

The Extent and Significance of Technical Analysis in the Foreign Exchange Markets

AARON SCHIFF

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Volatility is one of the defining characteristics of foreign exchange markets in the era of floating exchange rates. In an entertaining book about the inner workings of the foreign exchange markets, Roberts (1995) observes that foreign exchange markets are in an almost continuous state of flux. To illustrate this, figure 1 shows the daily percentage change of the USD/DM exchange rate during 1994. Large percentage changes in both directions can be clearly seen. It is also obvious that exchange rates change every day. If an exchange rate is unchanged from one day to the next, it seems more likely to be due to coincidence than anything else. A result of this is that players in foreign exchange markets are required to make frequent predictions of future exchange rate movements.

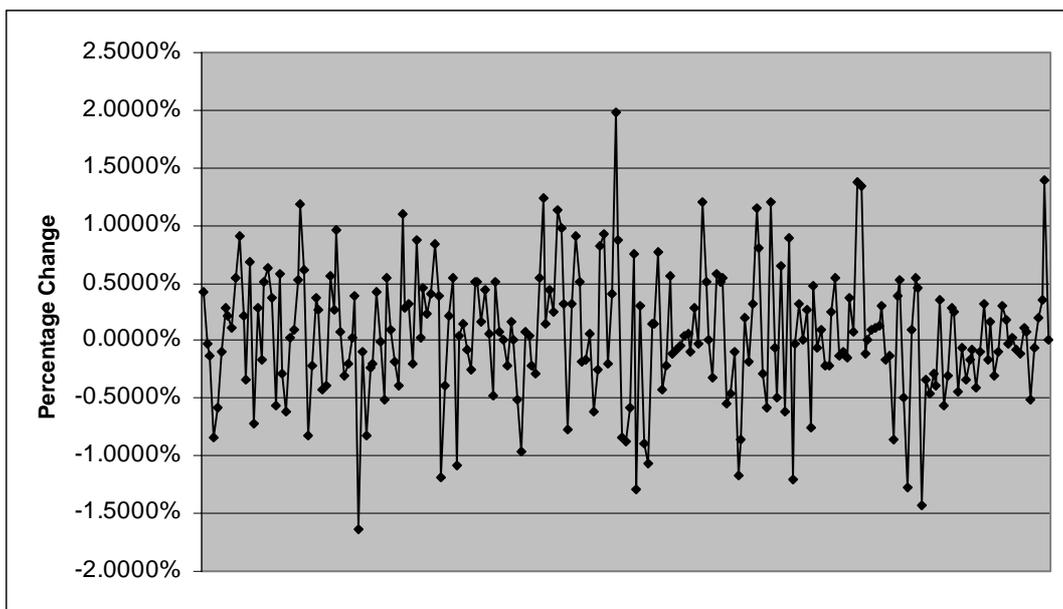


Figure 1: Daily percentage change of the USD/DM exchange rate over the year 1994.

The types of information used by market participants to form predictions of exchange rate movements can be separated into two broad categories: (i) fundamental information, such as inflation rates, GDP, unemployment rates, trade figures, etc.; and (ii) technical information such as prices and quantities traded. The use of the former is known as *fundamental analysis*, and the latter *technical analysis*, upon which this essay will focus.

In general, technical analysis is defined as being "... the use of past price behaviour to guide trading decisions in asset markets." (Neely, 1997). In the context of foreign exchange markets, this translates to the usage of past exchange rates as a guide for taking positions in currencies. Although technical analysis is not new, it has traditionally been regarded with scepticism in the economics profession, due in part to belief in the efficient markets hypothesis (Taylor & Allen, 1992). However it has recently become the focus of serious economic research. The intent of this essay is to bring together some of this recent research by presenting a summary of the empirical evidence regarding the usage and profitability of technical analysis in foreign exchange markets. To pre-empt, the usage of technical analysis is found to be widespread and so the potential effects and significance this are summarised and discussed.

THE EXTENT OF TECHNICAL ANALYSIS

There is clear evidence that many participants in the foreign exchange markets commonly use technical analysis of some form. The most direct evidence has come from surveys conducted by Taylor & Allen (1990 & 1992) of dealers in the London foreign exchange market. These surveys were designed specifically to assess the extent to which foreign exchange dealers and their institutions use technical analysis.

One of Taylor & Allen's key findings is that "At the shortest time horizons (intraday to one week), approximately 90 per cent of respondents reported using some chartist input when forming their exchange rate expectations..." (1992, p. 309). In addition, over the same time horizon, Taylor & Allen (1992) report that 60 per cent of respondents judged technical analysis to be at least as important as fundamentals when generating exchange rate predictions.

The usage of technical analysis seems to diminish as the time horizon for the prediction increases. Taylor & Allen (1992) find that at horizons of one month or more, the weight placed by dealers on economic fundamentals increases, and at the longest time horizons (greater than one year), approximately one third of respondents relied purely on fundamentals. It is also interesting to note that Taylor & Allen (1992, p. 309) report the existence of "... a persistent 2 per cent or so of respondents who apparently never use fundamental analysis at any horizon."

Taylor & Allen (1992, p. 309) also find that technical and fundamental approaches were generally viewed as being complementary and report that "... only 8 per cent replied that they considered the two approaches to be competing to the point of being mutually exclusive...." In particular, technical analysis is often used to *quantify* the predictions of fundamental analysis, or to provide guidance about the *timing* of exchange rate changes.

Having established the above evidence as to the prevalence of technical analysis in foreign exchange markets, the remainder of this essay will concentrate on explaining why technical analysis is so popular, and what the effects of this are likely to be.

IS TECHNICAL ANALYSIS PROFITABLE?

One obvious explanation of the apparent popularity of technical analysis could be that it is simply profitable. Hence much of the empirical work on technical analysis has been aimed at determining whether or not it is profitable. Basic empirical work on this question (for example, Dooley & Shafer, 1976 & 1983, Sweeney, 1986, and Neely, 1997) gives some evidence that positive profits could be made by using simple technical trading rules, such as moving averages and filter rules, in the foreign exchange market. In addition, Neely (1997) has shown that there is little evidence that the excess returns from such technical trading rules are compensation for bearing excessive systematic risk. However these studies have not tested the statistical significance of the alleged profits.

More comprehensive work by Levich & Thomas (1993) and Neely *et al.* (1997) uses a bootstrap approach to determine the statistical significance of profits attained by

following technical trading rules. The key finding of these papers is that following simple technical trading rules does lead to statistically significant excess returns.

It would seem that the weight of the empirical evidence supports the conclusion that following technical trading rules in the foreign exchange markets can generate excess returns. It should be noted, however, that the type of technical analysis tested by the papers surveyed in this section probably differs from what is actually used by practitioners. In particular, practitioners of technical analysis generally use some of their own judgement and interpretation when generating their predictions, rather than just following mechanical trading rules (Taylor & Allen, 1990). In light of this, a cautionary note is sounded by the findings of Taylor & Allen (1990). In that paper, they surveyed the exchange rate predictions of six practitioners of technical analysis or ‘chartists’. They found that all but one of the analysts were unable to consistently outperform the predictions of a random walk, on a root mean square error basis, for the exchange rates and time periods surveyed. However, research by Osler & Chang (1995) gives some evidence that at least one actual method of technical analysis used in practice, the “head and shoulders” trading rule, may in fact be profitable.

In addition, it was previously noted that in practice, technical analysis is often used in conjunction with fundamental analysis. The studies of profitability summarised above have only considered the performance of technical trading rules in isolation. An interesting line of research would be to investigate whether combining technical analysis with trading decisions based on fundamental analysis has a positive or negative effect on the profits produced.

THE SIGNIFICANCE OF TECHNICAL ANALYSIS

Given that technical analysis appears to be widely used in the foreign exchange markets, and that it may be profitable, the question immediately arises as to what the effects of this will be. This section discusses the possible impact of technical analysis on foreign exchange markets and society as a whole.

As was mentioned in the introduction, volatility is one of the key features of foreign exchange markets in the floating rate era. This also coincides with the rising popularity

of technical analysis in foreign exchange markets. Is this a mere coincidence, or is it possible that technical analysis is responsible for some of the observed volatility?

To answer this question, it will be helpful to give an explanation for the popularity of technical analysis, apart from its possible profitability. To do this, firstly consider that an exchange rate will never change unless there is some change in the demand and supply of the two currencies in question. Such changes in demand and supply can only occur as the result of a decision made by at least one of the participants in the foreign exchange market. Let us assume that these decisions are made on the basis of some sort of information, so that participants do not make their decisions based on the toss of a coin, for example. As stated previously, such information could be fundamental or technical in nature.

Given these basic observations and assumptions, it is now possible to propose the following hypothesis to explain the popularity of technical analysis. We observe that exchange rates change very frequently, as can clearly be seen by looking at hourly exchange rate data, such as in Goodhart & Giugale (1993). Yet it is certainly not the case that new fundamental information comes to light this often. Hence for making predictions or trading decisions over short time horizons, technical information is often the only information available. In other words, given that market participants still need to make predictions even in the absence of new fundamental information, there is a role for technical analysis to 'fill the gaps'. It would be interesting to see if this hypothesis could be formalised by developing a microeconomic model of a short-term speculator for whom it may be optimal to supplement fundamental analysis with technical analysis over some time horizon.

In addition to this hypothesis, one conjecture that can be made is that if technical analysis is widely used in a particular market, it is likely to become somewhat self-fulfilling. Indeed, one of the respondents to Taylor & Allen's survey (1992, p. 311) noted that "Knowledge of chart signals is essential to all operators as they have a bearing on the actions of many market participants...". This characteristic of technical analysis is would seem to serve only to increase its popularity.

If we accept the above explanations for the popularity of technical analysis over short time horizons, could this contribute to the high level of volatility in foreign exchange

markets? I believe so, for the following reasons. Firstly, if many market participants are using similar technical rules as a partial or total basis for their short-term decision making, they will tend to make similar decisions at similar times. Obviously, this will serve to increase the magnitude of exchange rate fluctuations. Secondly, there are many different types of technical trading rules, and they are generally open to interpretation. Therefore, market participants using technical analysis will not make exactly the same decisions at exactly the same time. This will serve to increase the ‘noise’ in exchange rate movements.

The model developed in De Grauwe, *et al.* (1993), has provided some theoretical support for this argument. In their model, the combination of different types of traders using technical and fundamental analysis results in chaotic exchange rate behaviour. Although chaos does not necessarily imply volatility, their model does exhibit some of the characteristics of exchange rate behaviour.

Unfortunately, the usage of technical analysis is not necessarily a good thing from society’s point of view. In their theoretical analysis of “noise traders”, Shleifer & Summers (1990, p. 31) point out that “... noise trading also has a private cost, as it makes returns on assets more risky, and so can reduce physical investment.” In addition, it can be shown that the impact of noise trading on the other market participants and the rest of society may be negative (De Long, *et al.*, 1989). Given the observation that technical analysis has become endemic in the foreign exchange markets, and given the conjecture that its popularity is likely to be self-enhancing, these welfare issues take on increased importance.

CONCLUSION

The evidence summarised in this essay makes it clear that technical analysis plays an important role in modern foreign exchange markets. In particular, it is widely used by market participants as an aid when forming exchange rate predictions over short time horizons. However, technical analysis is seldom used in isolation, and is largely viewed as being complementary to the analysis of fundamental economic information.

There is also plenty of evidence to suggest that following technical trading rules can generate significant excess returns that are not compensation for bearing additional systematic risk. It was noted, however, that such trading rules as have typically been tested might bear little correspondence to the actual use of technical analysis in practice.

The significance of technical analysis was also considered and it was hypothesised that the popularity of technical analysis may be ascribed to its ability to fill in the gaps between the availability of new fundamental information. In addition, technical analysis may be partially self-fulfilling and thus its employment is likely to further increase its popularity. Thus it was suggested that the usage of technical analysis would be likely to increase volatility in foreign exchange markets. It was also shown that there are potential negative impacts on society as a whole of widespread usage of technical analysis, particularly through a reduction in physical investment.

Finally, throughout this essay, two possible avenues for future research have been suggested. They can be summarised as follows: (i) empirical work on how the profitability of fundamental analysis is affected when it is used in conjunction with technical analysis; and (ii) building a microeconomic model of a short-term speculator to investigate the conditions under which it is optimal to use technical analysis as a complement to fundamental analysis.

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