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The use of fundamental and technical analyses by foreign exchange dealers: Hong Kong evidence

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Abstract

This article reports the results of a questionnaire survey conducted in February 1995 on the use by foreign exchange dealers in Hong Kong of fundamental and technical analyses to form their forecasts of exchange rate movements. Our findings reveal that > 85% of respondents rely on both fundamental and technical analyses for predicting future rate movements at different time horizons. At shorter horizons, there exists a skew towards reliance on technical analysis as opposed to fundamental analysis, but the skew becomes steadily reversed as the length of horizon considered is extended. Technical analysis is considered slightly more useful in forecasting trends than fundamental analysis, but significantly more useful in predicting turning points. Interest rate-related news is found to be a relatively important fundamental factor in exchange rate forecasting, while moving average and/or other trend-following systems are the most useful technical technique.

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1. Introduction

Standard analysis of exchange rates examines economic fundamentals to explain exchange rate movements, but, in many cases, current fundamentals-based models

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fail to explain the past adequately, or predict the future reliably (see Dornbusch, 1976, 1987; Meese and Rogoff, 1983; MacDonald and Taylor, 1991). Largely as a result of these failures, researchers have started to look beyond fundamentals to the role of other 'non-fundamentalist' influences on financial markets including the approach to forecasting taken by practitioners.

Frankel and Froot (1986, 1990b) suggest that technical analysis may have been among the reasons for the overvaluation of the US dollar in the 1980s, during which period, pressure in the opposite direction was indicated by the economic fundamentals. Goodhart (1988) finds that the interplay between practitioners basing their views on fundamentals and practitioners using a chartist approach influences the market outcome. In a survey conducted by the London foreign exchange market, Allen and Taylor (1989) and Taylor and Allen (1992) also provide evidence that non-fundamental analysis is widely used as an input into dealers' trading decisions, especially at short horizons.

Similar arguments that the use of technical analysis can influence market behavior have been advanced for other financial markets. For instance, Shiller (1989) explains excess bond and stock market volatility by 'irrational' patterns of investor behavior and suggests that technical analysis is one of the important factors that gave rise to the October 1987 international stock market crash. In the Hong Kong stock market, Wong (1993) shows that technical trend signals can affect investors and price behavior, generating excess market reactions without any fundamental reasons. In addition, many studies have looked at the role of noise traders (those traders who do not use, or who misperceive, the fundamentals) in financial markets (e.g. Black, 1986; De Long et al., 1987; Campbell and Kyle, 1988; Shleifer and Summers, 1990) and at the interaction between fundamental and non-fundamental forces (e.g. Frankel and Froot, 1990a; Kirman, 1991).

Despite the increasing interest in non-fundamental analysis, there is little empirical evidence on the prevalence and importance of such techniques in financial markets. Goodman (1980) examines the performance of technical analysts, but does not provide evidence on the importance which the market attaches to their advice. Allen and Taylor (1989) and Taylor and Allen (1992) study the use of technical analysis in the foreign exchange market, but do not directly compare the usefulness of technical analysis and fundamental analysis, nor distinguish the importance among different fundamental factors and technical techniques.

This article summarizes the results of a questionnaire survey undertaken in February 1995 investigating the use made by foreign exchange dealers of fundamental and technical analyses to form their forecasts of exchange rate movements in the Hong Kong foreign exchange market. This is the first survey concerned with how professional traders forecast exchange rate movements in Hong Kong. Given that Hong Kong is the fifth largest foreign exchange market in terms of daily average turnover[1] and the fact that dealers' views are an important factor driving

[1]According to a global survey conducted by the Bank for International Settlement in April 1995, Hong Kong's foreign exchange market had an average daily net turnover of US$90 billion and was ranked the fifth largest market in the world. It was just behind Tokyo's US$161 billion and Singapore's US$105 billion in the Asia Pacific region.

exchange rate movements, our results may enhance understanding of exchange rate analysis and forecasting.

We find that a very large proportion of dealers in Hong Kong use both fundamental and technical analyses when forming their views. This is consistent with the findings of Taylor and Allen (1992) for the UK market. At shorter horizons, there exists a skew towards reliance on technical as opposed to fundamental analysis, but the skew becomes steadily reversed as the time horizon considered is lengthened. Our findings also reveal that technical analysis is considered significantly more useful in predicting turning points than fundamental analysis, but only slightly more useful in forecasting trends than fundamental analysis. Interest rate news is found to be a relatively important fundamental factor in exchange rate forecasting, while moving average and/or other trend-following systems are the most useful technical technique. Nevertheless, both 'interest rates' and 'moving averages' are considered less influential than news of central bank intervention in intraday movement. These results are not affected by the respondents' trading limit or their views about the complementarity of fundamental and technical analyses.

2. Questionnaire design

To prepare the survey, we consulted dealers at the Hong Kong Monetary Authority (HKMA) and most of the major banks. After consultation, we designed a questionnaire investigating the following:[2]

1. the usefulness of fundamental and technical analysis in forecasting trends and turning points;
2. the importance that dealers personally give to fundamental and technical analyses over seven forecasting horizons: intraday, 1 week, 1 month, 3 months, 6 months, 1 year and beyond 1 year;
3. the importance of fundamental and technical analyses for the market as a whole as perceived by the dealers over the above seven horizons;
4. dealers' views of the complementarity of fundamental and technical analyses in exchange rate forecasting;
5. the importance of three categories of fundamental factors in exchange rate forecasting, namely: (i) interest rates and news that affects interest rate expectations (central bank announcements, bond prices, monetary aggregates, etc.); (ii) developments in the balance of payments (merchandise trade statistics, long-term capital flows, relative economic growth rates, etc.); and (iii) calculation of inflation differentials and purchasing power parity;
6. the importance of three major techniques of technical analysis, namely (i)

[2] The questionnaire will be available upon request.

moving averages and/or other trend-following systems, (ii) momentum lines, oscillators and/or rate-of-change indicators and (iii) contrary opinion;[3]
7. the length of the historical period and the data frequency used by dealers in chartist/technical analysis to forecast trends and turning points; and
8. the usefulness of central bank intervention in influencing exchange rates over the horizons of intraday, intramonth and beyond 1 month.

Respondents were requested to use a 10-point scale in their answers, with 0 for 'not important/useless' and 10 for 'very important/very useful'. In the question about the complementarity of fundamental and technical analyses, a scale from 0 to 10 was also used. A score of 0 (10) implies a view that the two approaches are strongly complementary (mutually exclusive) and an intermediate score shows an intermediate degree of complementarity. In addition, respondents were requested to provide information about their employment background, including type of organization, size of dealing room, experience in exchange dealing, current position and the trading limit authorized by their employer.

3. Data and sample

We were provided by the Hong Kong Forex Association with its membership list as of September 1994. On the list there were 812 members. A total of 153 fully completed questionnaires were returned, a response rate of 19%. Generally most of the respondents held senior posts, were very experienced and had large trading limits.[4] Approximately 81% of the respondents worked in licensed banks and another 13.72% in restricted license banks. The majority (84.97%) of respondents were employed by foreign institutions. Most respondents' firms are active participants in the market, with over 60% in number having a daily average turnover greater than US$100 million.

4. Results

Table 1 reports the perceived usefulness to dealers of fundamental and technical analyses in forecasting trends and turning points. The average scores for the usefulness of fundamental (technical) analysis to forecast trends and turning points are: trends, 6.54 (6.62) and turning points, 4.63 (7.26). This indicates that both approaches are used in forecasting. A very few respondents ($< 4\%$) give zero points to fundamental analysis[5] and almost all dealers place some weight on both

[3]The classification of (i) and (ii) used by Taylor and Allen (1992) is followed here. We added the third technique (iii) 'contrary opinion' given its role as a major technical technique widely used by dealers.
[4]The detailed profile of respondents' background will be provided upon request.
[5]Out of the 153 respondents, only two (6) considered fundamental analysis as useless in forecasting trends (turning points). None considered technical analysis useless for the forecasts.

Table 1
Perceived usefulness of fundamental analysis and technical analysis in predicting trends and turning points[a]

	Fundamental analysis	Technical analysis	t-test[b]
Trends	6.54 (1.90)	6.62 (2.01)	−0.33
Turning points	4.63 (2.24)	7.26 (1.69)	−11.43**
t-test[c]	7.95**	−3.00**	

[a]Scale: from 0 = useless to 10 = very useful.
[b]t-test for the null hypothesis of no difference in prediction between fundamental analysis and technical analysis.
[c]t-test for the null hypothesis of no difference in predicting trends and turning points.
Notes: Δ, significant at the 10% level; *, significant at the 5% level; **, significant at the 1% level. Figures in parentheses are standard deviations.

analyses. The highest score (7.26) shows that dealers believe technical analysis to be superior in predicting turning points. The standard deviation (1.69) of responses indicates that respondents have the smallest diversity of opinion with regard to this superiority. At the same time, fundamental analysis is considered more useful in forecasting trends than turning points, while technical analysis is more useful in predicting turning points than trends. The difference in scores is significant at the 1% level. Finally, a comparison between the two analytical approaches reveals that technical analysis is thought to be superior to fundamental analysis in predicting both trends and turning points. This result is significant for turning points at the 1% level, but not statistically significant for trends.

Table 2 compares the importance to dealers of fundamental and technical analyses over seven different forecast horizons. As indicated in columns (1) and (2), both approaches exercise an influence, though to a different extent, at all horizons. For fundamental analysis, this influence increases with the length of the time horizon, with the lowest average score of 3.33 for intraday and the highest 7.08 for a horizon longer than 1 year. The reverse is true for technical analysis, which has higher scores at shorter time horizons and lower scores at longer horizons.[6]

Thus, at shorter horizons, there exists a skew towards reliance on technical, as opposed to fundamental analysis, but this skew becomes steadily reversed as the length of horizon considered increases. This finding is consistent with that of Taylor and Allen (1992) for the UK foreign exchange market. Comparing the standard deviations in columns (1) and (2) further indicates dealers' consensus on

[6]A similar increase (decrease) in weight for fundamental (technical) analysis with the length of horizon is observed when using mode score instead of mean score.

Table 2
Perceived importance of fundamental and technical analyses over different forecast horizons[a]

Horizon	Importance given by dealers to		Dealers' perception of importance given by the market to		*t*-test for the null hypothesis of no difference between			
	Fundamental analysis (1)	Technical analysis (2)	Fundamental analysis (3)	Technical analysis (4)	(1) and (2)	(1) and (3)	(2) and (4)	(3) and (4)
Intraday	3.33 (2.59)	7.32 (1.98)	3.61 (2.49)	7.43 (1.88)	−14.92**	−0.93	−0.47	−14.86**
1 week	4.08 (2.32)	7.16 (1.65)	4.28 (2.19)	7.19 (1.57)	−13.20**	−0.75	−0.16	−13.15**
1 month	5.03 (2.07)	6.51 (1.64)	5.18 (2.07)	6.57 (1.49)	−6.88**	−0.65	−0.35	−6.66**
3 months	5.98 (1.68)	5.79 (1.87)	6.09 (1.71)	5.85 (1.62)	0.95	−0.58	−0.29	1.29
6 months	6.41 (1.98)	5.24 (2.21)	6.48 (1.90)	5.40 (1.88)	4.81**	−0.31	−0.67	4.88**
1 year	6.82 (2.19)	4.71 (2.55)	6.85 (2.01)	4.93 (2.25)	7.58**	−0.13	−0.80	7.63**
> 1 year	7.08 (2.40)	4.29 (2.66)	7.08 (2.24)	4.53 (2.52)	9.31**	−0.00	−0.76	9.04**

Notes. See notes in Table 1.

the shift in this skew.[7] Statistical analysis shows that the skew towards reliance on technical methods is significant at the 1% level at the intraday, 1 week and 1 month horizons while the skew towards fundamental methods is significant at 6 months and longer horizons. Reliance on the two methods is not significantly different at 3 months. This suggests that models that focus on fundamentals may perform poorly over short horizons because they miss the impact of technical analysis-based decisions on the market. Over a longer horizon, models based on fundamental economic reasoning may perform better.

Another striking observation to be drawn from Table 2 is that the weights given by dealers to the two analyses over the various time horizons are very similar to, but slightly below, their perception of how the market uses fundamental and technical analyses. The lower scores are not statistically significant, but may reflect the caution and conservatism of dealers when using different approaches to formulate their own forecasts. The results also imply that dealers would rather 'go with the flow' than be contrarians in their trading.

The joint influence of fundamental and technical analyses is further confirmed by dealers' perception of their complementarity. As Fig. 1 shows, a larger proportion of the respondents indicate that the two analyses are complementary than indicate that they are mutually exclusive.

The importance attached by dealers to different types of fundamental factors and to different technical techniques is given in Tables 3 and 4, respectively. Table 3 shows that interest rates and related news (e.g. monetary aggregates and bond prices) are considered relatively important in exchange rate forecasting, but their

[7]Specifically, the standard deviations in column (2) are smaller (larger) than those in column (1) at shorter (longer) horizons. This suggests that respondents have less disagreement on the superiority of technical analysis over fundamental analysis at shorter horizons and vice versa.

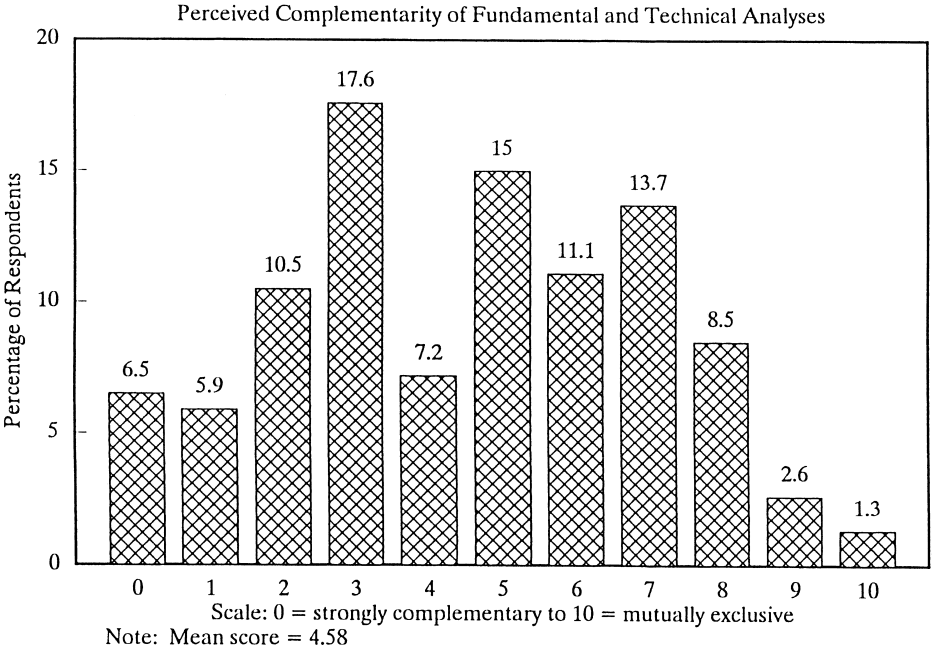

Fig. 1. Perceived complementarity of fundamental and technical analyses.

importance declines with the length of the horizon considered. This factor scores the highest at the intraday (6.82) and intramonth (6.43) horizons, and is significantly higher than balance-of-payments-related factors (merchandise trade statistics, long-term capital flows, relative economic growth rates, etc.) or inflation-related factors (calculations of inflation differentials and 'purchasing power parity'). Interest rates also score 6.14 in the $>$ 1 month horizon, only slightly below balance of payments factors. With a score of 6.39, balance of payments factors are the most important at horizons beyond 1 month. Inflation related factors are consistently the least important in the three forecasting horizons considered. Note that the importance of both balance-of-payments- and inflation-related factors increases significantly at longer horizons. Another point worth noting is the negative relationship between the mean scores given by the respondents and their standard deviations: higher scores are associated with lower standard deviations. There appears to be little diversity of opinion among traders about the fundamentals that matter.

Table 4 shows that moving averages and/or other trend-following systems are seen to be the most useful technical technique at all three horizons. Dealers generally consider 'contrary opinion' as the least useful. As the horizon length increases, the importance of 'momentum lines, etc.' and contrary opinion shows a slight decrease.

Since both Tables 3 and 4 use the same 10-point scale, comparisons are possible

Table 3
Perceived importance of fundamental factors[a]

Factor category		Intraday (1)	Intramonth (2)	> 1 month (3)	*t*-test for the null hypothesis of no difference between		
					(1) and (2)	(1) and (3)	(2) and (3)
(a) Interest rate related factors		6.82[H] (2.17)	6.43[H] (1.66)	6.14 (2.07)	1.74Δ	2.76**	1.33
(b) Balance of payments related factors		5.04 (2.30)	5.77 (1.78)	6.39[H] (2.03)	−3.04**	−5.37**	−2.82**
(c) Inflation related factors		3.84 (2.55)	4.68 (2.35)	5.47 (2.37)	−2.95**	−5.71**	−2.90**
t-test for the null hypothesis of no difference between	(a) and (b)	6.87**	3.33**	−1.05			
	(a) and (c)	10.84**	7.43**	2.61*			
	(b) and (c)	4.27**	4.50**	3.60**			

Notes. See notes in Table 1.
[H]The highest point in the given horizon.

to reveal the relative importance of different fundamental factors and technical techniques at the three horizons. One striking result is the importance of interest rate factors. In Table 2 we see that there is a skew towards reliance on technical analysis at shorter horizons. However, comparing Tables 3 and 4 shows that, intraday, interest rate factors score higher than any technical techniques and, intramonth, are not significantly less important than moving averages. This finding presumably reflects the fact that foreign exchange dealers use interest rate parity to calculate forward rates, which reflect expectations of future spot rates.

We also asked dealers to indicate the length of the historical period and the data frequency they most often employ in technical analysis. For predicting both trends and turning points, the period length used ranges from 1 day to 10 years, but the means and modes suggest that the typical period is approximately 12 months. Over 73% of respondents indicate that they use daily data most frequently and approximately 30% use weekly data.

In the study, dealers were also asked about their perception of the influence of central bank intervention over exchange rates. Most attach a relatively high score (an average of 7.73 with a S.D. of 1.70) to central bank invention at the intraday horizon. Nevertheless, most respondents think that the influence declines over the longer term. This is reflected by lower scores of 5.62 (with a S.D. of 1.67) for intramonth and of 4.45 (with a S.D. of 2.48) for horizons longer than 1 month. Note that the score of 7.73 at the intraday horizon is significantly higher (also with a lower S.D.) than that for any fundamental factor (see Table 3) or any technical analysis techniques (see Table 4) at the same horizon.

Table 4
Perceived importance of technical analysis techniques[a]

Factor category		Intraday (1)	Intramonth (2)	> 1 month (3)	*t*-test for the null hypothesis of no difference between		
					(1) and (2)	(1) and (3)	(2) and (3)
(a) Moving averages and/or other trend-following systems		5.91[H] (2.22)	6.59[H] (1.63)	6.51[H] (1.72)	−2.99**	−2.57*	0.44
(b) Momentum lines, oscillators and/or rate of change indicators		5.87 (2.37)	5.80 (2.01)	5.54 (2.09)	0.27	1.24	1.07
(c) Contrary opinion		5.07 (2.26)	4.86 (2.06)	4.67 (2.14)	0.83	1.51	0.73
t-test for the null hypothesis of no difference between	(a) and (b)	0.16	3.70**	4.29**			
	(a) and (c)	3.16**	7.86**	7.94**			
	(b) and (c)	2.90**	3.92**	3.47**			

Notes. See notes in Tables 1 and 3.

Additional information can be gained by two subgroup analyses.[8] Firstly the full sample was divided into three groups based on the respondents' trading limits: (i) < US$10 million; (ii) US$10–19 million; and (iii) ≥ US$20 million.[9] In general, the responses of the three groups are qualitatively similar. The main difference is in the perceived usefulness of technical analysis. It appears the larger the trading limit, the less the usefulness attached to technical analysis. This phenomenon is particularly apparent between groups (i) and (iii), i.e. in predicting turning points and over 1–6-month horizons.

We also examined how the responses of those who view fundamental and technical approaches as 'strongly complementary' differ from those who view the two as 'mutually exclusive'. This division was motivated by our interest in the fact that while 'theorists' would rarely describe the two approaches as complementary, it is apparent that many practitioners perceive them as such. Based on the responses to the question concerning the complementarity of fundamental and technical analyses (see Fig. 1), we classify respondents who assigned more than

[8] Detailed results are given by Lui and Mole (1996) which will be provided upon request.
[9] We use trading limit as the classification criterion for subgroup analysis because it is more meaningful and representative than position and dealing experience.

seven points into the 'mutually exclusive group' and those who assigned fewer than three points into the 'complementary group'. A detailed comparison reveals that the perception of the usefulness of fundamental analysis and technical analysis is not much different between the subgroups. Except for the prediction of intraday exchange rate movement, the 'mutually exclusive' group generally seems to be more cautious and gives a smaller weight to the usefulness of both approaches than the 'strongly complementary' group. In addition, in most cases the 'mutually exclusive' group also has a larger diversity of opinion. Note that these two groups do not exhibit any major difference in their employment background.

5. Conclusions

Our major findings may be summarized as follows:

1. At all time horizons, a very high proportion of respondents place some weight on both fundamental and technical analyses when forming views. At shorter horizons, there exists a skew towards reliance on technical as opposed to fundamental analysis, but the skew becomes steadily reversed as the length of horizon considered is increased.
2. Dealers perceive value in using both fundamental and technical analyses to predict both trends and turning points. In forecasting trends, technical analysis is considered only slightly more useful than fundamental analysis, but in predicting turning points technical analysis is considered significantly more useful than the latter.
3. In the use of chartist/technical analysis in forecasting trends and turning points, the most common length of historical period used by the dealers is 12 months and the most used data frequency is daily data.
4. Interest-rate news is found to be a relatively important fundamental factor, while moving average and/or other trend-following systems are the most used technical techniques. Nevertheless, they are both given less weight than news about central bank intervention in influencing intraday exchange rate movements.

These findings have some interesting implications. First, since professional traders do not trade purely on the basis of the economic fundamentals, but also take account of market movements generated by 'noise trading', knowledge of technical signals is essential to anyone who wants to participate successfully in the foreign exchange market. Second, with respect to short-term exchange rate movements (particularly intraday movements), investors need to note that dealers pay special attention to changes in interest rates, use trend-following systems and watch for central bank intervention aimed at influencing exchange rates. Third, the existence of a skew towards reliance on fundamental analysis at longer horizons suggests that models based on economic considerations will be more useful over the long-run.

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