Journal of International Money and Finance 35 (2013) 20–35

Contents lists available at SciVerse ScienceDirect

Journal of International Money and Finance

journal homepage: www.elsevier.com/locate/jimf

Is exchange rate – Customer order flow relationship linear? Evidence from the Hungarian FX market

Yuliya Lovcha [a,*], Alejandro Perez-Laborda [b]

[a] Universidad de Navarra, Departamento de Economia, 31080 Pamplona, Spain
[b] Departament d'Economia and CREIP, Universitat Rovira-i-Virgili, Spain

JEL classifications:
C22
F31
G15

Keywords:
Customer order flow
Markov Switching model
Structural threshold model
Microstructure
Exchange rate

A B S T R A C T

Over the last decade, the microstructure approach to exchange rates has become very popular. The underlying idea of this approach is that the order flows at different levels of aggregation contain valuable information to explain exchange rate movements. The bulk of empirical literature has focused on evaluating this hypothesis in a linear framework. This paper analyzes non-linearities in the relation between exchange rates returns and customer order flows. We show that the relationship evolves over time and that it is different under different exchange rate volatility conditions. Further, we found that the non-linearity can be captured successfully by the Transition Regression and Markov Switching models, which provide substantial explanatory power beyond the constant coefficients approach.

1. Introduction

In standard macroeconomic models exchange rate is determined by fundamental factors, which are observed by all agents in the economy and constitute public knowledge. In these models, there is no private information and price determination is straightforward and immediate. Unfortunately, their empirical performance is very poor. Meese and Rogoff (1983) show that the structural macro models almost do not have power to explain exchange rate movements and cannot out-perform a naïve random walk in in-sample and out-of-sample fitting.

* Corresponding author.
E-mail address: ylovcha@unav.es (Y. Lovcha).

0261-5606/$ – see front matter
http://dx.doi.org/10.1016/j.jimonfin.2013.01.002

Inspired by Lyons (1995), the market microstructure approach to exchange rate determination has recently become popular. According to this approach, the information on the market is asymmetric, i.e., some agents have private information. When the market is not fully efficient, the informed agents can exploit this information to get profit. In the classical framework of Evans and Lyons (2002a), dealers get informed about local demand by observing orders from their own customers, and receive information about global demand by trading with other dealers. Consequently, they can infer the private information from the order flows, and adjust the quotes accordingly trying to close with zero net open positions at the end of the day. In this way, the information is embedded into the market through the order flows.

A growing amount of empirical literature focuses on examining the relation between exchange rates and order flows, mainly by estimating a linear regression of the price changes on the net order flows. The overall conclusion is that order flows contain relevant information for exchange rate determination (see e.g. Evans and Lyons (2002a) for inter-dealer order flow or Bjonnes et al. (2005) for customer order flow).

Although linearity has been a maintained assumption in the empirical literature, a time varying relation between exchange rates and order flows is, a priory, more realistic: why dealer's reaction should be the same in different situations on the market?

In fact, there is now evidence that the price impact of the order flow changes with news and trades. For instance, Luo (2001) finds that the information contained in the order flow tends to increase with spread and volatility and decrease with the volume of trade. Evans (2002) and Evans and Lyons (2008) study how news enter exchange rates. As opposed to the traditional direct effect, the authors find that that most of the price effect of news is transmitted through the order flow, and that the strength of this effect increases with trading intensity. Further, Evans and Lyons (2008) find that (for a given degree of intensity) the order flow is more informative following the arrival of macroeconomic news. Also Evans and Lyons (2002b) conclude that the impact of order flow to prices depends on the pace of public macro information. Berger et al. (2008) show that the relationship between exchange returns and the order flow appears to be stronger when market liquidity is lower. Recently, Nguyen and Shin (2011) find evidence of a non-linear cointegration relationship between exchange rates and order flow. They find that negative orders (selling pressure) have a higher impact on exchange rate than positive ones.

In this paper we question the linearity assumption in the exchange rate–order flow relationship posed in the empirical literature. To do so we analyze data on the Hungarian forint (HUF)–euro (EUR) spot exchange rate and different types of spot customer order flows: foreign participants, domestic non-banks, central bank, and domestic banks. We start by conducting an analysis of the linear relation between exchange rate returns and net customer order flows. Our analysis reveals that the relationship is not linear and evolves over time. We provide further evidence of this result through the estimation of a fairly general Markov Switching model (MS). In spite of the sizable attention that these models have currently received in the exchange rate literature, MS models still have not been employed for the exchange rate–order flow analysis. By fitting a MS model to the data we remain agnostic about the sources driving the non-linearities in the exchange rate–order flow relationship. Posterior analysis reveals a very high correlation between the estimated regime changes and several measures of exchange rate volatility. Thus, we also consider Threshold Regression (TR) specifications using volatility as a threshold variable. Given that contemporaneous volatility is a priori likely to be endogenous, we control for it with an econometric technique developed by Kourtellos et al. (2011). Our main results include the following. First, we confirm that the customer order flows considered in this paper contain valuable information to explain contemporaneous HUF/EUR exchange rate movements. Second, the relationship between order flows and exchange rate is clearly non-linear. Order flows have higher impact to exchange rate returns in periods of high volatility. This result is in line with the information uncertainty model developed by Easley and O'Hara (1992) and the conclusions of Subrahmanyam (1991). Third, the non-linear relation between exchange rate and order flows can be successfully captured by non-linear models. In particular, the MS and the TR specifications provide substantial explanatory power beyond the constant coefficient (OLS) approach.

The paper is organized as follows. Section 2 contains a description of the data set, the results of the preliminary estimations and the non-linearity testing. Section 3 makes a short description of the non-