Essays in macroeconometrics and short-term forecasting
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The thesis is composed of three essays in the field of macroeconometrics and short-term forecasting. The first two chapters are on nowcasting, a topic that has received increasing attention both among practitioners and the academics, especially in conjunction and in the aftermath of the 2008-2009 economic crisis. At the heart of the two chapters is the idea of exploiting the information from data published timely and at a higher frequency for obtaining early estimates of the macroeconomic variables of interest. The models used to compute the nowcasts are dynamic models conceived for handling in an efficient way the characteristics of real-time data. While the first chapter uses a small model such as a VAR for nowcasting Italian GDP, the second one makes use of a dynamic factor model, more suitable to handle medium-large data sets, for providing early estimates of the employment in the euro area. The third chapter develops a topic only marginally touched by the second chapter, i.e. the estimation of dynamic factor models on data characterized by block-structures.

The first chapter, entitled “Nowcasting Italian GDP in real-time”, assesses the accuracy of the Italian GDP nowcasts based on a small information set consisting of GDP itself, the industrial production index and the Economic Sentiment Indicator. The task is carried out by using real-time vintages of time series in an out-of-sample exercise over rolling windows of data. Beside using real-time data, the real-time setting is also guaranteed by updating the nowcasts according to the historical release calendar of the data. The model used is a mixed-frequency Vector Autoregressive (VAR) model, cast in state-space form and estimated by maximum likelihood. The results show that the model can provide quite accurate early estimates of the Italian GDP growth rates not only with respect to other small size models but also with respect to professional and institutional forecasts. The chapter also analyzes the role of the Economic Sentiment Indicator, and of soft data in general, in improving nowcasts accuracy.

The second chapter, entitled “Anticipating Eurostat estimates of employment for the euro area” focuses on nowcasting the quarterly national account employment of the euro area making use of both country-specific and area wide information. The relevance of anticipating the Eurostat estimate of employment rests on the fact that, despite it represents an important macroeconomic variable, euro area employment is measured at a relatively low frequency and published with a considerable delay. Obtaining an early estimate of this variable is possible thanks to the fact that several Member States publish employment and employment-related data in advance with respect to the release of the euro area employment. Data availability represents, nevertheless, a major limit as time series are in general non homogeneous across countries, have different starting periods and, in some cases, are very short. We construct a data set of monthly and quarterly time series consisting of both aggregate and country-level data on Quarterly National Account employment, employment expectations from business surveys and Labour Force Survey employment and unemployment. In order to perform an out-of-sample exercise simulating the (pseudo) real-time availability of the data, we construct an artificial calendar of data releases based on the effective calendar observed during the first quarter of 2012. The model used to compute the nowcasts is a dynamic factor model allowing for mixed-frequency data, missing data at the beginning of the sample and ragged edges typical of non synchronous data releases. Our results show that using country-specific information as soon as it is available allows to obtain reasonably accurate estimates of the employment of the euro area well in advance with respect to the official release. We also look at the nowcasts of employment of the four largest Member States. We find that (with the exception of France) augmenting the dynamic factor model with country-specific factors provides better results than using the initial dynamic factor model.

The third chapter of the thesis deals with dynamic factor models on data characterized by local cross-correlation due to the presence of a block-structure. The latter is modeled by introducing block-specific factors, i.e. factors that are specific to blocks of time series. We propose an algorithm to estimate the model by (quasi) maximum likelihood and use it to run Monte Carlo simulations to evaluate the effects of modeling or not the block-structure on the estimates of
common factors. We find two main results: first, that, beside being interesting *per se*, modeling the block-structure can help reducing the model miss-specification and getting more accurate estimates of the common factors in finite samples; second, that imposing a wrong block-structure or imposing a block-structure when it is not present does not have negative effects on the estimates of the common factors. These two results allow us to conclude that it is recommendable to model the block-structure especially if the characteristics of the data suggest that there is one.