

Chapter 6

Conclusions

This investigation dealt with the profitability of technical trading rules and its relationship to central bank interventions and exchange rate regimes. Throughout we analysed the profitability of two classes of trading rules which are known to have been in wide use during the period over which our samples of exchange rate and interest rate data ran. For flexible exchange rates we showed that for both trading rule classes it is extremely unlikely that the observed trading rule returns should have come about by chance and thereby added to the growing body of evidence suggesting that simple technical trading rules have predictive ability in foreign exchange markets. A second important result we confirmed was that the observed trading rule returns do not appear to be a compensation for bearing high levels of risk. In contrast, we have found strong indications that following trading rules is less risky than buying and holding currencies or stock market indices. Moreover, we found no evidence at all of decreasing or even vanishing trading rule returns over time. It thus seems as if over a period of 14 years technical analysis had been a simple way to earn excess returns without having to pay for these with the incurrence of additional risk.

Whilst many economists feel uneasy about embracing this conclusion, some attempts have been made to provide theoretical explanations for the existence and persistence of trading which is not based on economic fundamentals. The model by DeLong et al. (1990), which was already mentioned, tries to explain the success of extrapolative trading by allowing for noise traders whose erroneous beliefs cause enough additional volatility in prices, that rational arbitrageurs are deterred from driving both prices to their fundamental values and noise traders out of the

market. The main contribution of DeLong et al.'s (1990) paper is that it demonstrates that it is possible that noise traders themselves create the conditions which are necessary for their survival. Whilst this self-fulfilling component may be an intuitively appealing explanation for the existence of technical traders, in other respects the model of DeLong et al. (1990) is not in agreement with the empirical regularities we found. One implication of the model is that whilst noise traders have higher expected returns than rational arbitrageurs, the volatility of these returns is overproportionally high. Our finding that trading rule returns are less risky than returns from a Buy-and-Hold strategy suggests that a simple identification of noise traders with technical analysts would be inaccurate. Another respect in which the noise trading model is at odds with evidence on technical analysis is that in the model noise traders are the less well informed market participants, whereas in reality technical analysis is particularly popular with foreign exchange professionals.¹ Thus there exist important respects in which the noise trading model needs to be modified in order to capture the nature of technical trading in asset markets more adequately.

As regards the question of the role of central bank interventions for the profitability of technical trading rules, we started off by showing that LeBaron's (1996) finding that technical trading rules are remarkably useful on days on which central banks intervene is robust to considering a wider range of technical trading rules and using not only Fed but also Bundesbank intervention data. This finding strongly suggests that interventions and technical trading are related. The nature of this relationship, however, is not as easy to determine. We argued that the explanation that central banks introduce exploitable time dependencies into the paths of exchange rates and thereby transfer funds to technical traders does not square with our finding of very substantial intervention profits for both the Fed and the Bundesbank. As an alternative explanation we suggested and provided evidence that interventions are related to technical analysis in the sense that interventions are intended to counter the influence of technically motivated trading. If this is the case then the reason for the remarkably high profitability of technical trading rules on intervention days is simply that interventions are more reliable signs for the existence of technical trends than trading rule signals by themselves. However,

¹See Menkhoff (1997) for an analysis of the characteristics of foreign exchange market participants engaging in technical analysis.

our results also indicate that in the short run technical trends continue in spite of central bank interventions and that exchange rates move in a direction consistent with central banks' intentions only in the long run. Moreover, it emerges that this empirical regularity can even be exploited using information contained in daily newspapers.

We have argued that the peculiar discrepancy between the short and long term behaviour of exchange rates after interventions is not explained by any existing theoretical model of the effects of central bank interventions. It is worth noting, however, that there exists a corresponding result which Frankel and Froot (1990) found analysing market participants' process of expectation formation. Examining survey data on exchange rate expectations, Frankel and Froot (1990) observed that whilst short term (1-week to 3-month) expectations exhibit bandwagon tendencies, in the long term market participants tend to forecast a return to a long-run equilibrium such as Purchasing Power Parity.² If one assumes that central bank interventions are intended to counter extrapolative technical trading which drives exchange rates from their fundamental values, then our results indicate that this twist in the expectations of market participants is nothing but an indication of profit-maximising behaviour. Moreover, this interpretation also squares with the results of Taylor and Allen's (1992) study of the use of technical analysis in foreign exchange markets. About 90% of the respondents of their questionnaire survey use at least some chartist input at short horizons (intraday to one week), whilst at long horizons (one year or longer) 85% of respondents view fundamental analysis as more important than chart analysis. Given the results of these studies and the findings made in this investigation, it seems fair to count the observed divergence between short and long term dynamics of exchange rates as an important stylised fact in need of explanation. It remains one of the main challenges of theoretical research in international economics to develop a model that can rationalise it.

Our results concerning the profitability of technical trading rules for EMS exchange rates indicate that for these there do not exist time dependencies which can be exploited by means of technical analysis. Moreover, we have provided strong evidence that the GBP's participation and the ITL's departure from the ERM significantly affected technical trading rule profits.

²Frankel and Froot (1990), p. 96ff. See also the evidence in Froot and Ito (1989) and Ito (1990) on the inconsistency of short- and long term exchange rate expectations.

These results are in perfect agreement with the above mentioned paper by Jeanne and Rose (1999). In this paper, a noise trading framework is employed to explain the difference in volatility between fixed and flexible exchange rate regimes. In this model the presence of noise traders can lead to multiple equilibria in flexible exchange rates: One equilibrium with a large number of noise traders and high volatility and one with few noise traders and low volatility. Joining a fixed exchange rate regime like the EMS can in this context be seen as a way to pin down the economy in a low volatility equilibrium. The evidence we provided concerning the influence of joining/leaving the ERM on trading rule profitability can be considered as the closest thing to an empirical verification of the model.

We also found that moving average technical trading rules were unprofitable in fixed exchange rate regimes because gross returns were compensated by interest differentials and we noted that this was at least partly a reflection of the fact that uncovered interest parity (UIP) works much better in fixed than in flexible exchange rate regimes. Again it is worth noting that this finding is in line with Mark and Wu's (1998) recent attempt at explaining the failure of UIP within a noise trading model. If noise trading is responsible for deviations from UIP for flexible exchange rates, then the fact that fixing exchange rates is one way to drive noise traders out of the market might well explain why UIP works much better for fixed exchange rates.

In this context it is also worth noting that we found that technical trading rules were not even profitable during periods of low credibility of the EMS exchange rate parities. This indicates that the rules are of little use as regards predicting the timing of realignments of fixed exchange rate parities and suggests that technical trading and speculative attacks are distinct phenomena, associated with different exchange rate regimes. Whilst technical trading goes on continually in flexible exchange rate markets and may be the root of excess volatility, in a system of fixed exchange rates speculative attacks occur from time to time and cause sporadic, though potentially very costly turbulence. Seen in this way, the choice between exchange rate regimes comes down to opting for the lesser evil.³

Two other policy issues should also be addressed: The first is the obvious question what

³Arguably, speculative attacks need not occur in fixed exchange rate markets as long as the authorities in charge of fixing the central parities do so only taking into account economic factors (i.e. not political ones, or national pride). Experience shows, however, that this rarely happens (e.g. the UK in 1992).

our findings tell us concerning the desirability of conducting central bank interventions. At first sight it might seem hard to make out a case against interventions, given that they are highly profitable and appear to be in accordance with economic fundamentals. One potential danger might be, however, that interventions come to be seen as confirmations of the existence of technical trends and thereby attract additional technical trading. In this case, they would tend to increase exchange rate volatility and would therefore be undesirable. Given the recent results by Dominguez (1998) and Chang and Taylor (1998), which indicate that interventions tend to increase volatility, and our finding that newspaper reports of interventions are exploitable, this danger should be considered real.

The second policy issue is the more general one of whether a case can be made for the introduction of a Tobin tax, i.e. a small tax on foreign exchange transactions intended to reduce volume and volatility on foreign exchange markets.⁴ The model by Jeanne and Rose (1999) suggests that volatility in flexible exchange rate markets is unnecessarily high due to the influence of noise traders. The question is whether introducing a Tobin tax can be an alternative to joining a fixed exchange rate regime when the aim is to drive noise traders out of the market. Experiments with our observed technical trading rule returns show that a tax (modelled as an increase in transaction costs) of between 0.35% and 0.8% would be necessary to render trading rule returns insignificant.⁵ Given that technical trading rules yield significant profits in a number of other asset markets (e.g. stock and commodity markets), it might be expected that the introduction of such a tax would indeed drive technical traders out of the market. However, this ignores another possible reaction to the introduction of a Tobin tax, namely that foreign exchange markets move to a place where no such tax is levied. Whilst it might be desirable to forge an international agreement to introduce such a tax, the gains for countries who do not participate are too large for it to seem likely that such an agreement could be reached. Thus, although our results suggest that flexible exchange rates do indeed display the symptoms of a disease that is curable with a Tobin tax, without a sensible plan to make such a tax enforceable, its introduction does not belong onto the political agenda.

⁴Tobin (1978); see also Frankel (1996) for a recent discussion of the Tobin tax.

⁵N.B. These figures are quite close to the 0.5% suggested by Tobin.