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The market microstructure approach to foreign exchange: Looking back and looking forward☆

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A B S T R A C T

Research on foreign exchange market microstructure stresses the importance of order flow, heterogeneity among agents, and private information as crucial determinants of short-run exchange rate dynamics. Microstructure researchers have produced empirically-driven models that fit the data surprisingly well. But FX markets are evolving rapidly in response to new electronic trading technologies. Transparency has risen, trading costs have tumbled, and transaction speed has accelerated as new players have entered the market and existing players have modified their behavior. These changes will have profound effects on exchange rate dynamics. Looking forward, we highlight fundamental yet unanswered questions on the nature of private information, the impact on market liquidity, and the changing process of price discovery. We also outline potential microstructure explanations for long-standing exchange rate puzzles.

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The ancient and honorable field of international finance has grown furiously of late in activity, in content, and in scope.

Michael R. Darby

These opening words, written by the editor to introduce the inaugural issue of the *Journal of International Money and Finance* (JIMF) in 1982, could well have been written about the field of foreign exchange (FX) research today. Over the past thirty years, research on exchange rates has continued to grow in response to the puzzles that naturally arose following the move to floating rates after the breakdown of Bretton Woods.

We survey an important and relatively new line of exchange-rate research known as FX market microstructure. Researchers in this field take a microeconomic approach to understanding the determination of exchange rates, which are after all just prices. They analyze the agents that trade currencies, the incentives and constraints that emerge from the institutional structure of trading, and the nature of equilibrium.

Our survey first looks back at how FX microstructure emerged in the 1990s in response to the disappointing empirical performance of macro-based exchange-rate models. Early microstructure researchers went directly to the market, observing the trading process in action and talking to the FX dealers who actually set this price. These observations prompted research into features of this market that had previously been considered irrelevant, such as trading flows and private information. Progress was slow until the mid-1990s, when FX market activity shifted to electronic platforms that generated large and accurate trading records. Studies confirmed the initial insights from first-hand observation of the market and inspired fruitful new lines of inquiry. In interpreting this evidence, FX research drew on a strong conceptual foundation from existing equity-market microstructure research, always recognizing that research on one market cannot be uncritically be "taken over in to and applied to the FX market because the nature of the markets differ" (Booth, 1984, p. 210).

We survey the extensive body of striking and robust results that has emerged from these efforts and re-visit some early pioneering research that laid the ground work for recent studies. The new insights from the FX microstructure literature have their own inherent scientific value and are proving valuable in achieving the field's original goal: understanding macro-level exchange-rate puzzles. Our survey finishes by looking forward to the impact of recent dramatic changes in the FX market structure, and highlight topics that may be a fruitful focus for future research.

This survey follows the FX microstructure literature in focusing primarily on empirical studies, while highlighting the numerous important contributions published by the *JIMF*.[1] The *JIMF*, always receptive to the 'facts first' approach, has been the leading outlet for this field. The *JIMF* has published four times as many FX microstructure papers as the next leading journal (see Appendix, Table A). The *JIMF* has published key microstructure papers even if they adopted methodologies not widely accepted in economics (e.g. surveys), even if they reached conclusions at odds with the rest of international economics (e.g. Evans and Lyons, 2002a), and even if they dealt with microstructural nonlinearities orthogonal to standard exchange-rate models (e.g. Osler, 2005). The *JIMF* has thus played an important role in establishing this line of inquiry as a respected part of international economics.[2]

Given the breadth of FX microstructure research, some important topics are not covered in this survey. The current study only briefly discusses the changes in electronic trading and, the FX market infrastructure, which are covered in detail by King et al. (2012).[3] We do not discuss the large literature on FX intervention, which is surveyed by Sarno and Taylor (2001), Neely (2005), Melvin et al. (2009) and Menkhoff (2010). We do not review the many studies on the FX reaction to macro news

[1] Since our focus is on the empirical evidence we outline only a few key microstructure models. Other models can be found in Bacchetta and van Wincoop (2006), Evans (2011), and Lyons (2001).

[2] Frankel et al. (1996) and Lyons (2001) are early surveys of FX microstructure research. Osler (2006) highlights macro lessons for modeling short-run exchange rate dynamics. Vitale (2007) presents a VAR analysis of order flow that controls for feedback effects. Osler (2009) compares FX market structure to the structure of other financial markets.

[3] King et al. (2012) provides a comprehensive history of the evolution of FX market structure, with considerable detail on the geography and composition of currency trading, the players in FX markets, and the evolution of electronic trading. The chapter is descriptive and does not consider the microstructure literature or other academic studies of FX.