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A Method for Investigating the Alterations in the Price Trends of the Currency Markets and Forecasting of Probable Future Alterations

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Abstract: *The paper discusses some tools developed to aid the forecasting of the price tendencies on the currency markets. The most frequent disadvantages in making currency deals with the purpose of investments and profits are indicated. A solution is proposed that attempts to decrease the risk rank, aiding the discovery of possible market corrections or of a lasting change in the market trends. Investigations which prove the efficiency of the method proposed are realized. All this leads to the conclusion that this method might be of interest in future analyses of the market tendencies. Possibilities are considered for combining with other tools and techniques of forecasting, in order to achieve better precision with the purpose to decrease the risk in undertaking investment actions.*

Keywords: *Currency markets, price trends, alterations forecasting, Moving Average (MA).*

1. Introduction

The markets in their essence have been existing in one or another form for centuries. It is known that the bank-notes and the checks of the tradesmen and bankers existed in Babylon since twenty centuries b.c. Some known facts suppose that during 12th century in most of the town markets there existed markets, connected with the arbitration network [4].

The stock markets were developed later, when more complex financial tools were designed, accepted and traded, such as securities of the state loans. The earliest famous stock markets have appeared in 14-th century in the Mediterranean towns of Pisa, Venice, Florence, Genoa, Valencia and Barcelona. The first building, constructed as a stock market, was built in 1393 in Barcelona. With the appearance of the stock markets, the speculators and investors started to operate [3].

It is assumed that the method of analysis and prognosis of the markets and prices has appeared since that time – the technical analysis. Though ancient, its history is not well documented. It seems very probable that the speculators of that time would have written down the prices of these improved markets and would have found a way to profit on the account of this data. Even if the prices were not written on a paper by a pencil, the storing of the past prices and the use of these records could have been a type of technical analysis. Up to 1985 there is data about 339 commodities, traded on the streets and cafes in Amsterdam [8].

Up to the present moment the use of technical analysis has turned into unalterable part of the investor process of decision making. It is a fact that some technical analyzers, like Robert Prechter have predicted the global financial crisis years before it started.

2. Modern technical analysis

Charles Dow (1851-1902) is considered to be the father of modern technical analysis. The main accents, defined by him, can be presented in the following order.

1. Indices of the auctions for measuring the efficiency of the stock markets:

The modern financial currency tools include the currency index. For US dollar this is the dollar index. It enlists a basket of currencies which form the value of the index.

2. **The market and its direction (prices) is constructed by three main trends:**

The three main types of trends (primary – main, secondary – correcting, tertiary – short-term or daily).

a) The primary (main) trend reflects the direction of the long-term movement of the prices. Such type of a trend (Fig. 1) is presented on the graphic for the period from 1972 up to 2012 for the USD and the Japanese currency JPY. This is very important information about the investors, because it gives an idea what is the long-term tendency of the prices direction. This type of trends is more constant and they alter their direction very slowly. That is why it is considered that if they do not demonstrate any patterns of change, it is better to make deals in their direction.

b) The secondary trend is correcting the primary one. The secondary trend (Fig. 1) can be noticed at moments when the price is moving opposite to the primary trend. It is obvious that its movements are shorter, though in this case they last for years. After them the price manages to reach a new, lower than the previous one bottom, which is a sign of confirmation of the primary trend. The experienced investors try to recognize and predict the end of these corrections, in order to earn by the movement to the next lower bottom or top.

c) Tertiary (daily, short-term) are short-term movements that could be in any direction (down, up and sideway). Their time frame is small and they may be a part of each one of the upper two trends. They are often used by the more common speculators, in order to make short-term deals with the purpose of rapid profits. They are a subject of analysis by investors that have long-term aims as well, because they could give detailed information about the current state of the market.

Fig.1. 40-years market trend of the US dollar and Japanese yen

- **It is necessary to seek for confirmation of the indices**

The index of a given currency is defined, forming its average value on the basis of a basket of currencies. Reflecting this value for a certain time period determines the index trend. Probably the most famous among the indices is that of the US dollar (US Dollar Index (DXY)), because it is established as worldwide currency and is one of the most often traded. As an application of the index, let us consider the example with a currency pair of Euro versus US dollar. Let us assume that at a given moment the dollar is considerably getting up with respect to the Euro. We relate the alteration period with the dollar index, wishing to trace how its value has changed. If it has not altered its value proportionally, this means that no tendency of American dollar rising is available, but simply the Euro is in a period of devaluating in comparison with the dollar and other currencies.

- **The deals volume is taken into account when confirming the market trend**

The volume of the money flows is one of the most complex for evaluating elements, used for the purpose of prognosis analysis. The reason is that on the currency markets, besides the inter-bank currency operations, all subjects of real economy are participating. And their actions cannot be measured so precisely. That is why the volume of the currency markets is considered an approximate value.

• **The market trend is valid until a change in its direction is not confirmed**

A change in the trend happens when the price refuses to reach a new bottom or top according to the trend direction. Observing the 11-years trend for Euro and US dollar, it can be accepted that for this pair the main trend is not confirmed at this stage. Fig. 2 follows below.

Fig. 2. Trend of the Euro in relation to the US dollar

Referring Dow's theory to currency markets, it becomes clear that it is a good basis for starting the analysis of the currency trend. Nevertheless, in order to increase the accuracy of the result, it is necessary to apply more than one tool for analyzing the market trend. For example, we could improve Dow's theory, applying the wave theory of Ralph Nelson Elliott – Elliott's Wave Theory (EWT).

The basis of Elliott's theory describes the market structure as series of waves of different length and magnitude, inserted one into another. The conclusion is that all the markets consist of five waves, and all bear markets – of three waves. It follows that each bull phase comprises three pulse waves (1, 3 and 5), as well as two correcting waves, located in-between (2 and 4). The bear phase consists of two correcting pulses (A and C) and one correcting wave with opposite direction between them (B). Fig. 3 presents the model described.

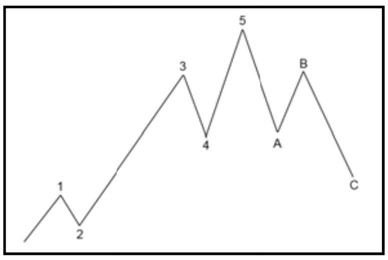

Fig. 3. Presentation of the main wave principle of EWT

Besides the main model discussed, it must be taken into account that the correcting stage of the trend (A, B, C) tolerates much more variables than the presented structure. Fig. 4 gives an example analysis of a currency trend of the Euro and the US dollar with the help of EWT.

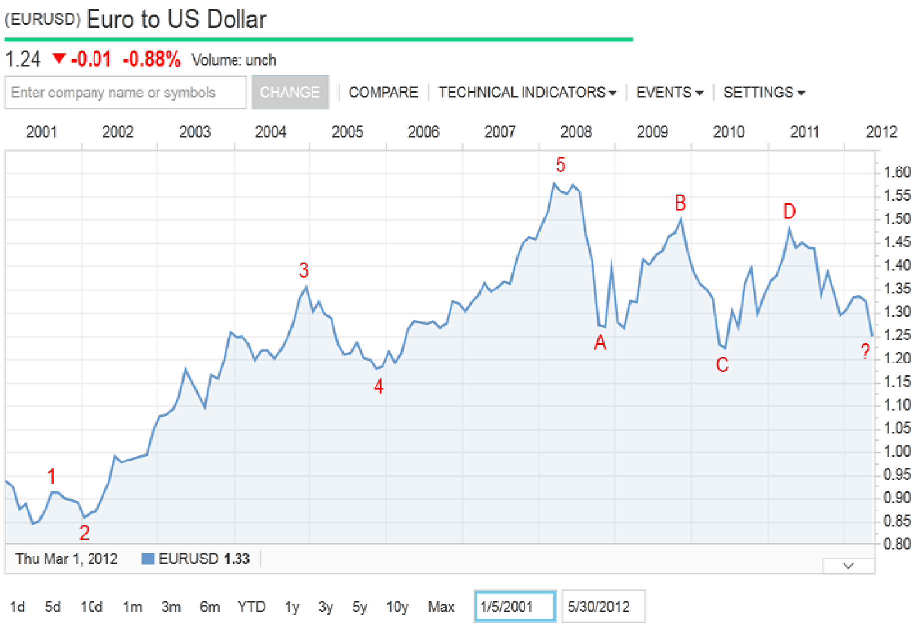

Fig. 4. Example analysis of the Euro in relation to the US dollar with the help of EWT

Thus with the help of the graphics and EWT analysis of the currency trend EUR/USD, one almost 8-years pulse of three rising (1, 3 and 5) and two correcting waves (2 and 4) can be defined. Nevertheless, up to the present moment the graphics indicates one correction with a more complex structure. Probably it is not yet completed and lasting at present almost four years, described by the points A, B, C, D and ?. This does not contradict to EWT, because according to it the formations of the corrections are various and complicated.

Some specialists believe that EWT is difficult for applying, and some are even rejecting it. However, it is a fact that outstanding analyzers and specialists of stock market practice have relied on it, even extending it. As an example, the names of William Gann, Tom De Mark and Robert Prechter could be mentioned. The latter uses EWT even as a basis for defining the psychology of the market participants. This has resulted in the creation of a new theory, called socionomics.

From the above exposed it can be accepted that sufficiently reliable methods of analysis are available that give an idea about the tendencies of direction of a given currency trend. In spite of that, the risk to make a deal at an inappropriate moment and not completed market correction, is very realistic. This can lead to considerable losses or bankruptcy. Another possibility is to freeze the portfolio resources for long-term trading. Let us consider the situation below described by an example:

Imagine that an investor has purchased Euros in exchange of US dollars at the end of 2004. This could lead to one of the losing situations described until this moment. The reason is that in the period from the end of 2004 up to the end of 2005 there was a tendency of Euro value dropping with respect to the dollar (Fig. 5). Or more exactly, the primary trend is in a correction phase. This could lead to losses in case the investor does not possess the financial possibility to stand this considerable market movement. In case he possesses the financial possibility and can afford to wait, he/she will block his/her resources from the beginning Q2 of 2007, so that the initial value of the investment will only be reached.

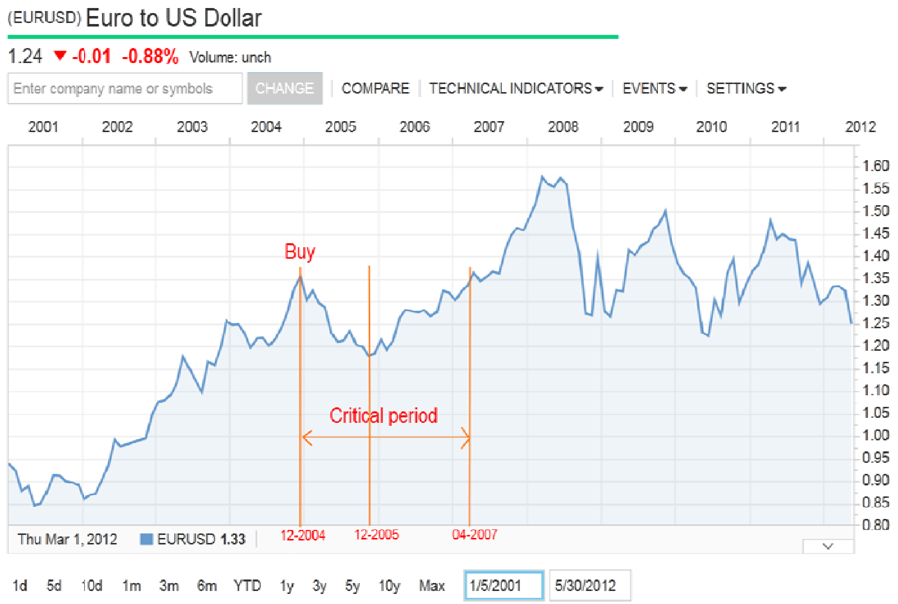

Fig. 5. A critical period for Euro purchase in exchange of an US dollar

It would be nice to know more about the status of the market at a given moment. For example, if the larger part of the participants have bought or sold enough up to the moment and if there are not many, that could move the price in the given direction. This is the case when the market is influenced by any strong sentiment. Our emotions, concerning the market movements when investing, can be one of the obstacles at such a moment. Besides this, the continuous movement of the price in a given direction is also misleading the psychics. The long-term duration of the trend movement in a given direction could cause a feeling of security and optimism in the participants. It is often neglected at such moments that everything is after all cyclic. The market changes its direction not when expected, on the contrary – it often appears that up to the last moment before the collapse, the mood was extremely optimistic. One of the ways to avoid this is to have more information, but in most of the cases we either do not have it or it comes when the market has already consumed it. Another way is to have the appropriate tool, which will warn us about the high probability to reach such a moment.

A market indicator, determined on the basis of another indicator, known as the Moving Average (MA) could be proposed as two solutions.

- **Moving Average.** This is an indicator invented to trade in the direction of the current trend. Its calculation is accomplished, averaging the prices at opening and closing for a given time framework. The concept of MA is that the curve it draws, if close or pierced by the trend, may be accepted as a signal for opening a position. It also smoothes the oscillations of the trend, formed along its length. In an ascending trend MA sinks below the trend, in a descending one it emerges above it.

MA calculation is realized, collecting the prices of a given market instrument for the last *N* periods, that are then divided by *N*. The time period of the value *N* is not defined, it is evaluated by the analyzer. There is a special feature however that if MA must be computed for a period of 14 days, it is necessary to have data covering more than 14 days. This is imposed because the 14-days moving average can be obtained after the price at the 14-th day appears on the graphics.

- **Determining the period of MA.** For the purposes of the present investigation we shall accept a value of 21 days. We select this periodicity, because we suppose that the line obtained is sufficiently balanced for the needs of the analysis. A very small period could make it too quick and sharply moving around the trend. A very long period could make it very smooth, will move it away and will slow it. But it is possible to experiment with this constant and with other values, looking for a more appropriate variant after individual evaluation.

Fig. 6. 21-days MA of a currency trend of a British pound in relation to Australian dollar

From the graphics (Fig. 6) it is obvious that the line of the 21-days MA follows the trend, smoothing slowly the movement. But this interpretation, that MA follows the trend, is developed in the conventional way of applying this indicator. However, now we shall apply a different way that could also give important information about the market and the price tendency. Let us imagine the opposite – that MA is moving independently in its 21-days period and the trend gravitates around it. Thus the conclusion can be made that the trend could move away from MA, but no matter how it moves, it always returns to it and even crosses it at a given moment. This is an important fundamental fact, for after the trend drifting away from MA at a given distance, its return could be expected. That is why MA gravitation again attracts it. This can be a correcting movement or a turn in its direction. Now this critical distance has to be defined and a signal will be expected, when the alteration would occur.

When analyzing a market trend and MA of USD/CHF (Fig. 7), it becomes obvious what is the critical distance, at which the price gravitates around the 21-days MA. Hence, after determining this relation for a given market tool, it can be considered, that after this point it enters the zone of over purchases and over sales. But reaching the critical distance does not mean that the price would not go still further from MA orbit, but that it has reached the critical limit. Then it will be better to be more precautious and to expect corrections. However, the actions at that moment can be selected according to the different trade strategies of the tradesmen. Some more cautious of them would wait for the development and completion of the correction. After that they will find possibilities to open positions at more profitable levels in the trend direction. Others, more aggressive, might use the signal to open short-term positions in a direction opposite to the trend, with the purpose of rapid profits. The more conservative ones would close their positions and collect the profits. Then they would probably wait for the price return to MA, in order to open new positions with the smallest possible risk in the trend direction. Some actions, not described herein, could also be undertaken, according to the individual market strategy of each participant on the market. But independently on the various trade strategies, the fact that a signal has come to reconsider the situation, cannot be neglected.

Fig. 7. 21-days MA and defining of a gravitating trend for USD/CHF

On the basis of the graphics and the analysis (Fig. 7) the critical values of trend shifting away from the 21-days MA can be noticed. For this pair it could be accepted that each value larger than 310 pips is critical, i.e., we enter the zone of over purchases and over sales. Hence, it would be reasonable to reconsider the positions when reaching it. In this case a trailing stop, maintained by the modern platforms of trade, could also be used. This type of the stop gives the possibility to shift the position of automatic closing after a certain number of pips beyond the current price. Thus, if the price passes through more pips after a defined critical zone and begins a return to MA, a better profit will be obtained.

Besides the signal for defining zones of over purchases and over sales, still more information can be derived from this method, such as the formation of deeper market corrections or a turn in a market trend (Fig. 8). In fact this is a matter of interpretation, dependent on the time frame, in which the market is observed

Fig. 8. 21-days MA and determining of the gravitating trend for GBP/AUD

Analyzing the cycles for the currency pair British pound to Australian dollar (Fig. 8), it can be assumed that the zone above 300 pips is critical for price moving away from the 21-days MA. From this example it is also obvious that the price manages to move away to still more extreme values in the zone of over purchases and over sales in MA orbit. It even reaches values, such as 449 pips on 17.01.2012 and 462 pips on 15.05.2012, that can be called extreme. The moving away of the market price in them is with more than 50 % from the critical zone also, that is close to the smallest registered value. This means that the market is over sold or over purchased and very strong sentiment is prevailing. Probably most of the speculators and investors have made deals and the market is overloaded by these actions. The price has moved too much and the appropriate moment has come to cash the profits and to reconsider the positions. Thus since already there are not many participants, moving the trend in one and the same position, a natural return occurs, that could prove to be a deeper correction or even a trend turn. That is why the conclusion can be made that the price entry in the extreme zones indicates higher probability for the market to cross the 21-days MA.

We may summarize that this method gives a different point of view in the analysis and prognosis of the market movements and the application of the moving average curves. This improves the accuracy of these indicators. But still it is better to have in mind the rule of technical analysis, that the forecasting of a tendency would be more precise if confirmed by more methods. As an example it can be combined with Elliott wave theory and fundamental analysis. As a whole, it is considered that this method can increase the percent of successful actions in selecting the market tendencies and making investment decisions.

References

1. Source of historical graphics.
http://investing.money.msn.com
2. F r o s t, A. J., R. R. P r e c h t e r, J r. Elliott Wave Principle: Key to Market Behavior, March 1998.
3. C a r r i e r e, C. Negociants Marseilles au XVVII Siecle, **Vol. 1**, 1973.
4. B r a u d e l, F. Civilization and Capitalism, 15th-18th Century. **Vol. I**. The Structure of Everyday Life. Civilization & Capitalism, 15th-18th Century, 23 December 1992.
5. M u r p h y, J. J. Technical Analysis of the Financial Markets. A Comprehensive Guide to Trading Methods and Applications. New York Institute of Finance, 1 January 1999.
6. G a n n, W. D. 45 Years in Wall Street, 2009. Preprint of the Original 1949 Edition.
7. K i r k p a t r i c k, C. D., J. R. D a h l q u i s t. Technical Analysis: The Complete Resource for Financial Market Technicians, 28 August 2006.
8. B o x e r, C. R. The Dutch Seaborne Empire, 1600-1800. Pelican, Paperback, 7 February 1989, Penguin Books. 392 p.

Метод исследования изменений в ценовых трендах валютных рынков и прогноз будущих вероятных изменений

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(Р е з ю м е)

В статье рассматриваются инструменты для применения в прогностике ценовых трендов валютных рынков**.** Обсуждаются некоторые недостатки заключения валютных сделок с целью осуществить инвестиции и прибыли. Предложено решение, которое уменьшает ранг риска. Все это дает основание принять, что метод будет полезным в будущих анализах рыночных тенденций. Рассмотрены возможности его комбинирования с другими инструментами и техниками прогнозирования с целью лучшей прецизности для уменьшения риска в инвестиционных действиях.