Office for National Statistics

Annual Business Survey

Background Information 2008 and later

ABS Publications & Special Analysis Section
Room 2.301
Office for National Statistics
Cardiff Road
Newport
NP10 8XG

By telephone on: +44 (0) 1633 456592
Email: ABS publication and analysis

CONTACT INFORMATION

If you require further help or information about the Annual Business Survey please contact us

By email at: ABS publication and analysis

By telephone on:
+44 (0) 1633 456592 Julian Dowsell

By post at:
ABS Publications & Special Analysis Section
Room 2.301
Office for National Statistics
Cardiff Road
Newport
NP10 8XG

Statistician responsible

The statistician responsible for the Annual Business Survey is Heather Bovill who can be contacted by email at the above address
or by telephone on +44 (0)1633 455107.

Contents

General Outline

Coverage

The Annual Business Survey (ABS), formerly (prior to 2009) known as the Annual Business Inquiry - part 2 (ABI/2), is an annual survey of businesses covering the production, construction, distribution and service industries, which represents about two thirds of the UK economy, by Gross Value Added.

Every year, ABS questionnaires are sent by ONS to around 62,000 businesses in Great Britain, while the Department for Finance and Personnel Northern Ireland (DFPNI) send their ABI questionnaires to around 9,000 businesses in Northern Ireland. The details of these businesses, registered for Value Added Tax (VAT) and/or Pay As You Earn (PAYE), are obtained from the ONS's Inter Departmental Business Register (IDBR), (for more details see the heading on The Register below). Since 2008 the industries covered have been classified to the UK Standard Industrial Classification 2007 (1.29 Mb Pdf).

Statistical and reporting units

The survey is addressed to the individual legal unit, i.e. the individual company, partnership, sole proprietorship, etc. In a few cases, combined returns are accepted covering two or more legal units which are not able to provide separate returns.

Questionnaires

As with all its statistical surveys, the ONS is concerned to minimise the form-filling burden of the ABS. The questionnaires are designed to ensure the burden on the individual respondent is kept as low as possible.

A number of different questionnaire-types are used in the survey:

- Long questionnaire-types are sent to all businesses with an employment of 250 or more and also to a proportion of selected businesses with lower employment.
- Short questionnaire-types are sent to the remaining selected businesses.
- From 2002 Northern Ireland data is collected by Department of Enterprise, Trade and Investment in Northern Ireland (DETI) (now the Department of Finance and Personnel (DFPNI)) using their own questionnaires.

The questionnaires differ in that long questionnaire-types ask for a detailed breakdown of turnover; purchases; employment costs; taxes, duties and levies whereas short questionnaire-types just ask for the totals of these variables.

Response

Details of the survey's response rates can be found in an Annual Business Survey Quality Measures reference table published each year. The Statistics of Trade Act 1947 prohibits the disclosure of any information relating to an individual response without the consent of the person carrying on that response. Rigorous checks are made to ensure that information relating to individual businesses is not disclosed, either directly or by deduction, in any of the figures released. Similar precautions will be taken in safeguarding the confidentiality of individual businesses in the preparation of any special analyses and in all other statistics which are made available at any time.

Rounding of figures

Where necessary, figures have been rounded to the nearest final digit shown. Consequently, there may be slight discrepancies within a reference table between totals and the sums of constituent items.

Methods Used

The development of the ABI is described in an article published in the November 2000 edition of Economic Trends, The Development of the ABI (37.7 Kb Pdf).
A more detailed description of the survey methodology is now given in the ABS Technical Report (1.61 Mb Pdf) - August 2012. These articles should be read in conjunction with any methodology information given here.

The Register

The register used for the ABS is the ONS' Inter-Departmental Business Register (IDBR), which consists of information on companies, partnerships, sole proprietorships, public authorities, central government departments, local authorities and non-profit making bodies. The main administrative sources of the IDBR are HM Revenue and Customs (HMRC) for VAT and PAYE details.
The following VAT details are passed to the ONS in respect of each VAT registration and for members of group registrations for use in creating a statistical register or conducting a statistical survey: - VAT number, name, address, trading style, legal status, standard industrial classification and turnover.
The following PAYE information is also passed to the ONS for use in creating a statistical register: - PAYE reference, name, trading style, PAYE registered office address, legal status, Trade Classification Number, birth date, current quarter employees.

Each legal unit is classified to a single activity, whether it is wholly or mainly engaged in that activity. The nature of a business can change with time, possibly because another business has been absorbed in a take-over. Some businesses have a very significant secondary activity, perhaps completely different from their main activity, and a small change of direction can lead to a new main activity and to the reclassification of the business. Other changes may arise from improvements to classification data held on the IDBR as a result of new information received about

individual businesses. The reclassification of businesses for reasons such as these contributes to the year on year changes in the figures published.

Sample Design

The ABS's population of legal units is stratified by SIC (2007), employment, and country using the information from the IDBR. The ABS sampling scheme is designed to give best estimates of the population totals from a stratified random sample of about 62,000 businesses (since the 2009 survey), and involves selecting all the largest businesses with a progressively reducing fraction of smaller businesses. This method ensures the sample size is kept to the minimum required.

The survey results are weighted up to the register population, so that they relate to all active GB businesses on the IDBR for the sectors covered.

Estimation

Weights are produced to enable estimates for all businesses classified to each SIC(2007) to be compiled from data provided by responding businesses. These weights are calculated for each employment size-band within each SIC(2007) and are equivalent to the ratio of responding businesses to the total number of businesses. Northern Ireland and Scotland are sampled and estimated for separately, England and Wales are sampled separately but are combined for the estimation procedure.

Returns for the few large non-responders are imputed for individually. This imputation is normally based on summary data received from the business, or on the business' response to the survey in the previous year adjusted to take account of the likely change in the value of trading over the period.

Regional Estimation

Important Information about Regional Data - The total regional estimate for a variable summed across all regions within any industry will not necessarily equal the UK industry estimate of the variable. This is due to the method of calculating estimated regional data. The regional estimates are constrained to the UK data at the all-industry level (SIC sections A-S).

The ABS regional methodology apportions returned data to the local units (individual sites) of the reporting unit (main site from which data is collected) before the estimation process. The estimation process is then performed at local unit level. For the UK industry level data the estimation process is performed at the reporting unit level.

The local unit estimation process calculates an estimation factor for non-response from the apportioned local unit data. The estimation factor is then applied to the apportioned local unit values to give a total estimate for the local unit population. The estimation factor is calculated using the IDBR employment, classification and region of the local unit. This estimation factor will cause the regional data to differ from the estimated national data and so the data is constrained to the UK all industry level.

The reporting unit estimation process calculates the estimation factor for non-response from the returned reporting unit data. The estimation factor is then applied to the returned reporting unit data to give a total estimate for the reporting unit population. The estimation factor is calculated using the IDBR employment, registered turnover and classification of the reporting unit.

The local unit classification may differ from the classification of the reporting unit and the apportioned value for the local unit will be added to the industry of the local unit, not the industry of the reporting unit as would be the case for UK data.

The sub-national estimates are constrained to the UK data at the all-industry level and so the total regional estimate, for a variable summed across all regions, and all industries, will equal the UK estimate of the variable at the SIC sections A-S level in the national results.

Regional Capital Expenditure

Figures on regional capital expenditure are no longer available from the ABS. Accurate estimation of regional capital expenditure is dependent on there being a strong correlation between the variable on which any estimation is based, in this case local employment, and the variable for which we are attempting to produce estimates, here regional capital expenditure. It has been established that the relationship between regional employment and regional capital expenditure is, in fact, unreliable.

It will still be possible to obtain regional capital expenditure figures by requesting either standard extracts, for which there is no charge, or special analyses, for which a charge will be made. ONS does not recommend the use of these regional capital expenditure figures but recognises that some users will, nevertheless, wish to have them.

For more information about either of these services, please either email abs@ons.gov.uk or telephone +44(0) 1633 456592 for standard extracts or +44(0) 1633 456601 for special analyses.

Further information on the regional methodology is contained in an article published in the November 2000 edition of Economic Trends, The Development of the ABI (37.7 Kb Pdf). Refinements to the methodology have taken place since this article was written; methodological information given on these pages supersedes the Economic Trends article.

Estimates of approximate Gross Value Added shown for regional data will not be exactly the same as those published in the United Kingdom Regional Accounts. They differ in three key areas; adjustments for coverage; adjustments needed to move the accounts onto an ESA 95 basis; and adjustments for balancing purposes. More information can be obtained through the variable information section.

Sampling and other errors

Estimates derived from samples invariably produce results which differ from those that would have been obtained from a complete survey. If a number of different samples were selected then each would produce a different result. Sampling errors measure the extent to which these estimates can be expected to differ from the 'true' value.

These sampling errors are small for the aggregates of the main ABS variables and indeed the sample is specifically designed to achieve this. Quality measures are available for total turnover, approximate gross value added, total purchases and capital expenditure.

However, in addition to sampling errors there is the potential for non-statistical errors which cannot be easily quantified. Examples where these errors may occur are deficiencies in the survey register and errors made by respondents in completing the survey questionnaires.

Expansion of information on the questionnaires

Short questionnaire-types ask only for total turnover; purchases; employment costs; taxes, duties and levies rather than the detailed breakdown asked for on long questionnaire-types.

Proportionate breakdowns of the total turnover; purchases; employment costs; taxes, duties and levies provided by the smallest businesses completing the long questionnaire-types are calculated for each SIC(2007). Factors are then applied to the data against the summary headings on the short questionnaire-types to derive the breakdown for the above variables.

Symbols and abbreviations

The following symbols and abbreviations are used within the ABS data:

.. not available

- nil or less than half the level of rounding

* Information suppressed to avoid disclosure

Variable Information

Number of enterprises

An enterprise is defined as the smallest combination of legal units, which have a certain degree of autonomy within an enterprise group. An enterprise group is simply a number of enterprises under common ownership.

Total turnover

Turnover is defined as Total sales and work done. This is calculated by adding to the value of Sales of goods produced, Goods purchased and resold without further processing, Work done and industrial services rendered and Non industrial services rendered.

Approximate gross value added at basic prices

Gross value added (GVA) represents the amount that individual businesses, industries or sectors contribute to the economy. Broadly, this is measured by the income generated by the business, industry or sector less their intermediate consumption of goods and services used up in order to produce their output. GVA consists of labour costs (e.g. wages and salaries) and an operating surplus (or loss). The latter is a good approximation to profits. The cost of capital investment, financial charges and dividends to shareholders are met from the operating surplus.

Data collected and published through the ONS Annual Business Survey (ABS) are used to produce an approximate estimate of GVA at basic prices. This measure is approximate because it does not allow fully for certain types of National Accounts concepts/issues such as taxes or subsidies or income earned-in-kind.

The ABS forms a major data input in the production of Input-Output Annual Supply and Use Tables used to set the annual level of UK Gross Domestic Product. These National Accounts tables also show industry estimates of GVA at basic prices (see section 2.3 of UK National Accounts), which are different from those shown in the ABS. In producing the Input-Output based estimates of GVA at basic prices fully consistent with the European System of Accounts 1995, there are essentially four key adjustments required to the survey based data: coverage adjustments; conceptual and valuation adjustments; quality adjustments; and coherence adjustments. Details are available of the coherence adjustments on pages 304-305 of the 2006 edition of the United Kingdom Input-Output Analyses.

Estimates of approximate Gross Value Added published by ABS in its regional release will also not be exactly the same as those published in the Regional Accounts for the same reasons.

The gross value added estimate for Group 41.1 (Section F) – Development of building projects, is not considered as National Statistics quality but is included to meet user needs. A gross value added estimate is now published for Real estate activities in Section L and for Insurance activities in Section K.

Total purchases of goods materials and services

This represents the value of all goods and services purchased during the year.

Total employment

This is the point in time estimate of full and part time employees on the payroll plus the number of working proprietors employed on a set day in September.

Total average employment

This is the point in time estimate of full and part time employees on a set day in September, adjusted to give a year average value, plus the number of working proprietors employed on the same day.

Total employment costs

This represents amounts paid during the year to employees. This includes all overtime payments, bonuses, commissions, payments in kind, benefits in kind, holiday pay, employer's national insurance contributions, payments into pension funds by employers and redundancy payments less any amounts reimbursed for this purpose from government sources. No deduction is made for income tax or employee's national insurance contributions etc. Payment to working proprietors, travelling expenses, lodgings allowances, etc are excluded.

Total net capital expenditure

This is calculated by adding to the value of new building work, acquisitions less disposals of land and existing buildings, vehicles and plant and machinery.

Regional capital expenditure data for years later than 2004 will not be available on the ABS website pages. It will be available on request. See the regional capital expenditure section for additional information on regional estimates of capital expenditure

Total net capital expenditure - acquisitions

This is calculated by adding to the value of new building work, acquisitions of land and existing buildings, vehicles and plant and machinery.

Total net capital expenditure – disposals

This is calculated by adding the value of disposals of land and existing buildings, vehicles and plant and machinery.

Total stocks and work in progress - value at end of year

This represents the value at the end of the year for materials, stores and fuel and goods on hand for sale. Amounts for materials which have been partially processed but which are not usually sold without further processing are also included.

Total stocks and work in progress - value at beginning of year

This represents the value at the beginning of the year for materials, stores and fuel and goods on hand for sale. Amounts for materials which have been partially processed but which are not usually sold without further processing are also included.

Total stocks and work in progress - increase during year

This represents the increase during the year for materials, stores and fuel and goods on hand for sale. Amounts for materials which have been partially processed but which are not usually sold without further processing are also included.

Retail Outlets (Only applies to Division 47)

The total number of outlets consists of stores, mail order outlets, market stalls and road side pitches, owned and operated by businesses classified to the retail sector in the UK. It is a point in time estimate made at the end of the calendar year.

There are some methodological differences in the production of the retail outlets data for 2008. Most significantly, the source data for 2008 was sampled on Standard Industry Classification (SIC) 2007. The change of SIC has meant that some activities are now outside the scope of the 2008 retail sample (e.g. household repair) while others are now within scope (e.g. Retail sale of petrol).

Retail Commodities (Only applies to Division 47)

This is a breakdown of the total retail turnover within the retail sector into groupings of like items based upon the European COICOP (Classification of Individual Consumption by Purpose) classification.

The commodity details from ABS are not the same as those for household expenditure in the National Accounts Blue Book and the Input-Output Analyses for two reasons.

- Household final consumption expenditure includes expenditure on commodities sold by all types of seller, not just by businesses classified as retailers in the ABS. However, household final consumption expenditure does not include sales by retailers to businesses.

- The COICOP detail from ABS for retailers and similar information for retail sales by non-retail businesses has not been fully incorporated in the Blue Book because long-run revisions to the National Accounts, necessary to

reconcile results from the 2000 ABS and onwards with earlier years' retail data, have not been made.

For this year's National Accounts, only the revised total retail business information from the ABS has been used to provide a benchmark in deriving estimates of total household final consumption expenditure on goods sold by retailers and non-retailers. This has been supplemented by growth-rate movements of many of the commodities.

Regional Information

ONS has produced ABS estimates for English regions, Scotland, Wales and Northern Ireland. The methodology used to calculate these estimates is consistent across the UK and the resulting estimates are constrained to the UK national estimates at the all-industry level. This regional methodology produces estimates suitable for comparisons to be made between regions of the UK.

Regional capital expenditure data is not available in ABS publications. It will be available on request. See regional capital expenditure for additional information on regional estimates of capital expenditure.

Scotland

The Scottish Executive publishes additional analyses for Scotland based on ABS estimates. These are available on the Scottish Government Website.
Scottish Government Data - More detailed results for Scotland can be obtained:

Susan Duncanson
Tel: 0300 244 6802
email: industrystatistics@scotland.gsi.gov.uk

Scottish Government
Business, Enterprise and Energy Statistics
Office of the Chief Economic Advisor
5 Atlantic Quay
150 Broomielaw
Glasgow
G2 8LU

Wales

The Welsh Government publish Gross Value Added estimates for Wales, these will differ from ONS estimates due to differences in methodology.
Welsh Government Data - Further information can be obtained:

John Morris
Tel: 029 2080 1401
email: morris.john@wales.gsi.gov.uk

Second Floor
Economic and Labour Statistics
Cathays Park
Cardiff
CF10 3NQ

Northern Ireland

Due to the recent transfer of functions, Department of Finance and Personnel (DFP) estimates for Northern Ireland are currently available on the Department of Enterprise, Trade and Investment, Northern Ireland DETI(NI) website. These estimates will differ from ONS Northern Ireland estimates due to differences in the methodology. The DFP methodology, while broadly comparable with that of the UK, is designed to give the best Northern Ireland estimate rather than an estimate which is consistent with the rest of the UK. Users who want to look at trends in results for Northern Ireland are advised to look at the Northern Ireland website.

Department of Finance and Personnel, Northern Ireland Data - More detailed results, special analyses and further information on DFP methodology can be obtained:

Stephanie Harcourt
Tel: 028 9052 9403
email: stephanie.harcourt@dfpni.gsi.gov.uk

Brian Spence
Tel: 028 9052 9424
email: brian.spence@dfpni.gsi.gov.uk

Economic and Labour Market Statistics
Department of Finance and Personnel
Netherleigh
Massey Avenue
Belfast
BT4 2JP

Quality Measures

The ABS is a stratified random sample, using SIC(2007), employment and country as stratifying variables.

As in all samples, the estimates from the survey are subject to various sources of error. The total error in a survey estimate is the difference between the estimate derived from the data collected and the true (unknown) value for the population. The total error consists of two main elements; the sampling error and the non-sampling error.

The ABS is designed to minimise both these errors.

Sampling error

- The sampling error is the error that arises because the estimate is based on a survey rather than a census of the population. The results obtained for any single sample may, by chance, vary from the true values for the population but the variation would be expected to average to zero over a number of repeats of the survey.
- The standard error is the estimated value of the sampling error. Our estimate for a variable, plus and minus the standard error for the variable, gives a range in which the true unknown value for the population should lie. The closer the standard error to 0, the more reliable the estimate.
- The coefficient of variation is the standard error of a variable divided by the survey estimate, and it is used to compare the relative precision across surveys or variables. The closer the coefficient of variation is to 0, the more reliable the estimate.

Sampling errors for ABS surveys are available at 3 digit SIC(2007) group level for the following variables:

- Total Turnover
- Approximate Gross Value Added at Basic Prices
- Total Purchases of Goods and Services
- Total Net Capital Expenditure

Non-sampling error

Non-sampling errors are not easy to quantify and include inadequate coverage, measurement, processing and non-response.
The response rate gives an indication of the likely impact of non-response error on the survey estimates.

A Quality and Methodology Information report for the ABS is available. This gives qualitative information on the various dimensions of ABS quality.

Revisions policy

Planned Revisions

Planned revisions usually arise from either the receipt of additional data from businesses or the correction of errors to existing data by businesses responding to the ABS. Those of significant magnitude will be highlighted and explained.

These revisions to published ABS data can be expected at the following times in the normal course of operation of the ABS:

a) Figures for the current survey year will usually be revised between the provisional and revised national releases.

b) The accompanying figures for the previous survey year will be revised at the current survey year's revised national data release and provisional regional data release.

All other revisions will be regarded as unplanned and will be dealt with by non-standard releases. All revisions will be released in compliance with the same principles as other new information.

Unplanned revisions

All revisions outside those detailed above will be regarded as unplanned. In addition revisions to the current and previous survey years may be issued as unplanned revisions if they are considered to be large enough and of sufficient interest to users that a delay till the next standard release is not justifiable. The timing with which revisions are released will take into account:

a) The need to make the information available to users as soon as practicable,

and

b) The need to avoid two or more revisions (to the same data items) in quick succession, where this might cause confusion to users.

ABS Analyses

Standard Extracts

The following range of standard extracts is available on request:

For 1995-2007 an expanded range of variables for Sections A-O down to 5 Digit Subclass level of SIC(92)/ SIC(2003) and, for 2008 onwards for Sections A-S of SIC(2007) where available.
Retail commodity data down to 5 digit subclass level for Division 52 of SIC(92)/ SIC(2003) for 1995-2007, and Division 47 SIC(2007) for 2008 onwards.

Regional information for 5 main variables at 3 digit Group level for Sections A-O of SIC(92)/ SIC(2003) for 1995-2007, and Sections A-S of SIC(2007) for 2008 onwards.

Bespoke Analyses

Data not available from the standard extract option may be available as a bespoke analysis.

It should be noted that, even through the bespoke analysis service, it will not be possible to produce any back-runs of pre-2008 data based on the new SIC(2007). There is a charge for these analyses and quotations will be given on request.

Once produced, all special analyses will be available free of charge to other users on request.

More information on our standard extracts and special analyses is available from the ABS webpages.

For more information about either of these services please contact us at ABS publication and analysis, or telephone +44 (0)1633 456592 for Standard Extracts or +44 (0)1633 456601 for Bespoke Analysis

Related Articles

The following articles are related to the Annual Business Survey:

ABS Technical Report (1.61 Mb Pdf) - August 2012

Quinquennial full review of the Annual Business Survey 2010 (170.4 Kb Pdf) - April 2011

Progress Report on the Recommendations of the Quinquennial Review of the Annual Business Survey 2010 (73.5 Kb Pdf) – June 2012

Labour Productivity Measures from the Annual Business Inquiry – November 2002

The Development of the ABI (37.7 Kb Pdf) - November 2000

100 Years of the Census of Production in the UK (417.3 Kb Pdf)

Annual Business Survey: Glossary of Terms

Published date: 3rd July 2014

Introduction

The Annual Business Survey (ABS) is the key resource for understanding the detailed structure and performance of businesses across the UK. It is an annual survey of businesses covering the production, construction, service and distribution industries and parts of the agriculture industries which represent the UK Non-Financial Business Economy. This is about two thirds of the UK's whole economy in terms of Gross Value Added. Estimates published include turnover, purchases, approximate Gross Value Added at basic prices (aGVA) and employment costs for industry sectors and the UK Non-Financial Business Economy.

This glossary contains descriptions of terms used within the ABS Release. It is being published to aid users with the terminology used.

Your Views Matter

Please let us know if you feel any terms need to be added to the glossary.

We constantly aim to improve this glossary. We would welcome any feedback you might have, and would be particularly interested in knowing how you make use of the ABS data to inform your work.

Please contact us via email:

abs@ons.gsi.gov.uk or telephone Daniel Ayoubkhani on +44 (0)1633 456391.

Government Statistical Service (GSS)	Section
Gross domestic product (GDP)	Social security costs
Gross wages and salaries – including redundancy and severance payments	Standard Industrial Classification (SIC)
Group	Stocks and work in progress – increase during the year
I.	Stocks and work in progress – value at beginning of year
Inter departmental business register (IDBR)	Stocks and work in progress – value at end of year
L.	Structural Business Statistics (SBS)
Local unit	Sub- class
M.	T.
Motor trades turnover	Taxes, duties and levies paid
N.	Turnover excluding VAT
National accounts	Turnover including VAT
National non-domestic taxes (business rates)	U.
Net capital expenditure	UK Non-Financial Business Economy
Non- motor trades turnover	V.
Non-retail turnover	Value added tax (VAT)
Number of full-time employees – average during the year	Value of industrial services purchased
Number of full-time employees – point in time	W.
Number of part-time employees – average during the year	Work in progress (WIP)
Number of part-time employees – point in time	

GLOSSARY

A.

ABS Government User Group

The primary role of the ABS Government User Group is to liaise with its government users in order that the ABS can, where possible, meet their requirements. The user group reports to the ABS Management Board.

The role of the ABS Government User Group is to:

- Keep government users fully aware of the progress of the ABS;
- Give government users the opportunity to list their requirements and voice any concerns communicate their views to the ABS Management Board;
- Provide feedback in terms of any issues concerning the quality of the ABS data with a view to informing the development and implementation of the survey;
- Communicate and feedback to government users the introduction of proposed changes to the ABS, such as coverage and methodology.

Return to Index

ABS Management Board

The primary role of the ABS Management Board is to communicate to its members any high-level developments affecting the Annual Business Survey (ABS) and associated areas and to make strategic decisions on ABS matters.

The role of the Management Board is to:

- Decide on strategic issues or planned major changes before they are communicated more widely, to the ABS Government User Group for example;
- Be the main forum for communication of ABS high-level issues, whether concerning ABS directly or in Board member areas and affecting ABS. The main focus is on the ABS inter-relationship with National Accounts (NA), Eurostat, Business Data Division (BDD), Information Management (IM) and Survey Methodology (SM);
- Exchange information between Board members, particularly with a view to alerting each other to future developments which might have an impact on their specific area.

Return to Index

ABS Micro-data User Group

ABS micro-data is used extensively by researchers in a wide variety of institutes. The primary role of the ABS Micro-data User Group is to liaise with its micro-data users in order that the ABS can, where possible, meet their requirements. The user group will report to the ABS Management Board.

The role of the ABS Micro-data User Group is to:

- Give micro-data users the opportunity to provide information on how ABS micro-data is being used and the decisions it is informing
- Give micro-data users the opportunity to list their requirements and voice any concerns or difficulties using the datasets with a view to informing developments
- Update micro-data users on progress of the ABS and feedback on decisions taken by ABS Management Board
- Communicate and feedback to micro-data users on the introduction of proposed changes to the ABS, such as coverage and methodology, and seek user feedback

Return to Index

Acquisitions

This is a measure of Capital Expenditure, that is money spent to acquire, improve, repair or upgrade fixed assets. Fixed assets are things such as property, land, machinery and equipment that are expected to be kept for some time, (specifically they are not used up in the production process during the reference year), and that cannot readily be sold or converted into cash. The ABS measure of acquisitions includes many things such as new construction, computer software and replacing things destroyed in circumstances which give rise to an insurance claim, such as fire or flood.

Return to Index

Approximate gross value added at basic prices

Approximate Gross Value Added at basic prices (aGVA) is the amount individual businesses, industries or sectors contribute to the economy.

This is the difference between the value of goods and services produced by a company (called the output) and the cost of raw materials and other inputs which are used up in production of those goods and services (called the intermediate consumption).

Basic prices means that the valuation of output includes net taxes (taxes minus subsidies) on the production process (such as business rates), but not net taxes on individual products that result from that process (such as Value Added Tax (VAT)). Note that intermediate consumption is always valued in purchaser's prices – the amount paid by the purchaser for a good or service, minus reclaimable VAT and any other taxes deductible by the purchaser.

The ABS measure of aGVA can be used as an approximation to the National Accounts measure of Gross Value Added (GVA), or in its own right as a measure of business performance. ABS data are used in the estimation of GVA, but National Accounts carry out coverage, conceptual and coherence adjustments. GVA uses input from a number of sources other than the ABS and covers the whole of the UK economy, whereas the ABS covers just the UK Non-Financial Business Economy, a subset of the whole economy.

More information can be found in the paper '[A comparison between ABS and National Accounts Measures of Value Added]'.

Return to Index

Approximate gross value added at factor cost

Gross Value Added (GVA) at factor cost is equal to GVA at basic prices less net taxes on production. Approximate Gross Value Added at factor cost is an approximation to GVA at factor cost using data from the ABS, and is calculated as Approximate Gross Value Added at basic prices (aGVA) less amounts payable in non-domestic business rates and vehicle excise duty.

Return to Index

Approximate total output at basic prices

Approximate total output at basic prices is calculated as:

total turnover
- VAT paid included in total turnover
- the value of goods and services bought for resale without further processing
+ changes in total stocks and work in progress less changes in stocks of materials, storage and fuels
+ work of a capital nature carried out by own staff for own use (excluding in-house developed computer software)
- total net taxes (or just total taxes for service industries)
+ net taxes on production (business rates + vehicle excise duty - subsides received through the Work Programme)

Basic prices means that the valuation of output includes net taxes (taxes minus subsidies) on the production process (such as business rates), but not net taxes on individual products that result from that process (such as Value Added Tax (VAT)).

Return to Index

B.

Business Register and Employment Survey (BRES)

The ABS does not collect information on employment level, so instead this key information is taken from another source. In the past, employment data were collected via Annual Business Inquiry Part 1(ABS/1), however, in 2009, ABI/1 was replaced with the Business Register and Employment Survey (BRES). The ABS and BRES are both optimal for their respective purposes, however caution should be taken when combining the financial data from the ABS and employment information from BRES to calculate estimates due to differences in methodology.

The survey collects employment information from businesses across the whole of the GB economy for each site that they operate. Northern Ireland data is provided separately by the Department of Finance and Personnel Northern Ireland (DFPNI). This allows the ONS to produce employee and employment estimates by detailed to include in the ABS releases.

Return to Index

C.

Class

See “Section”

Return to Index

Classifications

Statistics are usually compiled from a large set of individual observations.
In order to draw conclusions, these observations need to be grouped or 'classified' together.
A classification assigns items to categories according to shared characteristics, and provides a framework for the description and comparison of statistics.

Classifications facilitate the accurate and systematic arrangement of data according to common properties so that the resulting statistics can be easily reproduced and compared over time as well as between different sources. Classification is an essential part of statistics, and standard classifications are key instruments of official statistics. See also **Standard Industrial Classification**.

Return to Index

Commercial insurance premiums paid

The amount of money to be paid to an insurance company to facilitate insurance cover with that company is called the premium. Premiums are included for all questionnaires of commercial insurance, including insurance premium tax (e.g. fire, motor vehicle, accident, transit within the UK, loss of profit).

Return to Index

Customs and excise duty payable

Amounts paid directly to HMRC are included in the total turnover figure. This includes amounts paid on tobacco, cigarettes, cigars, alcoholic drinks, import duties, petroleum and petroleum products.

Return to Index

D.

Disposals

This is another measure of Capital Expenditure, specifically the proceeds arising from the sale of capital fixed assets no longer required. Fixed assets are things such as property, land, machinery and equipment that have generally been kept for some time. The ABS measure of disposals includes such things as the sale of land, buildings and machinery.

Return to Index

Division

See “Section”

Return to Index

E.

Employment - average during the year

This is the point in time estimate of full-time and part-time employees normally on a set day in September, adjusted to give a yearly average value, based on quarterly data from the Short Term Employment Survey (STES), plus the number of working proprietors employed on the same day. See also **Employment – point in time**.

Return to Index

Employment costs

This includes all gross wages and salaries, employers' National Insurance contributions, contributions to pension funds, overtime, bonuses, commissions, payments in hand, holiday pay by employers and amounts payable to employees through redundancy and severance less any amounts reimbursed for this purpose from government sources.

Return to Index

Employment - point in time

An employee is classed as anyone aged 16 years or over that an organisation directly pays from its payroll, in return for carrying out a full-time or part-time job or being on a training scheme. This includes those temporarily absent but still being paid e.g. absent through sickness or on maternity leave. It excludes Government Supported Trainees and HM Forces. BRES also excludes very small businesses which are below both VAT and PAYE thresholds. Point in time relates to the specific date that the Business Register and Employment Survey (BRES) asks for employment information on their questionnaire, normally in September.

Return to Index

Enterprise

The enterprise is the smallest combination of legal units that is an organizational unit producing goods or services, which benefits from a certain degree of autonomy in decision-making, especially for the allocation of its current resources. An enterprise carries out one or more activities at one or more locations. An enterprise may be a sole legal unit.

So an enterprise brings together legal unit information such as PAYE, VAT, company registration to create a statistical unit.

An enterprise may consist of one or more sites (called local units), for example, the head office for a group of shops. An enterprise may therefore have local units at different locations, and may carry out more than one type of economic activity.

The business unit to which survey questionnaires are sent is called the reporting unit. An enterprise can comprise of one reporting unit, or it can be split into several non-overlapping reporting units. These are identified by grouping lists of local units which have similar activity. Other than for a minority of larger business or businesses which have a more complex structure, the reporting unit is the same as the enterprise.

Return to Index

G.

Government Statistical Service (GSS)

GSS (Government Statistical Service) is a network of professional statisticians and their staff operating both within the Office for National Statistics and across most UK government departments and agencies. Members of this community produce National Statistics and other official statistics including those from the ABS.

Return to Index

Gross domestic product (GDP)

GDP (Gross Domestic Product) is an integral part of the United Kingdom's (UK) National Accounts and provides a measure of the total economic activity in the country. GDP is often referred to as one of the main 'summary indicators' of economic activity.

GVA is a key component of GDP. Estimates of turnover and purchases from ABS are used to produce estimates of output and intermediate consumption (and therefore GVA and GDP) in the National Accounts.

Return to Index

Gross wages and salaries - including redundancy and severance payments

Wages and salaries are a periodic payment paid in cash or kind to employees for their labour. This measure accounts for all workers employed by the company, regardless of working pattern or permanency. It includes Golden Handshakes. It does not include such things as sub-contractors, pay given for piecework and travelling or subsistence expenses, nor rebates from the NI redundancy fund or accrued holiday pay.

Return to Index

Group

See "Section"

Return to Index

I.

Inter-Department Business Register (IDBR)

Introduced in 1994, the IDBR, which is the comprehensive list of UK businesses that is used by government for statistical purposes is fully compliant with the European Union of Regulation on Harmonisation of Business Registers for Statistical purposes. It provides the main sampling frame for surveys of businesses carried out by the ONS and by other government departments including the ABS. It is also a key data source for analyses of business activity.

The IDBR covers over 2.1 million businesses in all sectors of the UK economy, other than some very small businesses (those without employees, and with turnover below the tax threshold) and some non-profit making organisations.

The information used to create and maintain the IDBR is obtained from the five main administrative sources below. These data are provided under various legislation.

1. HMRC VAT - Traders registered for VAT purposes with HMRC
2. HMRC PAYE - Employers operating a PAYE scheme, registered with the HMRC
3. Companies House - Incorporated businesses registered at Companies House.
4. Department for Environment, Food and Rural Affairs (DEFRA) farms
5. Department of Finance and Personnel, Northern Ireland (DFPNI)

As well as the five main sources listed above, a commercial data provider, Dunn and Bradstreet, is used to supplement the IDBR with Enterprise Group information.

In addition the ONS Business Register and Employment Survey (BRES) and other surveys supplement these administrative sources, identifying and maintaining the business structures necessary to produce detailed industry and small area statistics. BRES is the only ONS source of local unit (site) information.

Return to Index

L.

Local unit

This is the basic unit used in analysis of regional data for the ABS. Each Local Unit comprises a single physical site, and there may be many Local Units in a single Reporting Unit. Local Unit data is not requested separately, but estimated from Reporting Unit level information.

Return to Index

M.

Motor trades turnover

Turnover questions on the motor trades' questionnaire are specific to the industry and have a greater breakdown in turnover compared to the other industries.

Turnover in the motor trade industry can be split into Motor trade and Non-motor trade turnover. Motor trade turnover is everything listed below which is not included in non-motor trades turnover.

Turnover consists of total takings or invoiced sales and receipts of the business in connection with the sale of goods and services, including VAT invoiced to the customer. Interest and similar income, other operating income and extra-ordinary income are excluded.

Sales are valued at selling price, before deducting allowances for vehicles traded in. Sales of vehicles and parts to fleet operators are included with retail sales, even if the price charged is the trade price.

The following classifications of goods are to be included in this figure:

- motor vehicles (include cars, motorhomes, caravans and trailers, taxis, vans and other commercial vehicles and public service vehicles, but exclude static caravans and agricultural vehicles);
- demonstration cars (cars registered and used by the manufacturer and resold, including courtesy and self-supply cars);
- demonstration commercial vehicles include trucks and lorries;
- motorcycles including, scooters, mopeds and three wheelers;
- campaign bonuses including tactical and registration bonuses paid by the manufacturer of the sale and marketing of their products;
- petrol filling stations which operate on a commission basis only include the commission paid to them not the petrol sales.

Only applicable for the Motor Trades industry.

Return to Index

N.

National accounts

The National Accounts provide a comprehensive description of all economic activity within the economic territory of the UK. This includes activity involving both domestic units (for example individuals and institutions resident in the UK) and external units (those resident in other countries).

Coverage of the core accounts is all encompassing:

- production;
- consumption;
- generation;
- distribution;
- redistribution of income;
- capital investment;
- and the financing of the above.

These core accounts deal with transactions between the main sectors of the economy, namely households, businesses, government and any international transactions with the rest of the world.

Additionally, accounts are produced for the regions, sub-regions and local areas of the UK, as are satellite accounts which cover activities linked to the economy. Separate from the core accounts, most notably are the environmental accounts.

Return to Index

National non-domestic (business) rates

'Business rates' is the commonly used name for national non-domestic rates, a tax on the occupation of non-domestic properties. These rates are amounts payable via local authorities in respect of industrial and commercial properties. They exclude water rates and sewerage charges.

Return to Index

Net capital expenditure

Capital expenditure can be defined as expenditure on acquiring or adding to the value of fixed assets, or alternately the money gained from disposing of such fixed assets no longer needed by the company. Fixed assets are things such as property, land, machinery and equipment that are expected to be kept for some time.

Net capital expenditure is the balance between money spent on the acquisition of fixed assets, and money gained from the disposal of fixed assets bought previously. Net capital expenditure is calculated as the difference between acquisitions and disposals.

Return to Index

Non-motor trade turnover

Turnover in the motor trade industry can be split into Motor trade and Non-motor trade turnover.

Non-motor trade turnover is everything listed below which is not included in motor trades turnover:

- Claims received from all forms of commercial insurance (e.g. fire, motor vehicles, accident, transit within the UK, loss of proof). Insurance companies should only record claims made on behalf of own business.
- Income derived from the renting of land (if recorded separately within your accounts)
- Interest and dividends
- All trade, cash or other discounts and rebates that are recorded in your profit and loss and/or income and expenditure accounts.

For other turnover included within the motor trades please see "Motor trades turnover".

Only applicable for the Motor Trades industry.

Return to Index

Non-retail turnover

Turnover in the retail industry can be split into retail and non-retail turnover.

Turnover consists of total takings or invoiced sales and receipts of the business in connection with the sale of goods and services. Interest and similar income, other operating income and extra ordinary income is **excluded**.

Examples of non-retail turnover would be:

- Repair of all household goods (including clothing, footwear, household products, clocks, watches and jewellery)
- Turnover arising from service activities (e.g. sales of prepared food and drink consumed on the premises, hire or rental of goods)
- Other non-retail turnover such as wholesaling.

Only applicable for the Retail industry

Return to Index

Number of full-time employees - average during the year

This is the point in time estimate of full -time employees normally on a set day in September. It is adjusted to give a yearly average value based on quarterly data from the Short Term Employment Survey (STES). This includes the number of working proprietors employed on that same day.

Return to Index

Number of full-time employees - point in time

Full-time employees are defined as working more than 30 hours per week, on a specific date.

Return to Index

Number of part-time employees - average during the year

This is the point in time estimate of part-time employees normally on a set day in September, adjusted to give a year average value based on quarterly data from the Short Term Employment Survey (STES).

Return to Index

Number of part-time employees - point in time

Part-time employees are classed as working 30 or less hours per week, on a specific date.

Return to Index

O.

Organisation for Economic Co-operation and Development (OECD)

The OECD provides a forum in which governments can work together to share experiences and seek solutions to common problems. They work with governments to understand what drives economic, social and environmental change. They measure productivity and global flows of trade and investment. They analyse and compare data to predict future trends and set international standards on a wide range of things, from agriculture and tax to the safety of chemicals.

They also look, at issues that directly affect the lives of ordinary people, like how much they pay in taxes and social security, and how much leisure time they can take. They compare how different countries' school systems are readying their young people for modern life, and how different countries' pension systems will look after their citizens in old age.

Return to Index

Other amounts paid for taxes, duties and levies

Covered in other taxes, duties and levies are, stamp duties, council tax, export levies, statutory amounts paid to either Environment Agency (EA), Office of Gas and Electricity Markets (OFGEM) or the Water Regulators – Office of Water Services (OFWAT) in England and Wales and the Scottish Water and Sewerage Customers Council (SWSCC) in Scotland, Consumer and Credit Act fees, franchise payments.

Return to Index

Other services purchased

This covers any services purchased by a firm which are not covered elsewhere on the questionnaire. These include such things as exam costs, postage costs, congestion charges and bank charges among others. There is a comprehensive, though not exhaustive, list of inclusions and exclusions in the notes attached to each ABS questionnaire.

Return to Index

Output

Goods and services produced in the accounting period, broadly estimated as sales plus changes in inventories of finished goods and work in progress, including output for a unit's own final use.

Return to Index

P.

Payments for hiring, leasing or renting plant, machinery and vehicles

Leasing, renting and hiring are processes whereby a business can pay a fixed and/or, periodic payment for use of a fixed asset, without having to pay the full initial outlay to purchase that fixed asset. These payments can be tax-deductible for the firm. Including in the above are rental of property, telephone handsets and modems, car hire or other vehicle hire without drivers and hire of scaffolding.

Return to Index

Payments to sub-contractors

A subcontractor is a person who is hired by a general contractor, or prime contractor, to perform a specific task as part of the overall project, and is normally paid for services provided to the project by the originating general contractor. Payments to subcontractors are classified under general purchases rather than employment costs, as they do not feature on the main contractor's payroll for PAYE purposes.

Return to Index

Purchases

The net costs of purchases made during the period of the return whether or not they were used or resold during the period. Employment costs, stock variation, bad debts, depreciation, interest payments, amounts charged to a capital account and capitalised building repairs are all excluded.

Return to Index

Purchases of advertising and marketing services

Advertising or marketing campaigns including payments for television or radio media, newspaper or billboard space, market research and public relation activities carried out by a third party.

Return to Index

Purchases of computer and related services

Consultancy charges on computer software and hardware, cost of repair, maintenance and installation of office and computing machinery.

Return to Index

Purchases of energy and water products for own consumption

All fuels (e.g. electricity, gas, oil, coal, coke, petrol, diesel), water abstraction application charges, water rates, sewerage charges and any other waste disposal or effluent costs used in the running of own business.

Return to Index

Purchases of goods and materials

This includes the cost of raw materials, components, semi-manufactures, workshop and office materials, transfers of goods to the business from other parts of the company, costs of any materials supplied for work done by a sub-contractor, costs of all materials purchased for use in the installation of customers' goods, purchases of telephones, food and drink used in preparation of meals and drinks, building materials purchased for own use.

Return to Index

Purchases of goods for resale

Goods resold in the same state as bought.

Return to Index

Purchases of road transport services

The cost of freight transport by road, road transport used for movement of furniture or other items, services purchased for own staff use (e.g. buses taxis), amounts payable for road vehicles hired with drivers. Car hire is excluded.

Return to Index

Purchases of telecommunication services

Rental charges on telephone services including mobile phones; cost of all telephone calls; facsimiles; internet services and data transmission.

Return to Index

R.

Region

The Nomenclature of Units for Territorial Statistics (NUTS) is a hierarchical classification of geographical units that provides a breakdown of the European Union's territory for the purposes of producing comparable regional statistics. There are various levels of NUTS from UK countries and regions down to individual wards. The UK is divided into 12 NUTS1 regions, which are used in the ABS Regional release. They include nine English regions, Scotland, Wales and Northern Ireland. These align with the former 'Government Office for the Regions (GOR)' classification which is now obsolete.

Return to Index

Regional apportionment

The business unit to which ABS questionnaires are sent is called the reporting unit. For ABS, the reporting unit represents an enterprise, which may consist of one or more sub-units (called local units). For example, an enterprise might be the head office for a group of shops. An enterprise may therefore have local units at different locations, and may carry out more than one type of economic activity.

To produce the regional estimates, the reporting unit data returned by each business is divided amongst its local units, largely in proportion to the employment in each local unit. Local unit employment is obtained from the Business Register Employment Survey (BRES), which collects data from local units. Results are then aggregated for each country / English region and industry, using the industry classification of the local units.

Each local unit is assigned a single SIC code, which corresponds to the unit's principal activity. Where more than one type of economic activity is carried out by a local unit or enterprise, its principal activity is the activity in which most of the workforce is employed. Hence the estimated regional totals will not necessarily match the corresponding national totals (for example by industry) as local units might not all share the same industry classification as their parent units.

http://www.ons.gov.uk/ons/guide-method/method-quality/specific/business-and-energy/annual-business-survey/quality-and-methods/abs-technical-report---june-2014.pdf

Return to Index

Reporting unit

Reporting Units hold the mailing address of business to which the survey questionnaires are sent. The questionnaire can cover the enterprise as a whole, or parts of the enterprise identified by lists of local units.

Return to Index

Retail turnover

Turnover in the retail industry can be split into retail and non-retail turnover.

This is the amount of money taken by a business for the sale of goods and foods to the general public (not other businesses) for personal or household use. This also includes money taken for repairs and installation of these goods.

Examples of retail turnover are:

- Retail sales from shops (excluding forecourt shops)
- Retail sales by mail order (including retail sales over the Internet)
- Retail sales by direct selling to consumers in their own homes or work places using regular roundsmen (e.g. milk delivery roundsmen)

- Retail sales by direct selling to consumers in their own homes or work places sing independent sales people (e.g. as a member of the Direct Selling Association) including party plan and door-to-door but excluding regular roundsmen.
- All other retail sales including sales of petrol, sales from automatic vending machines and sales by other means.

Only applicable for the retail industry, however, the question does appear on both the Wholesale and Catering forms although the data is not published.

Return to Index

S.

Sales of goods bought for resale without further processing

Also known as “merchanted goods” or “factored goods”, this applies to goods which are bought and sold onwards without any processing carried out in the meantime. Processing would include packaging or labelling, and also includes goods which have been bought on “sale or return” and subsequently sold, not including the cost of those which were returned

Return to Index

Sales of goods produced, work done and services rendered

Turnover consists of total takings or invoiced sales and receipts of the business in connection with the sale of goods and services. Included are all sales made in the year of the return whether or not the goods were produced in the year.

Return to Index

Section

The UK Standard Industrial Classification 2007 (SIC 2007) is divided into 21 sections, each denoted by a single letter from A to U. The letters of the sections can be uniquely defined by the breakdown to the divisions (denoted by two digits) which are broken down into groups (three digits), then into classes (four digits) and, in some but not all cases, again into subclasses (five digits).

For example, in SIC (2007):

section	C	manufacturing (comprising divisions 10 to 33)
division	13	manufacture of textiles
group	13.9	manufacture of other textiles
class	13.93	manufacture of carpet and rugs
subclass	13.93/1	manufacture of woven or tufted carpets and rugs

The full structure of SIC 2007 consists of 21 sections, 88 divisions, 272 groups, 615 classes and 191 subclasses.

The industries covered by ABS are:

- Agriculture (support activities, group 01.6), forestry and fishing – part of section A;
- Production industries – sections B-E;
- Construction industries – section F;
- Distribution industries - section G;
- Non-Financial service industries – sections H, I, J, L, M, N, P (private provision only), Q (private provision only in groups 86.1 and 86.9), R, S.

The main industries excluded by ABS are:

- Agriculture (crop and animal production, groups 01.1, 01.2, 01.3, 01.4 and 01.5) – part of section A;
- Financial activities – section K;
- Public administration and defence – section O;
- Education (public provision) – section P;
- Health (public sector provision in groups 86.1 and 86.9, all medical and dental practice activities in group 86.2).

Data for a small part of the Financial and insurance sector (section K) has been collected by the ABS since 2008, and Insurance and reinsurance (groups 65.1 and 65.2) were previously included in the results. However, following discussions with key users, ONS decided to remove this experimental series from ABS releases for the reference year 2012 onwards due to the continued volatility of the data.

Return to Index

Social security costs

This is composed of Employers' National Insurance contributions and Contributions to pension funds (including lump sum contributions). Employers' pension contributions represent actual net amounts rather than notional values.

Return to Index

Standard Industrial Classification (SIC)

A Standard Industrial Classification (SIC) was first introduced into the UK in 1948 for use in classifying business establishments and other statistical units by the type of economic activity in which they are engaged.

The classification provides a framework for the collection, tabulation, presentation and analysis of data. In addition, it can be used for administrative purposes and by non-government bodies as a convenient way of classifying industrial activities into a common structure.

The Classification which is being used in any analysis is denoted using a 2 digit number which relates to the year in which the Classification was revised, normally the most recent version. Currently, ABS uses SIC(2007), referring to the Classification produced in 2007

Since 1948 the classification has been revised in 1958, 1968, 1980, 1992, 1997, and 2003.

Return to Index

Stocks and work in progress - increase during year

The increase during the year is value of stocks at the end of year minus the value of stocks at the beginning of the year.

Return to Index

Stocks and work in progress - value at beginning of year

The value of stocks at the beginning of the financial year, include all stocks that they hold title to, stocks owned and held by them in the UK or currently in transit within the UK, products that they own title to in the intermediate stages of completion, value of any goods let out on hire, contracts not yet finalised – commission fees for work carried out, building work carried out by themselves.

Return to Index

Stocks and work in progress - value at end of year

The value of stocks at the end of the financial year, include all stocks that you hold title to, stocks owned and held by you in the UK or currently in transit within the UK, products that you own title to in the intermediate stages of completion, value of any goods let out on hire, contracts not yet finalised – commission fees for work carried out, building work carried out by themselves.

Return to Index

Structural Business Statistics (SBS)

ABS data are one of the major sources used to comply with the Structural Business Statistics Regulation (SBS) for annual structural statistics,

SBS describe the structure, activity, competitiveness and performance of economic activities within the business economy down to the detailed level of several hundred sectors. They are used to inform and monitor European Policy.

In broad terms, SBS are compiled from information concerning units engaged in economic activity; the types of statistical units observed are mainly enterprises, although local units are often used for regional SBS, some industrial SBS data relates to the kind of activity unit.

This data is collected within the context of the Council Regulation 58/97 on structural business statistics.

SBS cover the business economy, which includes industry, construction and services. Because of their specific nature and the limited availability of most types of SBS, financial services are included in SBS but treated separately.

SBS do not cover agriculture, forestry and fishing, nor public administration and (to a large extent) non-market services such as education and health.

Return to Index

Sub-class

See “Section”

Return to Index

T.

Taxes, duties and levies paid

This covers the total amount payable in rates, duties, levies and taxes to government. It includes, among other things, business rates, vehicle excise duty, taxes and duties paid to HMRC and charges under the Climate Change Levy.

Return to Index

Turnover excl VAT

Turnover consists of total takings or invoiced sales and receipts of the business in connection with the sale of goods and services. Interest and similar income, “Other Operating Income” and extra ordinary income is **excluded**. VAT invoiced to the customer is excluded.

Return to Index

Turnover inc VAT

Turnover consists of total takings or invoiced sales and receipts of the business in connection with the sale of goods and services. Interest and similar income, “Other Operating Income” and extra-ordinary income should be **excluded**. VAT invoiced to the customer is included.

Return to Index

U.

UK Non-Financial Business Economy

See “Section”

Return to Index

V.

Value added tax (VAT)

A tax on consumption which is paid to the tax authorities by the seller on behalf of the consumer. It is not levied on goods used as intermediate consumption

All VAT is included. The only exception is VAT paid under the Margin Scheme for second-hand goods, works of art, antiques and collectors' items.

Return to Index

Value of industrial services purchased

This covers the amounts payable for various services of an industrial nature. It includes, but is not exclusive to, printing services, repairs and installation of plant and machinery, hire of agricultural and forestry equipment with operator and amounts payable for water abstraction or water discharge consent services. Fuller lists of the values to be included can be found on the notes attached to the SBS questionnaire specific to each industry.

Return to Index

W.

Work in progress (WIP)

WIP consists of goods and services that have been partially processed, fabricated, or assembled by the producer but that are not usually sold or turned over to others without further processing. Products held by the unit which belong to third parties are excluded, as are partially completed structures for which the ultimate owner is deemed to have taken ownership. This can be either by existence of a contract or sale/purchase or because the production is for the business' own use.

Return to Index

Office for National Statistics

Information paper

Annual Business Survey (ABS): Exporters and importers in Great Britain, 2012

Overview

This note provides information on the experimental business export and import statistics from the Annual Business Survey (ABS) to help users determine if the estimates are fit for their purpose. The note explains the background to the estimates, describes the methodology used to compute them, gives guidance on interpretation and provides information on other similar sources. It finishes by outlining future plans for these statistics.

The questions and methodology used to compute these are in their infancy. At this stage the estimates should be considered as ***experimental official statistics****.*

We are constantly working to improve and develop ABS outputs. We would welcome any feedback you might have, and would be particularly interested in knowing how you make use of these data to inform your work. Please contact us via email: abs@ons.gsi.gov.uk or telephone Heather Bovill on +44 (0)1633 455107.

Background

There are a range of sources which provide information on business exporting or importing behaviour, however, these tend to focus exclusively on goods or services rather than providing information on both.

Discussions with users, such as the Department for Business, Innovation and Skills (BIS) and UK Trade and Investment (UKTI), identified a need for a source to supply comprehensive information on business trading behaviour for both goods and services to provide answers to questions such as:

- what share of businesses export goods and/ or services?
- what share of businesses import goods and/ or services?
- are importing businesses also those that export or do some businesses only import or export?

The ABS was identified as the preferred source for collecting this information. The ABS is a sample survey of 62,000 businesses in Great Britain (GB) and 11,000 businesses in

Northern Ireland (NI) each year.[1] Completion of the survey is mandatory under the Statistics of Trade Act 1947 and is a paper questionnaire. The sample is selected from the Inter-Departmental Business Register (IDBR) using stratified random sampling with a census taken of all large businesses (those with 250 or more people in employment) due to the importance of these businesses to the economy. The ABS covers only the UK Business Economy which accounts for approximately two thirds of the UK economy in terms of Gross Value Added.

The industries covered by the survey are:

- Production industries – Part of Section A and Sections B-E
- Construction industries – Section F
- Distribution industries – Section G
- Service industries – Sections H, I, J, L, M, N, P (private provision only), Q (private provision only in SIC 86.1 and 86.9), R and S
- Insurance and reinsurance industries – Section K (65.1 and 65.2).

More details on the methodology of the ABS can be found in the ABS Technical Report.

Methodology

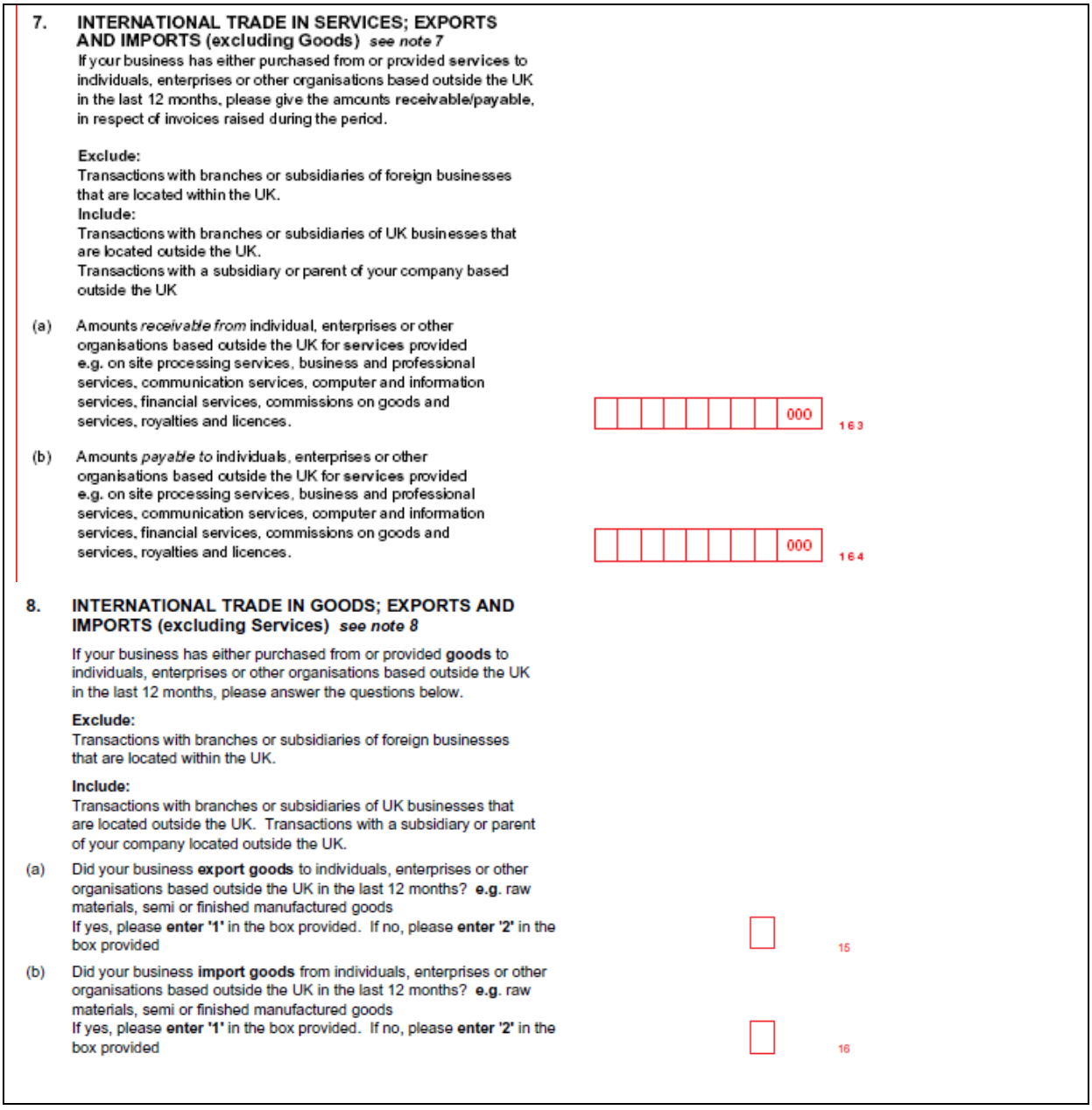
Questions

Since the 2007 reference year, the ABS has included two questions which ask businesses to provide the value of services exports and imports in the last calendar year. For the 2011 reference year two further questions were added to the ABS to determine which businesses exported or imported goods.

The question wording and accompanying notes can be found in Box 1. Respondents are asked to include transactions with a subsidiary or parent of the same company which is located outside of the UK as export activity. The same is applicable to imports.

[1] The ABS is actually a sample of reporting units. The response from the reporting unit can cover the enterprise as a whole, or parts of the enterprise identified by lists of local unit. Other than for a minority of larger business or businesses which have complex structure, the reporting unit is the same as the enterprise. More information can be found in section 3.1 of the ABS Technical Report.

Box 1



7. **INTERNATIONAL TRADE IN SERVICES; EXPORTS AND IMPORTS (excluding Goods)** *see note 7*

If your business has either purchased from or provided services to individuals, enterprises or other organisations based outside the UK in the last 12 months, please give the amounts receivable/payable, in respect of invoices raised during the period.

Exclude:
Transactions with branches or subsidiaries of foreign businesses that are located within the UK.
Include:
Transactions with branches or subsidiaries of UK businesses that are located outside the UK.
Transactions with a subsidiary or parent of your company based outside the UK

(a) Amounts *receivable from* individual, enterprises or other organisations based outside the UK for services provided e.g. on site processing services, business and professional services, communication services, computer and information services, financial services, commissions on goods and services, royalties and licences. — 000 — 163

(b) Amounts *payable to* individuals, enterprises or other organisations based outside the UK for services provided e.g. on site processing services, business and professional services, communication services, computer and information services, financial services, commissions on goods and services, royalties and licences. — 000 — 164

8. **INTERNATIONAL TRADE IN GOODS; EXPORTS AND IMPORTS (excluding Services)** *see note 8*

If your business has either purchased from or provided **goods** to individuals, enterprises or other organisations based outside the UK in the last 12 months, please answer the questions below.

Exclude:
Transactions with branches or subsidiaries of foreign businesses that are located within the UK.

Include:
Transactions with branches or subsidiaries of UK businesses that are located outside the UK. Transactions with a subsidiary or parent of your company located outside the UK.

(a) Did your business **export goods** to individuals, enterprises or other organisations based outside the UK in the last 12 months? **e.g.** raw materials, semi or finished manufactured goods
If yes, please **enter '1'** in the box provided. If no, please **enter '2'** in the box provided — 15

(b) Did your business **import goods** from individuals, enterprises or other organisations based outside the UK in the last 12 months? **e.g.** raw materials, semi or finished manufactured goods
If yes, please **enter '1'** in the box provided. If no, please **enter '2'** in the box provided — 16

The responses to these four questions are used to identify whether each business imports services, exports services, imports goods or exports goods.

Data validation and imputation

As with all surveys the ABS suffers from unit and item non-response. Unit non-response is where a sampled business does not respond at all to the survey while item non-response is where a response is received but there are gaps for some questions.

More detail on how non-response is handled for the ABS can be found in section 5.2 of the ABS Technical Report.

The service export and import questions contain value information similar to other questions on ABS and so non-response is handled in the same way as for other ABS questions, that is a value for large businesses which either do not respond at all or provide a partial response, is imputed based on historical information from the same business or using information from similar businesses. For most other businesses blanks on the forms are assumed to be zero

as reviews of the forms indicate that businesses often leave a question blank rather than entering a zero value.

The categorical, yes/ no, nature of the export and import of goods questions differs from most other questions on the ABS which request values. As such the same imputation approach cannot be easily applied. Instead the following approach was taken:

- All valid responses were assumed correct
- For all those with blank responses for the questions of interest:
    - All large businesses without a questionnaire return were removed from the sample and the data reweighted
    - All businesses reporting zero turnover and purchases were assumed not to export or import goods (these businesses may not have not started trading yet)
    - Remaining responses were then validated against HMRC intra/ extrastat returns for the period. All businesses which had no intra/ extrastat return were assumed not to export or import goods (it was assumed that a blank response to the ABS form meant no exporting or importing of goods). Those with an intra/ extrastat return but a blank ABS response were removed from the sample and the data reweighted, as there was evidence to indicate that the assumption that a blank response meant no exporting or importing of goods may not be valid.

Reweighting procedure

The ABS uses standard statistical weighting methods to produce estimates as described in section 5.4 of the ABS Technical Report. As a result of the data validation and imputation methods described above, a number of businesses were removed from the sample. To account for this change in sample size in the estimation process, the design weights were rescaled such that the weights for the businesses remaining in the sample in each strata sum to the strata population counts. This approach is experimental and differs slightly from the main ABS estimation methodology.

This initial approach for dealing with missing data will be developed and refined going forward as more data becomes available, for example using previously provided information from the same business where current year information is missing.

Coverage and terminology

The estimates do not cover all businesses. They cover registered business in the GB Non-Financial Business Economy.

The following are not covered by these estimates:

- Businesses in Northern Ireland – initially the export and import questions were only asked of businesses in GB. Dependent on user need, coverage of the estimates may be extended in the future.
- Insurance and reinsurance industries (Section K) – ABS only covers a small part of the finance sector (SIC 2007 65.1 and 65.2) and with the financial data currently considered experimental within ABS releases, it was decided not to ask the export questions to this sector at that time.
- Part of agriculture – ABS only covers a small part of the agriculture (support activities 01.6 only)
- Unregistered businesses – businesses which are not registered for PAYE or VAT will not be listed in IDBR and therefore not covered by the ABS.

Interpretation

There are lots of combinations of activities each business can undertake. There are two factors to consider – whether a business is trading internationally and what they are trading (goods, services or both).

Trading internationally

Businesses may import only, export only or undertake both activities. The export figures plus the import figures will not sum to the total proportion of businesses trading internationally as some businesses import **and** export. The tables provide figures for total exporters, total importers and the crossover between these groups to allow this crossover to be adjusted for (see Example 1).

What is being traded?

A further complexity is that a business may export goods only, services only or both goods and services, and similarly for imports. The tables provide figures for goods and/ or services, for goods and for services. The goods figures plus the services figures do not sum to the goods and/ or services figures as some businesses undertake trade in both goods and services. Example 2 illustrates this for exporting.

Commentary and tables

The tables show which businesses import and export by employment size, age and ownership.

- Employment size bands are based on IDBR employment and represent employment of the whole enterprise.
- Age of a business is defined using the birth date, or registration date, of the business held within the IDBR. Mergers and other changes in structure may require re-registration and therefore affect the validity of this date.
- Ownership is where a business has a majority share, and therefore control. Foreign-ownership refers to those businesses that are owned/controlled outside of the UK.

Some enterprises are made up of a number of local units or sites. In some cases the characteristics of these sites may differ from that of the enterprise (reporting unit) for example, in terms of industry or location, and it is not possible to identify from the information collected which sites are involved in importing or exporting. Any breakdowns by industry or region based on the industry or region of the enterprise (reporting unit) may be unrepresentative of trading location or industry type. For this reason regional and industry variables are not provided. Further investigation in to whether any industry or regional splits can be produced will be undertaken.

Counts are rounded to the nearest 100. Percentages were calculated using unrounded data and then rounded to one decimal place. All tables have been checked for disclosure and relevant suppressions applied.

The commentary published with the tables focuses on goods and/ or services in total. As coverage of the ABS estimates is not for all businesses the analysis in the commentary has focussed on percentages rather than level values. For simplicity, the term ‘business’ is used in place of ‘enterprise’.

Example 1

In 2012, of all registered businesses in the Non-Financial Business Economy:

- 11.2% engaged in exporting (of goods and/ or services)
- 10.7% engaged in importing

There was some crossover within these groups with 6.5% of businesses both exporting and importing.

If the exporting and importing share of businesses where added together the group that do both would be counted twice. Therefore the share of businesses engaged in international trade (importing or exporting of goods **and/ or** services) is estimated to be 15.4%, that is:

11.2% (% engaged in exporting)

+ 10.7% (% engaged in importing)

- 6.5% (% that do both)

Another way to consider the data would be to take off the overlap from the share of exporters and share of importers and consider the group that do both separately:

- 4.7% engaged in only exporting
- 4.2% engaged in only importing
- 6.5% engaged in exporting **and** importing

This is illustrated in Figure 1 using rounded data.

Figure 1

Example 2

In 2012, of all registered businesses in the Non-Financial Business Economy:

- 5.9% engaged in exporting of goods
- 6.5% engaged in exporting of services

If the share of businesses exporting goods and exporting services where added together the group that export both goods and services would be counted twice.

The share of businesses engaged in exporting activity (goods and/ or services) is estimated to be 11.2%, so we know that 1.2% of businesses export goods and services.

5.9% (% engaged in exporting of goods)

+ 6.5% (% engaged in exporting of services)

- 11.2% (% that export goods and/ or services)

Another way to consider the data would be to take off the overlap from the % of goods exporters and services exporters and consider the group that do both separately:

- 4.7% engaged in exporting of goods only
- 5.3% engaged in exporting of services only
- 1.2% engaged in exporting of goods **and** services

This is illustrated in Figure 2 using rounded data.

Figure 2

Coherence with other sources

There a range of sources which provide information on business exporting or importing behaviour. Users of these data should note the differences between ABS estimates and those from similar sources. The key sources are described below with differences between these and the ABS estimates highlighted.

The first set of sources provide information on the share of exporters and importers which are the headline figures from the ABS estimates. The ABS tables also provide the number of importers and exporters, so the second set of sources consider other providers of estimates of the level of goods exporters and importers.

Share of exporters/ importers

Small Business Survey (SBS)	
Provides:	Share of Small and Medium Size Enterprises (SMEs) that are exporters.
Key figures:	Latest survey shows 19% of SME employers (and 12% of zero employee enterprises) reported selling goods or services or licensing products outside of the UK in 2012.
Can be used for:	Analysis of SME exporters in the UK sector, region, size and other characteristics over recent years.
Methodology:	• **Sample** – Based on a stratified sample survey of around 5,000 SMEs (<250 employees) in the UK. • **Sample frame** – Dunn and Bradstreet. • **Mode –** The voluntary survey was conducted over the telephone. • **Coverage** – Private sector (SME) business population with results weighted back to the UK SME business population. • **Question** – Respondents are asked "Does your business sell goods or services or licence your product outside the UK?" • The SME Business Barometers also provided information on exporters. These surveys are smaller in size than the SBS (around 500 SMEs) but were more frequent.
Produced by:	Department for Business, Innovation and Skills (BIS)
Main differences from ABS:	• SBS covers all industry sectors. • 2012 SBS fieldwork took place between June and September 2012.

	• SBS covers registered SMEs only. If the ABS figures were constrained to SMEs then the ABS estimate indicates that 10.5% of SME businesses were exporters in 2012. • SBS covers the whole of the UK. • SBS covers only exporting (including licensing products abroad) and not importing.
To find out more:	• The SBS publications can be found here.

Innovation Survey (also referred to as Community Innovation Survey (CIS) and UKIS)	
Provides:	Share of enterprises with 10+ employees that are exporters.
Key figures:	The last survey (CIS7 in 2011) found that around 15% of enterprises with 10+ employees exported in 2010, with some variation by size: • 14% of those with 10-49 employees • 22% of those with 50-99 employees • 26% of those with 100-249 employees; and • 22% of those with 250+ employees.
Can be used for:	Research into the nature and functioning of the innovation system and for policy formation. It is used widely across government, regions and by the research community.
Methodology:	• **Sample** – Based on sample of over 28 thousand UK enterprises. • **Mode** – The voluntary survey was conducted by means of both a postal questionnaire and telephone interview for businesses that had yet to complete a postal response. • **Sample frame** – IDBR • **Coverage** – CIS only covers SIC 2007 Sections B – N. • **Question –** The question asks: "Please ESTIMATE this business's total value of exports for 2010". A copy of the questionnaire used can be found here.
Produced by:	Department for Business, Innovation and Skills (BIS)

Main differences from ABS:	• CIS only covers those businesses with employees of ten or more, excluding the smallest employment size band (1-9). Around 23% of businesses with 10 or more people in employment exported in 2011 according to the ABS. • CIS is for 2010. • CIS only covers SIC 2007 Sections B – N. • CIS7 covers the whole of the UK. • CIS7 covers only exporting and not importing.
To find out more:	• The UKIS publications can be found here.

Internationalisation of EU SMEs	
Provides:	Evidence on SME internationalisation by member state where possible based on survey data
Key figures:	When asked about activity over the 3 year period 2006-08, around 21% of UK SMEs answered “yes” to imports and “yes” to exports.
Can be used for:	Understanding the internationalisation of European SMEs - the barriers and advantages of internationalisation. The study analysed all activities that put SMEs into a meaningful business relationship with a foreign partner: exports, imports, foreign direct investment, international subcontracting and international technical co-operation
Methodology:	• **Sample** – Based on an achieved sample of 9,480 SMEs (from 33 European countries) in spring 2009, including around 600 UK SMEs in the sample. • **Coverage** – Mining; Manufacturing (Food, Textiles, Wood, Publishing, Chemicals, Metal, Machinery, Motor Vehicles, Miscellaneous Manufacturing); Electricity; Construction; Sale of Motor Vehicles; Wholesale Trade; Retail Trade; Hotels; Transport; Real Estate; Renting; Computer; Research; Legal; Other Business; Human Health; Veterinary Health; Other Services • **Question –** The question asks: Enterprise had any own imports in 2006-2008; Enterprise had any direct exports in 2006-2008
Produced by:	Eurostat

Main differences from ABS:	• Looks over a 3-year period. • Covers fewer industry sectors.
To find out more:	The Internationalisation of EU SME can be found here.

Counts of exporters/ importers

Overseas Trade Statistics (OTS) and Regional Trade Statistics (RTS)	
Provides:	OTS: Detailed monthly statistics covering the value of the UK's trade in goods at a disaggregated country and product level. RTS: Quarterly statistics split by UK region covering the value of the UK's trade in goods at disaggregated country and product level.
Key figures:	RTS data for the UK (2012) shows around 18,000 importers from the EU and 98,000 from outside the EU, and 21,000 exporters to the EU and 68,000 to outside the EU. Since some enterprises will export (or import) both within and outside the EU, the individual figures cannot be added to give total exporters (or importers) figures. The total unique importer count is 102,000 and the total unique exporter count is 73,000. *The EU importers and EU exporters figures only relate to businesses that are above the Intrastat Exemption threshold (see below for details).*
Can be used for:	Trend analysis and comparing the relative magnitude of components.
Methodology:	The OTS and RTS are created from three data sources. **Intrastat system**: is a survey to determine the level of trade conducted within the EU. It has been in operation since 1993 for all EU Member States and is linked to the VAT system. All VAT-registered businesses are required to complete two boxes on their VAT returns (arrivals (imports) and dispatches (exports)), which in the UK are normally submitted quarterly. Businesses whose annual value of arrivals and/or dispatches exceeds a given exemption threshold are required to provide an Intrastat declaration each month, showing full details of their arrivals (imports) and dispatches (exports) during that month. The thresholds are reviewed annually to minimise the burden on business of the Intrastat system whilst maintaining the coverage by value of UK trade required by European legislation. For the calendar years 2010 - 2013 these thresholds were set,

	and have remained at £600,000 for arrivals and £250,000 for dispatches. These detailed Intrastat declarations are required to cover at least 95 per cent of the value of trade for arrivals, and at least 97 per cent of the value of trade for dispatches. The trade declarations received are made using commodity codes from the UN Tariff (HS Nomenclature) and its EU derivative the Intrastat Classification Nomenclature (ICN) **Customs system (Extrastat)**: Goods imported to and exported from non-EU countries are usually covered by customs declarations (Single Administrative Document, the SAD) and presented to Customs using the Customs Handling of Import and Export Freight (CHIEF) system. This is an administrative data collection system. In general, these declarations are recorded in the month of account when the declaration was submitted (not necessarily when the goods were imported or exported). r trade with the EU, data is collected via the Intrastat survey esses above the exemption thresholds. For businesses below lds, trade is estimated using the Below Threshold Trade TA) process, by initially summing the values of EU imports and pplied on their VAT returns. The BTTA process estimates the t mass and supplementary units for each combination of 8-digit de and partner country for below threshold businesses.
Produced by:	
Main differences from ABS:	• The OTS and RTS only publish trade in goods statistics. • The OTS and RTS collect EU trade from businesses that are above the Intrastat Exemption Threshold. Non EU trade is collected from Custom Declarations which is an administrative data source. • The EU importers and EU exporters figures only relate to businesses that are above the Intrastat Exemption threshold • Provides details on value of trade as well as counts on number of traders.
To find out more:	• An overview of OTS can be found in the OTS methodology paper here.

International Trade by Enterprise Characteristics	
Provides:	Total intra and extra-EU trade in goods by Member State, by enterprise size, industry, as well as data on number of exporters and importers.
Key figures:	Data for the UK (2010) shows around 132,000 importers from the EU and 101,000 from outside the EU, and 112,000 exporters to the EU and 69,000 to outside the EU. *These estimates include EU importers and EU exporters that are above the Intrastat Exemption threshold.*
Can be used for:	Analysis of UK and other EU Member States trade by enterprise size, industry, for the years 2008, 2009 and 2010.
Methodology:	The compilation of trade flows by enterprise characteristics and is based on linking micro data on intra- and extra-EU trade with structural information from business registers.
Produced by:	Eurostat (from data supplied by individual member states – HMRC provide the data for the UK).
Main differences from ABS:	• It covers trade in goods only. • Latest data are for 2010. • Since some enterprises will export (or import) both within and outside the EU, the individual figures cannot be added to give total exporters (or importers) figures.
To find out more:	The International trade by characteristics information can be found here.

Future plans

Following the publication of the 2012 estimates in November 2013 a review of the methodology will take place to ensure it remains fit for purpose. The review will also assess whether any additional breakdowns of results can be produced such as by industry or region. If you have any comments on the current format of the export and import results or on additional content that would be useful please contact abs@ons.gsi.gov.uk .

It is intended that this import and export breakdown will be provided each November alongside the standard ABS release, with the next update available in November 2014 and containing information for the 2013 survey year. Future outputs will be available on the ONS website via the ABS webpage. At the same time that a new year of data is published, data for the previous year will be revised to reflect additional information received.

13th March 2014

Issued by
Office for National Statistics,
Government Buildings, Cardiff
Road, Newport, NP10 8XG

Media Office 0845 6041858

Information paper

Quality and Methodology Information

General details

Title of output:	Annual Business Survey
Abbreviated title:	ABS
Designation:	National Statistics
Geographic coverage:	UK
Date of last SQR or QMI*:	February 2013
Contact details:	abs@ons.gov.uk

Executive summary

The Annual Business Survey (ABS)[1] formerly known as the Annual Business Inquiry - part 2 (ABI/2), is an annual survey of businesses covering the production, construction, distribution and service industries, which represents approximately two thirds of the UK economy, by Gross Value Added (GVA).

Every year, ABS questionnaires are sent by the Office for National Statistics (ONS) to around 62,000 businesses in Great Britain, and by the Department for Finance and Personnel Northern Ireland (DFPNI) to around 11,000 businesses in Northern Ireland.

ABS is the largest business survey conducted by ONS in terms of the combined number of respondents and variables it covers (62,000 GB questionnaires, with around 600 different questions asked). It is the key resource for understanding the detailed structure and performance of businesses across the UK, and is a large contributor of business information to the UK National Accounts[2].

ABS provides a number of high-level indicators of economic activity such as the total value of sales and work completed by businesses, the value of purchases of goods, materials and services, and total employment costs. The data published are estimates of totals for the calendar year, January to December.

The contribution of different industries to the overall value of economic activity can be assessed. Although estimates of employment from each company are not collected by the ABS, it is possible to get a measure of value added and costs per head to allow better comparison between industrial sectors of different sizes. This can be carried out using employment estimates from the Business Register Employment Survey (BRES), which are published alongside the ABS data in the ABS releases. The indicators in the ABS publications are collected and presented as monetary values or counts, for example, approximate Gross Value Added (aGVA) and numbers of enterprises. They are essentially a snapshot of UK business activity, and can be used to understand the level of the contributions to the UK economy from different sectors of the economy at any one time. The statistics produced are referred to as structural business statistics.

The ABS publishes estimates at national and English Region/UK Country level, for the UK Non-Financial Business Economy and industry breakdowns down to the detailed industry class 4-digit UK Standard Industrial Classification (SIC 2007) level. Further breakdowns by industry and geography, and additional variables are available on request from the ABS Special Analysis[3] team.
ABS outputs may be used to answer questions such as:

- how much wealth has been created in a particular industry?

* Quality and Methodology Information' (QMI) replaced 'Summary Quality Reports' (SQR) from 04/11

- has there been a shift in activity from one industrial sector to another, and which industry groups/classes/subclasses are driving the change?
- are any industries particularly dominant in specific regions or countries of the UK and are there structural changes over time? and
- how productive is a particular industry, such as the chemicals sector, and what is its operating profitability?

Summary of the ABS

What it measures	The ABS measures business and financial information from UK businesses, including total turnover, total employment costs, total purchases, capital expenditure, stocks and other aggregates. Variables derived from these statistics, such as approximate GVA at basic prices are also published by the ABS. Detailed industry and geographical breakdowns are available.
Frequency	Annual - estimates are made for calendar years.
Period available	From 1997. Between 1997 and 2008, ABS estimates were published on the UK Standard Industrial Classification 2003 (SIC 2003) system. In 2008, this system was updated to meet European requirements, and estimates from 2008 are classified by SIC 2007[4]. Estimates from the 1997-2008 time series, converted from SIC 2003 to SIC 2007 are available on the ABS web pages[1].
Sample frame	The ABS sample frame is the Inter-Departmental Business Register (IDBR)[5]. The IDBR covers businesses in all parts of the economy, except those which are not registered for Value Added Tax (VAT) or Pay As You Earn (PAYE), which includes very small businesses, the self-employed, those without employees, and those with low turnover. Some non-profit making organisations are also not registered on the IDBR. There are 2.1 million businesses on the IDBR, covering nearly 99% of UK economic activity. It is used by government departments, including ONS, as the sampling frame for most business surveys. The ABS draws its sample from the 1.9 million businesses which are in scope for the survey.
Sample size	The ABS samples approximately 62,000 businesses across Great Britain. The Department of Finance and Personnel Northern Ireland (DFPNI) supplement the Great Britain sample with a sample of around 11,000 businesses from Northern Ireland.
Sample design	Stratified random sample, where the strata are defined by Standard Industrial Classification (SIC), UK country and employment size.
Imputation	Imputation is mainly carried out for non-responding businesses with an employment of 250 or more, and businesses with smaller employment but high turnover. For other businesses, imputation is not carried out, and totals are estimated using weights adjusted for non-response. To calculate imputed values, ratio imputation is used. This uses, where available, the previous returned value for the business with an estimated growth applied, derived from the returned values of similar businesses.

Estimation	Estimation is carried out using standard statistical techniques for stratified random sampling. Each sampled business is weighted by its design weight (a-weight) and a calibration factor, which is calculated using ratio estimation (g-weight). The a-weight represents the number of similar businesses that each sampled business represents. The g-weight improves the precision of the estimates and corrects for any imbalance in the selected sample by taking account of characteristics of the businesses that were randomly selected. Weights are updated annually.
Outliers	Businesses with atypical values compared with other businesses in their industry and employment size are treated as outliers, using a post-stratification method. Values returned by businesses which are identified as outliers are given a weight of one in estimation calculations, that is, they represent only themselves.
Coverage	The ABS estimates cover the UK Non-Financial Business Economy. This is approximately two-thirds of the whole UK economy, by GVA. The SIC 2007 industries which are included in the survey are: • agriculture (support activities 01.6 and hunting, trapping and related service activities 01.7), forestry and fishing - part of section A; • production industries - sections B-E; • construction industries - section F; • distribution industries - section G; and • other service industries - sections H, I, J, K (insurance and reinsurance, groups 65.1 and 65.2 only)[i], L, M, N, P (excludes public sector), Q (excludes public sector and medical and dental practice activities, group 86.2), R, S.
Publication schedule	• November - national-level Provisional Results release, 11 months after the end of the reference period. • June - national-level Revised Results release, 18 months after the end of the reference period. • July - Provisional Regional Results release, 19 months after the end of the reference period. • June - national-level Final Results release, 30 months after the end of the reference period. Release dates are published on the UK National Statistics Publication Hub Release Calendar[6].

Full details on the background and history, uses and users, and concepts and statistical methods underlying the ABS can be found in the ABS Technical Report[7].

This document contains the following sections:

- Output quality;
- About the output;
- How the output is created;
- Validation and quality assurance;
- Other information, relating to quality trade-offs and user needs, and;
- Sources for further information or advice.

Output quality

This document provides a range of information that describes the quality of the output and details any points that should be noted when using the output.

[i] ABS covers the Insurance and Reinsurance parts of the Financial and insurance sector (groups 65.1 and 65.2 in Section K). However, data for this industry have remained experimental and, due to ongoing volatility, ONS has decided to remove it from the ABS 2012 Provisional release and future ABS releases while a more detailed quality assessment is undertaken. This does not affect other industries.

ONS has developed Guidelines for Measuring Statistical Quality[8]; these are based upon the five European Statistical System (ESS) quality dimensions. This document addresses these quality dimensions and other important quality characteristics, which are:

- Relevance;
- Timeliness and punctuality;
- Coherence and comparability;
- Accuracy;
- Output quality trade-offs;
- Assessment of user needs and perceptions, and;
- Accessibility and clarity.

More information is provided about these quality dimensions in the sections below.

About the output

The ABS meets the quality standards required by its UK and legal obligations for the collection and delivery of business statistics as described below. However, the ABS team also seeks to continually improve the quality of ABS statistics and services for its wider users, informed by the collection and analysis of feedback from users.

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

The ABS collects data which fulfils the UK's obligations under the Structural Business Statistics (SBS) Regulation of the European Union, established by the Council Regulation (EC, Euratom) No 58/97 of 20 December 1996. This established a common framework for the production of Community statistics on the structure, activity, competitiveness and performance of businesses in the Community. It was recast (Regulation (EC) No 295/2008) for the 2008 survey with new demands and the move to SIC 2007. Data are transferred to Eurostat and used for policy monitoring and formulation by the EU, and as a source for annual structural statistics.

The ABS also meets its requirements as a statutory annual survey conducted under the Statistics of Trade Act 1947, for the production of the National Accounts (for the compilation of Supply and Use tables, which provide a framework for understanding and analysing the interdependence of industries in the UK), and to give weights for index aggregation and turnover deflation for the Indices of Services and Production.

Key users of the output include:

- National Accounts - for the compilation of Supply and Use tables, which show the sales and purchases relationships between consumers and producers by industry;
- Indices of Services and Production - to calculate the weights used to produce the indices, and to calculate the deflation of turnover;
- Eurostat - to meet the Structural Business Statistics Regulation requirements for annual structural statistics to inform and monitor European Union policy;
- the Scottish Government and the Welsh Government - to calculate the Scottish and Welsh Indices of Production, to produce Scottish and Welsh Supply and Use tables, to inform and monitor policy;
- the Department for Business, Innovation & Skills - to assess the structure and performance of UK industries;
- the Inter-Departmental Business Register team - to update information on UK businesses held on the register;
- local authorities - for economic research, planning purposes, lobbying and economic strategy development;
- business consultants - to understand trends in industry sectors and UK regions;
- marketing experts - demographic mapping and market segmentation;
- analysts - to carry out detailed analysis of UK business using microdata; and
- other local and national government departments and bodies, businesses, academics and the general public.

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 ABS publishes its releases annually. The UK National Statistics Publication Hub publishes the release dates 12 months in advance, through its Release Calendar[6]. The ABS has consistently met the target publication deadlines. If there are any changes to the pre-announced release schedule, public attention will be drawn to the change and the reasons for the change will be explained fully at the same time, as set out in the Code of Practice for Official Statistics[9].

ABS national provisional results are published 11 months after the end of the calendar year reference period, revised national results are published 18 months after the end of the reference period, and the final revised results are published 30 months after the end of the reference period. In 2012, the ABS team reviewed the timeliness of the publication. The review found that the processing time could potentially be reduced, although some challenges remain before this is possible. The Timeliness review of the Annual Business Survey publication - progress report[10] documents the progress made so far, and the options for improving timeliness.

The long time lag between the collection and publication of ABS results reflects the size and complexity of the survey. Detailed breakdowns by industry and geography require detailed responses from a large number of businesses (62,000 businesses answering questions drawn from a possible 600). It is not possible to collect this large quantity of data more frequently, as this would place an unacceptable level of burden on businesses, and would require a prohibitively large resource to process results. Therefore, the ABS is used to explore the UK Non-Financial Business Economy in detail, but ONS also publishes more timely, but less detailed, short-term indicators (for example the Monthly Retail Sales release). In this way, the need for detailed analysis as well as timeliness is met.

How the output is created

The ABS covers the UK Non-Financial Business Economy, which represents around two-thirds of the whole economy of the UK by GVA. The SIC 2007 industries covered by ABS are:

- agriculture (support activities 01.6 and hunting, trapping and related service activities 01.7), forestry and fishing - part of section A;
- production industries - sections B-E;
- construction industries - section F;
- distribution industries - section G; and
- other service industries - sections H, I, J, K (insurance and reinsurance, groups 65.1 and 65.2 only)[ii], L, M, N, P (excludes public sector), Q (excludes public sector and medical and dental practice activities, group 86.2), R, S.

The main areas excluded are:

- agriculture - section A (crop and animal production, groups 01.1, 01.2, 01.3, 01.4 and 01.5);
- financial activities - section K (groups 64, 65.3, 66);
- public administration and defence - section O;
- activities of households as employers; undifferentiated goods and services-producing activities of households for own use - section T; and
- activities of extraterritorial organisations and bodies - section U.

Employment data are not collected by the ABS. The employment variables published by the ABS are collected by BRES. BRES is optimised for the collection of employment data from local units, and uses different sample and questionnaire designs, and different validation and estimation methodologies to the ABS. The sampling frames are also created at different points in time. This means that care must be taken with the interpretation of measures calculated using the ABS variables and the BRES employment variables, for example, 'per number of people in employment' measures of productivity.

[ii] ABS covers the Insurance and Reinsurance parts of the Financial and insurance sector (groups 65.1 and 65.2 in Section K). However, data for this industry have remained experimental and, due to ongoing volatility, ONS has decided to remove it from the ABS 2012 Provisional release and future ABS releases while a more detailed quality assessment is undertaken. This does not affect other industries.

Sample design

Data are collected for the ABS by ONS from around 62,000 businesses in Great Britain, and by DFPNI from around another 11,000 businesses in Northern Ireland.

Sample selection is carried out using a stratified random sample design. Groups of businesses (called cells) are defined by three criteria: employment size band; industry (SIC 2007); and UK country. There are around 4,000 of these cells in the ABS design. Sample selection occurs independently for each cell. When the sample is designed, the size of the sample in each cell is determined by an algorithm which distributes the sample amongst the cells to give the lowest estimated variance (uncertainty). This design is significantly more efficient (that is, it gives a much more accurate estimate for the same sample size) than a simple, unstratified random sample, or a census with a poor response rate.

Imputation

Imputation techniques are used to estimate the value of the missing data due to non-response.

Imputation is carried out for large businesses with an employment of 250 or more, and for businesses with low employment but high turnover. To calculate imputed values, ratio imputation is used. This uses the returned values of businesses within a similar industry and with a similar size to estimate the value of missing responses.

For non-responding businesses with fewer than 250 employment, and without a high turnover, imputation is not carried out and totals are estimated using adjusted weights.

Estimation

In order to calculate estimates of totals for an entire population from data collected from a sample, ABS uses standard statistical weighting methods. Essentially the results received from the sample are multiplied by two weights:

- the a-weight, also known as the design weight, which accounts for the fraction of the population in a particular stratum that the sample represents for that stratum. So, for example, if one business out of every five is selected in a particular stratum, each selected business will have an a-weight of five, as it 'represents' five business in the population;
- the g-weight, or calibration factor, makes a correction for any imbalance in the sample. For example, in a random selection of five businesses out of a population of 10, it is possible that the five businesses selected have, by chance, higher values for the variables of interest than the non-sampled businesses. If no correction is made, the population total would be over-estimated due to the variability in the population. Auxiliary information, that is, information not collected by the survey, but already available for every business, which is statistically related to the variable of interest, is used to correct for this effect. The ratio of the actual population total for the auxiliary variable to the population total estimated from the sample's auxiliary variables is calculated, and this is called the g-weight. For ABS, the auxiliary variables are the IDBR employment and turnover, with the choice dependent on the variable being estimated. Due to some strata containing small numbers of businesses, g-weights are calculated within groups of strata; strata representing the three smallest size bands are typically collapsed to form a g-weight band whereas strata representing larger size bands are not collapsed.

Outliers

For the ABS, outliers are defined as those returned values which are atypical when compared with similar businesses, and also have a large impact on estimated totals. The method ABS uses to treat outliers is known as the post-stratification method. In this method, the weights of the outliers are reduced to one, so that they do not have a large distorting effect on the estimates. The weights of other businesses in the same cell as the outlier are then recalculated.

Statistical disclosure

Statistical disclosure control methodology is applied to ABS data. This is to make sure that information attributable to an individual or individual organisation is not identifiable in any published outputs. The Code of Practice for Official Statistics[9] and specifically the Principle on Confidentiality set out practices for how individual data are protected from disclosure. The Principle includes the statement that ONS outputs should 'ensure that official statistics do not reveal the identity of an individual or organisation or any private information relating to them, taking into account other

relevant sources of information'. More information can be found in National Statistician's Guidance: Confidentiality of Official Statistics[11] and also on the Statistical Disclosure Control Methodology[12] page of the ONS website.

The ABS Technical Report

The ABS Technical Report[7] describes the procedures used by the Office for National Statistics to produce the Annual Business Survey. The report is aimed at users who want to know more about the background and history, uses and users, and concepts and statistical methods underlying the survey. It includes information about questionnaire development, sample design, data collection, results processing, publications and quality issues.

Further enquiries about ABS can be addressed to the ABS team at abs@ons.gsi.gov.uk, or, to engage in discussion about the ABS and to share information with other users or producers of business statistics, visit the Business and Trade Statistics Community[13] on the Royal Statistical Society's StatsUserNet discussion forum.

Validation and quality assurance

Accuracy

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

The ABS meets its legal requirements for statistical accuracy. However, as in all surveys, the estimates from the ABS are subject to various sources of error. The total error in a survey estimate is the difference between the estimate derived from the data collected and the true (unknown) value for the population. The total error consists of two main elements; the sampling error and the non-sampling error. The ABS was designed to minimise both these errors.

Sampling error

The sampling error is the error that arises because the estimate is based on a survey rather than a census of the population. The results obtained for any single sample may, by chance, vary from the true values for the population but the variation would be expected to be zero on average over a number of repeats of the survey.

- The standard error gives an indication of the magnitude of the sampling error. We expect 95% of our estimates for a variable to be within two standard errors of the true unknown value for the population. The closer the standard error to zero, the more precise the estimate.
- The coefficient of variation is the standard error of a variable divided by the survey estimate, and it is used to compare the relative precision across surveys or variables. The closer the coefficient of variation is to zero, the more precise the estimate in percentage terms.

Sampling errors[14] (652.5 Kb Excel sheet) for the ABS are available down to 4-digit SIC 2007 class level for the following variables:

- total turnover;
- approximate Gross Value Added at basic prices;
- total purchases of goods and services; and
- total net capital expenditure.

Non-sampling error

Non-sampling errors are not easy to quantify but can be caused by coverage issues, measurement, processing and non-response. The response rate gives an indication of the likely impact of non-response error on the survey estimates.

Key non-sampling error quality issues for the ABS are listed below:

- response accuracy - it is difficult to accurately quantify the effect of response inaccuracy. Questionnaires are tailored to industrial sector, so that businesses are only asked to respond to questions relevant to their industry. This helps to reduce inaccuracy. In addition, ABS has a rolling programme of questionnaire reviews, to improve and clarify the survey questions and supporting notes, and hence to help respondents complete the survey more accurately. The Annual Business Survey Questionnaire Review[15] reports on the June 2011 review of the ABS catering and services industries questionnaires. Upon receipt of the questionnaires, responses are validated and edited where necessary. This process involves automatic totalling and

rounding, date tests, and selective editing using the SELEKT tool. For further information on editing, see Section 5.1 of the ABS Technical Report[7].

- ABS calendar year results - ABS results are published for calendar years. However, in order to reduce the burden on respondents, businesses have, and some use, the option to return data for their business year end, covering any 12 month period up to and including the end of the financial year that follows the end of the calendar year. It is possible that, particularly if the economy is undergoing a period of rapid change such as during a recession, the different reporting periods could introduce some bias. A paper on this issue was presented to the GSS Methodology Advisory Committee (MAC)[16] in May 2013. No correction is currently made for this effect and further analysis and consultation will be undertaken before a final decision is reached;
- regional apportionment - data are collected by ABS at the head office level. These data are then divided amongst the businesses' local sub-units ('apportioned') to produce the regional results. This means that the regional results are less accurate than if the data were collected at the sub-unit level, but the burden on businesses and resource costs of carrying out the ABS at the local unit level are prohibitive. At present, employment information from BRES, which is collected at the sub-unit level, is used to apportion national results to regional estimates. Apportionment of Financial Variables Using BRES Local Unit Turnover Data[17] describes the analysis of proposals for apportioning ABS UK financial data to the UK regions using BRES local unit turnover data, which may be a better proxy for most financial variables than employment. Work is underway to investigate the feasibility of using BRES turnover instead of employment for regional apportionment; and
- Industry classification in the IDBR - industry re-classification of a business can occur due to a relatively small change to the nature of its operation, and this can have a significant effect on ABS estimates by industry. In addition, the correction of misclassification of businesses can lead to bias, particularly where there is systematic movement from one industry to another. This is because, where classification updates are identified via survey returns, it is only units in the survey sample which are updated. Where a survey does not cover the whole business population, such as the ABS, re-classification can lead to units moving out of the sample, but never into it. In the ABS, this effect is likely to be small, and is corrected for by adjusting the weights of the businesses which remain in the sample.

More detailed information on these and other quality issues is available in the ABS Technical Report[7].

Coherence and comparability

(Coherence is the degree to which data that are derived from different sources or methods, but refer to the same topic, are similar. Comparability is the degree to which data can be compared over time and domain for example, geographic level.)

ONS produces other business statistics in addition to the ABS, some of which publish the same or similar variables. The Government Statistical Service (GSS) Business Statistics Interactive User Guide[18] allows users to find out what official business statistics are available, and provides information which allows users to choose the right data for their needs. The guide is suitable for non-expert users, and users who are not familiar with the full range of business statistics available. The interactive user guide covers around 200 variables from around 40 different sources.

There are differences between the ABS approximate measure of GVA at basic prices and the measure published by National Accounts[19]. National Accounts carry out scope adjustments, coverage adjustments, conceptual and value adjustments such as subtracting taxes and adding subsidies not included in the ABS measure, quality adjustments and coherence adjustments. The National Accounts estimate of GVA uses input from a number of sources, and covers the whole UK economy, whereas ABS does not include some parts of the agriculture and financial activities sectors, or public administration and defence. ABS total aGVA is approximately two-thirds of the National Accounts whole economy GVA, because of these differences in scope, coverage and calculation.

No real (inflation-adjusted) estimates of regional GVA are published in the National Accounts, however, nominal (non-inflation-adjusted) regional GVA and approximate regional GVA at basic prices are published by Regional Accounts[20] and ABS respectively.

Further discussion of these and other issues is presented in the ABS Technical Report[7].

The ABS is designed in accordance with Eurostat regulations (Regulation (EC) No 295/2008) to ensure comparability across European Union Member States. A key aspect of this is the use of the

UK's Standard Industrial Classification of Economic Activity system (SIC, which is consistent with the European Union's NACE system of industry classification.

The UK is required by European legislation to revise the SIC in parallel with NACE so that both systems remain identical down to and including the 4-digit class level. In the UK SIC, a further breakdown is provided for certain classes by the addition of a 5-digit subclass level. Both the UK SIC 2007 and NACE (Rev. 2) are completely consistent with the fourth revision of the UN's International Standard Industrial Classification of all Economic Activities (ISIC Rev. 4). Results for ABS are available on the SIC 2003 system for the reference years 1995 to 2007. However, following the 2007 review, SIC 2003 was updated to SIC 2007, to reflect changes to the structure of the European economy, for example, the growth in technology industries. As a result, ABS estimates from reference year 2008 onwards are published classified by SIC 2007, and these are not directly comparable with the earlier results published on SIC 2003. In response to user feedback, the ABS team published the 1997 to 2007 time series converted from SIC 2003 to SIC 2007. Converted values for all the variables in the national and regional results are available, for industry levels down to industry division (2-digit SIC).

Other information

Assessment of user needs and perceptions

(The processes for finding out about uses and users, and their views on the statistical products.)

The ABS team welcomes feedback from users through the Business and Trade Statistics Community[13] on the Royal Statistical Society's StatsUserNet. This is a forum to promote dialogue, share information and maintain close liaison between the producers and users of official business and trade statistics. Feedback, comments and requests are also sought from users of the ABS Special Analysis service[3] and through the ABS Government User Group[21].

A summary of user feedback on all aspects of the ABS, together with the ABS team's plans to meet any identified unmet user need, and a summary of the ABS user engagement plan can be found in the document Responding to ABS user needs[22].

Sources for further information or advice

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.)

ONS's recommended format for accessible content is a combination of HTML web pages for narrative, charts and graphs, with data being provided in usable formats such as CSV and Excel. The ONS website also offers users the option to download the narrative in PDF format. In some instances other software may be used, or may be available on request. Available formats for content published on the ONS website but not produced by the ONS, or referenced on the ONS website but stored elsewhere, may vary. For further information please refer to the contact details at the beginning of this document.

For information regarding conditions of access to data, please refer to the links below:

- Terms and conditions (for data on the website)[23];
- Copyright and reuse of published data[24];
- Pre-release access (including conditions of access)[25];
- Accessibility[26].

The ABS publications and data[27] are available free of charge from the ONS website, for reference years 2009 to the present. Releases of the Annual Business Inquiry - part 2 (ABI/2)[28], from 1995 to 2008 are also available. The ABS web pages[1] also host a wealth of information about all aspects of ABS, including sections for:

- News[29];
- User engagement and survey management[30];
- Publications and special analysis[3];
- Quality and methods[31]; and
- History and background[32].

ABS releases include background notes to aid user understanding and interpretation of ABS estimates.

The ABS Technical Report[7] covers all aspects of the production and publication of ABS estimates.

Further enquiries about ABS can be addressed to the ABS team at abs@ons.gsi.gov.uk, or, to engage in discussion about the ABS and to share information with other users or producers of business statistics, visit the Business and Trade Statistics Community[13] on the Royal Statistical Society's StatsUserNet discussion forum.

References

Reference		Website location
1	ABS web pages	http://www.ons.gov.uk/ons/guide-method/method-quality/specific/business-and-energy/annual-business-survey/index.html
2	UK National Accounts	http://www.ons.gov.uk/ons/rel/naa1-rd/national-accounts-concepts--sources-and-methods/august-2011/uk-national-accounts---a-short-guide.pdf
3	ABS Special Analysis	http://www.ons.gov.uk/ons/guide-method/method-quality/specific/business-and-energy/annual-business-survey/publications-and-special-analysis/index.html
4	Standard Industrial Classification system	http://www.ons.gov.uk/ons/guide-method/classifications/current-standard-classifications/standard-industrial-classification/index.html
5	Inter-Departmental Business Register (IDBR)	http://www.ons.gov.uk/ons/about-ons/products-and-services/idbr/index.html
6	UK National Statistics Publication Hub – Release Calendar	http://www.statistics.gov.uk/hub/release-calendar/index.html
7	ABS Technical Report	http://www.ons.gov.uk/ons/guide-method/method-quality/specific/business-and-energy/annual-business-survey/quality-and-methods/abs-technical-report.pdf
8	Guidelines for Measuring Statistical Quality	http://www.ons.gov.uk/ons/guide-method/method-quality/quality/guidelines-for-measuring-statistical-quality/index.html
9	Code of Practice for Official Statistics	http://www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html
10	Timeliness review of the Annual Business Survey publication - progress report	http://www.ons.gov.uk/ons/guide-method/method-quality/specific/business-and-energy/annual-business-survey/quality-and-methods/review-of-abs-timeliness/index.html
11	National Statistician's Guidance: Confidentiality of Official Statistics	http://www.statisticsauthority.gov.uk/national-statistician/ns-reports--reviews-and-guidance/national-statistician-s-guidance/index.html
12	Statistical Disclosure Control Methodology	http://ons.gov.uk/ons/guide-method/method-quality/general-methodology/statistical-disclosure-control/index.html
13	RSS StatsUserNet Business and Trade Statistics Community	http://www.statsusernet.org.uk/communities/viewcommunities/groupdetails/?CommunityKey=36dd28ed-e10a-440e-b7fb-86650b746c43
14	Sampling Errors	http://www.ons.gov.uk/ons/rel/abs/annual-business-survey/2012-provisional-results/rft-abs-qm-2012.xls
15	Annual Business Survey Questionnaire Review	http://www.ons.gov.uk/ons/guide-method/method-quality/specific/business-and-energy/annual-business-survey/quality-and-methods/abs-questionnaire-review-2011.pdf
16	Methodology Advisory Committee (MAC)	http://www.ons.gov.uk/ons/guide-method/method-quality/advisory-committee/24th-meeting/index.html
17	Apportionment of financial variables using BRES local unit turnover data	http://www.ons.gov.uk/ons/guide-method/method-quality/specific/business-and-energy/annual-business-survey/quality-and-methods/apportionment-of-financial-variables-using-bres-local-unit-turnover-data.pdf
18	GSS Business Statistics Interactive User Guide	http://neighbourhood.statistics.gov.uk/HTMLDocs/Interactive_Business_Stats/interactive_business_statistics_user_guide.html
19	National Accounts	http://www.ons.gov.uk/ons/rel/naa2/quarterly-national-accounts/index.html

20	Regional Accounts	http://www.ons.gov.uk/ons/rel/regional-accounts/regional-gross-value-added--income-approach-/index.html
21	ABS Government User Group	http://www.ons.gov.uk/ons/guide-method/method-quality/specific/business-and-energy/annual-business-survey/management-and-user-engagement/index.html
22	Responding to ABS user needs	http://www.ons.gov.uk/ons/guide-method/method-quality/specific/business-and-energy/annual-business-survey/management-and-user-engagement/responding-to-abs-user-needs.pdf
23	Terms and conditions (for data on website)	http://www.ons.gov.uk/ons/site-information/information/terms-and-conditions/index.html
24	Copyright and reuse of published data	http://www.ons.gov.uk/ons/site-information/information/creative-commons-license/index.html
25	Pre-release access	http://www.ons.gov.uk/ons/guide-method/the-national-statistics-standard/code-of-practice/pre-release-access/index.html
26	Accessibility	http://www.ons.gov.uk/ons/site-information/information/accessibility/index.html
27	ABS publications and data	http://www.ons.gov.uk/ons/rel/abs/annual-business-survey/index.html
28	Annual Business Inquiry - part 2 (ABI/2) releases 1995-2008	http://www.ons.gov.uk/ons/rel/abs/annual-business-inquiry/index.html
29	ABS News	http://www.ons.gov.uk/ons/guide-method/method-quality/specific/business-and-energy/annual-business-survey/abs-news/index.html
30	ABS User engagement and survey management	http://www.ons.gov.uk/ons/guide-method/method-quality/specific/business-and-energy/annual-business-survey/management-and-user-engagement/index.html
31	ABS Quality and methods	http://www.ons.gov.uk/ons/guide-method/method-quality/specific/business-and-energy/annual-business-survey/quality-and-methods/index.html
32	ABS History and background	http://www.ons.gov.uk/ons/guide-method/method-quality/specific/business-and-energy/annual-business-survey/history-and-background/index.html

Office for National Statistics

Information paper

Apportionment of Financial Variables Using BRES Local Unit Turnover Data – Investigating the Robustness of the Methodology

Salah Merad, Office for National Statistics *April 2012*

1. Introduction

Local unit turnover has been collected in the Business Register and Employment Survey (BRES) since 2009, and an apportionment methodology that utilises this variable has been developed. It was found that the new methodology should improve the regional estimates of two variables: turnover and purchases. The usefulness of the new methodology for the components of Gross Value Added (GVA), for example 'changes in stocks', would be limited. Because of insufficient resources, BRES turnover data had limited validation in 2009 but no validation in 2010. Although a lot of care was taken is determining valid, and hence usable, data, it is quite likely that some data errors remained in the data. A few cases were found when comparing 2010 data with 2009 data. In one instance, a large value was returned but, because it was transcripted outside the boxes provided on the questionnaire, the return was not scanned – it was captured as a blank. This local unit (LU) is in Wholesale and located in London. When corrected, the proportion of turnover in Wholesale in London was found to be only 1% lower than the corresponding proportion under the current methodology – the difference reported with the original data was 2.5%. Because other data errors may still be present in the data, there may be issues with the reliability of the results, in particular the details.

In this paper we present a comparative analysis of the application of the new methodology to 2009 and 2010 ABS data. In addition to the analysis of regional apportionment of turnover and GVA, we consider year-on-year change in estimates and the issue of volatility in estimates.

2. Results

We present a comparative analysis for the whole economy and for two sectors: Wholesale and Retail (Section G) and Manufacturing (Section C).

2.2 Whole economy

Table 1 shows the regional apportionment of the estimates of turnover in 2009 and 2010 under the current method and the new method. We can see that in both years the London percentage is lower under the new method by 0.7% and 0.4%, respectively. The differences in other regions are similar from year to year. Table 2 shows similar results for GVA: the pattern is similar for London and the East of England, lower by about 0.3% in both years, but other regions, including Scotland, show a different pattern in the two years.

Table 3 shows the year-on-year percentage change in the estimates of turnover, purchases and GVA. It can be seen that for turnover and purchases the magnitude of the changes are comparable in most regions, but the change is much higher under the current method in the North East and Wales. GVA does not follow the same pattern as turnover and purchases; for instance, the magnitude of the change is quite similar in Wales. This is to be expected given that GVA is a derived variable with 11 components.

Table 1. Regional apportionment of turnover

	Turnover in 2009			Turnover in 2010		
Region	Current method	BRES-based method	Difference	Current method	BRES-based method	Difference
NE	2.65	2.75	0.09	2.74	2.73	-0.01
NW	9.22	9.34	0.12	8.88	9.02	0.14
YH	6.09	6.16	0.07	6.05	6.11	0.06
EM	5.34	5.44	0.11	5.10	5.15	0.05
WM	6.97	6.94	-0.03	7.34	7.24	-0.09
EE	7.81	7.78	-0.04	7.97	7.98	0.01
LON	27.31	26.63	-0.68	27.68	27.27	-0.41
SE	15.27	15.31	0.03	14.90	14.99	0.09
SW	6.48	6.57	0.09	6.32	6.38	0.06
Wal	2.96	3.10	0.14	3.20	3.24	0.04
Sco	7.94	8.02	0.08	7.95	8.03	0.08
NI	1.97	1.97	0.00	1.86	1.86	0.00
Total	100.00	100.00	0.00	100.00	100.00	0.00

**For definitions of regions see annex 1.*

Table 2. Regional apportionment of GVA

	GVA in 2009			GVA in 2010		
Region	Current method	BRES-based method	Difference	Current method	BRES-based method	Difference
NE	2.72	2.87	0.15	2.85	2.88	0.03
NW	9.55	9.63	0.07	10.09	10.07	-0.02
YH	6.29	6.32	0.02	6.06	6.25	0.20
EM	5.54	5.65	0.11	5.34	5.28	-0.06
WM	6.44	6.59	0.15	7.08	7.07	-0.01
EE	8.22	7.93	-0.29	8.20	7.88	-0.32
LON	23.40	23.04	-0.35	23.08	22.82	-0.26
SE	15.34	15.58	0.24	15.10	15.40	0.30
SW	7.45	7.55	0.10	7.19	7.31	0.12
Wal	2.90	3.05	0.15	2.81	2.92	0.11
Sco	10.16	9.82	-0.34	10.24	10.16	-0.07
NI	1.97	1.97	0.00	1.96	1.96	0.00
Total	100.00	100.00	0.00	100.00	100.00	0.00

Table 3. Year-on-year percentage change in estimates – Whole economy

	Turnover		Purchases		GVA	
Region	Current method	BRES-based method	Current method	BRES-based method	Current method	BRES-based method
NE	9	5	10	6	8	3
NW	1	2	0	0	9	7
YH	5	4	9	7	-1	2
EM	1	-1	2	2	-1	-4
WM	11	10	12	12	13	10
EE	7	8	10	11	3	2
LON	7	8	8	10	1	2
SE	3	3	5	5	1	2
SW	3	2	4	3	-1	-1
Wal	14	10	22	16	-1	-2
Sco	5	5	7	5	4	6
NI	-1	-1	-2	-2	2	2
Total	5	5	7	7	3	3

2.2 Analysis in some sectors

Wholesale and Retail

From Table 4, it can be seen that London shows a fall of nearly 1% in both years under the new method in its percentage of the turnover estimate in this sector; the differences in other regions are quite small. For GVA (see Table 5), the picture is less clear: London shows a fall in both years under the new method, but the magnitude is much higher in 2010 (-1.3% against -0.5% in 2009); the South East moves in the opposite direction to London; the East of England shows quite a large fall in both years. The year-on-year change for turnover and purchases is similar to that under the whole economy, but the pattern is quite different for GVA. In many regions, even though there is little difference in the percentage changes in turnover and purchases, GVA shows a large difference between the two methods - the regions NW, YH, EM, WM and the SE are examples of this (see Table 6). In Scotland, the difference between the two methods is quite dramatic: the percentage change is -11% under the current method and 12% under the new method. This is because the year-on-year change under the new method is higher for turnover and lower for purchases. Still, it would be useful to carry out more data checks and external validation, against other sources if available, to see which method produces the more reliable estimates of GVA.

Table 4. Regional apportionment of turnover in Wholesale and Retail

	Turnover in 2009			Turnover in 2010		
Region	Current method	BRES-based method	Difference	Current method	BRES-based method	Difference
NE	1.82	1.99	0.17	1.80	1.87	0.07
NW	8.34	8.45	0.11	7.69	7.80	0.11
YH	4.90	4.94	0.04	5.05	5.15	0.10
EM	4.71	4.87	0.16	4.45	4.58	0.13
WM	6.57	6.49	-0.07	6.64	6.44	-0.20
EE	7.57	7.51	-0.06	7.73	7.76	0.03
LON	36.65	35.81	-0.84	37.52	36.68	-0.83
SE	14.99	14.98	-0.01	14.50	14.70	0.20
SW	5.86	6.01	0.15	5.95	6.05	0.10
Wal	2.06	2.26	0.20	2.28	2.35	0.08
Sco	4.76	4.92	0.16	4.68	4.91	0.23
NI	1.77	1.78	0.00	1.72	1.70	-0.01
Total	100.00	100.00	0.00	100.00	100.00	0.00

Table 5. Regional apportionment of GVA in Wholesale and Retail

	GVA in 2009			GVA in 2010		
Region	Current method	BRES-based method	Difference	Current method	BRES-based method	Difference
NE	2.86	3.30	0.44	2.81	3.01	0.20
NW	11.65	11.73	0.08	12.98	12.13	-0.85
YH	6.82	6.56	-0.26	6.44	7.10	0.66
EM	6.99	7.12	0.13	6.85	7.01	0.16
WM	5.95	6.88	0.92	7.38	7.57	0.19
EE	11.17	10.22	-0.94	10.33	9.12	-1.21
LON	17.97	17.43	-0.53	16.32	14.99	-1.33
SE	16.32	16.88	0.55	17.01	18.41	1.40
SW	7.15	7.59	0.43	7.50	7.81	0.31
Wal	2.88	3.29	0.41	2.61	3.12	0.51
Sco	7.66	6.45	-1.21	6.74	6.86	0.12
NI	2.57	2.55	-0.03	3.03	2.87	-0.16
Total	100.00	100.00	0.00	100.00	100.00	0.00

Table 6. Year-on-year percentage change in estimates in Wholesale and Retail

	Turnover		Purchases		GVA	
Region	Current method	BRES-based method	Current method	BRES-based method	Current method	BRES-based method
NE	5	1	7	2	-1	-4
NW	-2	-1	0	2	13	9
YH	10	12	15	13	-5	14
EM	1	1	1	1	-1	4
WM	8	7	8	8	25	16
EE	9	11	13	15	-7	-6
LON	9	10	10	11	-8	-9
SE	3	5	4	5	5	15
SW	8	8	9	8	6	9
Wal	18	12	24	15	-8	0
Sco	5	7	9	6	-11	12
NI	3	3	0	0	19	19
Total	6	7	8	9	1	6

Manufacturing

Table 7, Table 8 and Table 9 show the results in Manufacturing. The differences between the regional proportions are generally small in both years for turnover; however, for GVA there are some rather notable differences in 2010; for example, in the region NW, where the percentage under the new method is about 1% higher, and the region EM , where the percentage under the new method is about 1% lower.

Table 7. Regional apportionment of turnover in Manufacturing

	Turnover in 2009			Turnover in 2010		
Region	Current method	BRES based method	Difference	Current method	BRES-based method	Difference
NE	4.76	4.71	-0.05	5.30	5.21	-0.10
NW	13.42	13.49	0.07	14.56	15.00	0.44
YH	10.39	10.42	0.04	10.25	10.41	0.15
EM	9.06	9.24	0.18	8.81	8.59	-0.22
WM	9.28	9.32	0.04	9.97	10.06	0.09
EE	8.32	8.30	-0.03	8.71	8.74	0.03
LON	5.47	5.17	-0.30	4.63	4.54	-0.09
SE	12.88	12.83	-0.05	11.66	11.90	0.25
SW	7.29	7.29	0.00	7.50	7.20	-0.30
Wal	7.38	7.55	0.18	7.71	7.69	-0.01
Sco	8.04	7.96	-0.08	7.38	7.13	-0.25
NI	3.73	3.72	-0.01	3.52	3.54	0.02
Total	100.00	100.00		100.00	100.00	

Table 8. Regional apportionment of GVA in Manufacturing

	GVA in 2009			GVA in 2010		
Region	Current method	BRES based method	Difference	Current method	BRES-based method	Difference
NE	3.76	3.78	0.02	4.54	4.57	0.02
NW	13.40	13.54	0.14	16.11	17.17	1.06
YH	10.40	10.51	0.12	9.01	9.42	0.41
EM	9.41	9.80	0.39	8.93	7.87	-1.06
WM	8.68	8.85	0.17	9.65	10.03	0.38
EE	9.20	8.89	-0.30	9.70	9.65	-0.05
LON	5.39	5.31	-0.08	5.37	5.38	0.01
SE	12.26	12.36	0.11	9.51	10.13	0.62
SW	8.25	8.17	-0.08	9.04	8.21	-0.83
Wal	5.36	5.41	0.05	5.94	5.88	-0.06
Sco	10.23	9.71	-0.52	8.89	8.31	-0.58
NI	3.67	3.65	-0.01	3.30	3.39	0.08
Total	100.00	100.00		100.00	100.00	

Table 9. Year-on-year percentage change in estimates in Manufacturing

	Turnover		Purchases		GVA	
Region	Current method	BRES based method	Current method	BRES based method	Current method	BRES based method
NE	20	18	21	19	33	29
NW	16	18	9	11	32	35
YH	6	6	13	13	-5	-4
EM	4	-1	5	6	4	-14
WM	15	15	16	16	22	21
EE	12	12	13	13	16	16
LON	-9	-6	-12	-8	9	8
SE	-3	-1	4	6	-15	-13
SW	10	5	3	2	20	7
Wal	12	8	12	9	22	16
Sco	-2	-5	1	-2	-5	-9
NI	1	1	5	5	-1	-1
Total	7	6	8	8	10	7

2.3 Volatility analysis

An important quality criterion for estimates is their year-on-year volatility. The analysis needs to be based on a large of number of estimates to obtain reliable results. Therefore, we consider the magnitude of the year-on-year percentage change in the regional estimates of turnover and GVA under the current and new methods at Division level. Figure 1 and Figure 2 show a scatter plot of turnover and GVA estimates, respectively, under the two methods. It is not easy to see from the plots which method shows a lower magnitude of year-on-year change; a statistical analysis shows that the magnitude of change under the new method is not significantly different than under the current method.

Figure 1.

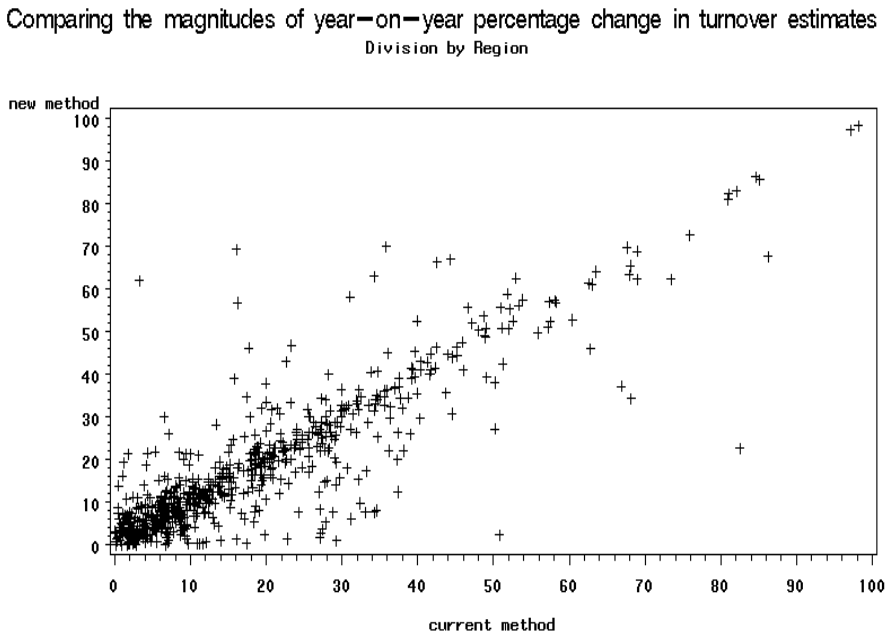
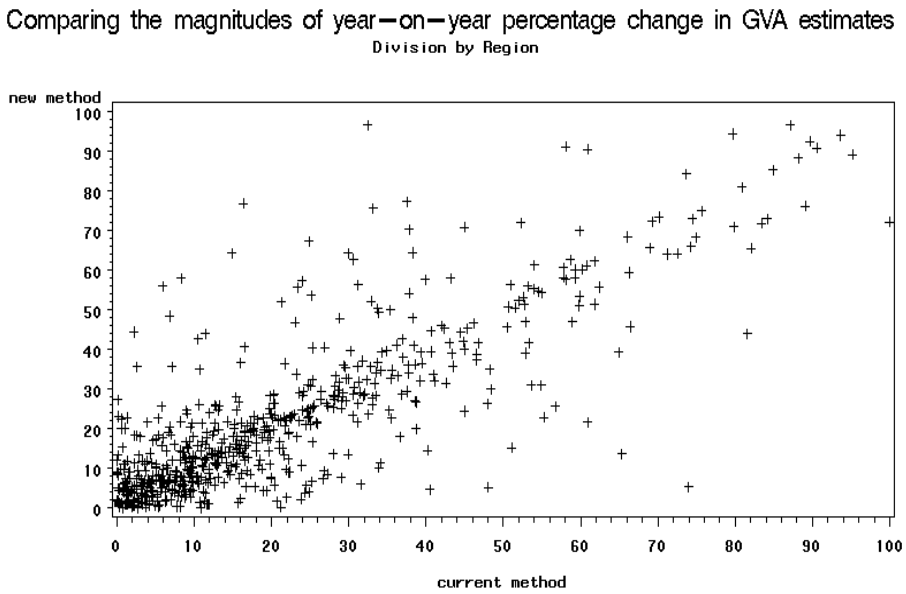


Figure 2.



3. Conclusion

As was noted in the previous report on the new methodology, the validation of the collected turnover data is important: it was only carried out partially in 2009 and it was completely absent in 2010. A lot of effort was spent in determining what data to use in the development of the models for the new methodology, but errors may have remained undetected. Therefore, caution is needed in the interpretation of the results of the analyses presented in this paper. The results should be broadly reliable but the exact differences between the methods, in particular at lower levels of aggregation, would probably be sensitive to changes in the data. The analyses show that the performance of the new apportionment method is broadly consistent in the two years it was applied, 2009 and 2010, and hence the new method should be robust. For instance, the London percentage of total turnover is lower than under the current method by about 1% in both years. The picture is more complex for GVA, even at sector level. A striking example is that of Wholesale and Retail in Scotland. The current method shows an 11% year-on-year percentage fall in the estimate, whereas the new method shows a 12% percentage increase. Several other regions show large differences between the two methods. It would be very useful to carry out more checks on the data and consistency checks with other data sources to see which method produces the more reliable estimates. With regard to volatility, there is no significant difference between the current method and new method according to the measure used in this paper. A more useful measure would be the standard error of the regional estimates; unfortunately, the methodology and system for producing standard errors are not readily available. This could be done in the future if a resource was made available.

Annex 1.

Code	Region	Description
NE	North East	Tees Valley & Durham
		Northumberland & Tyne & Wear
NW	North West	Cumbria
		Cheshire
		Greater Manchester
		Lancashire
		Merseyside
YH	Yorkshire & The Humber	East Riding & North Lincolnshire
		North Yorkshire
		South Yorkshire
		West Yorkshire
EM	East Midlands	Derbyshire & Nottinghamshire
		Leicestershire, Rutland & Northamptonshire
		Lincolnshire
WM	West Midlands	Herefordshire, Worcestershire & Warwickshire
		Shropshire & Staffordshire
		West Midlands
EE	East of England	East Anglia
		Bedfordshire & Hertfordshire
		Essex
LON	London	Inner London
		Outer London
SE	South East	Berkshire, Buckinghamshire & Oxfordshire
		Surrey, East & West Sussex
		Hampshire & Isle of Wight
		Kent
SW	South West	Gloucestershire, Wiltshire & North Somerset
		Dorset & Somerset
		Cornwall & Isles of Scilly
		Devon
Wal	Wales	West Wales & The Valleys
		East Wales
Sco	Scotland	North Eastern Scotland
		Eastern Scotland
		South Western Scotland
		Highlands & Islands
NI	Northern Ireland	Northern Ireland

Office for National Statistics

A Comparison between Annual Business Survey and National Accounts Measures of Value Added

24 April 2014

Daniel Ayoubkhani

Office for National Statistics

2014

Official Statistics

ONS official statistics are produced to the high professional standards set out in the Code of Practice for Official Statistics.

About us

The Office for National Statistics

The Office for National Statistics (ONS) is the executive office of the UK Statistics Authority, a non-ministerial department which reports directly to Parliament. ONS is the UK government's single largest statistical producer. It compiles information about the UK's society and economy, and provides the evidence-base for policy and decision-making, the allocation of resources, and public accountability. The Director-General of ONS reports directly to the National Statistician who is the Authority's Chief Executive and the Head of the Government Statistical Service.

The Government Statistical Service

The Government Statistical Service (GSS) is a network of professional statisticians and their staff operating both within the Office for National Statistics and across more than 30 other government departments and agencies.

Contacts

This publication

For information about the content of this publication, contact Heather Bovill
Tel: 01633 45 5107
Email: heather.bovill@ons.gsi.gov.uk

Other customer enquiries

ONS Customer Contact Centre
Tel: 0845 601 3034
International: +44 (0)845 601 3034
Minicom: 01633 815044
Email: info@statistics.gsi.gov.uk
Fax: 01633 652747
Post: Room 1.101, Government Buildings,
Cardiff Road, Newport, South Wales NP10 8XG
www.ons.gov.uk

Media enquiries

Tel: 0845 604 1858
Email: press.office@ons.gsi.gov.uk

Copyright and reproduction

Any enquiries regarding this publication should be sent to: info@statistics.gsi.gov.uk

This publication is available for download at:
www.ons.gov.uk

Summary

Gross Value Added (GVA) is a component of Gross Domestic Product (GDP) – a measure of economic activity within the UK. It is a key measure of economic performance produced by the UK National Accounts and, under the production approach to estimation, is calculated as the difference between the values of the output (goods and services produced) and the intermediate consumption (goods and services used up in the process of producing the output) within the economy. Approximate Gross Value Added (aGVA) is a measure produced by the Annual Business Survey (ABS), outside of the National Accounts framework. It can be used as an approximation to GVA, or in its own right as a measure of business performance. There are situations when aGVA may in fact be the preferred measure, for example when information at a very low level of industrial detail is required.

Estimates of turnover and purchases from the ABS are used to produce estimates of output and intermediate consumption (and therefore GVA) in the National Accounts. The process of converting ABS estimates to National Accounts estimates consists of a number of adjustments which can summarised as:

- removal of non-market activity included in the ABS coverage;
- adjustment to align with estimates of net taxes on production used in the National Accounts;
- adjustment to align with estimates of inventories (finished goods, stocks of materials, storage and fuels, and work in progress) used in the National Accounts;
- coverage adjustments;
- conceptual adjustments;
- addition of own-use and non-market output using data from other sources;
- coherence (balancing) adjustments.

Although ABS data are used in the production of output and intermediate consumption, many other sources (including surveys and administrative sources) are also used to produce National Accounts estimates. These include sources of data on taxation and inventories (which are preferred to the ABS as they are used consistently throughout all parts of the National Accounts), as well as own-use output and non-market output (as these activities are only partially covered by the ABS).

There are differences between the two measures of gross value added in terms of coverage. For example, GVA covers the whole of the UK economy while aGVA covers the UK Non-Financial Business Economy, a subset of the whole economy that excludes large parts of agriculture, all of public administration and defence, publicly provided healthcare and education, and the financial sector.

There are conceptual differences between the two measures of gross value added. For example, some production activities such as illegal smuggling of goods must be included in the National Accounts but are outside the scope of the ABS.

There are three approaches to measuring GDP; one based on production activity, one based on expenditure, and one based on income. In theory, the three approaches should produce the same estimate of GDP. However, in practice this is never the case because the three approaches make use of different data sources, each with their own definitions and limitations. The three different estimates are therefore reconciled in a process known as *Supply and Use balancing*. The balancing process is informed by a variety of data sources, and results in adjustments to estimates of output and intermediate consumption. For many industries, the balancing adjustment is the greatest source of difference between estimates from the ABS and the National Accounts.

When deciding which estimate of gross value added to use for their analysis, users should consider a number of factors including:

- coverage;
- industrial detail;
- quality measurement;
- comparability over time;
- timeliness;
- concepts.

1. Introduction

Background

The Annual Business Survey (ABS) is an annual survey of businesses covering the production, construction, distribution and most service industries. It was introduced in 1998 under the name “Annual Business Inquiry – part 2” (ABI/2).

ABS questionnaires are sent to a sample of around 73,000 UK businesses each year, with the Office for National Statistics (ONS) surveying around 62,000 businesses in Great Britain and the Department for Finance and Personnel – Northern Ireland (DFPNI) surveying around 11,000 businesses in Northern Ireland. The ABS is the largest business survey conducted by ONS, and is a key resource for understanding the structure and performance of businesses across the UK.

A large number of variables are available from the ABS; each survey respondent is typically asked between 15 and 70 different questions (depending on the industry of the business), with the responses then being used to derive further variables. Some of the most frequently used variables for analytical purposes include: *turnover* (the total value of businesses’ sales); *purchases* (the total value of goods and services purchased during the year and consumed by businesses in order to generate turnover); and *approximate Gross Value Added* (or aGVA, a measure of the amount that businesses contribute to the economy).

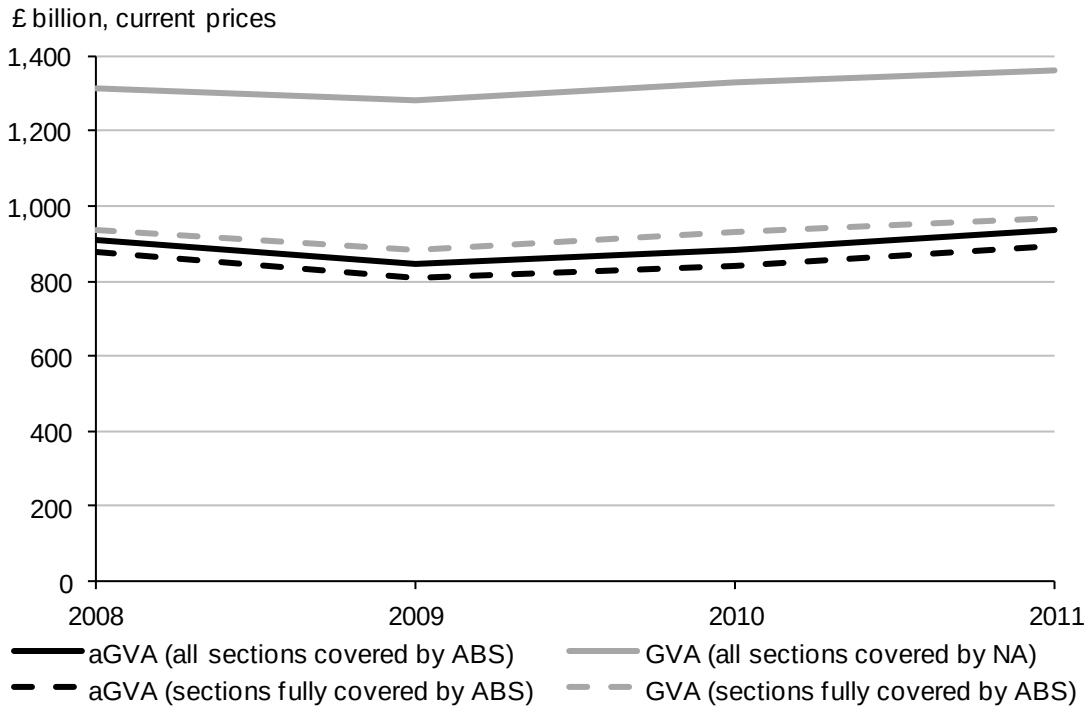
Statistics from the ABS are produced in line with various EU statistical regulations, ensuring comparability as well as having links to various users, and uses, of business statistics. The ABS provides data that help fulfil the UK’s obligations in meeting the EU Structural Business Statistics Regulation (SBSR).

Users of the ABS include: UK government departments, devolved administrations and local authorities (to set and monitor national and regional policies); international organisations such as Eurostat and OECD (to inform European Union policies and to make international comparisons of business performance); researchers representing universities, think tanks and consultancies (who sometimes want to answer specific research questions using the survey micro-data via the Virtual Microdata Laboratory or UK Data Service); and the general public (who will often engage with the data either directly or via the media). However, one of the biggest ABS users is ONS itself, as ABS data represent a key contribution to the UK National Accounts, particularly in the production of Gross Value Added (GVA).

Gross Value Added and its approximation

The term “approximate” in “approximate Gross Value Added” reflects the fact that the ABS measure of aGVA can be used as an approximation for the National Accounts measure of GVA. Figure 1.1 compares aGVA and GVA between 2008 and 2011 when all covered sections of the economy are considered (solid lines) and when only those sections covered by the ABS are considered (dashed lines). When all covered sections are considered, aGVA is between 66% and 69% of GVA in each of the years due to differences in concepts, coverage and data sources. However, when only those sections covered by the ABS are considered, the estimates of aGVA and GVA are much closer, with aGVA being between 90% and 94% of GVA in each of the years.

Figure 1.1: Gross Value Added and approximate Gross Value Added, UK, 2008-2011



Source: Office for National Statistics

Table 1.1 shows aGVA as a percentage of GVA for each section of the UK Standard Industrial Classification 2007 (SIC07) between 2008 and 2011. The aGVA data are taken from the Annual Business Survey, 2011 Revised Results, while the GVA data are taken from The United Kingdom National Accounts, The Blue Book, 2013 Edition. Sections not covered by the ABS (Financial and insurance activities, Public administration and defence and compulsory social security, and Activities of households of employers and activities of households for own use) have been excluded. aGVA is substantially lower than GVA for sections L, A, P and Q. The first of these is due to the way activity in the real estate industry is measured in the National Accounts (known as the *imputed rent* approach, explained later in the article), while the other three reflect the partial coverage of the ABS for these sections. aGVA is consistently higher than GVA for a number of sections, most notably sections D, G, M and N.

Table 1.1: approximate Gross Value Added as a percentage of Gross Value Added by SIC07 section, UK, 2008-2011

%

Section		2008	2009	2010	2011
A	Agriculture, Forestry and Fishing[1]	19	21	16	17
B	Mining and Quarrying	97	93	87	94
C	Manufacturing	105	99	106	109
D	Electricity, Gas, Steam and Air Conditioning Supply	150	148	125	135
E	Water Supply; Sewerage, Waste Management and Remediation Activities	98	99	92	100
F	Construction	97	83	80	81
G	Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	108	106	104	107
H	Transportation and Storage	99	98	104	106
I	Accommodation and Food Service Activities	87	85	89	96
J	Information and Communication	103	102	101	103
L	Real Estate Activities	22	24	22	20
M	Professional, Scientific and Technical Activities	116	119	115	117
N	Administrative and Support Service Activities	114	109	120	129
P	Education[1]	13	14	16	16
Q	Human Health and Social Work Activities[1]	23	25	24	25
R	Arts, Entertainment and Recreation	80	88	74	81
S	Other Service Activities	81	75	72	65
Total		69	66	66	69

[1] Only partially covered by the ABS.

Source: Office for National Statistics

Although the two measures of gross value added have co-existed for several years, two questions still often asked by ABS users are “why does the ABS measure of gross value added differ to that produced by the National Accounts?” and “which measure of gross value added should I use for my analysis?” This article attempts to answer the first of these questions and provide users with the information they need to answer the second question for themselves. The article is structured as follows:

2. How is gross value added estimated in the National Accounts?
3. What is *approximate* Gross Value Added?
4. How are ABS data used in the National Accounts?
5. Case study
6. How are ABS data used in the Regional Accounts?
7. Which of the two measures of gross value added should I use for my analysis?

Key terms introduced in section 1:

Annual Business Survey (ABS): an annual survey of businesses covering the production, construction, distribution and most service industries

Turnover: the total value of businesses’ sales

Purchases: the total value of goods and services purchased during the year and consumed by businesses in order to generate turnover

Approximate Gross Value Added: a measure of the amount that businesses contribute to the economy, estimated from the ABS

2. How is gross value added estimated in the National Accounts?

The National Accounts are an integrated description of economic activity within the economic territory of the UK, and are used to produce many of the most important official economic statistics, such as Gross Domestic Product (GDP) – a measure of economic activity within the UK. They are compiled using the UN System of National Accounts (SNA) guidelines. Within the EU, member states compile their National Accounts in line with the European System of Accounts (ESA), which is consistent with the SNA as far as practically possible. This ensures a high degree of comparability of the outputs across the EU and beyond. The UK produces GDP and its underlying components such as GVA in line with ESA, the present version being ESA 1995. In September 2014, the UK will move onto the new version of ESA, ESA 2010.

The National Accounts comprise a sequence of 19 different accounts, split into three categories: the *Current Accounts*, recording the generation and distribution of income; the *Accumulation Accounts*, summarising transactions recorded in the Current Accounts; and the *Balance Sheets*, detailing changes in assets, liabilities and net worth of the economy over the accounting period.

The production approach to estimating GDP

The *Production Account* is the first within the sequence of the Current Accounts; it is from this account that an estimate of Gross Value Added (GVA) can be obtained. GVA for a particular institutional unit (for example, a business, household, charity, public corporation, or even a government department) is a measure of the economic value generated by that unit. The sum of GVA across all units in the economy gives GVA for the economy as a whole.

GVA is estimated as *output* minus *intermediate consumption*. Output covers goods and services produced in the accounting period, and is broadly estimated as sales plus changes in inventories of finished goods and work in progress, including output for a unit's own final use. Intermediate consumption covers goods and services used up in the process of producing the output over the accounting period, such as raw materials, fuel, rent and advertising, but not including labour costs.

GVA is calculated in *basic prices*. That is, the valuation of output includes net taxes (taxes minus subsidies) on production, such as business rates, but not net taxes on individual products that result from the production process, such as Value Added Tax (VAT).

GDP at *market prices* can be obtained from GVA at basic prices by adding net taxes on products. This estimate of GDP is in fact more accurately referred to as GDP(P); that is, GDP under the *production approach* to estimation.

GDP at *factor cost* (not published as part of the UK National Accounts) can be obtained from GDP at market prices by subtracting net taxes on both production and products.

Note that intermediate consumption is always valued in *purchaser's prices* – the amount paid by the purchaser for a good or service, minus reclaimable VAT and any other taxes deductible by the purchaser.

The relationship between GVA at market prices, basic prices and factor cost can be summarised as:

GDP(P)
= GVA at market prices
= GVA at basic prices
+ (taxes on products - subsidies on products)
= GVA at factor cost
+ (taxes on production - subsidies on production)
+ (taxes on products - subsidies on products)

Table 2.1 shows part of a set of company accounts for a hypothetical business in order to illustrate the concepts of market prices, basic prices and factor cost.

Table 2.1: Company accounts for a hypothetical business

Total sales at market prices	**£1,200**
Taxes on products	£450
Subsidies on products	£150
Net taxes on products	£300
Total sales at basic prices	**£900**
Taxes on production	£200
Subsidies on production	£50
Net taxes on production	£150
Total sales at factor cost	**£750**

The business sold a total of £1,200 worth of goods and services during the reference year. The value of sales at market prices is therefore £1,200. The business paid £450 in taxes on products (for example, import duties and export levies) but received £150 in subsidies on products (for example, import and export refunds). The value of net taxes on products was therefore £300, resulting in total sales at basic prices of £900. Furthermore, the business paid £200 in taxes on production (for example, business rates and vehicle excise duty) but received £50 in subsidies on production (for example, subsidies received through the Work Programme). The value of net taxes on production was therefore £150, resulting in total sales at factor cost of £750.

Other approaches to estimating GDP

The production approach is in fact just one of three different approaches to measuring GDP. The other two are the *expenditure approach*, resulting in GDP(E), and the *income approach*, resulting in GDP(I). In contrast to GDP(P), which is the sum of all production activity within the economy, GDP(E) is the sum of all final expenditure within the economy plus trade, while GDP(I) is the sum of all the income generated by production within the economy.

GDP(E) is calculated as the sum of final consumption expenditure of households and non-profit institutions serving households (also known as NPISH, for example charities, religious organisations and political parties), government spending, the value of gross capital formation (this is largely investment in fixed assets that are not used up during the reference year, such as buildings and machinery), and the difference between the values of overseas exports and imports.

GDP(I) is calculated as the sum of income earned by employees and the self-employed, plus gross operating surplus (or GOS, largely the trading profit of corporations plus income earned through the rental of buildings).

Balancing Supply and Use tables

A macroeconomic model known as the *Circular Flow of Income* suggests that the three approaches to estimating GDP should give the same answer as, in its simplest form, the model assumes that all income is spent on consumption of goods and services and, conversely, all goods and services produced are consumed (there are of course lots of other factors to consider in the economy, such as savings, investment and international trade, and these all have their place in the National Accounts). In other words, it should be the case that GDP(P) = GDP(E) = GDP(I). However, in practice the three approaches to estimating GDP

never give the same answer as they make use of different data sources, each with its own definitions, coverage, coverage error, non-response error, measurement error, and so on. Sources that make use of sample surveys will also be subject to sampling errors. The resulting differences between the three estimates of GDP are known as *statistical discrepancies*. In order to reconcile the three estimates of GDP, the three different measures are balanced using a Supply and Use table (SUT) framework on an annual basis, with the results being published approximately 18 months after the end of the reference year (note that quarterly GDP balancing also takes place, but this is not considered here). The balanced estimates are then published by ONS in the annual Blue Book publication. The first estimate of GDP for the most recent reference year published in the Blue Book will not be balanced through the SUTs process, so the statistical discrepancies between the three approaches to measuring GDP will remain. However, subsequent estimates for the reference year will be estimated through the SUTs process and will therefore be balanced. For example, Blue Book 2013 reports estimates of GDP up until 2012. However, the estimate for 2012 is not balanced and will therefore be revised through the SUTs process for Blue Book 2014.

Deflation

Although balancing is conducted on *current price* values, estimates in the Blue Book publication are presented in both *current prices* and in *volume* terms (using current price weights derived from the SUTs process). Estimates in current prices are *deflated* to give estimates in volume terms so that the effects of price changes over time are removed from the data. The value of money is effectively fixed at its value in a particular reference year so that changes over time purely reflect changes in the volume of economic activity, rather than a combination of changes in both volume and prices. Conversely, estimates in current prices have not been adjusted for inflation (current price GDP estimates are often referred to as “money GDP” or “nominal GDP”). For example, Blue Book 2013 reports that UK GVA in current prices increased from £1,360,925m in 2011 to £1,383,082m in 2012, an increase of 1.6%. However, GVA in volume terms (in 2010 prices) increased from £1,343,737m in 2011 to £1,347,426m in 2012, an increase of 0.3%. We can therefore infer that 1.3 percentage points of the 1.6% increase in the current price measure is in fact due to changes in prices, rather than real changes in activity.

Key terms introduced in section 2:

National Accounts: an integrated description of economic activity within the economic territory of the UK, used to produce many of the most important official economic statistics

Gross Domestic Product (GDP): a measure of economic activity within the UK

Current Accounts**:** a record of the generation and distribution of income

Accumulation Accounts**:** a summary of transactions recorded in the Current Accounts

Balance Sheets**:** details of changes in assets, liabilities and net worth of the economy over the accounting period

Gross Value Added (GVA): a measure of economic value generated within the economy, estimated as output minus intermediate consumption

Output: goods and services produced in the accounting period, broadly estimated as sales plus changes in inventories of finished goods and work in progress, including output for a unit's own final use

Intermediate consumption: goods and services used up in the process of producing the output over the accounting period, such as raw materials, fuel, rent and advertising, but not including labour costs

Net taxes: taxes minus subsidies

Basic prices**:** the valuation includes net taxes on production but not net taxes on products

Market prices: the valuation includes net taxes on production and net taxes on products

Factor cost: the valuation does not include net taxes on production or net taxes on products. This is not published as part of the UK National Accounts

Purchaser's prices: the amount paid by the purchaser for a good or service, minus reclaimable VAT and any other taxes deductible by the purchaser

GDP(P): the estimate of GDP obtained under the production approach to measurement

GDP(E): the estimate of GDP obtained under the expenditure approach to measurement

GDP(I): the estimate of GDP obtained under the income approach to measurement

Statistical discrepancies: the differences between the three estimates of GDP

Supply and Use Tables (SUTs): used to reconcile, or "balance", the three estimates of GDP

Current prices: prices faced by purchasers at any given time

Deflation: the process by which the effects of price changes are removed from values in current prices to leave values in volume terms so that changes over time purely reflect changes in economic activity, rather than a combination of changes in both activity and prices

3. What is *approximate* Gross Value Added?

aGVA is derived solely from the responses of businesses to questions asked on the ABS. It is a measure of the income generated by businesses, industries or sectors, less the cost of goods and services used to create the income. The main component of income is *turnover*, while *purchases* is the main component of the consumed goods and services. Stock levels which may rise or fall can also have an impact on aGVA, as can the values of subsidies received or duty paid. Businesses' labour costs (for example, wages and salaries) are paid from the value of aGVA, leaving a gross operating surplus (or loss) which is a good approximation for profit (or loss). The cost of capital investment, financial charges and dividends to shareholders are met from the gross operating surplus.

Approximate output at basic prices is calculated as:

total turnover
- VAT paid included in total turnover
- the value of goods and services bought for resale without further processing
+ changes in total stocks and work in progress less changes in stocks of materials, storage and fuels
+ work of a capital nature carried out by own staff for own use (excluding in-house developed computer software)
- total net taxes (or just total taxes for service industries)
+ net taxes on production (business rates + vehicle excise duty - subsidies received through the Work Programme)

Approximate intermediate consumption at purchaser's prices is calculated as:

total purchases (including insurance premiums purchases)
- the value of insurance claims received
- the value of goods and services bought for resale without further processing
- changes in stocks of materials, storage and fuels

aGVA at basic prices is the difference between approximate output at basic prices and approximate intermediate consumption at purchaser prices, so it can be calculated as:

total turnover
- VAT included in total turnover
+ changes in total stocks and work in progress
+ work of a capital nature carried out by own staff for own use
- total net taxes (or just total taxes for service industries)
+ net taxes on production (business rates + vehicle excise duty - subsidies received through the Work Programme)
- total purchases (including insurance premiums purchases)
+ the value of insurance claims received

Key terms introduced in section 3:

Approximate output: output as estimated by the ABS

Approximate intermediate consumption: intermediate consumption as estimated by the ABS

4. How are ABS data used in the National Accounts?

ABS data are used in the National Accounts in order to compile the SUTs, as well as benchmark various other components like gross fixed capital formation, change in inventories, and so on. Two of the largest inputs to the SUTs process are output (in the Supply Table) and intermediate consumption (in the Use Table), with GVA being the difference between these quantities. Output is broken down into:

- market output (output associated with the production of goods and services sold at economically significant prices);
- own-use output (output associated with the production of goods or services for the producer's own final use or gross fixed capital formation);
- non-market output (output associated with the production of goods and services provided for free or at prices that are not economically significant).

Market output contributed over 80% of total output for the whole economy in 2011. Own-use output contributed around 6%, while non-market output contributed around 13%.

The ABS is the largest source of input data for market output and intermediate consumption. However, as the ABS asks for the value of own-use activity of only businesses (institutions such as households are excluded), the majority of own-use output is estimated using data from other sources. Furthermore, the ABS covers only a relatively small part of non-market output, so it is not used as an input at all for this part of total output.

The main ABS variables of interest for market output and intermediate consumption are *turnover* and *purchases* respectively. The value of goods and services bought for resale without further processing is subtracted from both variables, as no production activity has taken place by the purchaser for these items (the activity will be recorded in the National Accounts against the original UK producer or importer).

Timing effect

ABS data used in the production of the National Accounts are generally not consistent with any published set of ABS results, as illustrated in Table 4.1. This inconsistency in ABS datasets will lead to differences between estimates from the ABS and the National Accounts.

ABS data for a particular reference year are first supplied to National Accounts in the October following the end of the reference year. These data are consistent with the provisional national ABS results which are published the following month. For example, ABS data for reference year 2011 were first supplied to National Accounts in October 2012 and the provisional national ABS results were published in November 2012. In order to produce results within the required timescales, National Accounts receive a revised dataset the following February, 14 months after the end of the reference year (at the same time, a final dataset for the previous reference year is also delivered). Estimates that have been substantially revised in this dataset will replace the corresponding estimates supplied in the previous dataset. The revised dataset is not consistent with any set of published ABS estimates, as the revised national ABS results are not published until the following June, 18 months after the end of the reference year (the ABS results are then finalised 12 months later). Additional ABS responses will have been received between the February dataset delivered to National Accounts and the June ABS publication, leading to changes to the aggregate estimates. There will therefore always be a *timing effect* between ABS and National Accounts estimates, as ABS data used in National Accounts calculations are never consistent with the published ABS results for any particular reference year.

Table 4.1: Timeline of Annual Business Survey deliveries to National Accounts

Year	Month	Description
T	December	End of reference year
T+1	January	Data collection and validation
	February	
	March	
	April	
	May	
	June	
	July	
	August	
	September	
	October	Provisional data submitted to National Accounts
	November	Provisional ABS results published
	December	Data collection and validation
T+2	January	
	February	Revised data submitted to National Accounts
	March	Data collection and validation
	April	
	May	
	June	Revised ABS results published
	July	Data collection and validation
	August	
	September	
	October	
	November	
	December	
T+3	January	
	February	Final data submitted to National Accounts
	March	Data collection and validation
	April	
	May	
	June	Final ABS results published

National Accounts adjustments to ABS estimates

The process of converting ABS estimates of turnover and purchases to National Accounts estimates of output and intermediate consumption consists of a number of adjustments which can summarised as:

- removal of non-market activity included in the ABS coverage;
- adjustment to align with estimates of net taxes on production used in the National Accounts;
- adjustment to align with estimates of inventories (finished goods, stocks of materials, storage and fuels, and work in progress) used in the National Accounts;
- coverage adjustments;
- conceptual adjustments;
- addition of own-use and non-market output using data from other sources;
- coherence (balancing) adjustments.

The adjustments are applied at a level of industrial aggregation known as SUT level. This is approximately equivalent to the 2-digit level (or 3- or 4-digit levels in some cases) of SIC07, but with some industries grouped together. Output and intermediate consumption are adjusted separately, with GVA being the difference between the adjusted values for each industry.

Removal of non-market activity included in the ABS coverage

The ABS covers only a relatively small part of non-market output, so it is not used as an input at all for this part of total output. Therefore, the limited number of public corporations, central government bodies, local authorities and non-profit institutions (i.e. those listed on the Inter-Departmental Business Register (IDBR) as having legal status 4 to 7) that are defined to be within the UK Non-Financial Business Economy are filtered from the ABS sample. This leaves just companies, sole proprietors and partnerships (i.e. those listed on the IDBR as having legal status 1 to 3). These institutions contribute largely to market output, but also to own-use output.

Adjustment to align with National Accounts estimates of net taxes on production

Reported payments in VAT, net taxes on production (business rates and vehicle excise duty, less subsidies received through the Work Programme) and other taxes, duties and levies, less any subsidies received, are subtracted from reported turnover to leave total sales at factor cost. Net taxes on production are then added back in using data from other sources (largely HMRC) to give sales at basic prices. Administrative data are preferred to survey data from the ABS because they align with the concepts and coverage required by the National Accounts while remaining free of the variability introduced by conducting a sample survey. This is atypical of the use of administrative data sources in the production of official statistics in general, where increased accuracy is usually offset by imperfect concepts and/or coverage. Administrative data on taxes and subsidies are also used in other parts of National Accounts where ABS data are not available, so using them during the Supply and Use balancing process allows for internal consistency within the accounts.

Differences between the National Accounts and ABS measures of net taxes on production are largely driven by subsidies that are included in the National Accounts measure but not in the ABS measure, for example subsidies on rail transport and tax credits on research and development activities (treated as subsidies in the National Accounts). The fact that the ABS asks for information on the amount of tax paid during the reference year, whereas the data used in the National Accounts are on an accruals basis (i.e. when the money was owed rather than when it was actually paid), could also be a contributing factor to differences between the two measures of net taxes on production.

Adjustment to align with National Accounts estimates of inventories

The change in the value of finished goods, stocks of materials, storage and fuels and work in progress over the duration of the reference year is added to the value of sales. These represent production activity conducted during the reference year but not captured in total turnover, as the goods/services that have been produced have not yet been sold. Note that these data are collected by the ABS, but the Quarterly Stocks Inquiry (QSI) is preferred as this source is used consistently throughout other parts of the National Accounts. However, the QSI data are in turn benchmarked to annual totals from the ABS.

As it is the change in inventories over the reference year that is of interest, rather than the level of inventories at a point in time, the effect of having different opening and closing prices must be removed from the QSI data. This process provides an estimate of the change in the value of inventories under the current prices of the reference year. This processing of the QSI data is a potential factor contributing to differences between National Accounts and ABS estimates of finished goods and work in progress, as similar processing is not carried out by the ABS.

Coverage adjustments

Coverage adjustments are made to account for the output and intermediate consumption of businesses and industries that are not defined to be part of the UK Non-Financial Business Economy, and are therefore not covered (or only partially covered) by the ABS. For example, ABS data are supplemented by data from:

- administrative records and company accounts for public corporations, local and central government bodies and NPISH;
- the Department for Environment, Food and Rural Affairs (DEFRA) for large parts of the agriculture industry;
- the NHS for the healthcare industry.

The IDBR includes only those UK businesses that are registered for VAT and/or PAYE, so some very small businesses (those without employees and with turnover below the tax threshold, for example some of the self employed) are not included. The ABS sample is drawn from the IDBR so these very small businesses are not covered by the survey, and their output and intermediate consumption must therefore be imputed in the National Accounts. This is known as the IDBR under-coverage adjustment, and is performed as a

proportional adjustment to output and intermediate consumption. Each SUT industry is adjusted separately, and the proportion for each industry has remained constant since reference year 2004. The proportion is around 1% at the whole economy level but varies by SUT industry, typically from around 0.001% (for example, for mining of coal and lignite) to around 7% (for example, for sports, amusement and recreation activities), although the adjustment is greater than this for a small number of industries. The largest proportional adjustment (17%) is made to the output and intermediate consumption of land transport services and transport services via pipelines (excluding rail transport). National Accounts are currently reviewing the IDBR under-coverage adjustment using data from HMRC, and plan to have updated adjustments in place for Blue Book 2015.

Data for the insurance and reinsurance industries are collected by the ABS, but these are not used in the compilation of the National Accounts. Instead, a set of 25 specialist surveys plus administrative data sources are used to estimate GVA for the finance sector. In addition, the Financial Intermediation Services Indirectly Measured (FISIM) approach is used to estimate the output and intermediate consumption associated with financial services that are provided to customers without a fee being explicitly charged (for example, the provision of a current account). Estimates from FISIM contribute to only the finance industry for output but all industries for intermediate consumption, as many organisations make use of financial services in order to operate.

Conceptual adjustments

Conceptual adjustments account for the value of production activities carried out in the economy during the reference year but not captured in the total turnover generated by businesses, and therefore outside the scope of the ABS. Examples include benefits in kind, company cars and property provided by companies to their employees, and tips paid to restaurant staff. Adjustments are also made to account for the *illicit economy*, for example tax avoidance and illegal smuggling of goods. From Blue Book 2014 onwards, these adjustments will be extended to account for activity associated with illegal drug dealing and prostitution.

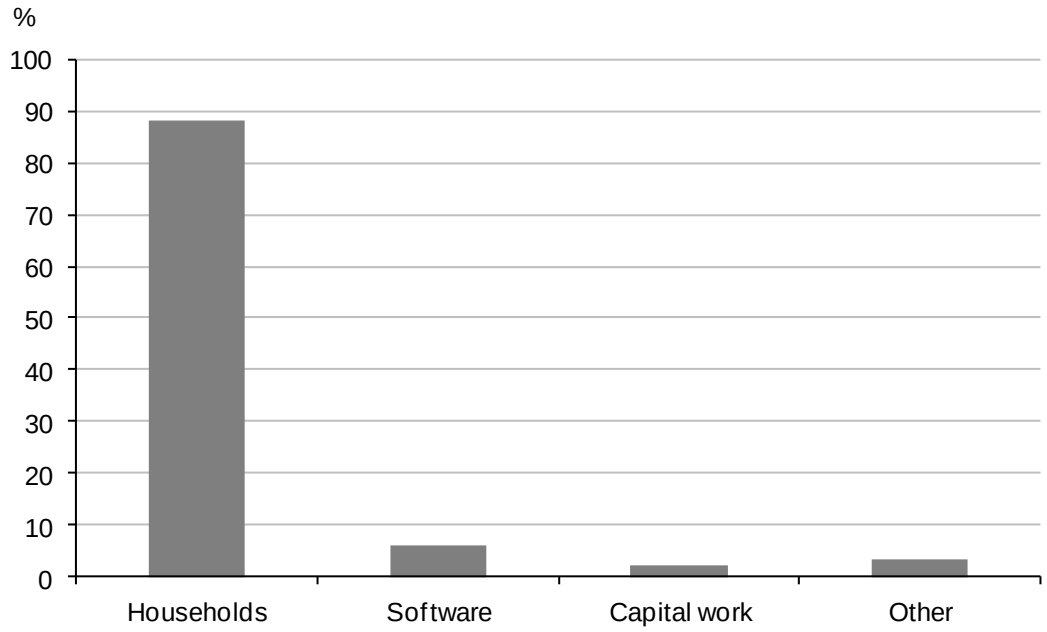
Addition of own-use and non-market output using data from other sources

The only ABS variable used in the estimation of own-use output is work of a capital nature carried out by staff for businesses' own use. Figure 4.1 shows contributions to total own-use output for 2011 (prior to conducting the SUTs process). Work of a capital nature carried out by staff for businesses' own use was the third largest component of own-use output (2%). The second largest component was computer software developed by staff for businesses' own use (6%); this information is also collected by the ABS, but the Quarterly Capital Expenditure Survey is preferred for consistency with other parts of the National Accounts. The addition of in-house developed computer software in the National Accounts leads to differences between the ABS and National Accounts estimates of own-use output across the majority of industries.

However, work of a capital nature carried out by staff for businesses' own use and the in-house development of computer software were dwarfed by the contribution of the own-use output of households (88%), the majority of which results from the *imputed rent* approach.

Under National Accounts concepts, home owners are producers of housing services that they then consume. In order to capture this economic activity, rental values of properties in the private rented sector are used to 'impute' values for owner-occupied properties. This technique is known as the imputed rent approach. It is not used in the estimation of aGVA, so differences between GVA and aGVA are quite large for the real estate industry.

Figure 4.1: Contributions to total own-use output (prior to balancing), UK, 2011



Source: Office for National Statistics

Non-market output is produced mainly by the government sector, but other sectors such as NPISH also contribute. Non-market output is difficult to estimate due to the absence of prices. It is calculated through a variety of direct and indirect approaches to measurement, none of which involve data from the ABS. For example, the direct measure of public service output weights together different sorts of activities using unit costs (the cost of producing one unit of a good or service) to approximate market prices, while the indirect measure uses total expenditure to approximate total output.

Coherence (balancing) adjustments

The SUTs process leads to further adjustments to the data. The aim of these adjustments is to eliminate the statistical discrepancies between GDP(P), GDP(E) and GDP(I). SUTs record how supplies of different kinds of goods and services originate from domestic industries and imports, and how these supplies are allocated between various intermediate and final uses. Each of the tables is a matrix of values representing industry-product combinations. As the three approaches to measuring GDP can all be calculated from the SUTs, a single estimate of GDP can be derived by balancing the supply and demand for goods and services and reconciling them with the corresponding input and output estimates. Balance is achieved when, for industries, input (from the Use Table) equals output (from the Supply Table) and, for products, supply (from the Supply Table) equals demand (from the Use Table).

The balancing process is informed by evidence from a variety of internal and external sources (including data on prices, trade, the labour market, and so on), and makes minor use of mathematical optimisation algorithms. Separate balancing adjustments are applied to market output, own-use output, non-market output and intermediate consumption for each SUT industry.

Note that the ABS measure of approximate intermediate consumption includes *net* insurance premiums purchased (premiums purchases less claims received). However, the ABS purchases data used in the SUTs process include insurance premiums purchased, but insurance claims received are not subtracted. An adjustment to account for this is therefore included in the balancing process.

Key terms introduced in section 4:

Market output: output associated with the production of goods and services sold at economically significant prices

Own-use output: output associated with the production of goods or services for the producer's own final use or gross fixed capital formation

Non-market output: output associated with the production of goods and services provided for free or at prices that are not economically significant

SUT industry level: the level of industrial detail at which SUTs are used to reconcile the three estimates of GDP

Timing effect: the effect on National Accounts estimates of revised (or final) ABS data being submitted to National Accounts prior to compilation of the revised (or final) ABS results

Coverage adjustments: adjustments to ABS data made by National Accounts to account for the market output and intermediate consumption of businesses and industries that are not defined to be part of the UK Non-Financial Business Economy, and are therefore not covered (or only partially covered) by the ABS

Conceptual adjustments: adjustments to ABS data made by National Accounts to account for market output and intermediate consumption during the reference year but not captured in total turnover and purchases of businesses, and therefore outside the scope of the ABS

Balancing adjustments: adjustments to market output, own-use output, non-market output and intermediate consumption, made by National Accounts during the SUTs process in order to eliminate the statistical discrepancies between GDP(P), GDP(E) and GDP(I)

Financial Intermediation Services Indirectly Measured (FISIM): a technique used in the National Accounts to estimate the output of financial services that are provided to customers without a fee being explicitly charged

Imputed rent: a technique used in the National Accounts to capture the economic activity associated with the production (and consumption) of housing services by home owners who live in their own home

5. Case study

The manufacture of motor vehicles, trailers and semi-trailers industry (SIC07 division 29) will be used as a case study in order to examine the magnitude of the various sources of differences between aGVA and GVA. aGVA was 116% of GVA for this industry in 2011. ABS sales and purchases are adjusted separately in the National Accounts so, accordingly, output and intermediate consumption will be considered separately. The ABS data used in the analysis are consistent with the Annual Business Survey, 2011 Revised Results, while the National Accounts data are consistent with The United Kingdom National Accounts, The Blue Book, 2013 Edition.

Output

Figure 5.1 shows adjustments made by both the ABS and the National Accounts to obtain output at basic prices for the manufacture of motor vehicles, trailers and semi-trailers industry in 2011. The starting point, £47,243 million of ABS sales at factor cost (less goods and services purchased for resale without further processing), is the same for both measures. The content of the chart is summarised below.

- As there are no public corporations, central government bodies, local authorities or non-profit institutions in the ABS sample for this industry, the National Accounts filtering process has no effect. Only market and own-use output need to be considered as there is no non-market output.

- There is a timing effect of -£84 million in the National Accounts measure, resulting from additional ABS data collection and validation between submission of the ABS dataset to National Accounts and publication of the revised ABS results.

- The value of net taxes on production added in to the ABS measure (£135 million) is slightly greater than that added in to the National Accounts measure (£115 million).

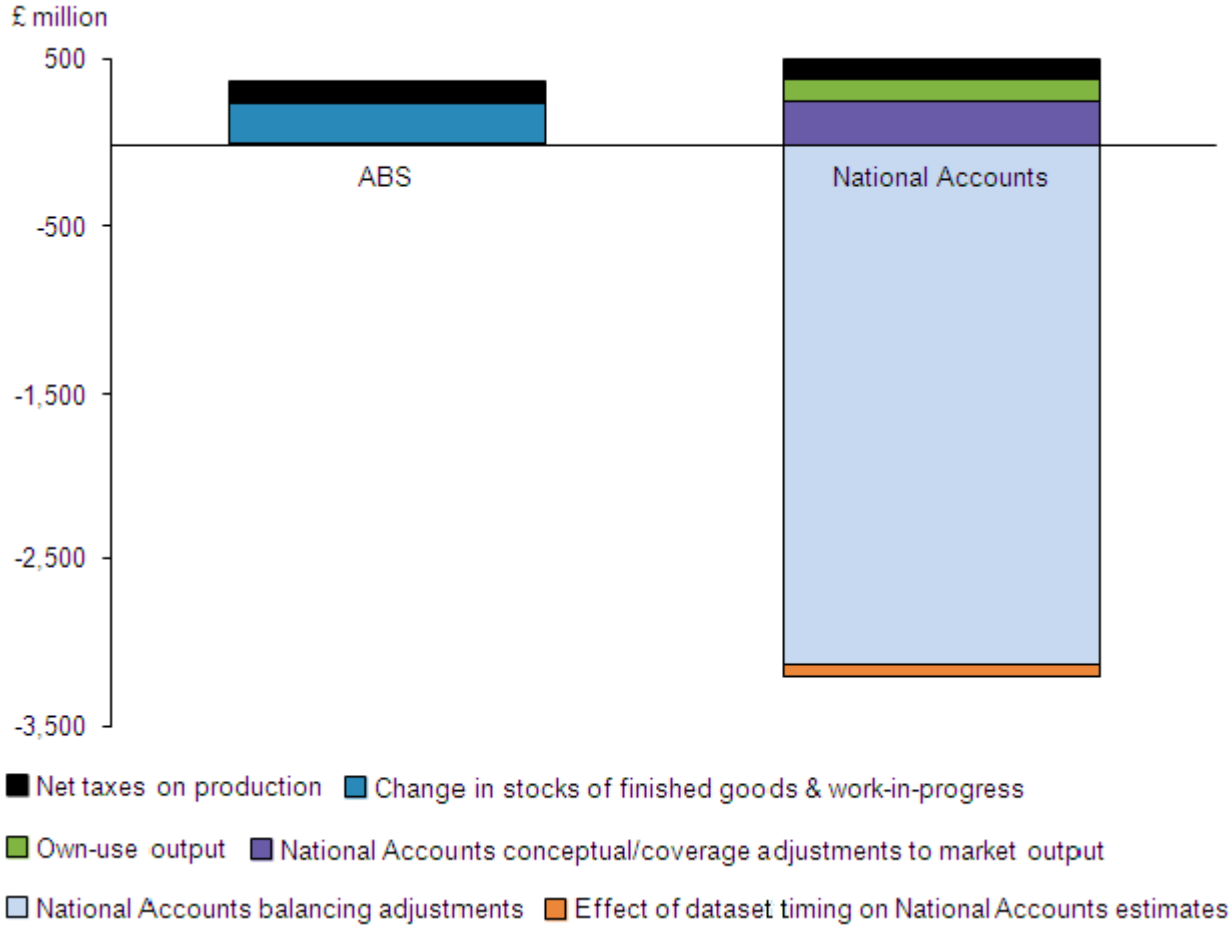
- The adjustment for the change in stocks of finished goods and work in progress is notably larger for the ABS measure (£221 million) than the National Accounts measure (£6 million).

- Own-use output is estimated as £11 million in the ABS measure, but £133 million in the National Accounts measure. The latter consists of £10 million in own-account capital work (as in the ABS measure, less £1 million due to measurement timing) and £123 million in computer software developed in-house. The ABS team is currently investigating the possibility of including in-house developed computer software in its measure of own-use output.

- £240 million of conceptual and coverage adjustments to market output are made in the National Accounts measure. These consist of the IDBR under-coverage adjustment (£141 million), reflecting the presence of unincorporated businesses, and conceptual adjustments for the production of cars, dwellings and other payments in kind provided by businesses to their staff (£99 million).

- At this point, the total adjustment to ABS sales at factor cost is similar for both measures. £367 million has been added to sales in the ABS measure, resulting in £47,610 million of approximate output, while £411 million has been added to sales in the National Accounts measures, resulting in £47,654 of output. However, balancing adjustments totalling -£3,023 million reduce output in the National Accounts measure to £44,631 million. The total balancing adjustment consists of a -£3,119 million adjustment to market output and a £96 million adjustment to own-use output. The balancing adjustment reflects the fact that the ABS is a single source of information on output and, like any sample survey data source, is subject to sampling error, non-response error, coverage error, and so on. The SUTs process evaluates a range of data sources (in the case of SIC07 division 29, these include HMRC data on GOS and pay, Household Final Consumption Expenditure data on car purchases, and trade data from the Society of Motor Manufacturers and Traders (SMMT)) and confronts all available evidence in order to balance supply and demand.

Figure 5.1: Adjustments to ABS sales at factor cost less goods and services purchased for resale without further processing, SIC07 division 29, UK, 2011



Source: Office for National Statistics

Intermediate consumption

Figure 5.2 shows adjustments made by both the ABS and the National Accounts to obtain intermediate consumption at purchaser prices for the manufacture of motor vehicles, trailers and semi-trailers industry in 2011. The starting point, £36,592 million of ABS purchases at producer prices (less goods and services purchases for resale without further processing), is the same for both measures. The content of the chart is summarised below.

- As with sales, the filtering of public corporations, central government bodies, local authorities and non-profit institutions from the ABS sample has no effect on the value of purchases for this industry.

- There is a timing effect of £248 million in the National Accounts measure, resulting from additional ABS data collection and validation between submission of the ABS dataset to National Accounts and publication of the ABS results.

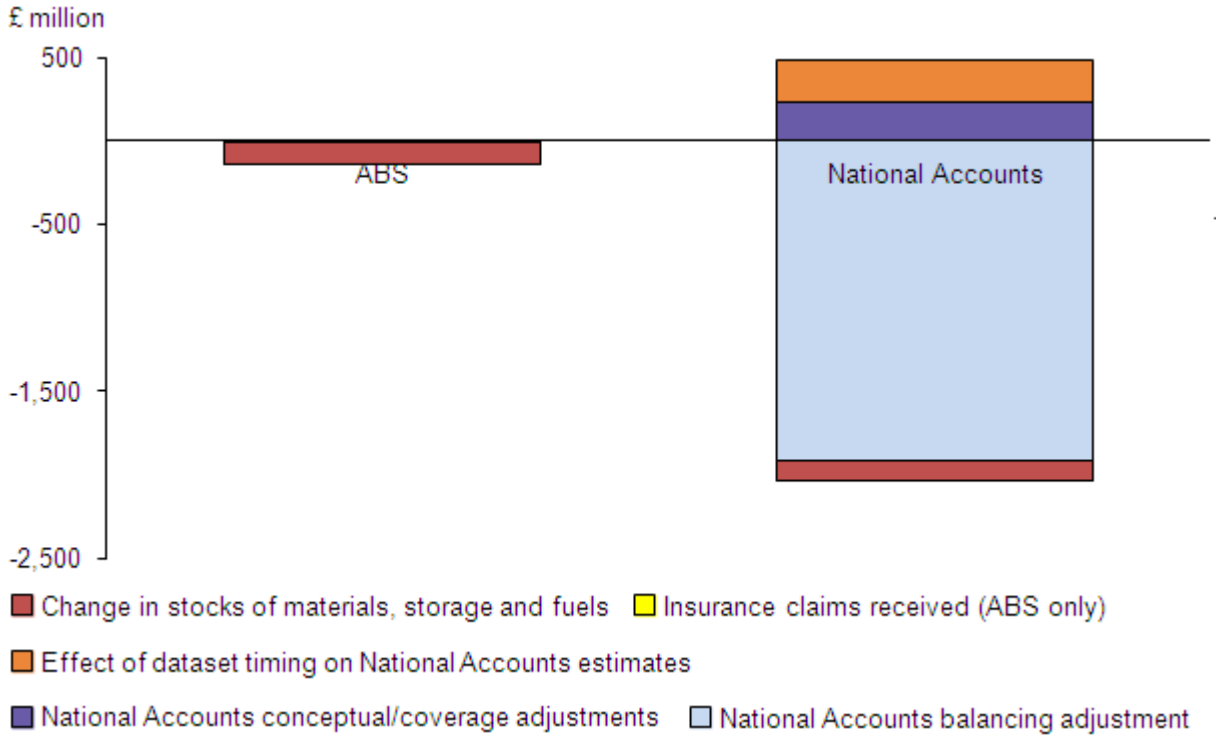
- The adjustment for the change in the value of stocks of materials, storage and fuels is similar for both measures (-£131 million in the ABS measure and -£127 million in the National Accounts measure).

- £231 million of conceptual and coverage adjustments are made in the National Accounts measure. These consist of the IDBR under-coverage adjustment (£111 million), estimates obtained through the FISIM approach (£126 million) and other adjustments (-£5 million).

- £4 million of insurance claims received are subtracted from the ABS measure in order to "net off" insurance premiums purchased. This adjustment is made as part of the SUTs process in the National Accounts measure and is therefore included in the balancing adjustment.

- At this point, the total adjustment to ABS sales at factor cost is negative (-£135 million) for the ABS measure, resulting in £36,457 million of approximate intermediate consumption, but positive (£352 million) for the National Accounts measure, resulting in £36,944 of intermediate consumption. However, the positive adjustment in the National Accounts measure is offset by a balancing adjustment of -£1,913 million, which reduces intermediate consumption to £35,031 million. The balancing adjustment to intermediate consumption is made for similar reasons, using similar data sources, as for output.

Figure 5.2: Adjustments to ABS purchases at producer prices less goods and services purchased for resale without further processing, SIC07 division 29, UK, 2011



Source: Office for National Statistics

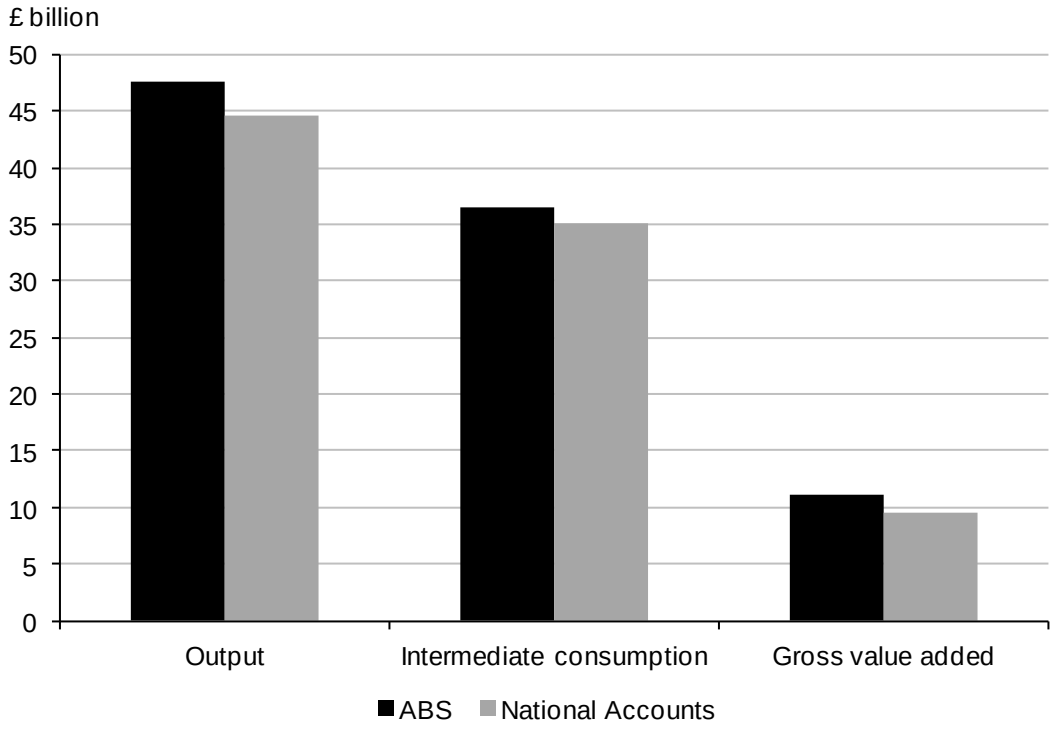
Conclusion

In terms of output at basic prices, the total adjustment to ABS sales at factor cost is positive for the ABS measure but negative for the National Accounts measure, driven by the negative balancing adjustment. This results in ABS approximate output exceeding National Accounts output by £2,979 million.

In terms of intermediate consumption at purchaser prices, the total adjustment to ABS purchases is negative for both measures, but is of a greater magnitude for the National Accounts measure. This is again driven by the balancing adjustment. This results in ABS approximate intermediate consumption exceeding National Accounts intermediate consumption by £1,426 million.

The ABS measure is greater than the National Accounts measure for both output and intermediate consumption, but the difference between the two measures is larger for output than it is for intermediate consumption, as illustrated in figure 5.3. This results in aGVA being £1,553 million greater than GVA for the motor vehicles, trailers and semi-trailers industry in 2011.

Figure 5.3: Annual Business Survey and National Accounts estimates of output, intermediate consumption and gross value added, SIC07 division 29, UK, 2011



Source: Office for National Statistics

6. How are ABS data used in the Regional Accounts?

This article has so far just considered measures of gross value added for the UK as a whole. However, ONS also produces estimates of both GVA and aGVA for regions within the UK. As is the case with the national GVA measure, ABS data are used as an input to the regional GVA measure, but the way in which the data are used is not the same.

Regional estimates from the ABS

ABS data are collected for statistical units called *reporting units*. Each reporting unit will typically represent an *enterprise* (the legal entity of the business), but larger enterprises may be split into a number of reporting units. Each reporting unit returns information via the ABS on behalf of one or more *local units* (individual sites). Regional estimates obtained from the ABS must be based on local unit information, as local units that belong to a particular reporting unit may be spread across a number of regions. However, each ABS return represents information for a reporting unit *as a whole*; data for individual local units are not collected in order to reduce the burden placed on survey respondents. Data for each reporting unit must therefore be *apportioned* amongst its constituent local units. The apportionment is based on the distribution of employment (as recorded on the IDBR) amongst local units that belong to each reporting unit. The method makes use of weights derived from a regression model fitted to returns for reporting units that are believed to behave like local units, and is applied to each variable (including turnover, purchases and

aGVA) separately. More information on the ABS regional apportionment method can be found in the ABS Technical Report.

The Regional Accounts

Estimates of regional GVA are obtained from the Regional Accounts, a set of accounts for different regions of the UK produced according to the same concepts and definitions as the National Accounts. Regional GVA can be estimated in two ways: via an income-based approach, leading to regional GVA(I), or a production-based approach, leading to regional GVA(P). GVA(P) is the newer of the two measures; it was published for the first time in December 2013 and remains an experimental statistic.

Regional GVA(P) is estimated by first calculating the proportions of output and intermediate consumption (obtained from the ABS) that are contributed by each region. These proportions are then applied to the estimates of national output and intermediate consumption obtained from the SUTs process. Finally, regional estimates of GVA(P) are obtained by subtracting regionalised intermediate consumption from regionalised output. Hence the balanced estimate of national GVA is apportioned out to regions using weights obtained from the regional ABS results. Regionalisation is carried out separately for different industries, where industries are defined at SUTs level. A variety of data sources are used to regionalise the national GVA estimate for those industries not covered by the ABS. For example, regional shares of public sector employment obtained from the Business Register and Employment Survey are used to regionalise national GVA for the public sector.

Although GVA(I) is a conceptually different measure to GVA(P), the way in which ABS data are used is similar. For example, regional estimates of GOS are arrived at by subtracting employment costs from aGVA – both obtained from the regional ABS results – for each region and each SUT industry. Regional shares of GOS are then used to regionalise national estimates of gross trading profit (a substantial component of GVA(I)) for those industries covered by the ABS. Although regionalisation is based on the balanced estimate of national GVA, so that the sum of the regions will equal national GVA for both GVA(P) and GVA(I), the two regional measures are not currently reconciled with each other, so that GVA(P) will not equal GVA(I) for any particular region.

Both GVA(P) and GVA(I) can be thought of as “top-down” approaches to estimating regional gross value added, starting with the national balanced estimate of GVA and then apportioning down to regions. On the other hand, regional aGVA can be thought of as a “bottom-up approach”, starting with survey responses from individual businesses and then aggregating up to regions. This difference in starting position is the fundamental reason why regional estimates of GVA and aGVA will not give rise to the same answer.

Key terms introduced in section 6:

Reporting units: statistical units for which ABS data are collected

Local units: one or more individual sites that are associated with each reporting unit

Regional apportionment: a technique used to apportion ABS data for each reporting unit down to its associated local units so that regional estimates of GVA and other variables can be obtained

Regional Accounts: a set of accounts for different regions of the UK produced according to the same concepts and definitions as the National Accounts

Regional GVA(I): an income-based approach to estimating GVA for each region of the UK

Regional GVA(P): a production-based approach to estimating GVA for each region of the UK

7. Which of the two measures of gross value added should I use for my analysis?

Coverage

To recap, the ABS excludes large parts of agriculture, all of public administration and defence, publicly provided healthcare and education, and the financial sector (data for the insurance and reinsurance industries are collected by the ABS but do not contribute to the published results). Therefore if users are particularly interested in analysing gross value added for these industries, or for the economy in its entirety, then GVA from the National Accounts should be used.

Industrial detail

The ABS measure of gross value added is available down to the 4-digit level of SIC07. However, the National Accounts measure can be disaggregated only as far as SUT industry level. Regional GVA is published to an even higher level of industrial aggregation: 20 SIC07 sections, plus sub-sections for the manufacturing sector. aGVA is therefore available to a greater level of industrial detail than GVA, and users might need to consider this when deciding which source to use for their analysis.

If users require a measure of value added that is in line with National Accounts concepts and definitions, but to a greater level of industrial detail than that provided at SUT industry level, then users may consider apportioning GVA at SUT industry level down to lower levels of SIC07 according to shares of aGVA. However, this approach assumes that the proportions of gross value added contributed by different industries are the same under the concepts and definitions of the National Accounts as they are under those of the ABS. The approach also involves many implicit assumptions. In reality, these assumptions may not hold and thus an (unknown) error will be induced.

Where possible, a consistent source should be used when analysing different industries. For example, users should not attempt to compare GVA for the finance sector with aGVA for the manufacturing sector, or calculate the share of whole economy gross value added (which can only be obtained for GVA) contributed by a particular 4-digit industry (which can only be obtained for aGVA).

Quality measurement

Standard errors and coefficients of variation (CVs) are published alongside estimates of national aGVA from the ABS. However, it is not possible to produce such measures for GVA as the National and Regional Accounts are compiled from multiple input sources, some of which are not even sample surveys. Therefore assessing statistical quality, and particularly the accuracy of the estimates, is more difficult for GVA than it is for aGVA. In any case, users of GVA should remember that they are working with an estimate which, like aGVA, is subject to sampling and non-sampling errors, even though the errors cannot be easily quantified (although reconciliation of the three different estimates of GDP helps to "balance out" some of the total error).

Comparability over time

As the ABS is primarily intended for analysing the structure of the economy at a point in time, the data are not deflated. This means that any reported change in aGVA between successive years will be due to a combination of changes in real levels of activity and changes in prices. On the other hand, the National Accounts measure of gross value added is available in current prices but also in volume terms (using current price weights derived from the SUTs process), where the effects of price changes are removed from the data in the case of the latter (the GVA(P) measure from the Regional Accounts is also available in both current prices and in volume terms). Therefore GVA might be the preferred measure if users are primarily interested in analysing changes over time, rather than comparing the performance of very specific industries at a particular point in time.

Users should consider deflating aGVA estimates from the ABS if they are interested in analysing changes over time but also require a greater level of industrial detail than that provided at SUT level. However, this requires careful consideration over the choice of deflator. For example, the deflators used in the National Accounts are *implied* by the current price and volume data, so they reflect changes in prices under National Accounts concepts and definitions. It may therefore be inappropriate to apply these deflators to ABS data, which conform to a different set of concepts and definitions. Furthermore, the National Accounts implied deflator is published only for the economy as a whole, so applying it to individual industries requires the assumption that changes in prices for individual industries are identical to changes in prices for the economy as a whole. Alternatively, users may consider using an appropriately chosen price index from the Producer Price Indices, Service Producer Price Indices or Consumer Price Indices to deflate ABS data.

The ABS revisions policy is another reason why users should exercise caution when comparing estimates of aGVA over time. A provisional estimate of national aGVA for a particular reference year is available 11 months after the end of the reference year, with a revised estimate available seven months later. The final revision takes place 12 months later, 30 months after the end of the reference year. However, no further revisions take place after this time, even if new information comes to light. On the other hand, at least three years of data are open to Supply and Use balancing in every Blue Book publication. Furthermore, historical estimates of GVA may be revised if there are specific reasons for doing so (such as change in classification structure or a major change in methodology), so the National Accounts measure can be analysed in a time series context.

Timeliness

Although *annual* GVA is the main focus of this article, *quarterly* (national) GVA is also published by ONS. This is not the case for aGVA, which is only available annually. This is likely to be an important factor for users who are predominantly interested in short-term analysis. However, users who are interested in annual estimates of gross value added will find the ABS measure to be the timelier of the two, as illustrated in table 7.1.

Although an annual estimate of national GVA will be available soon after the end of the reference year, this will be revised during the SUTs process, with the results not being made available until publication of the Blue Book around 19 months after the end of the reference year. A provisional estimate of national aGVA is available 11 months after the end of the reference year, with a revised estimate available seven months later (around one month before publication of the Blue Book for the same reference year).

Regional GVA(I) is available 12 months after the end of the reference year but, like national GVA, the estimate will be revised due to the National Accounts balancing process when the next set of estimates are produced 12 months later. The lag for regional GVA(P) is longer still, with estimates not published until 24 months after the end of the reference year. Meanwhile, regional aGVA is available 19 months after the end of the reference year, five months earlier than the Regional Accounts measures that are based on balanced National Accounts data.

Table 7.1: Timeline of UK Gross Value Added and approximate Gross Value Added releases

Year	Month	Description
T	**December**	**End of reference year**
T+1	January	
	February	
	March	
	April	
	May	
	June	
	July	**Blue Book published (year T not balanced)**
	August	
	September	
	October	
	November	**Provisional estimates of national aGVA published**
	December	**Provisional estimates of regional GVA(I) published (year T not balanced)**
T+2	January	
	February	
	March	
	April	
	May	
	June	**Revised estimates of national aGVA published**
	July	**Blue Book published (year T balanced)**
		Regional aGVA published
	August	
	September	
	October	
	November	
	December	**Regional GVA(P) published (year T balanced)**
		Revised estimates of regional GVA(I) published (year T balanced)

Concepts

Ultimately, GVA and aGVA are conceptually different measures of gross value added; GVA is grounded in wider economic theory, while aGVA is simply a product of business accounting. In light of this difference, GVA is balanced to reconcile the estimate with those produced under the expenditure and income approaches to estimation, while aGVA is not balanced. In this respect the term “approximate” in “approximate Gross Value Added” might be viewed as misleading, as it might lead one to think that aGVA is in some way a less complete measure than GVA (although this is certainly true in terms of coverage). In reality, the two measures are estimates of different phenomena. If the user is interested in activity within the *economy as a whole*, then ideally GVA should be used for analysis. On the other hand, if the primary interest is solely the performance or structure of *businesses*, then aGVA may in fact be the preferred measure.

Office for National Statistics

Information paper

Regional Estimation: Apportioning financial variables using BRES local unit turnover data

Salah Merad, Office for National Statistics *May 2011*

Executive Summary

Business Register and Employment Survey (BRES) went live in 2009 and the returned local unit turnover data were used to refine the models we developed using data from the BRES 2008 pilot. We have used the estimated local unit turnover data to apportion turnover in the Annual Business Survey (ABS), and explored its usefulness in apportioning variables other than turnover; we focused on purchases and stocks.

We have produced estimates of turnover, purchases and Gross Value Added (GVA) using the current method, the local unit turnover based methods, as well as an apportionment method based on employment. More work needs to be done to quality assure the results and explore and explain some of the observed differences. Therefore, we have not included in this paper any analysis of estimates based on the current and new models. Instead, we have focused on the data quality issues and the performance of models that utilise local unit turnover.

Although about two thirds of businesses returned valid turnover data, a relatively large proportion of the very largest businesses didn't. Nearly 50% of the top 1,000 businesses returned no data at all.

The modelling is in two parts. The first consists of deriving an annualisation rule using data from the Monthly Business Survey (MBS). The annualisation model performs well but, because MBS does not cover all sectors, for example, Construction and Real Estate and not covered, the new method cannot be applied in these sectors. The second part consists of modelling local unit turnover from BRES.

Our investigations show that modelling each variable should lead to more accurate estimates than simply apportioning on employment counts or costs. Modelled local unit turnover should lead to more accurate estimates for the ABS variables turnover and purchases and, possibly to a slightly lesser extent, GVA. The added benefit for other variables may be limited.

Another important criterion is the robustness of the models, especially with regard to year-on-year change. We would need to rerun the methods with 2010 data and analyse the year-on-year changes that would result from the current models and the new models.

1. Introduction

BRES went live in 2009 and the returned local unit turnover data were used to refine the models we developed using data from the BRES 2008 pilot. We have used the estimated local unit turnover data to apportion turnover in ABS, and explored its usefulness in apportioning variables other than turnover; we focused on purchases and stocks. We have produced estimates of turnover, purchases and GVA using the current method, the local unit turnover based methods, as well as an apportionment method based on employment. More work needs to be done to quality assure the results and explore and explain some of the observed differences. Therefore, we have not included in this paper any analysis of estimates based on the current and new models.

In Section 2 we give a brief description of the current apportionment method and regional estimation methodology, and in Section 3 we discuss quality issues in the BRES local unit turnover data. In Section 4 we describe the new apportionment method for turnover and the models we developed to obtain estimates for annual local unit turnover. In Section 5 we describe some of the limitations of the new models and in Section 6 we consider the use of turnover to apportion variables other than turnover, with special focus on purchases and stocks. We present concluding remarks in Section 7.

2. Current apportionment method

ABS collects data at reporting unit level (RU), and large RUs contain several local units that can be spread across different sectors of activity and locations. To obtain estimates by SIC and region, we need local unit data. As these are not collected in ABS, they are estimated via models.

The models are derived separately for each variable using data from single sites and small multisite RUs. For each variable, the modelling is in two parts: in the first part, a model of positive returns is derived, using a linear regression model, and in the second part the propensity to return a positive value is modelled, using a logistic model. The covariates in the two models are: 4-digit or 3-digit Standard Industrial Classification (SIC), geography (NUTS2 or NUTS3) and size (by employment bands).

The current method assumes that units in multisite RUs are similar to single site RUs with the same characteristics. In particular, all local units are treated in the same way: no distinction is made between head offices and warehouses on one hand and production units on the other.

The R-squared of the model for positive turnover values using 2009 data is 0.26.

The regional estimation method is in two stages. In the first stage, direct estimates, based on sampling weights and calibration weights, are computed for minimum domains. These are mostly at 2-digit by NUTS1 or NUTS2 level. In the second stage, an estimate is produced for every local unit in the universe that belongs to a reporting unit not included among the respondents. This is done by apportioning the minimum domain estimate minus the values from the local units belonging to the responding RUs between the remaining local units in the universe that fall into the minimum domain. The apportionment is based on local unit register employment.

3. BRES local unit turnover data – quality issues

The data from the 2008 pilot allowed us to improve the validation rules, in particular to correct automatically £1,000s errors; however, the proportion of businesses that do not respond to the turnover question remains high among the largest of businesses. We carried out an analysis of businesses with 10 or more local units or more than 10,000 employment. Table 1 shows the number of businesses where the proportion of local units with a positive return is 0%, <25%, …, and 100%. We can see that 469 out of a total of 1,005 businesses didn't return any positive values, that is nearly 50%. On the other hand, 453 out of 1,005 had at least 75% of positive returns.

Table 1. Analysis of zero turnover returns in large businesses

% of LUs returning a positive value	Number of RUs
0	469
<25	41
25 to < 50	14
50 to <75	28
75 to <100	380
100	73
Total	1,005

A small number of RUs had between 25% and 75% of positive returns. An analysis of the returns of these RUs didn't show any pattern for the way the businesses may be reporting. We had to adopt a rule to decide which of the RUs with zeros returned valid data. On the basis of the detailed analysis of the comments in the 2008 pilot, we decided to use only RUs where at least 75% of the returns are positive. This resulted in about 66% of RUs in BRES being declared as having valid data, but this percentage decreases with the size of businesses. Overall, about 5% of local units reported a zero value for turnover.

4. Estimating annual local unit turnover

ABS collects annual turnover for each RU and we need to apportion this return between its constituent local units. Annual local unit turnover should be the best variable on which to do the apportionment. BRES collects turnover for August, which means that it needs to be annualised. Many RUs in ABS are not in the BRES sample, or do not respond with valid returns. This means that we need to predict an August value, or a transformed value such as its logarithm, and then annualise it.

The annual local unit turnover is obtained as:

- Annualised BRES LU TO if BRES return>0
- 0 if BRES return=0
- Probability LU has non-zero TO*(annualised predicted August value | LU has non-zero TO)

  if no BRES return available.

We have assumed that local units that returned a zero value in August have a zero annual value. This may not be true, but it is unclear how we can identify the local units that should have a non-zero annual turnover and how to estimate its value. Data from the pilot indicated that the majority of units with a valid zero are either a head office or a warehouse.

We first present the annualisation model and then the modelling of BRES local unit turnover.

4.1 Annualising August turnover

The annualisation rule was obtained by using turnover data from the Monthly Business Survey (MBS). Only units with a return in every month of the year and either containing a single site or having all their sites in the same division and region were used to fit the model. The final modelling dataset contained about 14,000 units. Units with zero August turnover were excluded. An annual turnover value was derived for every unit by summing monthly turnover values.

The model is given by:

- Outcome variable: Log(annual turnover per head)
- Covariates: Log(August turnover per head), 3-digit SIC, GOR, employment bands

The residuals plot and statistical tests indicated that the variance of the residuals could not be assumed to be constant. Hence, we considered fitting a model assuming a non-constant variance model (heteroscedastic): exponential function of the covariate Log(August TOPH). The fitted variance model is

$$\text{Variance(residuals)} = C*\exp(-0.3 \log(\text{August TOPH}))$$

$$= C*\text{August TOPH}^{-0.30}$$

where C is a constant and TOPH denotes turnover per head.

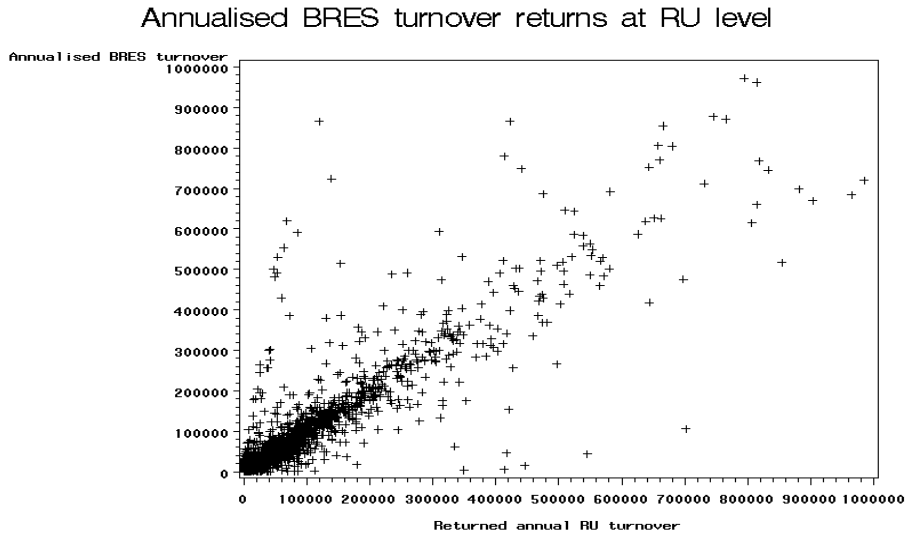
It appears that the log transformation, used to remove the skewness to the right, is too strong. Other transformations were tried, but they perform less well than the log transformation.

When the outcome variable is transformed, there is a need to apply a bias adjustment factor to the backtransformed predicted values. Because we fitted a model with a non-constant variance model, the most appropriate adjustment is obtained by applying smearing estimation; see Welsh et al (2004), who generalised the method proposed by Duan (1983) for models with residuals that are not normally distributed.

To obtain annual turnover for a local unit, we need Log(August TO per Head) for the local unit; hence, there is no need to backtransform the predictions derived from the model based on BRES local unit data. In this method, we only need to apply backtransformation once – in the annualisation process.

The annualisation rule was applied to the local units for which BRES returns were available and annual turnover values for the parent reporting units were derived. Graph 1 shows a scatter plot of the derived (modelled) annual turnover against the returns from ABS. We can see that most of the points are close to the diagonal, suggesting that the annualisation rule performs quite well.

Graph 1. Performance of the annualisation rule



4.2 Modelling BRES LU turnover

As was mentioned above, to obtain an annual value of turnover for each local unit, we need to have a value for Log(August turnover per head) for each local unit. Therefore, for local units for which no data, or no valid data, are available in BRES we need to obtain modelled values for Log(August turnover per head). The model is fitted using BRES data considered as 'usable', as described in Section 3. The model was based on positive returns only, and is given by

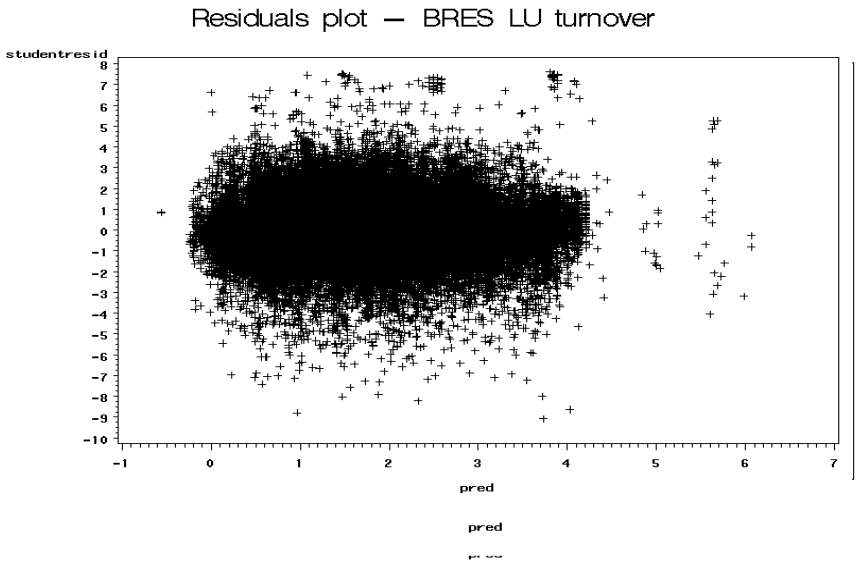
- Outcome variable: Log(August TO per head)
- Covariates: 3-digit SIC, GOR, LU size band, no of local units per RU(banded), RU register TO per head (banded).

We considered multi-level modelling, to account for the clustering of local units within a reporting unit, but the SAS procedures failed to estimate the model coefficients. Therefore, we fitted a multiple liner regression model, with the clustering of local units within a reporting unit ignored.

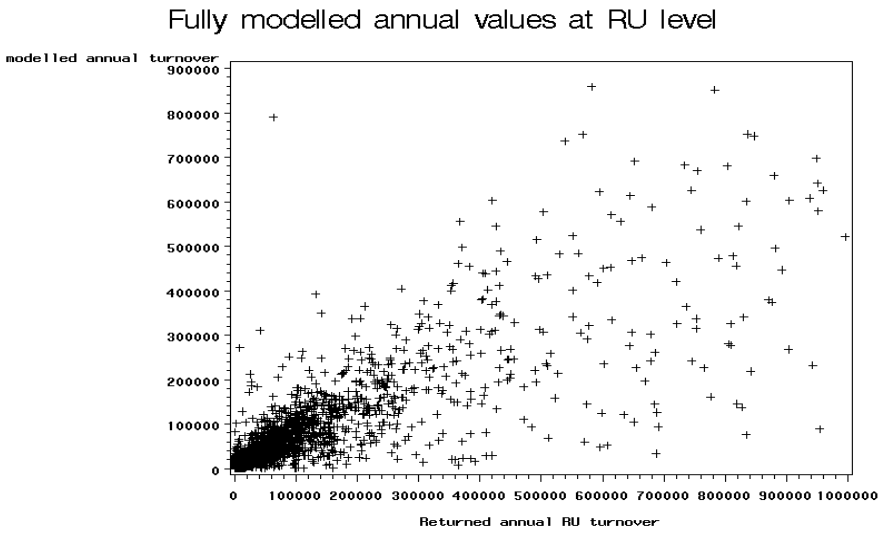
The model R-square increases from 0.36 to 0.46 when RU register TOPH is included as a covariate; Graph 2 shows the residuals plot. The model was assessed and validated using bootstrapping; it was found that there was no notable benefit from assuming a non-constant variance model. Hence, OLS was used to fit the model.

The annual turnover for each reporting unit with no local unit data in BRES was derived by summing the modelled annual turnover values of their constituent local units, and compared with the returned turnover in ABS. Graph 3 shows a scatter plot of the 'fully' modelled turnover values against the returned turnover values; it can be seen that there is more scatter around the diagonal than in Graph 1, which is expected as here we have the combined effect of two models.

Graph 2. Modelling BRES local unit turnover – Residuals plot.



Graph 3. Performance of the BRES model and the annualisation rule



5. Application to the apportionment of turnover in ABS 2009

When applying the models to turnover in ABS 2009, there are limitations due to the fact that some industries are not covered by MBS (eg: Construction, Real Estate). From 2010 onwards, we could use output data from Construction Output survey to build an annualisation rule. However, it's unclear whether an annualisation rule based on output would be appropriate to annualise turnover.

We have also investigated using HMRC VAT turnover data to build an annualisation rule. We have found that it would not be appropriate as the businesses reporting on a monthly basis are not representative of all businesses.

Therefore, we have adopted the following strategy: we use the current models instead of the new models in RUs where one or more local units (LUs) weren't covered by MBS. As a result, in some

industries the proportion of LUs where the new method is used is rather low or even 0 (as in Construction).

Analysis of the impact of the new apportionment on estimates of turnover is in progress. We have also considered apportioning on the basis of local unit employment only.

6. Dealing with variables other than turnover

GVA is derived from 11 variables, including turnover, purchases and changes in stocks. For variables other than turnover we have no local unit data, and hence we can't consider models based on local unit data. Instead, we investigated whether local unit turnover could be a useful additional covariate in the current models. We have focused on Purchases and Stocks.

As described in Section 2, the current models are based on data from reporting units, the majority of which are single sites. We wanted to see how much improvement annual turnover confers to the predictive power of the models.

6.1 Modelling purchases

To do this, we fitted the same models as in the current system but added returned annual turnover to the set of covariates. When this was done, the R-square increased from 0.25 to 0.66. However, a pattern appeared in the residuals plot but it was not obvious which variance model should be assumed.

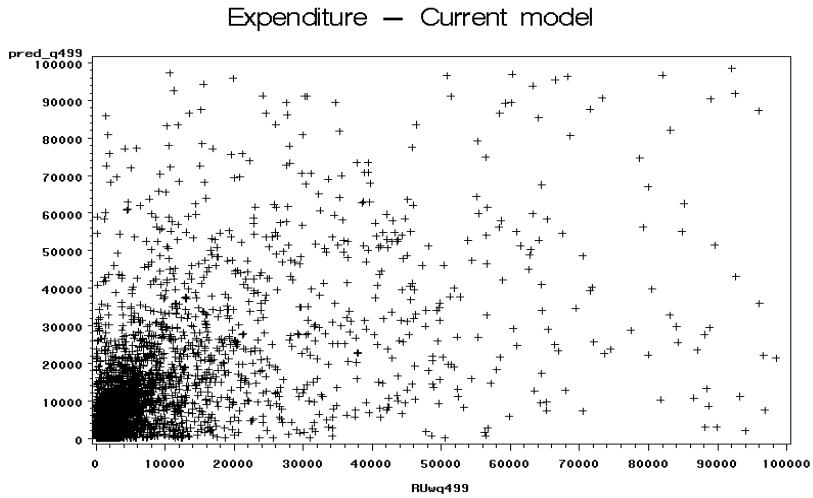
We also considered a ratio model by SIC Division, which meant that no variable transformation was required. Here, it is assumed that purchases are proportional to turnover but a separate model is fitted in each Division.

The current model and the two proposed models were evaluated by performing repeated data splits: 2/3 of the modelling dataset was used to fit the models, whereas 1/3 of the data (evaluation dataset) was used to evaluate the models. Being based on data from reporting units, not local units, this evaluation is limited but should be informative on the usefulness of turnover to predict purchases and other variables.

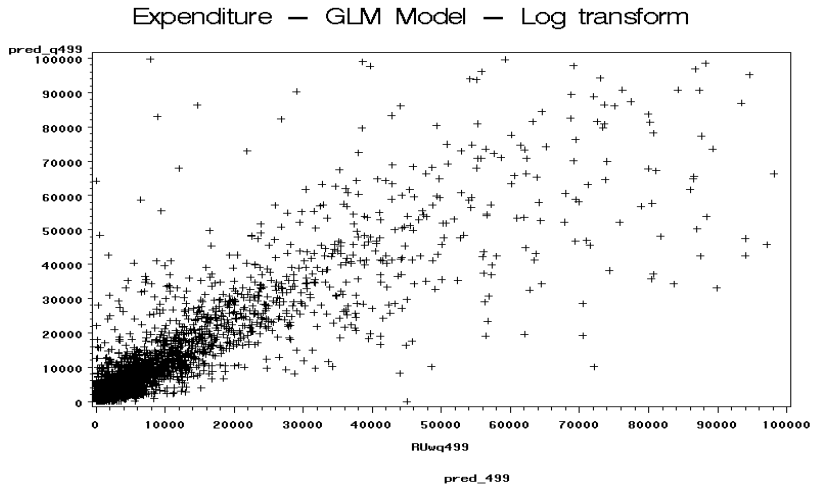
Graph 4, Graph 5 and Graph 6 show the scatter plot of the predicted values of purchases against the returned values of purchases in the evaluation dataset under the current model, current model plus turnover and the ratio model, respectively.

Clearly, turnover (as seen in Graph 5 and Graph6) leads to a lot less scatter than when turnover in not used as a covariate (Graph 4), but it is not obvious which of the two proposed models performs best. To find out, we carried out repeated data splits and computed the R-square under each model. Table 2 contains the R-square values for purchases under all three models for 10 runs. We can see that the proposed models, which utilise turnover, are much better than the current model in every run, and the ratio model is slightly better than the current model plus turnover in very run. Also, because the ratio model does not involve any variable transformation, no extra model bias would be introduced.

Graph 4. Modelling purchases using the current model



Graph 5. Modelling purchases – Adding Log(returned annual TOPH) to covariates



Graph 6. Modelling purchases using the ratio model

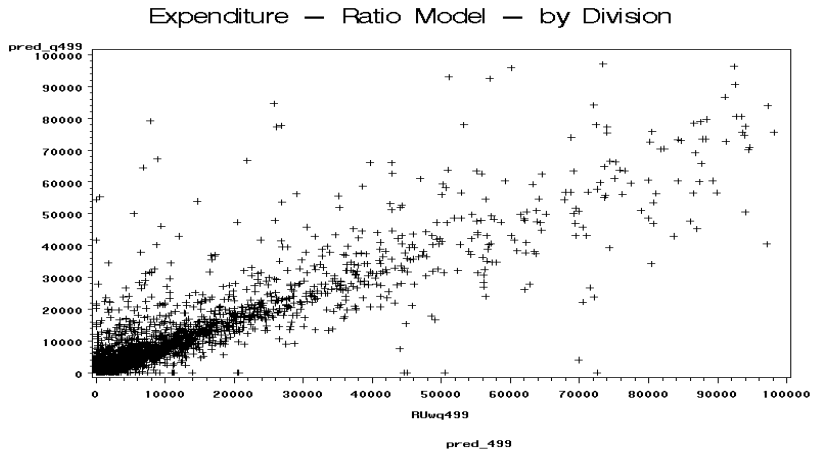


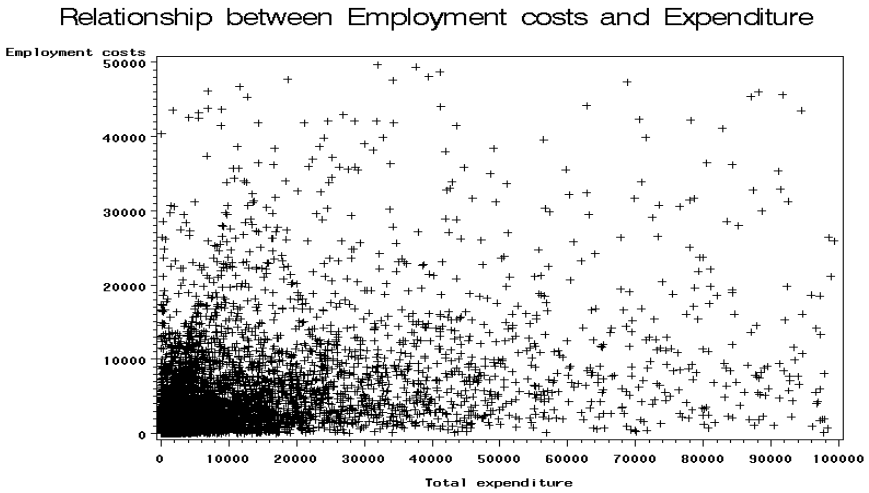
Table 2. Modelling purchases – Comparing models

Run	R-squared current model	R-squared Log model with TO as covariate	R-squared Ratio model
1	0.08	0.73	0.76
2	0.09	0.76	0.83
3	0.14	0.78	0.79
4	0.08	0.77	0.81
5	0.11	0.65	0.81
6	0.01	0.70	0.76
7	0.01	0.66	0.76
8	0.13	0.71	0.82
9	0.09	0.72	0.83
10	0.15	0.75	0.78

In some statistical institutes, as in the Netherlands, apportionment is based on employment costs; it is unclear whether this variable is collected or modelled, at least partly. Graph 7 shows a scatter plot of returned employment costs against returned purchases in the set used to build the current models. We can see that the scatter is quite important, and more important than under the current model (Graph 4), which means that it could lead to an increase in the variance of the regional estimates. However, if employment costs are collected and not modelled, then apportioning on employment costs would not introduce an extra model bias.

Of all four models, the ratio model seems to perform best in terms of predictive power, but to apply it we would have to use modelled local unit annual turnover. Therefore, its performance will not be as good as shown in Graph 6, but it should be better than that under the current model and using employment costs.

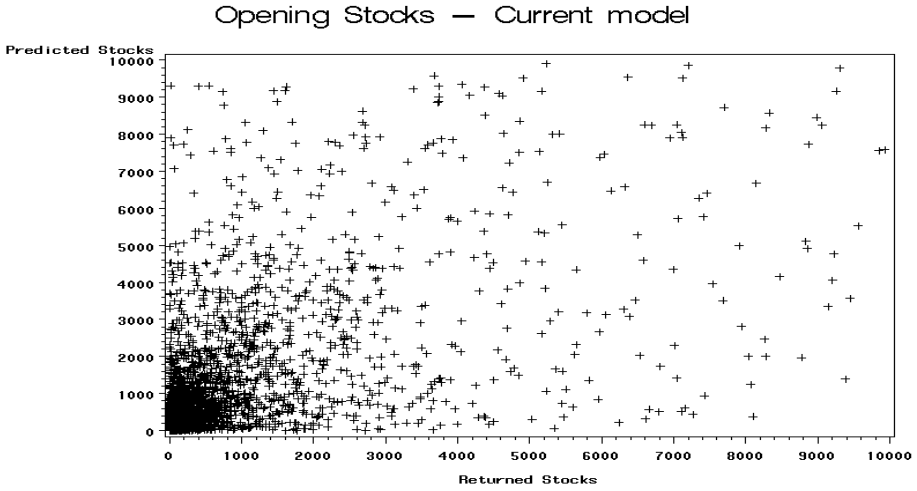
Graph 7. Employment costs and purchases



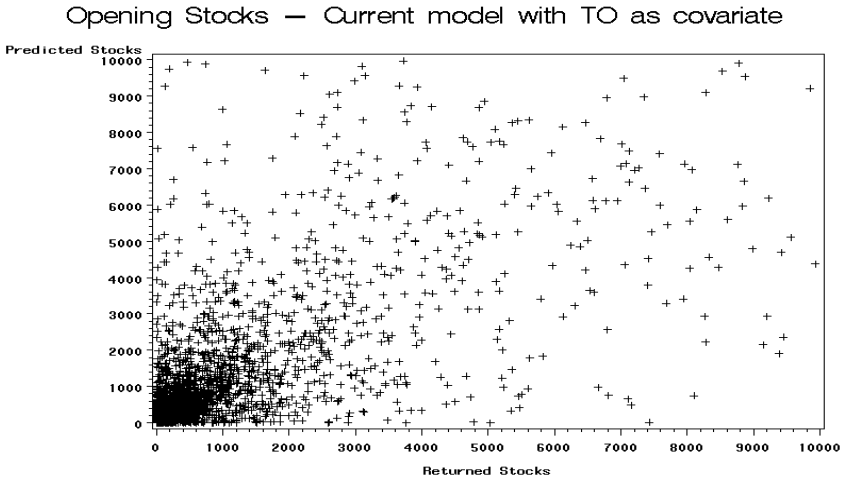
6.2 Modelling opening stocks

We repeated the analysis carried out for purchases for opening stocks, but we didn't consider the ratio model. Graph 8 and Graph 9 display scatter plots of predicted opening stocks against returned stocks in the validation dataset under the current model and the current model plus turnover, respectively. We can see that Graph 9 shows less scatter than Graph 8, but the difference is rather small. Moreover, because we would need to use modelled annual turnover if we were to apply the new model to ABS data, it is unclear whether the new model would perform better than the current model. Hence, (modelled) local unit turnover data may not lead to notable benefits over the current models. Also, it can be seen from Graph 10 that employment costs would be a poorer variable for apportioning stocks than the current model.

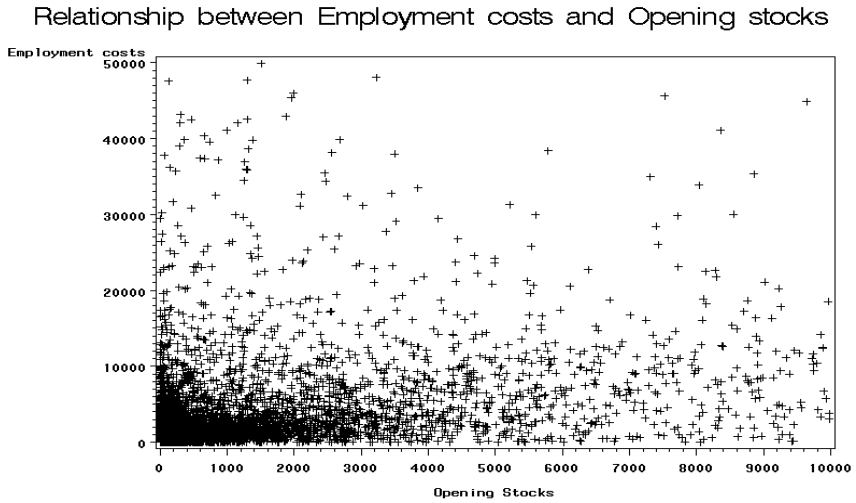
Graph 8. Modelling stocks under the current model



Graph 9. Modelling stocks – Adding Log(returned annual TOPH) to covariates



Graph 10. Employment costs and stocks



7. Conclusions

Because there is no gold standard for regional estimates, it is difficult to measure the benefits from moving to new methods; we have to rely on an evaluation based on statistical criteria.

Our investigations show that modelling each variable should lead to more accurate estimates than simply apportioning on employment counts or costs. Local unit turnover should lead to more accurate estimates for turnover and purchases and, possibly to a slightly lesser extent, GVA. The added benefit for other variables may be limited.

Another important criterion is the robustness of the models, especially with regard to year-on-year change. We would need to rerun the methods with 2010 data and analyse the year-on-year changes that would result from the current models and the new models.

References

Duan, N. (1983), "Smearing estimate: a nonparametric retransformation method", *Journal of the American Statistical Association*, 78, 605-610.

Welsh, A. H. , Zhou, X. (2004), "Estimating the retransformed mean in a heteroscedatisc two-part model", *UW Biostatistics Working Paper Series*, University of Washington.

Standard Errors for Regional Annual Business Survey (ABS) Data

Jennifer Davies, ONS
Matthew Greenaway, ONS
Gary Brown, ONS

August 2013

0. Executive Summary

The aim of the project was to develop a methodology for calculating standard errors of the regional ABS estimates of total turnover, total purchases and approximate gross value added, at SIC07 division by NUTS1 region level.

The recommended method is to use the SAS routine GES (Generalised Estimation System). GES is the standard method for calculating standard errors in ONS.

This work was funded by the Quality Improvement Fund.

Notes

Although good quality standard errors were produced for all estimates and all methods tested, for disclosure reasons, standard errors and coefficients of variation (CVs) are only presented in the graphs where the corresponding estimate is provided in the ABS regional publication. The commentary makes general references to standard errors and CVs that are not included in the graphs. Therefore the conclusions drawn in the commentary may not always be apparent in the graphs.

CVs for Northern Ireland estimates calculated in this report may differ from those published by the Department of Finance and Personnel – Northern Ireland (DFPNI). This is because they have been calculated using different methodologies.

1. Introduction

In 2013, the ABS branch in Business Outputs and Developments division at the Office for National Statistics (ONS) were awarded funding from the Quality Improvement Fund (QIF) to develop a methodology for calculating standard errors of ABS regional estimates. The aim of calculating standard errors is to provide an indication of the quality of the estimates.

The research budget was managed by the ONS Methodology Advisory Service, which recruited members of the Sample Design and Estimation for Business (SDEB) Surveys branch in Survey Methodology and Statistical Computing division, ONS. SDEB are responsible for providing methodological support on sample design, sample allocation and estimation methods used for ONS business surveys. This includes developing methods for calculating standard errors of business statistics estimates.

The research was completed during Summer 2013 using ABS data from 2010.

2. Annual Business Survey

The Annual Business Survey (ABS) is the largest annual structural business statistics survey conducted by the Office for National Statistics (ONS). The survey samples 71,000 businesses in Great Britain and Northern Ireland from the production, construction, distribution and services industries as well as part of the agriculture, forestry and fishing sector. A census is taken of businesses with 250 or more employment and a stratified simple random sample is taken of businesses with employment of less than 250. The stratification is based on industry and employment.

Regional estimates of total turnover, total purchases of goods, materials and services, approximate gross value added at basic prices, and total employment costs are published down to SIC07 division by NUTS1 region level. Users can also submit ad hoc requests for estimates of these variables at lower levels of aggregation, for example at local authority by SIC07 5-digit industry level.

The Inter-Departmental Business register (IDBR) is used as the sampling frame for ABS. The IDBR holds information on 2.1 million businesses in the UK, including turnover, employment and region. The IDBR imposes structures on businesses creating units called reporting and local units. Local units (LUs) are the individual sites of a business, for example shops and factories. Reporting units (RUs) are addresses held on the Inter Departmental Business Register (IDBR) for contacting businesses. For single site businesses (those with one LU) this will typically be the address of the LU, for multi-site businesses (those with more than one local unit) this may be an address of an administrative unit, for example a head office, which reports for a number of LUs.

The ABS samples and collects returns at the RU level. When producing regional estimates, an apportionment model is used to split the RU return to its local units so that businesses' returns can contribute to estimates in the regions where they are based. More information on how the regional apportionment model works can be found in the ABS Technical Report (ONS, 2012)[1].

After the apportionment process, estimates at or above the minimum domain[2] level are produced using ratio estimation. Estimates below the minimum domain are produced a using

[1] ONS, 2012 *Annual Business Survey (ABS) Technical Report,* available at http://www.ons.gov.uk/ons/guide-method/method-quality/specific/business-and-energy/annual-business-survey/quality-and-methods/abs-technical-report.pdf accessed on 14/8/13

[2] Minimum domain – pre-defined levels of aggregation for which estimates at the minimum domain (or higher) are produced using standard ratio estimation, estimates at lower levels must be produced using small area estimation. For ABS the minimum domains are typically SIC07 division by NUTS1 region. For some divisions the minimum domain uses a less detailed geography (eg Great Britain and Northern Ireland) and for others a more detailed geography (NUTS2 or NUTS3).

small area estimation method, which works by apportioning out the minimum domain estimates to lower level aggregates based on total LU employment in that domain. Figure 1 illustrates how regional estimates are produced.

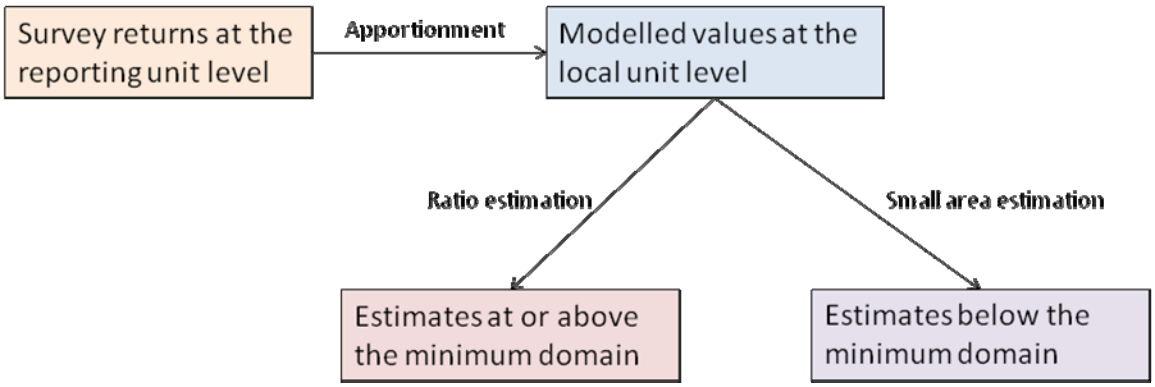


Figure 1: Regional estimation process.

3. Standard errors

If the Annual Business Survey took a census of all businesses in the UK and all businesses completed the questionnaires correctly, then the true values of population totals of all variables would be known. However, the ABS takes a sample of UK businesses which means that population totals are estimated and these estimates are subject to sampling variability. Sampling variability means that if a different set of businesses had been sampled a different estimate would have resulted. Exactly how much estimates would vary by taking different samples cannot be measured directly, but is estimated using the standard error (the standard error is the square root of the variance of the estimate).

Standard errors are one measure of the quality of an estimate - another quality measure is bias. This is the difference between the expected value of an estimator over all possible samples, and the true value of what is being estimated. Even if a census of RUs was taken because an apportionment model is used to estimate LU returns, the regional estimates are going to be different from the regional estimates that would result from a census of LUs. This means that the regional estimates may contain an unknown element of bias.

Figure 2 illustrates the difference between bias and variance. Imagine throwing darts and aiming for the centre of the dart board. In picture 1 the darts fall close to each other so there is low variation between where each throw falls and they are centred on the middle of the board so there is low bias. In picture 2 the darts are more spread out but are still centred on the centre of the board illustrating larger variance but low bias. In picture 3 the darts are all close together but centred on a point away from the middle. This illustrates low variance and large bias. In picture 4 the darts are more spread out and not focussed on the centre illustrating high variance and some bias.

If all businesses fill in questionnaires correctly then the ABS national estimates are approximately unbiased (pictures 1 and 2). The regional estimates however may contain an unknown element of bias due to the use of modelled LU values - calculated using an apportionment model - instead of LU survey returns (pictures 3 and 4).

Standard errors capture the variance and not the bias of estimators; therefore by calculating standard errors of the region estimates, the aim of this project was to look at the variance of the regional estimates due to sampling and not the potential bias introduced by using an apportionment model.

The ideal measure of quality would be a combination of both sampling variability and bias. This is captured by the Root Mean Squared Error (RMSE) – the square root of the Mean Squared Error (MSE). The MSE is the sum of the variance and the (squared) bias. However, bias is difficult to measure in this case as there is a lack of true LU data to compare the apportioned data to.

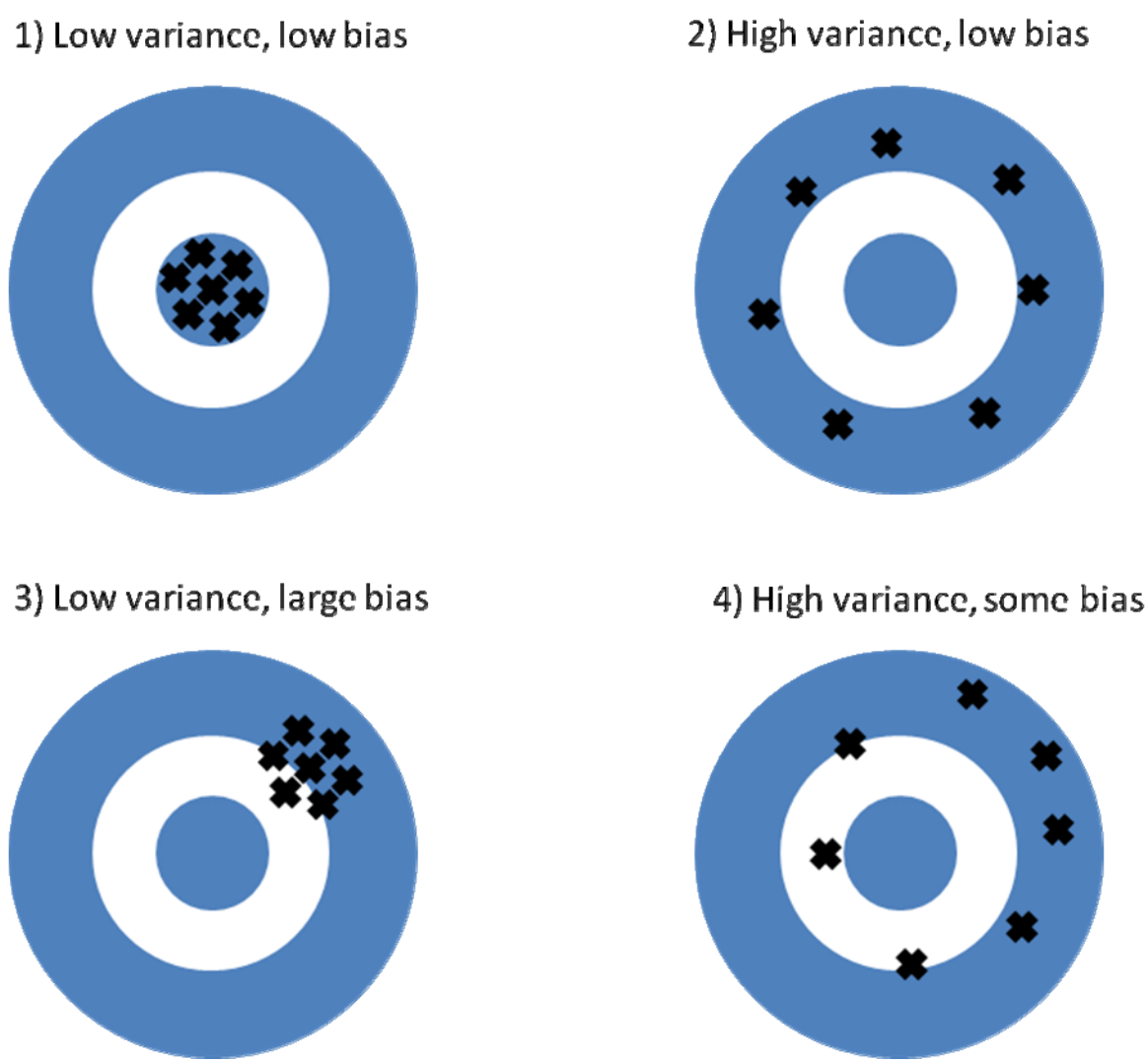


Figure 2: Illustration of differences between bias and variance.

4. Methods

Two methods for calculating standard errors were selected by the ABS team for testing:

- GES in SAS – a generic theory-based approach; and
- Bootstrapping – a simulation-based approach.

Other potential methods, for example using pre-existing routines written in other software, or deriving specific expressions for the variance, were not investigated due to time constraints.

4.1 GES

Generalised Estimation System (GES) is a suite of SAS macros used in the production systems of many ONS surveys for estimation and standard error calculation.

To use GES for the regional estimates, the parameters in the regional apportionment model are assumed to be fixed. In effect these standard errors assume that the apportioned LU values are real LU returns. This assumption is known to be incorrect as the parameters are estimated and so are subject to sampling error. The accuracy of the GES approach thus depends on the impact of this assumption. The alternative method of bootstrapping is used to quantify this impact.

In addition, the GES method can only be used for estimates at levels of aggregation at or above the minimum domain. This is because GES can produce standard errors for the ratio estimator, but not for estimates produced using the small area estimation method.

4.2 Bootstrapping

Bootstrapping is a re-sampling-based technique whereby a subsample of the actual sample is taken. Estimates are then calculated based on the new sample. This process is repeated a large number of times, and the standard error of the original estimate is estimated by taking the standard deviation of the estimates produced under this repeated re-sampling procedure.

Figure 3 illustrates how re-sampling works. From an original population of size N a simple random sample of size n was taken without replacement (each unit has an equal chance of selection and can only be selected once).

Bootstrapping re-samples from this sample with replacement n-1 times. This means that the businesses in the original sample can be included in the re-sample once (yellow and purple businesses), multiple times (red business) or not at all (green and blue businesses). The bootstrap sample is then used to produce estimates using the same methodology as the original estimate.

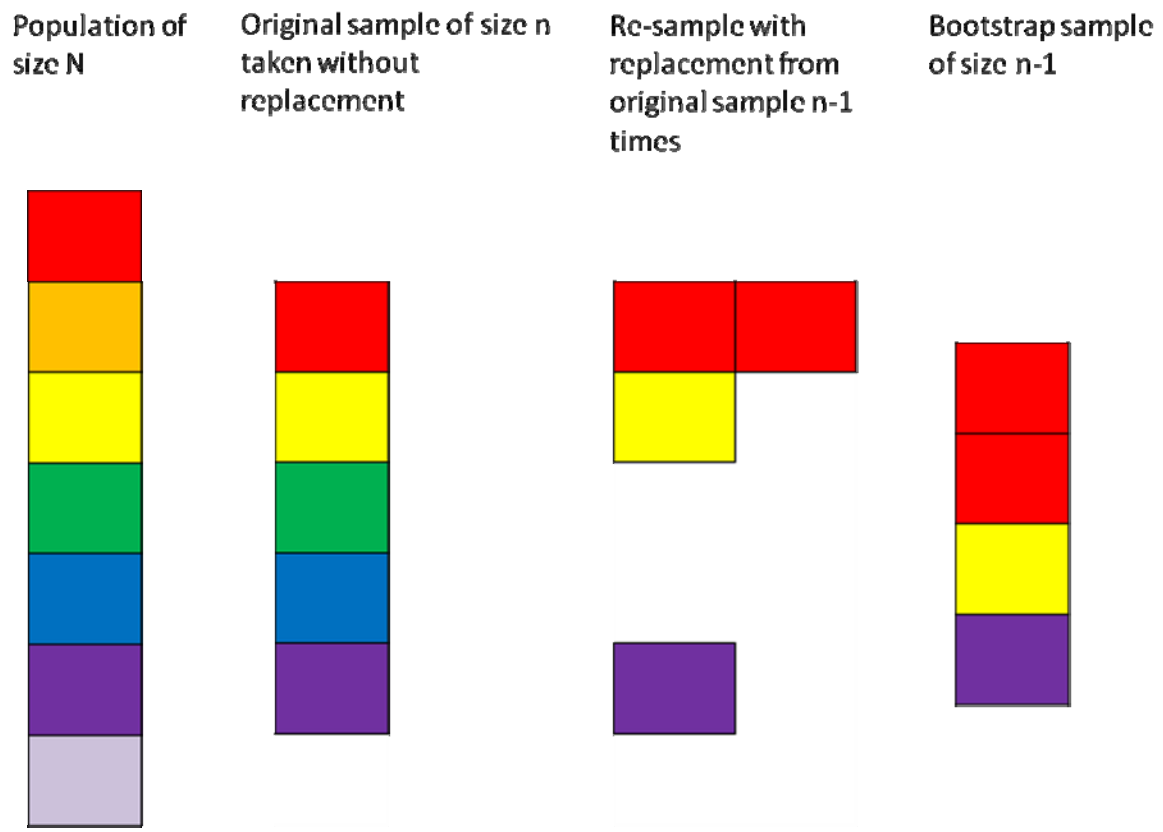


Figure 3: Illustration of bootstrap re-sampling.

The aim of re-sampling is to replicate the original sampling process. As stratified simple random sampling was originally used for the ABS sample design, bootstrapping is carried out separately for each original design stratum.

Some of the original design strata have a large sampling fraction, which means that a large proportion of the population of the stratum was included in the sample. To account for this, a rescaling bootstrap method is implemented which adjusts design weights taking into account original sampling fractions. More details on this method are available in Girard (2009)[3].

Above the minimum domain, the bootstrapping method is as follows.

1. Re-sample with replacement from the original sample of reporting units
2. Use the bootstrap sample of RUs as the input for the regional apportionment model
3. Use the resulting regional apportionment model to apportion RU returns to LUs for units in the bootstrap sample
4. Use the LU data from step 3 to calculate ratio estimates for SIC07 division by NUTS1 region domains
5. Repeat stages 1 to 4 a large number of times

[3] Girard, C., 2009 *The Rao-Wu rescaling bootstrap: from theory to practice*, Federal Committee on Statistical Methodology Research Conference

6. Estimate the standard error of the original estimate as the standard deviation of these new estimates

As a quality check of the bootstrapping method, results were also produced skipping stages 2 and 3, to mimic the GES method, and compared with the GES results. LUs of RUs selected in the bootstrap sample retain their original apportioned values calculated using the full sample in the regional apportionment model.

Bootstrapping also provides a solution to producing standard errors for estimates below the minimum domain.

A potential methodology for producing standard errors of estimates below the minimum domain level was scoped out. The method is outlined below, but was not tested as part of this project.

1. Re-sample with replacement from the original sample of reporting units
2. Use the bootstrap sample of RUs as the input for the regional apportionment model
3. Use the resulting regional apportionment model to apportion RU returns to LUs for units in the bootstrap sample
4. Use the LU data from step 3 to calculate ratio estimates for SIC07 division by NUTS1 region domains
5. Use the small area estimation methodology to apportion the minimum domain estimates to their lower level aggregates
6. Repeat stages 1 to 5 large number of times
7. Estimate the standard error of the original estimate as the standard deviation of these new estimates

5. Results

5.1 GES

GES standard errors of estimates of Total Turnover, Total Purchases and Approximate Gross Value Added (GVA) at SIC07 division by NUTS1 region level took 10 hours to produce on a standard desktop computer. The length of time can be attributed to the large size of the 2010 local unit data set.

Figures 4 to 6 plot the coefficients of variation (CVs, absolute for GVA[4]) for the estimates of turnover, purchases and GVA by SIC07 division and NUTS1 region for divisions above the minimum domain. The pink points indicate CVs above 20%, a commonly used threshold for acceptable CVs. We remind readers that since not all CVs are plotted for disclosure reasons, there may be some general findings referred to in the text which are not apparent from the graphs; for further details see the note in the Executive Summary.

For each variable there are 780 standard errors of turnover, purchases and GVA and the number of these standard errors exceeding the 20% threshold are 71, 134 and 125 respectively. The North East, the East of England, Wales and Northern Ireland have more standard errors above 20% than the other regions for each of the variables of interest.

In division 31 (manufacture of furniture), 6 of the 12 UK regions have estimates of turnover and GVA with CVs above 20% and there are seven such regions for purchases. For purchases, divisions 78 (employment activities) and 80 (security and investigation activities) the regional CVs are over 20% in 9 and 10 regions respectively. Divisions 90 (creative, arts and entertainment activities) and 94 (activities of membership organisations) have 9 regions with CVs of GVA over 20% and division 91 (libraries, archives, museums and other cultural activities) has 11 regions with CVs over 20%.

Figures 4 and 5 show large CVs for the Northern Ireland estimates for turnover and purchases in division 70 (activities of head offices; management consultancy activities). A number of these LUs are associated with RUs in other divisions including divisions 46 (wholesale trade, except of motor vehicles and motorcycles) and 47 (retail trade of motor vehicles and motorcycles). When these RUs were originally selected, they were in strata with other wholesalers or retailers in Northern Ireland who do not have any LUs in division 70. This means that within the original design strata there are a large number of RUs with no activity in division 70 in Northern Ireland and a small number which do. The variance calculation accounts for the original sample design meaning that these businesses with no activity in the domain of interest can have a large impact on the variance even though their contribution to the estimate is zero.

Figure 6 shows that the estimates of GVA in divisions 90 (creative, arts and entertainment activities), 91 (libraries, archives, museums and other cultural activities) and 94 (activities of membership organisations) consistently have large CVs across most regions. This is because GVA can take positive and negative values. In these divisions the estimates of GVA are very

[4] A coefficient of variation of an estimate is its standard error divided by the estimate. Absolute coefficients of variation have been provided for GVA as estimates of GVA can be negative.

small, meaning that the CVs are very large. This highlights why the CVs for GVA need to be treated carefully.

CVs of variables which can be both positive and negative difficult to interpret; therefore it may be preferable to publish standard errors rather than CVs for GVA estimates.

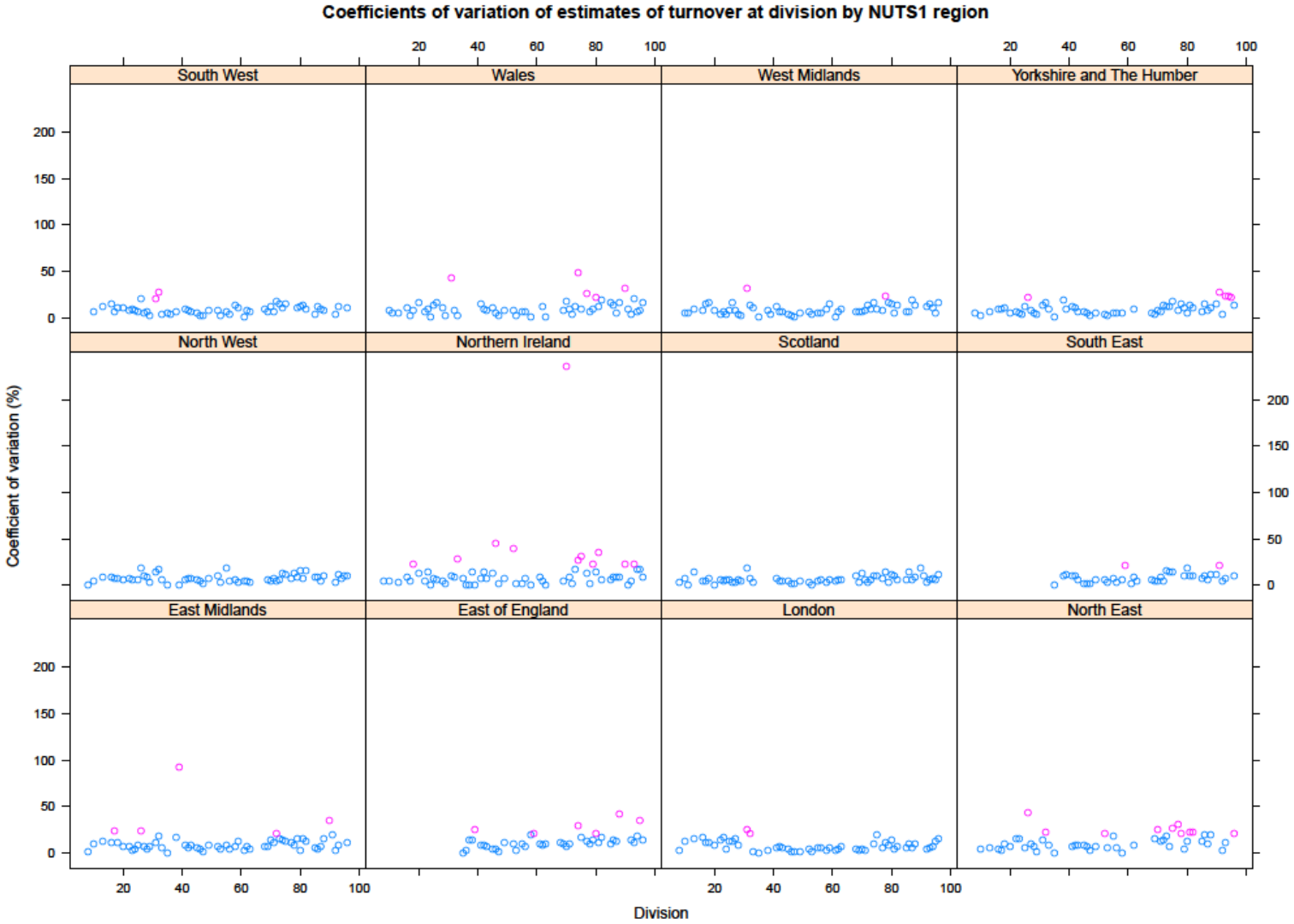


Figure 4: Plot of coefficients of variation of estimates of turnover by SIC07 division and NUTS1 and higher levels of aggregation. Pink points indicate coefficients of variation above 20%. Some divisions have been excluded for disclosure reasons.

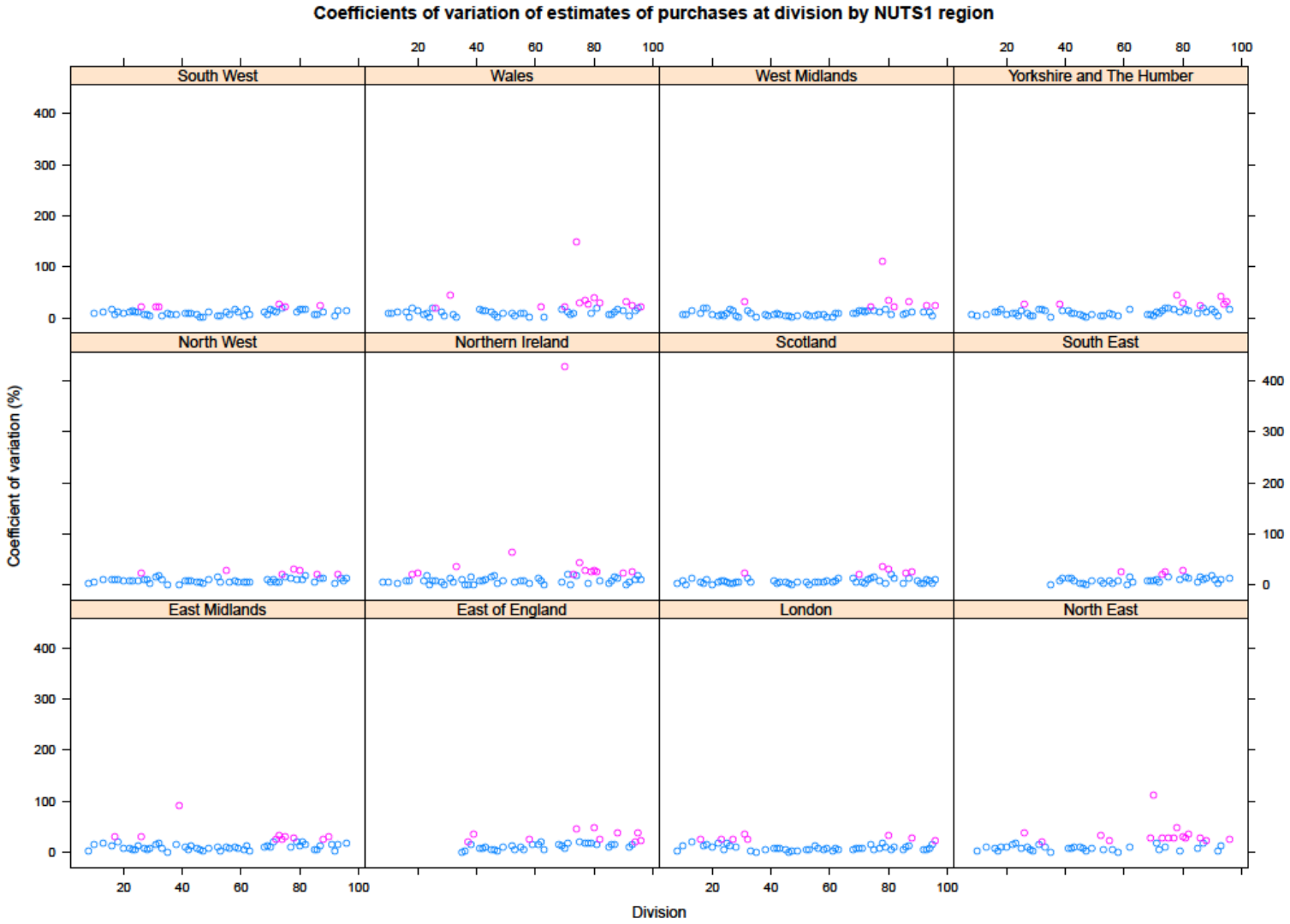


Figure 5: Plot of coefficients of variation of estimates of purchases by SIC07 division and NUTS1 and higher levels of aggregation. Pink points indicate coefficients of variation above 20%. Some divisions have been excluded for disclosure reasons.

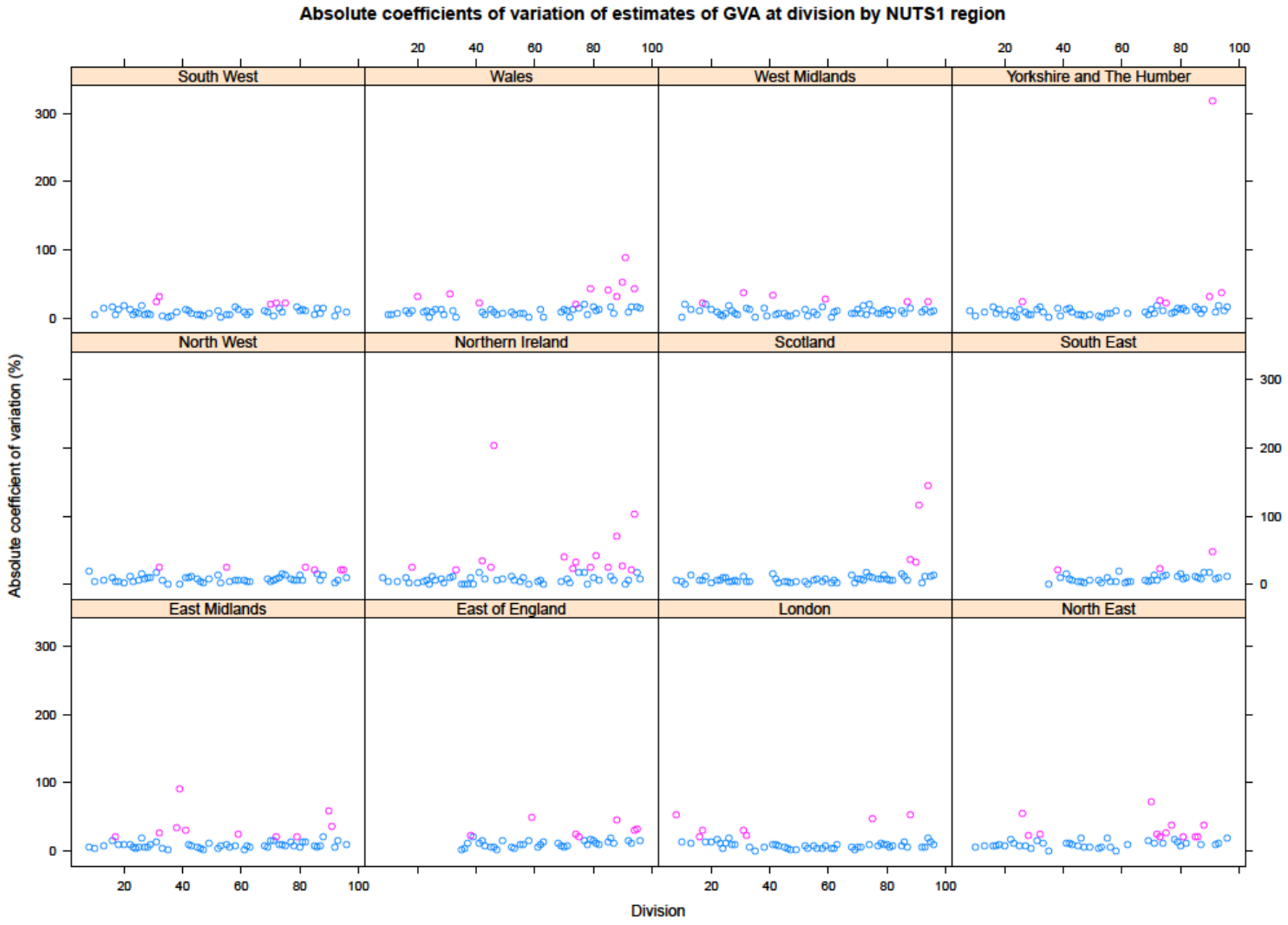


Figure 6: Plot of absolute coefficients of variation of estimates of GVA by SIC07 division and NUTS1 and higher levels of aggregation. Pink points indicate coefficients of variation above 20%. Some divisions have been excluded for disclosure reasons.

5.2 Bootstrapping

Bootstrapping took 6 hours and 45 minutes to calculate standard errors of total turnover and 4 hours and 34 minutes for total purchases for 300 replications.

The standard errors for GVA took considerably longer - 16 hours for 100 replications. As GVA is a derived variable the apportionment model is slightly more complicated. The regional apportionment model is fitted for each of its component variables, then these apportioned values are used to calculate LU GVA.

Figures 7 to 9 plot the bootstrapped standard errors with and without refitting the regional apportionment model.

Bootstrapping where the model is re-fitted produces similar results to bootstrapping without re-fitting the model in a large number of divisions. The relative percentage differences between the bootstrap estimates with and without re-fitting the apportionment model are summarised in table 1. The table shows, for example, that 81% of the standard errors of estimates of turnover at division by NUTS1 region calculated with re-fitting the regional apportionment model were within ±10% of the standard error calculated without re-fitting the regional apportionment model.

	Percentage of standard errors		
Relative Percentage Difference	Turnover	Purchases	GVA
<0%	3%	3%	3%
<1%	31%	35%	15%
<5%	73%	71%	51%
<10%	81%	81%	64%
<20%	87%	86%	74%
<50%	92%	91%	83%
<100%	94%	94%	89%
100%+	6%	6%	11%

Table 1: Summary of relative percentage differences between standard errors for estimates of turnover, purchases and GVA at division by NUTS1 region level, when calculating using bootstrapping with and without re-fitting the regional apportionment model.

From figures 7 to 9 it can be seen that divisions where there are large differences between the two standard errors are fairly consistent for both turnover and purchases. The differences are particularly noticeable in, for example divisions 8 (other mining and quarrying), 35 (electricity, gas, steam and air conditioning supply), 47 (retail trade, except motor vehicles and motorcycles) and 92 (gambling and betting activities). For GVA, the same divisions show large differences and a handful of other divisions (for example divisions 24 and 46) see even larger differences between the two sets of standard errors. This is not unexpected as GVA requires models to be fitted for all its component variables and each model can add to the variance. The GVA standard errors were checked for their convergence (stability) and even after 100 replications there were no noticeable instances where the series had not

converged meaning that there is no reason to believe that using more replications would change any conclusions.

The divisions where the apportionment model increases variability appear to be those where a large proportion of the estimate is affected by the regional apportionment model. Clearly where an RU has all of its LUs in one division and region, its contribution to the division by region estimate will not be affected by the regional apportionment model.

It is worth noting that while a business may have all of its LUs in one region and division, these LUs may be spread out within that region and may specialise in different activities within that division. While most standard errors are quite similar for estimates at the division by NUTS1 level with and without re-fitting the regional apportionment model, this result may not hold for lower level estimates.

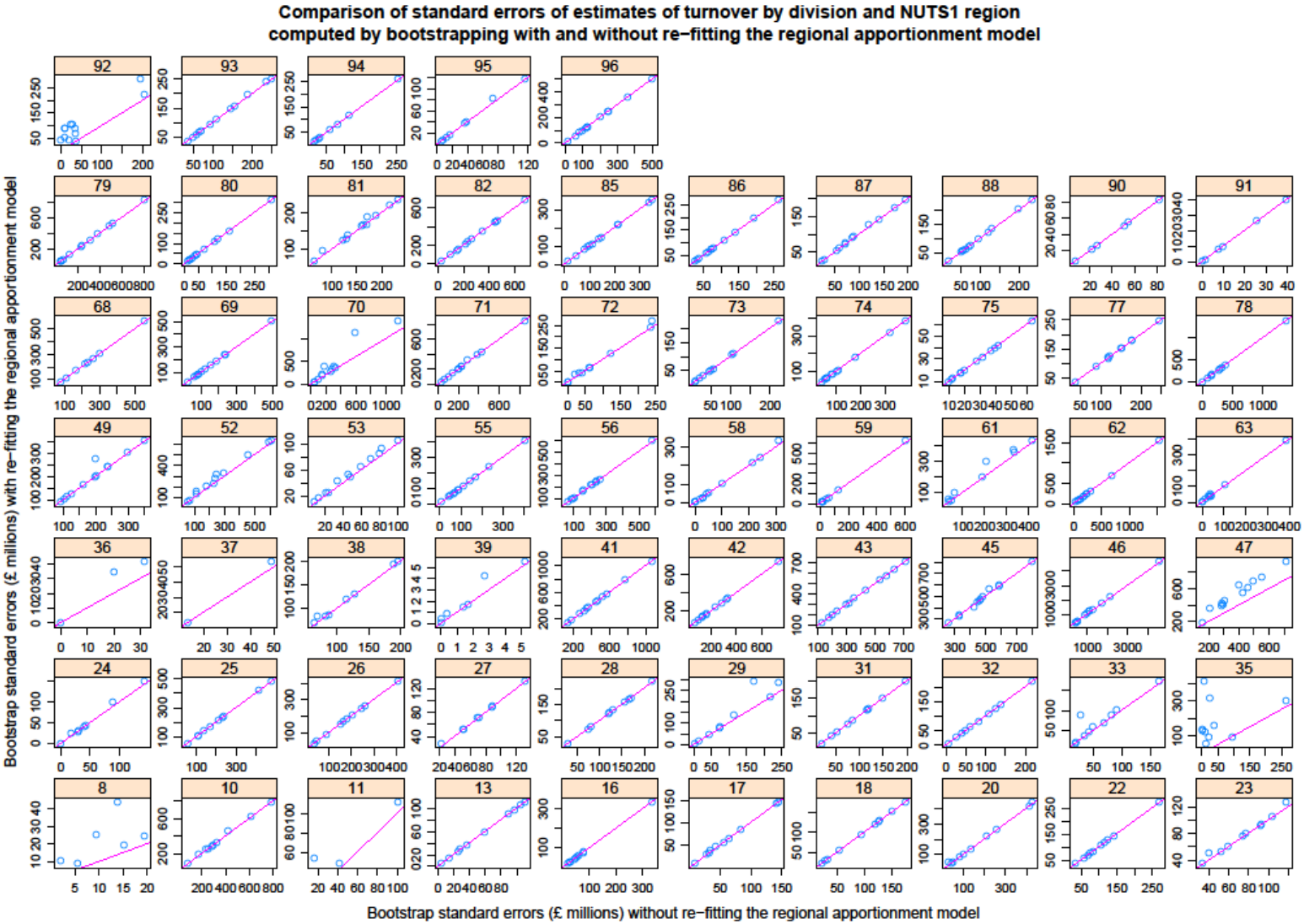


Figure 7: Plots of bootstrapped estimates of the standard errors of estimates of turnover at division by NUTS1 level with and without re-fitting the regional apportionment model. Some divisions have been excluded for disclosure reasons.

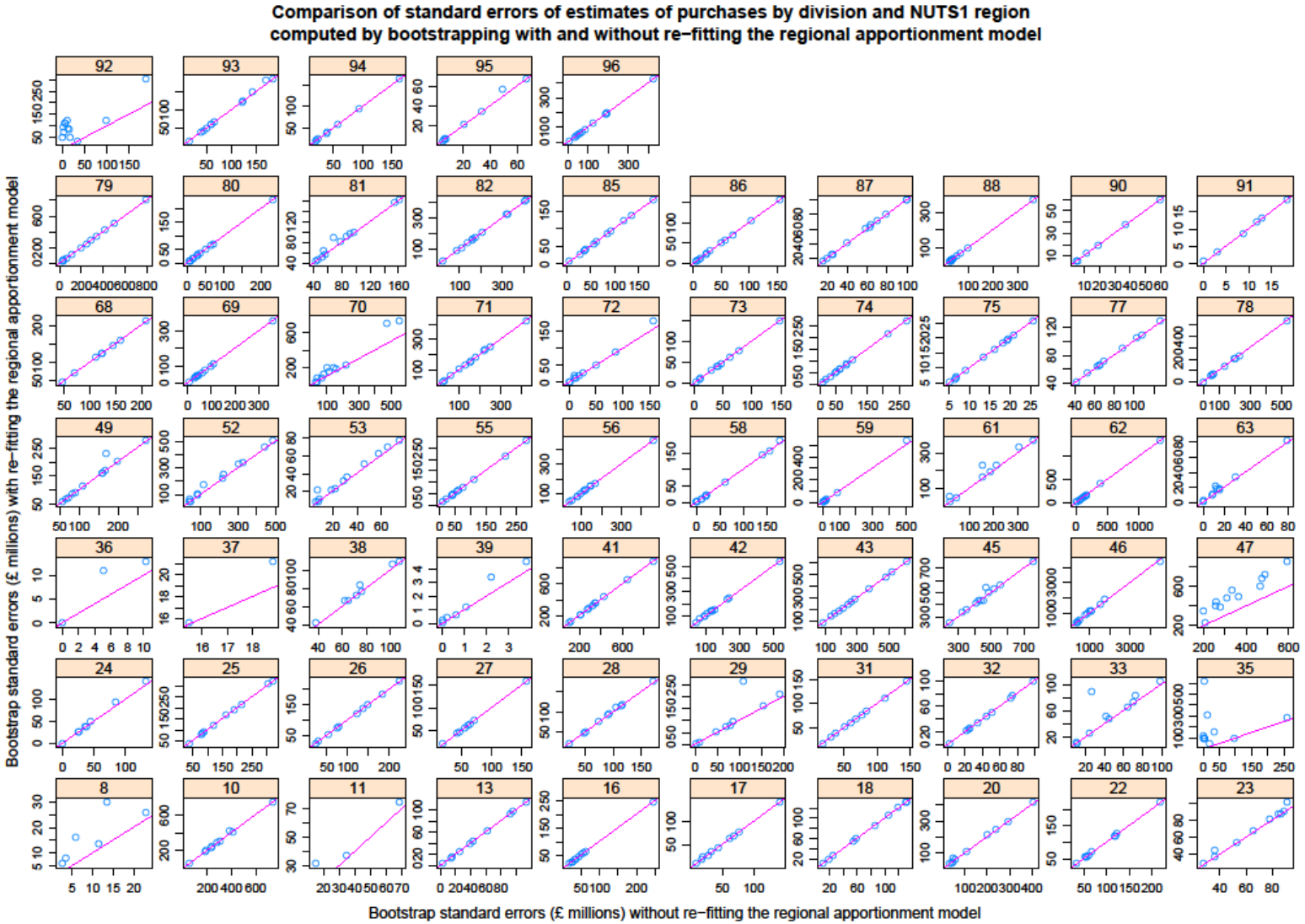


Figure 8: Plots of bootstrapped estimates of the standard errors of estimates of purchases at division by NUTS1 level with and without re-fitting the regional apportionment model. Some divisions have been excluded for disclosure reasons.

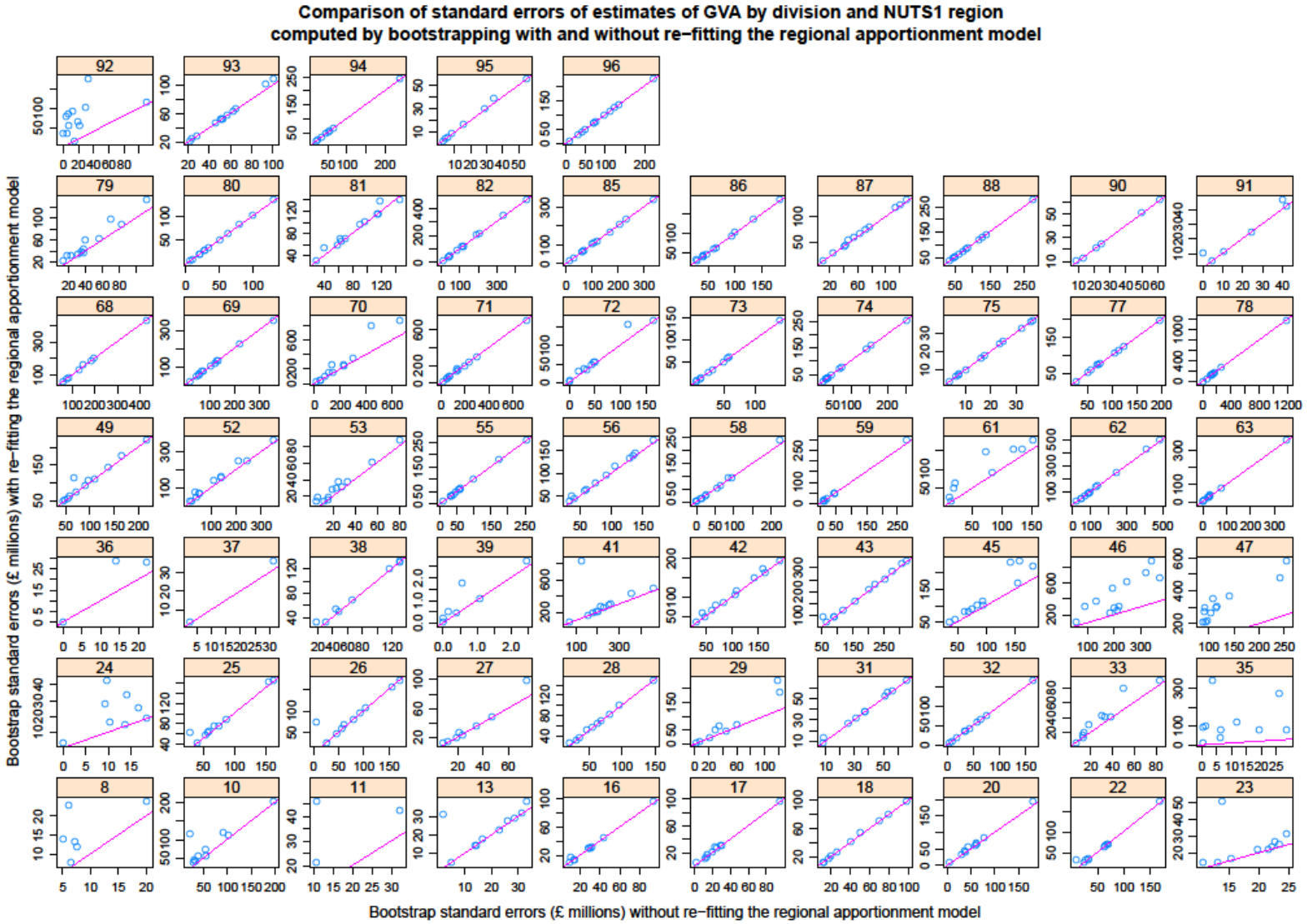


Figure 9: Plots of bootstrapped estimates of the standard errors of estimates of GVA at division by NUTS1 level with and without re-fitting the regional apportionment model. Some divisions have been excluded for disclosure reasons.

5.3 Comparison of GES and bootstrapping

The standard errors produced by GES and bootstrapping (without re-fitting the model) are both trying to estimate variability assuming a fixed apportionment model. For this reason they should be comparable. The performance of the bootstrapping method can be assessed against a benchmark of the GES standard errors.

This comparison was carried out for turnover and purchases only because of difficulties replicating the apportioned values of GVA.

Figures 10 and 11 show that in most cases the standard errors for the same estimates produced under the two different methods are very similar. Two factors which explain some of the differences are: the slightly different treatment of outliers in the computation of the standard errors; and a limitation of the bootstrap method when there is a sample size of one in an original design stratum.

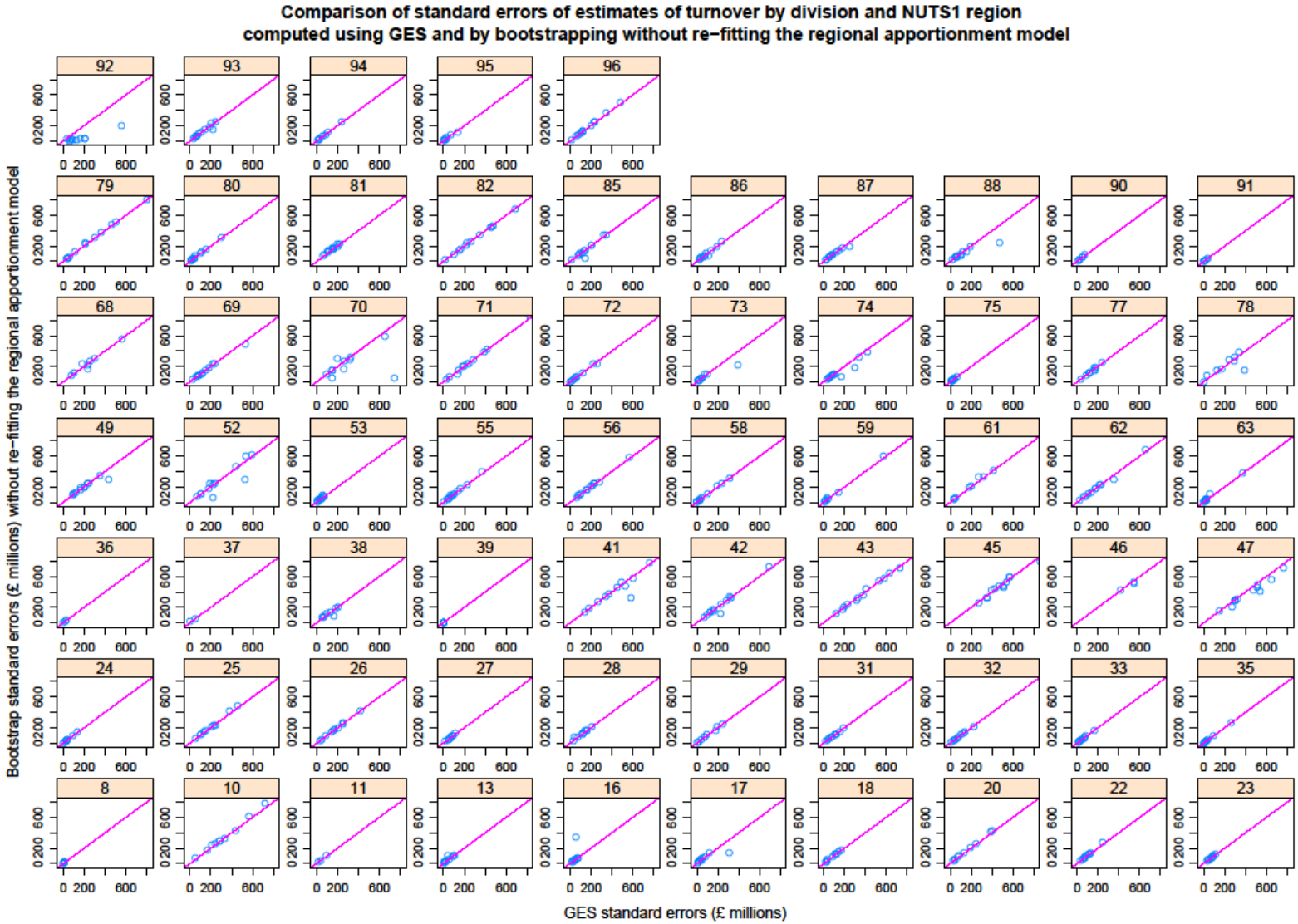


Figure 10: Plot of bootstrap standard errors against GES standard errors for estimates of turnover. Some divisions have been excluded for disclosure reasons.

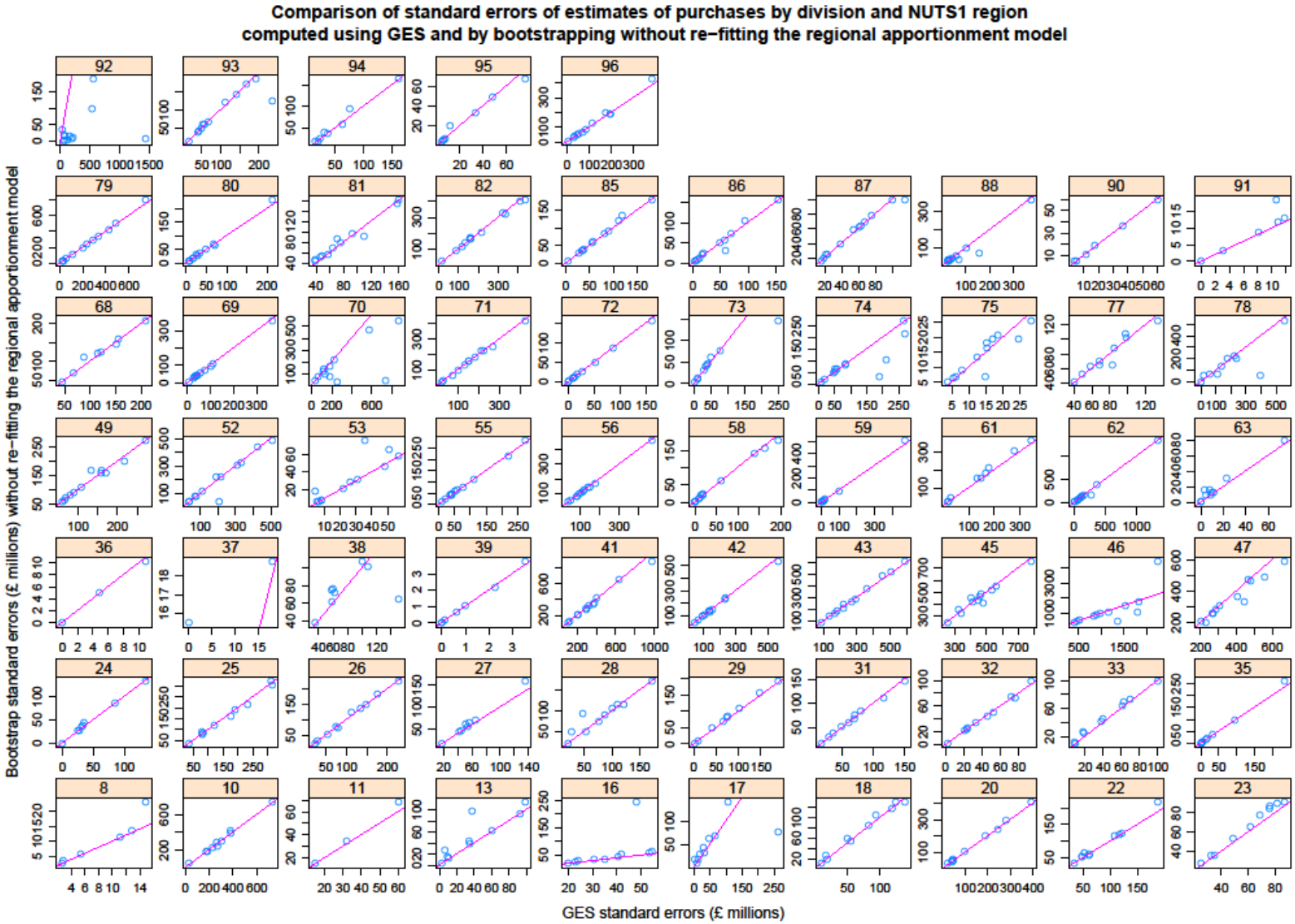


Figure 11: Plot of bootstrap standard errors against GES standard errors for estimates of purchases. Some divisions have been excluded for disclosure reasons.

6. Conclusions and recommendations

Based on these findings in this report, standard errors for estimates of turnover, purchases and GVA should be computed using GES. These should be accompanied by a caveat explaining that they capture sampling variance but not additional variance from the apportionment model. The caveat should explain that additional variance from the apportionment model has been investigated and was found to be small in most cases for turnover and purchases and had slightly more of an impact for GVA.

Update to Released ABS Datasets

What has happened?

Some data that are missing from a number of Annual Business Survey (ABS) micro-data files made available to approved researchers via the Virtual Microdata Lab (VML) and the UK Data Service (UKDS) have recently become available. An update will therefore take place to ensure that researchers have access to these data.

The update affects a small number of variables for a minority of businesses, and concerns only data from the ABS; data from other ONS surveys, such as the Business Register and Employment Survey (BRES), are not affected. Furthermore, only ABS micro-data files distributed via the VML and UKDS are affected; ABS aggregates published by ONS are not affected.

Which variables and businesses are affected?

The update primarily affects businesses in the Agriculture and Production sectors (sections A to E of the Standard Industrial Classification (SIC)), whereby missing values for some businesses will be replaced with values. Within these sectors, the most important variables affected are:

- wq500 (total value of all stocks at the beginning of the period)
- wq599 (total value of all stocks at the end of the period)
- wq600 (total acquisitions)
- wq699 (total disposals)

Two other variables are also affected for businesses within the Agriculture and Production sectors, although these are unlikely to be utilised by most researchers:

- wq144 (number of hours taken to complete the questionnaire)
- wq145 (number of minutes taken to complete the questionnaire)

Outside of the Agriculture and Production sectors, just one variable for businesses within the Wholesale sector (divisions 45 and 46 of the SIC) if affected by the update:

- wq11 (start date of the period covered by the return)

Which files are affected?

The update affects the following ABS micro-data files distributed via the VML and UKDS:

- reference year 2008 (final release only)
- reference year 2009 (final release only)
- reference year 2010 (revised release only)
- reference year 2011 (provisional release only)

How will the update be carried out?

ONS will submit updated final releases of the data for references years 2008 and 2009 to both the VML and the UKDS. Researchers currently making use of one or more of the affected variables in the existing final release for these reference years will be given access to the updated final releases of the data.

Researchers currently making use of one or more of the affected variables in the revised release for 2010 or the provisional release for 2011 will be given access to the most up-to-date releases for these years.

Will there be a need for more updates in the future?

ONS has simplified and improved the process it uses to collate ABS micro-data files to be distributed via the VML and the UKDS, and has incorporated additional quality assurance checks. It is therefore not anticipated that any further updates will be required.

ONS apologises for any inconvenience caused.

For further information, please contact abs@ons.gov.uk

Office for National Statistics

Information paper

Weighting in the Regional System

Salah Merad, Office for National Statistics ***September 2011***

Executive Summary

In the course of assessing the benefits of using Local Unit Turnover from Business Register and Employment Survey (BRES) to produce regional estimates, we have found that improvements to the Annual Business Survey (ABS) sub-national estimation system could be made by implementing a relatively simple change to the weighting. The current weighting method is essentially model-based and hence prone to bias if the models do not hold. The new weighting method uses a design approach, with the design weights calibrated to recover register employment totals, which makes the resulting estimator approximately unbiased.

Analysis of the impact of the new weighting method shows that the resulting differences in the figures are generally small, particularly at high levels of aggregation. After extensive discussions, MD, ABS and Regional Economic Statistics Branch (RES) agreed to implement the change. A timetable for introducing this change has been agreed and is now being implemented. The timing of the change will allow the ABS regional team to begin processing 2009 figures on the new basis in September/October 2011, for December delivery to Regional Accounts and the regions. The same timing applies to year 2010 deliveries, also delivered under the new method. On the ABS website, in Bulletins and Special Analyses, year 2009 results will be changed in summer 2012, following the normal revisions practice/timing. Figures for 2008 and earlier will not be changed.

1. Outline of issue

In the course of assessing the benefits of using Local Unit Turnover from BRES to produce regional estimates, we have found that improvements to the ABS sub-national estimation system could be made by implementing a relatively simple change to the weighting. The current system utilises a model-based estimation approach which relies on fairly optimistic assumptions regarding local units belonging to reporting units selected from strata with different sampling fractions. Where these assumptions do not hold, the estimates are prone to bias. This bias can be mostly removed by using a largely design based approach to the estimation. In the new weighting method, the design weights are calibrated to recover register employment totals, which should improve the precision of the estimates. The current approach of apportioning reporting unit data down to local unit level will remain (this is still model based and subject to model bias) but the calculation of sub-national weights would use a purely design approach.

In this new approach, the sub national design weights (or a-weights) would not need to be calculated since each local unit would merely "inherit" the weight of its Reporting Unit "parent". This reflects the probability of selection into the sample and is a consequence of the fact that a Local Unit is included in the sample if and only if its Reporting Unit has been included. Once these design weights have been transferred to the local units, the calibration weight (or G weights) would then be calculated as in the current system. The minimum domain and Local Unit Universe estimation process would also remain to reduce volatility at low levels of aggregation.

In Section 2, we present the old and new weighting methods and demonstrate the differences through an example. In Section 3, we compare estimates of Gross Value Added (GVA) based on the old method and the new approach, referred to as the calibration approach, and the resulting regional

N.B. The analyses were performed on data that do not match exactly with the data used in the published estimates and hence there may be some differences.

distributions for 2009. All estimates are in £1,000s.

2. Comparing the old and new weighting methods

We consider the estimator of the population total for variable y, turnover, say, in a domain D, for example, in the London region in Standard Industrial Classification (SIC) Division 47 (Retail trade, except of motor vehicles and motorcycles).

The gweight bands are defined in terms of the variable POSTSTAT (Parent's Division and region of local unit) and the parent's size band PARSIZE.

The estimator under the old weighting method, in Division 47 and region H (London), can be written as

$$\hat{T}^{Old}_{y,Div47,H} = \sum_{poststat\_H} \sum_{parsize} \sum_{s\_Div47} \left(\frac{\sum_{Univ\_poststt\_parsize} register\ employment}{\sum_{samp\_poststt\_parsize} register\ employment} \right) y_i$$

Where POSTAT_H denotes all POSTATS where local units are in the London region, and s_Div47 denotes the respondent local units in the sample that are in Division 47.

Note that more than one POSTSTAT can contribute towards the estimate in any domain as POSTSTATs are defined in terms of the parent's Division whereas regional estimates are obtained for domains defined in terms of the local units's SIC, for example, Division.

The form of the estimator under the old method indicates that for all local units in the same gweight band, given by the parent's division and size and the local unit's region - that is POSTSTAT and PARSIZE, the overall weight under the old weighting method is constant and is given by

$$w_i^{Old} = \frac{\sum_{Univ\_poststt\_parsize} register\ employment}{\sum_{samp\_poststt\_parsize} register\ employment}$$

The estimator under the new weighting method, in Division 47 and region H, is a calibration estimator and can be written as

$$\hat{T}^{New}_{y,Div47,H} = \sum_{poststat\_H} \sum_{parsize} \sum_{s\_Div47} (a_i g_i) y_i$$

where ai denotes the design weight (or aweight) and gi denotes the calibration weight (or gweight) for local unit i . The gweight is given by

$$g_i = \frac{\sum_{Univ\_poststt\_parsize\_new} register\ employment}{\sum_{samp\_poststt\_parsize\_new} a_i\ register\ employment}$$

.

Note that we combined parent size bands into a new size band, parsize_new, to increase the number of units used to compute the gweight.

The overall weight under the new weighting method is given by

---

N.B. The analyses were performed on data that do not match exactly with the data used in the published estimates and hence there may be some differences.

$$w_i^{New} = a_i g_i = a_i \frac{\sum_{Univ\_poststt\_parsize\_new} register\ employment}{\sum_{samp\_poststt\_parsize\_new} a_i register\ employment}$$

Because a POSTAT is defined at Division level and aweights are normally computed at 4-digit SIC by parsize (level of sampling), even within the same size band parsize local units whose parents belong to different 4-digit SIC groups can have different aweights, resulting in different overall weights . Figure 1 displays the old and new overall weights in a particular gweight band, defined under the old method. We can see that the old overall weight is constant whereas the new weight takes a wide range of values, reflecting the range of aweight values in the POSTSTAT(between 1 and 53.7) .

Figure 1.

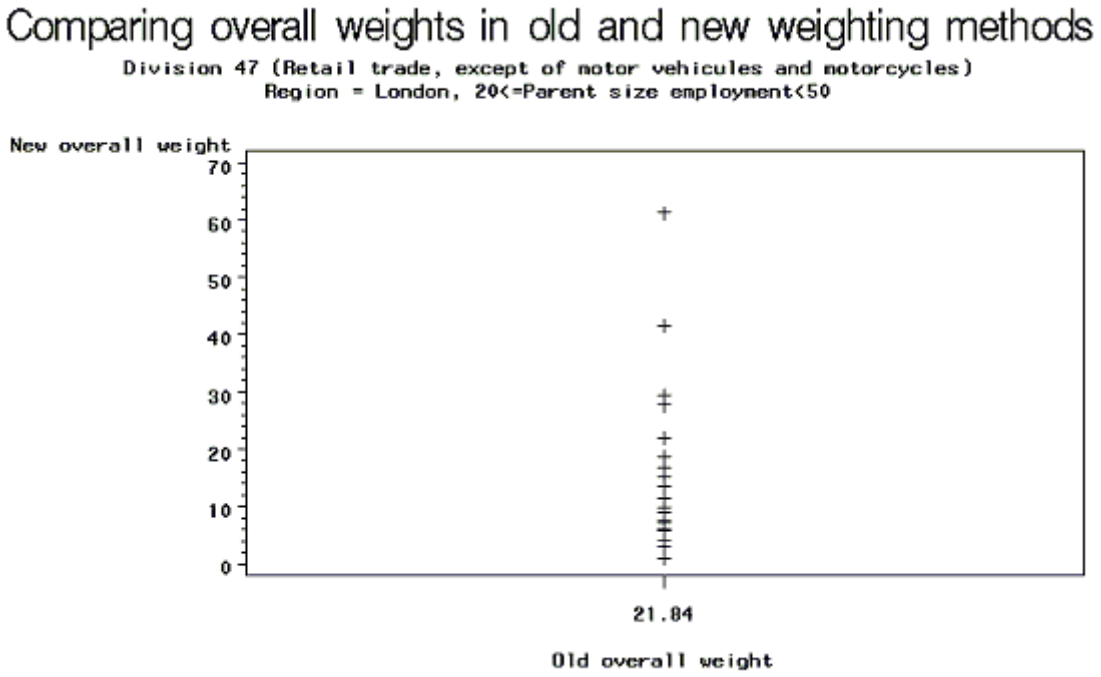


Table 1 shows the estimates of GVA in 2009 under both the old and new weighting methods in the London region in Division 47, overall and by parent's size band. We can see that the largest differences occur in size bands 1 to 5. This is not surprising as the aweights in these bands can vary a lot. Units in size bands G and O have an aweight equal to 1, resulting in equal overall weights; the differences between the estimates is due to the different scaling factors applied under the two methods. Most units in size band 6 have an aweight equal to 1 or close to 1 (when there is non-response), resulting in very similar overall weights under both the old and new weighting methods.

N.B. The analyses were performed on data that do not match exactly with the data used in the published estimates and hence there may be some differences.

Table 1. Comparing estimates of GVA in 2009 in Division 47 in the London region under the old and new weighting methods

Size band of parent	Number of local units	Old method	New method	Difference
1 (1<=employment<10)	230	2,397,359	2,205,157	-192,202
2 (10<= employment<20)	30	539,358	395,921	-143,436
3 (20<= employment<50)	47	821,093	432,070	-389,023
4 (50<= employment<100)	112	283,065	334,686	51,620
5 (100<= employment<300)	211	491,712	406,797	-84,915
6 (employment>=300)	8,126	7,833,469	7,812,769	-20,701
G (low employment and high turnover)	8	80,141	79,472	-669
O (outliers)	64	26,656	27,023	367
Overall	8,828	12,472,853	11,693,895	-778,958

**See footnote for details of the data displayed in tables 1-13*

We have looked in more detail at size band 3 to see what is driving the large difference. Table 3 shows the local units with the largest differences between the scaled weighted values of GVA. We can see that one local unit accounts for most of the difference between the estimates; the large difference between the overall weights (21.8 under the old method and 6.0 under the new method) combined with a large return for turnover from this local unit resulted in a large difference between the weighted values.

As can be seen from Figure 1, the new overall weights of some local units are lower than the old overall weights, whereas in other local units it is the other way around. When there are no units with large values of GVA (as derived from the returns of the component variables) in size bands 1 to 5, the negative and positive differences between the weighted values tend to balance out approximately, resulting in a quite small difference between the estimates. However, when large returns are present, as in the case presented here, the differences between weighted values do not balance out, resulting in large differences between the estimates.

Table 2. Comparing extreme differences between weighted values - Division 47, London, Parent size band 3

		Old method		New Method				
Value of turnover of local unit	Value of GVA of local unit	Overall weight	Scaled weighted GVA value of local unit	Design weight	Gweight	Overall weight	Scaled weighted GVA value of local unit	Difference between scaled weighted values
27,989	18,131	21.8	396,153	5.2	1.1	6.0	110,999	-285,154
2,286	2,169	21.8	47,104	2.7	1.1	3.0	6,725	-40,379
..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..
5,643	1,906	21.8	42,190	25.9	1.1	29.5	57,892	15,702
1,345	751	21.8	16,434	53.7	1.1	61.2	47,168	30,734

N.B. The analyses were performed on data that do not match exactly with the data used in the published estimates and hence there may be some differences.

3. Analysis of impact of new weighting on 2009 GVA estimates

Whole economy, by region

The following table shows that the differences between the current and new regional estimates over the whole economy are quite small.

Table 3. 2009 GVA - Whole economy

	Estimates		Regional distribution (%)		
Region	Current method	Calibration method	Current method	Calibration method	Difference
NE	24,225,015	24,713,799	2.66	2.71	0.05
NW	86,381,260	86,568,089	9.48	9.51	0.02
YH	57,084,620	57,355,537	6.27	6.30	0.03
EM	49,878,796	50,514,027	5.48	5.55	0.07
WM	59,844,281	58,603,349	6.57	6.43	-0.14
EE	74,793,999	74,963,252	8.21	8.23	0.02
LON	216,198,533	214,212,429	23.74	23.52	-0.22
SE	141,232,524	139,161,172	15.51	15.28	-0.23
SW	67,663,535	68,230,771	7.43	7.49	0.06
Wal	24,444,047	26,305,014	2.68	2.89	0.20
Sco	91,039,769	92,158,939	10.00	10.12	0.12
NI	17,952,686	17,952,686	1.97	1.97	0.00
Total	910,739,065	910,739,065	100.00	100.00	0.00

**For definitions of Regions see annex 1.*

By sector of activity

The following table shows that the new GVA estimate for Section G (Wholesale and Retail) is rather notably lower than the current estimate; under the new method it accounts for 16.2% of total GVA, whereas under the current method it accounts for about 17.0% of GVA.

Table 4. 2009 GVA - Distribution by sector

	Estimates		Regional distribution (%)		
Sector	Current method	Calibration method	Current method	Calibration method	difference
I (ACCOMMOD SERVICES)	29,440,842	30,430,071	3.23	3.34	0.11
K (FINANCIAL SERVICES)	54,218,658	55,914,084	5.95	6.14	0.19
C (MANUFACTURING)	122,169,715	123,941,312	13.41	13.61	0.19
L (REAL ESTATE)	25,726,552	24,516,634	2.82	2.69	-0.13
G (WHOLESALE & RETAIL)	155,033,880	147,469,171	17.02	16.19	-0.83
H (TRANSPORTATION)	61,859,420	62,266,410	6.79	6.84	0.04
Other	462,289,998	466,201,384	50.76	51.19	0.43
Total	910,739,065	910,739,065	100.00	100.00	0.00

N.B. The analyses were performed on data that do not match exactly with the data used in the published estimates and hence there may be some differences.

Sector by region level

The following table shows that at the Sector level of manufacturing, the differences between the regional estimates are quite small.

Table 5. 2009 GVA - Regional distribution in manufacturing

		Estimates		Regional distribution (%)		
SECTOR	Region	Current method	Calibration method	Current method	Calibration method	difference
C (Manufacturing)	NE	4,719,595	4,648,138	3.86	3.75	-0.11
	NW	16,172,894	16,539,007	13.24	13.34	0.11
	YH	12,782,219	13,101,827	10.46	10.57	0.11
	EM	11,280,067	11,603,844	9.23	9.36	0.13
	WM	10,657,564	10,735,110	8.72	8.66	-0.06
	EE	11,667,130	11,379,192	9.55	9.18	-0.37
	LON	6,303,891	6,656,505	5.16	5.37	0.21
	SE	14,910,674	15,104,866	12.20	12.19	-0.02
	SW	10,184,123	10,405,045	8.34	8.40	0.06
	Wal	6,181,138	6,586,767	5.06	5.31	0.25
	Sco	12,717,908	12,645,597	10.41	10.20	-0.21
	NI	4,592,512	4,535,414	3.76	3.66	-0.10
	Total	122,169,715	123,941,312	100.00	100.00	0.00

The following table is for Section G (Wholesale and Retail); it shows quite a large fall in the new estimate. compared with the current estimate, and a relatively larger fall in London compared with other regions.

Table 6. 2009 GVA - Regional distribution in Wholesale and Retail

		Estimates		Regional distribution (%)		
SECTOR	Region	Current method	Calibration method	Current method	Calibration method	difference
G (Wholesale and Retail)	NE	4,396,155	4,207,128	2.84	2.85	0.02
	NW	17,425,223	17,043,378	11.24	11.56	0.32
	YH	10,462,890	10,029,252	6.75	6.80	0.05
	EM	10,827,691	10,503,062	6.98	7.12	0.14
	WM	9,621,522	8,740,165	6.21	5.93	-0.28
	EE	17,130,900	16,801,208	11.05	11.39	0.34
	LON	29,501,257	26,339,476	19.03	17.86	-1.17
	SE	25,306,351	23,999,192	16.32	16.27	-0.05
	SW	10,983,804	10,520,331	7.08	7.13	0.05
	Wal	4,327,386	4,237,140	2.79	2.87	0.08
	Sco	11,218,177	11,247,219	7.24	7.63	0.39
	NI	3,832,525	3,801,619	2.47	2.58	0.11
	Total	155,033,880	147,469,171	100.00	100.00	0.00

N.B. The analyses were performed on data that do not match exactly with the data used in the published estimates and hence there may be some differences.

The next table is for Section L (Real Estate); the new estimate for the South East decreased relatively more than in other regions (by about -1.3%).

Table 7. 2009 GVA - Regional distribution in Real Estate

		Estimates		Regional distribution (%)		
SECTOR	Region	Current method	Calibration method	Current method	Calibration method	difference
L (REAL ESTATE)	NE	356,396	390,230	1.39	1.59	0.21
	NW	2,141,504	2,067,399	8.32	8.43	0.11
	YH	1,187,233	1,222,811	4.61	4.99	0.37
	EM	891,526	901,440	3.47	3.68	0.21
	WM	1,769,171	1,837,094	6.88	7.49	0.62
	EE	1,720,664	1,637,958	6.69	6.68	-0.01
	LON	10,486,669	9,855,720	40.76	40.20	-0.56
	SE	3,317,142	2,837,705	12.89	11.57	-1.32
	SW	1,827,544	1,740,466	7.10	7.10	0.00
	Wal	379,552	364,747	1.48	1.49	0.01
	Sco	1,160,505	1,169,145	4.51	4.77	0.26
	NI	488,647	491,918	1.90	2.01	0.11
	Total	25,726,552	24,516,634	100.00	100.00	0.00

The following table is for Section K (Financial activities); the differences between the estimates are quite small, although London shows the largest relative increase (about 0.5%).

Table 8. 2009 GVA - Regional distribution in Financial Services

		Estimates		Regional distribution (%)		
SECTOR	Region	Current method	Calibration method	Current method	Calibration method	difference
K (FINANCIAL ACTIVITIES)	NE	302,424	308,514	0.56	0.55	-0.01
	NW	2,061,644	2,109,003	3.80	3.77	-0.03
	YH	597,166	628,050	1.10	1.12	0.02
	EM	292,300	299,579	0.54	0.54	0.00
	WM	1,429,853	1,462,130	2.64	2.61	-0.02
	EE	2,397,835	2,446,323	4.42	4.38	-0.05
	LON	18,632,237	19,497,930	34.36	34.87	0.51
	SE	8,125,378	8,338,313	14.99	14.91	-0.07
	SW	7,448,374	7,616,035	13.74	13.62	-0.12
	Wal	810,862	823,143	1.50	1.47	-0.02
	Sco	11,806,221	12,069,731	21.78	21.59	-0.19
	NI	314,364	315,332	0.58	0.56	-0.02
	Total	54,218,658	55,914,084	100.00	100.00	0.00

N.B. The analyses were performed on data that do not match exactly with the data used in the published estimates and hence there may be some differences.

The following table is for Section H (Transportation and Storage); the current and new estimates differ very little.

Table 9. 2009 GVA - Regional distribution in Transportation and Storage

		Estimates		Regional distribution (%)		
SECTOR	Region	Current method	Calibration method	Current method	Calibration method	difference
H (TRANSPORTATION and STORAGE)	NE	1,392,214	1,400,687	2.25	2.25	0.00
	NW	6,191,233	6,189,785	10.01	9.94	-0.07
	YH	4,363,625	4,596,675	7.05	7.38	0.33
	EM	3,633,250	3,624,844	5.87	5.82	-0.05
	WM	4,423,196	4,369,688	7.15	7.02	-0.13
	EE	5,791,430	5,852,621	9.36	9.40	0.04
	LON	14,994,329	15,128,116	24.24	24.30	0.06
	SE	9,679,721	9,607,141	15.65	15.43	-0.22
	SW	3,516,333	3,550,214	5.68	5.70	0.02
	Wal	1,333,029	1,421,106	2.15	2.28	0.13
	Sco	5,131,664	5,073,884	8.30	8.15	-0.15
	NI	1,409,395	1,451,649	2.28	2.33	0.05
	Total	61,859,420	62,266,410	100.00	100.00	0.00

The following table is for Section I (Accommodation and food services); we can see that the new estimate for the North West shows quite a notable relative increase (by about 0.9%).

Table 10. 2009 GVA - Regional distribution in Accommodation and Food Services

		Estimates		Regional distribution (%)		
SECTOR	Region	Current method	Calibration method	Current method	Calibration method	difference
I (ACCOMMODATION and FOOD SERVICE ACTIVITIES)	NE	864,116	1,012,964	2.94	3.33	0.39
	NW	2,654,347	3,017,578	9.02	9.92	0.90
	YH	1,620,085	1,660,334	5.50	5.46	-0.05
	EM	1,199,495	1,201,715	4.07	3.95	-0.13
	WM	2,335,518	2,370,970	7.93	7.79	-0.14
	EE	2,053,860	2,077,921	6.98	6.83	-0.15
	LON	7,403,633	7,651,249	25.15	25.14	0.00
	SE	4,247,212	4,367,552	14.43	14.35	-0.07
	SW	2,684,633	2,614,675	9.12	8.59	-0.53
	Wal	1,139,122	1,190,788	3.87	3.91	0.04
	Sco	2,580,397	2,609,572	8.76	8.58	-0.19
	NI	658,424	654,752	2.24	2.15	-0.08
	Total	29,440,842	30,430,071	100.00	100.00	0.00

Division by region

The following tables show examples of divisions where there is quite a large discrepancy between the regional estimates under the current method and the calibration method.

The GVA estimates in Division 13 show that the new estimate for London has increased relatively more than in the other regions, whereas the new estimates for the North West and Yorkshire and the Humber have decreased relatively more.

N.B. The analyses were performed on data that do not match exactly with the data used in the published estimates and hence there may be some differences.

Table 11. 2009 GVA - Regional distribution in the Manufacturing of textiles

		Estimates		Regional distribution (%)		
Division	Region	Current method	Calibration method	Current method	Calibration method	difference
13 (Manufacture of textiles)	NE	41,330	55,051	2.48	3.16	0.68
	NW	401,193	385,784	24.04	22.14	-1.90
	YH	359,132	327,549	21.52	18.79	-2.72
	EM	258,296	246,942	15.48	14.17	-1.31
	WM	80,989	109,705	4.85	6.29	1.44
	EE	44,547	21,218	2.67	1.22	-1.45
	LON	41,692	100,413	2.50	5.76	3.26
	SE	75,925	107,582	4.55	6.17	1.62
	SW	113,092	114,654	6.78	6.58	-0.20
	Wal	33,340	53,908	2.00	3.09	1.10
	Sco	158,736	159,708	9.51	9.16	-0.35
	NI	60,798	60,332	3.64	3.46	-0.18
	Total	1,669,068	1,742,846	100.00	100.00	0.00

The GVA estimates in Division 46 (Wholesale trade, except motor vehicles and motorcycles) show that the new London estimate decreased relatively more than in any other region (by -2.1%); on the other hand, the increases are quite small. The new estimate for Division 46 is lower than the current estimate by about £4 billion.

Table 12. 2009 GVA - Regional distribution in Wholesale trade, except motor vehicles

		Estimates		Regional distribution (%)		
Division	Region	Current method	Calibration method	Current method	Calibration method	difference
46 (Wholesale trade, except motor)	NE	1,052,392	1,034,353	1.54	1.61	0.07
	NW	8,252,567	8,159,008	12.09	12.69	0.60
	YH	3,733,479	3,669,196	5.47	5.71	0.24
	EM	5,555,575	5,518,145	8.14	8.58	0.44
	WM	3,890,801	3,412,588	5.70	5.31	-0.39
	EE	8,046,690	8,076,878	11.79	12.57	0.77
	LON	15,554,002	13,291,480	22.79	20.68	-2.12
	SE	12,118,548	11,511,195	17.76	17.91	0.15
	SW	4,434,880	4,085,723	6.50	6.36	-0.14
	Wal	980,347	925,569	1.44	1.44	0.00
	Sco	3,496,239	3,476,023	5.12	5.41	0.28
	NI	1,122,408	1,117,659	1.64	1.74	0.09
	Total	68,237,928	64,277,817	100.00	100.00	0.00

N.B. The analyses were performed on data that do not match exactly with the data used in the published estimates and hence there may be some differences.

The next table shows that the new estimate of GVA for Wales in Division 86 (Human health activities) is relatively much higher than the new estimates for other regions.

Table 13. 2009 GVA - Regional distribution in Human Health Activities

		Estimates		Regional distribution (%)		
Division	Region	Current method	Calibration method	Current method	Calibration method	difference
86 (Human health activities)	NE	98,227	100,587	1.68	1.58	-0.10
	NW	764,572	692,514	13.07	10.84	-2.23
	YH	299,562	326,273	5.12	5.11	-0.01
	EM	434,345	513,908	7.42	8.05	0.62
	WM	331,880	356,318	5.67	5.58	-0.09
	EE	525,116	472,011	8.98	7.39	-1.58
	LON	1,086,254	1,240,791	18.57	19.43	0.86
	SE	1,104,407	1,181,241	18.88	18.50	-0.38
	SW	506,903	508,223	8.67	7.96	-0.71
	Wal	149,300	440,399	2.55	6.90	4.34
	Sco	316,611	305,628	5.41	4.79	-0.63
	NI	232,673	247,879	3.98	3.88	-0.10
	Total	5,849,851	6,385,772	100.00	100.00	0.00

4. The Way Forward

We have agreed to introduce the change with a timing that will allow the regional team to begin processing 2009 figures on the new basis in September/October 2011, for December delivery to Regional Accounts and the regions. The same timing applies to year 2010 deliveries, also to be delivered under the new method.
On the ABS website, in Bulletins and Special Analyses, year 2009 results will be changed in summer 2012, following the normal revisions practice/timing. Figures for 2008 and earlier will not be changed.

As the analysis is Section 3 shows, the differences in the figures resulting from applying the new weights are generally small, particularly at high levels of aggregation. Cases where the figures that are more notably different under the new approach will, as now, be investigated by the ABS regional team and, where appropriate, improved by actions such as outliering. Note that there may be units that are outliers under the new weighting method but not under the old method; in the analysis shown above we have not considered outlier detection and treatment. Because an automatic outlier detection method is applied at national level, we expect the number of outliers at regional level to be small. Hence, the impact of the treatment of any outliers on the results shown below should be negligible. Work on the development of an automatic outlier detection method for the regional estimates is in progress.

N.B. The analyses were performed on data that do not match exactly with the data used in the published estimates and hence there may be some differences.

Annex 1.

Code	Region	Description
NE	North East	Tees Valley & Durham
		Northumberland & Tyne & Wear
NW	North West	Cumbria
		Cheshire
		Greater Manchester
		Lancashire
		Merseyside
YH	Yorkshire & The Humber	East Riding & North Lincolnshire
		North Yorkshire
		South Yorkshire
		West Yorkshire
EM	East Midlands	Derbyshire & Nottinghamshire
		Leicestershire, Rutland & Northamptonshire
		Lincolnshire
WM	West Midlands	Herefordshire, Worcestershire & Warwickshire
		Shropshire & Staffordshire
		West Midlands
EE	East of England	East Anglia
		Bedfordshire & Hertfordshire
		Essex
LON	London	Inner London
		Outer London
SE	South East	Berkshire, Buckinghamshire & Oxfordshire
		Surrey, East & West Sussex
		Hampshire & Isle of Wight
		Kent
SW	South West	Gloucestershire, Wiltshire & North Somerset
		Dorset & Somerset
		Cornwall & Isles of Scilly
		Devon
Wal	Wales	West Wales & The Valleys
		East Wales
Sco	Scotland	North Eastern Scotland
		Eastern Scotland
		South Western Scotland
		Highlands & Islands
NI	Northern Ireland	Northern Ireland

N.B. The analyses were performed on data that do not match exactly with the data used in the published estimates and hence there may be some differences.