

# Technical analysis and central bank intervention

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## Abstract

This paper extends genetic programming techniques to show that US foreign exchange intervention information improves technical trading rules' profitability for two of four exchange rates over part of the out-of-sample period. Rules trade contrary to intervention and are unusually profitable on days prior to intervention, indicating that intervention is intended to halt predictable trends. Intervention seems to be more successful in checking such trends in the out-of-sample (1981–98) period than in the in-sample (1975–80) period. Any improvement in performance results from more precise estimation of the relationship between current and past exchange rates, rather than from information about contemporaneous intervention. © 2001 Elsevier Science Ltd. All rights reserved.

*Keywords:* Technical analysis; Trading rule; Genetic programming; Exchange rate; Central bank; Intervention

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## 1. Introduction

There is now a considerable amount of evidence to suggest that technical trading rules can earn economically significant excess returns in the foreign exchange market (Dooley and Shafer, 1984; Levich and Thomas, 1993; Neely et al., 1997; Neely and Weller, 1999; Sweeney, 1986). However, the reasons for the existence of these excess returns are still not well understood. One possible explanation is that the intervention activities of central banks in the market may account for at least part of the profitability of technical trading rules (Dooley and Shafer, 1984; LeBaron,

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1999; Szakmary and Mathur, 1997; Neely, 1998). The arguments advanced in favor of this hypothesis focus on the fact that central banks are not profit maximizers, but have other objectives that may make them willing to take losses on their trading. Thus, the stated goal of intervention by the Federal Reserve is to maintain orderly market conditions, and the unstated goals may include the achievement of macroeconomic objectives such as price stability or full employment.<sup>1</sup> If the target for the exchange rate implied by these goals is inconsistent with the market's expectations of future movements in the exchange rate, there may be an opportunity for speculators to profit from the short-run fluctuations introduced (Bhattacharya and Weller, 1997).

LeBaron (1999) investigated the relationship between intervention by the Federal Reserve and returns to a simple moving average trading rule. He used daily intervention data to show that most excess returns were generated on the day before intervention occurred. He found that removing returns on the days prior to US intervention reduced the trading rule excess returns to insignificance.<sup>2</sup> Szakmary and Mathur (1997) examined the link between monthly trading rule returns and monthly changes in the foreign exchange reserves — a proxy for intervention — of five central banks. They also found evidence of an association between intervention activity and trading rule returns.

The fact that trading rule returns were abnormally high on the day *before* intervention tends to support the hypothesis that strong and predictable trends in the foreign exchange market cause intervention, rather than that intervention generates profits for technical traders. But it still leaves open the possibility that a sophisticated technical trader might be able to respond to the fact that intervention had occurred to modify his position and increase his profits. If this is the case, then observing intervention carries additional useful information about the future path of the exchange rate that is not contained in current and past rates.

Although intervention by the Federal Reserve is not publicly announced at the time it occurs, there is evidence that foreign exchange traders quickly become aware of it.<sup>3</sup> Thus we are interested in determining whether knowledge of central bank intervention can increase excess returns to trading rules in dollar exchange rate markets. We investigate this question using the methodology developed in Neely et al. (1997). This allows us to identify optimal *ex ante* trading rules that use information about whether intervention has occurred, and to compare their profitability to that

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<sup>1</sup> The goal of maintaining “orderly market conditions” is stated in the “Foreign Currency Directive”, published annually in the Federal Reserve Bulletin with the minutes of the first Federal Open Market Committee meeting of the year.

<sup>2</sup> The timing of the data used by LeBaron (1999) — exchange rates observed at 9:00 am and 11:00 am New York time — left it unclear whether the high returns preceded or were coincident with the high exchange rate returns. Experimentation with data collected before the opening of the New York market makes it clear that the high returns precede the intervention activity. Those results are not reported for brevity.

<sup>3</sup> Klein (1993) finds that for US intervention from 1985 to 1989, 72% of interventions were reported and that 88% of reports were correct. In addition, practitioners with whom we have spoken express confidence that they are aware when the Federal Reserve is intervening.

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