

How the preliminary estimate of GDP is produced

Geoff Reed
Office for National Statistics

e-mail: gdp@ons.gov.uk National Statistics customer enquiry line: +44 (0)845 601 3034

Introduction

This article explains how the preliminary quarterly estimate of Gross Domestic Product (GDP) is produced and describes the developments in statistics of output which made it practicable. This estimate of the change in GDP is based mainly on output information and is produced three and a half weeks after the end of the quarter to which it relates: the earliest regular production of such an estimate in the world.

The preliminary estimate is mainly derived from the output or production measure of GDP, commonly known as GDP(O). The output methodology is essentially the same for the preliminary and subsequent estimates. The subsequent estimates for each quarter are improved, not only by incorporating additional output data, but also by a greater emphasis on National Accounts' coherence and balancing through the income and expenditure measures of GDP. The article considers the influence of these wider relationships on the preliminary output-based estimates.

Improvements which led to the publication of a preliminary estimate

The GDP(O) indicator series have been subject to a considerable degree of change and improvement during the past decade. This followed the recommendations of the 'Pickford' review of economic statistics in 1989. Articles in *Economic Trends* No. 448^{1a} and No. 460^{1b} describe the widespread resulting improvements in data collection for the National Accounts. These included new short-term turnover inquiries for selected service industries to help improve the measurement of GDP(O).

Improvements in the quality of the early indicator results made possible an advance in the publication date for the first estimate of change in GDP. The then Central Statistical Office (CSO) announced in May 1993, in *Economic Trends* No. 475^{1d} an arrangement to begin publishing regularly an earlier estimate of the quarterly change in GDP. Publication began in April 1993. Since then a First Release called the 'Preliminary Estimate of GDP' has been published three and a half weeks (about 24 days) - after the end of each quarter, four weeks earlier than hitherto.

The new quarterly turnover inquiries (QTIs) were directed to many of the important private sector service industries which were previously relatively neglected in terms of statistical collections. As well as producing results more quickly, they offered conceptual and quality improvements: in many cases they replaced employment series which provided a measure of the level of input to an industry rather than of its output. Estimates from turnover inquiries can implicitly include quality adjustments through the deflation process and in the short-term the change in deflated turnover is considered to be representative of that in constant price value-added.

Challenges resulting from the Improvements

The introduction of service sector QTIs and the subsequent development of prices to deflate the results posed a number of difficulties. The new surveys drew samples from parts of the ONS business register that had hitherto been little used. As a result the quality of those parts of the register was initially relatively poor and this inevitably affected the survey results based on them.

Conceptual Basis of the Output or Production Measure of GDP

The value-added by an economic activity is defined as the total output of the activity less the inputs of other economic activities required to produce the output. The output estimate of GDP is defined as the sum of the value added of all the economic activities which produce goods and services. A definition of the production boundary, which marks the dividing line between what is included in economic activity and what is excluded, by international agreement, can be found in *National Accounts Concepts, Sources and Methods*³. The output approach provides an estimate of short-term change in economic net output, or value-added at constant basic prices, using a range of industry surveys and other sources as indicators to provide estimates of the changes for individual industries.

These industry estimates generally do not measure the short-term change in constant-price value-added directly. Rather they are 'proxy' indicators for that change. These are indicators that are considered to serve as an adequate alternative estimator of the change in value-added in the short term. Preferably the proxy indicator is the deflated turnover of a business, although volume and other indicators are used where necessary, or where they are considered adequate.

Any current price indicator series is deflated to constant price volume terms. Then it is indexed and aggregated with other volume indicators, using value-added weights for each industry for the base year - currently 1995. Base year value-added weights are taken from the annual *Current Price Supply and Use Tables*⁹ produced by the ONS, supplemented by more detail where necessary. The result - an estimate of the constant price change in value-added in the economy - is then used as an estimate for the short term change in GDP. Since the introduction of the ESA95 the output results are compiled as estimates of industry value-added at constant basic prices. For publication the aggregate is converted into a quarterly change in GDP at constant market prices.

A range of published sources describes the output methodology more fully. Much can be found in *National Accounts Concepts, Sources and Methods*³ while the complete range of present output indicators and their deflators can be found listed in the GSS Methodology Series publication No. 15: *Gross Domestic Product: Output Approach (Gross Value Added)*⁵ edited by Peter Sharp. This latter publication also gives the detailed set of up-to-date value-added weights used to aggregate the series following the recent rebasing of the fixed-base Laspeyres indices onto 1995=100. A previous edition of this publication, GSS Methodology Series No. 5⁴, contains more on the output approach methodology.

The new QTIs have been accompanied by a vigorous programme of improvements in ONS survey practices. Since 1993, many improvements have been made: in the business register, in collection techniques and sample design. Some changes have also been necessary for other reasons: for instance to improve employment estimates; or so that the ONS could reduce the burden of survey forms on small businesses as required by the Osmotherley Group report¹⁰ whereby small businesses are exempt from all surveys for a period. Other sample changes or reductions have been driven by ONS cost imperatives.

Since the introduction of QTIs the gradual improvement in the quality of the service industries parts of the register meant that the sequence of estimates produced for individual service industries was subject to a series of discontinuities. To overcome these, bridging adjustments are often necessary in industry series.

The new range of QTIs also brought a need for a range of new deflators: industry specific service industry price series were rare. The ONS's extensive programme to collect new service industry deflators to remedy this deficiency has been discussed elsewhere, e.g. in *Economic Trends* No. 538¹⁹. That programme is still far from complete: not only for cost reasons, though they are important, but also because much of the work is intrinsically difficult. The lack of a full set of industry specific deflators may have greater long-term rather than short-term effects on the estimates; an inadequate deflator may have only a small effect on a single quarter but may cause the estimated change in an industry's output to drift incorrectly over time. This may show up as an imbalance in the National Accounts and if significant it will be remedied in due course through National Accounts' balancing adjustments.

Where data series are of inadequate quality, National Accountants use their expertise to improve the quality of estimates generated from the raw data series, making adjustments as necessary. For GDP(O) some pre-1991 indicators and data collections were less timely and less conceptually appropriate, but they exhibited greater stability and continuity. Adjustments were made less frequently and to remedy temporary problems. Liaison with a supplier, or natural data revision, would generally result in an improved series and the removal of adjustments. As a result of the accelerated pace of operational change and the process of frequent collection improvement since the first QTIs were introduced in 1991, this situation no longer holds. Frequent data collection, register and other changes have necessitated more frequent adjustments and their long-run retention for some industries.

Timetable for the Preliminary Estimate.

The estimate produced three and a half weeks after the end of the quarter is appropriately called 'preliminary'. A 'provisional' estimate is produced four weeks later and a so-called 'final' estimate is produced after a further five weeks as part of the full quarterly National Accounts. This last is not definitive: revisions still occur due to data updates, National Accounts' quarterly balancing and as part of the preparation of data for the annual *National Accounts Blue Book*⁶.

A timetable of the main events leading to the production of the preliminary estimate is below. The dates are those for October 1999: the schedule is typical.

- Index of Industrial Production (IoP), to end of August, published Wednesday 6 October.
- Supply deadline for most input series to the preliminary round: Friday 8 October.
- Receipt of later data and data entry processing runs: 11 - 15 October.
- GDP(O) Retail sales series received and processed: Friday 15 October.
- Distribute material for the Balancing meeting, p.m. Monday 18 October.
- Balancing meeting: a.m. Tuesday 19 October.
- Retail sales to end of September published: Wednesday 20 October.
- Supply draft First Release⁹ with near final figures to selected Government ministers, 5.00 p.m. 20 October.
- Pre-release ONS Press Office review a.m. Thursday 21 October.
- Publication; almost always on a Friday: 9.30 a.m. 22 October 1999.
- Press conferences to the electronic agencies and to the National Press: 9.30 and 10.30 am.

As with all ONS regular First Releases, the date of publication is pre-announced several months in advance. Typically, as here, the preliminary estimate of GDP is published two days after the retail sales for the full quarter: the retail sales publication is one of the key determinants of the date for the publication of the preliminary estimate.

Preliminary Estimate: processes carried out by GDP(O) Branch

Calculation Processes

About two-thirds of GDP(O), measured by value-added in the economy, comes from the service industries: see Chart 1. Of the

Chart 1

Industry Contributions to GDP: by Value-Added Weight

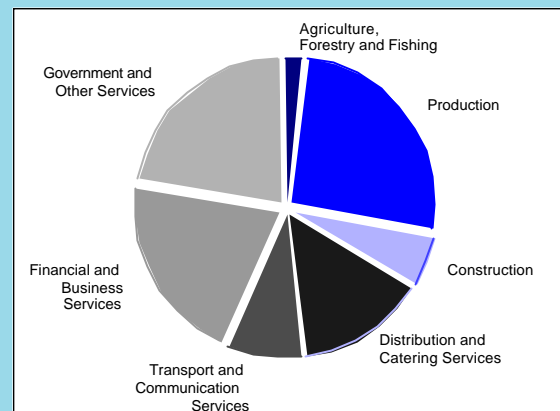
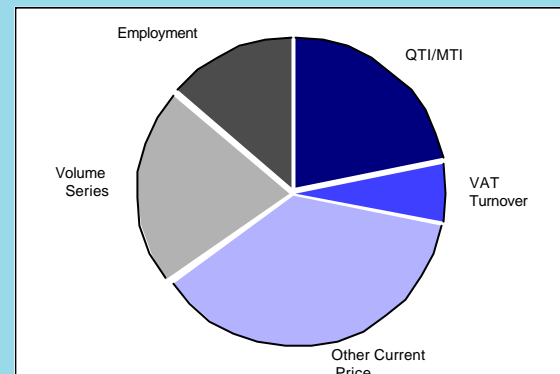


Chart 2

Types of Indicator used for GDP Service Industries: by Value-Added Weight



remainder, the largest single component - about a quarter - is the IoP: agriculture and construction make up the rest. Each of these last three is delivered to the quarterly National Accounts as aggregated series: three for the IoP, three from the Ministry of Agriculture, Fisheries and Food and two for construction - from the Department of the Environment, Transport and the Regions, and the Northern Ireland Departments. For the service industries the GDP(O) measure uses over 600 indicator series - including about 130 deflators. They are supplied by over 50 different suppliers in over 20 different organisations, although the majority come from within the ONS. About 55 of the QTI series are used and these often represent industry components with relatively large weights. Chart 2 shows the main types of indicator used for services.

The production of the preliminary estimate is based on output sources and estimates only: it relates to other National Accounts estimates

only where common indicator sources are used. Each month data is requested from suppliers to a timetable, received and checked. Late supply and queries are chased up. Estimates are necessary where data is missing so that all component series have a value up to and including the latest period. Estimates for missing data are produced using an automatic Holt-Winters' procedure - a well-known, reliable and easy-to-understand method¹¹. This calculation produces an estimate through exponential smoothing and incorporates the trend and seasonal components of the raw series. The Holt-Winters' procedure also gives the greatest weighting to the most recent values in the series and this is considered to be appropriate for these short-term estimates.

Where the indicators are current price series they are individually deflated to give constant price series. Each of these is converted to a fixed base Laspeyres volume index series. These are aggregated together, using gross value-added base-year weights and seasonally adjusted. The results - the published level industry series and the GDP(O) index - are all presented as base-weighted index series and percentage changes, each suitably rounded.

Adjustment Environment and Practices

GDP output estimates have to be consistent with an IoP series which is already published, and with agriculture and construction which are published independently. Therefore these do not bear long-term National Accounts adjustments - although, as in the production of most economic series, data quality adjustments are made. The discussion of adjustments which follows concentrates on those made to service industries, mainly to private sector service industries, because:

- the service industries make up two thirds of the value-added in GDP(O);
- the quality of some, mainly private sector, services indicator series is considered to be relatively poor and so they sometimes bear relatively large quality adjustments;
- any GDP(O) balancing or coherence adjustments are usually made to service industries.

For the preliminary round, the scrutiny of suspect indicator series concentrates on the most recent quarter. Where a particular indicator series or value is considered unacceptable the GDP(O) estimate used will depend on the application of judgement to supplement the calculation process. This judgement is applied to individual industry indicator series: in some cases at a detailed level, in others to more aggregated series. For the preliminary round any

new adjustments will be made only to the latest quarter to give the best estimates of quarterly change.

QTIs are one of the major indicator sources for service industry output estimates - not only in terms of the number of series used: they tend to be used for indicators with large value added weights. They are also - unsurprisingly, given the new departure they initially represented and the subsequent register and methodology changes - a major source of discontinuity and variability; hence a need for adjustments.

The 1996 *Report on the Review of the Quarterly Turnover Inquiries*² included a list of the sources of discontinuity which had arisen in the most recent single year, then 1995:

- moving QTIs more fully onto the new inter-departmental business register (the IDBR);
- introducing new common survey processing software;
- reducing the sample sizes;
- introducing a system of rotational sampling;
- changing the industry classification system to the SIC92;
- replacing some quarterly inquiries by monthly ones (MTIs).

The number and importance of the changes to data collection processes each year have rarely been this great, although since 1995 improvements have been introduced every year. Resources have not been available to carry out any direct assessment of the effects on the continuity of the time series, so any consequences have to be estimated indirectly.

At a 'final' quarterly round the coefficients of variation (the ratio of the standard error of a turnover estimate to the estimate itself) for detailed individual QTI series may range from about two per cent to ten per cent, with around half about four per cent or more. A 95 per cent confidence range around the resulting quarterly growth estimates for many of these individual indicator series may be of the order of 10 per cent. Volatility and coefficients of variation will be greater at a preliminary round when response rates are lower.

Table 1 shows the variability which can exist at a 'final' round, using figures for a variety of familiar industries with value-added weights totalling over three percent of GDP(O) where growths can sometimes appear erratically high. The series are presented as growths over the corresponding quarter of the previous year to remove any seasonal effects. Corresponding quarterly turnover series are published by the ONS in a quarterly News Release⁷: 'Distributive and services trades'.

TABLE 1**Quarterly Turnover Results for selected industries: percentage growths over the corresponding quarter a year earlier**

Period	Scheduled passenger land management	Computer software consultancy	Accounting, book-keeping and auditing	Business and consultancy activities
1995 Q1	+16.7%	+12.7%	+10.6%	+20.1%
1995 Q2	+5.4%	+16.3%	+8.7%	+21.4%
1995 Q3	+8.6%	+20.0%	+6.0%	+14.2%
1995 Q4	+5.5%	+22.1%	+4.9%	+18.5%
1996 Q1	+4.7%	+19.9%	+10.5%	+17.8%
1996 Q2	-8.0%	+26.3%	+6.7%	+20.2%
1996 Q3	-12.9%	+12.9%	+8.8%	+18.2%
1996 Q4	-12.0%	+21.3%	+14.2%	+17.4%
1997 Q1	+4.9%	+13.7%	+21.3%	-1.0%
1997 Q2	-6.4%	+11.7%	+6.0%	+0.1%
1997 Q3	+3.6%	+14.3%	+8.5%	+21.5%
1997 Q4	+13.6%	+22.6%	-2.9%	+18.2%
1998 Q1	-6.7%	+27.1%	+12.6%	+44.1%
1998 Q2	+32.9%	+33.6%	+32.4%	+66.0%
1998 Q3	+22.6%	+45.5%	+34.7%	+43.6%
1998 Q4	+13.0%	+38.9%	+37.4%	+30.4%
1999 Q1	+16.3%	+25.5%	+7.5%	+18.4%
1999 Q2	+7.1%	+13.6%	+2.6%	-0.7%

#The process of evaluation and the application of judgement each round is carried out over a short period. Therefore the focus tends to be on major series of suspect quality: most investigation is of series whose gross value-added weight, or contribution to GDP(O), is greatest. The first step is the observation that a value appears to be inconsistent with those that precede it. Investigation is undertaken of possible reasons; enquiries are made to the supplier; and alternative estimates may be produced.

The main criteria for deciding whether a series value seems inadequate are:

- comparison with the earlier values of the series;
- the comparative movements of related output series;
- changes in other source indicators for the same industry.

Two other quarterly data sources are available for many industries where QTIs have been introduced: employment and VAT turnover

data. Employment data comes from ONS employment surveys. VAT turnover data is aggregated HM Customs and Excise VAT returns of businesses' turnover: not a survey but an administrative data source covering VAT registered businesses - with all the strengths and weaknesses associated with that.

Employment is conceptually the poorer indicator, since it actually measures input to an industry rather than its output: it is also less timely. Consequently early VAT turnover data is the alternative most often used to provide a source for checks on the output indicator movements, and for alternative estimates; as well as serving as an indicator in its own right for some industries. The use of VAT turnover data requires care because it is subject to its own different seasonal patterns and other limitations.

For the preliminary estimate detailed industry series are considered not to be of publishable quality so generally only broad indications of the nature of the changes are given. Detailed industry series are published later, with the 'final' estimate each quarter.

Relationship to the Income and Expenditure Measures of GDP

The indicators used in GDP(O) to estimate the quarterly changes in economic activity do not measure directly the changes in constant-price value-added in the economy. However ONS experience of early estimates, including revisions, shows the output measure to be the best National Accounts' indicator of short-term economic change (*Economic Trends* No. 471)^{1c}. The introduction of QTIs helped reinforce the quality of the early output estimates.

For longer term estimates the dependence of the output estimate on a range of input, volume and gross output indicators limits its value. Annual growth is better estimated using the input/output process for balancing the income, expenditure and output approaches to GDP at current prices, then deriving annual growth at constant prices by deflating using the expenditure approach.

During each quarter's subsequent rounds the preliminary estimates of GDP change are revised through balancing adjustments to reduce the inconsistencies which would otherwise exist between the different approaches to measuring the National Accounts (*Economic Trends* No. 504)^{1e}. This allows the preliminary estimate to take more account of the expenditure and income measures of GDP, as these become stronger. The result, for each quarter's estimates, is a consistent and firm view of GDP through the three different approaches with credible estimates for the components of each. Any annual balancing adjustments to the output-based estimates follow these quarterly quality and balancing adjustments and are published, most recently in notes to Chapter 2 in the 1999 *Blue Book* ⁶.

The Preliminary Round Balancing Meeting

The preliminary industry output results are scrutinised at a National Accounts' balancing meeting whose aim is to ensure the estimates are the best possible and consistent with the information available elsewhere in the National Accounts. At the preliminary round the amount of expenditure information available is small and income data is almost totally lacking. For the balancing meetings held during the 'provisional' and 'final' monthly rounds each quarter, more expenditure and income data is available.

For the preliminary round balancing meeting, the limited internal balancing information for the latest quarter is usually supplemented by a range of indirect and 'softer' sources:

- knowledge from previous rounds' monthly balancing meetings of the extent and direction of any longer term balancing stresses;
- a National Accounts 'trial balance' giving limited information on expenditure and income;
- a presentation on the Index of Industrial Production;
- results produced from a modelling approach to output;
- an assessment of the economic background by ONS professional economists;
- a review of wider ONS economic indicators and of external econometric indicators, put together by ONS economists; including employment, earnings, retail sales, trade, any results from the Confederation of British Industry, British Chambers of Commerce and Chartered Institute of Purchase and Supply, and consumer confidence surveys;
- a paper explaining the quality of the preliminary GDP estimate and the component GDP(O) industrial series, highlighting major changes, adjustments made and their effects.

The meeting assesses the preliminary GDP(O) estimate against the other sources and agrees amendments when necessary. The implications of the wider sources are considered for individual industry sectors and overall. Industries are identified where estimates are suspect and where further adjustments may be needed. External data and 'softer' sources play a limited role but may help resolve conflicts in ONS data.

The GDP(O) information to the meeting is considered to be the strongest component presented. Consequently small adjustments are imposed and then only on a minority of occasions: about one third of the time. Where a balancing adjustment is required, the size along with the broad industry revisions to achieve it, are decided. The result is a preliminary estimate of GDP change which, while based mainly on output indicators, takes account of other National Accounts' data.

Service industry series usually carry any coherence adjustment that is needed. This is partly due to the convention of not adjusting the other components, and partly because the quality of the service industry estimates is considered weaker. Occasionally during a preliminary round coherence adjustments are made to agriculture or construction, or to the Index of Production (IoP), though any such adjustments are removed when these series are published for the full quarter. The overall effect of any balancing adjustment on the preliminary estimate of GDP is rarely more than 0.1 per cent. Effects on individual service industries are of course larger.

Through this process the ONS develops a preliminary estimate of GDP where:

- GDP(O) is the lead - but not the sole - indicator of change for the latest quarter, and
- the ONS has satisfied itself that the result is the best central estimate of change in GDP.

Results and Outputs

All GDP estimates are published to a pre-announced timetable, through a First Release supported by press conferences and through the ONS electronic databank. Advance information is also supplied to a restricted set of Government customers - officials and ministers mainly at the Treasury and the Bank of England - about 36 hours in advance of publication, in line with the ONS code of practice.

For the preliminary estimate, some of the industry series delivered will be subject to considerable later revision and much data will not have arrived. Consequently the ONS publishes only a small amount of industry detail at this stage. Furthermore, the preliminary estimate shows no revisions for previous quarters, following a National Accounts convention, so the only new figures presented are the changes for the latest quarter in:

- the Distribution and Catering Trades;
- all services;
- total GDP.

All the detailed industry series, whether published or not at the preliminary round, contribute to the aggregates. To explain that, and to increase user understanding of, and confidence in, the published figures, additional briefing is given at the press conferences: qualitative information about the unpublished industry contributions; their direction; broad magnitude and previously published results to show the historical context.

One of the high quality components is the contribution of retailers, where retail sales results have already been published for the full quarter. This is one reason why a 'distributive and catering trades' value for the latest quarter is published in the preliminary round. The GDP(O) measure uses retail sales aggregated by value-added weight - rather than by sales as published in the retail sales index two days earlier - so the quarterly changes are rarely the same. The detailed GDP(O) retail estimate itself is published along with all detailed industry series, at the time of the 'final' estimate. The unpublished IoP estimate supplied to the preliminary round is also of relatively high quality. A detailed qualitative briefing for the IoP is included as part of the preliminary round press conference briefing.

Other unpublished industry components are of poorer quality. A summary assessment of the quality of the industry estimates is presented to the preliminary round balancing meeting. The assessment presented to the Q3 1999 preliminary round in October 1999 is at Table 2: the percentages are representative of the position for preliminary rounds. The first column gives a guide to the proportions of firm supplier data in the preliminary estimate. For instance the 67 per cent 'Supplier data' for Production industries (the IoP) represents the inclusion of two months' survey results in the latest quarter's estimate. The 'supplier estimates' column indicates roughly the proportions estimated by suppliers for the preliminary round. The final column shows the remainder - where values for the latest quarter have been estimated as part of the calculation processes described earlier.

For the preliminary round many sources, such as the QTI survey results, are based on a small proportion of early returns. So only a

TABLE 2
Proportions of data in October 1999 for the Q3 1999 preliminary estimate

Industry group	Supplier Data	Supplier Estimates	GDP(O) Branch Estimates
Agriculture	94%	nil	6%
Production industries	67%	33%	Nil
Construction	10%	90%	Nil
Distribution and catering	78%	17%	5%
Transport, storage and communication	22%	40%	38%
Finance and business services	47%	23%	30%
Government and other services	47%	21%	32%
TOTAL	58%	26%	16%

small fraction of their weight is included in the 'supplier data' column, the rest being assumed to be a 'supplier estimate' until response rates are more complete. The estimates are plainly a rough guide but on this basis the result for the Q3 1999 preliminary round, of between 50 per cent and 60 per cent supplier data, is typical. For the 'final' round, two months later, this will increase to about 95 per cent.

The largest industry quality adjustments are most often in transport and communication and in finance and business services. One potential justification for this may be apparent from Table 2. For the Q3 1999 preliminary round the net effects of quality adjustments of the type described in the section on adjustment processes was to add about 0.2 per cent to the latest quarter's growth. From quarter to quarter the net effect of adjustments is variable and this magnitude of overall effect is not untypical, though it is often less. Although the net overall effect on growth can be of either sign it is more usually negative rather than this positive example.

Assessment of Revisions and Estimates

The preliminary estimate is subject to a performance target agreed with the Treasury - initially to the effect that no more than one estimate in four should be revised by more than 0.25 per cent between 'preliminary' and 'final' publication. This was changed to a more demanding 0.2 per cent from 1997 Q1. Since its first publication the preliminary estimate has always met its performance target.

Revisions to the preliminary estimate since it began in 1993 are shown in Table 3. The greater revisions tend to occur from the 'final' estimate to the present one: a period that differs for each row of the table, though for all the early rows it is considerable. Chart 3 shows the relatively small revisions between the 'preliminary' and 'final' monthly rounds in comparison to the - generally much larger - current estimates of quarterly growth.

Amongst the many important factors which contribute to the longer term revisions is the five-yearly rebasing - most recently onto a 1995 base year - and the conversion of the UK National Accounts data onto ESA95. Only the last five rows of Table 3 are unaffected by these two factors.

The preliminary estimate of GDP is always subject to revision and improvement - as part of a coherent and balanced set of data. The generally moderate size of the revisions, between the preliminary and both the 'final' estimates and later, demonstrates that the preliminary estimate performs well in this respect.

Chart 3

Estimates of quarterly change in GDP since 1993 and preliminary to 'final' round revisions

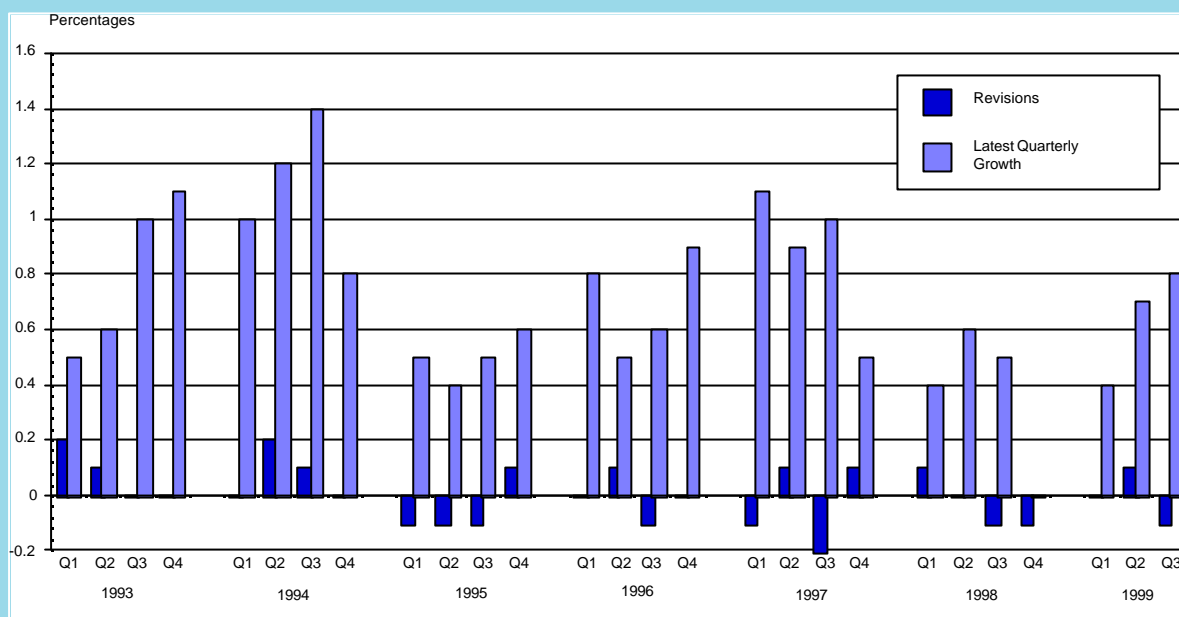


TABLE 3
Estimates of quarterly change in GDP since 1993, showing revisions

Year and Quarter	'Preliminary' estimate	'Final' estimate	Present estimate
1993 Q1	+0.2%	+0.4%	+0.5%
1993 Q2	+0.5%	+0.6%	+0.6%
1993 Q3	+0.6%	+0.6%	+1.0%
1993 Q4	+0.7%	+0.7%	+1.1%
1994 Q1	+0.7%	+0.7%	+1.0%
1994 Q2	+0.9%	+1.1%	+1.2%
1994 Q3	+0.7%	+0.8%	+1.4%
1994 Q4	+0.8%	+0.8%	+0.8%
1995 Q1	+0.8%	+0.7%	+0.5%
1995 Q2	+0.6%	+0.5%	+0.4%
1995 Q3	+0.5%	+0.4%	+0.5%
1995 Q4	+0.4%	+0.5%	+0.6%
1996 Q1	+0.4%	+0.4%	+0.8%
1996 Q2	+0.4%	+0.5%	+0.5%
1996 Q3	+0.8%	+0.7%	+0.6%
1996 Q4	+0.8%	+0.8%	+0.9%
1997 Q1	+1.0%	+0.9%	+1.1%
1997 Q2	+0.9%	+1.0%	+0.9%
1997 Q3	+1.0%	+0.8%	+1.0%
1997 Q4	+0.5%	+0.6%	+0.5%
1998 Q1	+0.4%	+0.5%	+0.4%
1998 Q2	+0.5%	+0.5%	+0.6%
1998 Q3	+0.5%	+0.4%	+0.5%
1998 Q4	+0.2%	+0.1%	+0.0%
1999 Q1	+0.1%	+0.1%	+0.4%
1999 Q2	+0.5%	+0.6%	+0.7%
1999 Q3	+0.9%	+0.8%	+0.8%

The output-based estimate of GDP can sometimes exceed the estimates from the other measures for a number of quarters. The cause might be a change in the relationship of gross output or turnover to value-added. Or our existing statistical sources may be finding it more difficult to track short-term change in the economy. This may give rise to a need for annual balancing adjustments as described in the *Blue Book*.

In considering the merits of the adjustments made before publishing estimates, care must be taken to avoid a conclusion that results prior to adjustment are somehow 'true' estimates of quarterly change or that the size of adjustment gives an indication of the extent to which the final estimate of GDP may be inaccurate. This would take no account of the National Accounts imbalances that would result. Evaluation of the raw data and the use of adjustments is a key contribution to high quality National Accounts estimates.

Estimates of GDP change are subject to regular analysis for potential bias. Analysis published in *Economic Trends* No. 510¹⁷ in 1996 showed no significant bias in the revisions to the short-term estimates. The article did suggest that revisions to the longer term estimates over a period of three years tend to be upwards, but over the longer period changes in the economy and in definitions as well as improvements in measurement, make interpretation complex. More recently, the first revisions analysis of the preliminary estimate, comparing each with the corresponding 'final' estimate, concludes again that there is no significant bias in the revisions to the short term estimates, while once more suggesting an upward bias in the longer term ones.

Without the adjustments made in compiling the preliminary estimates those too may be more likely to show an upward bias compared with the balanced National Accounts' estimates published after three months.

Table 2 shows that almost half the preliminary GDP estimate consists of estimates rather than supplier data. While this limits its quality, the estimated components, together with any adjustments, reduce the sensitivity to short-term random variation. Any resultant tendency to smoothness in the preliminary estimate might contribute to the positive user perception of reliability.

Although the preliminary estimate of GDP is derived only from output sources it does not stand-alone. It is the most up-to-date and least complete of a series of quarterly GDP estimates and is part of a set of balanced National Accounts where the effect of the other measures on previous preliminary estimates is known. Anticipation of the influence of the other GDP measures on each preliminary estimate might help reduce revisions.

The ONS presents each preliminary estimate at a press conference where it gives some qualitative explanation of the unpublished figures to explain how the aggregate is derived and to increase confidence in the limited results published. The response from customers suggests that supporting the published figures with some explanatory indications of the unpublished components contributes to the value the customers get from the preliminary estimate and to their confidence in it.

The ultimate value of the preliminary estimate of quarterly GDP change lies in the quality of the estimate produced and in the value customers find in what is provided. In both respects, the UK preliminary estimate of GDP, for the past six years the earliest such publication in the world, is a clear success.

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