

**Can Market Micro-Structure of the Currency Trading
Explain the Puzzles of International Asset Under-
diversification & Exchange Rate Behavior?***

Grant Proposal to Financial Services Exchange on the subject of
FINANCIAL SERVICES EXCHANGE: MISSION AND PURPOSE

by

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Brief Overview

Current "rules of the game" (a term describing the formal and informal arrangements of the international financial system) differ from the rules that were in place twenty, and even ten years ago. These differences are relatively minor on the macroeconomic side, but substantive on the market microstructure side, consisting mainly of technological and legal advances, and changes in the product space and organizational structure of the financial industry.

As a consequence, macroeconomic and monetary policy parameters cannot fully explain the international asset allocation and exchange rates behavior, which must reflect the market microstructure as well; see Froot & Rose (1995) for a literature review. Accordingly, it is not surprising that statistical analysis, which checks how well macroeconomic models explain the exchange rate behavior, indicates that these models have only limited success. In particular, long-term deviations of exchange rates from their natural levels (which are sometimes called fundamental levels, and could be defined as time varying mean level) and their volatility remain a mystery. Similarly, macro models are relatively coarse in explaining the puzzle of home bias in assets, i.e. a disproportionate share of portfolio invested in domestic securities. To summarize, there are many indications that the exchange rates behavior and international portfolio allocation are determined by a *combination of macroeconomic and monetary policy parameters and market microstructure*.

We suggest that the excess currency volatility, the forward bias puzzle, and long-term deviations of exchange rates from their natural levels are closely related questions. In this project, we draft a model connecting these questions and explain the puzzles of the data.

A Statement of Research to be Undertaken

In the next two paragraphs we outline two theoretical ideas on which we build.

1. We introduce a model in which market microstructure considerations are central. Specifically, we model the legal (and settlement) costs of the foreign exchange trading. We consider the ways in which minor market imperfections, typical for financial markets, affect exchange rate behavior. Our key assumption is endogenous settlement costs. We suggest that the effects that we found account for the observable exchange rates behavior, and explain the remainder of the home bias in asset holdings puzzle, which has not been explained by existing studies; see Obsfield and Rogoff (2000).

2. The foreign exchange market structure has interesting implications for the foreign exchange trading production function. When the volume of original (i.e. non intra-industry) spot trading increases, the associated increase in the cumulative currency trading volume is about ten-fold. This follows from empirical observation that more than 95 percent of the cumulative trading volume are the trades between financial institutions; see Lyons (2001). We suggest that these trades induce liquidity provision and risks hedging, i.e. these trades serve as the means of production for the financial industry. It is likely that some of these trades serve to discover market prices and some are purely speculative. But what matters for us is that an initial increase in spot trading is associated with a ten-fold concomitant increase in cumulative trading.

We suggest that a combination of this peculiarity **(2)** of the foreign exchange trading production function and endogenous settlement costs **(1)** explains several puzzles of international finance.

Connections with the Existing Literature

A number of violations of the Perfect Capital Market (PCM) conditions that were already considered by the literature have substantially reduced the magnitude of the home asset puzzle. By the reduction of the size of the puzzle, we mean that the literature permits explanation of a sizable fraction of the observable bias. Nevertheless, there remains an unexplained bias. We

suggest that this remainder completely disappears once endogeneity of transaction costs of currency trading is taken into account.

The literature can be classified into groups, where papers in each group assume that one (or several) conditions of the PCM hypothesis do not hold. The first group of papers considers the effect of informational imperfections on asset allocation; see Coval and Moskowitz (1999). This group of paper includes the ones that consider the consumption side uncertainly due to business cycles; see Pesenti & van Wincoop, (1996). The second group concerns the effects of capital controls, and other regulations. The last group of papers proposes a transaction cost explanation of the home bias in asset holdings, reviewed in Obstfeld and Rogoff (2000).

Our approach fits precisely into this last group, as we focus on the analysis of the generalized transaction costs.

Research Design and Methodology

Specifically, we consider only one type of transaction costs: settlement costs related to currency trading. These costs are low, but we suggest that they are endogenous. This endogeneity leads to a substantive adjustment of the equilibrium allocation of the international asset holdings.

We employ game theoretic modeling: we borrow (and generalize) the setup of Schwartz (2000), where legal expenses are endogenously determined by investment, and increasing in it. For brevity, we omit the more elaborate description of the model here.

Relation to Empirical Facts

No empirical papers relate volume of currency trading to other variables of interest, such as return on capital invested in foreign exchange, foreign exchange market volatility, etc. Due to lack of the relevant data, the volume of currency trading is not included in the currency regressions at all. Our theoretical analysis suggests that empirical studies controlling for the

volume of currency trading can be useful to explain some puzzles of the currency data. Below we show how our intuition relates to the existing financial data.

F1. Foreign exchange trading market of US\$ has a yearly volume of 10 times world GNP.

F2. This volume is increasing in exports, which increased substantially over past decade(s). The currency trading market expansion is faster than related increase in exports.

We relate these facts with improved liquidity provision due to the technology advancement.

F3. Offshore currency trading volume has dramatically increased during the same period.

F4. Clearinghouses operating internationally were rapidly advancing (in volume and, importantly, in the implementation of clearing procedures) during the same period.

F5. The financial institutions involved in onshore and offshore operations are the same.

F6. International finance is a high-risk business; or so the stock market believes. When a financial institution invests in this business area, the credit ranking of this institution drops.

F7. The excess return on investment in currency trading (controlling for risk) is one of the puzzles in international finance.

We suggest that the facts F1 - F6 and the puzzle (F7) are related. Offshore and onshore trading have the same production function. Typically, financial institutions are engaged in both these activities. Thus, the expected marginal benefit from investing in onshore and offshore banking (controlling for risk) should be the same. Therefore, the observed excess return on investment in offshore markets can be explained by non-optimality of further investment in offshore operations (i.e. an expected sharp decline in the rate of return on investment). We explain this excess return by exogenous transaction costs, which are increasing in trading volume, thus, making the business expansion sub-optimal.

Thus, the bottleneck of foreign exchange trading is the clearing procedures. Low enforceability, complexity and contradictions of international law make the prosecution of contract violations slow and costly.

Summary

Our model provides a transaction costs based explanation of several regularities in exchange rate behavior. Specifically, we introduce a general specification for endogenous settlement costs. Our only restriction is an assumption of decreasing returns in production of legal services (which is the same as an assumption of decreasing returns of settlement production).

Thus, we assume that settlement costs are increasing in the foreign exchange volume (this increase is driven by the increase in the counter party risk). This assumption is well supported by data, which shows that firms allocating more capital to foreign exchange market operations, experience a downgrade in their credit ranking. Another phenomenon supporting our intuition is rapid development and improvement of the system of clearinghouses, which accompanies the expansion (i.e. the increase in volume and in the menu of services) of the international foreign exchange market.

We identify the clearance and settlement procedures as an industry bottleneck, and suggest that improving the efficiency of clearing institutions may result in a positive externality for financial industry.

Significance to the Financial Services Industry

Greenspan (2000) stresses the need to improve clearance and settlement procedures. Achieving these improvements requires thorough understanding of underlying incentive mechanisms. We hope that our project contributes to such understanding.

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