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## Noise traders, exchange rate disconnect puzzle, and the Tobin tax

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### A B S T R A C T

This paper proposes a framework to explain the “exchange rate disconnect puzzle”. Two types of foreign exchange traders, rational traders and noise traders are introduced into a sticky-price general-equilibrium model. The presence of noise traders creates deviations from the uncovered interest parity. Combined with local currency pricing and consumption-smoothing behavior, our model can help to explain the “disconnect puzzle”. The excess exchange rate volatility caused by noise traders can be reduced by the ‘Tobin tax’. However, the effect of the ‘Tobin tax’ depends on the market structure and the interaction between the Tobin tax and other trading costs.

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## 1. Introduction

A central puzzle in international macroeconomics over the last 20 years is that real exchange rates are volatile and persistent. Furthermore, as Flood and Rose (1995) have elegantly documented, the exchange rate seems to “have a life of its own”, being disconnected from other macroeconomic variables. For example, Mussa (1986), Baxter and Stockman (1989) and Flood and Rose (1995) all find that both nominal and real exchange rates are highly volatile, especially when compared to the macroeconomic fundamentals, such as relative price level, consumption, and output. Exchange rate volatility also varies substantially over time. Obstfeld and Rogoff (2001) state this kind of “exceedingly weak relationship between the exchange rate and virtually any macroeconomic aggregates” as the “exchange rate disconnect puzzle”.

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This irregularity casts some doubts on the traditional monetary macroeconomic model of exchange rates, which assumes that purchasing power parity (PPP) holds. With PPP, the “expenditure-switching” effect of exchange rate changes will lead to substitution between domestically-produced goods and internationally-produced goods. It implies that the exchange rate volatility will be transferred to macroeconomic fundamentals. Nevertheless, empirical evidence<sup>1</sup> indicates that nominal exchange rate changes are not fully passed through to goods prices. Motivated by this evidence, [Betts and Devereux \(1996, 2000\)](#) introduce local currency pricing into the baseline *Redux* model developed by [Obstfeld and Rogoff \(1995\)](#). They assume that firms can charge different prices for the same goods in home and foreign markets and that the prices are sticky in each country in terms of the *local* currency. This allows the real exchange rate to fluctuate, and delinks the home and foreign price levels.

Although the new open economy macroeconomics models with sticky prices, imperfect competition and local currency pricing can generate volatile exchange rate movements,<sup>2</sup> they typically predict a strong counterfactual relationship between the real exchange rate and relative consumption. A monetary shock simultaneously raises domestic consumption (by more than it raises foreign consumption) and creates a (temporary) depreciation of home currency. Consequently, these models almost generically predict a strong positive correlation between depreciation and relative consumption, which is not observed empirically.<sup>3</sup> For example, [Chari et al. \(2002\)](#) refer to this puzzle as the consumption-real exchange rate anomaly and they show that neither incomplete financial market nor habit persistence can eliminate it.

One explanation for this discrepancy might lie in the fact that the nominal exchange rate is also an asset price, and therefore will be inevitably affected by imperfections in the financial markets. These imperfections may include herd behavior, momentum investing and noise trading. Working together with sticky prices, these are all important reasons to explain why the real exchange rate persistently deviates from the level predicted by the fundamentals-based models.

Since the early nineties, many economists studied the behavior of market participants in foreign exchange markets through survey conducted in dealers.<sup>4</sup> The evidence collected in these surveys showed that a majority of traders does not rely on information about fundamentals factors, but use various sources of ‘technical’ information such as trend curves. Also, most traders believe that at least over the short and medium run, exchange rates are governed more by speculative behavior or technical trading rather than macroeconomic fundamentals and pertinent news. [Evans and Lyons \(2002\)](#) show that most of the short-run exchange rate volatility is related to order flow, which also reflects the heterogeneity in investors’ expectations. [Cai et al. \(2001\)](#) also provide evidence in support of the independent role of order flow and its associated information as a determinant of exchange rate dynamics. These pieces of evidence all suggest deviation from rational expectation and the extensive use of non-fundamental trading strategy in foreign exchange markets.

Therefore, our paper intends to propose a new approach to study exchange rates, that combines the macroeconomics model of exchange rates and the microstructure approach of foreign exchange markets. This approach is implemented within a specific model, where noise traders are introduced into the new open economy macroeconomics framework. The combination is helpful for understanding the behavior of exchange rates and their relationship with macroeconomic fundamentals. It also gives more rigorous microeconomic foundations to the “noise trader” approach and enriches the new open economy macroeconomic framework with a more realistic setting of the microstructure of foreign exchange market. In addition, it provides a well-defined framework for policy evaluations, especially for policies designed to control non-fundamental volatilities, such as the ‘Tobin tax’.

<sup>1</sup> See [Engel \(1993, 1999\)](#) and [Parsley and Wei \(2001\)](#) for details.

<sup>2</sup> A high risk aversion coefficient of household (about 5) is usually required in these models to reproduce the data’s volatility of real exchange rate relative to output. See [Chari et al. \(2002\)](#).

<sup>3</sup> [Benigno and Thoenissen \(2008\)](#) report the correlation between bilateral exchange rate and bilateral relative consumption for seven countries (Canada, France, West Germany, Italy, Japan, U.K. and U.S.) for the periods starting from 1970 until 2002. The cross-correlation varies between  $-0.45$  and  $0.42$ .

<sup>4</sup> See [Frankel and Froot \(1987, 1990\)](#), [Allen and Taylor \(1990\)](#), [Taylor and Allen \(1992\)](#), [Cheung and Chinn \(2001\)](#), [Chinn and Frankel \(1994\)](#) and [Cheung and Wong \(2000\)](#) for details.

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