The Quality of the output approach to measuring GDP

The quality of a statistical product can be defined as the fitness for purpose of that product. Gross domestic product (GDP) is one of the main indicators of economic growth. The output approach to measuring GDP, sometimes referred to as GDP(O), is the measure of output or production in the economy. This is used to produce the Preliminary Estimate of GDP which is published around 25 days after the end of the quarter. It covers the whole economy and uses the same data that make up the Index of Production, Output in the Construction Industry, Retail Sales and the Index of Services, in addition to the output estimates for agriculture, forestry and fishing for which ONS does not publish a separate release.

The Quality and Methodology Information (QMI) report for GDP contains information on the strengths and limitations of the three approaches to measuring GDP (output, income and expenditure) and the methodology used to create them. QMI reports for the Index of Services, the Index of Production and Retail Sales are also available on the above web page. The QMI for Output in the Construction Industry is available in the Business and Energy section.

Measuring the accuracy of the output approach to GDP

All statistics retain an element of statistical uncertainty. Statistics are often based on samples and approximations of the 'true' value of the activity being measured. As a consequence of this normal statistical process, all statistics are subject to statistical errors. The Monthly Business Survey, for example, is a sample survey and therefore the results are subject to sampling errors and non-sampling errors (more information on the quality of the MBS can be found in the QMI report on the Business and Energy page). The nature of these errors provides an indication of the quality of the statistics, which aids users when judging whether the estimates are fit for their purpose.

Sampling errors

The terms 'statistical error' or 'sampling error' should not be confused with errors arising from human mistakes or system failures. Statistical sampling errors are inherent in the processes of sampling and estimation. For many well-established statistics, ONS is able to measure and publish the sampling error associated with the estimate, using this as an indicator of accuracy. The output approach of GDP, however, is currently constructed from a wide variety of data sources, some of which are not based on random samples. Because of this it is not possible to measure the sampling error.

Non-sampling errors

Non-sampling errors may also arise during the statistical production process. This may be because of problems with coverage, non-response, respondent error (for example, failure to understand questions), or the use of proxy measures when direct measurement is not possible. Human error and system failures may also lead to non-sampling errors.

Expectations of accuracy and reliability in early estimates of GDP are often too high. Revisions often occur as a result of the trade-off between timeliness and accuracy as early estimates are based on incomplete data.
revisions reflect the incorporation of new information and revisions to early estimates in particular are the inevitable consequence of actual data replacing forecasted data. Revisions allow the errors of previously published estimates to be reduced. Revisions can also reflect the adoption of new statistical techniques. Only rarely are there revisions due to avoidable errors such as human or system failures and such mistakes are made clear when they do occur. Further information is available in the revisions document on the Output approach to GDP Methods and Sources web page.

The results of revisions analysis are regularly presented in the background notes section of each Preliminary Estimate of GDP release. (While revisions analyses can be a useful indicator on the reliability of the estimates, it is important to note that a value can be reliable (i.e. not revised) without being accurate.)

Monitoring the Quality of the National Accounts (2008) looks at ways of assessing the accuracy of the three approaches to measuring GDP (output, income and expenditure), amid a wider discussion around data quality.

Improvements

It should be noted that ONS is continually working on methodological changes to improve the accuracy of the output approach to measuring GDP (more information can be found on the improvements web page). As part of the GDP Continuous Improvement Programme, articles are regularly published on the ONS statistical continuous improvement page, which provide detailed updates of the work carried out so far.

Quality assurance

The ONS GDP(O) production team uses a variety of procedures to try to ensure that the estimates produced are of high quality. The purpose of the quality assurance procedures is to understand and be able to explain movements in the data, to allow quality adjustments to be made in an informed manner and to check that the data to be published have been calculated correctly.

As the Preliminary Estimate of GDP uses the same data that is included in the Index of Production, Output in the Construction Industry, Retail Sales and the Index of Services datasets, a large proportion of the quality assurance will have been carried out as part of the production round for each of these outputs separately. More information on the quality assurance procedures for each of the outputs can be found in the following documents:

- Index of Services Quality document (additional information is also available in the Quality Adjustments for Index of Services document) on the IoS methods page and the Quality and Methodology Information reports for IoS and Retail Sales Index
- Quality and Methodology Information report for the Index of Production
- Quality and Methodology Information report for Output in the Construction Industry

Quality assurance is also carried out on the agriculture, forestry and fishing industry (which is sourced from an external data supplier) using a similar process to ONS sourced data. If the data are flagged as irregular during any of the quality assurance procedures, further investigation is undertaken to ascertain the figures are correct and to obtain a story (where possible), which usually involves contacting the data supplier.

After the component level data have been aggregated, data tables showing index numbers, growth rates and revisions to previously published data help to identify unusual behaviour, which is then investigated further if
necessary. Tables showing the contributions to growth in GDP also help to explain the key drivers to the growth in the high level series. In addition, a quarterly economic briefing is provided by an ONS economist, giving information about movements in comparable data sources and major news stories that might affect economic output.

There are also a number of automatic system checks that are carried out each month to ensure that all procedures are functioning correctly ahead of publication and to ensure consistency across systems.

ONS is currently undertaking a change in the quality assurance procedures carried out across national accounts. This is to ensure consistency in procedures across the range of outputs that feed into national accounts and to reduce waste and non value added steps. This is part of the National Accounts work plan and overall ONS strategy for 2013-2023, which places the focus on quality and value for money. Further information can be found in Lean Coaching Principles: Using Lean Six Sigma and Coaching to Improve the Quality of Outputs.