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Currency risk hedging

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Abstract

With the modern commerce, the need, coming from multinational operating company, for a specific tool/method used for the forecast of future evolution of exchange rates is more and more stringent.

So, in this paper, I have presented the main methods of future exchange rate evolution used in most of the papers related to this subject. Furthermore, I stated the main ideas drawn from a few studies that engaged the subject of using financial derivatives in order to build a relevant method of hedging against currency risk. Finally, after evaluating the results of the transactions placed according to 3 different technical indicators, I came upon the conclusion that the used method in this dissertation presents a great potential, regarding its use as a currency risk hedging process.

Introduction

The main idea used for the purpose of arguing the choice of this theme is the fact that of all methods of protection against foreign exchange risk, I consider that a hedging method realised through a mix of futures instruments and technical analysis associated with each financial asset, be it a classical one or a derivative, takes in consideration all the real, empirical characteristics of an asset. In this way, an essential information processing is being made, stricly regarding the price, which signifies a real value given by the market, by means of balancing the supply and demand for that financial instrument.

I consider that any other method, with its advantages, isn’t as capable in finding and processing values as close to the real evolution of the quotation, as well as the technical, chartist method. Therefore, in this paper I will try to explain, through rational and valid arguments, the practical advantages of using this mix in initiating transactions in an adequate conditions, in terms of effective protection against currency risk. In order to achieve what I intended, I will have to introduce the terms, concepts and framework in which the analyzes are being conducted.

I begin by determining, in the chapter called "Theoretical knowledge framework", the origins and main features underlying the notion of international exchange rate. Also, so to outline the main methods by which you can manage an effective hedging process, I present a brief enumeration of them.

The next chapter, entitled "Previous research", brings forth a summary of some relevant analyzes closely related to this paper.

The last part of the paper brings actual economic arguments used to boost the benefits of using this mix of methods. Firstly, the main fundamental characteristics of the analytical

methods are presented, in opposition to the main concepts of informational efficient markets, following that, after this, to be broadly described in the multitude of constitutive and defining elements. It is also the section dedicated to the case study of this dissertation, in which I will consider three technical analysis indicators, similar in respect to the type of emitted trading signals, following that each of them to be integrated into a automated trading system. The results thus obtained will be analyzed in terms of risk, cost-effectiveness and efficiency of the generated transactions, in order to indicate the extent to which this method is capable of determining a relevant future evolution of the exchange rate and, hence, its effectiveness as a hedging method.

In conclusion, I will clarify the relevance of the results that were reached, as well as the degree of their applicability in the real market .

Literature review

As for some of the most relevant studies made in respect to the general theme of this dissertation, I stumbled upon some opposite conclusions. Thus, Allayanis and Weston found out, after a study on almost 720 non-financial companies, that the use of derivative financial instruments having a currency pair exchange rate as an underlying asset, in order to hedge against the currency risk, presented, on average, a company value of 4,87% greater than of the firms not using this respective methods. Furthermore, in an 2009 paper by Bartram, Brown and Conrad, the benefits, in terms of reducing the overall and currency risk of several multinational companies, of this hedging instruments are highlighted. On the other hand, the results of the Hentschel and Kothari's "Are Corporations Reducing or Taking Risks with Derivatives?" study proves that the presence of the above mentioned financial instruments in the world of hedging methods used by american corporations is insignifiant compared to other currency risk protection modes.

Case study

In order to emphasize the practical part of this paper, I considered to be appropriate the use of a selection of several technical indicators in an automated transaction placing script (a robot) with the purpose of inserting transactions and evaluating their efficiency and risk.

All the initiated transactions were supported by a Metatrader platform, using a CFD contract (Contract For Difference – a type of a futures contract in which the payment between the parties consists on the difference existing among the current price and the initial settlement price) with the EUR/RON currency pair as the underlying asset, for the 2013-2014 period.

The idea behind this logic is that the transactions placed should be considered as hedging positions taken so that, given the efficiency and the risk of all the deals initiated, an entity could

minimize their currency risk (e.g. assuming a company has a net position on a currency, according to the before mentioned reason, it should initiate transactions on the exchange rate international market – FOREX, depending on its interest regarding the future evolution of that specific currency pair).

The three technical indicators used in my analysis are:

1. Random Walk Index
2. Stochastic Oscillator
3. Relative Vigor Index

After stating their definitions and optimizing the transactions that considered them, I've integrated each, in a build-up kind of a method – the first analysis included the first indicator, the second took into consideration the first 2 indicators and the third one was attached in the final analysis, into the transaction script.

For each scenario I was able to record the transactions placed according to the entry signals provided by the indicator/set of indicators taken into consideration. The process through which I generated the corresponding deals is called **backtesting**, that is, the method in which you use a predefined automated transaction placing script together with the historical data in order to place transactions and to analyze their net output.

After each indicator integration, I noticed that all the outputs improved - the total risk of the transactions was gradualy eliminated and the profitability grew. This led to the conclusion that the use of the three technical indicators all together can provide a reliable and relevant method of forecasting the future evolution of an asset price, the EUR/RON exchange rate, in this case.

Conclusions and proposals

After conducting the ensemble of each stage specific analysis of the case study, I concluded that such a trading vision, related to the integration of several technical indicators, presents real benefits. So, after defining the general concepts on how to determine the exchange rate, in the first chapter, we were able to identify the main modalities commonly used in analyzing and determining future relevant evolutions of the exchange rate.

I also started to select and define the most important methods of analyzing a financial asset, for the sole purpose of determining its future evolutions. In my approach, I even tried to sketch the main ideas that come to contradict these methods. Among these hypotheses, I found that although they present diverse arguments, theories as "Efficient Market Hypothesis" and "Random Walk Hypothesis" have a lot of challengers in our days. In fact, even the results of the analyzes carried out during this paper's case study come to refute the general character of the before mentioned theories.

Considering all this information on the theoretical concepts related to the field of financial markets and especially for the trading process part of it, I decided to test the impact that the integration of technical indicators will have in achieving an algorithm that will allow automatic trading, according to certain parameters and, implicitly, to a currency hedging method, using quotations provided by a CFD contracts provider for the EUR / RON exchange rate for the 01.01.2013-01.01.2014 period.

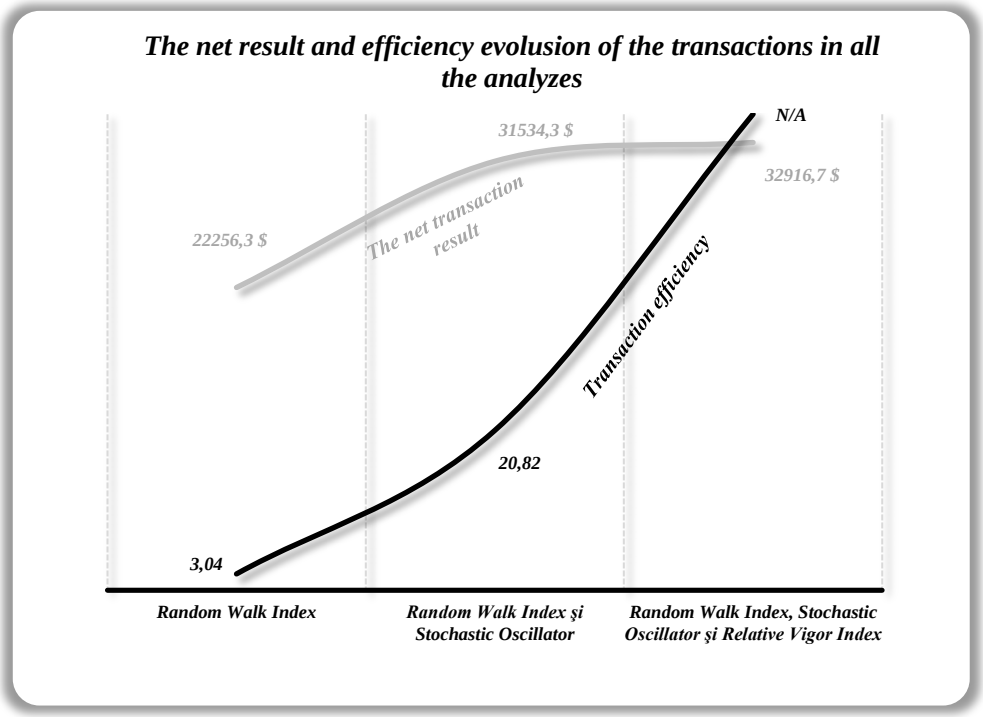
Thus, after having identified those indicators considered useful in this analysis, namely Random Walk Index, Stochastic Oscillator and Relative Vigor Index, formulated the general idea of each one and presented the corresponding formulas, I was able to integrate the indicators one by one in an quotation graph overlapping interface, in order to illustrate, by means of colored arrows, the opportune moments to initiate transactions, whether they were LONG (buy) or short (sell) type transactions. This particular process, of incorporating an increasingly larger number of indicators, actually consisted, primarily, in a simultaneous association of the signals generated by the Random Walk Index with those emitted by Stochastic Oscillator, followed after by the joining to this tandem of the transaction initiation moments identified by the Relative Vigor Index.

I found that as I implemented an even larger number of indicators in the previous mentioned interface, the number of trading signals decreased, also correlated with an increase in the efficiency of these signals, in the sense of an increased degree of anticipation of the future quotation evolutions.

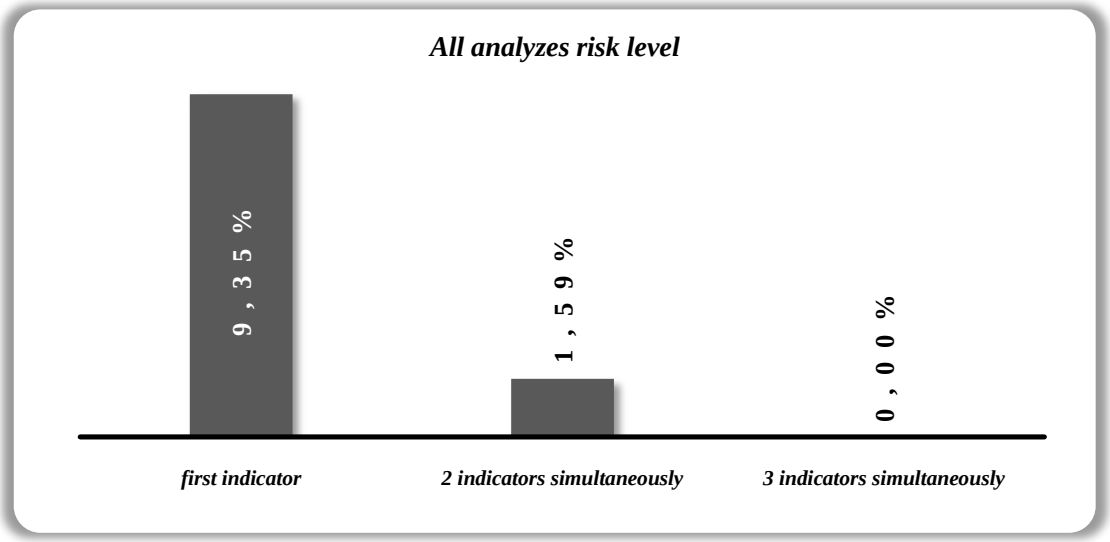
The final part of the case study permitted, through the backtesting phase – the simulation of transactions initiation using historical quotes - and the automated trading software implemented algorithm, the tracking of performance, in terms of profitability, efficiency and risk, obtained by gradual combination of several technical indicators. In this way, I obtained three different risk analysis, as follows:

- **a.** results obtained by using RWI;
- **b.** risk reduction percentage achieved by joining the Stochastic Oscillator indicator next to the Random Walk Index;
- **c.** the benefits, by means of decreasing the overall risk, resulting from the association of all 3 indicators: RWI, Stochastic Oscillator and RVI.

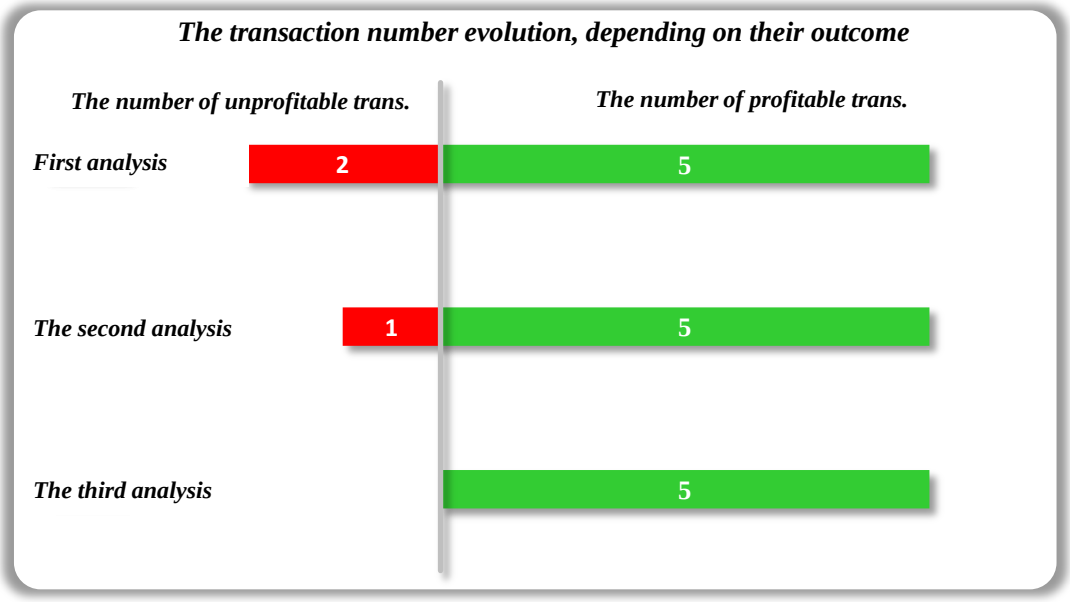
According to these three analyzes, I noticed that as the number of the indicators associated for testing grew larger, the viability of the signals was gradually improved, and the degree of the future evolution estimation experienced new highs, reaching even 100% in the final analysis. First place in the top levels of the associated risk reduction is occupied by the transactions based on all three indicators, followed by the value obtained when using the both the Random Walk Index and Stochastic Oscillator.



Onto the last position, in terms of net result obtained (an indicator for the ability to accurately forecast future evolutions of the EUR/RON exchange rate) stands the outcome provided by the use of a single indicator, namely Random Walk Index. However, an additional motivation in using multiple signal generator indicators is given by the fact that the discrepancy between the results of gradul insertion of the technical indicators techniques is significant.



As for the profitable transactions in total ratio, it can be observed, again, in the below chart, a major improvement, in the sense of a reduction of the total number of unprofitable transactions, along with the association of the third indicator. Adding this with the fact that the number of profitable transactions remains constant, we can firmly say that the procedure chosen in this paper, namely the association of an even greater number of indicators, is successful in its effort to find a viable way of identifying future evolutions of the exchange rate.



In conclusion, the main proposed objective, to identify a capable method for forecasting future evolutions of the exchange rate was achieved, particularly by eliminating unprofitable transactions from the described scenery. The market insertion of a number of transactions according to the signals generated by different combinations of indicators is synonymous to taking hedging purposes positions, with the entry and exit times the same, just the purpose being different. I have shown, therefore, that the implementation of a coherent technical analysis according to the market profile, can lead to remarkable results in the field of forecasting future price trends.

An entity may, therefore, given the aforementioned signals, coordinate and manage its cash in and out flow so that the net position for a specific currency to take into account the forecast generated by the indicators. Any change of a signal should be accompanied by an update of the net position for the foreign currency / currencies involved.

From a practical viewpoint, the analisys performed during this paper comes to prove that by finding ways to generate more efficient trading signals, a positive result can be obtained, in hedging terms on a real market. On the other hand, a major obstacle to widespread

implementation of such a method can be represented by the considerable costs associated with the plurality of entry and exit points in and from the market.

As for the scientific perspective, it can be stated that through the analysis of all the information and results obtained, all the hypothesis trying to demonstrate the market efficiency, from a informational point of view, are, again, contradicted. The impulsive character and "herd" behavior, specific for the human nature, causes irrational reactions in terms of the trading activity and not only, thus leading to a deviation from the ideas of "Efficient-Market Hyphotesis" or "Random Walk Hyphotesis" scientific hypotheses.

Bibliography

Anghelache, G. 2000, „Bursa şi piaţa extrabursieră". Editura Economică, Bucureşti;

Anghelache, G. 2004, „Piaţa de capital. Caracteristici, evoluţii, tranzacţii". Editura Economică, Bucureşti;

Bayoumi, T. and Eichengreen, B. (1994) „One money or many? Analyzing the prospects for monetary unification in various parts of the world";

Black, S. (1994) – „On the Concept and Usefulness of the Equilibrium Rate of Exchange", in „Estimation of Equilibrium Exchange Rates";

Clarida, R. and Gali, J. (1994) – „Sources of Real Exchange Rate Fluctuations: How Important are Nominal Shocks?"

Clark, P. (1995) – „Concepts of Equilibrium Excange Rates";

Cojocaru, B. 2012. Bursa românească, în topul creşterilor la nivel mondial anul acesta. http://www.zf.ro/;

Coricelli, Fabrizio and Jazbec, Bostjan (2001) – „Real Exchange Rate Dynamics in Transition Economies";

Cuaresma, Jesús C., Fidrmuc, Jarko and MacDonald Ronald (2003) „The monetary approach to exchange rates in the CEECs";

Ehlers, J. F. 2002. Something Old, Something New, Relative Vigor Index (RVI). Technical Analysis of STOCKS & COMMODITIES;

Engel, Charles and Rogers, John H. (1996)– „How Wide is the Border?"

Fama, Eugene 1965. Random Walks In Stock Market Prices;

Froot, K. A. and Thaler, R. H. (1990) – „Anomalies. Foreign Exchange".

Harberger, A.C (1950), „Currency Depreciation, Income and the Balance of Trade"

Hinkle &Montiel (1999) – „Exchange Rate Misalignment: Concepts and Measurements for Developing Countries";

Isard, Peter (1977)– „How Far Can We Push the <<Law of One Price>>";

Isard, P., Faruqee, H., Kincaid, G. R. And Fetherstion M. (2001) – „Methodology for current account and exchange rate assessments";

Kennon, J. Over-the-Counter Options, An Introduction to OTC Derivative. http://beginnersinvest.about.com;

Lo, A. W. şi Hasanhodzic, J. 2010. The Evolution of Technical Analysis: Financial Prediction from Babylonian Tablets to Bloomberg Terminals. Bloomberg Press: pag. 150;

Meredith, G. and Chinn, M. D. (1998) – „Long-Horizon Uncovered Interest Rate Parity";

Murphy, John J. 1999. Technical Analysis of the Financial Markets. New York Institute of Finance: pag. 1-5;

Nurkse, R. (1945a) 'Conditions of International Monetary Equilibrium', Essays in International Finance, No. 4 Princeton University;

Obstfeld, Maurice and Rogoff, Kenneth (1996) – „Exchange Rate Dynamics Redux";

Silber, K. 2009. The Earliest Securities Markets, Stocks and bonds have origins stretching back across the centuries. http://www.advisorone.com;

Stein, J. L. and Allen, P. R. (1998) „The Natural Real Exchange Rate of the United States Dollar, and Determinants of Capital Flows" in „Fundamental Determinants of Exchange Rates";

Obreja, C. Curs Pieţe de Capital, FABBV – ASE;

Legea nr. 297/2004 privind piaţa de capital, Cap. IV, Art. 69;

Legea nr. 297/2004 privind piaţa de capital, Cap. V, Art. 157, Alin. (2);

OUG Nr. 25 din 13 martie 2002 privind aprobarea Statutului Comisiei Naţionale a Valorilor Mobiliare, Art. 1 (Statutul Comisiei Naţionale a Valorilor Mobiliare), Alin. (1) şi (2);

REGULAMENT C.N.V.M. Nr. 3 din 1 februarie 2006 privind autorizarea, organizarea şi funcţionarea Fondului de compensare a investitorilor, Cap. I, Art. 4, Alin. (1);