



NEW PROCEDURE FOR CONSTRUCTING ECB STAFF PROJECTION RANGES

A. Introduction

Macroeconomic projections are surrounded by considerable uncertainty. To take this uncertainty into account, the ECB/Eurosystem staff projections are presented in the form of ranges. Since the projections were first published in December 2000, the projection ranges for each variable and horizon have had a width equal to twice the mean absolute projection error, based on an extrapolation of historical projection errors.¹ The width of these ranges has not been updated since then.

In order to update the ECB staff projection ranges and to incorporate both the information contained in historical projection errors and more timely information on economic developments, the procedure for computing the ranges has been changed as from the September 2008 ECB staff projection. This change in procedure is of a purely technical nature. The format for publishing the projections in the ECB's Monthly Bulletin remains unchanged: they continue to be presented as ranges in order to convey projection uncertainty.

B. Description of the new procedure

The new procedure for constructing the projection ranges is based on a set of vector auto-regressive models which include the projection variables reported in the Monthly Bulletin, namely one model including real GDP growth and HICP inflation, and another including the growth of GDP components. The models are estimated with standard Bayesian techniques (resulting in "BVAR models") conditional on the same exogenous variables that are used in the ECB staff projections, namely the price of oil, the nominal effective exchange rate, short and long-term interest rates and foreign demand.

The BVAR models are used to generate a forecast distribution (*predictive density*) for each variable which is then "twisted" to include the ECB staff projection, employing a method described in Robertson et al.

¹ See the December 2000 issue of the ECB's Monthly Bulletin, p. 49. See also "A guide to Eurosystem staff macroeconomic projection exercises", ECB, 2001, p. 15.

(2005).² This method re-weights the original predictive density to generate another density (close to the first one in a certain metric) which is compatible with the projection outcome. From this density, a probability interval can be derived which, when appropriately calibrated, closely approximates the range based on the previous procedure, although it has a more rigorous probabilistic interpretation and is model-based.

A uniform 75% probability interval has been employed for all variables in order to portray the projection uncertainty. This calibration maintains a high degree of continuity with the previous ranges. As with the previous procedure, the new BVAR-based ranges differ depending on the time horizon concerned and tend to widen over the projection horizon, as the uncertainty surrounding projections increases for longer horizons. In addition, also in line with the previous ranges, the new ranges tend to be wider for variables with higher volatility – such as the growth of gross fixed capital formation – as a result of the more dispersed predictive densities produced by the BVAR models.

The new and previous projection ranges for HICP inflation and GDP growth are depicted in the charts below for all projection exercises from December 2003 to June 2008. The charts demonstrate that the new ranges are stable over time, even though they were computed in real time and the procedure is based on a sequential update of the information. For the one-year-ahead HICP inflation projections, the ranges implied by the BVAR model for the past projection exercises turn out to be narrower than the previous ranges. This feature is consistent with the empirical forecasting literature and the experience of other forecasters.

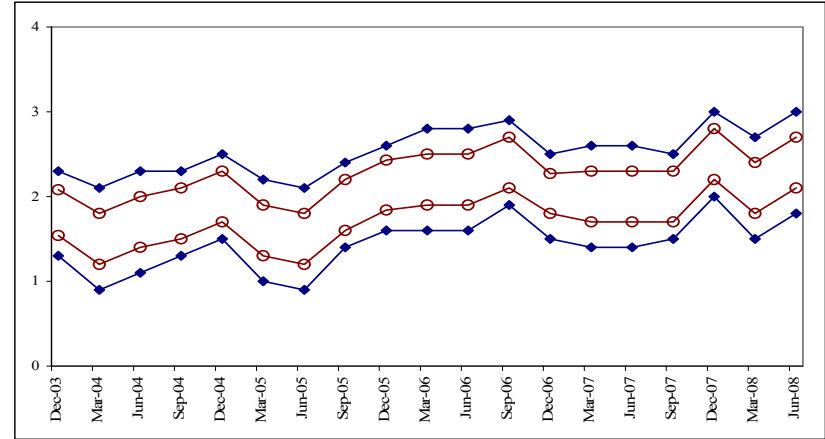
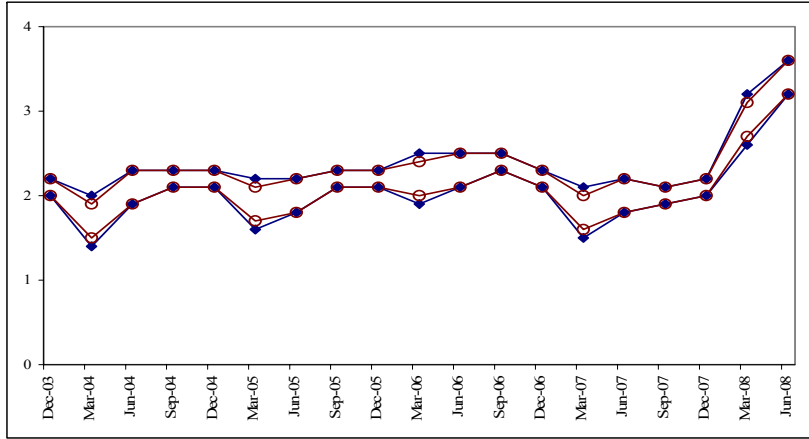
² See Robertson, J. C., E. T. Tallman and C. H. Whiteman, “Forecasting using relative entropy”, *Journal of Money, Credit and Banking*, 37(3), 2005, pp. 383-401.

Projection ranges for HICP inflation and real GDP growth
75% BVAR-based ranges vs. previous projection-error-based ranges

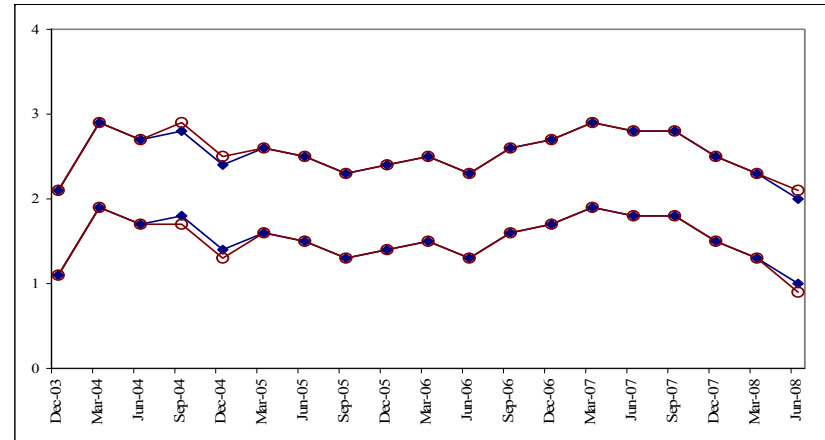
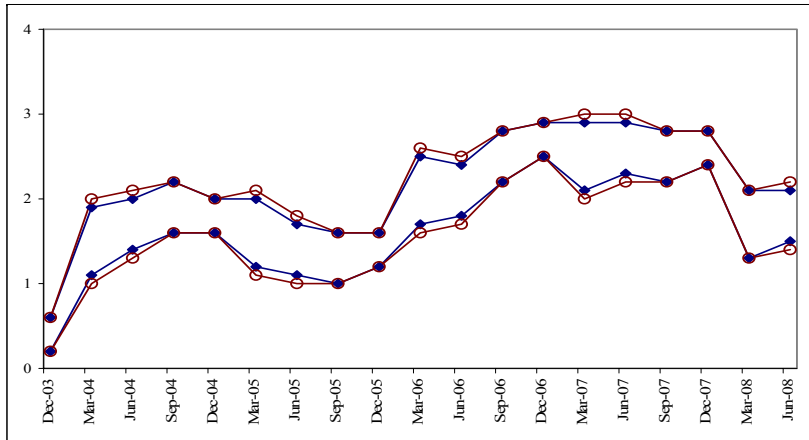
Current year

One year ahead

HICP inflation



Real GDP growth



PREVIOUS



NEW

