A system for a real time monitoring of the euro area economy

Gian Luigi Mazzi, Filippo Moauro and Rosa Ruggeri Cannata

Abstract This paper shows how official statistics can be combined with nowcasting, high frequency estimates and composite indicators to produce a real time monitoring and an early warning system of the economic situation in the euro area and its member states. The study presents the results of a real time analysis carried out on most recent estimates of the bridge modelling approach adopted for the construction of coincident indicators and EuroMIND, the euro area monthly indicator of economic activity. As an example, the early warning system related to mid October 2012 is shortly discussed.

Key words: coincident indicators, cyclical estimates, nowcasting, single factor models, temporal disaggregation

1 Introduction

Official statistics provide the most complete set of reliable information for policy making, analysis and forecasting. Since official statistics are derived by a very complex production system implying a variety of data sources and surveys, they can respond quite slowly to the changes in user needs. Furthermore, differences among statistical systems at European and not European level determine divergences in some quality dimensions of official statistics: examples are provided by the existing timeliness gap of Principal European Economic Indicators (PEEIs) between Europe and US, as well as the non-availability of indicators at the desired frequency. Finally, official statistics do

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not show all relevant signals, such as cyclical features and turning points, which can be displayed only after a suitable filtering. Then, complementing official statistics with econometric techniques can help in reducing the existing gaps with respect to user needs. Aim of this paper is to show how combining econometric techniques and official data can lead to a first attempt of a real time monitoring and an early warning system for the euro area. The paper is organized as follows: Section 2 presents several statistical approaches to derive nowcasts, together with the results of a reliability analysis of the obtained results; Section 3 is devoted to the methodology for the construction of a monthly indicator of the euro area activity, EuroMIND, and its variance; Section 4 introduces a system of euro area turning points detection, whereas Section 5 presents the early warning system referred to the recent evolution of the euro area economy. Section 6 shortly concludes.

2 PEEIs’ nowcasts: a bridge modeling approach

In its PEEIs’ research activity Eurostat is strongly involved in the production of coincident indicators for a set of relevant macroeconomic variables based on a bridge model (BM). BMs aim at translating the information content of high frequency indicators (e.g. monthly) to compute early estimates or forecasts over a short horizon of the target variable, usually available at a lower frequency (e.g. quarterly).

Application of BMs starts from the following dynamic regression equation:

$$\Delta y_t = c + \sum_{i=1}^{p} \alpha_i \Delta y_{t-i} + \sum_{j=1}^{k} \sum_{l=0}^{q} \beta_{jl} x_{j,t-l} + u_t, \quad t = 1,\ldots,T$$

(1)

Where:

- $y_t$ is the dependent variable observed over the sample period $t = 1,\ldots,T$ taken in its first (log-) differences, with $\Delta$ the difference operator such that $\Delta y_t = y_t - y_{t-1}$;
- $c$ is an intercept;
- $\alpha_i$ and $\beta_{jl}$ are regression coefficients respectively related to $\Delta y_{t-i}$, i.e. $\Delta y_t$ lagged of $i=1,\ldots,p$ periods, and to a set of $k$ predictors $x_{j,t} \quad j=1,\ldots,k$, each of them eventually lagged of $l=0,1,\ldots,q$ periods;
- $u_t$ is a mean zero disturbance with variance $\sigma^2$.

Equation (1) provides a general specification which can also be adapted to the case of cointegration among implied variables imposing suitable coefficient restrictions for including error correction (EC) terms.

Estimation of BMs follows a 3-step procedure: (a) $x_{it}$ are projected over a forecast horizon by means of a univariate time series technique; (b) the indicator is temporal aggregated at the same time span of the target variable; (c) parameter estimation of model (1) is carried out to determine the coincident indicator $\hat{y}_t$ over the full sample period $t=1,2,\ldots,T$. For recent reviews with applications refer to Barhoumi et al. (2008), to Baffigi et al. (2004) and Mazzi and Montana (2009) for an application to PEEIs.
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Variable selection is carried through the least angle regression (LARS) algorithm by Bai and Ng (2008) able to selecting a set of targeted predictors to obtain the most accurate nowcasts.

The BM approach is applied by Eurostat to GDP, total employment and the industrial production index (IPI) of the euro area. Model specification is adapted to the composition of the information set which varies according to the delay from the end of reference period at which the nowcast is computed.

In the current production nowcasts of GDP are computed 30 days before the end of the reference quarter, denoted hereafter as T-30, exactly at the end of the reference quarter (T+30), whereas the first official release by Eurostat occurs at T+45 days; nowcasts for Employment are computed at T-15, T+0 and T+7 days respectively from the end of the reference quarter, with first Eurostat's release at T+75 days. Finally, for IPI nowcasts are computed at T+15 days from the end of the reference month, with first Eurostat's release at T+45.

Recently (May 2012) Eurostat has extended its activity to coincident indicators of GDP for the main euro area member states (Germany, France, Italy, Spain, Netherlands and Belgium) and to the development of an indirect approach for constructing a coincident indicator of the euro area derived by member state estimates. A short presentation of these results will be provided in Section 5

<table>
<thead>
<tr>
<th>Table 1: Model specification of BM for GDP, Employment and IPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln(GDP)</td>
</tr>
<tr>
<td>GDP</td>
</tr>
<tr>
<td>Employment</td>
</tr>
<tr>
<td>IPI</td>
</tr>
<tr>
<td>Retail Sales</td>
</tr>
<tr>
<td>Exports</td>
</tr>
<tr>
<td>Construction output</td>
</tr>
<tr>
<td>Unemployment rate</td>
</tr>
<tr>
<td>Exchange rate euro/$</td>
</tr>
</tbody>
</table>

**Business and consumer surveys**

Present business situation

Major purchases over next 12 months

Industrial confidence

Construction confidence

Construction employment expectation

Note: A denotes the difference operator, in the logarithm and \(\Delta x_{i,t}^h\) the squared difference with sign transformation

### 2.1 Real time simulation exercise

In this section we provide a summary view of results related to the production of coincident indicators by means of the BM approach using the PEEIs vintage database.
We refer to euro area GDP and Employment computed at T+0 days from the end of the reference quarter and to euro area IPI computed at T+15 days. Reliability of nowcasts is measured through a real time analysis aiming at comparing the results with official Eurostat’s flash estimates.

Details of the model specification are shown in table 1, with the three dependent variables involved in the BM nowcast exercise by column and the full set of regressors by row. For each dependent variable the table provides information on the regressors entering into the model specification, its lag and the adopted transformation.

Note that the model specification is always in log-differences of the dependent variable $y_t$, with indicators in the upper part of table 1 also subject to logarithm transformation, in opposition to business and consumer surveys (lower part of table 1) which are always treated in levels.

Table 2 shows the BM nowcasts relative to euro area GDP and total Employment in the quarters from 2011q1 to 2012q2 and to IPI in the months from February to July 2012. In all cases the nowcasts are expressed in terms of growth rates and are accompanied, in parenthesis, by differences (errors) from their first official estimates. Concerning IPI, their nowcasts are relative to the months in the sample October 2011-March 2012. In the last two columns of the table we provide the summary error statistics of mean absolute error (MAE) and root mean squared error (RMSE). MAE and RMSE are computed over the sample 2010q1-2012q2.

Table 2: Real time nowcasts of relevant euro area indicators and their error statistics

<table>
<thead>
<tr>
<th></th>
<th>2011q1</th>
<th>2011q2</th>
<th>2011q3</th>
<th>2011q4</th>
<th>2012q1</th>
<th>2012q2</th>
<th>MAE</th>
<th>RMSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>0.63</td>
<td>0.44</td>
<td>-0.02</td>
<td>-0.40</td>
<td>0.00</td>
<td>0.00</td>
<td>0.26</td>
<td>0.30</td>
</tr>
<tr>
<td></td>
<td>(-0.20)</td>
<td>(0.27)</td>
<td>(-1.17)</td>
<td>(-0.10)</td>
<td>(0.00)</td>
<td>(0.20)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment</td>
<td>0.22</td>
<td>0.13</td>
<td>-0.01</td>
<td>-0.07</td>
<td>-0.08</td>
<td>-0.16</td>
<td>0.18</td>
<td>0.19</td>
</tr>
<tr>
<td></td>
<td>(0.17)</td>
<td>(-0.18)</td>
<td>(0.11)</td>
<td>(0.15)</td>
<td>(0.11)</td>
<td>(-0.19)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPI</td>
<td>0.50</td>
<td>0.05</td>
<td>0.07</td>
<td>0.15</td>
<td>-0.43</td>
<td>-0.49</td>
<td>0.57</td>
<td>0.73</td>
</tr>
<tr>
<td></td>
<td>(-0.01)</td>
<td>(0.34)</td>
<td>(0.89)</td>
<td>(-0.41)</td>
<td>(0.22)</td>
<td>(-1.09)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Nowcasts are in growth rates with, in parenthesis, errors computed as difference from respective first official Eurostat release. MAE is the mean absolute error and RMSE is the root mean squared error over the quarters from 2010q1 to 2012q2 for GDP and Employment and over the months from January 2010 to July 2012 for IPI.

From table 2 it emerges that nowcasts are particularly accurate for employment, with nowcast errors of growth rates on average below 0.2 percentage points in terms of both MAE and RMSE. Slightly higher are the errors related to GDP, with MAE and RMSE equal respectively to 0.26 to 0.3. Concerning IPI nowcasts errors become larger, with MAE to 0.57 and RMSE to 0.73, reflecting the high volatility of the indicator. In conclusion, we can infer a certain confidence in nowcasts related to employment and GDP, while IPI requires further investigation in order to account for the high volatility of this indicator.
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3 PEELs nowcasts: an unobserved component based approach

From 2006 onwards, we have investigated the possibility of constructing a euro area monthly indicator of economic activity as much as possible consistent with the GDP, called EuroMIND. The availability of a monthly indicator such as EuroMIND is particularly relevant to monitor the business cycle in real time. Moreover, being EuroMIND disaggregated into branches, it allows following in real time the evolution of the different elements of the euro area economy: sectors and demand components.

The main characteristics of EuroMIND (for details see Frale et al. (2011)) are the following: 1) use of a disaggregate approach represented by the output and expenditure breakdowns of the GDP at quarterly frequency; 2) for each component, a set of monthly indicators are selected, including both macroeconomic variables and survey answers; 3) indicators are both monthly and quarterly, modelled into the Stock and Watson single index model; 4) model is casted into a state space form allowing for temporal disaggregation (for details see Harvey (1989)); 5) use of a computational efficient procedure; 6) chain-linking is taken into account; 7) final estimate obtained combining the estimates from the output and expenditure sides, with optimal weights reflecting their relative precision; 8) benchmarking to official quarterly accounts so that full consistency between monthly and quarterly estimates is achieved; 9) explicit measure of uncertainty around the indicator available.

The modelling strategy mentioned at point 3) refers to the Stock and Watson (1991) SW single index model. The fundamental idea behind this specification is to separate the dynamics which are common to a set of N coincident series, $y_t$, that are I(1) but not cointegrated, from the idiosyncratic component, which is specific to each series. The level specification of the SW single index model here considered expresses $y_t$ as the linear combination of a common cyclical trend, that will be denoted by $\mu_t$, and an idiosyncratic component, $\mu^*_t$. Letting $\varphi$ and $\eta$ denote N×1 vectors of loadings, and assuming that both components are stationary in first difference and subject to autoregressive dynamics, we can write:

$$y_t = \mathbf{g}_0 \mu_t + \mathbf{g}_1 \mu_{t-1} + \mu^*_t + \mathbf{B} \mathbf{x}_t, \quad t = 1, \ldots, n$$

$\varphi(L)\Delta \mu_t = \eta_t$, \hspace{1cm} $\eta_t \sim \text{NID}(0, \sigma^2)$,

$D(L)\Delta \mu^*_t = \delta + \eta^*_t$, \hspace{1cm} $\eta^*_t \sim \text{NID}(0, \Sigma_{\eta^*})$.

where $\varphi(L)$ is an autoregressive polynomial of order p with stationary roots

$$\varphi(L) = 1 - \varphi_1 L - \cdots - \varphi_p L^p$$

and the matrix polynomial $D(L)$ is diagonal:

$$D(L) = \text{diag}[d_1(L), d_2(L), \ldots, d_N(L)]$$

with $d_i(L) = 1 - d_{i1} L - \cdots - d_{ip} L^p$ and $\Sigma_{\eta^*} = \text{diag}(\sigma_{\eta^*_1}, \ldots, \sigma_{\eta^*_N})$. The vector $\mathbf{x}_t$ contains the value at time t of k deterministic regressors common to all the series, e.g. trading days and moving holidays regressors, and $\mathbf{B}$ is an N×k matrix of regression coefficients. The disturbances $\eta_t$ and $\eta^*_t$ are mutually uncorrelated at all leads and lags.

3.1 Performance of EuroMIND based on survey data

In order to take into account particular events for better exploiting the characteristics of EuroMIND as powerful tool for the assessment of the economic situation, several
extensions have been envisaged. The first one is the generalization of this model with better forward looking properties, bringing to the production of the EuroMIND-S indicator based on the incorporation, as a separate factor, of surveys data (for details see Frale et al. (2010)).

We concentrate here on EuroMIND-S for its ability to better nowcast the latest monthly evolution of the euro area economy. Reliability of EuroMIND-S is assessed by looking at its revision history. In particular, starting from the first estimate for the 2nd quarter 2010, at the beginning of each quarter τ EuroMIND-S generates nowcasts for its three months, using the quarterly information up to the quarter τ-1 and the information on the monthly indicator up to and including the month of interest. At the same time the estimates concerning the three months of the previous quarter τ-1 are revised and monthly revision errors can be computed for three horizons (one to three months). Until the most recent estimate of EuroMIND-S relative to July 2012, nine sets of revision errors are available which are employed to construct statistics of mean errors (ME), MAE and RMSE.

Table 3 provides statistics of ME, MAE and RMSE for EuroMIND-S revisions over the period 2010q1-2012q2. Revision errors are all computed in terms of growth rates. These results suggest that revisions of EuroMIND-S are rather contained, with the natural conclusion that errors are larger for a three step horizon than one or two steps.

<table>
<thead>
<tr>
<th></th>
<th>1 step</th>
<th>2 steps</th>
<th>3 steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME</td>
<td>0.04</td>
<td>0.01</td>
<td>0.11</td>
</tr>
<tr>
<td>MAE</td>
<td>0.12</td>
<td>0.11</td>
<td>0.15</td>
</tr>
<tr>
<td>RMSE</td>
<td>0.14</td>
<td>0.13</td>
<td>0.17</td>
</tr>
</tbody>
</table>

4 The system of euro area turning points detection

The Eurostat methodology for the construction of a euro area turning points (TP) chronology and a system of coincident TP indicators is the following (for details see Anas et al. (2008)):
1) simultaneous analysis of classical business cycle and growth cycle in the so called ABCD framework;
2) statistical dating of euro area TP by means of a simple non parametric dating rule;
3) comparison of euro area and member states (MS) dating;
4) preliminary investigation of alternative models for the construction of TP composite coincident indicators for classical business cycle and growth cycle, including the identification of appropriate number of regimes and related thresholds;
5) variable selection performed on the basis of the ability of a set of potential candidates series to correctly detect growth cycle TP. For each series a set of transformations is assessed in order to choose the most appropriate one. As a result, five variables have been identified as components of the growth cycle TP composite
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coincident indicator: Employment expectation, Construction confidence indicator, Financial situation of the last 12 months, IPI, Imports of intermediate goods;

6) construction of the growth cycle coincident indicators (GCCI) as a weighted mean of the transition probabilities returned by the five univariate two regimes Markov Switching models fitted on each variable as follows

\[ GCCI_t = \frac{1}{5} \sum_{k=1}^{5} \Pr(\text{Recession})_t^k, \]  

(7)

where \( \Pr(\text{Recession})_t^k \) is the probability that the k-component of the GCCI is in a recession of the growth cycle at time t, with \( k \in \{1,2,3,4,5\} \). An equal weight averaging scheme is used.

For each occurrence, the QPS and Concordance Index are computed as follows:

\[ QPS = \frac{1}{T} \sum_{t=1}^{T} (P_t - RC_t)^2, \]  

(8)

where, for \( t \in \{1, \ldots, T\} \), \( P_t \) is the filtered probability of being in recession, \( RC_t \) is a binary variable that assumes value 1 if \( t \) is a TP of the reference chronology and

\[ CI = \frac{1}{T} \left[ \sum_{t=1}^{T} I_t \times RC_t + \sum_{t=1}^{T} (1 - I_t) \times (1 - RC_t) \right], \]  

(9)

where \( I_t \) is a binary random variable that assumes value 1 if the coincident indicator is in the recessionary phase of the business cycle and 0 otherwise.

7) variable selection has been performed on the basis of the ability of a set of potential candidates series to correctly detect business cycle TP. For each series a set of transformations is assessed in order to choose the most appropriate one. As a result, three variables have been identified as components of the business cycle TP composite coincident indicator (BCCI): IPI, New cars registration and Unemployment rate;

8) construction of BCCI as a weighted mean of the transition probabilities returned by the three univariate three regimes Markov Switching models fitted on each variable as follows:

\[ BCCI_t = \frac{1}{3} \sum_{i=1}^{3} \omega^i \Pr(\text{Recession})_t^i, \]  

(10)

where, by analogy, the variables in (10) follow the same definitions as in (7). The resulting weights are IPI=0.34, Unemployment=0.46, New cars registration=0.20.

For both the GCCI and BCCI the threshold is set to 0.5. In other words values above/below 0.5 indicate a recession/expansionary phase.

In order to enhance the cyclical monitoring of the euro area, several initiatives have been recently undertaken. A first one concerns the extension of the cyclical monitoring also to the acceleration cycle following the \( \alpha \)AB\( \beta \)CD approach. A second one the construction of alternative GCCI and BCCI based on a multivariate Markov Switching approach (see Billio et al. (2011) for more details).
5 Real time monitoring and the early warning system: an overview of the current economic situation

A summary view of more recent economic trends in the euro area is discussed in this section. It is shown how the picture takes clearly advantage by the early estimates of relevant PEEIs and the other instruments presented in previous sections. Official data are improved in terms of timeliness, completeness and the preliminary estimate of turning points.

The early warning system of main euro area PEEIs is shown in Table 4. It consists of two main parts: above there are the more recent trends of quarterly GDP and employment and the monthly data of HICP, producer price index (PPI), IPI, Unemployment rate, the Economic Sentiment Indicator (ESI) and EuroMIND-S. All data are presented in their growth rates, referring to official Eurostat figures complemented by the nowcasts obtained by the methodology of coincident indicators of section 2; below the table presents the summary picture of more recent TP, with details of the provisional dating and TP relative to the multivariate approach.

Table 4: Recent evolution of main euro area PEEIs and its early warning system

<table>
<thead>
<tr>
<th>Economic Cycle</th>
<th>Coincident indicator</th>
<th>Peak</th>
<th>Trough</th>
<th>Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceleration Cycle</td>
<td>Provisional dating</td>
<td>2006 Q1</td>
<td>2008 Q1</td>
<td>2010 Q2</td>
</tr>
<tr>
<td></td>
<td>ACCI</td>
<td>June 2006</td>
<td>March 2009</td>
<td>Dec. 2010</td>
</tr>
<tr>
<td>Growth cycle</td>
<td>Provisional dating</td>
<td>2008 Q1</td>
<td>2009 Q3</td>
<td>2011 Q4</td>
</tr>
<tr>
<td></td>
<td>GCCI</td>
<td>March 2007</td>
<td>July 2009</td>
<td>August 2011</td>
</tr>
<tr>
<td>Classical business cycle</td>
<td>Provisional dating</td>
<td>2008 Q1</td>
<td>2009 Q2</td>
<td>2011 Q4</td>
</tr>
</tbody>
</table>

( ): nowcasts obtained by a bridge modelling approach
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**Table 5: GDP growth by country**

<table>
<thead>
<tr>
<th>Country</th>
<th>2011 q1</th>
<th>2011 q2</th>
<th>2011 q3</th>
<th>2011 q4</th>
<th>2012 q1</th>
<th>2012 q2</th>
<th>2012 q3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>0.8</td>
<td>0.2</td>
<td>0.0</td>
<td>-0.1</td>
<td>0.2</td>
<td>-0.5</td>
<td>0.0(*)</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.6</td>
<td>0.0</td>
<td>-0.3</td>
<td>-0.6</td>
<td>0.2</td>
<td>0.2</td>
<td>0.1(*)</td>
</tr>
<tr>
<td>Spain</td>
<td>0.3</td>
<td>0.2</td>
<td>0.0</td>
<td>-0.5</td>
<td>-0.3</td>
<td>-0.4</td>
<td>-0.5(*)</td>
</tr>
<tr>
<td>Italy</td>
<td>0.1</td>
<td>0.3</td>
<td>-0.2</td>
<td>-0.7</td>
<td>-0.8</td>
<td>-0.8</td>
<td>-0.8(*)</td>
</tr>
<tr>
<td>France</td>
<td>0.9</td>
<td>0.0</td>
<td>0.3</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.1(*)</td>
</tr>
<tr>
<td>Germany</td>
<td>1.2</td>
<td>0.5</td>
<td>0.4</td>
<td>-0.1</td>
<td>0.5</td>
<td>0.3</td>
<td>0.2(*)</td>
</tr>
</tbody>
</table>

(*): nowcasts obtained by a bridge modelling approach

What emerges quite clearly from table 4 is the stagnation of the euro area economy. Concerning GDP, its quarterly growth is close to nil from the second quarter of 2011 on and it is gradually decreasing in the same quarters in terms of annual growth. Note the negative quarterly growth from end 2011 with the exception of stagnation in the first quarter of 2012 for both the official flash estimate and the nowcasts obtained by BM. Looking at Employment the situation is even worse considering a negative growth starting from the third quarter of 2011 and a negative annual variation nowcasted for the third quarter of 2012 at -0.7%. This decline is accompanied by high and constant increasing rates of unemployment above 11% since March 2012.

Annual inflation in the euro area is at 2.6% in September 2012 according to the flash estimate officially released by Eurostat, up from 2.4% and 2.6% recorded respectively in July and August. Similar recovery occurs for the PPI whose annual growth in September 2012 is nowcasted at 2.8%, up from 1.6% and 2.7% of July and August respectively.

Quite interesting appears the evolution of EuroMIND: its estimate for September 2012 reveals a positive annual growth of 0.1% after 6 consecutive negative variations. The growth of EuroMIND over previous month also remains slightly positive to 0.1%, stationary from previous three months. Conversely, for what concerns the ESI released by the European Commission, the perception of the economic situation by producers and consumers remains negative in September 2012: here its value is equal to 85, with a trend constantly down since March 2012.

In table 5 we provide a synthetic picture of GDP quarterly growth by country supplemented by the nowcasts for the third quarter of 2012. Concerning the German economy GDP expectations for the third quarter remains positive to +0.2%, but slightly down from +0.3% recorded in the second quarter. In France the third quarter of 2012 is nowcasted to 0.1, up from nil of second quarter. Concerning Italy the negative trend of 2012 still persists in the third quarter whose GDP nowcast is -0.8% like previous two quarters. Stagnation of the economy invests also Belgium and Netherlands where GDP growth expectations are nil and 0.1% in the third quarter of 2012. Finally, the negative economic evolution of Spain appears confirmed in the third quarter of 2012 when GDP growth decreases of -0.5%, down from -0.4% of previous quarter.

**6 Conclusions**

In this paper we have shown as econometric techniques such as nowcasting, construction of high frequency and cyclical composite indicators can be valuable in
analysing the euro area economic situation, complementing and integrating official statistics and making them more attractive and useful for final users.

Beside an adaption of traditional forecasting techniques to nowcast the current economic evolution, we have presented an innovative scheme, combining the single factor model proposed by Stock and Watson with temporal disaggregation and benchmarking techniques within a state-space framework, to derive reliable monthly macroeconomic figures when they are only available at lower frequency. Finally we have presented an integrated system for turning points detection based on univariate and multivariate Markov switching models able to extract from official statistics, almost in real-time, relevant statistical signals providing a detailed cyclical picture of the economy.

Combining existing official statistics with the results obtained by applying the econometric techniques presented in this paper enables us to design a first draft of a real-time monitoring and early warning system for the Euro area.

This system can help policy makers to take informed decisions and promptly react to the evolution of the economic situation designing effective and timelier economic and monetary policies. It can also enhance the support of official statistics to analysts and forecasters in their daily work.

References