

# **EABCN Workshop**

## **“Using Euro Area Data: Issues and Consequences for Economic Analysis”**

**Cambridge, 26-28 March 2008**

### **SUMMARY**

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This EABCN workshop focused on the role of using real time data in policy making and economic analysis, and methodological issues associated with the aggregation of data across Euro area countries. The workshop, co-organised by the EABCN, the CEPR and the CFAP, was held in Cambridge on 26-28th March 2008. The organisers, **Mardi Dungey**, University of Cambridge, **Kirstin Hubrich**, European Central Bank and **Denise Osborn**, University of Manchester, arranged the programme around six topics: ‘The Role of Data in Policy Making and Modelling’, ‘Benchmark Revisions’, ‘Data Sources and Consequences’, ‘Monetary Policy’ ‘Aggregation and Disaggregation’ and ‘The Consequences of Choosing Different Weights’. Sixteen papers were presented, some focussing on databases, with discussants considering 10 of these papers. The workshop concluded with a general discussion.

The EABCN workshop received a large number of submissions, with many interesting papers unfortunately having to be declined. There were also a significant number of requests, after the deadline, from people who wished to participate.

#### ***Session 1: The Role of Data in Policy Making and Modelling***

**Lucrezia Reichlin** (ECB and CEPR) started the first session by presenting an overview of key projects conducted by the ECB for constructing early estimates of current quarter GDP. She stressed the importance of exploiting the information obtained from indicators in real time in order to construct the early estimates of quarterly GDP. This is despite the fact that the ECB does not use real time data in its models due to lack of availability of such data when the project started. The forecasting (nowcasting) exercises of the Bank can be classified into two categories; short term forecasting based on quantitative analysis, judgmental analysis etc. and medium term forecasting based on structural models. Short run forecasting is very important for the Bank, as it is the only horizon that can be predicted with some confidence. The key idea of the nowcasting exercise of the ECB is the exploitation of data released throughout the quarter (survey data, financial data, etc.) to provide early estimates of quarterly GDP. The traditional tools for combining monthly and quarterly information include bridge equations, or averaging across bridge equations. These tools combine the monthly variables and univariate forecasts of missing monthly observations to form an early estimate of

quarterly GDP. The ECB has implemented a new tool, known as bridging with factors based on Giannone, Reichlin, Small (2005, forthcoming Journal of Monetary Economics). A panel of data (surveys, industrial production,) is aggregated quarterly and a bridge equation is implemented between the quarterly data and unobserved factors. A Kalman filter of the factor model is used to forecast (Doz, Giannone and Reichlin, 2006 and 2007) and estimate the forecast weights of the underlying data (Banbura and Runstler, 2007).

An empirical example highlighted the performance of three different methods: the bridge equations with factors, pool of bridge equations and the currently used ECB bridge equations (Angelini 2008). Using a combination of 85 variables for the period 1998q3-2005q4 showed that bridging with factors gives the best forecast performance, and current ECB models give similar results to factor models only towards the end of the quarter. To contribute to medium term forecasting aims, Reichlin outlined a method that combines short-term/conjectural analysis with structural micro-founded models (Giannone, Monti and Reichlin, 2008). Using an ECB structural model, the timely information coming from monthly releases can be exploited to obtain more accurate forecasts of observable variables and, importantly, real-time estimates for unobserved variables such as the output gap and the natural rate of interest. This method builds on information within a structural model without interfering with the estimation of the structural model and hence is able to improve forecasting and analysis outcomes.

**Dean Croushore** (University of Richmond) presented a paper summarising existing research on real time data analysis. He outlined five categories of research: data revisions, forecasting, monetary policy, macroeconomic research and current analysis. A number of existing datasets were highlighted, including the U.S. real time data set developed in the mid 1990's ([www.philadelphiafed.org/econ/forecast/real-time-data/index.cfm](http://www.philadelphiafed.org/econ/forecast/real-time-data/index.cfm)). The OECD, Bank of England, Bank of Canada and the EABCN also provide real time data sets. Croushore emphasised the importance of institutional support as essential in promoting the use of real time data and the author appreciated the effort of EABCN regarding this. He noted that data revisions arise in a number of ways, and revisions should not be interpreted as criticism of government statistical agencies. In fact, revised data may be better than the earlier releases due to improvements in methodologies. The key issue of concern is whether data revisions are large enough economically to worry about or whether the revisions are just white noise that should be ignored. A striking example provided was real US consumption growth for the second quarter of 1973 as viewed from the perspective of 138 vintages. It clearly showed that data revisions could be highly significant both in short and long horizons and might have an effect on forecasting, current analysis and macroeconomic research. Croushore suggested that a good rule of thumb is that forecast evaluations should focus on early releases of the data, or the last vintage of the data after a forecast is made, but prior to a benchmark revision that changes the base year or redefines variables. Real time data has important implications for monetary policy. Revisions to indicators such as core PCE inflation rate are substantial and could lead the Fed to misleading conclusions (Croushore 2008). An interesting result from Bernanke-Boivin (2003) suggests that using factor models will wash out the effects of revisions.

Macroeconomic research is also potentially affected by data revisions. Croushore-Stark (2003) analyses how results from key macro studies are affected by alternative vintages. This literature is in its infancy with more work needed in examining the robustness of research results, incorporating data revisions into macro models and examining how or whether data revisions affect economic activity.

**Katarina Juselius** (University of Copenhagen) presented a paper written jointly with Andreas Beyer (ECB). A key issue in empirical studies for the Euro zone area is the creation of aggregated data for the period prior to the formation of the single currency. Four main aggregation methods exist in practice; summing the levels or the growth rates of variables using fixed or variable weights. By comparing aggregates calculated using different methods, the paper shows that the effect of different aggregation methods on inference is not always dramatic, but the base year should be chosen to be not too far from purchasing power parity. One issue is that purchasing power parity will not be satisfied for all individual countries at the same time and therefore the authors suggest aggregation should be done recursively. The paper shows that nominal GDP weights are preferable to real GDP weights in practice. Using a three-country example, the authors show why the choice of base year matters for the real GDP weights in Beyer, Doornik and Hendry (2000,2001). Under the assumption that the absolute prices of a basket of goods are known, weights should be calculated from nominal income weighted by nominal exchange rates under a flexible exchange rate regime or by relative prices translated into a common currency in a fixed exchange rate regime. The paper illustrates how the real GDP weights are affected by the choice of different base years assuming either fixed or flexible weights and the results are compared with the case when the weights are based on nominal rather than real GDP. Although the aggregation methods may produce apparently similar aggregate values, the deviations can be highly persistent and therefore may influence the cointegration properties of empirical models. The authors test this by looking at the cointegration properties of the Euro area model in Coenen and Vega (2001) using data based on the four different aggregation methods. The results show that while 3 of the 4 aggregation methods give similar results, the other deviates significantly. The differing measure is one in which the purchasing power parity of Italy relative to other member states is unlikely to be satisfied, illustrating the importance of choosing a base year for aggregation without significant deviations from purchasing power parity.

**Mardi Dungey** (University of Cambridge) discussed this paper. She started by pointing out that the paper is very much in line with the main motivation of the conference; that is how one can get a sensible set of data to do research on the Euro Area. One question posed by the discussant was whether using nominal GDP weights to aggregate financial markets data like interest rates and inflation would be sensible. Would it be realistic to have a world interest based on the weights of top five economies by GDP? An alternative method is suggested by Bruggemann and Lutkepohl, who use German weights as an indicator for the pre unification period interest rate. In practice researchers

typically use one set of data for many purposes, so that the problem of identifying the correct data set becomes an issue. The Beyer and Juselius paper suggests that the differences that occur due to different aggregation methods may not matter for macroeconomic relationships. However, the problem is similar to inducing a moving average error term by using annualized inflation rates instead of quarterly rates and we need to check whether the errors are an I(1) process or not. However, detecting an I(1) process in errors is usually an indication of a missing cointegration relationship and not an error created from the incorrect weighting method etc. Therefore the diagnosis of the real cause for such an error could be difficult in practice.

## ***Session 2: Benchmark Revisions***

**Vincent Labhard** (ECB) started the second session by presenting a paper written with Alistair Cunningham (Bank of England), Jana Eklund (Bank of England), Christopher Jeffery (Bank of England) and George Kapetanios (Bank of England and Queen Mary University). The paper describes a formal state-space model that may be used to extract the signal from uncertain data. The fact that most macroeconomic data are estimates rather than perfect measures creates uncertainty, and thus may provide the motivation for central banks to obtain an estimate of the 'true' data. Data revisions can be considered as one possible symptom of this uncertainty. As illustrated by means of data for UK real GDP growth, revisions may be large relative to the variance in published data, and may be partially predictable (as shown also by Garratt and Vahey 2006). The model presented in the paper uses past revisions to proxy the uncertainty surrounding the latest vintage of the official data published by the Office for National Statistics. The model's output provides an estimate of the true value of the variable of interest and may also be used as a cross-check of the latest published data. The estimation strategy involves two steps; a first step in which patterns in revisions are used to estimate bias, heteroskedasticity, serial correlation and correlation with economic activity and a second step in which the Kalman filter is used to estimate the law of motion of the unobservable 'true' data, as well as the mapping of those data to observed real GDP growth and alternative indicators. The model is tested using quarterly UK real investment growth. The paper shows that the errors attached to the model estimates are smaller than the errors attached to the official published estimates. This finding suggests that systematic patterns in revisions may be exploited to reduce the uncertainty associated with the latest published estimates.

**Sylvia Kaufmann** (Austrian Central Bank) discussed the paper. After discussing the technical details of the model she raised some issues to be considered. With regards to the discussion on news vs. noise in the paper, she pointed out that the method used is conditioned on the reporting definitions and compilation methods. Therefore with benchmark revisions for example the model may encounter some problems. The model can be considered as modelling news, not the noise. She suggested that proxying the revision with measurement errors in the model is not very intuitive and needs clarification.

Another suggestion was to consider model based estimates or a relatively unrevised index to improve the estimate of the released data. Finally as a suggestion for future work, she suggested the use of the covariance structure on previous revisions as a Bayesian prior input.

**Thomas Knetsch** (Deutsche Bundesbank) presented a paper jointly authored with Hans-Eggert Reimers (Hochschule Wismar). The paper is a study on the impact of benchmark revisions on the analysis of regular revisions. Data revisions can be divided into two categories; regular revisions and benchmark revisions. Revision analysis in practice means detecting empirical characteristics of regular revisions which require a correction for benchmark revisions as a prior step. Benchmark revisions could be in the form of changes in sector classifications, base year conversions and changes in index formula. The paper investigates base year conversions as a form of benchmark revision and assesses the importance of this on real time data by looking at the heterogeneity of the German production index and orders statistics across different vintages. A new survey method introduced in 1999 has divided the sample of the production survey into mutually exclusive quarterly and monthly reporting firms, resulting in a standardized publication scheme involving four releases of the data. The authors find that the detrimental impact of benchmark revisions is less important in growth rates compared with level series. Therefore a common method to eliminate the problem caused by benchmark revisions is to use first differences of the data. However in cointegration analysis differencing may be inappropriate. Other methods used in the literature are rebasing and regression (Patterson and Heravi, 1991). The authors use affine vintage transformation functions estimated by cointegration regressions and show that the estimated vintage transformation functions modelling the changeover to base year 2000 are significantly different for production and orders, altering the estimation of the long run relationship between the two variables. They also show that the benchmark revision does not meet the condition needed for rebasing and differencing and hence conclude that the impact of benchmark revisions is often rather complex, suggesting differencing and rebasing are not advisable.

**Kevin Lee** (University of Leicester) discussed the paper. As a possible second stage to the analysis presented in the paper, the discussant used a bivariate VAR model that uses the first release of the data together with its revision, hence assuming only one revision. The model represented a joint model of actual and revised output series. He concluded by pointing out that the first-stage analysis to accommodate benchmark revisions is essential and the regression approach is superior to rebasing. Failure to incorporate this generates misspecification in time series analysis of both separate series and joint analyses. Finally, series that are purged of benchmark revision still require regular revisions to be modelled for use in nowcasting/forecasting.

### ***Session 3: Data Sources and Consequences***

**Roberto Barcellan** (Eurostat) started the next session by presenting a paper that describes how some selected key short term European indicators are

compiled and how Eurostat has dealt with issues like seasonal adjustment, exchange rates conversion, enlargement effects and revision policy in compiling these indicators. The indicators analysed in the paper are the quarterly GDP, quarterly accounts for institutional sectors, the Harmonised Index of Consumer Price and the Industrial Production Index. The process of improving the quality and availability of European key short-term indicators has been initiated by the European Commission and Eurostat, the main objective being the construction of timely and reliable data set for the Principal European Economic Indicators (PEEI). A quarterly GDP series for the Euro Area is constructed using a sophisticated aggregation method. The information used includes the annual European totals obtained through summation of Member States figures and the quarterly figures of those Member States for which the data are available. The Euro Area data is carried out using a temporal disaggregation method. This breaks down the known complete annual EU aggregate into quarterly figures using the sum of the partially available quarterly country data as an indicator. This is an efficient method since it uses all information available (quarterly and annual) at the time of the estimation. Seasonal adjustment of European series is done by estimating the seasonally adjusted series from seasonally adjusted Member States data. Revision policy is based on three releases each quarter. In case of Euro area enlargement, the policy of Eurostat is to disseminate the time series for the Euro area in its more recent composition. Quarterly accounts for institutional sectors are estimated by building up the Euro area aggregates by estimating missing countries, estimating and adding the institutional accounts for the European Institutions, estimating the rest of the world sector and finally aligning to other major datasets. The Industrial Production Index for total industry for the Euro area is compiled as a weighted average of national IPI indices for Euro area Member States. Seasonal adjustment is based on the working day corrected series provided by the Member States.

**Domenico Giannone** (ECB, ECARES and CEPR) presented a paper written together with Jerome Henry (ECB), Magdalena Lalik (ECB) and Michele Modugno (ECARES). The paper is a first outcome of a project to construct a real time database for the Euro area that is sponsored by EACBN. The project is also being used as a pilot case study for designing real time datasets for individual countries in the Euro area. The data set is constructed through the collection of monthly vintages of the Area Wide macroeconomic data underlying the ECB Monthly Bulletin. It includes the historical record of the summary information supplied to the public each month via the Monthly Bulletin, to the ECB Governing Council at its first meeting of any given month. The database is currently available to EACBN fellows ([www.eabcn.org](http://www.eabcn.org)) and will be available to public soon. It is updated every three months. Data coverage includes monthly vintages collected each month from the start of the monetary union for 38 key macroeconomic time series organized by vintages and by variables as well as monthly vintages collected each month since 2001 for 230 macroeconomic time series organized by vintages only. The data is collected according to the concepts as presented in the Monthly Bulletin in a given month. Regarding the revisions the paper proxies the final data by the data released 2 years after the reference period. International comparison of the size of the revisions (standardized by GDP volatility) for US and EU shows

that the standard errors of the revisions in US are relatively higher than that of EU.

**Magdalena Lalik** (ECB) provided an interactive overview of the properties of the Statistical Data Warehouse developed by the ECB that can be reached through the link (<http://sdw.ecb.europa.eu/>). SDW is a user-friendly database with many features and functionalities such as graphing the data, filtering, reporting and exporting the data in various formats. These functionalities can also be used with the real time data set that is under construction by the ECB and will be available to public soon.

**Emmanuelle Guidetti** (OECD) presented an overview of the real time database provided by the OECD and its applications to the Euro area. The database can be reached through the link (<http://stats.oecd.org/mei/default.asp?rev=1>). The dataset provides access to time series data for 21 key economic variables as originally published in each monthly edition of the MEI from February 1999 onwards with a user-friendly format. Data for all OECD countries, the Euro area, China, India, Brazil, South Africa and the Russian Federation are available. Automated programs to perform revisions analysis are also provided. The motivation is to enable economists to perform real-time data analysis of econometric models and statisticians to study the magnitude and direction of subsequent revisions to published statistics. It originated as a response to the needs of EABCN regarding real time datasets.

**Rosa Ruggeri Cannata** (Eurostat) presented a paper written together with Gian Luigi Mazzi (Eurostat). The paper presents the Eurostat's PEEIs Real Time Database that has been developed from daily snapshots of the Euro-IND database, with the objective of constructing a historical database containing all Member States, Euro area and European Union aggregates in an indexed catalogue of vintages for the most relevant macroeconomic variables. The Euro-IND database is an outcome of the Euro-SICS project, launched by Eurostat in 1999 and mainly based on PEEIs, integrated and completed by some monetary and financial indicators as well as business and consumer surveys. It covers 46 geographical entities and contains more than 55000 time series by the end of January 2008. Eurostat aims to build a complete database containing all vintages from the 16<sup>th</sup> November 2000 onwards and the part of the database that was already processed could be released in the coming months. The paper provided several analyses such as the timeliness and revisions of an indicator as well as some real time simulations in order to give an idea of an assessment of the quality of data in hand. The new PEEIs real time database will constitute a major improvement for the European Statistical System since it contains historical information on a large set of macroeconomic indicators for all European Union Member states and European aggregates.

**Heinz Christian Dieden** (ECB) discussed the paper. The PEEIs are very important from the ECB's perspective. As of 2008 the scope, timeliness and quality of the existing PEEIs are under review and new housing indicators on

prices and activity/sales are one area that has been suggested for further development. Eurostat's PEEI Real-Time Database is comprehensive, reliable and regularly updated; once publicly available, such a "Quality stamped" product by Eurostat could serve as a general data source and, as such, avoid redundancies and inconsistencies across different user applications. It is not however clear as to what sort of metadata will be included in the dataset. A comment concerned the timeliness of the data, in particular to identify the exact timing of the handling of the releases by different countries. One issue regarding the content of the real time database is the use of opinion surveys that are by definition not revised in a real time database. Timely preparation for the inclusion of new or potential PEEIs in this real-time database is necessary. Currently, there seems to be no information included on data flags such as final, estimated, revised etc.

#### ***Session 4: Monetary Policy***

**Jan Egbert Sturm** (KOF Swiss Economic Institute and CESifo) presented a paper written with Timo Wollmershauser (IFO Institute for Economic Research and CESifo). The paper investigates the adequacy of the single monetary policy for each of the European Monetary Union (EMU) members by using the asymmetries in inflation and cyclical output developments across countries. The analysis is carried out through an estimation of a "modified" forward looking Taylor rule for the Euro area that proxies real economic development by growth rates instead of output levels. The difference between the actual monetary policy implemented by the ECB and the monetary policy preferred by individual member countries is likely to cause monetary stress. Therefore a stress in a monetary system occurs when a central bank is unable to set its policy instrument optimally. The authors define a country specific monetary stress as the gap between the optimal area wide interest rate and the optimal interest rate that would prevail in a country if it was able to follow a country specific interest rate policy. Given that the individual countries have voting power within the ECB, they will put political pressure on ECB to change its policies in their favour. The paper includes estimates of a Taylor rule for the actual interest rate policy of the ECB during the period 1999-2006, and subsequent analysis of indicators for business cycle convergence in the Euro area and measurement of the actual implicit political representation in the ECB. The paper also sheds some light on whether the Euro area is an optimal currency area. To overcome the problem posed by the non-existence of data on national monetary policy during 1999-2006 the authors assume that all EMU member countries prefer the preference parameters implied by the ECB and the national central banks would implement a similar policy rule as the ECB. Overall, the actual monetary policy of the ECB seems to have been rather appropriate for countries like Austria, Belgium, France and Italy. Stress levels vary considerably across the EMU countries and this variation is also time varying. Whether or not business cycles are converging for the Euro area as a whole since 1999 depends on the weighting scheme imposed on the decision-making process within the ECB Governing Council.



**Refet Gurkaynak** (Bilkent University and CEPR) discussed the paper. He pointed out that convergence could be defined in two ways: convergence in business cycles and convergence in transmission mechanisms. Given the second definition the short-term interest rate set by the ECB should also imply same set of 2 year and 5 year interest rates across the individual countries within the EMU. Evidence shows that financial market convergence has been remarkable (Ehrmann, Fratzscher, Gürkaynak and Swanson, ECB2007). Some issues were raised regarding the model assumption that individual countries have the same set of structural preference parameters and shock parameters and therefore would implement the same monetary rules had there been no ECB. Another issue raised was on the ambiguity of welfare metric to evaluate the size of the cost. One suggestion was to look at how the results differ if countries had used Taylor rules from before EMU. The discussant pointed out that the sample size is not long enough to capture a full business cycle. Finally it is known that Central Banks are better at forecasting than the private sector, therefore the use of private consensus forecasts data (Consensus Inc.) in a Taylor rule shouldn't mean that these are the forecasts underlying Central Bank's decision making process.

**David Papell** (University of Houston) presented a paper written together with Alex Nikolsko-Rzhevskyy (University of Houston) and Tanya Molodtsova (University of Houston) concerned with the out of sample predictability of the Euro/Dollar exchange rate. The novelties of the paper include the use of Taylor rule fundamentals to forecast exchange rate as opposed to traditional methods (Monetary, PPP, Interest Rate Parity) and the use of real time data as opposed to revised data. The paper aims to provide answers to questions as to whether Taylor Rules provide a reasonable approximation of interest rate setting in the U.S. and Euro Area, whether the models with Taylor rule fundamentals provide evidence of Euro/USD exchange rate predictability and whether the evidence of predictability come from Taylor rule fundamentals, as opposed to either inflation or the output gap. The authors use quarterly real time data for the U.S and Euro Area to analyze whether the variables that normally enter central banks' interest rate setting rules, can provide evidence of out of sample predictability for the US Dollar/Euro exchange rate from the inception of the Euro in 1999 till the end of 2007. For each forecasting equation, the authors use 34 quarters to estimate the historical relationship between the Taylor rule fundamentals and the change in the exchange rate. The estimated coefficients are then used to forecast the exchange rate one quarter ahead. The results suggest evidence in favour of predictability with Taylor rule fundamentals for a wide variety of specifications that include inflation and a measure of real economic activity. The evidence is stronger for real time data than revised data. However the evidence is only found for specifications that exclude real exchange rate in the forecasting equation.

**Luisa Corrado** (University of Cambridge) discussed the paper. An issue was raised about the homogeneity assumption in the paper regarding the weights that Central Banks attach to inflation and output gap in their Taylor rule specifications. The discussant pointed out that the FED cares more about output gap than the ECB and hence this violates the homogeneity assumption. The coefficients that are attached to FED and ECB Taylor rules

are also time varying. Orphanides (JME, 2003) points out that there is an important informational problem as both inflation and output gap are measured with noise. Therefore the policy-maker's real-time observed inflation and output may differ from the true inflation and output gap. In fact, noisy data make the linear response of the exchange rate to fundamentals also subject to noise, which may affect the results in the paper. An alternative forecasting model would account for the reaction to the noise process. A suggestion offered by the discussant is to derive bootstrapped critical values to check for the robustness of the test statistics when the data are observed with noise.

### ***Session 5: Aggregation and Disaggregation***

**Helmut Lütkepohl** (EUI) presented a paper written together with Ralf Brüggemann (Universität Konstanz) and Massimiliano Marcellino (Università Bocconi, CEPR). Their motivation is to overcome some of the problems posed by using synthetic pre-EMU data constructed by aggregating individual country data. The problems associated with such approach include missing data for some member countries, the use of different seasonal adjustment procedures in different countries, the choice of aggregation method, as well as possible structural breaks caused by the adjustment process in some countries during the run-up to EMU. The paper suggests an alternative method by combining German data until 1998 with EMU data from 1999 onwards, given that Germany had roughly satisfied the Maastricht criteria when conditions were announced and hence no substantial adjustment processes was necessary. The validity of using German data is tested through a forecasting exercise to test whether Euro area variables can be forecast better by using just data from Germany for the pre-Euro period. Forecast models include linear and nonlinear (time-varying) univariate models and are based on quarterly data for the period 1970Q1-2003Q4. Using a range of different forecasting methods prevents the bias that may occur from selecting a bad model. By comparing the out of sample forecasts for different forecasting equations the authors conclude that real variables as well as some nominal and financial variables are better forecast by using synthetic European data for the pre-EMU period. However, the results also suggest that variables which have a similar level for Germany and the Euro area (such as prices) are better forecast using German pre-EMU data, suggesting that this data may be useful for studying economic problems in the Euro area.

**Michael Clements** (University of Warwick) discussed the paper. The main motivation for out-of-sample forecast comparisons over historical periods is to use them as a guide as to which model might be best for real forecasting. Given that one model and data combination produces results that are statistically more accurate than another, it is likely that this will be so in the future. However the discussant pointed out that such motivation would not work here, as the past contains German unification and EMU, so is unlikely to be a good guide as to the future. Given the motivation of the paper is to determine which data is suitable for economic analysis by investigating the forecast performance of models it would be useful to look at bivariate

forecasting models. However, a good forecast performance does not necessarily mean a good model since forecasting performance may not in fact be a good metric for evaluating models in general. The discussant also suggested forecasting by taking averages over models of the same type but with different specifications.

**Heather Anderson** (Australian National University) presented a paper written together with Mardi Dungey (University of Cambridge), Denise Osborn (University of Manchester) and Farshid Vahid (Australian National University). The paper proposes a new methodology, based on the historical distance from monetary integration between core and periphery countries, for producing backdated monetary and financial series for the Euro Area. The key challenge is to be able to account for the formation and evolution of the European Monetary Union (EMU). The methodology adopted is based on weighting country specific financial series according to their distance from monetary integration, as well as their relative "importance" in the EMU. Current methodologies for aggregating Euro data include cross country aggregation methods and representative country methods. The AWM database constructed by the ECB is an example of the first methodology. The disadvantages of AWM database include the assumptions of economic homogeneity across all countries and constant real exchange rates as well as the underweights /overweights of the contribution of the core/periphery countries during the early part of the sample. Using German data as representative of the Euro area for pre 1999 part of the sample is an example of the second methodology (Brüggemann and Lütkepohl 2006). The disadvantage of this method is that it overweighs Germany during the early part of the sample and involves a need to account for structural change. Rather than employing constant weights, the authors propose a method based on sliding weights to represent the convergence of exchange rates in periphery countries to their irrevocable weights during the development of the current Euro Area. They use a simple SVAR model of the Euro Area and a two country DSGE model for the US and the Euro Area to demonstrate that the results differ substantially when using their data rather than the AWM dataset.

**Andreas Beyer** (ECB) discussed this paper. The discussant suggested that the paper include more robustness checks and reference points to justify the methodology in order to convince existing users to use this new data set. The motivation of the paper is to construct new aggregates using sliding weights. However, using Germany and Italy as an extreme example, the method proposed does not show convergence. The choice of the extent of sliding is an important issue, requiring greater sensitivity analysis and robustness checks. The discussant concluded that sliding weights are an interesting idea but felt that more convincing evidence was needed.

### ***Session 6: The Consequence of Choosing Different Weights***

**Roberto Golinelli** (University of Bologna) presented a paper written together with Guido Bulligan (Banca d'Italia) and Giuseppe Parigi (Banca d'Italia). The paper analyzes the performance of alternative forecasting methods in predicting the index of industrial production (IPI) in Italy from one to three months ahead using twelve different models and alternative estimation windows. The models used include ARIMA models and dynamic factor models. Forecasting methods are defined through combinations of three sets of options; the degree of model complexity, the estimation window and the length of the estimation window. Results show that indicator information matters in forecasting (Bridge Models and Factor Models outperform ARIMA and ARDL models) suggesting that the short run indicator signal always dominates the noise component. IPI forecasts from multiple equation Bridge Models are often significantly better than those from single equation Bridge Models. Bridge Models significantly outperform Factor Models in efficiency. The use of real-time data sets does not alter this ranking. However, the relevance of the issue depends on the amount and number of revisions e.g. Italian (raw) indicators are not revised; and IPI revisions are not particularly deep. The vintage effect does not appear to alter the ranking of the forecasting methods emerging from the baseline results, where latest available data are used.

**Matteo Ciccarelli** (ECB) discussed this paper. An issue was raised about the revisions regarding the Industrial Production data. The authors claimed in the paper that industrial production is not subject to heavy revisions and hence the use of real time data sets does not alter the ranking among different forecasting methods. However the plot of the revised data against the real time data points to some significant differences that could arise at different points in time and hence forecasting results may depend on the chosen sample. Models are estimated in levels and it is not clear how benchmark revisions are treated in the estimations. In the paper the model estimates refer to raw data but results on forecasting performance are based on seasonally adjusted data, potentially affecting the comparison of the results. The discussant suggested using bivariate VAR models as an extension and showing the performance of the models compared with the existing literature.

**Johannes Mayr** (Ifo Institute for Economic Research) presented a paper jointly authored with Oliver Huslewig (Ifo Institute for Economic Research) and Timo Wollmershauser (Ifo Institute for Economic Research). Short-term forecasts of real GDP in the Euro area are frequently derived by employing autoregressive distributed lag models (ADL) based on business cycle indicators and these indicators are collected on a national level by national statistical agencies or national survey institutes. There are two choices for an optimal use of the national information in predicting the area wide variable of interest: pooling of forecasts (multi equation approaches) and pooling of information (single equation approaches). This paper proposes a new method to pool the information contained in national indicator series to a single Euro area wide indicator by employing a weighting scheme that minimizes the variance of the out-of-sample forecast error for Euro area real GDP growth. By allowing a pre-aggregation of individual information to national indicator series, the optimal pooling of information problem is reduced to a manageable number of variables and thus avoids the construction of a "super model"

whose computation is often deemed to be prohibitively costly or even impossible. The data set used for the Euro area comprises real GDP that is collected area wide and for the member states, and business cycle indicators for the sample period from 1990Q1 to 2007Q2. The authors generate quarterly forecasts of Euro area real GDP by estimating ADL models for each business-cycle indicator (ESI, ECI and WES) recursively over the forecast sample from 1999Q4 to 2006Q2. They compare the forecast performance of the newly generated area-wide indicator to the area-wide indicator published by the agencies. The authors conclude that the optimal pooling of information approach yields new area-wide indicators that improve forecast accuracy regarding Euro area real GDP by 20% compared to the published indicators.

**Antonio Espasa** (Universidad Carlos III de Madrid) discussed this paper and raised questions concerning the adequacy of evidence provided in favour of the new method. Drawing on material in the paper (Table 6) he queried whether the better forecasting performance was truly evident. A further issue concerns the weights generated in the paper; specifically the interpretation of the weights, the stability of the weights and the training period used in estimation to obtain the weights. Additionally it would be of interest to extend the forecast horizon and consider the effect on the weights.