

Box 5

HOW ARE FORECASTS IN THE ECB SURVEY OF PROFESSIONAL FORECASTERS FORMED? RESULTS OF A SPECIAL QUESTIONNAIRE

This box summarises the results of a special questionnaire which was sent to the participants in the ECB Survey of Professional Forecasters (SPF) in autumn 2008, in the context of the ten-year anniversary of the SPF's launch in January 1999.¹ The purpose of the questionnaire was to obtain more information on how the SPF forecasts are formed. Responses were received from 45 SPF participants, which represents approximately three-quarters of the average number of responses received in the regular survey rounds (i.e. around 60). The respondents were a representative cross section of the SPF panel in terms of type of forecaster: financial institutions accounted for approximately half of the replies (this compares with a share of about 66%, on average, in the regular SPF rounds). The questionnaire contained questions on timeliness and methods of forecasting, in particular relating to the frequency of forecast updates, the models used, the importance of judgement, and the generation of reported probability distributions and assumptions regarding other variables implicitly underlying the forecasts. It should be noted that on some occasions the percentages reported may add up to more than 100%, as respondents indicated more than one category.

Frequency of updates of the forecasts reported in the SPF

The majority of respondents (84%) reported that their forecasts are updated according to a regular calendar (e.g. at the beginning of the month, end of the quarter, etc.), while 30% reported that the updating of their forecasts is event or data-driven (e.g. following a key data release).

1 A copy of the questionnaire and a more detailed summary of the results can be found on the ECB's website at <http://www.ecb.europa.eu/stats/prices/indic/forecast/html/index.en.html>.

A substantial proportion of respondents (around one-third) indicated that their forecasts are both calendar and event or data-driven, depending on the specific situation.

Of those respondents who update their forecasts regularly according to a calendar, over 50% reported that their forecasts are updated on a quarterly basis, with a slightly smaller share (35%) updating on a monthly basis. A small proportion (around 10%) reported that they update their forecasts less frequently (e.g. two or three times per year), while two respondents reported that they update “continuously”.

Most respondents indicated that they provide their latest available forecast in each SPF round, with only a small proportion (less than 10%) preparing a new forecast for the SPF. However, a number of respondents (around one-quarter) said that they may partially update their forecasts when responding to the SPF. Overall, given the high frequency of regular updates and respondents’ comments that they also adjust or prepare a new forecast in exceptional circumstances, the replies suggest that the SPF responses are quite timely.

Forecasting techniques and models

SPF participants were asked what models they use for forecasting. They were also asked to assign approximate weights (percentages) to the relative influence of models and of judgement. It is important to bear in mind, as was highlighted in the questionnaire itself, that responses to this question may only be an approximation and may vary over time.

Regarding the use of models for forecasting, the questionnaire listed a number of model types: time series models (including auto regressive integrated moving average (ARIMA), single equation, and vector auto regression (VAR) or vector error correction (VEC) models), traditional supply and demand-based macro models and dynamic stochastic general equilibrium (DSGE) models. The responses indicated that the type of model preferred varies according to the forecast horizon and to the variable being forecast. A pattern emerged whereby the use of time series models is more common for shorter-term horizons and for inflation forecasts, whereas traditional supply and demand-based macro models are used more at longer-term horizons and slightly more for real GDP and unemployment rate forecasting.

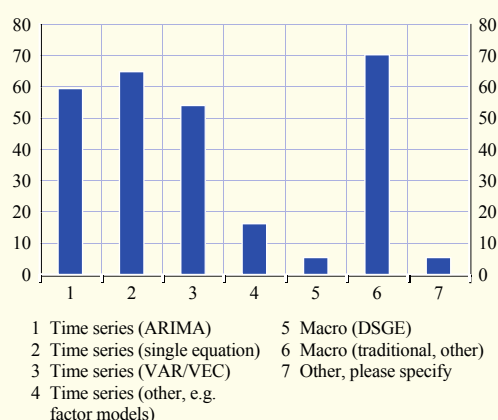
Considering in more detail the types of model used for forecasting, most respondents (around 85%) reported that they used at least one type of time series model. Three of these are relatively widely used: ARIMA, single equation, and VAR or VEC models (see Chart A). A smaller portion uses other time series models such as factor models. Most respondents using time series models reported that they use two or more types of such models. Almost 70% of respondents reported that they use traditional macro, supply and demand-based models, while very few forecasters indicated that they use DSGE models or some other type of model not already specified.

Regarding the role of judgement, the results showed that, on average, respondents consider 45% of their forecast to be judgement-based.² There were no major differences regarding

² It should be noted that a number of respondents indicated that their forecast is entirely based on judgement. Analysing the answers provided, it appears that there may be two types of behaviour behind these responses. First, there are forecasters who do not use models for some variables or forecast horizons, but report the forecast based on the official view of their institution. Second, there are forecasters who use models, but consider the final outcome to be based on judgement because their initial model forecast can be adjusted in any direction and to any extent depending on their subjective beliefs. In this context, the degree of judgement reported may be slightly overstated.

Chart A What types of model do you use for forecasting?

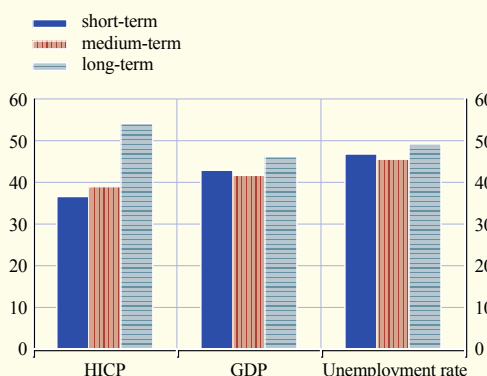
(percentage of replies)



Source: ECB.

Chart B Degree of judgement applied to the forecast

(percentages)



Source: ECB.

the relative use of judgement across variables or horizons, except in the case of inflation (see Chart B). Judgement applied to short-term (up to one year) inflation forecasts was indicated to be around 37%, increasing to 54% for longer-term forecasts (five years ahead). For real GDP forecasts, judgement is applied, on average, slightly less (44%) than for unemployment rate forecasts (47%). For both variables no significant differences were reported across forecast horizons, although judgement is used slightly more for the long-term horizons.

Probability distributions and corresponding point estimates

The respondents were also asked how they generate their reported probability distributions for inflation, GDP and unemployment. A large majority (79%) of respondents said that their reported probability distributions are estimated on the basis of judgement, while 17% generate them from models. A small number reported that the probability distributions provided in the SPF are based on a functional form (usually the standard normal distribution).

Forecasters were also asked whether they report their mean, modal or median forecast.³ The replies to this question revealed that a clear majority (75%) of respondents provide the point estimate which corresponds to the mean of their reported probability distribution. Almost 20% reported that their point forecast corresponds to the median, while a small proportion (7%) indicated that it corresponds to the mode of their reported probability distribution. A few respondents indicated that, depending on the economic environment, they may also deviate from the usually reported measure, using the mode or median instead of the mean, for example.

3 The mean is the weighted average of all possible outcomes, where the weights are the respondents' assessment of the probability associated with each outcome. The mode is the forecast that is most likely to occur, but does not necessarily reflect the balance of risks surrounding the most likely outcome. The median is the outcome with 50% probability above and 50% probability below. If the probability distribution is symmetric, the three measures coincide and the risks are considered to be balanced. If it is not symmetric, the balance of risks is assessed to be on the upside when the mean forecast is higher than the median, which in turn will be higher than the mode.

Other variables and conditioning assumptions

With regard to their “external” assumptions, most respondents form in-house forecasts for oil prices, exchange rates, interest rates and wage growth. In-house forecasts of oil prices are often complemented by market data, for example futures or spot rates. A few respondents reported that they use external forecasts to complement and cross-check in-house forecasts. In terms of other sources, a small number of respondents use automatic rules (e.g. a random walk). These replies suggest that, as is always highlighted in the reporting of the SPF results, SPF responses reflect a relatively diverse set of subjective views and assumptions.

In summary, the results show that the SPF responses are quite timely and that the forecasts are based on heterogeneous assumptions which are predominantly generated in house. In addition, although both structural and time series models are widely used, judgement also plays a key role. This is the case in particular for the reported probability distributions. It is thus very important to consider the heterogeneity of the SPF forecasts when analysing and interpreting either aggregate or individual results of the SPF.