Technical Analysis in Foreign Exchange –
The Workhorse Gains Further Ground

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Abstract:

This work extends earlier survey studies on the use of technical analysis by considering flow analysis as a third form of information production. Moreover the survey covers FX dealers and also the rising fund managers. Technical analysis has gained importance over time and is now the most equally spread kind of analysis. It has by far the greatest importance in FX dealing and is second in fund management. Charts are used for shorter-term forecasting horizons while flows dominate at the shortest-term and fundamentals at longer horizons. Preferred users of each kind of analysis exhibit different views about market frictions.

JEL-Classification: F31

Keywords: foreign exchange markets, technical analysis, flow analysis, fundamentals, fund managers

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Introduction

Academics typically regard technical analysis – or chartism – with great skepticism since it seems to violate fundamental notions of rationality in foreign exchange markets. On the other hand, many so-called puzzles in international finance are hard to reconcile with elementary notions of rationality. Leading surveys on foreign exchange markets attest a significant lack in our understanding of exchange rate behavior over horizons from days to a few years (Frankel and Rose, 1995, Taylor, 1995, Sarno and Taylor, 2002). At the same time recent research has established a remarkable prominence of chartism in decision-making among FX dealers, starting with the questionnaire survey of Taylor and Allen (1992). Despite some early attempts (e.g. Frankel and Froot, 1990, Vigfusson, 1997), technical analysis did not emerge as a major instrument to the better understanding of exchange rate movements – on the contrary, order flow analysis has attracted attention recently (Lyons, 2001, Evans and Lyons, 2002). This paper provides a warning statement, however, that the rise of the order flow concept should not be misunderstood as a signal to neglect technical analysis. A repetition of an earlier questionnaire survey after nine years seems to suggest that chartism has gained ground among FX professionals during the 1990s.

The increasing importance of technical analysis is an unexpected finding due to several arguments: the first argument is the – above mentioned – increasing attention given to order flows which has thus turned the earlier competition between fundamental and technical analysis into a tripartite battle. This alone could indicate that technical analysis is losing ground. Second, in the 1990s foreign exchange dealing underwent a process of concentration and international fund management was mushrooming (see BIS, 2002). The resulting larger participants are now better equipped to apply possibly more expensive instruments which are potentially useful for fundamental analysis (see Menkhoff, 1997, p.315). Third, the relative weight of fund managers on foreign exchange markets has increased, and precisely this group of market participants seems to rely comparatively less on technical analysis (Gehrig and Menkhoff, 2003). This might also set an incentive for FX dealers to put more

emphasis on fundamentals. Fourth, there is an early suspicion that the profitability of technical analysis may decrease over time (Dooley and Shafer, 1976), a claim that has been made recently for some trading rules in the 1990s (LeBaron, 2000). Why should professionals rely on possibly unprofitable instruments? Finally, surveys for the UK and US from the later 1990s have questioned a possible dominance of technical analysis among FX dealers (Cheung, Chinn and Marsh, 2000, Cheung and Chinn, 2001). On the basis of this reading of the literature, one would expect a diminishing role and importance of technical analysis over time. Moreover, the structural changes mentioned may have influenced the way in which technical analysis is used.

We test these expectations by evaluating responses to a survey questionnaire sent out in 2001 and comparing them to a similarly designed survey from 1992. The answers of about 200 FX dealers and international fund managers from Germany and Austria for each survey provide a rather clear picture. Overall, technical analysis has gained further ground. Since also flow analysis has become fashionable, it is fundamental analysis that has lost importance over time. According to our results, technical analysis dominates foreign exchange and most FX traders seem to be chartists now. When one goes into more detail, the use of technical analysis has largely remained unchanged. Most professionals use charts and fundamentals in a complementary manner, although flow analysis is nowadays usually a third kind of analysis. Regarding forecasting horizons, which have shortened over time, technical analysis is still the dominant instrument for short-term purposes in relation to fundamentals. However, flow analysis has been established as the very short-term forecasting instrument. This horizon-dependent pattern is valid for FX dealers as well as fund managers. Finally, psychological influences as possible exchange rate determinants are most closely related with technical analysis whereas fundamental or flow analysis show different proximities.

In summary, this work extends the study of Taylor and Allen (1992) by adding flow analysis as a third form of information production. Moreover, we check the robustness of the analysis with respect to recent data and different groups of market participants. We explicitly differentiate FX dealers and fund managers. Finally, we follow Menkhoff (1997) and Oberlechner (2001) in exploring additional relations in order to better understand the motivation of using technical analysis. Overall, our results complement earlier studies and improve our understanding of determinants of exchange rate behavior.

The paper is structured as follows. Section 1 provides a short literature review in order to motivate hypotheses to be tested later. The data underlying the examination are described in Section 2. Section 3 presents the findings on the hypothesis of declining importance and Section 4 results on the remaining hypothesis tests. Section 5 concludes.

1.   Literature and hypotheses

Systematic research on the role of technical analysis in foreign exchange markets started with Allen and Taylor (1990) and, in particular, with Taylor and Allen (1992). The later article provides for the first time survey-based evidence about London chief dealers. The core findings have been confirmed by further studies for Germany (Menkhoff, 1997), Hong Kong (Lui and Mole, 1998), the USA (Cheung and Chinn, 2001), the UK (Cheung, Chinn and Marsh, 2000), Austria and Switzerland (Oberlechner, 2001) and related work has also covered Japan and Singapore (Cheung and Wong, 2000). That means evidence has grown beyond London as the world's largest FX market and encompasses the major trading centers and time zones. What is missing so far is a test of core findings over the time dimension and not only at the cross-section, since survey studies have so far not been repeated over time. Moreover, the above-mentioned structural changes in foreign exchange may have influenced and changed the use and role of technical analysis.

We organize the discussion of evidence on the use of technical analysis around four basic hypotheses. At the foreground is definitely the finding of Taylor and Allen (1992) that at least 75% of responding dealers used technical analysis. This result has been confirmed by Menkhoff (1997), Lui and Mole (1998), Oberlechner (2001) and has been extended to international fund managers by Menkhoff (1997). The other above-mentioned survey studies did not ask for the use of technical analysis but for a preferred trading style. The alternative of four styles, i.e. fundamentalism, chartism, flow orientation and jobbing by and large resulted in a remarkable share of consistently more than 25 percent for technical analysis. This establishes a major role for chartism but is obviously a different kind of information than the finding that more than 75% of professionals use technical analysis. When analyzing responses in Menkhoff (1997) due to preferred kinds of analysis, 27.8% could be regarded as chartists, i.e. a similar dimension as in e.g. Cheung and Chinn (2001).

Further analyses in Menkhoff (1997) have searched for systematic relations between the preferred use of technical analysis and institutional factors, such as age, position, company size and education. Chartism tended to be related with better education only at the 90% significance level. The findings of non-significant relations of a similar kind have also been be reported by Cheung, Chinn and Marsh (2000) and Oberlechner (2001). We are going to test all of these findings again under the broad heading of hypothesis 1:

H1 Importance: Technical analysis is a major instrument of FX professionals in forecasting exchange rates with declining importance, however.

A second result related to a relevant but at the same time limited application of technical analysis is the statement by Taylor and Allen (1992) that fundamental and technical analysis are used in complementary manner. The urgent question in this respect is whether this parallel use of different kinds of information also holds in the present world where flow analysis has reached larger attention. Flow analysis has been identified as an independent instrument, and not as a substitute for fundamental or technical analysis (see Gehrig and Menkhoff, 2002). The role of technical analysis has not yet been analyzed in such a new environment.

H2 Complementarity: Technical analysis is used jointly with other kinds of analysis.

The finding that technical analysis was used along with fundamentals raises the question about any possible specialization between the various kinds of analysis. The stylized fact in this respect is the relation of technical analysis with shorter-term forecasting horizons. Taylor and Allen (1992) establish the relevance of technical analysis for short-term purposes and fundamental analysis for longer-term forecasting, a finding that has been repeatedly confirmed. This classification is challenged, however, when flow analysis is added. If the latter really has the semi-fundamental character as claimed by Ito, Lyons and Melvin (1998), Evans and Lyons (2002) or Gehrig and Menkhoff (2002), then flow analysis should be applied at the very short-term horizon, implying that technical analysis loses its appeal as "the" short-term instrument and could instead have an in-between position (see Menkhoff, 1997).

A shortcoming of testing this latter approach is a lack of robustness since respondents only defined a single forecasting horizon. Although the finding fits into the literature it would be even more interesting to know the horizons for the three kinds of analysis in separate form. Do theses analyses contribute to a consistent picture about the role of technical analysis? The hypothesis on this issue is quite broad:

H3 Short-term decision making: Technical analysis is used for shorter-term fore-casting purposes in comparison with other kinds of analysis.

Assuming that the general and robust finding of a relation of technical analysis with short-term forecasting holds also for recent data, what is the motivation behind this relation? In this respect Taylor and Allen (1992) mention a close association of chartism with psychological influences that may matter in foreign exchange (see also Oberlechner, 2001). Does this still hold? Is this relation an exclusive one for chartists and do preferred users of fundamentals or flows see other influences in the foreign exchange market? This complex is examined under the heading of hypothesis 4:

H4 Psychology: The use of technical analysis is exclusively related with the view that psychological influences matter in foreign exchange.

These are the four hypotheses which can be addressed by analyzing the responses to the repeated questionnaire study in 2001.

2. Data

The questionnaire survey was conducted in Germany and Austria during June and July 2001. Germany ranks fifth among FX dealing places worldwide, whereas Austria has about one tenth of the German turnover (BIS, 2002, Table B7). All banks taking own positions in foreign exchange have been addressed in these countries as well as all investment management companies with international assets in Germany. The survey has been conducted according to standard procedures including ex ante intensive interviews and a pretest. Several measures have been taken to improve the response rate, such as getting support from a respective bank association, a second mailing, repeated telephone calls and the promise of providing respondents with an interpretation of the evidence. These efforts have led to 203 useful responses, giving a comparatively high response rate of 51.9%. This outcome, as well as further analyses of the data, indicate reliability and tentative representativeness of the information (for more details see Gehrig and Menkhoff, 2002).

Even if survey data prove to be useful in-sample, there is the question about robustness of the results cross-country. In the case of foreign exchange markets one may not expect large national differences as the competition is truly international. From an empirical point of view, our data on FX dealers can be compared to data for other countries (e.g. Taylor and Allen, 1992, Cheung and Chinn, 2001), showing

quite stable structures in these survey data. Thus, it can be cautiously concluded that the information received may be generalized in respect to foreign exchange markets beyond the country of data origin.

As another indication of robustness, the basic information from the year 2001 about the use of types of analysis can be compared to an earlier survey being conducted with the same target group in the same way (see Menkhoff, 1997). Again, characteristics of respondents do not change radically but gradually and reveal consistent patterns (see Gehrig and Menkhoff, 2002).

Additionally to FX dealer surveys, our data set also includes information about international fund managers. During the last decade their market importance has increased considerably at the expense of dealers and non-financial customers. According to the latest Bank of International Settlements' study on foreign exchange markets (BIS, 2002), other financial institutions, incorporating in particular international fund managers, reached in 2001 a market share of 28%, up from 12% in 1992. Reporting dealers lost from 70% to 59% during this period and non-financial customers from 18% to 13%. It thus seems obvious that an understanding of technical analysis in foreign exchange markets improves by considering international fund managers in addition to FX dealers.

3. Results on the importance of technical analysis

According to the preceding study with data for the year 1992, i.e. Menkhoff (1997), technical analysis was characterized by its widespread and relevant use. By contrast, fundamentals were heavily preferred by fund managers only and flows had respectable importance in particular for FX dealers. In this sense only technical analysis is really accepted by all groups and one may call it the "workhorse" of FX professionals.

This status has even improved since 1992. Table 1 shows the mean values given by several subgroups for the relative importance of the three kinds of analysis under consideration. It is obvious that only technical analysis is used to a similar degree by all groups being differentiated. Moreover, roughly 97% of respondents give charts a relative importance of 10% and more, still more than an impressive 90%, which give it a relative importance of at least 20%. Technical analysis has thus even gained some ground when compared with the same examination for the year 1992. Oberlechner (2001, p.90) discusses evidence that points in the same direction, al-

though with major methodological objections (see also Cheung, Chinn and Marsh, 2000).

It is not its own strength, however, that pushes technical analysis into the foreground, it is also the weakness of fundamental analysis. As Gehrig and Menkhoff (2002) have shown, flow analysis has clearly gained ground during the nine years of comparison, and this move did not come at the cost of technical but fundamental analysis. So, fundamental analysis has lost its number one status and has been overtaken by technical analysis in the field of FX dealers. In the field of fund managers, fundamentals have also lost importance. Its relative importance according to Table 1 is now below 50% with only less than 10 percentage-points ahead of technical analysis.

This remarkable shift over time can be even better recognized when we do not focus on average importance figures but analyze the implicit information on the preferred kind of information. We call those respondents who give the greatest relative importance to technical analysis and also give it at least a 40% share "chartists". The same kind of calculation is done to identify "fundamentalists" and "flowtists". Table 2 shows in Panel A that chartists are in the lead in this respect with a share of 37.5% among FX dealers, whereas flowtists come in second with 22.2% share and fundamentalists only third with 20.1%. The situation is different for fund managers – see Panel B – where fundamentalists still dominate with a 52.5% share, chartists are second with 31.6% and flowtists hardly matter with 5.3%. The share that is missing to complete 100% is called "others" and is characterized by either an equal preference for two kinds of analysis, such as 50% and 50%, or by an indifference as no single type reaches at least 40% relative importance.

Comparing the total share of the three distinguished types of professionals in Panel C of Table 2 reveals that the largest change from 1992 to the year 2001 is the reduction of fundamentalists. Chartists and flowtists have each profited from this change to the same degree. We recognize from this analysis what we have learned already from the average figures on relative importance: technical analysis is now the most generally spread kind of analysis in total foreign exchange, i.e. when considering FX trading and international fund management jointly.

As a possible deviation from this uniformity, Oberlechner (2001) shows that technical analysis is slightly more intensively used in comparison to fundamentals in the smaller trading locations Austria and Switzerland than in Germany and the UK.

However, these differences are not significant at all horizons and they do not seem to apply to all locations. Taking our data for Austria and Germany indeed reveals the same direction, as FX dealers from Germany give a lower relative importance to charts and there is a smaller share of chartists in Germany. As the non-parametric U-test does not assess these differences as statistically significant we conclude that locational differences are probably of minor importance for the understanding of technical analysis.

As technical analysis is so broadly and generally used, it can be expected that it does not show very specific relations with other institutional characteristics of professionals. The rank correlation coefficients presented in Table 3 do indeed not reveal any significant relation to age, position, company size or education. Thus, the slight relations that were identified in the earlier data set seem to disappear with the even broader use of technical analysis. As a confirmatory analysis, the smaller group of 72 chartists in the sample is compared with all other respondents (see the last column in Table 3). There is only one statistically significant finding at the 90% level, i.e. chartists are over-represented in larger fund management companies.

We understand the findings presented in Tables 1 to 3 as support for hypothesis 1 and signaling one core message: technical analysis is very important, has gained importance over time and is the only kind of analysis that is of similar importance in both relevant groups, i.e. among FX dealers as well as among fund managers. That is why we call technical analysis the workhorse of professionals' analysis making.

The changes found over time raise the question whether other findings based on earlier work still hold for the latest data.

4.   Results on further hypotheses

In section 1 we motivated three more hypotheses on the use of technical analysis in foreign exchange. Regarding hypothesis 2, which states complementarity in the use of different kinds of analysis, results in section 3 indicate strong support. In an effort to test hypothesis 2 in a most direct and intuitively appealing manner, Figure 1 gives a structured plot on the responses about the relative importance of the three kinds of analysis (see Table 1 for the question). One can immediately recognize that most of the 201 respondents use all three kinds of analysis and that only some of them give any of the three kinds of analysis an overwhelming importance. That

means, FX professionals rely in general on all three kinds. Nevertheless, preferred users of technical analysis – i.e. chartists as identified above (see Table 2) – can be recognized in Figure 1 as well as fundamentalists, flowtists and others. There is no doubt: complementarity is the typical form when using different kinds of analysis.

Complementarity does not necessarily imply, however, that all kinds of analysis are used at the same time for the same decision making. Hypothesis 3 states rather that technical analysis is related to short-term decision making. Table 4 provides the distribution of responses regarding the forecasting horizon – as an indicator of possible short-term orientation – for chartists as well as all others. There is a slight tendency of chartists in comparison with others towards shorter forecasting horizons. Statistical tests shown at the bottom of Table 4 do not assess this tendency as significant, however. If we run a rank correlation of the relative importance of technical analysis with the individual forecasting horizon for all respondents, the coefficient turns significant at the 90% level (not presented here). Thus the findings are not as strong as usually stated in the literature (see e.g. Taylor and Allen, 1992). A plausible reason for this discrepancy between different studies is the consideration of flows which are usually missing in other studies.

In order to carve out the relative position of the three kinds of analysis considered here, that is charts, fundamentals and flows, another question has been asked about the forecasting horizon regarding each kind of analysis. The response in Figure 2 reveals a pattern that is well-known and new at the same time. It establishes that flow analysis is mainly used for horizons of minutes and hours by FX traders, while technical and fundamental analysis are particularly relevant for horizons of days and months respectively. Qualitatively, the same result applies to international fund managers, although their horizons are generally longer.

A confirmation of earlier findings is the relative shorter-term use of technical analysis in relation to fundamentals. This fact is here confirmed for new data, for FX dealers and fund managers and under consideration of a third variable. This third variable, i.e. flow analysis, explains indeed the weak relation found between technical analysis and short-term decision making. It is flow analysis that dominates the very short-term domain and thus puts technical analysis in an intermediate position. Hypothesis 3 on the use of technical analysis with short-term decision making is thus supported only in relation to fundamental analysis.

The preferred use of technical analysis for horizons between days and months provides a possible explanation for another puzzle: most studies find technical analysis, such as moving average rules, to be profitable and this finding has been confirmed over more than a 25-year period (see e.g. Dooley and Shafer, 1976, Sweeney, 1986, Levich and Thomas, 1993, and Neely, 2002). However, profitability does not seem to apply to intraday data (see Curcio et al., 1997, Neely and Weller, 2002) although chartism has been related to short-term horizons. So why should professionals use an instrument for short-term purposes that does not generate profits? The response from Figure 2 gives an obvious answer to this question as very high frequency data may be not the most popular application of chartism.

Finally, we test hypothesis 4 on the relation of charts with psychological influences in the foreign exchange market. As expected, we find that market participants with a strong preference for technical analysis are indeed more concerned with market psychology. They give market psychology a significantly higher importance than others do, as they did in 1992 (see Table 5). Moreover, the importance of market psychology has clearly increased over the nine-year period, a finding that fits well with the increased importance of technical analysis.

In another approach to test hypothesis 4, what can be said about professionals' possible motivations in preferring a certain type of analysis? As tested above, Taylor and Allen (1992) and Menkhoff (1997) identify a belief in psychological market factors for the use of technical analysis. Is this an exclusive belief of chartists or is it, for example, shared by flowtists too? Based on market microstructure considerations Gehrig and Menkhoff (2002) argue that the price impact of trades may be valuable information. To the extent that flow analysis helps to reveal large trades with temporary short run price impact, one might expect that the size of market participants affects the preference for flow analysis. Finally, Goodhart (1988, p.457) reports from discussions with London bankers that they would be "concerned that the state of their own book may cloud their judgment". Hence, these bankers will tend not to hold on to loss-making positions and behave in a rather short-term fashion.

Table 6 provides evidence about the potential motivations for the three groups of respondents depending on their preferred mode of analysis. Respondents with several preferred modes have been dropped from the analysis. Table 6 presents the responses to three questions concerning views about i) the role of psychology, ii) the influence of big market participants and iii) the impact of their own currency position.

We test the hypothesis of Taylor and Allen (1992) whether those market participants preferring the use of technical analysis to both other forms observe a higher importance of psychological influences on prices. The mean response of 2.21 is indeed a statistically significantly stronger agreement than the 2.52 response of the others. Interestingly, preferred users of fundamentals assess the importance of psychological influences to a significantly lower degree.

The second question, aiming at the importance of big market participants as claimed by the literature on flow analysis, shows a similar pattern. The theoretical concept is consistent with the evidence and again "fundamentalists" tend to support it less.

The third question can be regarded as a reflection on the agent's ability to speculate purely on private information and thus to beat the market. In a wider sense, this belief can be related to a concept of noise trader risk, as these emotions are unrelated to fundamentals and – due to their individual origin – difficult to forecast for others. It seems consistent that the recognition of this risk leads to less pronounced long-term position taking and thus "fits" in with relying on the very short-term flow analysis. "Fundamentalists" appear to hold contrasting views.

The evidence regarding hypothesis 4 thus indicates strong support: market psychology is clearly related to technical analysis. The increasing importance of psychology as seen by professionals nicely fits with increasing importance of technical analysis. Finally, the relation between psychology and chartism is an exclusive one and is not shared by fundamentalists or flowtists. Professionals preferring flows are the only ones who believe in an influence of big participants on prices. Fundamentalists are those believing less than others in inefficient markets.

In summary, reviewing the three hypotheses tested in this section reveals some modification and extension of the literature, although showing no obvious contradiction.

5. Conclusions

Our 2001 survey of FX professionals extends earlier work on the use of technical analysis. The evidence presented here is the most recent and the most comprehensive one as we cover flow analysis as well as fund managers in addition to earlier studies. This extended approach often shows confirmatory results, which is comfort-

ing (see also Sarno and Taylor, 2001). However, several new aspects are also identified beyond earlier findings.

It is shown that FX traders and international fund managers regard technical analysis as rather more important than nine years ago. Neither fundamentals nor flows are equally wide-spread in FX trading and in fund management. As a last indicator of importance, preferred users of technical analysis, i.e. chartists, are now revealed as the largest group in FX trading and as the second largest in fund management. Overall, other kinds of analysis may be preferred here or there but technical analysis is the "workhorse" in foreign exchange. This notion of a workhorse does not preclude a lot of variety regarding the specific form of technical analysis, as it exists in an analogous manner for fundamental models, too (see e.g. Allen and Taylor, 1990, Chang and Osler, 1999, Fiess and MacDonald, 2002, Osler, 2000, 2001).

Further in-depth analyses confirm the earlier finding of a complementary use of technical analysis even for a world where flows matter besides fundamentals and charts. Second, technical analysis is an instrument for short-term forecasting but not for very short-term horizons which are dominated by flow analysis. Third, fund managers use the three kinds of information distinguished in a similar pattern as FX dealers but with longer overall forecasting horizons. Fourth, chartists still believe in the importance of market psychology. Fifth, we add to this the exclusiveness of this relation as preferences for the three kinds of information are related to specific views about frictions in the foreign exchange market, indicating possible motivations.

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TABLE 1. The importance of technical analysis for several groups of professionals

Question: "Please evaluate the importance of the three following information types for your typical decision making, by distributing a total of 100 points. For information types which you do not use, please give 0 points."
- ...   Fundamentals (economic, political)
- ...   Technical analysis (charts, quantitative methods)
- ...   Flows (who is doing what, which customer orders are existing)

Relative importance of technical analysis	Chief FX dealers	Other FX dealers	All FX dealers	Fund managers
Technical analysis mean	44.9%	40.0%	41.4%	37.0%
TA ≥ 10%	95.2%	98.0%	97.2%	96.5%
TA ≥ 20%	95.2%	92.2%	93.1%	91.2%
TA ≥ 30%	85.7%	74.5%	77.8%	64.9%
TA ≥ 40%	73.8%	52.9%	59.0%	43.9%
TA ≥ 50%	38.1%	35.3%	36.1%	28.1%
(Fundamentals mean)	30.8%	33.1%	32.4%	46.2%
(Flows mean)	24.4%	26.9%	26.2%	16.8%
Number of responses	42	102	144	57
(Technical analysis mean,1992)	35.1%	38.5%	37.4%	36.8%

TABLE 2. Professionals by preferred kind of information

PANEL A	FX dealers			
	Chartist	Fundamentalist	Flowtist	Other
Number	54	29	32	29
Share	37.5%	20.1%	22.2%	20.1%
Tech. a. mean	60.8%	25.5%	26.2%	38.0%
Fund. a. mean	23.8%	56.7%	21.0%	36.7%
Flow a. mean	15.4%	17.8%	52.8%	25.3%

PANEL B	Fund managers			
	Chartist	Fundamentalist	Flowtist	Other
Number	18	30	3	6
Share	31.6%	52.5%	5.3%	10.5%
Tech. a. mean	60.6%	23.0%	30.0%	39.7%
Fund. a. mean	23.7%	63.2%	26.7%	38.8%
Flow a. mean	15.8%	13.8%	43.3%	21.3%

| PANEL C	FX dealers and fund managers			
	Chartist	Fundamentalist	Flowtist	Other
Total share in 2001	35.8%	29.4%	17.4%	17.4%
Total share in 1992	27.8%	50.2%	9.8%	12.2%

TABLE 3. Relations between the use of technical analysis and other institutional characteristics

Characteristics	Rank correlation with technical analysis[1]	No difference between[2] chartists and others
(Increasing) age	0.043 (0.548)	-0.333 (0.739)
(Higher) position	-0.107 (0.133)	-1.178 (0.239)
(Larger) company FX trading	-0.113 (0.188)	-1.330 (0.183)
(Larger) company fund. man.	0.214 (0.116)	-1.712 (0.087)
(Better) education	-0.054 (0.453)	-0.142 (0.887)

[1] The table gives the coefficient of the Spearman rank correlation and the p-value in parenthesis.
[2] The table gives the z-value of the Mann-Whitney U-test and the p-value in parenthesis.

FIGURE 1. The relative use of different kinds of information by FX professionals
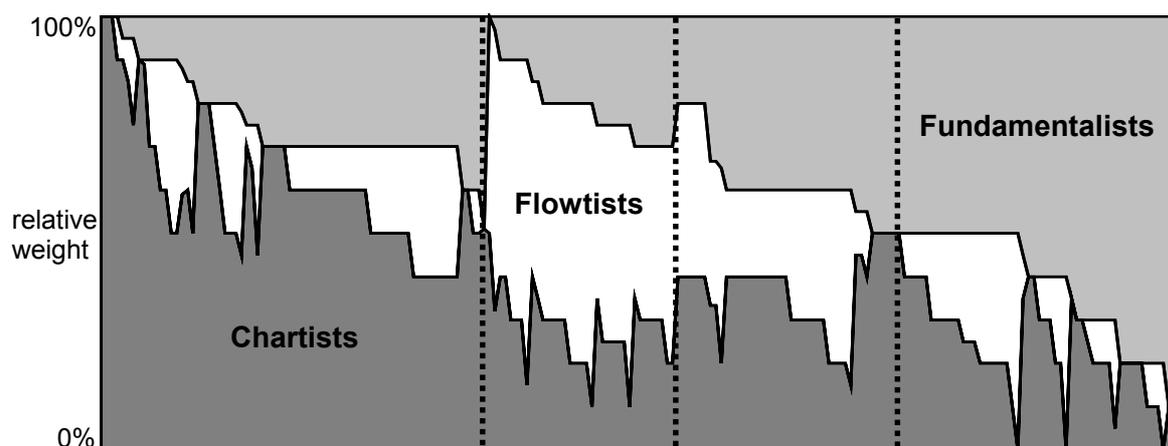
This figure informs about the relative use of technical analysis, fundamentals and flows for all 201 respondents. The ordering from left to right starts with those professionals who give the highest relative importance to technical analysis, i.e. chartists. It can be seen at the right end of the figure that some professionals do not regard charts at all. The correspondingly opposite ordering for fundamentals starts from the right end. The preferred use of flow analysis is given next to chartists. The remaining space characterizes those respondents who do not clearly prefer any single of the three kinds of information.

TABLE 4.   The forecasting horizon of chartists and other professionals

Question: "How far in advance do you take into account possible influences on the exchange rates when opening a position? Please, only one answer:" [1: intra-day, …, 6:> 12 months]

Forecasting horizon	Data 2001		Data 1992	
	Chartists	All others	Chartists	All others
Intra day	21.1%	27.9%	18.2%	24.3%
Few days	53.5%	28.7%	45.5%	34.7%
Few weeks	18.3%	24.0%	20.0%	15.3%
2-6 months	5.6%	15.5%	16.4%	18.8%
6-12 months	0.0%	3.1%	0.0%	6.3%
> 12 months	1.4%	0.8%	0.0%	0.7%
Number	71	129	55	144

Tests on no difference between groups, significance in parenthesis[1]

|	
Chartists vs. all others in 2001:	-1.341 (0.180)
Chartists vs. all others in 1992:	-0.414 (0.679)
Chartists in 2001 vs. in 1992:	-1.268 (0.205)
All others in 2001 vs. in 1992:	-0.562 (0.574)

[1] The table gives the z-value of the Mann-Whitney U-test and the p-value in parenthesis.

FIGURE 2. The importance of fundamentals, charts and flows at different forecasting horizons

Question: "How far in advance reaches your personal forecasting horizon typically when applying the following types of information? Please give one answer each:"
Fundamentals: ___ (minutes, hours, days, weeks, months, years)
Technical analysis: ___ (minutes, hours, days, weeks, months, years)
Flows: ___ (minutes, hours, days, weeks, months, years)

FOREIGN EXCHANGE DEALERS

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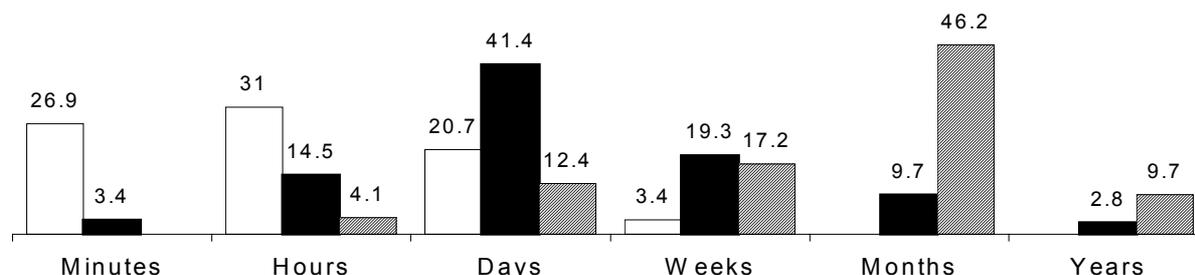
Flows   Technical Analysis   Fundamentals
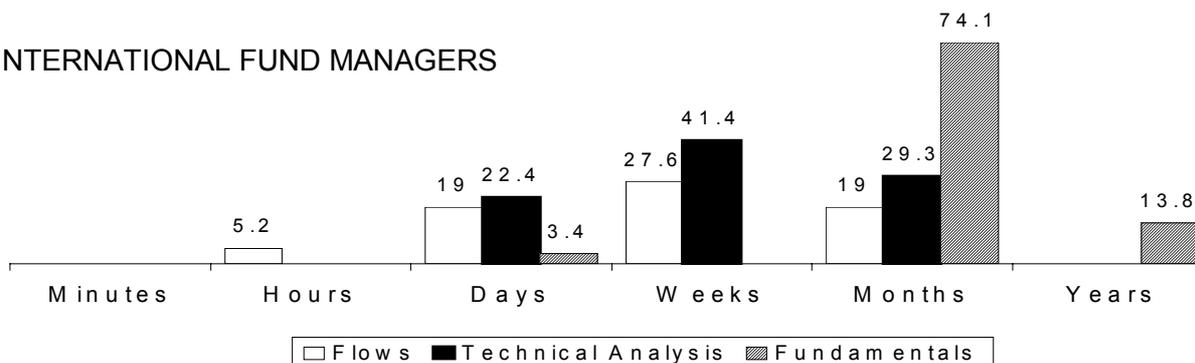
Note: The cumulation of percentage points for flows etc. does not add up to 100% as not all respondents use all types of information.

TABLE 5. The importance of market psychology for chartists and other professionals

Question: "How much importance do fundamentals and psychology have for exchange rate movements?"
( ) People are not machines; thus psychology is clearly more important than fundamentals.

Agreement with statement	Data 2001		Data 1992	
	Chartists	All others	Chartists	All others
(1) Agree completely	20.8%	16.4%	23.5%	13.0%
(2)	51.4%	39.8%	41.2%	26.1%
(3)	19.4%	25.8%	21.6%	27.8%
(4)	4.2%	13.3%	2.0%	14.8%
(5)	2.8%	3.1%	9.8%	16.5%
(6) Disagree completely	1.4%	1.6%	2.0%	1.7%
Number	72	128	51	115

Tests on no difference between groups, significance in parenthesis

Chartists vs. all others in 2001:	-2.086 (0.037)
Chartists vs. all others in 1992:	-2.969 (0.003)
Chartists in 2001 vs. in 1992:	-0.524 (0.600)
All others in 2001 vs. in 1992:	-2.953 (0.003)

TABLE 6.   Beliefs about market efficiency and preferred kinds of information

Question: "How much importance do fundamentals and psychology have for exchange rate movements?"
() People are not machines; thus psychology is clearly more important than fundamentals.
[1: agree completely, …, 6: disagree completely]

Question: "Do you belief that big market participants have an influence on price formations?"
() Yes, they can "make" exchange rates for a while via own position taking and customer orders.
[1: agree completely, …, 6: disagree completely]

Question: "Do you think that your decisions are influenced by the currency position you hold at any particular moment?"
() The positions taken bring emotions into the decision-making process, thereby damaging the latter.
[1: agree completely, …, 6: disagree completely]

Average agreement and Mann-Whitney test	for preferred users of		
	Technical analysis (n = 72)	Fundamentals (n = 59)	Flows (n = 35)
Higher importance of psychological influences on prices	**2.21** (2.58) -2.201 (0.028) [165]	**2.76** (2.23) -3.203 (0.001) [165]	2.26 (2.46) -1.096 (0.273) [168]
Big market participants influence prices	2.28 (2.19) -0.561 (0.575) [160]	2.37 (2.15) -1.305 (0.192) [160]	**1.89** (2.32) -2.213 (0.027) [160]
Own currency position influences decisions	3.09 (2.93) -0.871 (0.384) [166]	**3.24** (2.86) -1.881 (0.060) [166]	**2.39** (3.16) -3.301 (0.001) [166]

Note: The first figure in each field gives the average agreement of a certain group of preferred uses to the respective statement (bold figures are significant at the 10% level), the figure in parenthesis behind gives the average agreement of all other respondents. In the second line is the z-value of the Mann-Whitney U-test, third line shows the level of the p-value (Null: the same response for both groups, i.e. chartists vs. others etc.) and the fourth line gives the number of responses in squared brackets.