



# The scapegoat theory of exchange rates: the first tests

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## ABSTRACT

The scapegoat theory of exchange rates (Bacchetta and van Wincoop, 2004, 2013) suggests that market participants may attach excessive weight to individual economic fundamentals, which are picked as “scapegoats” to rationalize observed currency fluctuations at times when exchange rates are driven by unobservable shocks. Using novel survey data that directly measure foreign exchange scapegoats for 12 exchange rates, we find empirical evidence that supports the scapegoat theory. The resulting models explain a large fraction of the variation and directional changes in exchange rates in sample, although their out-of-sample forecasting performance is mixed.

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## 1. Introduction

A central conjecture of the work by Meese and Rogoff (1983a,b, 1988) is that the presence of time-varying parameters may be a key explanation for the failure of exchange rate models to predict future currency movements. Furthermore, time-varying parameters may not only help explain the weak out-of-sample predictive power of exchange rate models, but also the ex-post instability in the relationship between exchange rates and macroeconomic fundamentals, as pointed out by a growing literature. For example, Sarno and Valente (2009) show empirically that the relevance of information contained in fundamentals changes frequently over time, while in a survey of US foreign exchange (FX) traders Cheung and Chinn (2001) document that the importance attached by traders to different fundamentals changes over time.

Bacchetta and van Wincoop (BvW, 2004, 2013) propose a scapegoat theory to explain the weakness of and instability in the relationship between exchange rates and fundamentals. The scapegoat theory suggests that this instability is not explained by frequent and large changes in structural parameters, but rather by *expectations* about these structural parameters.<sup>1</sup> The scapegoat theory starts from the premise that, even though agents may have a fairly accurate idea about the relationship between fundamentals and exchange rates in the long run, there is substantial uncertainty about the structural parameters over the short to medium term. This implies that when currency movements over the short to medium term are inconsistent with their priors about the underlying structural relationships, agents search for scapegoats

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<sup>1</sup> In fact, Bacchetta et al. (2010) show that allowing for time-varying structural parameters has only a small effect on the predictive power of fundamentals for exchange rates.

to account for these inconsistencies. Such currency movements may be driven by unobservable fundamentals, yet for agents it is rational to assign additional weight to some observable fundamentals, thus making them scapegoats for exchange rate changes.

In fact, there is ample anecdotal evidence – as illustrated in the quote below – that financial market participants blame individual fundamentals for exchange rate movements, with such blame often shifting across different fundamentals over time:

*“The FX market sometimes seems like a serial monogamist. It concentrates on one issue at a time, but the issue is replaced frequently. Dollar weakness and US policy have captured its heart. But uncertainties are being resolved ... The market may move back to an earlier love ...”* [Financial Times, November 8, 2010]

The scapegoat theory entails that a particular macroeconomic variable is more likely to become a scapegoat the larger the (unexplained) FX rate movement *and* the more this particular fundamental is out of line with its long-run equilibrium. Over the short run, both the scapegoat fundamental as well as the unobservable fundamental may thus help explain FX movements. BvW (2009, 2013) also calibrate their model for five currencies of industrialized countries, using monetary fundamentals, to investigate its ability to match the moments of macro variables and exchange rates.

The present paper constitutes – to our knowledge – the first empirical test of the scapegoat theory of exchange rates. An important difficulty in designing an empirical test in this context involves finding a suitable proxy for the weight assigned to individual economic fundamentals by market participants (needed to identify scapegoats), and a proxy for the unobservable fundamental. This is made possible by exploiting novel data on FX scapegoats from surveys of a broad set of investors, as well as FX order flow to proxy unobservable exchange rate determinants.<sup>2</sup>

Exchange rate scapegoats stem from monthly surveys of 40–60 financial market participants, who are asked to rate on a quantitative scale the importance of six key variables (short-term interest rates, long-term interest rates, growth, inflation, current account, and equity flows) as drivers of a country's exchange rate *vis-a-vis* its reference currency.<sup>3</sup> This survey data allows us to extract quantitative scapegoat measures for each of these six fundamentals over time and across currencies. It is also worth noting that real-time data, taken from the OECD, is used for all these time series. Further, FX order flow data proxies for unobservable factors driving exchange rates since order flow contains information that is not public given the over-the-counter institutional features of the FX market and is empirically powerful in explaining exchange rate movements, as documented in a vast literature on FX microstructure (e.g. Evans, 2010). The order flow series are constructed from high-frequency data obtained from the Reuters electronic trading platform D2000-2 on special order.<sup>4</sup> The empirical estimations are conducted for 12 exchange rates over the period 2000–2011, using data at monthly frequency.

The test of the scapegoat theory of exchange rates rests on two main hypotheses. The first hypothesis inherent in the theory is that the inclusion of scapegoats (surveys) improves the power of fundamentals to explain exchange rate movements. We test this hypothesis by examining two specifications of the scapegoat model: one based on constant parameters following BvW (2013), and (a more general) one based on time-varying parameters as in the earlier version of BvW (2009). Although the unobservable fundamental is essential for the presence of scapegoat effects, simplified versions of the scapegoat models without our proxy are also estimated in order to evaluate the marginal contribution of the scapegoats versus the unobservable fundamental (order flow). Specifically, the following four models with constant parameters are estimated: a model that conditions only on macroeconomic variables (CP-M), which is tested against a model that conditions on scapegoats in addition to the same macroeconomic variables (CP-MS); a model that conditions on both macroeconomic variables and order flow (CP-MO), which is tested against a model that conditions on the scapegoats in addition to the same macro and order flow information (CP-SCA). The same four specifications, termed TVP-M, TVP-MS, TVP-MO and TVP-SCA, are then estimated allowing for time-varying parameters with Bayesian updating. Finally, the models are evaluated on several criteria – based on the adjusted  $R^2$ , root mean squared errors, information criteria, and market-timing (directional accuracy) tests.

Starting from the scapegoat models with constant parameters, the empirical analysis provides strong empirical evidence that these models generally outperform their respective benchmark models, i.e. the scapegoats add explanatory power to macroeconomic and order flow information. There is even stronger evidence supporting scapegoat effects when looking at the more general scapegoat model with time-varying parameters (TVP-SCA), which performs better than all alternative models across all performance criteria. Moreover, the magnitude of the improvement in the performance of TVP-SCA over the other models is substantial, leading to – on average across currencies – a hit ratio of correctly explained directional FX changes of about 75 percent and an adjusted  $R^2$  of about 36 percent.

<sup>2</sup> This paper may thus be seen as a companion paper to the theory of BvW (2009, 2013) and their calibration exercises in that we test empirically, rather than calibrate, the scapegoat model by using data on FX scapegoats.

<sup>3</sup> Specifically, with the exception of the current account all variables are measured as differentials relative to the country of the reference currency. The reference currency is mostly the US dollar.

<sup>4</sup> Reuters is one of the two major FX dealing platforms and Evans and Lyons (2002) were the first to use Reuters order flow data for FX analysis. Electronic brokers have become the preferred means of settling trades, and 50–70% of turnover is settled through the two main electronic platforms, Reuters and Electronic Brokerage System (EBS). The relative size of Reuters versus EBS varies across currencies, but Reuters generally dominates EBS for all currencies except the euro, the Japanese yen, and the Swiss franc.

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