very pessimistic (Figure 2).

However, on the other hand, the euro was under pressure of the European Central Bank's policy with extremely low interest rates: –0.40% on deposit funds and 0.00% at the refinancing rate. At the October meeting, these rates were not changed, against the background of which the rate of the European currency fell significantly. This was especially negative considering the expected further increase of the Federal Reserve's rate in December 2016.

Therefore, political and economic levers influenced the EUR/USD pair in different directions.

Simultaneously, in early November, the British currency began to appreciate against the lost of the British court on the procedure for exiting from the EU.

Source: <https://www.investing.com/currencies/eur-usd-chart>

Figure 1. Dynamics of the EUR/USD pair at the beginning of October 2016

Source: <https://www.investing.com/quotes/us-dollar-index-streaming-chart>

Figure 2. Dynamics of the dollar index at the beginning of October 2016

The very day of the elections in the United States (November 8th) had an extremely negative impact on the US dollar. In particular, the EUR/USD pair rate jumped immediately by 300 points.

However, the effect was extremely short-termed and the next day the dynamics of the rate returned to the previous position (Figure 3).

And the euro did not stop falling. The attitudes of traders were changing with the forecasts of parity of euro with dollar. In December 2016, Bloomberg respondents believed that in 2017 Europe's single currency would overcome the USD 1 mark. This forecast was given by 10 out of 53 analysts. According to Deutsche Bank, in 2017, the euro should reach the level of USD 0.95. Meanwhile,

Source: <https://www.investing.com/currencies/eur-usd-chart>



Figure 3. The EUR/USD pair rate jump on the day of the US presidential election (November 8, 2016)

Source: <https://www.investing.com/currencies/eur-usd-chart>



Figure 4. The impact of the increase in the discount rate of the US Federal Reserve (December 14, 2016) on the EUR/USD pair rate

Societe Generale and National Australia Bank were confident that the European currency equated to the dollar as early as April 2017.

By mid-December, the euro with its negative dynamics reached the mark of the early 2000s. One of the reasons for this were also the results of the

referendum in Italy where people voted against the draft constitutional reform proposed by the Prime Minister Matteo Renzi. The document provided modifications of more than 40 articles of the Constitution of Italy. The Prime Minister acknowledged the defeat of his reform and announced his intention to leave his post.

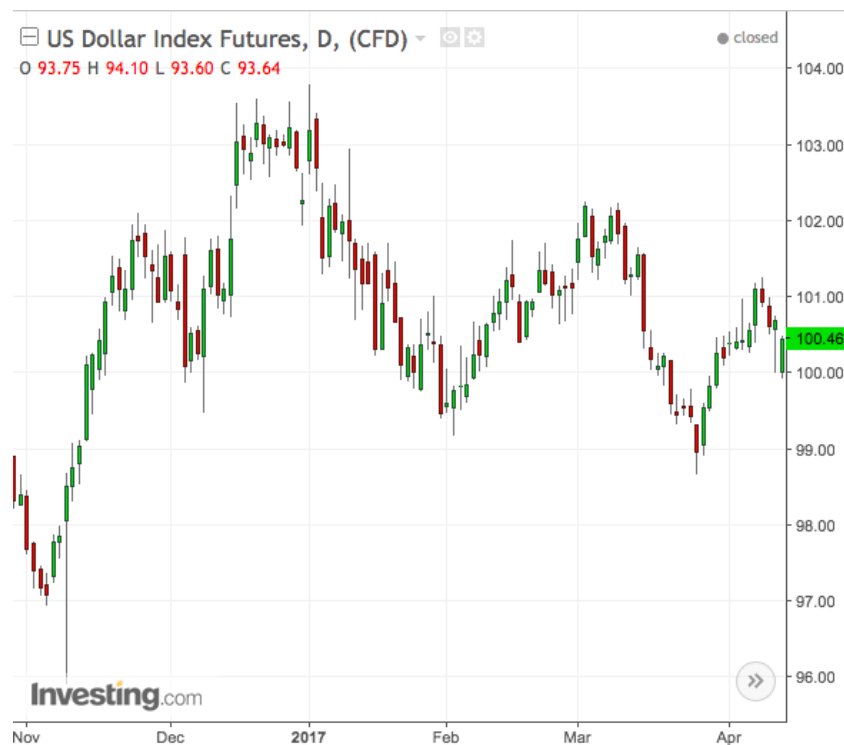
Source: <https://www.investing.com/quotes/us-dollar-index-streaming-chart>

Figure 5. Dynamics of the dollar index from November 2016 to April 2017

On December 14, the US Federal Reserve increased the discount rate from 0.5 to 0.75%. This resulted in a new failure of the euro (Figure 4).

On December 19, the results of the elections confirm Trump's victory.

On January 3, 2017 at 17:13 Kyiv time, the EUR/USD pair rewrote the multi-year minimum, dropping to the level of 1.0340.

On January 5, a new impulsion to the British pound was given by the expected speech of Theresa May who was to announce a tough scenario for the country's exit from the European Union. This meant that Britain would exit from the single European market, which would allow it to impose restrictions on the freedom of employment for the EU citizens on the territory of the kingdom. A tough scenario envisages the expulsion of Great Britain from the Customs Union. This will enable the British government to begin negotiations on bilateral free trade agreements with the United States and Australia.

However, on January 24, the British Court banned Teresa May from launching Brexit.

On January 20, Trump officially enters the office of the President of the United States.

And from the end of January to the beginning of February, the dollar depreciates due to a decrease in optimism about the stability of the US economy in the statements of the leadership of the Federal Reserve that some market inflation rates remain low.

However, already on March 15, there is a regular increase in the discount rate of the US Federal Reserve System, and this time up to 1%.

Also in mid-March, the British Parliament approved Brexit and the rate of the British pound continued to decline.

At the end of April, for the uncertainty of the euro was the presidential election in France, where the victory of a radically minded Le Pen could repeat the Brexit scenario and cause the fall by hundreds of points. However, already in the first round, she gains only 22%, which reduced the negative feeling in the foreign exchange market and gave the EUR/USD pair a boost.

Summing up. The leadership of Donald Trump in the presidential race and his radical temper foreshadowed the rapid depreciation of the US currency due to fears of traders. However, the real picture was directly opposite. This can be seen on the graph of the dollar index (USDX), which shows the ratio of the US dollar to the basket of six major currencies (Figure 5).

The above-mentioned dynamics is illustrated quite clearly by the so-called Triffin paradox: “the deficit of the balance of payments is getting worse and worse, and the trust in the dollar is getting higher and higher”.

The opposite policy of the Federal Reserve System and the European Central Bank has repeatedly caused forecasts of the parity of the euro against the US dollar. Doubts were, basically, in terms of the onset of this parity. However, even in this case the expectations of traders did not materialize (Figure 6).

In addition, it is interesting to study the pair of GBP/USD (British pound/US dollar) in connection with the BREXIT events. Here, too, negative

expectations were not fully justified. After a short-term shock, the rate of the British currency stabilized, albeit at low, but by no means catastrophic marks that were observed immediately after the referendum (Figure 7).

A few more recent similar cases can also be used to analyze the discrepancies and training of neural networks.

Overnight into June 9, 2017, the British pound lost more than 300 points against the US dollar. The reason was the defeat of the “Tories” in the elections to the Parliament of Great Britain. Theresa May’s party did not score the majority.

On July 26, the dollar rate fell across the whole spectrum of the market after publishing of the result of the meeting of the Committee for Open Market Operations (FOMC) of the US Federal Reserve System. As expected, the federal funds rate was maintained in the range of 1.00-1.25%. Much of the final instruction of the US Federal Open Market Committee (FOMC) remained unchanged from the June statement.

Source: <https://www.investing.com/currencies/eur-usd-chart>



Figure 6. Dynamics of the EUR/USD pair from November 2016 to April 2017

Source: <https://www.investing.com/currencies/gbp-usd-chart>

Figure 7. Dynamics of the GBP/USD pair from October 2016 to April 2017

Two increases in 2017 at that time had already taken place. And the question arose whether there would be a third raise. Apparently, the market less and less believed in it.

The next meeting of the US Federal Reserve takes place on September 20, 2017. The rate also remained unchanged but this time the market was ready and reacted in the opposite way. The dollar quickly wins positions relative to other currencies, in particular, against the euro about 160 points per hour.

3.2. Systematization of currency fluctuations that is not amenable to technical analysis

The above cases of discrepancies in the dynamics of currency pairs with forecasts have been divided into three groups according to the factors of fundamental analysis: economic; political; rumors and expectations. The fourth group, which is the circumstances of force majeure did not show any tangible influence during the study period. Results will be formed as Table 1, which will help

to structure the sampling of data to feed it to the neural network input.

4. DISCUSSION

Further objective is a more comprehensive analysis of the discrepancy between real trends and expectations of traders, as well as the development of the methodology for forecasting such discrepancies in the future. This can be used as a powerful tool for a trader in the FOREX market.

For the technical analysis, there is a whole mass of indicators, mathematical methods and mechanisms. The fundamental analysis is much less deterministic. To apply at this level a purely mathematical apparatus is already inadvisable due to a significant stochastic component, which combines the action of the above-described factors.

In our opinion, the use of artificial neural networks is the most promising in this direction. That is, mathematical models that are built on the principle of the organization and functioning of nerve cell networks of a living organism.

Table 1. Cases of currency fluctuations that are not amenable to technical analysis, divided by groups of fundamental analysis factors

Source: Compiled by the authors.

Time line	Event	Currency pair	Group of factors	Trend of dynamics
Mid-October 2016	Meeting of the European Central Bank, discount rate unchanged	EUR/USD	Economic	Small correction and the continuation of the fall in the euro
Beginning of November 2016	The lost case at the court on Brexit	GBP/USD	Political	Reversal in negative dynamics, pair growth
November 8, 2016	US Presidential Elections	USDX, EUR/USD	Political	Short-term increase, followed by an unexpected fall in the euro
December 14, 2016	The increase in the rate of the US Federal Reserve from 0.5% to 0.75%	USDX, EUR/USD	Economic	Despite meeting expectations, the pair's failure by 300 points
December 2016	Forecasts by Bloomberg, Deutsche Bank and National Australia Bank about the soonest parity of the euro with the dollar	EUR/USD	Rumours and expectations	Rebound from the multi-year minimums and the growth of the euro
January 15, 2017	Speech by Teresa May on a tough exit scenario from the EU	GBP/USD	Rumours and expectations	Strong push down
January 24, 2017	Court prohibition to launch Brexit	GBP/USD	Political	Return of the pair to the levels of mid-December 2016
End of January – beginning of February 2017	Statement by the leadership of the Federal Reserve System of the USA on low inflation rates	USDX	Rumours and expectations	Fall of quotations of the American currency
March 15, 2017	Raising the rate of the Federal Reserve System from 0.75% to 1%	USDX	Economic	Economic Dynamics reversal and growth of the US dollar rate
Mid-March 2017	UK Parliament approves Brexit	GBP/USD	Political	Pair reversal and new fall of British pound
End of April 2017	Presidential elections in France, defeat of Le Pen	EUR/USD	Political	Push for growth of the pair upwards
June 9, 2017	The defeat of the "Tories" in the elections to the British Parliament	GBP/USD	Political	Pound drop over the night by more than 300 points
July 26, 2017	Meeting of the US Federal Reserve, preservation of the discount rate	USDX	Economic	Fall of the dollar rate across the entire spectrum of the market
September 20, 2017	Meeting of the US Federal Reserve, preservation of the discount rate	USDX, EUR/USD	Economic	The opposite effect, a sharp drop in the euro

Neural networks are not programmed. They are trained. This is their main advantage over traditional algorithms. In the process of training, the neural network is able to identify complex dependencies between input and output data, and perform generalization.

The cases described above can be used for training a neural network, as well as other examples of both relatively stable periods in currency markets and periods of increased volatility caused by various political or economic reasons. Choosing the data for training the network and processing is the most difficult step in solving the problem. The source data is converted into the form in which they can be fed to the network inputs. In the process of training, the network scans the training sample in a certain order.

The neural network's ability to predict directly follows from its ability to generalize and isolate the hidden dependencies between input and output data. After training, the network is able to predict the future value of a certain sequence based on several previous values and (or) some existing factors at the moment.

For example, Table 1 can be expanded by various features of each case, its prerequisites and parallel processes. The wider and more detailed each element of the sample at the input of the neural network is, the faster and more qualitatively it will be able to recognize the possible patterns of influence of fundamental factors, combine them with technical analysis and form a viable forecast for the dynamics of the index or currency pair.

Thus, the artificial neural network can be a device that can be used in weakly structured and unstructured tasks which makes a fundamental analysis in the FOREX market and forecasting exchange rates.

Moreover, mistakes and inaccuracies in the first stages of the use of the neural network can be applied further to its input as a training material, increasing the accuracy of its operation.

CONCLUSION

The dynamics of currency pairs, particularly in the FOREX market, is a complex stochastic process that can not be described and predicted using purely technical analysis. Therefore, in the period of important political and economic processes, fundamental analysis comes to the forefront. However, even the synthesis of technical and fundamental analyzes does not give full confidence in the forecasts.

Between October 2016 and April 2017, the election of the US President was the most important political event in the world. The victory of Donald Trump has made a lot of adjustments to the dynamics of currency pairs but in the force and duration of influence, perhaps, lost to the policy of the Federal Reserve System of the United States. The phased increase in the discount rate as an indicator of the economy growth has repeatedly strengthened the position of the US dollar in international currency markets, and the delay in the next increase, on the contrary, has weakened these positions.

The referendum on the exit of Great Britain from the European Union, the so-called Brexit had the key influence on the rate of European currencies, i.e. the British pound and (to a lesser extent) the euro. Immediately after the referendum, multi-year minimums of the pound's exchange rates to the key European currencies were updated. In particular, the pair GBP/USD traded below 1.1500, which is the absolute minimum since 1985. Also Brexit shook the position of the euro. But soon the rates were adjusted, and the consequences were softer than many predicted.

Therefore, the use of fundamental analysis makes it possible to assess the trend and scale of changes in the rates of the world currencies, and in combination with technical analysis is an integral tool for successful trading and forecasting the dynamics of currency pairs. It is substantiated that to apply at this case a purely mathematical apparatus is already inadvisable due to a significant stochastic component which combines the action of the above-described factors.

It is grounded that the using of artificial neural networks as a mathematical models that are built on the principle of the organization and functioning of nerve cell networks of a living organism is the most promising in this direction. Artificial neural networks can be considered as a promising instrument of fundamental analysis on the FOREX market. After training on the selection of data on past fluctuations of the rates and their causes, the network can be used in future to predict and make decisions along with the existing set of technical indicators.

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