Forecasting industrial production in the Euro area

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Abstract. The creation of the Euro area has increased the importance of obtaining timely information about short-term changes in the area’s real activity. In this paper we propose a number of alternative short term forecasting models, ranging from simple ARIMA models to more complex cointegrated VAR and conditional models, to forecast the index of industrial production in the euro area. A conditional error-correction model in which the aggregate index of industrial production for the area is explained by the US industrial production index and the business confidence index from the European Commission harmonised survey on manufacturing firms achieves the best score in terms of forecasting capacity.

Key words: Forecasts comparison, alternative models, conditional ECM

JEL Classification: C53, C22

1. Introduction

The creation of the Euro area has certainly posed a number of important economic issues: the extent of the convergence process, from both the real and nominal points of view, the effects deriving from the stability pact, the role played by the European Central Bank and by the national central banks, etc. At the same time one of the key aspects has become that of obtaining timely information concerning the Euro area economic cycle and, if possible, its

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future developments\textsuperscript{2}. Obviously, these problems have already been examined at a national level but so far we do not know of any recent contribution at the Euro aggregate level. We therefore decided to try to develop some simple time series models able to forecast short-term changes in real activity in the Euro area. Because the economic cycle is influenced by the dynamics of the industrial sector, and because the information is provided without much delay, we focused our research on forecasting models for the industrial production index. Such information should be very helpful for economic policy decisions.

We began our analysis from simple univariate Arima models for the Euro area as a whole and by country (Germany, France, Italy and Spain; paragraph 2) and then moved to a VAR system in which we consider the industrial production indices for these four euro countries (paragraph 3). At this stage we introduced new variables which might significantly affect the European industrial production index; i.e. the United States production index and the level of confidence in the business sector computed by the European Commission. The US index is supposed to approximate the evolution of demand outside the Euro area. Apart from the fact that the US index produces better results than some alternatives (in particular the index of the UK), this choice may also be motivated by the reliability of the US index and the very short delay with which it is published\textsuperscript{3}.

In paragraph 4 we tried to evaluate the possibility of improving our forecast for the area by building country specific models with indicators and then by aggregating them. Finally, in paragraph 5 we present a comparison of the different proposed forecasting approaches and then conclusions are drawn.

2. Statistical analysis of the indices of industrial production

In a recent forecasting exercise for 215 US monthly macroeconomic time series with alternative methods, Stock and Watson (1998) find that the best overall performance of a single method is achieved by autoregressions with unit root pretest: «If a macroeconomic forecaster is restricted to use a single method, then for the family of loss functions considered here she would be well advised to use an autoregression with a unit root pretest and data-dependent lag-length selection.» (p. 21).

Though this paragraph is devoted to building univariate models for benchmark forecasts, after preliminary data inspection (section 2.1) we followed Stock and Watson’s suggestion to test for seasonal and non seasonal unit roots in the variables under scrutiny (section 2.2). Finally, the retained univariate ARIMA models for the Euro area as a whole, Germany, France, Italy and Spain are presented (section 2.3).

2.1 Preliminary data analysis

Analysis of the levels of the manufacturing output indices for Germany, France, Italy, Spain, the Euro area and the United States (Fig. 1; see the

\textsuperscript{2} Throughout the paper we use the terms Europe, EMU and Euro indifferently to refer to the 11 member countries of the Euro area.

\textsuperscript{3} Bodo et al. (1997) show that the US index may help forecasting the industrial production indices of Germany, Italy, France and the U.K.