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Price clustering in foreign exchange spot markets[☆]

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Abstract

This paper documents the existence of price clustering in the foreign exchange spot market for the German mark, the Japanese yen, the United Kingdom pound, the French franc, the Italian lira, and the Swedish krona. The U.S. dollar exchange rate indicative quotes for these currencies tend to exhibit clustering around right-most digits that end in either a “zero” or a “five.” The tendency for exchange rates to cluster has *increased* with increases in trading volume and volatility. Moreover, the tendency for exchange rates to cluster differs across currencies. © 2002 Elsevier Science B.V. All rights reserved.

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Price clustering is the tendency for securities prices to congregate around some specific set of values, for example whole digits (\$6.00) or half digits (\$6.50). Standard theories of pricing do not imply the coarse pricing intervals manifested as clustering.¹ Given the proliferation of derivative contracts that are being written against spot currencies and current spot transactions volume of over \$1.2 trillion per *day*, price

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¹Moreover, the existence of price clustering may be especially problematic for (1) valuing derivative securities that are written on assets whose prices exhibit clustering and, in a related context, (2) individuals who are attempting to hedge against adverse price movements in these assets.

clustering in the spot currency market might have significant consequences. This paper contributes to the growing literature on price clustering by documenting the tendency for indicative quotes for dollars quoted in the German mark, the Japanese yen, the United Kingdom pound, the French franc, the Italian lira, and the Swedish krona to cluster on “even-ending” prices, where an “even-ending” price is defined to be one whose right-most digit is either a “zero” or a “five” (e.g., \$6.00, \$6.05, \$6.10,... \$6.95.)² We focus on the foreign currency/US dollar exchange rates since the US dollar is involved in over 80% of all transactions.³

Goodhart and Curcio (1990) also observe the clustering phenomenon in spot exchange rates, however our study investigates a broader sample period as well as more currencies; and more importantly, our study goes beyond Goodhart and Curcio (1990) by exploring the factors that influence clustering in this market.

The structure of the article is as follows. Section 1 provides a brief description of the structure of currency markets. Section 2 reviews the existing literature on price clustering. Section 3 provides evidence of price clustering in spot currency markets. Section 4 empirically examines the factors that influence clustering. Section 5 concludes the paper.

1. Institutional structure of currency spot markets

The spot market for foreign exchange is a highly decentralized, relatively opaque, multiple dealer market.⁴ Unlike other markets, such as the New York Stock Exchange, there is no physical place where foreign currency traders meet and trade currencies. Although the trading volume in the FX market is tremendous, most of the volume occurs between dealers. The ten largest players are responsible for a dominant proportion of the order flow. Dealers trade with each other in two primary ways. The first is called an interdealer trade. The second way is by using a broker.⁵ Unlike an interdealer trade, which is transparent, the use of a broker protects anonymity.

In the FX market, dealers provide two-way quotes, but quotes typically are available in two types: indicative quotes and firm quotes. Indicative quotes (those examined in this paper) are non-binding quotes that have been posted by individual banks to the electronic data networks. They are non-binding in the sense that if market conditions suddenly change, the posting bank can choose not to transact at

²As will be discussed more fully in the data section, the prices that are examined in this paper are taken from indicative quotes, which are non-binding quotes—offered by banks—that are sent out over electronic networks, such as Bloomberg, Reuters, etc. Unlike firm quotes, banks are not obligated to transact at prices for which they have made indicative quotes.

³Source: Bank for International Settlements, *Central Bank Survey of Foreign Exchange and Derivative market Activity*, Basle, March 1996.

⁴In this section, the authors rely heavily on R.K. Lyon’s excellent book on futures market microstructure, *The Microstructure Approach to Exchange Rates*, MIT Press, forthcoming.

⁵In the FX market, brokers are involved almost exclusively in dealer to dealer transactions. They rarely trade for their own accounts.

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