

EXCHANGE RATE FORECASTING WITH MODIFIED MICROSTRUCTURE APPROACH MODEL

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ABSTRACT

The purpose of the article is to assess the exchange rate forecasting possibilities with a modified microstructure approach model. In this research, the main model's element order flow is represented by dealer clients' long/short positioning ratio. A regression analysis is done to distinguish whether it is possible to forecast the exchange rates with clients' long/short positioning ratio. Then three investment strategies are composed to compare the effectiveness of the forecasts. A conclusion is made that retail traders tend to position against the present exchange rate trend; moreover, as shown by the investment strategy analysis, the trend of the price changes just when the clients give up on their expectations and start to reverse their positions. On the other hand, none of the composed active strategies were able to outperform a simple buy and hold strategy.

Keywords: foreign exchange market, exchange rate forecasting, microstructure approach model, retail traders' positioning ratio, contrarian trading strategies.

INTRODUCTION

The foreign exchange market with its rapidly increasing turnover attracts the attention of many researchers. According to the latest data from Bank for International Settlements [1], the daily turnover in the month of April, 2013, was 5,345 trillion US dollars, which is 36.6% more than in 2010. This market is the largest financial market in the world. It is an over the counter system with many heterogeneous participants and many factors affecting the exchange rate, therefore it is a challenge to provide an appropriate model for forecasting the exchange rates.

Since the collapse of the Bretton Woods system there were many attempts to explain the changes in the currency rates with fundamental models. In these models the fluctuations of the exchange rates were caused by changes in the macroeconomical environment. But, even in nowadays researches a paper which was written in 1983 by Meese and Rogoff [11], is still being quoted. There the authors prove that fundamental exchange rate forecasting models are unable to outperform a random walk model in the short term periods. On the other hand, [9] suggests a "promising" [15] microstructure approach for exchange rate determination.

Microstructure approach releases the main assumptions of the fundamental exchange rate determination models and states that the exchange rate is affected by order flow, which is the difference between sell and buy orders initiated. If there are more buy orders, the order flow is positive, if there are more sell orders, the order flow is negative. It is worth to notice that these are the "signed" transactions, which means that the expectations of the market participants are backed by real money.

As stated above, foreign exchange market is an over the counter market with heterogeneous participants, therefore it is complicated to collect order flow from all the counterparties for the calculations. For that reason various sources and types of order flow data is being researched. In this research retail traders' long short positioning ratio is chosen as a proxy for the order flow which will require some modifications to the microstructure approach model. Therefore the **problem** arises: how is it possible to forecast the exchange rate fluctuations with retail traders' long/short positioning ratio? The **objective** of the research: to distinguish and evaluate the possibilities for forecasting the exchange rates with retail traders' long/short positioning ratio; The **tasks** of the research: to determine whether it is possible to forecast the exchange rate with retail traders' long/short positioning ratio, to evaluate the results of exchange rate forecasts based on retail traders' positioning ratio. **Methods** used in the research: analysis and synthesis of scientific literature, linear regression, analysis of statistical data provided by the trading strategy.

METHODOLOGY AND DATA

The concept of order flow attracts much attention from the researchers while in some research not only the order flow data in the microstructure approach models are used. [4] and [15] add the difference of two countries' interest rates, in both researches is shown that interest rate is unable to determine the changes in exchange rates without order flow data. [13] add commodity price index and a proxy for country risk level, but at the end they make a conclusion that the exchange rate is determined by interest rate differential and order flow. Interest rate differential and crude oil prices are added by [5]. [3] only use order flow to predict the exchange rate. Many variations of the microstructure approach models are used, although researchers agree, that the strongest relationship exists between order flow and the exchange rate.

Moreover, since the currency trading in microstructure approach models is done in two segments, the question arises which segment's data to use. The researchers use either customer, either inderdealer order flow. Customer order flow is composed of more segments and it is important to take that into consideration, as different customer segments behave differently. [12] show that asset managers' flows are associated with permanent shifts in future exchange rates, while hedge funds' order flow impact future exchange rates less, corporate customers' and private clients' flows represent uninformed trading, [5] decomposes order flow to commercial clients', Canadian financial institutions' (except dealers) order flow, order flow of foreign financial institutions (dealers included), and interbank order flow. The author shows that the changes in exchange rate were mostly affected by financial institutions' positioning, while other participants acted as liquidity providers. It is broadly shown, that financial customer order flow is positively correlated with exchange rate movements, while non financial customer order flow is negatively correlated [2]. [12] states that information in flows stems from trading with customers and not from inter-dealer trading, therefore customer order flows are more important for the research. According to [8], customer order flow is more widely researched in the literature than inter-dealer order flow.

Also, different methods for the empirical calculations are applied. [3] use linear regression, the same method was used by [15]. [8] used non-linear model and states that it is more appropriate for the calculations. [15] compose an investment strategy to evaluate the forecast efficiency and calculate Sharpe ratio. In this research a linear

regression model is going to be applied to see how the exchange rate fluctuations are represented by the order flow data.

For this research a client order flow of retail traders (individual clients and small companies) will be used. The dataset is provided by dealer Oanda and is open to public. The data provided by the same dealer was also used in the research done by [14]. The largest brokers and dealers in retail segment are presented in the table 1 below.

Table 1. The largest foreign exchange retail market dealers/brokers

No.	Dealer/Broker	Monthly turnover (\$ bln.)	Daily turnover (\$ bln.)
1	FXCM	321	14,6
2	Saxo Bank	232	10,5
3	GFT	200	9,1
4	Alpari	192	8,7
5	Gain Capital	161	7,3
6	IG Group	160	7,3
7	Oanda	150	6,8
8	FXDD	100	4,5
9	FXPro	98	4,5
10	Forex Club	80	3,6

Source: [6]

Dealer's Oanda daily turnover in 2011 was 6.8 bn. USD. In 2010 retail segment composed 8-10% of the overall spot daily turnover that is 125-150 bn USD per day [7]. Therefore the dealer's turnover composes 4.53-5.44% of the spot retail market. This is the only dealer which provides publicly accessible data which can be used for the calculations. FXCM also provides similar data to their clients, on the other hand, there are some periods in its dataset when the client positioning ratio was not calculated and it could affect the further calculations in this paper. Dealer Saxo bank show the long short positioning ratio in its website, but it is not possible to download the data. Therefore for this research dealer's Oanda dataset is chosen.

The long/short positioning ratio shows how many per cent of traders have long positions in a particular currency pair. For example, if more than a half traders, who trade the particular pair, have long positions, the long/short positioning ratio will be above 50% and the opposite. The data is collected every day at 16:00 GMT except Sundays and in this research we use data from 11/25/2012 to 7/9/2014 for three mostly traded currency pairs: EUR/USD, USD/JPY, GBP/USD.

Since the purpose is to see whether the long/short positioning ratio can reflect the fluctuations of the exchange rates, we modify the microstructure approach model suggested by [4] by excluding the interest rate element. The regression model is presented in equation 1.

$$\Delta P_c = \beta \Delta F_c + \varepsilon_c \quad [1]$$

Here P is the price of a particular currency pair c and F is a ratio of traders having a long position in a particular currency pair on a particular day. It means that the change in the exchange rate depends on the change in the percentage of traders having a long

position in a particular currency pair at particular time. The results for the selected currency pairs are stated in Table 2:

Table 2. Linear regression results for EUR/USD, GBP/USD, USD/JPY

c	β	R ²
EUR/USD	-0.029	0.423
USD/JPY	-0.068	0.233
GBP/USD	-0.024	0.187

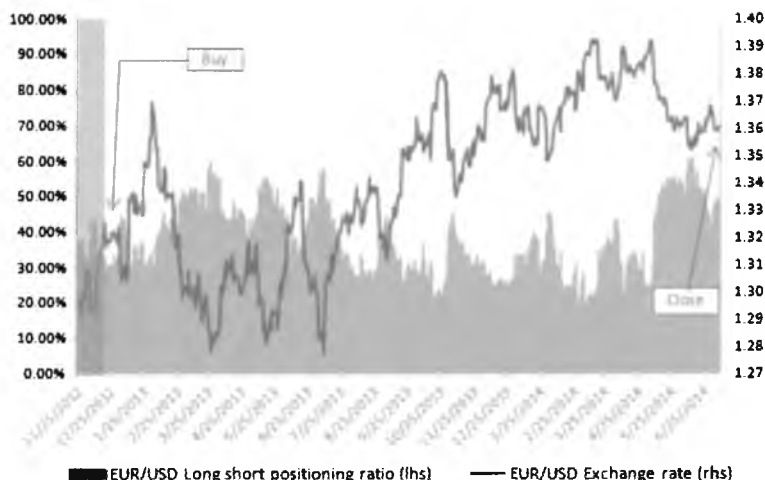
Source: composed by authors

As it is seen from table 2, the determination coefficients are 0.423 for EUR/USD, 0.233 for USD/JPY and 0.187 for GBP/USD. They are lower than the results provided by [4], where the coefficients ranged from 0.4 to 0.64 in USD/JPY and DEM/USD pairs respectively, on the other hand, in research on RBS clients order flow the coefficients ranged from 0.00 to 0.043 [10] in currency pairs, composed of EUR, USD, GBP and JPY, while [15] using dataset from Reuters D2000-2 for EUR/USD, USD/JPY and GBP/USD calculated determination coefficients of 0.42, 0.28 and 0.18 respectively.

Negative order flow coefficients show that retail clients tend to position against the present trend. Therefore, for assessing how useful the clients' long short positioning data can be for exchange rate forecasts, a contrarian trading strategy can be made. Based on the fact that Oanda's clients tend to position against the present trend, in this research three investing strategies are created:

1. **Passive buy and hold strategy.** In every pair the base currency is bought in the beginning of the period and sold in the end of the period (see Figure 1). This strategy is going to be used to compare the results with other two strategies.
2. **Active 50% threshold strategy.** A long position is initiated when the long/short client positioning ratio drops below 50% threshold level (when there starts to be more short sellers of the currency pair than buyers). The long position is closed when there starts to be more clients with long positions than with short (when the long short ratio hits the 50% threshold from the below) and a short position is opened (see Figure 2). These actions are repeated every time the 50% client positioning ratio threshold is reached.
3. **Aggressive tops and bottoms picking strategy.** This strategy is designed to exploit the emotions of the retail traders: a long position is initiated when the traders start to give up on their expectations that the price will increase (when they start to accumulate short positions). Then a long position is initiated. A short position is opened when the traders start to initiate long positions. The tops and bottoms of the long short positioning ratio are identified by a 30 day long short positioning ratio moving average. When the positioning ratio drops below the moving average (when the top is formed), a long position is opened; the position is closed when the positioning ratio crosses the moving average from the below. At the same time a short position is opened (see Figure 3).

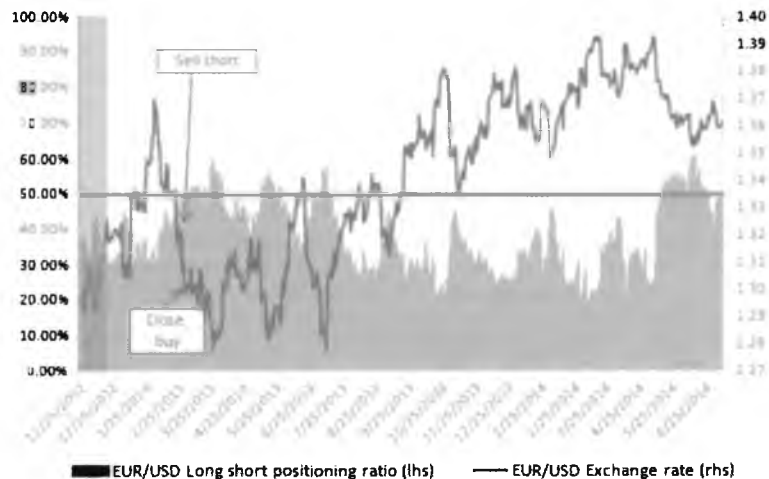
Because of the time period, necessary for the calculations of the third strategy, the results for all of the strategies will be presented for the period ranging from 12/28/2012 to 7/9/2014. Examples of the opening the positions are showed in the figures below.



Source: composed by the authors.

Figure 1. Opening and closing the position in in EUR/USD pair with the first strategy

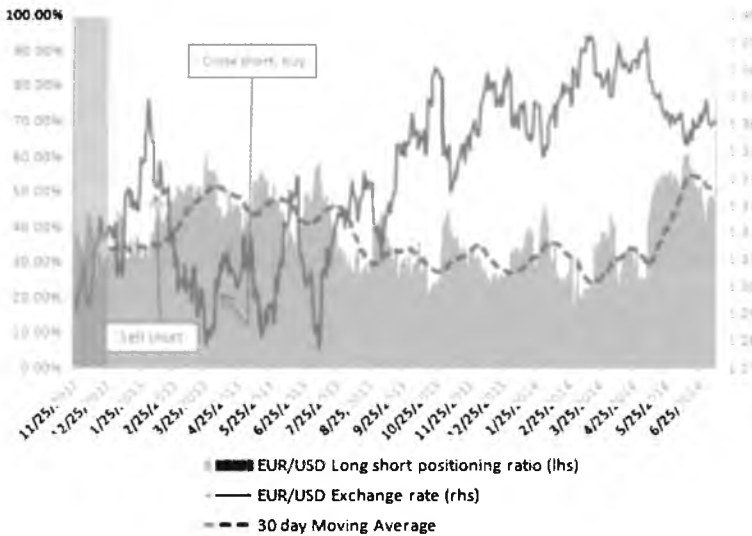
In Figure 1 a position of the first strategy is opened and closed. The left hand side shows the client long/short positioning ratio in percent and the right hand side shows the EUR/USD exchange rate, the shaded area covers the period necessary for the calculations of the third strategy.



Source: composed by the authors.

Figure 2. Opening and closing the position in EUR/USD pair with the second strategy

In Figure 2 a short position is initiated when the client positioning ratio drops the first time below the 50% threshold and closed when the ratio reached the 50% threshold for the second time. Then the long position is initiated.



Source: composed by the authors.

Figure 3. Opening and closing the position in EUR/USD pair with the third strategy

In Figure 3 a short position is initiated when the positioning ratio increases above its 30 day moving average and the position is closed when the ratio drops below the moving average, then the long position is initiated.

RESULTS

The results of the composed strategies are presented in Table 3 below.

Table 3. Results of the trading strategies for period 12/28/2012-7/9/2014

Strategy	Passive buy and hold			Active 50% threshold			Aggressive tops and bottoms picking		
	EUR/USD	USD/JPY	GBP/USD	EUR/USD	USD/JPY	GBP/USD	EUR/USD	USD/JPY	GBP/USD
Profit or loss (points)	391	1682	988	-329	299	1207	1232	-172	1627
Number of trades	2	2	2	21	24	6	44	70	67
Transaction costs (points)	4	4	4	42	48	12	88	140	134
Net profit or loss (points)	387	1678	984	-371	251	1195	1144	-312	1493
Strategy net profit or loss (points)	3049			1075			2325		

Source: composed by the authors

As it is seen from Table 3, none of the active strategies outperformed the buy and hold strategy. It is not a surprise, as all three currency pairs were in a strong uptrend during the selected period. The aggressive top and bottom picking strategy outperformed the 50% threshold strategy. The former strategy assumes that when the retail investors start to reverse their positioning, the price trend reverses against the change in the positioning. Based on the results of the strategy, it can be noticed, that the price starts to reverse just when more and more retail traders give up on the expectations (which are backed by the trades) that the price trend will change. On the other hand, in this strategy 181 transaction had to be made, therefore it is the costliest strategy of all.

CONCLUSIONS AND DISCUSSION

With many attempts to forecast the fluctuations of the exchange rates, the microstructure approach models tend to attract the interest of researchers, although data accessibility problem exists. It is a question which order flow data to choose, because heterogeneous market participants behave differently in the foreign exchange market.

After presenting the dealer's Oanda dataset it was showed that the retail clients' long short positioning ratio can explain from 18% to 42% of exchange rate fluctuations. With a linear regression model it was proven that retail traders tend to position against the present price trend.

There were three investing strategies composed for the purpose to evaluate the forecast possibilities of the retail traders' positioning ratio. None of the strategies based on the positioning against the retail traders' positioning ratio were able to outperform a simple buy and hold strategy. This can be explained by the reason that the currencies were in a strong uptrend during the selected period. On the other hand, the best results of the two forecasting strategies were shown by a strategy where the positions were initiated by identifying tops and bottoms of the client positioning ratio. The results show that when the retail traders give up on their expectations about the possible trend reversion and start to initiate opposite positions, the price trend eventually reverses causing the retail traders to be trading against the trend. This could be a case for behavioral finance field research, to see what emotions lead to the changes in the expectations of retail traders just before the price trend starts to reverse.

Also, a research on longer time data could be done since during the chosen period all three currency pairs were in an uptrend. Moreover, it would be useful to combine various brokers and dealers clients' positioning data to reflect a larger part of the retail forex trading segment.

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