HOW DO UK-BASED FOREIGN EXCHANGE DEALERS THINK THEIR MARKET OPERATES?

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Abstract: This paper summarises the results of a survey of UK based foreign exchange dealers conducted in 1998. It addresses topics in three main areas: The microeconomic operation of the foreign exchange market; the beliefs of dealers regarding the importance, or otherwise, of macroeconomic fundamental factors in affecting exchange rates; microstructure factors in FX. We find that heterogeneity of traders' beliefs is evident from the results but that it is not possible to explain such disagreements in terms of institutional detail, rank or trading technique (*e.g.* technical analysts versus fundamentalists). As expected, non-fundamental factors are thought to dominate short horizon changes in exchange rates, but fundamentals are deemed important over much shorter horizons that the mainstream empirical literature would suggest. Finally, market 'norms' and behavioural phenomena are very strong in the FX market and appear to be key determinants of the bid-ask spread.

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NON-TECHNICAL SUMMARY

This paper seeks to add to our knowledge of the actions of foreign exchange traders by presenting the results of a survey of their beliefs and actions.

It addresses three main topics:

1. The microeconomic operation of the foreign exchange market: the trading techniques used by FX dealers, who traders deal with, and the mechanisms by which they trade;
2. Traders' views on exchange rate determination: the perceived relevance of the concept of fundamental value, the factors that traders think important in determining exchange rate changes over a range of horizons, and the predictability of exchange rate trends over the same range of horizons;
3. Further market microstructure factors: the size of bid-ask spreads, and the factors that determine spreads.

The results point to three areas of divergence between academic writing and traders' views:

1. Fundamental value is seen as a relevant concept by a large proportion of traders at horizons much shorter than mainstream academic theory can explain. Over half the respondents think exchange rate changes over a six-month horizon (or less) accurately reflect changes in economic fundamentals. The academic consensus is closer to thirty-six months.
2. 'Speculative forces' appear to be an important factor in determining short-term currency movements. This is over and above the contribution made by economic factors, news, technical trading effects and bandwagon effects. Answering the question of what factors precipitate speculative flows in addition to the alternatives may contribute to our knowledge of exchange rate determination.
3. Although much has been made of the differences between chartists and fundamentalists, this survey shows very little evidence of systematic differences of opinion between these two groups. However, there is clear evidence of heterogeneity in the foreign exchange market as a whole. There is no consensus among traders on a wide range of important issues relating to fundamental value and the determinants of exchange rate movements.

The results also suggest a new answer to an old puzzle. The concept of purchasing power parity as a measure of an exchange rate's fundamental value is supported by a sizeable proportion of traders. However, a much smaller percentage of respondents would trade in such a way as to move exchange rates closer to PPP levels. This suggests an alternative reason for the ambiguous empirical results of tests of PPP. In addition to the standard arguments such as measurement difficulties and price frictions, traders, who jointly determine exchange rates, in the main do not act so as to restore equilibrium.

Finally, the results point to a new puzzle. Traders do not vary their bid-ask spread either very often or for some of the reasons thought important in the microstructure literature. Instead, market convention appears to exert a strong hold over traders. Why this is so deserves further research, and the importance of 'market norms' should be incorporated into microstructure models.

1. Introduction

One week spent at the side of a top foreign exchange trader led a recognised expert in the field to realise the extent of the gap between how academic economists view exchange rate determination and the way market professionals work (Lyons, 1999, Chapter 1). This realisation contributed significantly to the emergence of a new literature in exchange rates – market microstructure – and hence to a wider appreciation of the important role played by traders. This paper seeks to add to our knowledge of the actions of foreign exchange traders by presenting the results of a survey of their beliefs and actions. It addresses three main topics: the microeconomic operation of the foreign exchange market (including trader techniques, counterparties, and trading mechanisms); traders' views on exchange rate determination (including the (ir)relevance of the concept of fundamental value, the factors that are thought important over a range of horizons, and the predictability of exchange rate trends); and further market microstructure factors (the size of bid-ask spreads, and the factors that determine them). Further aspects of the market are addressed in the survey, but are not discussed in this paper to conserve space. A copy of the full survey, incorporating the results of all questions, is given in Appendix A.

The results of the survey do not in general set a new research agenda for international economists. Rather, they highlight the areas where the gap between academic teaching and traders' views remain large. These divergences do not necessarily mean that academics are wrong due to ivory tower isolation. Instead, they indicate where further work is needed if we are to understand why workers at the sharp-end of the industry disagree.

The results point to three areas of divergence between academic writing and traders' views. First, fundamental value is seen as a relevant concept by a large proportion of traders at horizons much shorter than mainstream academic theory can explain. Maybe practitioners have better models than academics, or maybe academics with good models become traders and keep their findings secret. Alternatively, since the majority of traders close out positions by the end of a working day, horizons of six months are of only academic interest to most traders. But it remains that over half the respondents think exchange rate changes over a six-month horizon (or less) accurately reflect changes in economic fundamentals. The academic consensus is closer to thirty-six months.

Second, 'speculative forces' appear to be an important factor in determining short-term currency movements. This is over and above the contribution made by economic factors (which is in any case tiny), news, technical trading effects and bandwagon effects. Answering the

question of what factors precipitate speculative flows in addition to the alternatives may contribute to our knowledge of exchange rate determination.

Third, although much has been made of the differences between chartists and fundamentalists, this survey shows very little evidence of systematic differences of opinion between these two groups. Furthermore, two relatively unresearched groups – jobbers and customer-led traders – appear to be equally important in the market. Arguably, models of the exchange rate market should incorporate a richer cast of participants. However, there is clear evidence of heterogeneity in the foreign exchange market as a whole. There is no consensus among traders on a wide range of important issues relating to fundamental value and the determinants of exchange rate movements.

The results also suggest a new answer to an old puzzle. The concept of purchasing power parity as a measure of an exchange rate's fundamental value is supported by a sizeable proportion of traders. However, a much smaller percentage of respondents would trade in such a way as to move exchange rates closer to PPP levels. This suggests an alternative reason for the ambiguous empirical results of tests of PPP. In addition to the standard arguments such as measurement difficulties and price frictions, traders, who jointly determine exchange rates, in the main do not act so as to restore equilibrium.

Finally, the results point to a new puzzle. Traders do not vary their bid-ask spread either very often or for some of the reasons thought important in the microstructure literature. Instead, market convention appears to exert a strong hold over traders. Why this is so deserves further research, and the importance of 'market norms' should be incorporated into microstructure models.

The next section describes the survey and the findings relating to the operation of the market. Section 3 contains results of questions collected under the broad heading of fundamental value, and section 4 considers additional microstructural affects. The paper closes with a brief conclusion and overview.

2. The data

The data used in this study were collected by a postal survey of UK-based foreign exchange dealers conducted in March/April 1998. A copy of the questionnaire is reported in Appendix A. Approximately 1,940 surveys were sent out to named dealers whose affiliations were extracted from the 1997 *Hambro's Dealers Directory*. Of these, 18 dealers were based in each of Belfast

and Edinburgh, 8 in Leicester, 7 in Glasgow, and 3 in Manchester. The remainder were all London based. Postage-paid return envelopes were supplied, and all responses were entirely anonymous. Staff turnover and bank closures resulted in 32 non-deliverable questionnaires, and the Bank of England dealers declined to participate but offered to discuss the results of the survey. A total of 110 completed surveys were returned, a response rate of approximately 5.8%. This low response rate may be due to the nature of some of the requested information. In particular, daily trading limits, departmental turnover and counterparty details (discussed below) could all be deemed too sensitive for even anonymous release. Nevertheless, the response rate still falls into Alreck and Settle's "typical" range of 5–10% for a postal survey (Alreck and Settle, 1985).

2.1 The respondents

A description the distribution of respondents is given in table I which cross-tabulates the respondents by rank ("dealer/junior dealer", "chief/senior dealer", "treasurer/manager" or "other"), daily position limit (in US$ millions or value at risk, VaR) and departmental average daily turnover (in US$ millions). The first two measures are indicative of a trader's importance in the market. In particular, the daily position limit is the maximum open position a dealer is authorized to assume during the trading day. Since in most cases dealers square their positions at the end of a trading day, the position limit can be used as a proxy for a dealer's trading capacity. This can only be an indication of a trader's importance since, in practice, traders rarely approach their daily limits. The departmental daily turnover is a comparable indicator of the importance of the trader's employer in the market. Some traders did not give full details for all three variables and are instead described in a footnote to the table.

One factor not detailed in the table is the nationality of the organisation. The parent companies of the dealers' organisations are internationally distributed – 36 are UK-based, 41 are from other European countries, 8 are US-based, 12 are Asian (ten of which are from Japan), with 13 based in other countries, primarily the Americas or the Middle-East. Though this is a survey of the UK foreign exchange market, we have in fact gathered views from traders of many nationalities and whose companies are headquartered around the world.

2.2 Trading technique

One popular technique for analysing financial markets is to hypothesise the use of different trading techniques (Frankel and Froot, 1990; Taylor and Allen, 1992; Menkhoff, 1998). In particular, much has been made of the different factors driving fundamentalists and technical analysts (Goodhart, 1988; Cutler, Poterba and Summers, 1990; De Long, Shleifer, Summers and Waldmann, 1990). Frankel and Froot (1990) suggest that traders switching between these techniques may explain the highly unpredictable nature of exchange rates. DeGrauwe and Dewachter (1990) go a step further and argue that mixing technical analysts with fundamentalists can generate a chaotic model.

Table II details the techniques that the respondents thought best characterised their current dealing methods, together with their methods of five years ago. In addition to technical trading and fundamental analysis, respondents were given "jobbing", "customer order-driven" and "other" as alternatives. Jobbing describes the (usually rapid and continuous) buying and selling of a currency for small profit each round trip. Adapting Silber's (1984) description of a scalper in a futures pit, a jobber looks to sell at his offer what he bought at his bid, or buy back at his bid what he has already sold at his offer.

Many of the traders surveyed claim to use at least two techniques and so the number of chosen techniques is much larger than the total number of responses to the question (110). Fundamental and technical trading-based strategies are both followed by approximately one-third of dealers, with even more selecting jobbing and customer orders as the driving forces behind their trading. Only two traders selected "other", indicating that the four remaining alternatives characterise the majority of traders in the market.

Two points are worth stressing from these results. First, the large proportions of respondents using jobbing techniques or following customer orders stands in contrast to the general perception that the foreign exchange market is dominated by technical analysis (Taylor and Allen, 1992). Second, fundamentals are as equally widely followed as technical analysis. The differences are probably due to the wording of the questions asked. For example, in Taylor and Allen (1992) respondents give the relative importance of technical analysis versus fundamentals along a ten-point scale at various trading horizons. In our survey, we ask the traders to select the *most* appropriate description of their trading method and provide a wider list of alternatives. Our results confirm and extend the findings of Menkhoff (1997) who, based on

a survey of German foreign exchange professionals, shows fundamentals and "flows" to be equally important as technical analysis.

The only major change in the gross figures over the five-year period is the replacement of jobbing with technical trading-based strategies by a substantial proportion of respondents (the χ^2 test of equality is strongly rejected by a test statistic of 12.0 with three degrees of freedom). As both are predominantly short-term strategies, this arguably represents a change in style rather than a shift in the nature of the market.

The gross numbers mask a multitude of changes at the individual level. For, example, of the 34 dealers that used fundamentals five-years ago only 26 still do so today. Similarly, although 36 dealers based their strategies on customer orders both five-years ago and today, only 26 maintained this approach – ten dealers have stopped using customer orders and these have been replaced by ten others that have begun to use customer orders.

2.3 Counterparties and trading systems

Table III(a) gives the breakdown of current trading by counterparty, and comparable figures from five years ago. The numbers are remarkably constant over time and indicate that around one-third of deals are with non-bank customers, the rest being interbank transactions. This breakdown favours customer orders slightly compared with previous work which has estimated customer orders at around one-fifth of turnover. Bank of England (1998) reports that trading with non-financial institutions constituted seven percent of turnover in London during April 1995 while other (non-bank) financial institutions made up 18% of business. The figure for non-bank financial institutions was lower in April 1998 (9.5%), with non-financial customer business unchanged.

What is noticeably different is the method of dealing (table III(b)). Currently, one-half of all business is conducted via electronic broking systems (EBS, Reuters 2000-2 etc), one-third via the interbank network and one-fifth through traditional voice brokers. Five years ago, electronic brokers only had five percent of the market with voice brokers and the interbank network sharing the remaining trades equally. The statistically significant gain of market share by electronic brokers (*t*-test of no change in market share is 17.2) has come at the expense of both traditional brokers and, to a lesser extent, the interbank network (individual *t*-statistics are -16.5 and -5.7 respectively, although these are not independent).

2.4 Correlations

Conceivably, relationships might exist between the descriptive responses discussed in this section. Trivially but reassuringly, for example, customer-order led traders conduct a significantly greater proportion of their deals with customers (52%) than other types of traders (22%); *t*-statistic is 6.76. At a more meaningful level, however, there is no significant relationship between trader type and any measure of market power (daily position limit, departmental turnover or rank), implying that high-ranking traders do not seem to use one particular trading strategy. Regarding trading systems, low position limit traders (<US$25m) do appear more likely to use the interbank network (41%) rather than brokers when compared to higher-ranking traders (25%); *t*-statistic is 3.19.

3. Fundamental value

Most (macro)economic models of the exchange rate seek to explain a fundamental or equilibrium value. Our survey shows that traders believe 'fundamental value' to be a concept of relevance to the foreign exchange market, but that this only truly becomes a widely-held view when considering exchange rate movements over a period in excess of six-months.

When looking intraday only three percent of traders agree that exchange rate changes accurately reflect movements in fundamental value (table IV(a)). This rises to 58% for the intermediate horizon of up to six-months, and to 87% for the long run (over six-months). Just one percent of respondents selected "no opinion", and then only over the long run which may be a period beyond the ken of exchange rate traders.

The responses to this question accord in part with the academic literature. Twenty-five years of research has had only limited success in modelling movements in exchange rates over horizons below six-months, where the findings of Meese and Rogoff (1983) still hold considerable sway. For example, in their comprehensive survey of exchange rate modelling Frankel and Rose (1995) conclude:

> "..the Meese and Rogoff analysis at short horizons has never been convincingly overturned or explained. It continues to exert a pessimistic effect on the field of empirical exchange rate modelling in particular and international finance in general."

The modern literature, in comparison, has much more to contribute to the prediction and explanation of longer-term currency movements. Mark (1995) and Chinn and Meese (1995) incorporate (different) long-run equilibria via error-correction modelling and demonstrate statistically and economically significant forecasting power but only over horizons in excess of thirty-six months.

However, a slender majority of traders see a relevance for fundamentals over the intermediate horizon, yet as the above quote suggests, there are very few academic papers demonstrating this (an exception is MacDonald and Marsh, 1997). This may imply that traders have access to better forecasting models, or that any horizon in excess of one day is not of practical relevance and therefore easily misjudged. But it could serve as a spur to those who believe that a combination of advanced econometrics and economic theory can result in better explanations for exchange rate movements than a standard survey of the literature would suggest.

3.1 Factors that determine currency movements

In order to glean further information on the perceived causes of movements in the exchange rate, traders were asked to select the single most important driving factor over the same three horizons. Their responses are summarised in table IV(b), which gives the number of responses for each answer divided by the total number of responses, since many panellists chose more than one factor. Intraday, over-reaction to news was cited most frequently (32.8% of respondents), closely followed by bandwagon effects (29.3%) and speculative forces (25.3%). Economic fundamentals are deemed irrelevant (0.6%) and technical trading is also ranked relatively lowly (10.3%).

News has been recognised as important to the exchange rate since the asset approach was developed in the 1970s (Mussa, 1976, 1979; Dornbusch, 1976). Studies of news announcements have demonstrated both the rapid response of the market and its tendency to over-react (Ederington and Lee, 1993). An additional question in the survey addresses the speed with which the market incorporates new information about a range of economic variables. The responses indicate that some announcements are thought to be more rapidly discounted than others. For example, 61% of panellists judge that interest rate news is incorporated into the current price within ten seconds of the announcement (and a further 28% say it is discounted within a minute), whereas news on GNP/GDP and the money supply is thought to be assimilated within ten seconds by just 27% and 21% respectively. Nevertheless, and in line with recent studies using

high-frequency data (Ederington and Lee, 1993; Anderson and Bollerslev, 1998), a clear majority claims that the FX market assimilates new information on all major economic variables within one minute. Further details regarding the answers to this and other questions are available on request.

Given this reaction speed, it is not surprising that news ceases to be important over the medium run, where instead economic fundamentals (31.4%), speculative forces (30.7%) and technical trading (26.3%) come to the fore. Over the long run, economic fundamentals are the only factor of real importance, although eleven percent of dealers still feel that technical trading is the primary explanation for such currency movements.

These results support three strands of the literature. First, the relative ranking of technical and fundamental analysis across horizons accords with the findings of Taylor and Allen (1992). They document that technical analysis dominates the use of economic fundamentals intraday but that for longer-run predictions economic fundamentals are deemed more important by traders. Similarly, both this survey and that of Taylor and Allen find a substantial minority of traders that bucks the trend and persists in considering technical analysis to be important over long horizons.

Second, while a substantial amount of work has considered the relative roles of technical analysis and economic fundamentals, this survey points to other factors as being much more important over short horizons. In particular, speculative forces rank highly intraday and are the only factor perceived to have a significant role over both the intraday and medium-run horizons. To the extent that traders measure speculative forces from the order flow through the market, this provides support for the newly emerging microstructure literature's focus on the information revealed by customer deals and via brokerage systems (Lyons, 1999). The survey suggests that micro factors are small in neither importance nor persistence, confirming recent evidence presented in Lyons and Evans (1999). However, the factors that prompt these flows remain to be explained. Traders clearly make a distinction between speculative forces on one hand, and bandwagon effects, technical trading and economic factors on the other. A model capable of explaining exchange rate movements needs to consider another factor, over and above the usual suspects.

A third aspect of the literature considers the forecasts and expectations of traders, usually by means of survey data. Researchers have examined two types of expectations formation in particular by performing the following regressions:

$$s^{e}_{t+k} - s_t = \beta^E\left(s_t - s_{t-j}\right) + \varepsilon^E_{t+k}$$

$$s^{e}_{t+k} - s_t = \beta^R\left(\bar{s}_t - s_t\right) + \varepsilon^R_{t+k}.$$

A clear pattern emerges from these studies (Frankel and Froot, 1987, 1990; Froot and Ito, 1989; Chinn and Frankel, 1994). At short horizons, extrapolative expectations, as characterised by the first equation, are strong and follow a bandwagon form. That is, the estimated coefficient β^E is significantly greater that zero such that positive (negative) changes in the log exchange rate, *s*, over the previous *j* periods are extrapolated into further positive (negative) expected changes over the forthcoming *k* periods. However, as *k*, the forecast horizon, lengthens the expectations coefficient turns negative implying that expectations are more stabilizing – a positive (negative) change is expected to follow a negative (positive) move. This switch appears to occur in predictions over a period somewhere between three and six months. This move to the stable form over the longer-run coincides with estimates of β^R in the second equation which are increasingly positive and significant as *k* rises. Such findings are supportive of a regressive expectations formation mechanism whereby the exchange rate is forecast to move towards its equilibrium or fundamental value, $\bar{s}$. Equilibrium is loosely specified in many of these papers and, in increasing levels of sophistication, is proxied by a constant, a long-term moving average or purchasing power parity estimates. Frankel and Froot (1987), for example, find an expected half-life of 2.5 years for deviations from a PPP equilibrium.

These findings compare very closely to the results of this survey. The respondents suggest that economic fundamentals are of essentially zero importance intraday, where instead bandwagon effects are singled out as the major determinant. However, these destabilising influences swiftly disappear as the horizon lengthens and economic fundamentals rank as the most important factor over the medium-run and dominate over the long-run. As the horizon lengthens, the power of attraction of fundamental value rises.

3.2 Purchasing power parity and fundamental value

The precise meaning of 'fundamental value' was left unspecified in the survey, but traders were asked for their views on purchasing power parity (PPP) since this theory lies at the root of most models of the exchange rate. The results are not encouraging for proponents of PPP. As might have been expected, less than five percent of respondents thought PPP could be used to gauge

or predict exchange rate movements intraday. But this only rose to 16.4% over the medium-run and 44.3% over the long-run (table IV(c)).

Even if almost one-half of respondents thought PPP relevant over the long-run (with 20% undecided), they were less willing to risk money on their beliefs. Less than 27% would sell the US dollar if a PPP-based calculation showed it to be overvalued, 65% would do nothing, and the rest were undecided. Fortunately none would buy the dollar. Standard economic reasoning suggests that factors such as price rigidities or the use of non-comparable price indices make PPP difficult to uncover empirically. This survey indicates that a lack of action by market participants who jointly determine exchange rates may be another reason for the weak evidence.

A common view is that PPP is "only one indication of true value" and can be used to compute fair value only "in very wide bands". Traders may think that economic fundamentals matter in the long-run, and many think they are important in the medium-run as well, but purchasing power parity alone is not seen as a good indication of fundamental value.

3.3 Exchange rate forecastability

Since academics view the exchange rate as a particularly difficult variable to forecast, traders were asked for their views. They were requested to indicate the degree of predictability of the market trend over the same three horizons as before, using a five-point scale where one indicates no predictability and five represents high predictability. The mean level of predictability and the standard deviation of responses are given in table IV(d).

Unexpectedly, given that most of their deals will be intraday, traders ranked intraday movements as more difficult to predict than medium and long-run movements. The respondents gave an average grade of 2.20 intraday, compared with 2.94 over the medium-run and 2.89 for the long-run. The increase in predictability as the horizon lengthens from intraday to the medium-run is highly statistically significant (*t*-statistic is 5.6), while the subsequent slight decline is insignificant (*t*-statistic is -0.5). The question then becomes, why do traders mainly engage in intraday deals and not longer-term if the latter are more predictable? Conversations with traders suggests that they perceive the risk involved in intraday trading to be much less than in overnight trades. Some traders do not have access to a full-service 24-hour dealing room, and even those that do are concerned about having to deal during the much thinner and more volatile overnight markets (see Andersen and Bollerslev, 1998; Danielsson and Payne, 1999).

These results should be considered alongside the earlier findings that more predictable forces such as economic and technical trading factors are deemed important over horizons in excess of one day. However, in a trading environment thought to be dominated by news releases and speculative forces (about which an individual trader has only patchy information), exchange rates should not be highly predictable. Traders who thought medium-run changes in exchange rates to be determined by reaction to news and/or speculative flows were significantly less likely than their peers to raise their estimated predictability of the exchange rate as the horizon increased (*p*-value 0.099, based on a standard contingency table test of independence).

3.4 Technical analysts and fundamental traders

As noted above, much is made in the literature of the different trading strategies and actions of fundamentalists and technical analysts. In this sub-section responses are disaggregated by trader type in an attempt to see whether traders' views on the relevance of fundamental value diverge significantly. In short, the answer is that they do not.

Traders were classified as fundamentalists (technical analysts) if they selected fundamental analysis (technical trading rules) as the best way to describe their trading method. Since several traders chose both options, these two categories are not mutually exclusive but the overlap is only a small proportion of either category. The proportion of traders in each classification responding positively to three different questions on fundamental value were then calculated, and the results graphed in figure 1. Equal levels of agreement for the two classifications would result in points on the 45° line.

There is perfect and unanimous agreement that intraday changes in the exchange rate do not reflect changes in fundamental value (point 10.I, at the origin of the figure). Fundamentalists are more inclined to agree that exchange rate changes reflect fundamental value changes in the medium and long-run (since points 10.M and 10.L lie some way below the diagonal). Similarly, they are more likely to reply that fundamental factors are key determinants of exchange rate movements over the medium run (15.M.fund). Technical analysts are more likely to agree that bandwagon effects are an important factor in determining intraday exchange rate movements (15.I.band) and, surprisingly, that PPP can be used to gauge/predict exchange rates intraday (18.I). Nevertheless, these deviations from equality are small and the correlation between the responses is almost 95 percent. Further, a non-parametric test of independence between response and technique is only significant for question 10.M.

There are differences between fundamentalists' and technical analysts' views on the predictability of trends. At each of the three horizons, fundamentalists are more optimistic: they give and average returns of 2.25, (3.00), and [3.08] at intraday, (medium-run), and [long-run] intervals, which can be compared with technical analysts' averages of 2.14, (2.84), and [2.92]. Nevertheless, although suggestive of a relationship between the importance of economic fundamentals and exchange rate predictability, these differences are not statistically significant.

It is not possible from these responses to argue that there are systematic differences between technical and fundamental traders' beliefs on fundamentals and the determinants of exchange rate movements. Neither was it possible to find such discrepancies when other types of trader were considered, nor when the respondents were disaggregated by seniority, daily trading limit or departmental turnover. Menkhoff (1998) also failed to find consistent differences between the beliefs of what he called "rational arbitrageurs" and "noise traders".

This is not to say, however, that the actions of technical and fundamental traders do not differ. Furthermore, the level of heterogeneity between market participants as a whole is high – the relevance of fundamentals over the medium-run showed no clear consensus; three different determinants of intraday exchange rate movements ranked equal first; three factors shared 90 percent of the votes over the medium-run too; the relevance of PPP over the long-run is as controversial among traders as it is academics. While we have not been able to explain the different responses of individual traders by workplace characteristics or trading technique, this survey has highlighted the very real disagreements that exist between market participants.

4. Microeconomic aspects of foreign exchange dealing

Market microstructure is a major growth area in foreign exchange economics. Dissatisfaction with the failure of macroeconomics-based attempts to model key exchange rates, perhaps best exemplified by Meese and Rogoff (1983), is a major cause. More positively, the success of the microstructure approach in explaining hitherto opaque aspects of other asset markets has acted as a spur.

Lately, a proliferation of new databases facilitating high frequency studies and/or containing microeconomic variables (*e.g.* inventory positions, order flow and bid-ask spreads) has allowed empirical research to address some of the issues raised by the theoretical microstructure literature. Unfortunately, the sheer size of the market, combined with its decentralized nature, makes generalizations based upon this empirical work questionable. Rather

than seek 'hard numbers', this survey concentrates on opinions. This is not without danger and this is fully recognised by the authors. However, we believe that the paucity of information in this area means that with any plausible levels of measurement error or selection bias, the results of this survey contain sufficient information to be relevant to current research.

4.1 Bid-ask spreads

One of the major variables studied in the market microstructure literature is the bid-ask spread. This is the standard measure of transactions costs in many financial markets, and has been studied in the FX market by Bessembinder (1994), Bollerslev and Melvin (1994), and Hartmann (1999) among others.

The size of the interbank bid-ask spread appears to differ between currencies. Dollar-Deutschmark deals are, on average, quoted with a three-point spread (*e.g.* DM1.7565-68); dollar-yen and dollar-sterling have mean spreads of four-points; dollar-Swiss franc is closer to 4.5 points. These numbers disguise the situation slightly in that the modal response for the yen is three-points (47% of responses, compared with 33% for five-points), whereas the modal response for the pound sterling is five-points (56%, compared with 32% for three-points). Overall, it is clear that the dollar-mark market has the narrowest spread, followed in turn by the yen, the pound and the Swiss franc. These rankings are exactly the same as the volume of turnover in the London FX market according to the Bank of England (1995) indicating that market liquidity affects spreads.

When asked whether market convention or the potential costs determined the spread that they themselves quote under most circumstances, 69% of traders selected the former. The potential costs of a quote were unspecified in the survey but the literature highlights order processing, adverse selection and inventory holding costs. In a recent paper Flood, Huisman, Koedijk and Lyons (1998) add search costs to this list. Irrespective of how the spread is apportioned, the majority of dealers feel it more important to satisfy unwritten market 'rules'. The most important reason for conformity was "to maintain an equitable and reciprocal trading relationship" (56% of respondents), followed by "to secure a good market image for the firm" (25%). In conversation, traders emphasise that quoting wide spreads will only drive turnover away and that the ability to maintain a tight quote is seen as enhancing a trader's reputation. One dealer said that "taking the pain is all part of the macho image traders have of themselves."

However, bid-ask spreads are seen to alter in the market at certain times, and traders were asked the frequency with which their quoted spreads differed from convention, in both directions. Overall, spreads are increased less than one-fifth of the time by ninety percent of respondents, and reduced less than one-fifth of the time by three-quarters of the respondents (Figure 2). Summarising, spreads are only occasionally adjusted in either direction, but there is a greater tendency for spreads to be narrowed rather than widened.

4.2 Liquidity, inventory and information effects

Microstructure theory suggests three main factors which might lead traders to change their spreads, the liquidity effect, the inventory effect, and the effect of asymmetric information (O'Hara, 1995). Traders were asked their reasons for changing their quoted spreads from the market convention, and the results suggest that the liquidity effect is dominant (figure 3). This was confirmed in conversations with traders.

Approximately thirty percent of respondents selected a thin market (either thin and hectic or, less often, thin and quiet) as a major reason for changing their spread. An unexpected change in volume was selected by another 9.5%, and almost 20% of traders chose "before and after a news announcement". We interpret the latter as a liquidity effect since volume is known to dry up before a scheduled release and to often increase dramatically once unexpected news is revealed. However, some traders have suggested that widening spreads before an announcement is more of a hedging tool in the face of uncertainty.

The asymmetric information options – a quote for a small bank (proxying an ill informed counterparty) or an informed bank – garnered some sixteen percent between them. The unequivocally inventory-related options of holding a position against the market trend and an increasing cost of holding a position were rarely selected. However, as Cheung and Wong (1999) note, changes in volatility and liquidity both alter the cost of holding a position. Increased market volatility could conceivably be linked to all three of the factors, and so the 15.6% of respondents that made this selection are not easily apportioned.

These considerations make it impossible to rule out inventory effects as being important determinants of bid-ask spreads, but traders said that inventory considerations are rarely seen as affecting spreads (assuming the position does not threaten trading limits) since (a) a position can always be laid off in the brokers market, and (b) changing the spread signals the inventory position more clearly than simply shading the quote up or down as appropriate.

Several market participants wondered whether the emerging dominance of the electronic broking services will alter the behaviour of traders. In particular, since these services allow traders to enter one-sided quotes and make the inside quote (best bid and best ask) much more transparent than the bilateral interbank market, an individual trader's spread will become an irrelevance.

5. Conclusions

In this paper we have documented the factors that practitioners believe affect the foreign exchange market. We do not contend that our methodology substitutes for the vast empirical literature addressing the workings of the currency markets and the characteristics of exchange rate dynamics. Rather, our work offers market information that is not available from a typical theoretical or empirical exercise. Thus, the results from the survey complement the studies in both the microstructure and macroeconomic literatures.

A key finding is that the irrelevance of the macroeconomic factors detected in the plethora of empirical exchange rate studies is to be expected, given the market participants' own assessment of the factors important at the daily, weekly, or even monthly, horizon – namely over-reaction, speculative, and bandwagon effects. It re-affirms the importance of the non-fundamental factors in explaining short-term exchange rate fluctuations. On the other hand, the time horizon at which dealers believe fundamentals to have significant effects on exchange rates seems much shorter than that reported in the empirical literature. It is a challenge to reconcile these two strands of evidence.

At the same time, our study points out several new avenues of enquiry. Many studies have pointed to agent heterogeneity as the source of seemingly unstable exchange rate relationships, as in the Frankel and Froot "Chartist/Fundamentalist" dichotomy. The heterogeneity of traders' beliefs is evident in our survey results. However, our results do not detect a systematic difference in views between those who self-identify themselves as technical traders, versus fundamentalists. The implications of heterogeneous traders for exchange rate dynamics and the channels through which the diverse beliefs affect exchange rates require further analysis.

While market practitioners accord some importance to purchasing power parity as determinant of a currency's 'fundamental value', it clearly does not dominate in their trading calculations. Otherwise, their response to a PPP deviation would be much more prominent.

Rather, traders view long term movements as being determined by a much larger set of fundamental variables. Identifying the manner in which these other factors enter expectations may lend guidance to future empirical modelling of exchange rates.

Finally, our survey results point to an additional factor determining bid-ask spreads in the interbank foreign exchange market. The market norm is strong and, apparently, is recognized and followed by the traders. It is hard to track down the origins of this norm, but given its strong presence, it seems reasonable to incorporate this, along with the other usual factors, in studies of bid-ask spreads. Practitioners also indicate the prevalence of the macho image – the ability to endure the "pain" of a tight spread is seen as a sign of a good trader. Further investigation of the role of this behavioural phenomenon may shed additional insight to the bid-ask spread dynamics.

Table I

*Categorisation of respondents by daily position limit (US$ millions or Value at Risk), departmental daily turnover ($ millions), and rank (*D *denotes a dealer,* CD *denotes a chief dealer, and* T *denotes a treasurer/manager). One respondent chose the "other" category and described him/herself as a 'repo dealer'. Since his/her daily limit was so much greater than any other 'dealer' in a similarly sized organisation we chose to categorise this respondent separately. Some respondents did not give full information on all three variables and these are detailed below the table.*

		Daily Position Limit					
Volume	Rank	<25	26 - 50	51 - 75	76 -100	>100	VaR
<100	D	7	1				
	CD	13	1				
	T	5					
100 – 500	D	5					
	CD	13	2		1		
	T	3	1				1
	Repo					1	
500 – 1,000	CD	3	4		1	1	2
1,000 – 5,000	D	1	1			1	
	CD	3	6	4	3	2	1
	T	1	2		1	2	4
>5,000	CD		2		1	2	1
	T						2

Not categorised: 1 dealer in 1,000-5,000 turnover department; 3 chief dealers, one each in 100-500, 500-1,000 and 1,000-5,000 turnover departments; 1 treasurer with 26-50 daily limit.

Table II

Traders were asked to select the technique which best characterised their dealing method. Many traders selected more than one technique. In the columns headed 'Total', the number of traders selecting a category is given. In the columns headed 'Percent', the proportion of traders selecting each category is given.

Technique	Current		Five Years Ago	
	Total	Percent	Total	Percent
Technical trading-based	36	32.7%	15	13.8%
Customer orders-based	41	37.3%	36	33.0%
Fundamentals-based	37	33.6%	34	31.2%
Jobbing	40	36.4%	58	53.2%
Other	2	1.8%	2	1.8%
Total number of responses	110		109	

Table III

Dealers were asked to give the proportions of their FX transactions that (a) relate to interbank and customer business, and (b) are traded via the interbank network, traditional and electronic brokers.

		Current	Five Years Ago
(a)	Interbank business	67.7	67.4
	Customer business	32.3	32.6
(b)	Interbank trades	33.5	47.2
	Traditional broker trades	15.9	47.1
	Electronic broker trades	50.6	5.7

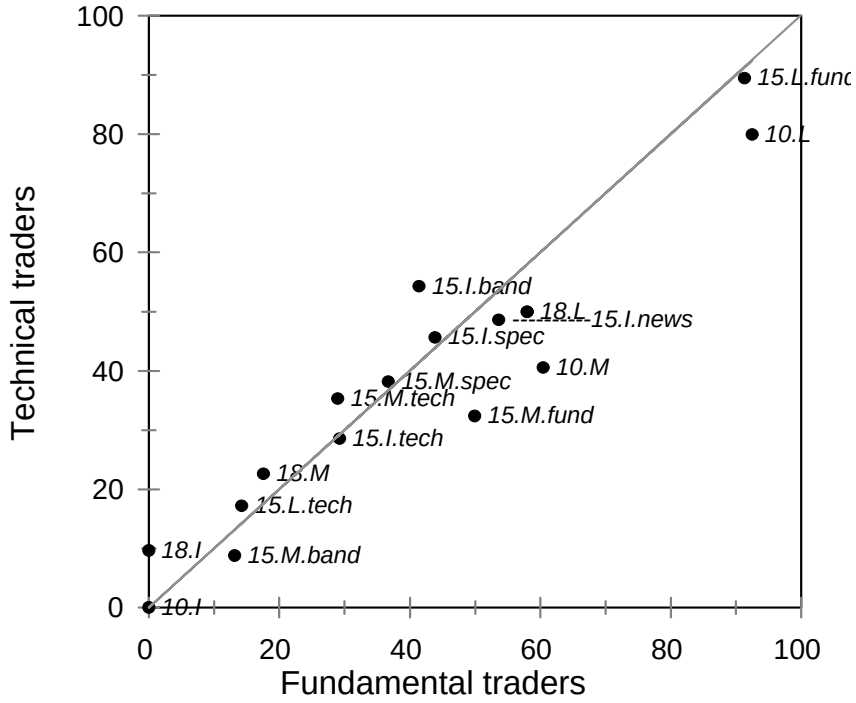
Table IV

Traders were asked the following questions relating to fundamental value in FX:

	Intraday	Medium-run (within 6 months)	Long-run (over 6 months)
(a) Do you believe exchange rate movements accurately reflect changes in the fundamental value? [Question 10 on survey]			
Yes	3	57.8	87
No	97	42.2	12
No opinion	0	0	1
(b) Select the single most important factor that determines exchange rate movements in each of the three horizons listed. [Question 15]			
Bandwagon effects	29.3	9.5	1
Over-reaction to news	32.8	0.7	0
Speculative forces	25.3	30.7	3.1
Economic Fundamentals	0.6	31.4	82.5
Technical trading	10.3	26.3	11.3
Other	1.7	1.5	2.1
(c) Do you think the PPP condition can be used to gauge/predict exchange rate movements? [Question 18]			
Yes	4.8	16.4	44.3
No	87.4	67.3	34.9
No opinion	7.8	16.3	20.8
(d) On the scale 1 to 5, please indicate if you believe the market trend is predictable. ("1" indicates NO predictability, "5" indicates HIGH predictability) [Question 12]			
Mean	2.2	2.93	2.89
Standard Deviation	0.98	0.99	1.16

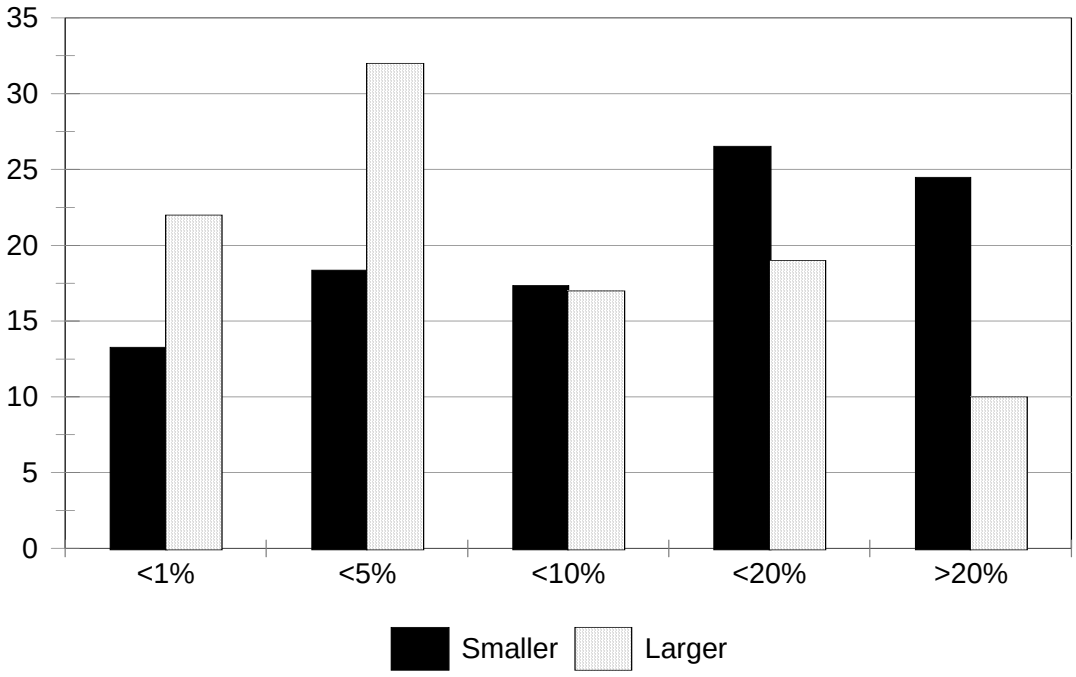
Figure 1

Responses of traders regarding fundamental value, disaggregated by trading technique.
Number of respondents that agreed with the question as a proportion of respondents that expressed an opinion.



The labels to each point give the question number (10, 15 or 18), followed by the horizon (Intraday, Medium or Long) and any applicable options (for Question 15).

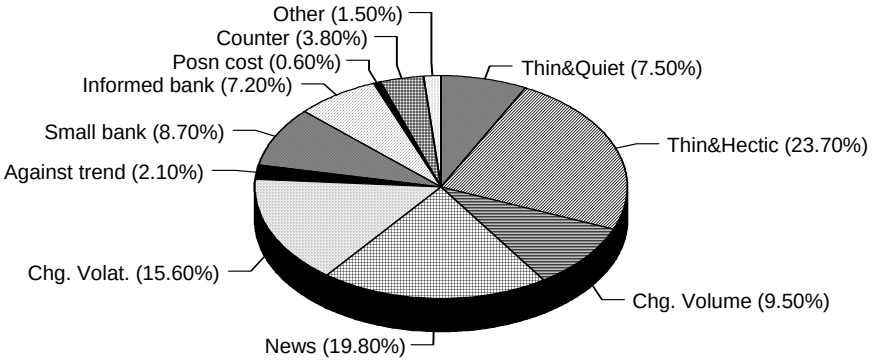
Figure 2



Distribution of the proportions of interbank quotes that differ from the market convention

Figure 3

Please check the 3 (or fewer) most important reasons for you to quote a bid-ask spread different from the market convention



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APPENDIX A

A SURVEY OF THE U.K. FX MARKET

I. BACKGROUND INFORMATION

1. Your current position is

23 treasurer/manager
69 chief/senior dealer
17 dealer/junior dealer
1 other: _____

2. Daytime spot position limit (US$ million)

54	below 25	7	76 - 100
21	26 - 50	9	over 100
4	51 - 75	11	value at risk :

3. Your organization's headquarters is in

8 US 36 UK 10 Japan 41 Europe (excluding UK)
2 Asia (excluding Japan) 13 other: _____

4. Your department's average daily FX turnover (US$ million) is

27	below 100	28	100-500	12	500-1000
34	1000-5000	8	over 5000		

5. FX transactions that are traded via

	interbank	traditional brokers	electronic brokers
now	33.5 %	15.9 %	50.6 %
5-years ago	47.2 %	47.1 %	5.7 %

6. FX transactions that are

	Interbank business	customer business
now	67.7 %	32.3 %
5-years ago	67.4 %	32.6 %

7. The best way to describe your spot FX trading is

now:	37	based on technical trading rules	36 driven by customer orders
	41	based on fundamental analysis	40 the "jobbing" approach
	2	other: _____	
5 years ago:	15	based on technical trading rules	36 driven by customer orders
	34	based on fundamental analysis	58 the "jobbing" approach
	2	other: _____	

II. ON THE FX MARKET

1. The conventional interbank bid-ask spread of each of the following exchange rates is

US$/£ :	4.1 points (mean value)	Yen/US$:	3.8 points
DM/US$:	2.9 points	Sfr/US$:	4.6 points

2. Under most circumstances, the bid-ask spread of your interbank quote is mainly determined by

77 the market convention 35 the potential costs of making that quote

3. Please indicate, for all interbank quotations, the proportion of your quotes that have a bid-ask spread larger (smaller)than the market convention.

proportion of spreads:	<1%	<5%	<10%	<20%	≥20%
larger than convention:	22	32	17	19	10
smaller than convention:	13	18	17	26	24

4. If most of your interbank price spreads conform to the market convention, please select the most important reason for such conformity.

7 your firm's policy
72 to maintain an equitable and reciprocal trading relationship with other traders
32 to secure a good market image for the firm
8 to maximize trading profits
7 to follow the practice of major players
3 other: _____

5. Please check the 3 (or fewer) most important reasons for you to quote a bid-ask spread different from the market convention.

21 a thin and quiet market
68 a thin and hectic market
28 an unexpected change in activity
59 before and after market news
47 increased market volatility
3 other: _____
6 holding a position against market trend
25 a quote for a small trading bank
23 a quote for an informed trading bank
2 an increase in the costs of keeping the position
12 a counterparty gave you a wide-spread quotation

6. Do you agree that the following forex markets are dominated by one or a few "big" players?

	Yes	No	No Opinion
☞ US$/£	83	21	5
☞ DM/US$	42	65	3
☞ Yen/US$	51	51	6
☞ Sfr/US$	90	13	5

7. Select the 3 (or fewer) most important sources of competitive advantage for the large players in the FX market.

10 lower operating costs	1 smaller counterpart risks
63 better information about the market	10 ability to offer new FX products
95 a large customer base	12 accessibility to global trading network
47 ability to deal in large volumes	9 experienced traders
40 ability to influence exchange rates	2 other: _____

8. How fast do you believe the market can assimilate the new information when the following economic announcements from the major developed countries differ from their market expectations?

	<10sec.	<1min.	<10min.	<30min.	>30min.
☞ unemploy. rate	51	44	10	1	1
☞ trade deficit	45	46	13	1	2
☞ inflation	49	40	14	2	2
☞ GNP(GDP)	29	50	23	1	3
☞ interest rate	65	30	9	0	3
☞ money supply	22	61	20	2	2

9. In your opinion, which one of the following economics announcements from the major developed countries has the biggest impact on the FX market?

now:

33 unemployment rate	3 trade deficit	24 inflation	0 GNP
57 interest rate	3 money supply	2 other: _____	

5 years ago:

11 unemployment rate	55 trade deficit	11 inflation	4 GNP
35 interest rate	3 money supply	1 other: _____	

10. Do you believe exchange rate movements accurately reflect changes in the fundamental value?

	Yes	No	No Opinion
☞ intraday	3	97	0
☞ medium run (within 6 months)	52	38	0
☞ long run (over 6 months)	87	12	1

11. If the FX market does not accurately reflect the exchange rate fundamental value, which of the following factors do you believe are responsible for this?

	Yes	No	No Opinion
☞ excessive speculation	75	12	0
☞ manipulation by the major trading banks	30	44	0
☞ manipulation by institutions/hedge funds	59	25	0
☞ excessive central bank intervention	40	42	0

12. On the scale 1 to 5, please indicate if you believe the market trend is predictable.
("1" indicates NO predictability, "5" indicates HIGH predictability)

2.20 intraday (mean value)	2.94 within 6 months	2.89 over 6 months

13. In your opinion, speculation (circle the appropriate choice)

☞ (increases 93 /decreases 7) exchange rate volatility
☞ moves exchange rates (away from 31/towards 62) their fundamental levels
☞ (increases 80/decreases 20) market liquidity
☞ (improves 71/reduces 29) market efficiency

14. In your opinion, central bank interventions (circle the appropriate choice)

☞ (increase 60/decrease 40) exchange rate volatility
☞ move exchange rates (away from 49/towards 52) their fundamental levels
☞ are usually conducted at the (appropriate 49/inappropriate 53) moment
☞ (achieve 43/do not achieve 57) the desired goal

15. Select the *single most* important factor that determines exchange rate movements in each of the three horizons listed.

	intraday	Medium Run (up to 6 months)	Long Run (over 6 months)
☞ bandwagon effects	51	13	1
☞ over-reaction to news	57	1	0
☞ speculative forces	44	42	3
☞ economic fundamentals	1	43	80
☞ technical trading	18	36	11
☞ other: _____	3	2	2

16. In your opinion, the purchasing power parity (PPP) condition

16 can be used to compute the fair spot exchange rates.
21 proposes national price levels, once converted to the same currency via the appropriate exchange rate, should be the same.
60 is only an academic jargon and has no practical relevance to the FX market.
9 other:_____

17. What action will you take if a PPP calculation indicates the US$ is overvalued?

0 buy US$ 29 sell US$ 70 no action 9 other:_____

18. Do you think the PPP condition can be used to gauge/predict exchange rate movements?

	Yes	No	No Opinion
☞ Intraday	5	90	8
☞ Medium Run (up to 6 months)	17	70	17
☞ Long Run (over 6 months)	47	37	22