MACROECONOMIC IMPLICATIONS OF THE BELIEFS AND
BEHAVIOR OF FOREIGN EXCHANGE TRADERS

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ABSTRACT

We report findings from a survey of United States foreign exchange traders. Our results indicate that (i) technical trading best characterizes about 30% of traders, with this proportion rising from five years ago; (ii) news about macroeconomic variables is rapidly incorporated into exchange rates; (iii) the importance of individual macroeconomic variables shifts over time, although interest rates always appear to be important, and; (iv) economic fundamentals are perceived to be more important at longer horizons. The short run deviations of exchange rates from their fundamentals are attributed to excess speculation and institutional customer/hedge fund manipulation. Speculation is generally viewed positively, as enhancing market efficiency and liquidity, even though it exacerbates volatility. Central bank intervention does not appear to have a substantial effect, although there is general agreement that it increases volatility. Finally, traders do not view purchasing power parity as a useful concept, even though a significant proportion (40%) believe that it affects exchange rates at horizons of over six months.

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1. INTRODUCTION

Conventional wisdom holds that a wide gulf separates the concepts forwarded by academic economists, and the day-by-day concerns of practitioners. Nowhere is this apparent gap more pronounced than in the area of international finance. Trade deficits do not matter in the standard monetary model of exchange rates, yet casual empiricism suggests that currency traders do pay attention to trade balance announcements. Similar contrasts can be drawn for purchasing power parity, and the efficient market hypothesis. In this paper we examine whether or not this apparent disjuncture actually exists using a survey of the attitudes of foreign exchange traders in the United States in 1997.

The inclination of the typical economist is to look askance at survey data, and thus it is reasonable to ask why one should resort to this approach. Our view is that it is apparent that the returns to focusing on the regularly reported price and quantity data has reached a point of diminishing returns relative to alternative sources of information. In particular, recent studies of the foreign exchange market have devoted some attention to the practices of traders (Frankel and Froot, 1990a,b; Taylor and Allen, 1992). This trend mirrors one in the general economics profession (see for instance Blinder, 1991, and Shiller, *et al.*, 1991).

Unlike some previous survey-based studies, we examine not only the practices followed, but also the beliefs and attitudes of the traders themselves. In doing so, we hope to shed light on the origins of some exchange rate dynamics that have proven difficult to model at very short horizons, even as recent research has made some advances at the longer horizon. Hence an organizing feature of this paper is the explicit linking of survey responses to stylized facts that

have been identified in the empirical exchange rate literature.[1]

To anticipate our findings, we conclude that (i) technical trading best characterizes about 30% of traders, with this proportion rising from 19% five years ago; (ii) news about macroeconomic variables is rapidly incorporated into exchange rates; (iii) the relative importance of individual macroeconomic variables shifts over time, although interest rates always appear to always be important, and; (iv) economic fundamentals are perceived to be more important at longer horizons. Respondents indicate that short run deviations of exchange rates from their fundamentals are attributable to excess speculation and to institutional customer/hedge fund manipulation. Speculation is generally viewed positively, as enhancing market efficiency and liquidity, even though it exacerbates volatility. Central bank intervention does not appear to have a substantial effect, although there is general agreement that it increases volatility. Finally, traders do not view purchasing power parity (PPP) as a useful concept in their day to day, or even week to week, operations, although a significant proportion (40%) believes that PPP at least partly determines exchange rates at horizons of over six months. Hence, the conventional wisdom is only partly validated by the responses. Traders *do* believe that fundamentals matter, although the influence of such factors is felt predominantly at the longer horizons that macroeconomic factors are believed to be relevant. At the shorter horizons, microstructural issues come into play. We examine these in a companion paper (Cheung and Chinn, 1999).

In Section 2, we describe the survey design, and give an overview of the respondents' characteristics. In Section 3, the survey responses are analyzed. Section 4 concludes.

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[1] In Cheung and Wong (1999a,b) results are reported for a survey of foreign exchange traders in the East Asian markets of Hong Kong, Singapore and Tokyo.

2. Survey Design and Data Overview

The data used in this study were obtained from a mail survey of the foreign exchange traders located in the United States. The survey was conducted between October 1996 and November 1997. The mailing list was compiled from the 1996 and 1997 editions of the *Dealers' Directory* published by the Hambros Bank. In preparing the questionnaire, we solicited and incorporated advice and suggestions from several experienced practitioners.[2] A total of 1796 surveys were mailed, 44 of which proved undeliverable. The number of completed questionnaires returned was 142. The response rate was approximately 8.1%, a rate typical for mail surveys.[3] The market we examine in this study is an important one. As of April 1998, the United States foreign exchange market was the second largest after the London market, and constituted about one-fifth of the daily turnover of US$1490 billion (BIS, 1998).

Information about the respondents and their organizations is summarized in Figure 1. As indicated in Figure 1.a, most respondents are experienced practitioners. Over 80% of them have the title "chief/senior dealer" or "treasurer/manager."

The intraday position limit is the maximum open position a dealer is authorized to assume during the day. Since, in most cases, dealers square their positions at the end of a trading day, the intraday position limit can be used as a proxy for a dealer's trading capacity. To buttress this point, note that Lyons (1998) documents the half-life of a dealer's position is only 10 minutes. Most respondents in Figure 1.b have a daytime position limit below US$25 million.

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[2] A copy of the questionnaire is reproduced as Appendix A.

[3] 8% is bracketed by the "typical" rates of 5% and 10% cited by Alreck and Settle (1985).

Only a few respondents stated their position limits in terms of the value at risk.

Figure1.c indicates that, as expected, a plurality of the respondents are associated with banks headquartered in the United States. Europe comes a close second. Japan comes far behind as the next most likely headquarters location, with only 8%.

Data on average daily turnover, which measures the activity and market share of a trading bank, are displayed in Figure1.d. The response pattern indicates a bimodal distribution, with 31% reporting a daily turnover of US$100-499 million, and 28% a figure of between US$1000-5000 million.

3. THE SURVEY RESULTS

3.1 Chartists and Fundamentalists

Frankel and Froot (1990b) argue that the endogenously changing prevalence of technical trading (what they termed chartism) might explain the seemingly random nature of exchange rate movements, especially in relation to the macroeconomic fundamentals that economic theory indicates should be relevant. Taylor and Allen (1992) report that 90% of London traders surveyed used at least some technical analysis. In this survey, we ask for the description *that best describes* their trading practices. We believe that responses to this question are more informative about the relative importance of technical trading in determining exchange rate dynamics.

The results in Figure 2 indicate that technical trading best describes only 30% of trading behavior. This is only a slightly greater proportion than that ascribed to fundamental analysis (25%). The rest of the trading is characterized as either customer order driven (22%) or "jobbing" (23%), defined further below. The prevalence of technical trading appears to have changed over

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time; five years ago, only 19% of respondents indicated that technical trading was the best description of their trading strategy. However, it would be a mistake to conclude that chartists have come to dominate over fundamentalists. Rather, technical trading seems to have gained at the expense of jobbing, rather than fundamentalist analysis.

The *a priori* effect of this shift on exchange rate dynamics is uncertain. "Jobbing" describes a trading style in which the trader continuously buys and sells in order to make many profits in perhaps small increments. As such, one could interpret this strategy as one of speculation at the very high frequency. To the extent that jobbing performs the same type of role as Friedman-type stabilizing speculation, the Frankel-Froot conjecture on endogenously changing trader proportions would still hold true, although the buying and selling is undertaken at such a short horizon, it would be somewhat difficult to interpret adherents of the jobbing approach as "fundamentalists". Furthermore, it is not clear that speculation is always stabilizing. Osler (1998) has forwarded a model wherein random shocks are propagated by the actions of rational agents stabilizing (in the presence of noise traders) in such a manner as to make the exchange rate follow a near random walk. Even when all agents are rational, speculation may induce more, rather than less, volatility when interest rates are taken into account (Carlson and Osler, 1996).

In contrast to the trends discussed above, the other two categories – fundamentals and customer orders – have each accounted for remarkably stable proportions of responses to this question over the two time periods. The fundamentals characterization declines negligibly, from 25% of responses to 23%, while customer orders rises slightly from 22% to 23%. Presumably, traders using primarily fundamentalist techniques are looking at variables like interest and inflation rates, GDP and money stocks. The issue of what variables traders pay attention to is

discussed below in Section 3.3. The constancy of the fundamentalists is notable because it contrasts very strongly with the tabulation undertaken by Frankel and Froot (1990a). They found that according to data reported in *Euromoney* the number of foreign exchange forecasting firms, or *services* (not individual forecasters), that used fundamentals fell from 19 to 0 from 1978 to1984 (the peak of the dollar), and then rose back up to 7 in 1988. Our results suggest that dramatic shifts in trading strategies have not occurred during the 1990s.

Customer orders are of interest because they constitute another link between the larger macroeconomic forces in the economy, and the factors that individual traders contend with.[4] One is tempted to ascribe a relatively minor role to customer order flows because, presumably they are primarily a function of trade-based motivations. Since the absolute value of all annual current accounts is equal to a day's forex trading volume. However, Lyons (1997) has forwarded a model in which customer orders act as the exogenous shocks that perturb the foreign exchange market. As risk averse dealers attempt to manage their inventories, the initial order is magnified several-fold; hence such inventory models can explain the enormous volume in the foreign exchange market. Lyons (1996) provides empirical evidence consistent with this hypothesis.

This complex mix of trading strategies suggests that any integrated model will need to map the theoretical motivations to the particular trading methods in order to successfully explain exchange rate dynamics.

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[4] See for instance Evans (1998) for a persuasive graph of the DM/$ rate and cumulative customer order flow imbalance.

3.2 The Effect of News

The idea that "news" -- that is innovations in macroeconomic variables -- causes the great

bulk of movements in exchange rates has a venerable history, going back at least as far as

Frenkel (1981). However, empirical attempts to link exchange rate movements to specific

announcements of macroeconomic variables have been hampered by the difficulty in extracting

the unexpected component in these announcements, as well as the fact the studies are often

conducted with relatively low frequency data. In particular, it may be that announcement effects

have dissipated by the time the exchange rate data are sampled, even when the data frequency is

daily or even hourly.

In our survey, we find that in fact the response of the exchange rates to news is extremely

rapid – on the order of minutes for most variables. Figure 3 presents the time that market

participants indicate is necessary for full adjustment to economic announcements regarding a

number of macroeconomic variables: unemployment, the trade deficit, inflation, GDP, the

interest rate, and the money supply. For the first five variables, the bulk of the adjustment takes

place within one minute. In fact, there is a striking uniformity in the responses. Consistently,

about 1/3 of the respondents indicate that full adjustment takes place in less than 10 seconds

(money is an exception – less than 20% respond thus)! In these cases, even minute by minute

data might not catch this news effect. For instance, Tanner (1997) reports complete adjustment of

the DM-$ rate to trade deficit figures in half an hour, but no significant responses to news about

money supply, industrial production or unemployment. His results may be driven by the fact that

the data -- in five minute installments -- are of insufficiently high frequency. In contrast, using

tick-by-tick data, Ederington and Lee (1993) find adjustment of volatility within the first minute

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to major announcements, confirming the need for relatively high frequency data to detect announcement effects. More recently, Anderson and Bollerslev (1998) analyzed a year's worth of 5-minute returns and concluded that volatility adjusts to news announcements within 10 to 20 minutes.

Interestingly, in the survey responses money supply announcements appear to be an outlier in several respects. First, 12% of respondents indicate that it takes more than 30 minutes for the adjustment to take place. This contrasts starkly with the 3% of respondents who indicate more than 30 minutes for the other five variables. Second, as mentioned above, the proportion of respondents indicating that adjustment to money announcements occurs within the initial 10 seconds is markedly less than the proportion reported for the other variables (except perhaps GDP). It is not clear why the response to the money supply announcement should differ so much from that of the others, although there is a striking pattern in the low importance accorded to monetary aggregates shown in Figure 4, discussed below.

3.3 What Matters and When Does It Matter?

While Figure 3 indicates the rapidity by which adjustment takes place, it does not shed any light on the relative importance of each of these macroeconomic variables, and the relevant time horizon. In this section, we first assess the impact of each of these variables on the foreign exchange market now, and five years ago; then we examine more closely the horizon at which these variables have their effects.

Table 4 reports the effects of economic announcements on the foreign exchange market. The two most important variables, by far, are unemployment and the interest rate, at 33% and

31% respectively. The money supply and GDP rank as the least important. As noted in the

discussion of Figure 3, these two variables evinced the slowest rate of adjustment. Perhaps the

adjustment is slowest because these variables are widely considered irrelevant. Furthermore,

GDP may also be ranked of lower importance because of the relative infrequency of GDP

announcements, especially as compared to other indicators of aggregate activity such as

unemployment and industrial production, both reported at a monthly, rather than quarterly,

frequency.

Besides the issue of data frequency, some traders have pointed out that there are some

ambiguities in the interpretation of GDP announcements. GDP is the sum of many components,

so the growth rate of aggregate output may not be a sufficient statistic, and in fact may require

more analysis in order to determine the true impact of the economic release. One concrete

example of this factor is the distinction between growth arising from an export surge, versus that

arising from inventory accumulation. The former has a positive implication for future output

growth, while the latter has the converse and hence the two have different implications on

exchange rate movements.

It is of interest to compare the import adduced to each variable as compared to five years

ago. The respondents (see Figure 4) pointed to the trade deficit as the key variable, which makes

sense since at that time (approximately 1991-92), the trade deficit was starting to rise again, after

declining to near zero during the 1990-91 recession. Unemployment, which ranks first in the

current survey period, was then only second. To the extent that unemployment proxies for

expected inflation or, more likely, for anticipated Fed monetary policy, this pattern makes sense

as the economy is widely thought to be currently operating very near potential.[5] The factor that

garnered the second most number of responses is the interest rate; this was also the second

ranked item for the current period, suggesting a consistent role for interest rates in exchange rate

determination. We conjecture that the importance accorded interest rate announcements arises

from the fact that such news flows continuously from the markets; in contrast, the other variables

are announced at scheduled intervals. In sum, this prominence should not be very surprising,

given the fact that, of all the macroeconomic variables that find their way into empirical models

of exchange rates, it is the interest rate or interest differential that most often shows statistical

and economic importance.[6]

These results have a number of implications for conventional empirical approaches to

exchange rate determination. First, the fact that the rankings of variables changes over time may

provide an explanation for why quasi-structural models of the exchange rate appear to evidence

parameter instability (Frankel and Rose, 1995). It might also provide a rationale for the

superiority of time-varying parameter approaches in short-horizon exchange rate forecasting.

Wolff (1987) estimated a monetary model using a Kalman filter to update coefficients; he found

that he could outperform a random walk in out-of-sample forecasts. Schinasi and Swamy (1989)

used a different time-varying parameter model to obtain similar results.

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[5] The unemployment rate as a indicator of future Fed policy seems more plausible, since current inflation announcements are not viewed as very informative. Interestingly, employment announcements appear to be very influential in the Anderson and Bollerslev analysis of the period corresponding to the early period (5 years prior to the survey) referred to in the survey.

[6] See for instance MacDonald and Taylor (1993) and Baxter (1994) among others. On theoretical grounds, the interest rate shows up as a determinant of the exchange rate in almost any extant model, ranging from ad hoc models such as the Frenkel (1976) and Dornbusch (1976) variants, to general-equilibrium models of the Lucas (1982) type.

In Figure 5, we attempt to discern at what horizon fundamentals matter, and what other factors besides fundamentals may influence exchange rates. Figure 5.a supports the general presumption that at short horizons such as the intraday, exchange rate movements do not reflect changes in fundamental values. In the medium run, which we have defined as a horizon of up to six months, 59% of respondents believe that exchange rate movements do reflect fundamentals. This proportion rises to 88% for the long run (over six months).

The result mirrors the emerging consensus that the conventional macroeconomic fundamentals have little effect at short horizons, but do have an impact at longer horizons (Flood and Taylor, 1996 for relative PPP; Meredith and Chinn, 1998, for uncovered interest rate parity). For instance, Mark (1995) documents the out-of-sample performance of a flexible-price monetary model of the exchange rate. Chinn and Meese (1995) provide similar results for various models, including ones that include a role for money supplies, incomes, interest and inflation rates, and -- in certain cases -- cumulated trade balances and the relative price of nontradables to tradables (the latter is a proxy for sectoral productivity differentials).

The question naturally arises as to what causes the deviations from fundamental values. We offer a variety of possible explanations, including excess speculation, major trading bank manipulation, institutional customer or hedge fund manipulation, and excessive central bank intervention. In Figure 5.b excess speculation garners the largest positive response, at 74% of respondents. Only 19% disagree with this conclusion. Surprisingly, institutional customer/hedge fund manipulation comes a close second, with 68% of respondents ascribing some blame there. There appears to be an even split regarding the role of major trading banks, with a relatively large proportion (12%) of respondents indicating no opinion. Central bank intervention, which is

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sometimes characterized as ineffectual, does not appear to be viewed as exacerbating deviations of the exchange rate from their fundamentals.

The role of institutional customer/hedge funds merits some discussion, especially in light of the recent debate over the East Asian currency crisis. Eichengreen *et al.* (1998) argue that hedge funds were not exacerbating factors in the onset of the crisis; moreover, such hedge funds typically control relatively small amounts of capital. On the other hand, the gyrations of the yen in late 1998 have given renewed credence to the view that other institutional investors tend to follow the lead of hedge funds. Moreover, due to their sometimes very high leverage, hedge funds such as Long Term Capital Markets and Tiger Management can at times exert a powerful influence on prices, especially on thinly traded currencies (Economist, October 10, 1998; Sesit and Pacelle, 1998).

In order to assess the temporal dimension of these deviations from fundamentals, we ask at what horizon these factors come into play (Figure 5.c). At the intraday horizon, most respondents indicate either over-reaction to news, bandwagon effects, or speculative forces as the primary factors in exchange rate movements (29%, 30% and 26% respectively). Technical trading enters in with a 14% response rate. In the medium run, economic fundamentals tie with technical trading (32% versus 31%) in gathering the most responses. However, speculative forces are still accorded surprisingly high importance (24%). Consistent with the earlier responses, traders believe that there is essentially no over-reaction to news in the medium run. Turning to the long run, one finds that economic fundamentals are of paramount importance, while all other factors – bandwagon, over-reaction, speculation, *and* technical trading – fade into insignificance.

How do these responses correlate with actual survey expectations? Bandwagon effects

can be defined explicitly in the context of the equation,

$$\Delta \hat{s}^e_{t,t+k} = \alpha_0 + \alpha_1(s_t - s_{t-1}) + u_t \tag{1}$$

where s is the nominal exchange rate, and $\Delta s^e_{t,t+k}$ is the expected nominal depreciation between time t and $t+k$, using time t information. A carat ("^") indicates that this is the survey-based measure of expectations.

A coefficient of $\alpha_1 > 1$ is consistent with bandwagon effects. Neither Frankel and Froot (1987), nor Chinn and Frankel's (1994) update, report any statistically significant evidence of bandwagon effects.[7] However, the forecast horizons they examine are 3, 6 and 12 months. The bandwagon effects are likely to manifest themselves at particularly high frequencies. Froot and Ito (1989) use weekly data from the surveys conducted by Money Market Services (MMS), and detect bandwagon effects at the one week horizon, and to a lesser extent, at the one month horizon. At all longer horizons, they obtain coefficient estimates indicating that, overall, there is short term over-reaction relative to long term expectations.[8] Hence, Froot and Ito (1989) and Ito (1990) conclude that there is an "expectational twist" in traders' views.

3.4 The Effects of Speculation and Central Bank Intervention

The effect of speculation in foreign exchange markets is a perennial favorite topic among

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[7] Frankel and Froot (1987) use mean forecasts from *The Economist, American Express Bank Review,* and Money Market Services. Chinn and Frankel (1994) use geometric mean response forecasts from *Currency Forecasters' Digest,* now published under the title *Financial Times Currency Forecaster.*

[8] See also Lai and Pauly (1992). In contrast, using a shorter sample Taylor and Allen (1990) fail to reject a static null hypothesis against any particular alternative for four of six individual forecasters.

journalists and policymakers. Evidence of this can be found in for instance the recent IMF report on the activities of hedge funds in causing the East Asian currency crises of 1997 (Eichengreen, *et al.*, 1998).

In Figure 6, we report the results from our inquiry regarding the effects of speculation. Overwhelmingly, traders agree with the proposition that speculation increases volatility (84%). While this appears to indicate a pernicious role for speculation, interestingly, traders also view speculation as pushing exchange rates *toward* their fundamental values. Moreover, speculation is viewed as enhancing market liquidity by 81%, and improving market efficiency by 74%. Hence, an interesting outcome of this pattern of responses is that speculation is viewed as an integral aspect of the foreign exchange market, and that volatility is not inimical to working markets.

The idea that speculation is stabilizing goes back to Friedman's (1953) conjecture. This view is, however, inconsistent with the McKinnon (1976) argument that locates excessive exchange rate volatility in insufficient speculation. The opinions reflected in this survey propound the idea that volatility, stabilization (in the sense of moving towards fundamentals) and speculation go hand in hand. To the extent that volatility is measured by higher variance in changes, and stabilization as being closer on average to the "correct" value, the seeming inconsistency can be resolved.

The role of central bank intervention in the foreign exchange market has generated a large body of research. Typically, researchers conclude that foreign exchange intervention has little effect on the first moment (see Obstfeld, 1990), although Edison (1993), Dominguez and Frankel (1993) and Kaminsky and Lewis (1996) have argued for a channel for intervention through the signalling of future monetary policy. Our survey results (Figure 7.b) are consistent with the view

of little effect, with opinion about evenly split between intervention pushing currencies away and toward their fundamental value. There is similarly a split opinion on whether such intervention is "successful" (Figure 7.d) where the criterion of success is determined by the respondent's interpretation of the central bank's goal. There is a slightly more positive response on the appropriateness of the timing of central bank intervention (60%). Finally, 61% of respondents view central bank intervention as exacerbating volatility (Figure 7.a). One might view these last two responses as mutually inconsistent; however, as in the question regarding the effects of speculation, increases in volatility may go hand in hand with market efficiency, in the view of market participants. These results are not inconsistent with those obtained by Edison (1998) in her case studies of central bank intervention. She finds that US intervention in recent years (which would be most prominent in the memory of these traders) has been infrequent, and sizable by historic standards; moreover, they have effected changes, albeit short-lived, in the trend of exchange rates. This experience may explain why the US traders have a relatively positive view of central bank intervention.[9]

3.5 Purchasing Power Parity

In our last set of questions, we attempt to determine what the traders' views are on a popular model of exchange rates, namely purchasing power parity (PPP). First we wish to assess the definition which traders use to interpret purchasing power parity. In Figure 8.a, response rates are displayed for four definitions. By a large majority -- 63% -- respond that PPP is "merely

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[9] The recent intervention on the behalf of the Japanese yen in June 1998 might also be construed as successful, even though the yen continued to stay at a relatively weak level for the subsequent month. By mid-November 1998, the yen had strengthened to considerably 125 ¥/$.

academic jargon". 16% interpreted PPP as meaning that price levels are the same in the same currency unit. Only 11% responded that PPP gave fair exchange rates, about the same proportion of respondents that gave "other" explanations. One representative statement is that PPP "...is rarely reached or maintained." Another signals a befuddlement shared by the economics profession, indicating that "it should work but doesn't, maybe the basket is wrong, or it excludes capital flows and real interest rates".

The disdain the traders held for PPP as a useful business concept is reflected in the numbers in Figure 8.b. A dollar overvaluation indicated by PPP would induce no action on 81% of traders. Only 13% would sell dollars. On the other hand, PPP does appear to be a "fundamental" in horizons not directly relevant to foreign exchange trading, according to the results in Figure 8.c. At the intraday horizon, PPP has no role according to 93% of respondents. At horizons of up to six months, a resounding 81% of respondents still view PPP as irrelevant; 9% disagree. Only at the long horizon of over six months – what these traders would likely characterize as "only academic" – does any substantial proportion of traders view PPP as having any influence: 40%.

The very low importance accorded deviations from PPP provides one possible explanation for why real exchange rates appear to revert very slowly to PPP. Froot and Rogoff (1995) put the consensus estimate of a PPP deviation half life at between 4 to 5 years. More recently, Cheung and Lai (1998) have shown that the impulse response function of a shock to real exchange rate is hump shaped; they argue that the half life of a deviation is substantially shorter -- on the order of a year and a half -- if one measures the beginning of shock decay from the peak of the shock, rather than from the initial impact. If the traders do not respond to PPP

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deviations, or respond perversely, then it is no surprise PPP deviations are slow to decay.

Another check on these results can be undertaken by correlating these verbal characterizations with survey-based expectations. Frankel and Froot (1987) estimate the following relationship between expected depreciation and the gap between spot and long run (S^{LR}) rates:

$$\Delta \hat{s}^e_{t,t+k} = \beta_0 + \beta_1 (s_t - s_t^{LR}) + v_t \qquad (2)$$

using survey measures of expectations.[10] In this case, they obtain estimates for an *expected* half-life of a deviation from PPP of about 2.5 years. Given these slow adjustment rates (from the perspective of the foreign exchange trader), one should not be surprised that the typical trader does not take a particular action on the basis of a PPP overvaluation. At the daily, or even monthly frequency, reversion to PPP is likely to be unobservable relative to movements in exchange rates induced by interest rate movements, for example. In terms of implications for researchers, these results mean that outside observers should expect to see foreign exchange traders responding to almost every variable *but* relative price levels.

4. CONCLUSIONS

This study presents findings from a survey of practitioners in the United States interbank foreign exchange markets. Short-run exchange rate dynamics are believed to mainly depend on non-fundamental forces (e.g., bandwagon effects, over-reaction to news, technical trading, and

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[10] The long-run nominal exchange rate is proxied by relative price levels.

excessive speculation) rather than fundamentals. This reinforces the consensus view regarding

the inadequacy of structural exchange rate models based on macroeconomic fundamentals for

data at high frequencies. The respondents also resoundingly affirm that technical trading has

non-trivial impact on medium-run exchange rates. These results challenge economists to

combine fundamentals and non-fundamentals in a unified model for both short-run and long-run

dynamics (De Long *et al.*, 1990; Frankel and Froot, 1990b; Mark and Wu, 1998; and Osler,

1998). A successful model should also allow for the self-fulfilling nature of the non-fundamental

factors.

At longer horizons exceeding six months, fundamentals (variously described by the

practitioners themselves) are seen to exert more and more influence. However, we have an only

imprecise knowledge of what these fundamentals are. Moreover, the relative importance of

macroeconomic fundamentals appears to vary over time, providing a rationale for why time-

varying parameter models of exchange rates often appear to outperform fixed coefficient

specifications.

The traders offer mixed evaluations on speculation and intervention. For instance, both

speculation and central bank intervention are perceived to increase market volatility. However,

practitioners contend that both speculation and intervention are also likely to restore

equilibrium by moving exchange rates toward their long run values. In this light, volatility is the

means by which deviations are eliminated.

Finally, in this survey, we confirm the widespread impression that traders themselves do

not view purchasing power parity as a relevant measure of macroeconomic fundamentals, except

perhaps at the very long horizon. This latter finding makes the difficulties in detecting reversion

to PPP and the highly persistent behavior of real exchange rates understandable. At the same time, it yields some rather troubling implications for international finance more generally, as some form of PPP is embodied in nearly every modern model of the open economy.

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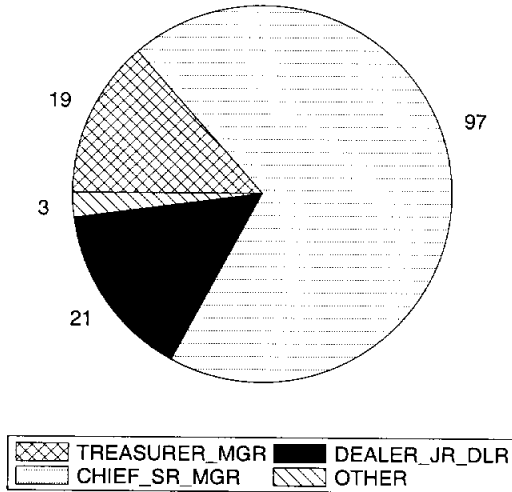
Figure 1.a: Respondent's Position
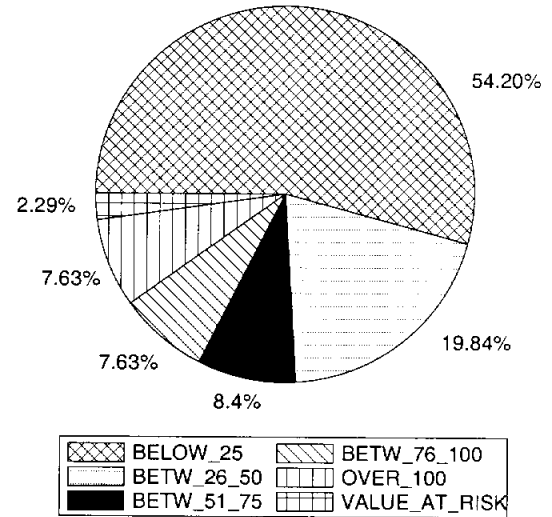
Figure 1.b: Daytime Position Limit (in millions of US$)
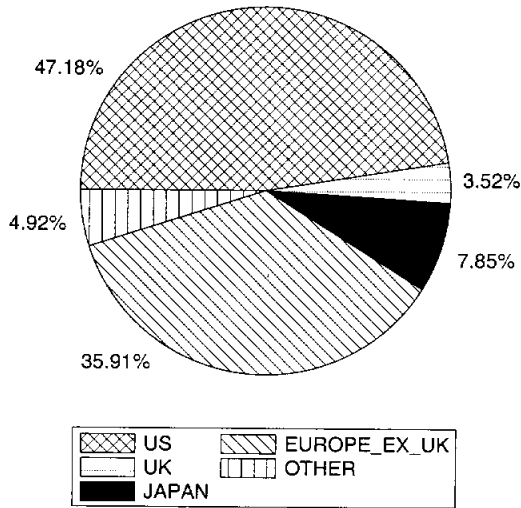
Figure 1.c: Headquarters Location
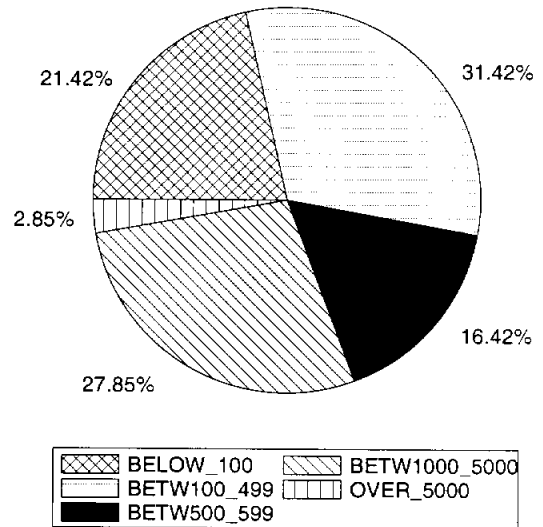
Figure 1.d: Average Daily Turnover of the Organization (in millions of US$)

NOTE: Figure 1.a reports the number of respondents under each of the listed job capacities. Other figures present the percentages of respondents who select the listed choices. For some questions, the component frequencies of a category do not sum to one due to rounding. In some cases, there are multiple responses or incomplete replies.
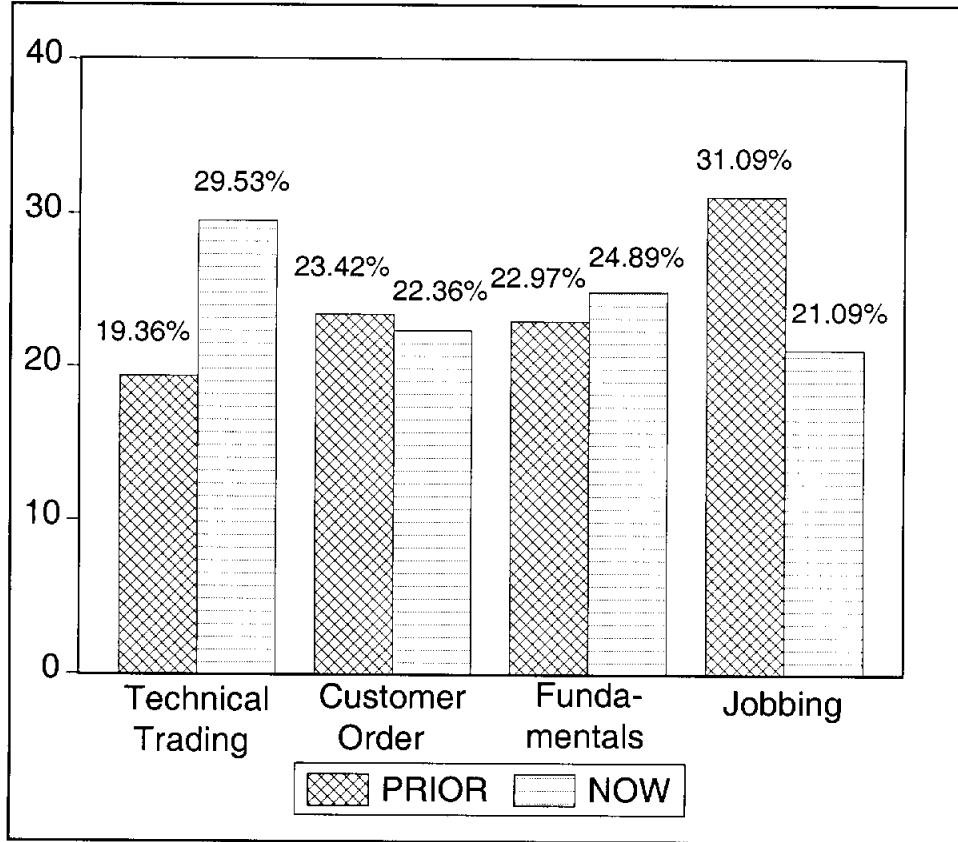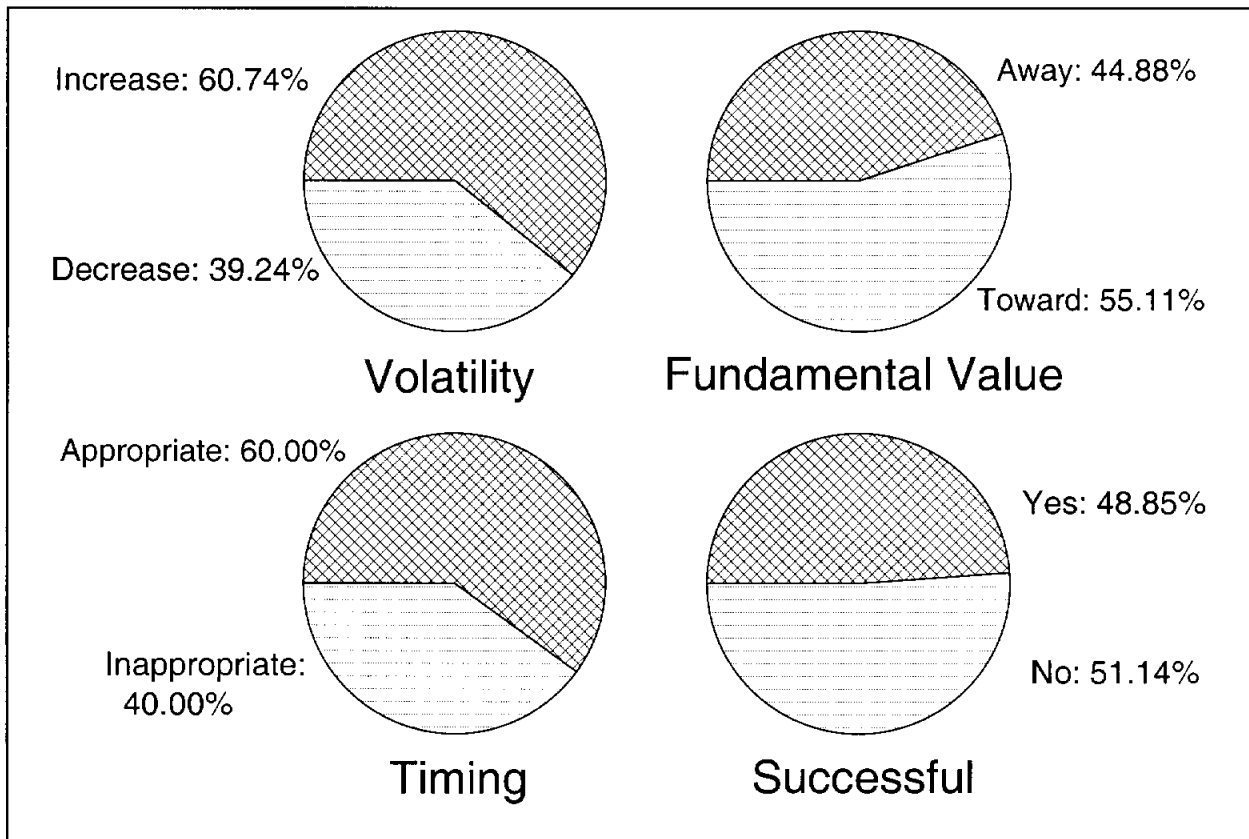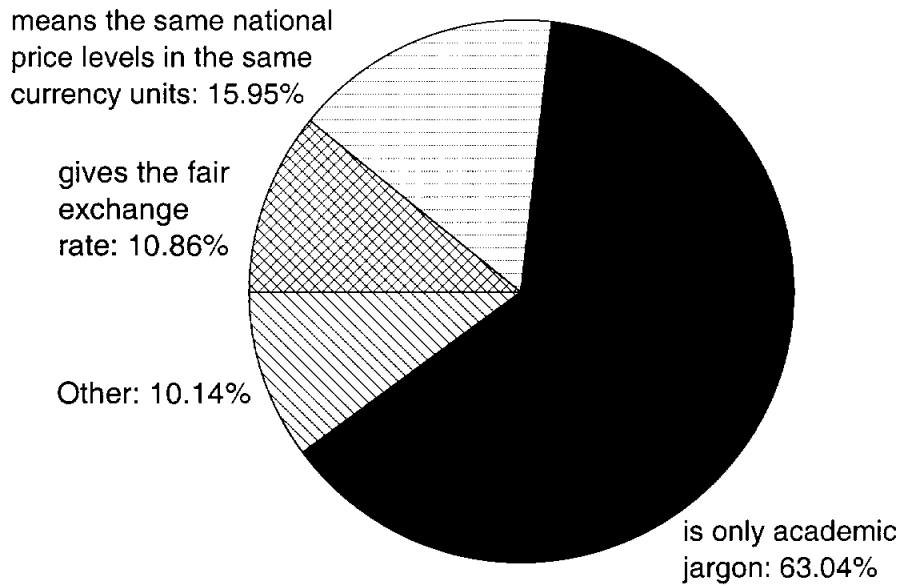
Figure 2: Spot Foreign Exchange Trading Method, Five Years Ago versus Today

NOTE: The percentages of respondents in each category are reported. The component frequencies of a category do not always sum to one due to rounding. In some cases, there are multiple responses or incomplete replies.
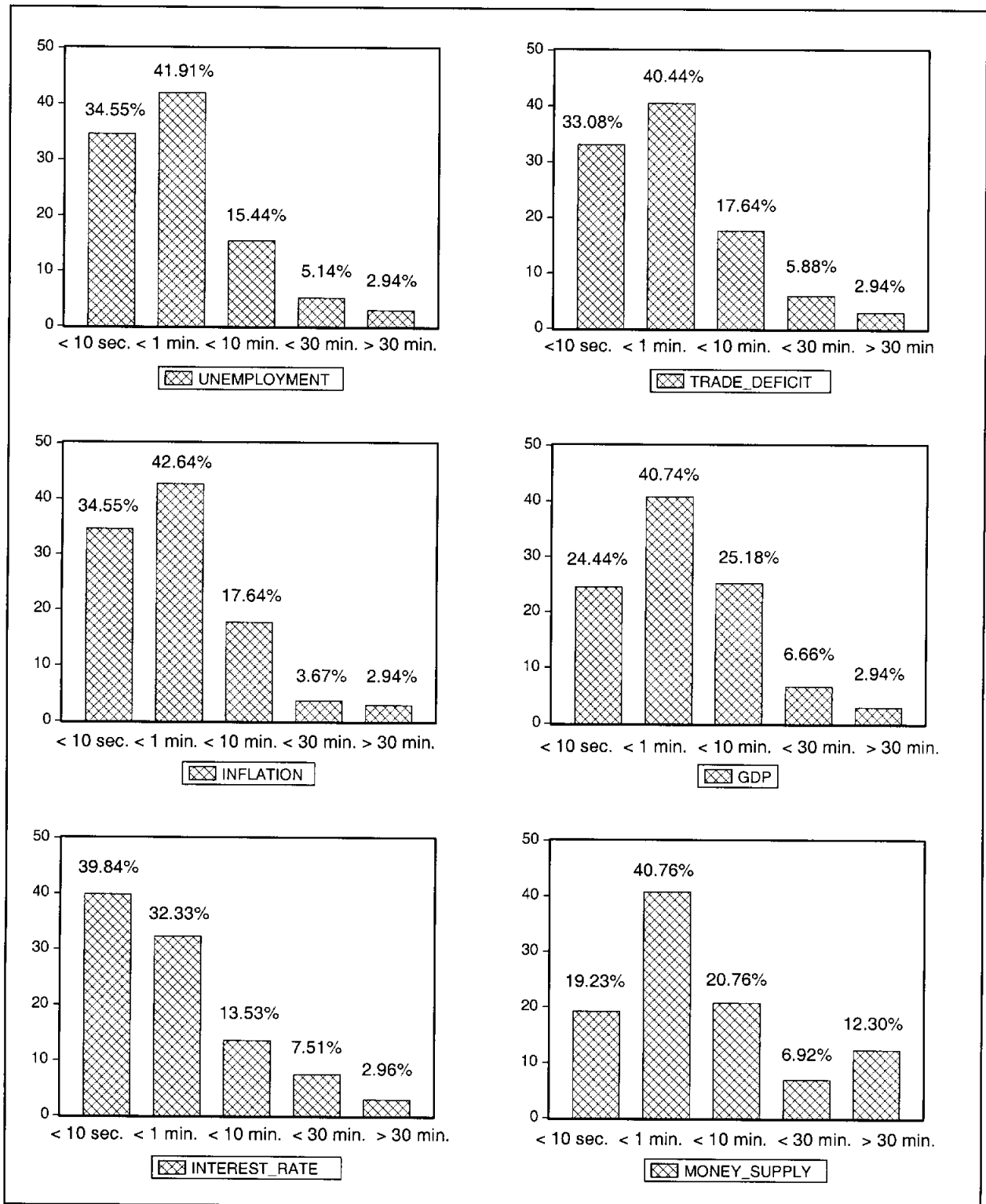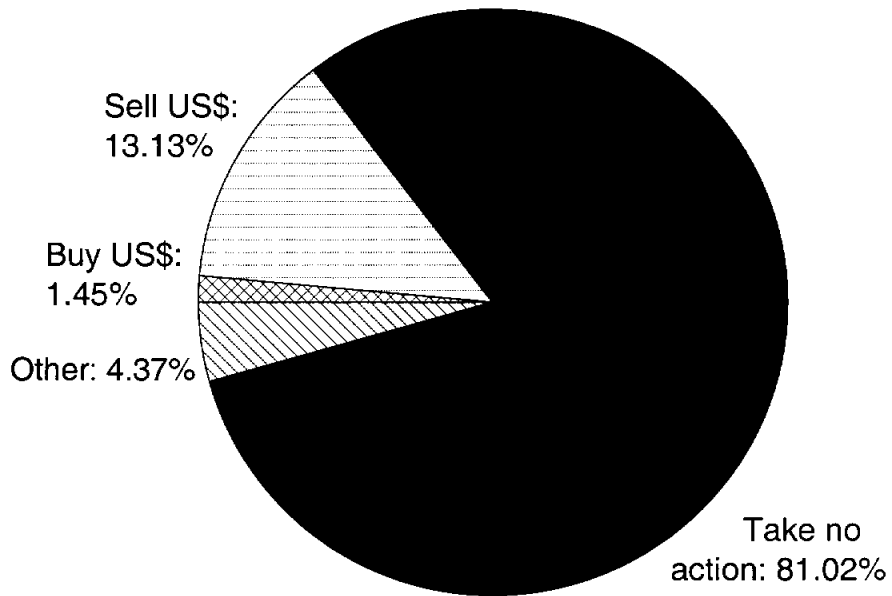
Figure 3: Adjustment to the Unexpected Component of Economic Announcements

NOTE: The percentages of respondents in each category are reported. From some questions, the component frequencies of a category do not always sum to one due to rounding. In some cases, there are multiple responses or incomplete replies.
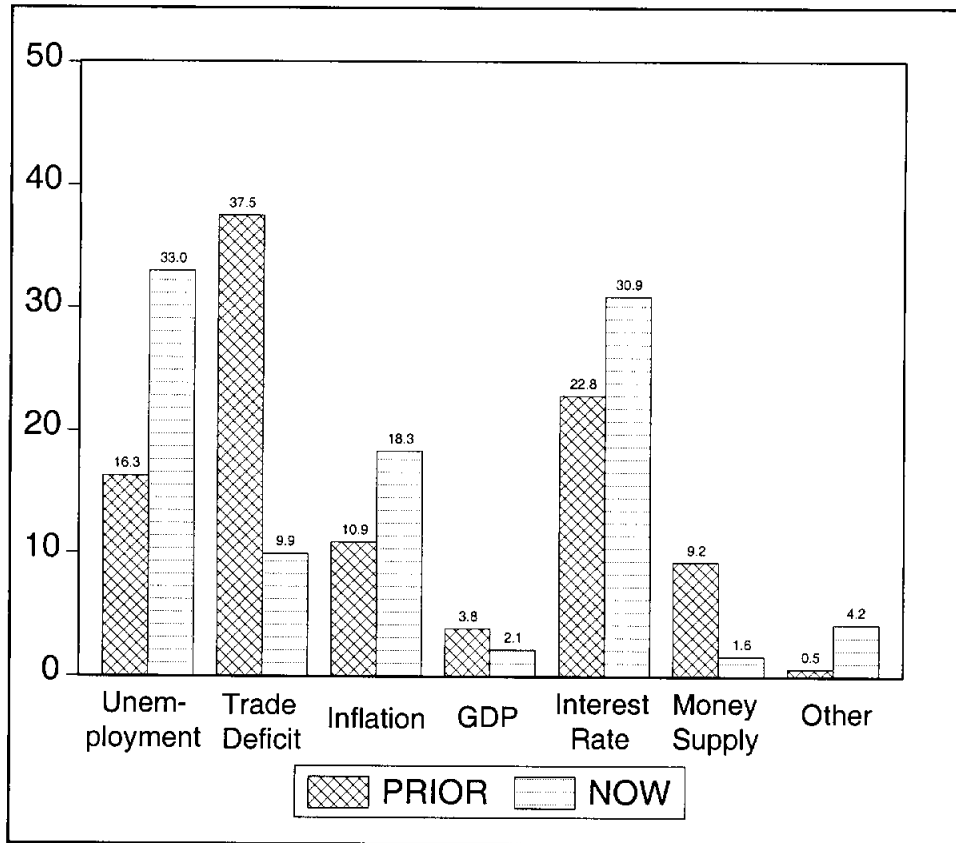
Figure 4: Effects of Economic Announcements on the Foreign Exchange Market, Five Years Ago versus Now

NOTE: The percentages of respondents in each category are reported. From some questions, the component frequencies of a category do not always sum to one due to rounding. In some cases, there are multiple responses or incomplete replies.

94.24%   58.69%   88.40%

1.43%

4.31%

9.42%

31.88%

3.62%

7.97%

Intraday   Medium Run   Long Run
(up to 6 months)   (over 6 months)

YES   NO   NO_OPINION
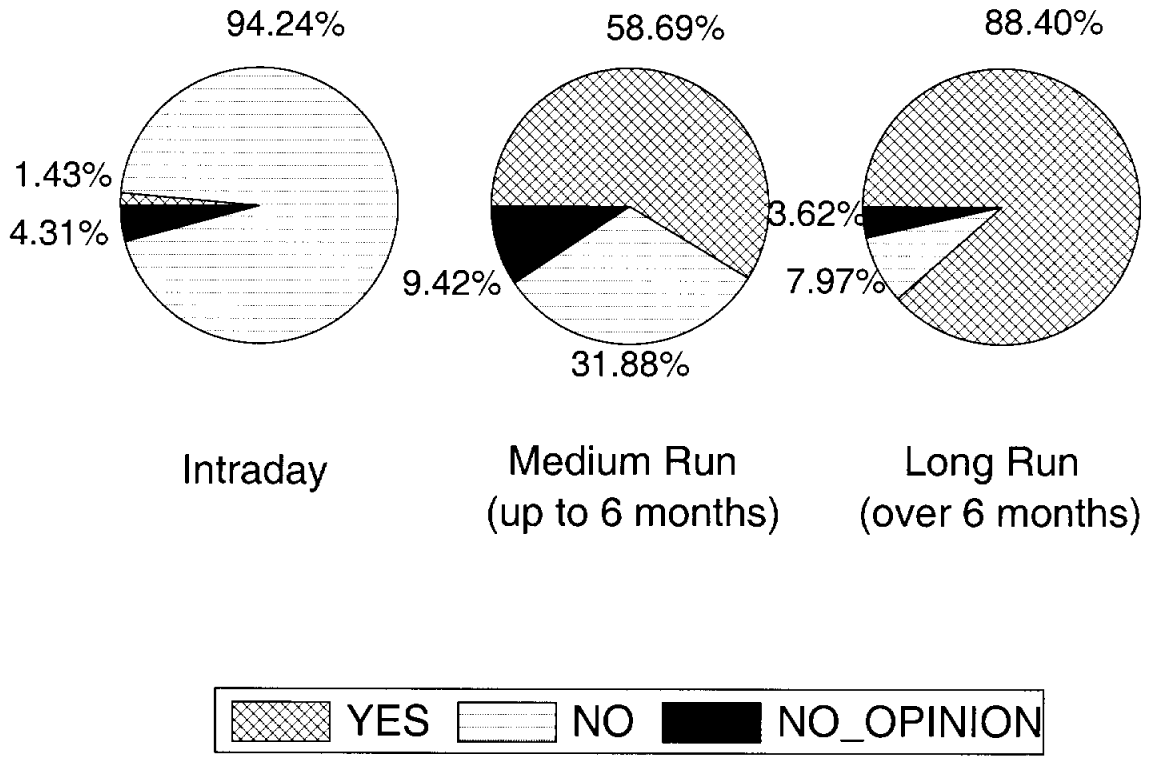
Figure 5.a: Do Exchange Rate Movements Reflect Changes in the Fundamental Value?

NOTE: The percentages of respondents in each category are reported. From some questions, the component frequencies of a category do not always sum to one due to rounding. In some cases, there are multiple responses or incomplete replies.

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Excess Speculation

Major Trading Bank Manipulation

Institutional Customer/Hedge Fund Manipulation

Excessive Central Bank Intervention
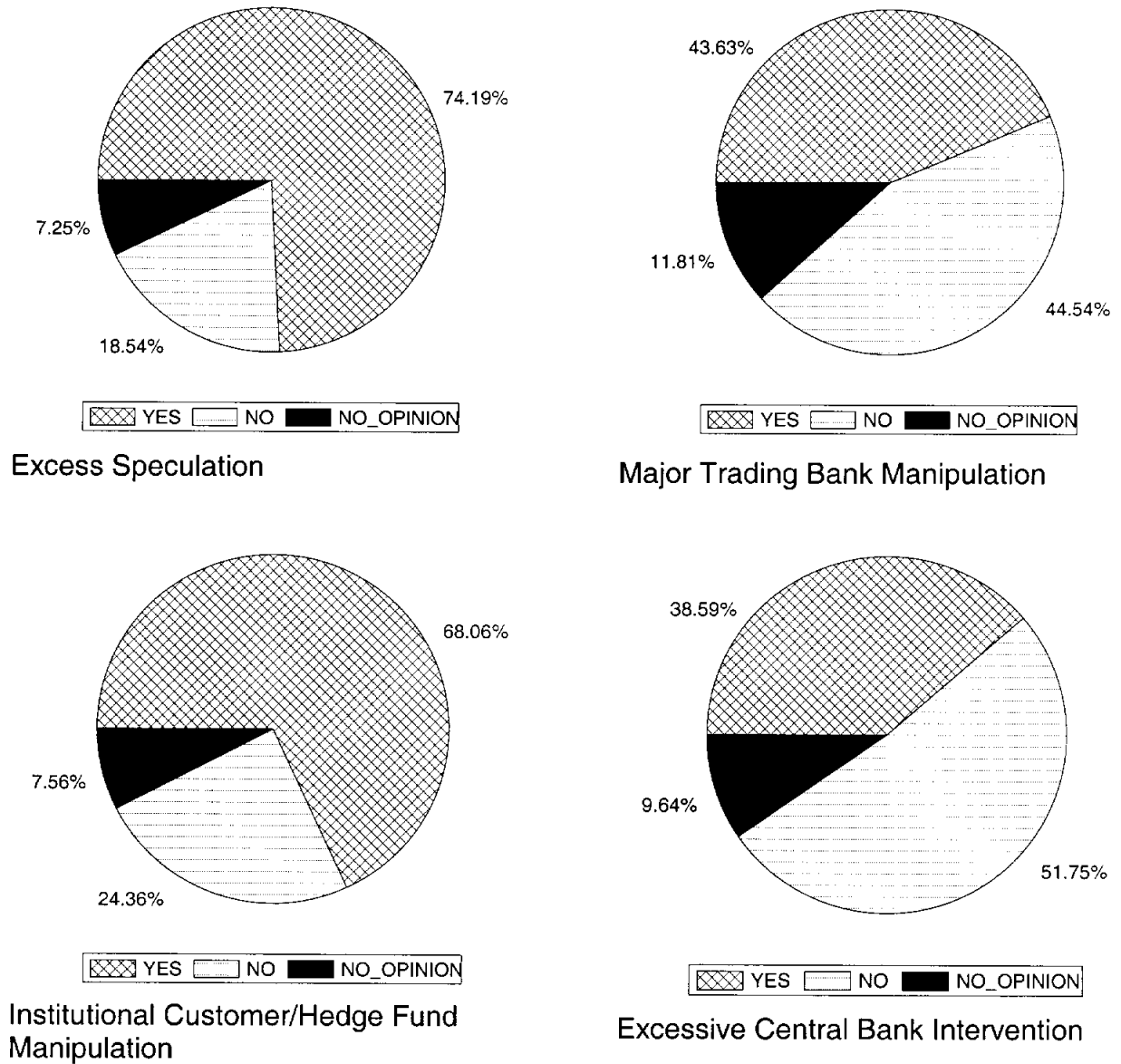
Figure 5.b: Reasons Exchange Rate Movements Do Not Reflect Changes in the Fundamental Value

NOTE: The percentages of respondents in each category are reported. From some questions, the component frequencies of a category do not always sum to one due to rounding. In some cases, there are multiple responses or incomplete replies.

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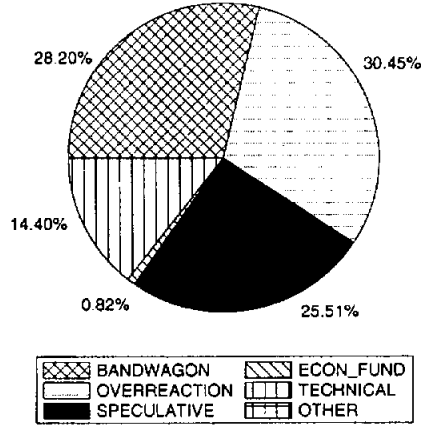
Intraday
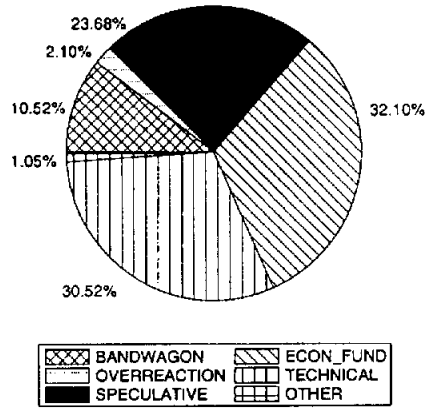
Medium Run (up to 6 months)
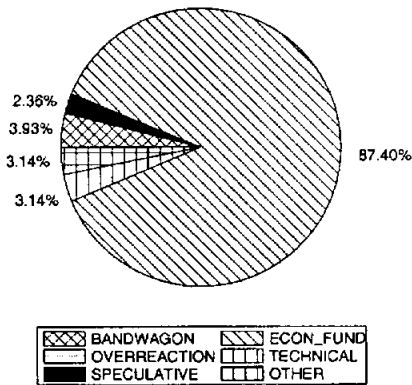
Long Run (over 6 months)

Figure 5.c: Factors Determining Exchange Rate Movements

NOTE: The percentages of respondents in each category are reported. For some questions, the component frequencies of a category do not sum to one due to rounding. In some cases, there are multiple responses or incomplete replies.
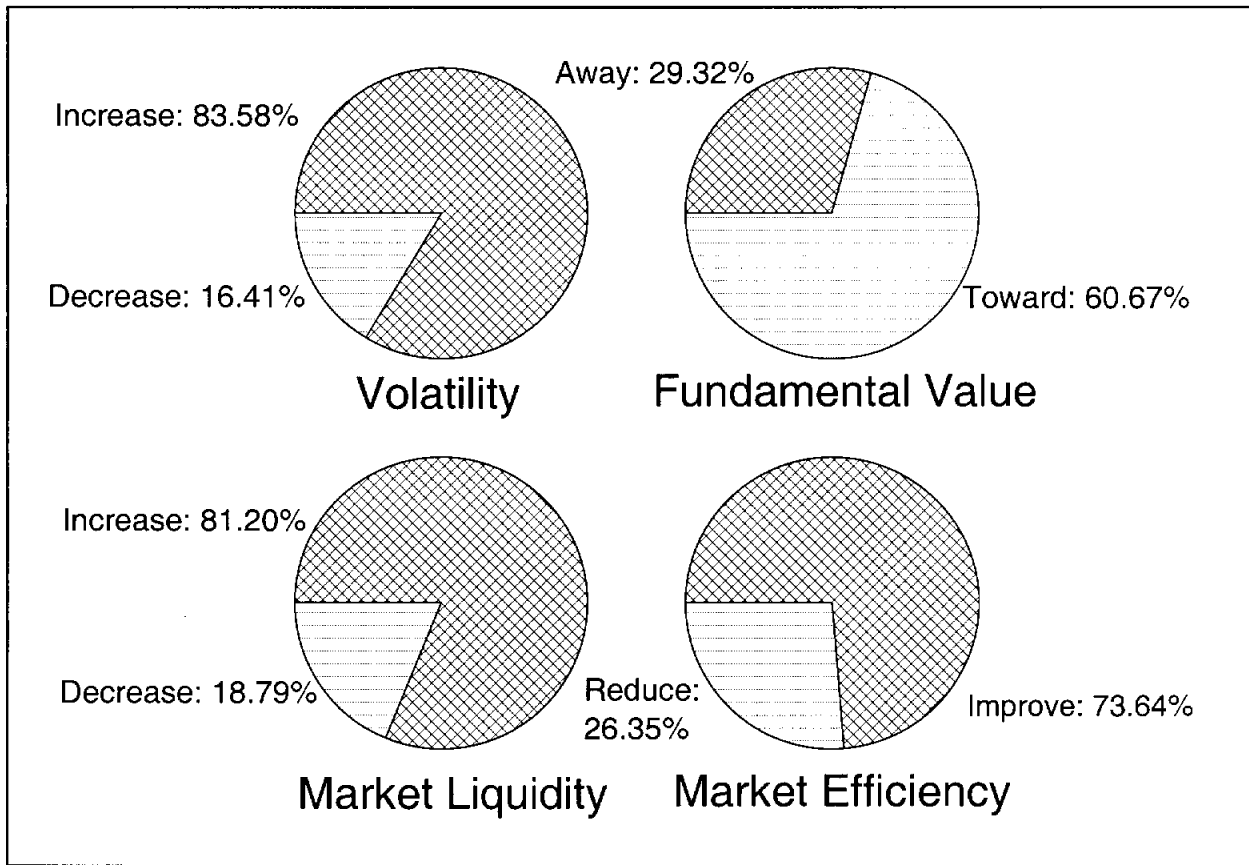
Figure 6: Effects of Speculation

NOTE: The percentages of respondents in each category are reported. For some questions, the component frequencies of a category do not sum to one due to rounding. In some cases, there are multiple responses or incomplete replies.

Figure 7: Effects of Central Bank Intervention

NOTE: The percentages of respondents in each category are reported. For some questions, the component frequencies of a category do not sum to one due to rounding. In some cases, there are multiple responses or incomplete replies.

Figure 8.a: PPP

Figure 8.b: Action in Response to a PPP Overvaluation of the US$:
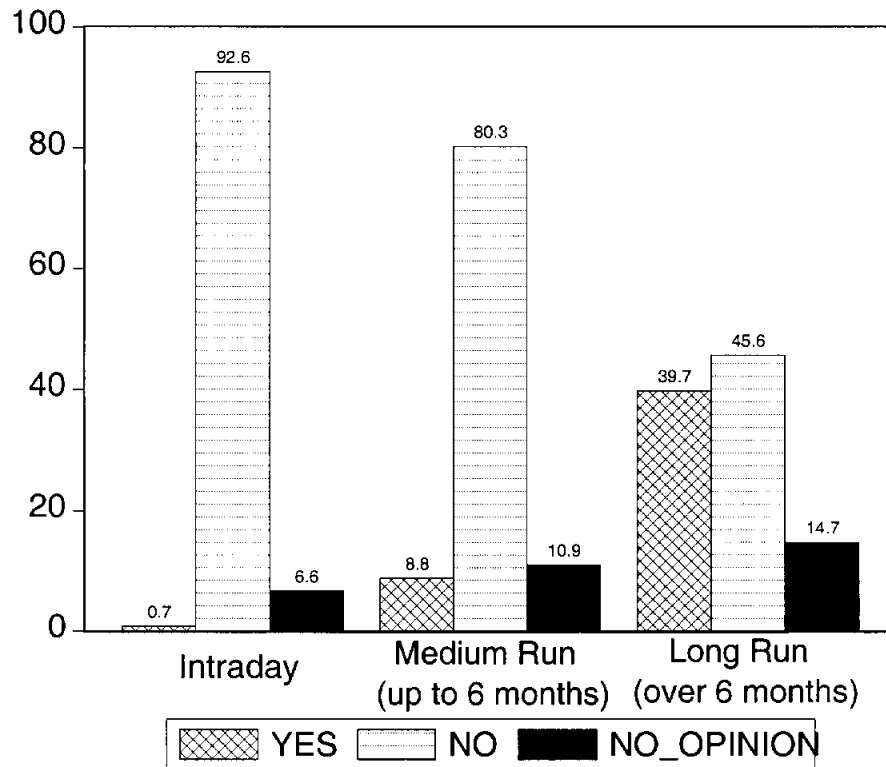
Figure 8.c: Does PPP Predict Exchange Rate Movements?

NOTE: The percentages of respondents in each category are reported. From some questions, the component frequencies of a category do not always sum to one due to rounding. In some cases, there are multiple responses or incomplete replies.

Appendix A
Copy of Survey

A SURVEY ON THE U.S. FX MARKET

I. BACKGROUND INFORMATION

1. Your current position is

    ❑ treasurer/manager
    ❑ chief/senior dealer
    ❑ dealer/junior dealer
    ❑ other: _____

2. Daytime spot position limit (US$ million)

    ❑ below 25   ❑ 76 - 100
    ❑ 26 - 50   ❑ over 100
    ❑ 51 - 75   ❑ value at risk : _____

3. Your organization's headquarters is in

    ❑ US   ❑ UK   ❑ Japan   ❑ Europe (excluding UK)
    ❑ Asia (excluding Japan)   ❑ other: _____

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

    ❑ below 100   ❑ 100-499   ❑ 500-999   ❑ 1000-5000   ❑ over 5000

5. FX transactions that are traded via

	interbank	traditional brokers	electronic brokers	Total
now	____ %	____ %	____ %	100%
5-years ago	____ %	____ %	____ %	100%

6. FX transactions that are

	interbank business	customer business	Total
now	____ %	____ %	100%
5-years ago	____ %	____ %	100%

*Interbank business includes deals to square customer transactions

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

now
    ❑ based on technical trading rules   ❑ driven by customer orders
    ❑ based on fundamental analysis   ❑ the "jobbing" approach
    ❑ other: _____

5 years ago
    ❑ based on technical trading rules   ❑ driven by customer orders
    ❑ based on fundamental analysis   ❑ the "jobbing" approach
    ❑ other: _____

II. ON THE FX MARKET

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

US$/£ : _____ points   Yen/US$: _____ points

DM/US$: _____ points   Sfr/US$: _____ points

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

❑ the market convention   ❑ 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 the convention:	❑	❑	❑	❑	❑
☞ smaller than the convention:	❑	❑	❑	❑	❑

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

❑ your firm's policy

❑ to maintain an equitable and reciprocal trading relationship with other traders

❑ to secure a good market image for the firm and yourself

❑ to maximize trading profits

❑ to follow the practice of major players

❑ other: _____

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

❑ a thin and quiet market

❑ a thin and hectic market

❑ an unexpected change in market activity

❑ before and after the announcement of market news

❑ increased market volatility

❑ other: _____

❑ holding a position against the market trend

❑ a quote for a small trading bank

❑ a quote for an informed trading bank

❑ an increase in the costs of keeping the position

❑ 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$/£	❑	❑	❑
☞ DM/US$	❑	❑	❑
☞ Yen/US$	❑	❑	❑
☞ Sfr/US$	❑	❑	❑
☞ other: _____	❑	❑	❑

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

☐ lower operating costs   ☐ smaller counterpart risks
☐ better information about the market   ☐ ability to offer new FX products
☐ a large customer base   ☐ accessibility to global trading network
☐ ability to deal in large volumes   ☐ experienced traders
☐ ability to influence exchange rates   ☐ 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?

	less than 10 sec.	less than 1 min.	less than 10 min.	less than 30 min.	Over 30 min.
☞ unemployment rate	☐	☐	☐	☐	☐
☞ trade deficit	☐	☐	☐	☐	☐
☞ inflation	☐	☐	☐	☐	☐
☞ GNP(GDP)	☐	☐	☐	☐	☐
☞ interest rate	☐	☐	☐	☐	☐
☞ money supply	☐	☐	☐	☐	☐
☞ other: _____	☐	☐	☐	☐	☐

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

now   ☐ unemployment rate   ☐ trade deficit   ☐ inflation   ☐ GNP (GDP)
         ☐ interest rate   ☐ money supply   ☐ other: _____

5 years ago   ☐ unemployment rate   ☐ trade deficit   ☐ inflation   ☐ GNP (GDP)
         ☐ interest rate   ☐ money supply   ☐ other: _____

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

	Yes	No	No Opinion
☞ intraday	☐	☐	☐
☞ medium run (within 6 months)	☐	☐	☐
☞ long run (over 6 months)	☐	☐	☐

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	☐	☐	☐
☞ manipulation by the major trading banks	☐	☐	☐
☞ manipulation by institutional customers/hedge funds	☐	☐	☐
☞ excessive central bank intervention	☐	☐	☐
☞ other: _____	☐	☐	☐

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)

( ) intraday   ( ) within 6 months   ( ) over 6 months

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

☞ (increases/decreases) exchange rate volatility

☞ moves exchange rates (away from/towards) their fundamental levels

☞ (increases/decreases) market liquidity

☞ (improves/reduces) market efficiency

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

☞ (increase/decrease) exchange rate volatility

☞ move exchange rates (away from/towards) their fundamental levels

☞ are usually conducted at the (appropriate/inappropriate) moment

☞ (achieve/do not achieve) 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	❑	❑	❑
☞ over-reaction to news	❑	❑	❑
☞ speculative forces	❑	❑	❑
☞ economic fundamentals	❑	❑	❑
☞ technical trading	❑	❑	❑
☞ other: _____	❑	❑	❑

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

❑ can be used to compute the fair spot exchange rates.

❑ proposes national price levels, once converted to the same currency via the appropriate exchange rate, should be the same.

❑ is only an academic jargon and has no practical relevance to the FX market.

❑ other:_____

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

❑ buy US$ ❑ sell US$ ❑ no action   ❑ other:_____

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

	Yes	No	No Opinion
☞ Intraday	❑	❑	❑
☞ Medium Run (up to 6 months)	❑	❑	❑
☞ Long Run (over 6 months)	❑	❑	❑

— END —
— THANK YOU —