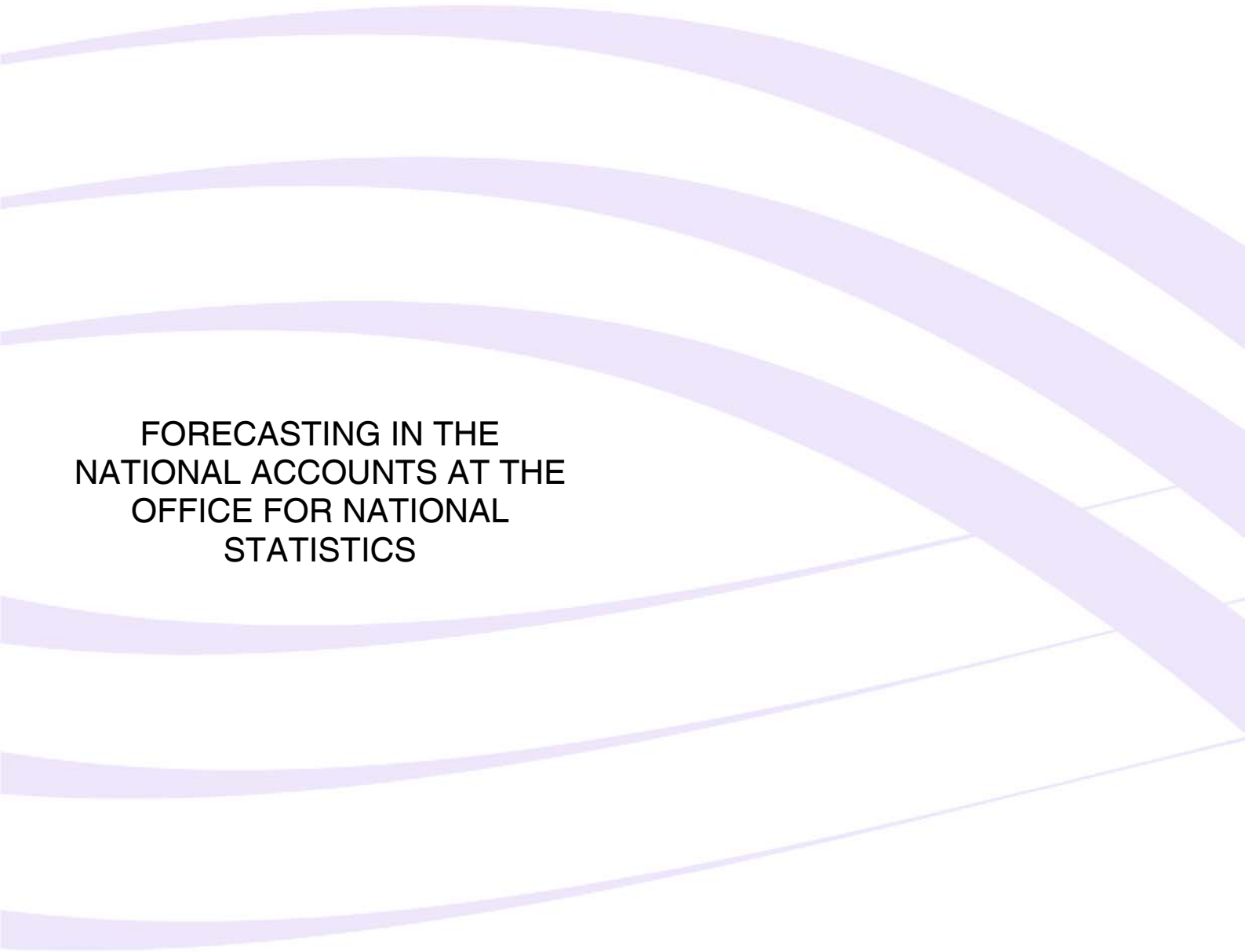


Statistics Commission



**FORECASTING IN THE
NATIONAL ACCOUNTS AT THE
OFFICE FOR NATIONAL
STATISTICS**

**Statistics Commission Report No 12
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Statistics Commission

Statistics Commission Report No. 12

Forecasting in the National Accounts at the Office for National Statistics

**A report of the Statistics Commission,
with an annex prepared by
Professor David Hendry and Dr Michael Clements**

Statistics Commission
10 Great George Street
London
SW1P 3AE
020 7273 8008
www.statscom.org.uk

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Statistics Commission

FORECASTING IN THE NATIONAL ACCOUNTS AT THE OFFICE FOR NATIONAL STATISTICS

Commission's Findings and Recommendations

The Commission has undertaken a research project, in the form of a scoping study, into forecasting in the National Accounts at the Office for National Statistics. The Commission has accepted the recommendations of the scoping study. The following summarises the main findings and recommendations arising both directly from the scoping study, and also from the Commission's own considerations further to the report of the scoping study. The two findings and first three recommendations emanate from the scoping study; the remaining three recommendations arise from the Commission's deliberations.

FINDINGS

The Role of Forecasting

1. Forecasting plays an essential role in the production of timely estimates of aggregate variables and the Commission endorses the ONS use of forecasting methods to this end.
2. The ONS is to be commended for the willingness with which they have used forecasting methods to produce estimates of GDP very promptly.

RECOMMENDATIONS

Forecast Monitoring

1. Given the importance of forecasting as part of the process of data production the Commission believes it desirable that a part of the resources recently made available to ONS should be devoted to the regular monitoring of the performance of these forecasts.
2. Similarly, the Commission recommends that the redesign of IT systems be carried out bearing in mind that forecasting and the monitoring of forecasts is an essential part of ONS work.

User Needs and User Interaction

3. Communication between ONS and users about the role of forecasting in the production of data could be improved. This would be likely to lead to increased user interaction which may be of benefit to ONS.
4. ONS press releases should be redesigned to provide information on forecasts where appropriate. The announcement by the ONS that the Index of

Production (IoP) estimate will be shown in future GDP first press releases is to be welcomed but ONS should also consider whether more information could be released on the service sector data available at the time of the GDP first release.

5. Where forecasting models are used to produce estimates of numbers which are subsequently published the models, such as the one used to calculate the IoP estimate included with the preliminary GDP estimate, should be made available to the public, with full details of the parameters used, so that the public can anticipate and reproduce the forecasts.

Timeliness of Data

6. As part of their regular review process, ONS should consider whether and how far greater use of forecasting methods can provide acceptable data on a faster timescale.

Introduction

1. This paper is based on the *Report of a Scoping Study of Forecasting in the National Accounts at the Office for National Statistics* (Annex A) produced by Professor David Hendry of Nuffield College, Oxford and Dr Michael Clements of Warwick University though it does incorporate the results of subsequent consideration of the report by the Statistics Commission.

Background

2. The ONS is under increasing pressure to produce estimates of variables such as GDP promptly. The ONS is one of the best-performing statistics offices in Europe in this respect, producing estimates of quarterly GDP within 25 days of the end of each quarter. Only the USA matches this timing, typically publishing within a few days of the UK. No other country publishes anything like this quickly.
3. The production of prompt estimates requires forecasts of those components for which information is slow to accrue. In this context, the term 'nowcasting' is in use to describe the process of short-term forecasting to fill gaps in the data though this report will continue to use the term forecasting. The Commission had a number of concerns that arose mainly because forecasting is not traditionally associated with statistical production and because ONS does not publish details of its forecasts.
4. Initial discussions with ONS showed that a great deal of forecasting/nowcasting took place. It was consequently decided to restrict the study to National Accounts (excluding regional accounts), and a scoping study would be carried out to see if a more substantive study would be required.

Particular issues of interest

5. The Commission had a number of issues that it wanted the study to address *viz.*
 - the adequacy of ONS monitoring of its forecasts/forecasting methods;
 - the strength of interaction with forecasters external to ONS as measured by:
 - i) the extent to which ONS keeps abreast of methods used by other forecasters;
 - ii) whether, or in what circumstances, ONS forecasts should be made public;
 - whether there are seasonal adjustments implicit in the forecasting techniques used. Are these different from the methods used for adjusting published data? If so, is the difference in methodology of consequence?

- the quality of the available documentation;
 - whether there are indications that a knowledge of the statistical properties of forecasting methods would help the ONS and the public quantify the reliability of early ONS estimates.
6. The Commission had an additional interest in assessing the value of surveys of economic activity in gauging changes in GDP. In particular, NTC had produced a report [1] which claimed that their Purchasing Managers' Index could be used to produce better estimates of changes in GDP than the first ONS estimate.

Objectives of scoping study

7. The study had the following objectives:
- describe the extent to which ONS uses forecasting methods in the estimation of National Accounts data;
 - make an assessment of the particular issues of interest;
 - recommend in the light of the assessment whether a more substantive study would be warranted;
 - give a preliminary view, taking the NTC report as an example, of the value of surveys that try to gauge economic activity without obtaining precise measures of such activity, in providing early estimates of changes in GDP. Outline, if warranted, a plan for future work.

Method of working of scoping study

8. The contractors were initially supplied with information by ONS in the form of a collection of papers 'Documentation for the review of forecasting in the UK National Accounts'. This was a collection of both internal and externally published papers.
9. Subsequently, a meeting was held between the contractors and the director of the National Accounts Group (NAG) as well as the lead methodologist on time series analysis, and four other statisticians from National Accounts. The emphasis of the study is on forecasting issues relating to the production of the preliminary estimate of quarterly GDP this being the main area within National Accounts where forecasting takes place.

Current forecasting situation at ONS

10. Currently, it is apparent that the philosophy of NAG is that of 'plugging gaps' when data are unavailable. There is a clear preference for finding a timely data source that provides a measure of the component that is required rather than expending resources in an attempt to find more accurate forecasts. When forecasting is utilised, it is based either on a version of a Holt-Winters or an ARIMA model. Of course, the use of seasonally-adjusted data or the

seasonal adjustment of unadjusted data, is in itself, an application of forecasting. The missing components of the preliminary estimate of quarterly GDP vary from quarter to quarter. At present about 45% of the estimate is information based. There is little interest in using different methods eg. multivariate approaches, use of proxies as explanatory variables and the current systems inhibit experimentation. Monitoring of forecasts is on an *ad hoc* basis rather than systematic. The National Accounts Re-engineering Project (NA REP) is currently underway. This is due to be completed in March 2006, and will lead to much improved systems.

11. Training in time series methods is provided by a one-day course on the time-series functions used in the internal package WinCSDB though only a quarter of relevant staff have attended to date. The Time Series Analysis Branch (TSAB) also provide a level of support and training. ONS staff keep abreast of methods used by other forecasters mainly through by having close links with some other central statistical agencies, and through attendance at conferences.
12. Current documentation of operating procedures is fair. The publication *United Kingdom National Accounts, Concepts, Sources and Methods* [2].provides a reference document though it is not completely comprehensive. It should be noted that the Standards and Guidance in NAG project (STaG), with a delivery date of March 2004, will provide a framework for the statistical standards of all staff, and should lead to improved documentation and dissemination of knowledge across staff. The quarterly press release for preliminary GDP does not include any figure that would indicate what component of the preliminary estimate is information based ; such a calculation is said by ONS to be resource intensive. The release does indicate however the source of the data by sector including references to the use of estimation. Whilst information on methodology and information content of GDP is not published on a regular basis, articles are published from time to time invariably in *Economic Trends*.
13. Whilst there are areas whereby forecasting could be improved, the current situation is not one that would justify, at the moment, a more substantive study.

Scoping study's views on forecasting

14. The researchers' thesis is that the goal is to produce the most reliable preliminary data that are feasible given the available information, the time constraints and the resources available. They believe that this can be potentially achieved through three initiatives:
 - use of multiple predictors. It is in the nature of forecasting that unanticipated shifts in time series behaviour will occur, and some models will be less affected by such changes relative to others. It has been shown that averaging across models can lead to improved accuracy;
 - use of proxy information. At present, percentage changes in proxy variables are often directly used to provide a direct estimate of the percentage changes in components for which forecasts are required. It

may be better to consider including the proxy variable as an explanatory variable in a model for the variable to be forecast;

- use of survey information. Claims have been made that the Purchasing Managers Index (PMI) could produce more reliable estimates of GDP than the preliminary result produced by ONS. Other similar surveys exist. Consideration needs to be given as to whether such surveys could be utilised either as an additional 'multiple predictor' or just to help 'plug the gaps'.
15. The above approaches require careful monitoring and evaluation. As already noted, the facilities to do such monitoring are not in place at the moment though obviously the NA REP should incorporate the flexibility to handle these suggestions. It may be that a pilot study on a segment of the NA could be carried out in order to assess the value of a broader approach to forecasting.

Scoping study's findings and recommendations

16. The following findings relate to the particular issues of interest identified by the Commission in paragraphs 5 and 6 above:
- *ONS monitoring of forecasts and methods*: this could be enhanced. It would require greater resource inputs;
 - *Strength of interaction with external forecasters (keeping abreast of methods used by other forecasters)*: this could be improved by more extensive continuing professional development, perhaps by wider use of outside experts;
 - *Strength of interaction with external forecasters (making ONS forecasts public)*: this depends on what aspects are under consideration. This is a question that the ONS and Statistics Commission might usefully reflect upon taking into account the views of users of ONS statistics. As a minimum, broad brush estimates of the extent of missing data should be helpful;
 - *Use of seasonal adjustment*: seasonal adjustment procedures are in use, and may entail contradictions with other adjustments, but seem unlikely to be the key problem to improved accuracy of preliminary data;
 - *Quality of documentation*: this is fair, and is improving;
 - *Usefulness of public and ONS having knowledge of statistical properties of forecasting methods*: the contractors believe it definitely would help, but view this as a long term objective, partly dependent on experts taking the trouble to communicate with the public;

- *Value of NTC's report:* it was not possible to judge the claims made in the NTC report from the information available but previous work on leading indicators would cast doubts on the claims made. Nevertheless, this should not disqualify such surveys from being included in the forecasting process.
17. Other recommendations were:
- an immediate more substantive study was unlikely to serve a useful purpose though this could be reconsidered in the future when new monitoring systems are in place;
 - a small *ex post* pilot study (or studies) focusing on one part of NA might usefully provide information on the potential gains to adopting a broader, more inclusive approach to forecasting;
 - currently the existing IT systems make the application of the above multiple predictor-continuous monitoring unworkable. The re-designing of IT systems would allow for the incorporation of such features but this appears to await consideration after the redesign. It would be more sensible to decide how ONS wishes to conduct its NA forecasting before putting systems in place.

Commission's views/recommendations

18. The Commission accepts the scoping study's recommendations. In particular, after consideration of the study, it wishes to emphasise that
- it regards short-term forecasting as an inherent part of the process of producing statistics and that it endorses the recommendation that ONS be more involved with forecasting organisations;
 - the scoping study makes a number of references to activities which ONS should undertake, such as storing its forecasts and assessing their performance (if resources permit). The Commission regards this as important because it is likely to lead to an improvement in ONS data. It should be possible either because of the recent increase in resources or as the outcome of a policy of stopping production of data for which there is now limited demand.
19. The Commission has three additional recommendations. These were not part of the remit of the scoping study:
- ONS should publish forecasts used in constructing National Accounts and other early estimates where appropriate. It is appropriate if the forecast is a forecast of a number that ONS will publish subsequently and this is plainly true of the Index of Production; it may be true of other variables as well. It is also likely to be appropriate for the forecasts of service components of GDP(O) to be published. The figures should be shown in the press release in a manner which would make clear that they were forecasts. This means that the requirement for proper analysis of revisions (as requested in Commission's comments on the revisions protocol) would not extend to these forecasts;

- the models used for forecasting should be published where relevant. This means that if, for example a Holt-Winters model is used, users should be told the model structure and values of its coefficients so that they will be in a position to reproduce the forecasts exactly;
 - as part of their regular review process, ONS should consider whether and how far forecasting methods can be used to provide acceptable data on a faster timescale. Such an issue has been raised in the *National Statistics Quality Review of the Labour Force Survey* (section 2.9) whereby an assessment of trend estimation techniques to improve timeliness was recommended.
20. Subsequent to the Commission's considerations, ONS announced that the IoP estimate included with the preliminary GDP estimate will be shown from the 24 October 2003 publication of the preliminary estimate. The Commission welcomes this.

Statistics Commission
July 2003

References

- [1] NTC Research Limited (7 May 2002), *Early, Accurate, Monthly GDP Estimates*. Economic Research Monograph No. 3, Henley-on-Thames.
- [2] ONS (1998), *United Kingdom National Accounts, Concepts, Sources and Methods*. London, ONS.

ANNEX A

Report of a Scoping Study of Forecasting in the National Accounts at the Office for National Statistics