

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

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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 be 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).

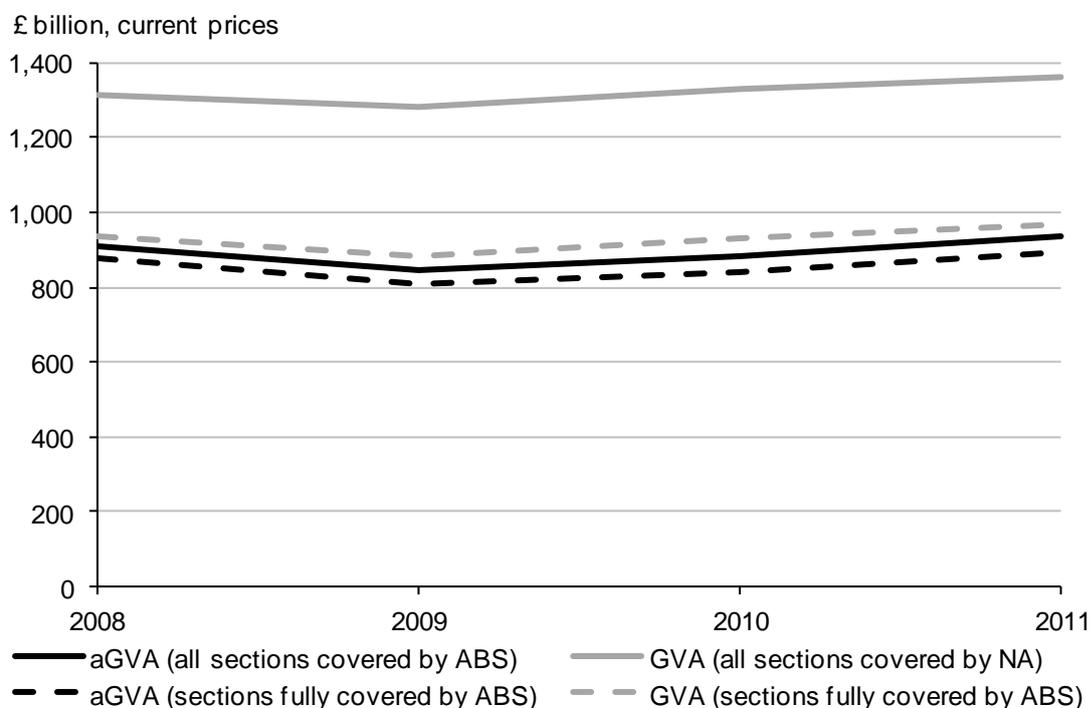
Statistics from the ABS are produced in line with various EU statistical regulations, ensuring comparability as well as having links to various users, and uses, of business statistics. The ABS provides data that help fulfil the UK’s obligations in meeting the EU [Structural Business Statistics Regulation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

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:

$$\begin{aligned} \text{GDP(P)} &= \text{GVA at market prices} \\ &= \text{GVA at basic prices} \\ &+ (\text{taxes on products} - \text{subsidies on products}) \\ &= \text{GVA at factor cost} \\ &+ (\text{taxes on production} - \text{subsidies on production}) \\ &+ (\text{taxes on products} - \text{subsidies on products}) \end{aligned}$$

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.

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 be 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.

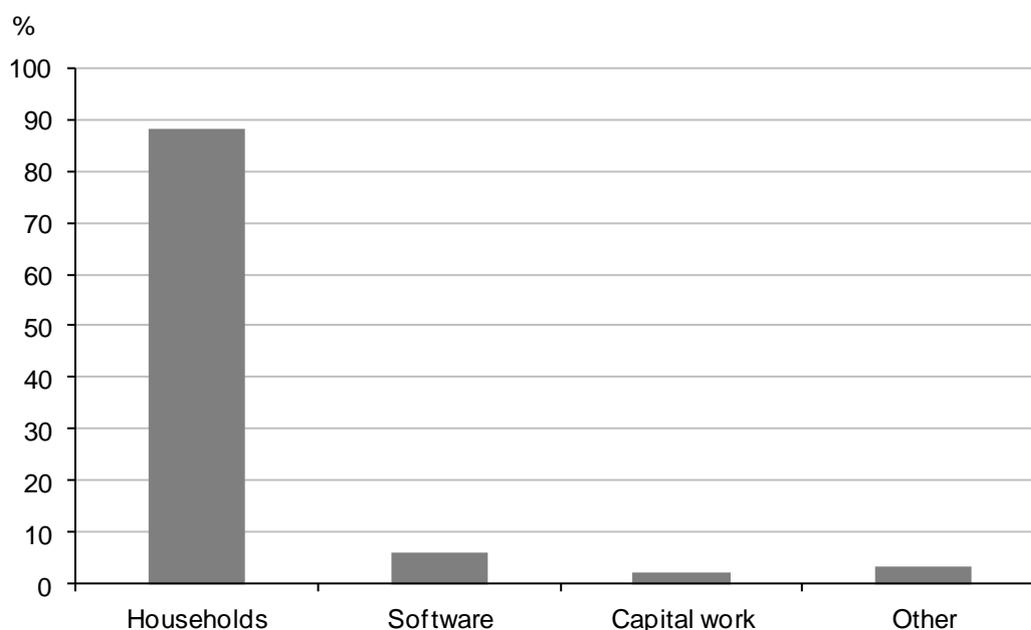
Addition of own-use and non-market output using data from other sources

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 purchased 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](#).

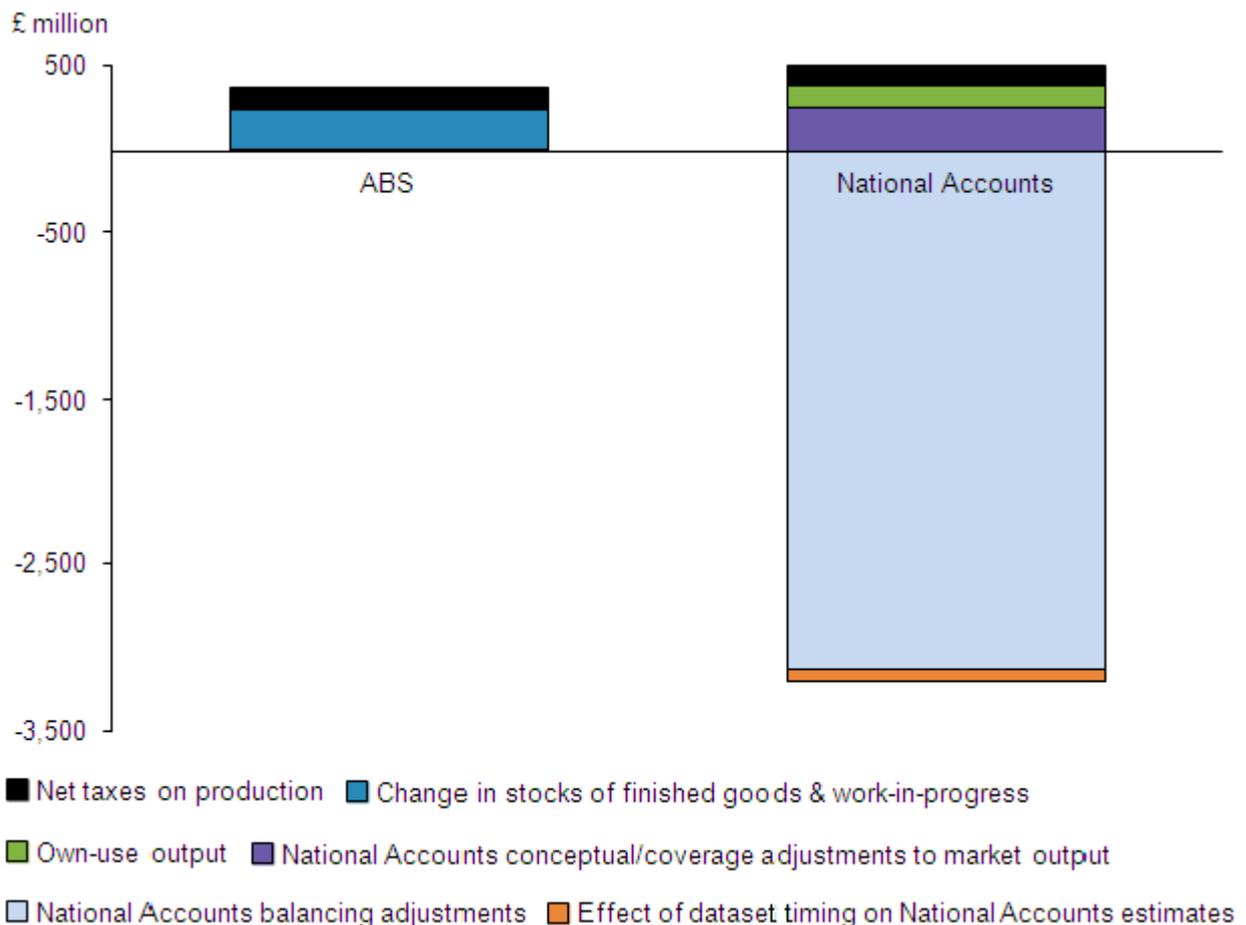
Output

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



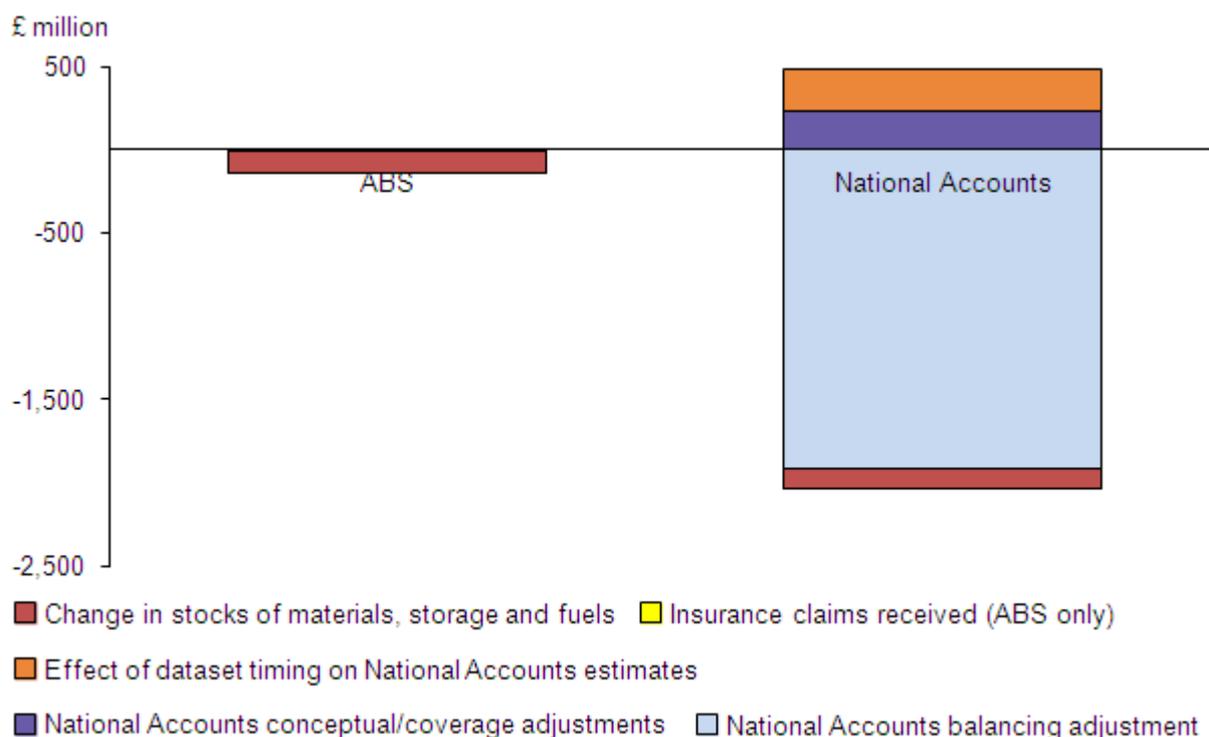
Source: Office for National Statistics

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

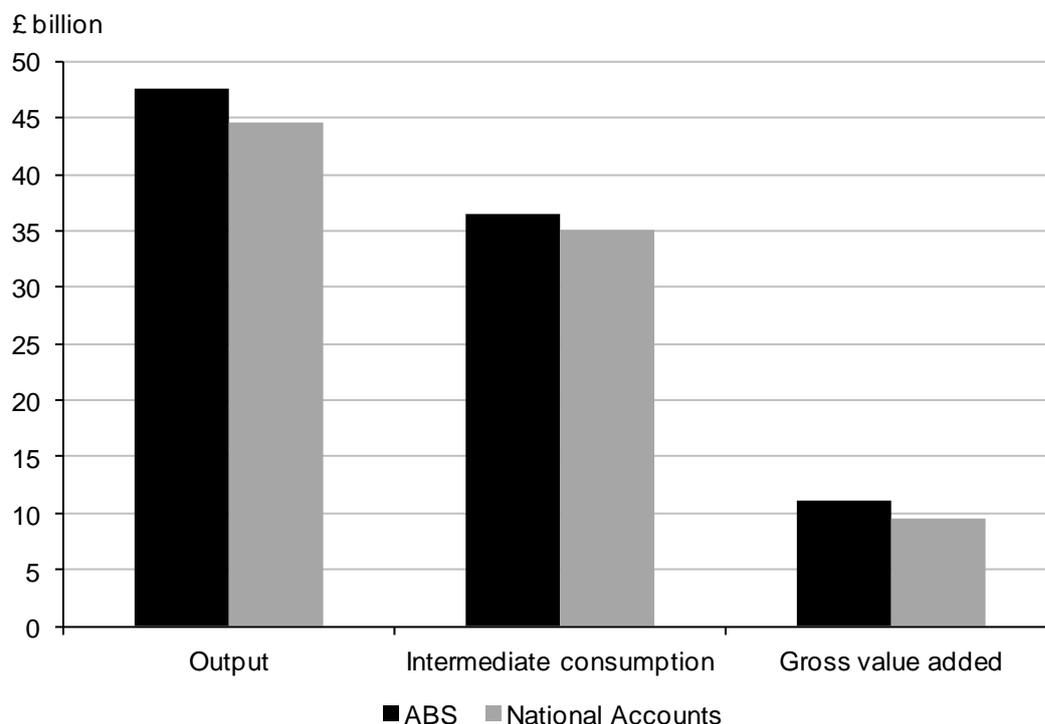
Conclusion

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.