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# Central bank intervention and feedback traders

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## Abstract

Using a chartist–fundamentalist model we study the effectiveness of linear central bank intervention rules. Leaning against the wind (LAW) dampens the amplitude of exchange rate fluctuations. However, the frequency of cycles may rise due to this policy. Interventions in support of a target exchange rate (TARGET) prove to be unsuccessful. While the amplitude stays constant, the frequency of cycles increases. If this rule is executed with a time lag, the amplitude even grows. Neither of the intervention strategies has an impact on the long-run equilibrium exchange rate.

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## 1. Introduction

Central bank interventions are motivated by the desire to check short-run trends or to correct long-term misalignments. Although the empirical literature is ambivalent about the usefulness of such operations, central banks intervene quite frequently in foreign exchange markets (LeBaron, 1999; Neely, 2001; Sarno and Taylor, 2001). At least some policy makers seem to believe that interventions can be an effective tool.

Recently, a new class of exchange rate models has emerged. The chartist–fundamentalist approach explores traders who rely on technical and fundamental

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analysis to forecast future prices. Technical trading rules extrapolate past price movements into the future, whereas fundamental trading rules look at the underlying factors. The interaction between these rules may create complex feedback dynamics. For instance, models by Frankel and Froot (1986), Kirman (1991), Brock and Hommes (1998) and Lux and Marchesi (2000) have the potential to replicate the main stylized facts of financial markets quite closely.

Clearly, if exchange rate fluctuations are driven by an endogenous feedback system, central banks may have the opportunity to manipulate the exchange rate path in a way that stabilizes the dynamics. Given the policy importance of central bank intervention, it is surprising that this aspect has received only little attention in the literature so far.

Our aim is to offer a simple framework which may help to understand the working of central bank intervention in the presence of chartists and fundamentalists. Our findings are as follows. Leaning against the wind (LAW) may stabilize the market. On the one hand, it reduces the amplitude of exchange rate fluctuations (i.e. the distortion). On the other hand, the frequency of cycles may rise (i.e. the volatility). Targeting long-run fundamentals has, however, no impact on the amplitude but increases the frequency of cycles. If fundamental targeting is executed with a time lag, the explosiveness of cycles even rises.

## **2. The model**

### *2.1. Motivation*

Let us briefly sketch the behavioral background of our model. First, traders are assumed to be boundedly rational. Neither do they have access to all relevant information for price determination, nor do they know the mapping from this information to prices. Second, traders follow strict rules. In a broader sense, one may say that our model has an empirical microfoundation. Such a direct underpinning is, for instance, also applied by Lux and Marchesi (2000). As is shown in Hommes, 2001, the behavior of our traders may be consistent with myopic mean-variance maximizers.

Trading volume in spot foreign exchange markets dwarfs that in other financial markets. According to BIS (2002), the overwhelming part of the turnover is due to short-term, speculative trading. Surprisingly, traders strongly rely on simple technical and fundamental trading rules to determine their trading decisions (Taylor and Allen, 1992). Technical analysis is a trading method that attempts to identify trends by inferring future price movements from those of the recent past (for a popular tutorial on technical analysis see Murphy, 1999). Such behavior is not irrational per se. For instance, Szakmary and Mathur (1997) demonstrate that certain technical trading rules may produce excess returns. Fundamental analysis, in turn, presumes that prices have an inherent tendency to converge towards their fundamental value.

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