

Information paper

Summary Quality Report for the Quarterly Stocks Inquiry

1 Introduction

This report is part of a rolling programme of quality reports being introduced by the Office for National Statistics (ONS). The full programme of work being carried out on [Statistical Quality](#)¹ is available on the National Statistics website. Summary Quality Reports are overview notes which pull together key qualitative information on the various dimensions of quality as well as providing a summary of methods used to compile the output.

This report relates to estimates of book value stocks collected by the Quarterly Stocks Inquiry and aims to provide users with information on usability/fitness for purpose of these estimates. The Quarterly Stocks Inquiry collects information on the value of stock held at the beginning and end of each calendar quarter. In some industry sectors an asset breakdown is required.

Terminology, concepts and methods used in stocks/inventories can be found in the [UK National Accounts: Concepts, Sources and Methods](#)².

2 Summary of quality

2.1 Relevance

The degree to which the statistical product meets user needs for both coverage and content.

Stocks are goods which are held by trading enterprises, and are intended either to be used within the production process or to be sold.

	Quarterly Stocks Inquiry
What it measures	The value of stock held by historic cost (book value), at the beginning and end of the quarter. Most industries are required to provide an asset breakdown, for example manufacturers are asked the value of their materials and fuel, work in progress and finished goods.
Frequency	Quarterly
Sample size	Approximately 13,000 (UK)
Sampling frame	Inter-Departmental Business Register (IDBR)
Sample design	Stratified random sample where the strata are defined by Standard Industrial Classification (SIC) and employment size of the business (10-49, 50-99, 100-299, 300+).
Weighting	Each business represents a number of similar businesses, based on number of employees and SIC (currently SIC 2003 ³). Weights are automatically calculated each quarter.
Estimation	Combined ratio estimation
Imputation	Automatic imputation using period on period movements is carried out for all non-responding businesses. System constructions are created for non-responding businesses the first time they are selected, based on average stock by employment. Manual constructions are used in exceptional circumstances.

Outliers	Firms with extreme or atypical key variable returns for their business size are treated as outliers.
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The key users of the Stocks estimates are:

- Gross Capital Formation Branch of National Accounts Group
- Index of Production Branch of National Accounts Group

The main user is ONS itself, which uses the data to provide estimates for use in the compilation of all three estimates of [Gross Domestic Product \(GDP\)](#)⁴. The change in inventories, or stock building, is part of final expenditure in the National Accounts. Changes in inventories are also added to sales figures to produce the [Index of Production \(IOP\)](#)⁵. Holding gains on inventories (or stock appreciation) is included within the income measure of GDP. Inventories are also used at the detailed level in the compilation of annual current price [Input-Output Supply and Use tables](#)⁶, which determine the level of current price [GDP](#)⁴. The Treasury uses the results for forecasting, analytical and briefing work on the economy wide output and on the company sector.

The survey covers the mining and quarrying, manufacturing, energy, construction, motor trades, wholesale and retail industries. For each of these, with the exception of wholesale and retail, a breakdown of stocks is required. For wholesale and retail, only the total stock is requested. Questionnaires are sent to 13,000 businesses each quarter, representing about 2 per cent of the UK economy. All companies with over 300 employees are included permanently, smaller companies are randomly sampled.

Results are produced three times a quarter, provisional results for quarterly [GDP](#)⁴ and revised and late results for the [IOP](#)⁵ and [GDP](#)⁴.

The survey is reviewed every three years to ensure it is being conducted in such a way as to obtain relevant information while imposing the minimum burden on respondents. Both customer and respondent feedback are obtained and used in the [Stocks Triennial Review](#)⁷.

Stocks and the [UK National Accounts](#)⁸ are compiled in accordance with the [European System of Accounts 1995 \(ESA 95\)](#)⁹, under EU law [ESA 95](#)⁹ is itself consistent with the standards set out in the [United Nations, System of National Accounts 1993 \(SNA 93\)](#)¹⁰. At the industry level results are classified by [SIC 2003](#)³.

2.2 Accuracy

The closeness between an estimated result and the (unknown) true value.

The survey obtains its samples from the IDBR which is a database of UK businesses that is maintained by ONS. The sample is periodically reviewed and optimised. We aim to achieve response rates of 69 per cent at the provisional stage and 80 per cent at the revised stage. Respondents are sent reminder letters to encourage response, and are also contacted by telephone to achieve the response targets. Non-responses are imputed using responses.

Estimates from this survey are subject to various sources of error. Total error consists of two elements, the sampling error and the non-sampling error.

Sampling error

This occurs because estimates are based on a sample rather than a census. Sampling error is minimised for the Stocks Inquiry through the use of a scientifically chosen sample which is reviewed and refined periodically. Sampling error is continually monitored with standard errors and coefficients of variation calculated for all survey outputs.

Non-sampling error

Non-sampling errors are not easy to quantify and include errors of coverage, measurement, processing and non-response. Response rates give an indication of the likely impact of non-response error on the estimates (eg bias). Non-sampling error is minimised through comprehensive input and output editing processes.

The Stocks Inquiry uses the IDBR as its sampling frame and uses it to calculate the design and calibration weights used in combined ratio estimation. The IDBR is updated frequently.

Responses are checked for internal consistency, and compared with those for similar units. Quarter-on-quarter comparisons are made at respondent data and aggregate level. Disparities are investigated to correct inaccuracies in any returns. Responses are imputed for non-responding units.

2.3 Timeliness and Punctuality

Timeliness refers to the lapse of time between publication and the period to which the data refer. Punctuality refers to the time lag between the actual and planned dates of publication.

The Stocks Inquiry is quarterly and produces three outputs per quarter. Provisional results are available to National Accounts six weeks after the calendar quarter; revised results eight weeks; and late results twelve weeks.

The Stocks Inquiry book values (stock valued at historic cost) are used internally by National Accounts to calculate the change in inventories. Inventories data form part of the [IOP](#)⁵ and the [GDP](#)⁴. Preliminary Estimates published around 25 days after the end of the quarter. Inventories data can be found in the quarterly releases UK Output, Income and Expenditure (at 55 days) and the UK Quarterly National Accounts (at 85 days) using provisional and revised inventories estimates respectively.

2.4 Accessibility and Clarity

Accessibility is the ease with which users are able to access the data, also reflecting the format(s) in which the data are available and the availability of supporting information. Clarity refers to the quality and sufficiency of the metadata, illustrations and accompanying advice.

The Quarterly Stocks Inquiry does not publish any data.

Access to data at the individual business level is restricted. The confidentiality of the data is legally enforced by the Statistics of Trade Act 1947 in Great Britain and in Northern Ireland the Statistics of Trade and Employment (NI) Order 1988.

For each of the three results per quarter briefings accompany the outputs to National Accounts. These include detailed reasons for movements in the data and include response rates, outlier numbers and variances, standard errors and coefficients of variation quality information.

The Stocks Inquiry book values are not published directly, but used internally by National Accounts to calculate the change in inventories. Inventories data form part of the [IOP](#)⁵ and the [GDP](#)⁴ Preliminary Estimates. Inventories data can be found in the quarterly releases [UK Output, Income and Expenditure](#)¹¹ and the [UK Quarterly National Accounts](#)¹² using provisional and revised inventories estimates respectively. Tables containing inventories data are also published in the [UK Economic Accounts](#)¹³, [Monthly Digest of Statistics](#)¹⁴ and the [UK National Accounts Blue Book](#)¹⁵. Individual [Time Series](#)¹⁶ are available on the ONS website.

The most up to date estimates are given to National Accounts. These will then be used in line with [National Accounts' revisions policy](#)¹⁷.

2.5 Comparability

The degree to which data can be compared over time and domain.

Stocks estimates have been produced on a comparable basis since 2003. Whenever methodological changes or other factors impact on the stocks estimates, users are consulted and every effort is made to ensure that all previous estimates are amended to make them directly equivalent.

Stocks surveys into manufacturing, wholesale and retail began as separate surveys in the 1950s. In 1992 two further surveys into motor trades and construction were set up, and in 1993 these were merged with wholesale and retail to create a non-production stocks survey. In 2000 this sample was extended to include hotels and restaurants and other business services. In 2003, the production and non-production surveys were merged.

In 2000, the sample was increased from 16,000 businesses to 21,500. This was then reduced in 2006 to 13,000, and hotels and catering and other business services were excluded. This was to save on validation costs, compliance costs and reduce the burden on businesses by reducing the possibility of them being selected.

There have been no major changes to the questionnaires in recent years. Stocks and the [UK National Accounts](#)⁸ are compiled in accordance with the [ESA 95](#)⁹, itself consistent with the [SNA 93](#)¹⁰ which has been adopted by statistical offices throughout the world.

2.6 Coherence

The degree to which data that are derived from different sources or methods, but which refer to the same phenomenon, are similar.

The results of the Stocks Inquiry are benchmarked once a year against the [Annual Business Inquiry \(ABI\)](#)¹⁸. The [ABI](#)¹⁸ covers production, construction and distribution and has a much larger sample of approximately 62,000 businesses. It collects the total (not asset) level of stocks at the beginning and end of the year.

The annualised figures obtained from the previous four Quarterly Stocks Inquiries are benchmarked against the latest results from the annual survey to ensure coherence at sector and industry level.

3 Summary of methods used to compile the output

3.1 Data collection

Eleven different questionnaires are sent out reflecting different sectors and sub sectors:

Questionnaire types	Stock breakdown requested
Mining & quarrying	Raw materials and consumable stores All other stock
Manufacturing	Materials and fuel Work in progress Finished goods
Energy (Electricity)	Coal Oil Gas Nuclear fuel Other stock
Energy (Gas)	Natural gas Other fuel Non fuel
Energy (Steam)	Coal Oil Other fuel Stores Work in progress
Energy (Water)	Stores Work in progress
Energy (Utilities)	Materials, stores and fuel Work in progress Goods on hand for sale
Construction	Materials, stores and fuel (dwellings) Work in progress and goods on hand for sale (dwellings) Materials, stores and fuel (non dwellings) Work in progress and goods on hand for sale (non dwellings)
Motor trades	New vehicles Used vehicles All other stock
Wholesale	Total stock

Retail	Total stock
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Questionnaires ask for the level of stocks at the beginning and end of each quarter. All respondents in the same sector, regardless of their employment size, receive the same questionnaire. They are asked to provide figures for a calendar quarter, although some provide data for slightly different periods if this is more convenient. Respondents may also provide estimates of closing stock if the actual figures are not available.

3.2 Sample and Design

The Stocks Inquiry sample is 13,000 businesses with the IDBR used as the sampling frame. Stratification of the Stocks Inquiry is by industrial classification (a single SIC code or groups of SIC codes), employment size band and region.

The sampled size bands are:

- for industries SICs 10 – 42 (20-49, 50-99, 100-299 and 300+)
- for industries SICs 45 and above (10-49, 50-99, 100-299 and 300+)

All businesses in the 300+ employment size band are permanently included in the sample. The smallest businesses in terms of employment (ie, 0-9 employment), are not sampled.

Most industries cover the UK (ie there is no further breakdown), but SICs in the Construction, Motor Trades, Retail and Wholesale sectors are stratified separately into Great Britain and Northern Ireland. The combination of industry, employment size band and region forms a 'cell'.

Using optimal Neyman allocation the sample is allocated in these cells to minimise the variance of the total stocks estimator. A minimum cell size is imposed and small alterations are made based on other evidence.

Combined ratio estimation is used (cells are combined in the same industry across sampled employment size bands) with IDBR employment being the auxiliary variable. The weights are adjusted to account for the smallest unsampled businesses.

3.3 Coverage

The Stocks Inquiry estimates cover UK businesses registered for Value Added Tax (VAT) and/or Pay As You Earn (PAYE) and are classified to [SIC 2003](#)³.

Industries covered are:

Industry	SIC
Mining & quarrying	10,12-14
Manufacturing	15-37
Energy	40-41
Construction	45
Motor trades	50
Wholesale	51
Retail	52

Non-distribution service industries are not covered by the Stocks Inquiry. SICs 55 (Hotels and Restaurants) & 74 (Other Business Activities) were collected between Q1 2000 and Q1 2006.

3.4 Statutory Status

The statutory basis of the Stocks Inquiry in Great Britain is the Statistics of Trade Act 1947 and in Northern Ireland, it is the Statistics of Trade and Employment (NI) Order 1988. Returns for companies in Northern Ireland are sent out by the [Department of Enterprise, Trade and Investment, Northern Ireland \(DETINI\)](#)¹⁹.

3.5 Survey Procedures

Questionnaires are mailed out before the end of the quarter, followed by two written reminders. All key responders who have not replied are telephoned before the first set of results is produced. Respondents in the distribution and services industries may reply using Telephone Data Entry (TDE) - a method of data collection where the responses are made via a telephone using the telephone's keypad functions, as less detail is requested for these industries.

Once the data are put onto the survey system, a series of validation tests are run and businesses re-contacted if the data need to be queried.

Imputed returns are made for all non-responding businesses, based on quarter-on-quarter ratios in the current and previous year. Non-responders selected for the first time are given a constructed value based on average stock for their employment level. Occasionally, manual constructions will be used to override these if more information is known.

The Stocks Inquiry uses combined ratio estimation. The implementation of design and calibration weights ensures the estimates take into account the characteristics of non-selected businesses including the 0-9 employment size band.

Businesses that have stock which is atypical or extreme are treated as outliers. An automatic method called one sided Winsorisation is used. An outlier weight is used to give the business a more appropriate weighting. In some circumstances if more evidence is known outliering may be done manually.

After imputation and estimation, stocks book value data are aggregated to three and four digit SIC, and delivered at this level to National Accounts for them to process further.

3.6 Statistical Disclosure Control

Statistical disclosure control methodology is also applied to data. This ensures that information attributable to an individual organisation is not disclosed in any publication. The [Code of Practice for Official Statistics](#)²⁰, and specifically Principle 5: Confidentiality, set out practices for how we protect data from being disclosed. The Principle includes a guarantee to survey respondents to "ensure that official statistics do not reveal the identity of an individual or organisation, or any private information relating to them". More information can be found on the [Statistical Disclosure Control Methodology](#)²¹ page of the ONS website and the [National Statistician's Guidance on the Confidentiality of Official Statistics](#)²².

4 References

	Title of Reference	Website location
1	Statistical Quality	http://www.ons.gov.uk/about-statistics/methodology-and-quality/quality/index.html
2	UK National Accounts: Concepts, Sources and Methods	http://www.statistics.gov.uk/statbase/product.asp?vlnk=1144
3	Standard Industrial Classification 2003 (SIC2003)	http://www.statistics.gov.uk/statbase/Product.asp?vlnk=14012
4	Gross Domestic Product (GDP)	http://www.statistics.gov.uk/CCI/nugget.asp?ID=56&Pos=3&ColRank=1&Rank=294
5	Index of Production (IOP)	http://www.statistics.gov.uk/statbase/Product.asp?vlnk=6230&More=N
6	Input-Output Supply and Use tables	http://www.statistics.gov.uk/statbase/Product.asp?vlnk=497&More=Y
7	Stocks Triennial Review	http://www.statistics.gov.uk/StatBase/Product.asp?vlnk=9605&Pos=2&ColRank=1&Rank=272
8	UK National Accounts	http://www.statistics.gov.uk/CCI/nugget.asp?ID=55
9	European System of Accounts 1995 (ESA 95)	http://circa.europa.eu/irc/dsis/nfaccount/info/data/esa95/en/esa95en.htm

10	UN System of National Accounts 1993 (SNA93)	http://unstats.un.org/unsd/sna1993/introduction.asp
11	UK Output, Income and Expenditure	http://www.statistics.gov.uk/StatBase/Product.asp?vlnk=1129&Pos=&ColRank=1&Rank=128
12	UK Quarterly National Accounts	http://www.statistics.gov.uk/statbase/Product.asp?vlnk=818
13	UK Economic Accounts	http://www.statistics.gov.uk/statbase/Product.asp?vlnk=1904
14	Monthly Digest of Statistics	http://www.statistics.gov.uk/statbase/Product.asp?vlnk=611
15	UK National Accounts Blue Book	http://www.statistics.gov.uk/statbase/Product.asp?vlnk=1143
16	Time series	http://www.statistics.gov.uk/statbase/tsdtimezone.asp
17	National Accounts revision policy	http://www.statistics.gov.uk/about/methodology_by_theme/revisions_policies/downloads/NA_Revisions_Policy.pdf
18	Annual Business Inquiry	http://www.statistics.gov.uk/abi/
19	Department of Enterprise, Trade and Investment, Northern Ireland (DETINI)	http://www.detini.gov.uk/cgi-bin/gethome
20	Code of Practice for Official Statistics	http://www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html
21	Statistical Disclosure Control Methodology	http://www.statistics.gov.uk/about/data/methodology/general_methodology/sdc.asp
22	National Statistician's Guidance on the Confidentiality of Official Statistics	http://www.statisticsauthority.gov.uk/national-statistician/guidance/confidentiality-of-official-statistics.pdf

Report last updated: January 2010