Office for National Statistics

Article

Impact of Blue Book 2021 changes on quarterly and monthly volume estimates of gross domestic product by industry

Methodological and data improvements that affect quarterly current price and volume, and monthly chained volume measures of gross domestic product (GDP) by industry, 1997 to 2019.

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Release date:
8 September 2021

Next release:
To be announced

Table of contents

1 . Overview

In the UK National Accounts, fully balanced estimates of annual current price gross domestic product (GDP) have traditionally only been produced in a Supply and Use Tables (SUT) framework. In Blue Book 2021, we will produce annual volume estimates of GDP in the SUT framework for the first time - including the first published official estimates of GDP applying double deflation along with improved reconciliation of current price and volume estimates. Blue Book 2021 will also improve the international comparability of the UK GDP estimates, with a package of improvements made in line with international best practice.

Information regarding changes for the financial sector data and double deflation were released on 28 June 2021. Additional analysis was published on 28 July 2021, providing indicative impacts on quarterly average GDP.

Alongside this analysis, detailed assessments have also been published today on the Institutional Sector and Financial Accounts and balance of payments ahead of the publication of Quarterly National Accounts and Balance of Payments on 30 September 2021, and the 2021 editions of the Blue and Pink Books on 29 October 2021.

This analysis covers the period 1997 to 2019 in line with SUT; data up to Quarter 2 (April to June) 2021 will be included in the releases published on 30 September.

2 . Scope of Blue Book 2021

There are important methodological improvements that will be incorporated into Blue Book 2021, impacting both current price and volume estimates of gross domestic product (GDP). There will be revisions to previously published estimates reflecting these improvements.

For further information on these changes, please see Impact of Blue Book 2021 changes on current price and volume estimates of gross domestic product.

As a result of changes to the level of annual GDP, the GDP quarterly and monthly path will also be revised to align to the new annual levels.

In our currently published estimates, the output approach to GDP current price (CP) and chained volume measures (CVM) data are produced independently because of the way each is benchmarked to annual values. Current price data are benchmarked at an industry level to gross value added (GVA), produced as part of the annual supply use balancing process. Annual supply use data are currently available up to 2018, with data beyond that derived using movements in the data from short term measures of output (for example, index of production and index of services). Prior to Blue Book 2021, there existed no annual industry GVA CVM data with which to benchmark in the same way that CP is benchmarked to supply use data. As a result, CVM were created from the short-term measures of output, whereby most indicators in the short-term measures are measuring changes in output as a proxy for changes in GVA.

During the “closed” years – that is, the periods subject to Supply and Use Tables (SUT) balancing – the volume estimates of output are aligned with the expenditure measure of GDP, reflecting the higher-quality consumer price deflators used. The adjustments to bring the lower-level industry GVA into line are made proportionally over the services industries.

As part of Blue Book 2021, there are now more coherent estimates of industry-level GVA. We have now expanded the SUTs framework to current prices and previous year's prices. Those industry-level estimates from within the SUTs framework are much richer than those that currently feed our industry short-term volume estimates. This not only reflects that this is based on a wider range of annual surveys and administrative information, but it is also recording the correct concept of GVA rather than turnover as a proxy indicator. This also means that, at industry level, the current price and volume relationship is now preserved, which historically has not been the case. This means that monthly and quarterly industry data in Blue Book 2021 will now be benchmarked to these new annual volume estimates in the same way that CP is benchmarked.

3 . Impact of Blue Book 2021 on quarterly and monthly GDP

With the changes introduced at Blue Book 2021, annual gross domestic product (GDP) and the industries have seen revisions across the years. Table 1 summarises these revisions to annual volume GDP and its main sub-components.

Table 1: Annual revisions to volume GDP and its main sub-components
UK, 1998 to 2019

	GDP	Services	Production	Manufacturing	Construction
Average revision 1998 to 2007	-0.3	-0.7	1.5	2.8	-1.3
Average revision 2010 to 2019	0.2	0.2	0.5	0.9	-0.4

Source: Office for National Statistics – UK National Accounts

Notes

1. This tables uses data from the output measure of GDP. Figures from this approach may differ from those calculated from the average measure of GDP which reflects balanced estimates from the expenditure income and output approaches.

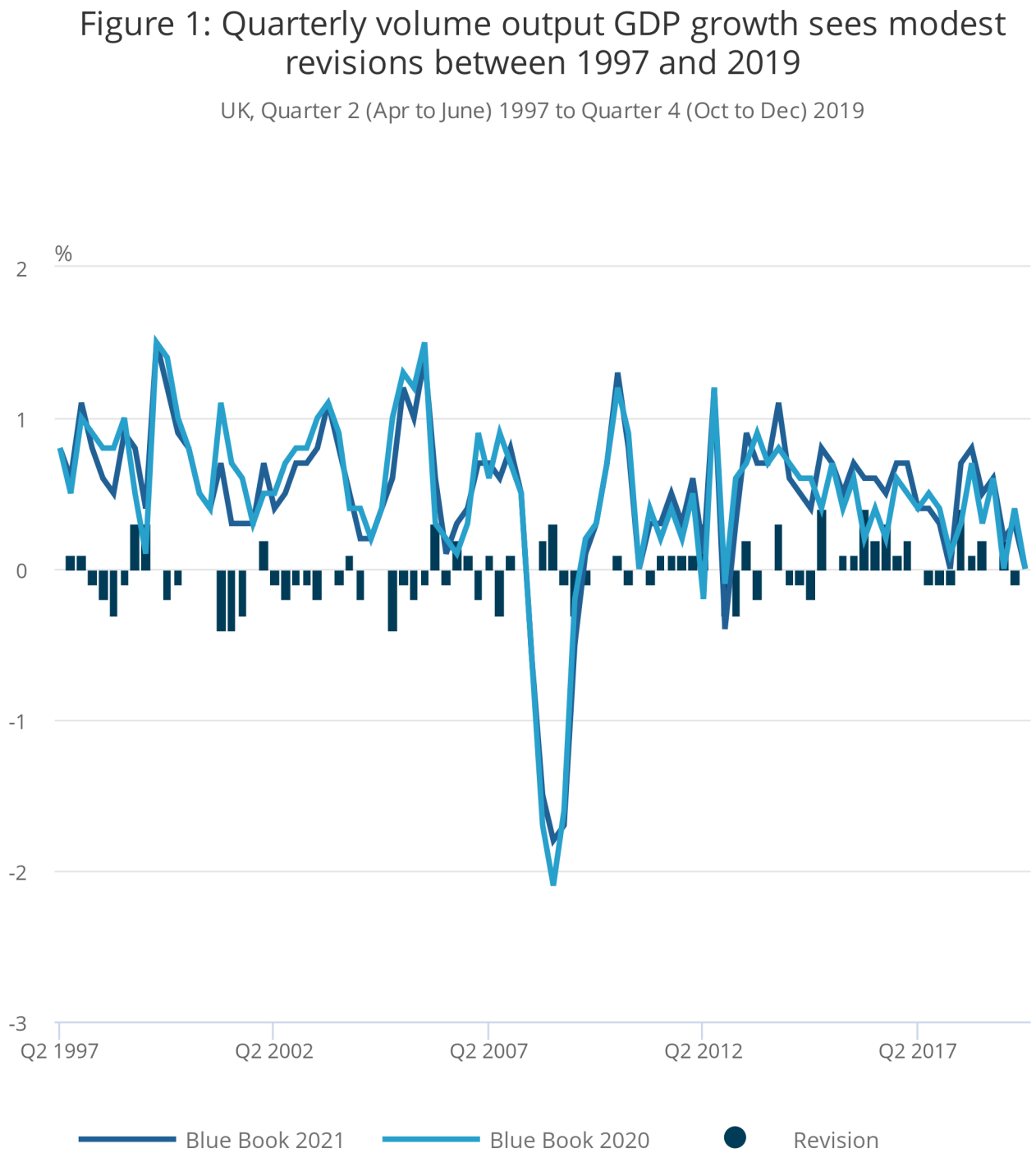
As a result of changes to the level of annual GDP, the GDP quarterly and monthly path will also be revised to align to the new annual levels.

Figure 1 shows the revisions to the quarterly profile of volume GDP growth for the output measure. Quarterly volume GDP growth over the period Quarter 2 (April to June) 1997 to Quarter 4 (October to December) 2007 sees an average 0.1 percentage point downward revision. For the period Quarter 1 (January to March) 2010 to Quarter 4 (October to December) 2019, quarterly volume GDP growth sees a 0.1 percentage point upward revision.

Previously published analysis shows the revisions to quarterly average GDP. Data from the output approach may differ from those calculated from the average measure of GDP, which reflects balanced estimates from the expenditure, income, and output approaches.

Figure 1: Quarterly volume output GDP growth sees modest revisions between 1997 and 2019

UK, Quarter 2 (Apr to June) 1997 to Quarter 4 (Oct to Dec) 2019



Source: Office for National Statistics – UK National Accounts

Notes:

1. Q1 refers to Quarter 1 (Jan to Mar), Q2 refers to Quarter 2 (Apr to June), Q3 refers to Quarter 3 (July to Sept) and Q4 refers to Quarter 4 (Oct to Dec).

Alongside quarterly data, revisions to individual months of volume GDP growth range from negative 0.4 to 0.4 percentage points from 1997 to 2019, although it is important to note that the monthly estimates are inherently more volatile than the quarterly estimates.

For full information on the monthly breakdown of GDP, please refer to the accompanying dataset.

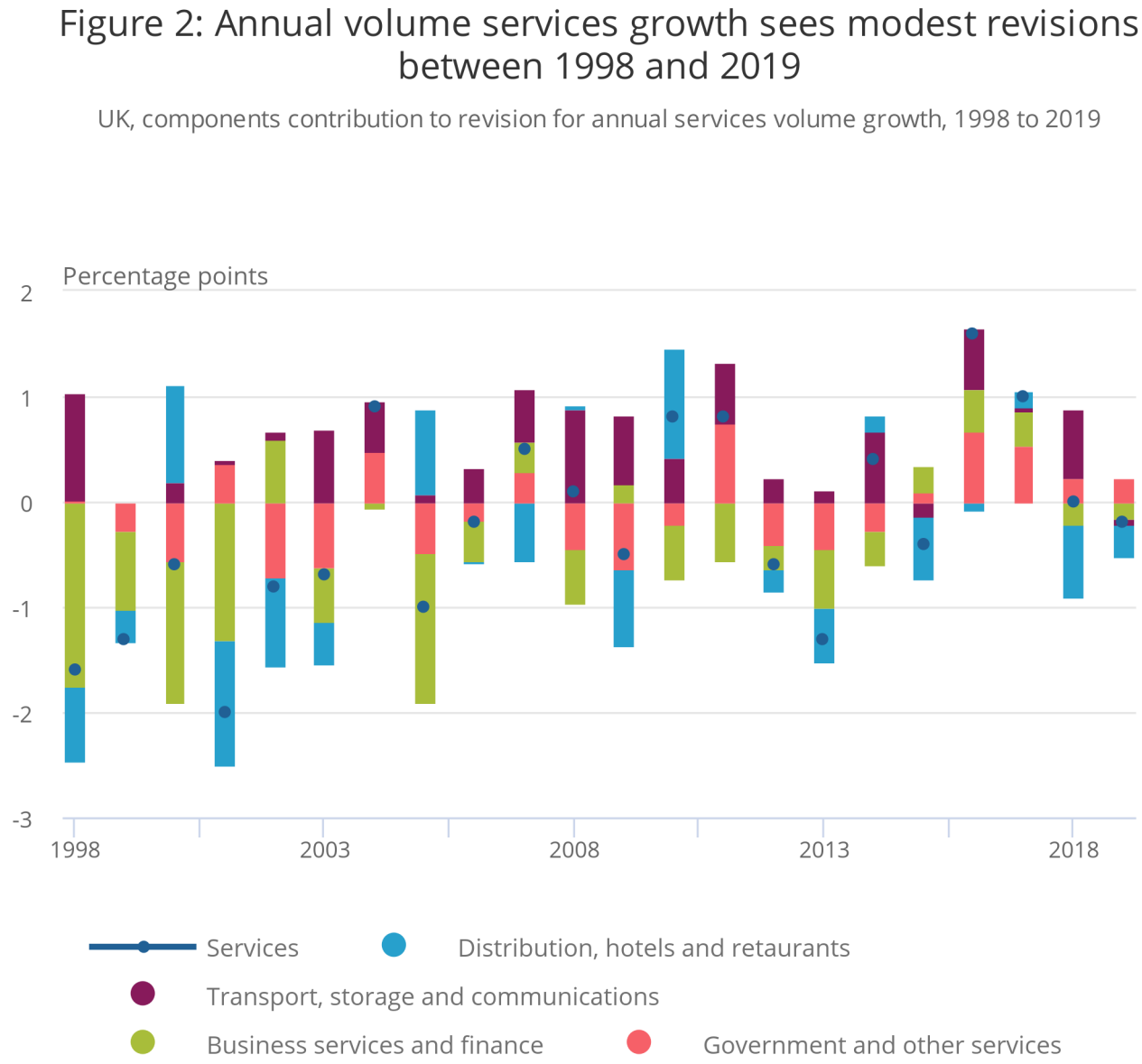
4 . Impact of Blue Book 2021 on the services sector

Figure 2 shows the services components contribution to revision to annual volume services growth. Annual volume growth over the period 1998 to 2007 sees an average 0.7 percentage point downward revision. For the period 2010 to 2019, annual volume services growth sees a 0.2 percentage point upward revision. These revisions are driven by the introduction of volume estimates at the annual level on gross value added (GVA). Previously, chained volume measures were created from the short-term measures of output, whereby most indicators in the short-term measures are measuring changes in output as a proxy for changes in GVA.

Revisions to the services sector is also driven by updated data from the Financial Services Survey and the update of the telecoms deflator.

Figure 2: Annual volume services growth sees modest revisions between 1998 and 2019

UK, components contribution to revision for annual services volume growth, 1998 to 2019



Source: Office for National Statistics – UK National Accounts

Notes:

1. Components contribution may not sum to total because of rounding.

Over the entire series, the revisions to individual years range from negative 2.0 to 1.6 percentage points.

The financial and insurance activities sub-sector contributed negative 1.1 percentage points to the 2.0 percentage points downward revision to services in 2001. This is because of the introduction of volume estimates at the annual level on GVA and updated data from the Financial Services Survey. Previously published analysis showed the impact that the Financial Services Survey has had on gross domestic product GDP across the years. In 2001, there were also downward revisions to the wholesale and retail trade and the repair of motor vehicles sub-sector, mainly because of improvements to the clothing deflator, which impacted the retail sales industry.

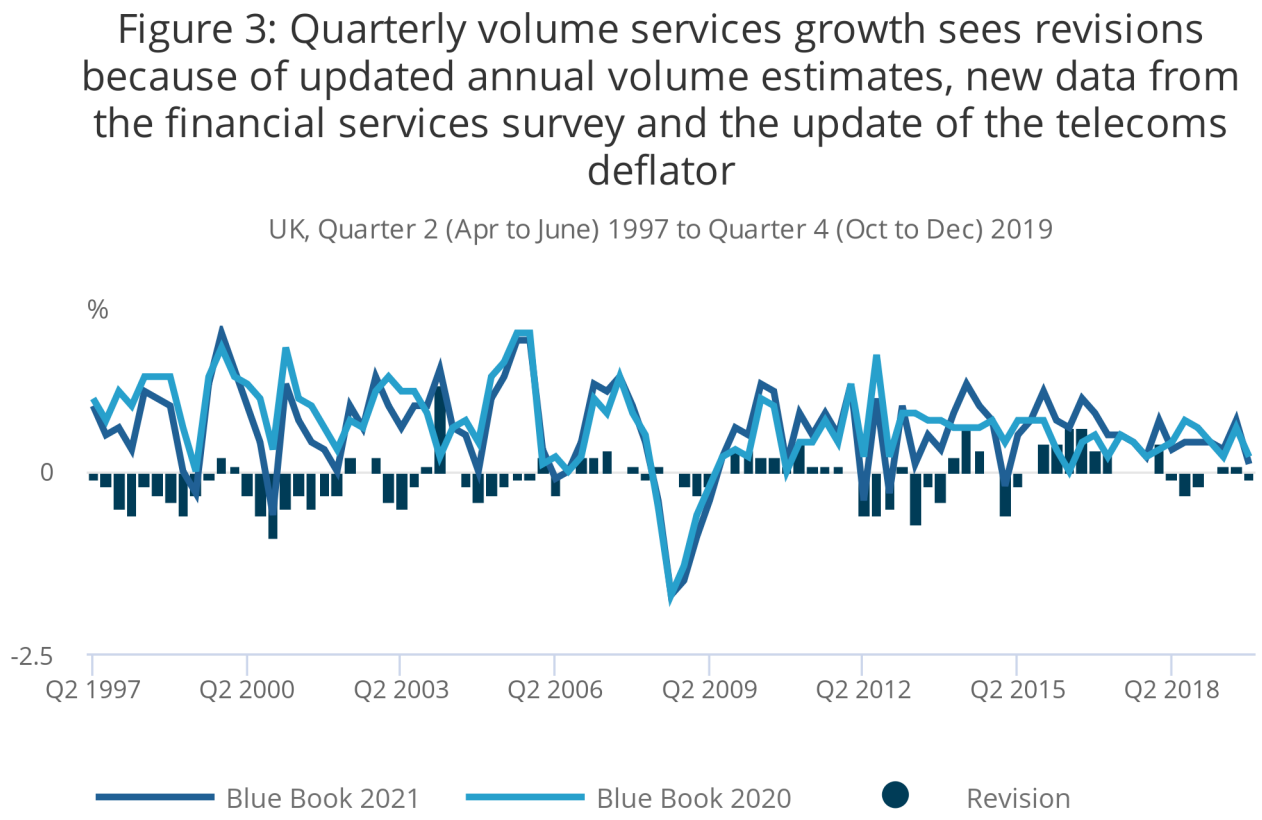
The 1.6 percentage point upward revision in 2016 is because of cumulative upward revisions across the services sector. This is in part because of the update of the telecoms deflator, which has an impact on the information and communication sub-sector - as well as other industries - because it is consumed as an input into the production process.

As a result of changes to annual services and its sub-sectors, the quarterly and monthly paths have also been revised to align to these new annual levels. Figure 3 shows the revisions to the quarterly profile of the services sector. Quarterly volume services growth over the period Quarter 2 (Apr to June) 1997 to Quarter 4 (Oct to Dec) 2007 sees an average 0.2 percentage point downward revision. For the period Quarter 1 (Jan to Mar) 2010 to Quarter 4 (Oct to Dec) 2019, quarterly volume GDP growth sees an average 0.0 (0.04) percentage point upward revision.

Over the entire data time series, the revisions to individual quarters range from negative 0.9 to positive 1.2 percentage points.

Figure 3: Quarterly volume services growth sees revisions because of updated annual volume estimates, new data from the financial services survey and the update of the telecoms deflator

UK, Quarter 2 (Apr to June) 1997 to Quarter 4 (Oct to Dec) 2019



Source: Office for National Statistics – UK National Accounts

Notes:

1. Q1 refers to Quarter 1 (Jan to Mar), Q2 refers to Quarter 2 (Apr to June), Q3 refers to Quarter 3 (July to Sept) and Q4 refers to Quarter 4 (Oct to Dec).

Alongside revisions to annual and quarterly services sectors, the monthly path has also been revised to align to these new annual levels. Although monthly estimates are inherently more volatile than quarterly, over the entire data time series the revisions to individual months range from negative 0.6 to positive 0.8 percentage points; however, over this time period the series sees an average 0.0 (0.02) percentage point downward revision.

For full information on the monthly and quarterly breakdown of the services sector, please refer to the accompanying dataset.

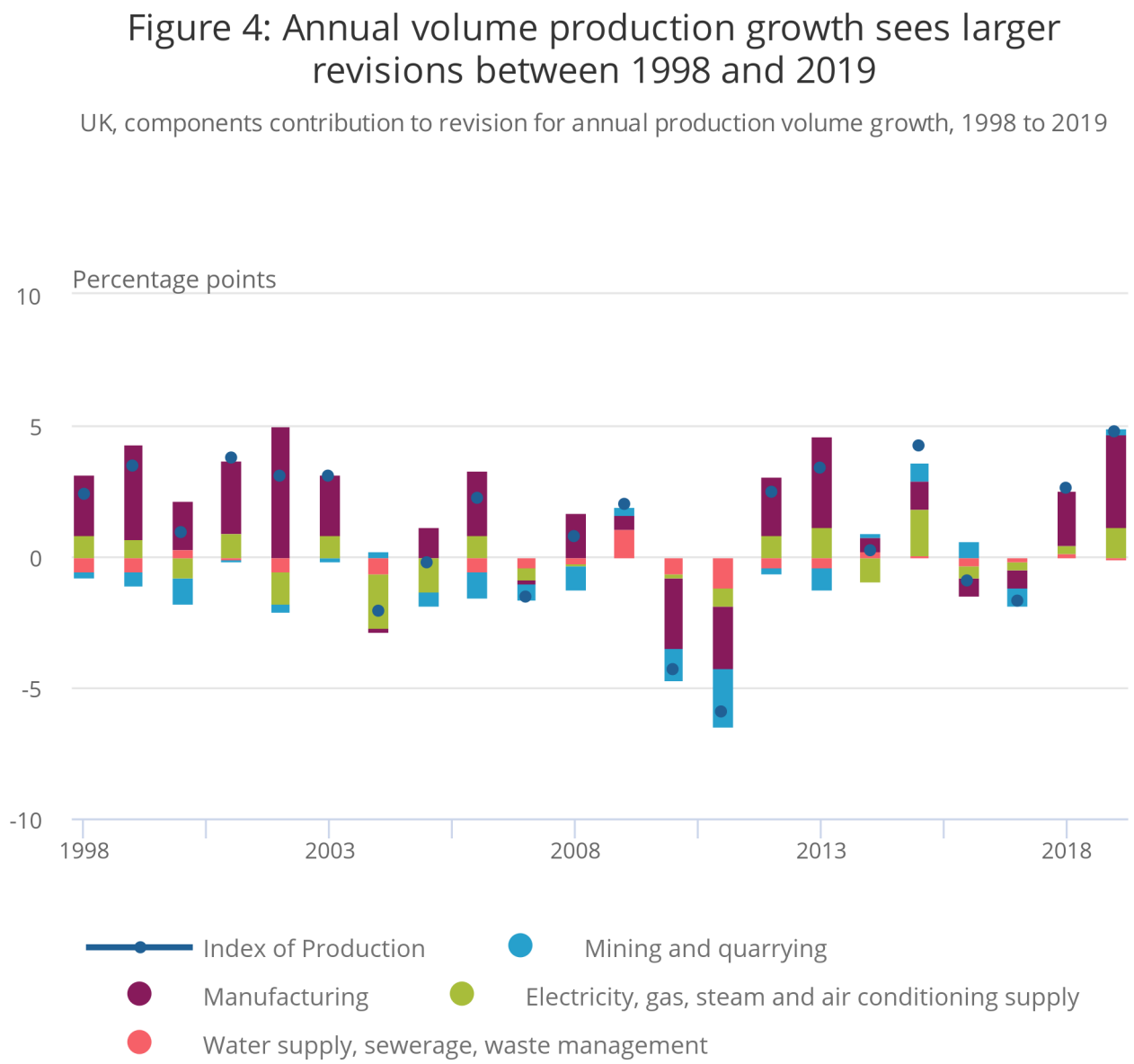
5 . Impact of Blue Book 2021 on the production sector

The production sector sees larger revisions to annual growth, and this is because of our new annual Supply and Use Tables (SUT) approach where volume estimates of production are reconciled at a detailed product by industry level.

Figure 4 shows the contributions to annual revisions in production, where manufacturing has the largest contribution to these revisions. In the pre-crisis years of 1998 to 2007, there has been a large average upward impact of 2.8 percentage points on the annual average growth rate for manufacturing. In contrast, the change is only 0.9 percentage points in the annual average growth rate in the period 2010 to 2019.

Figure 4: Annual volume production growth sees larger revisions between 1998 and 2019

UK, components contribution to revision for annual production volume growth, 1998 to 2019



Source: Office for National Statistics – UK National Accounts

Notes:

1. Components contribution may not sum to total because of rounding.

As a result of changes to the manufacturing sub-sector, the quarterly and monthly paths have also been revised to align to these new annual levels. Figure 5 shows the revisions to the quarterly profile of the manufacturing sector. Over the entire time series from Quarter 2 (April to June) 1997 to Quarter 4 (October to December) 2019, the revisions to individual quarters range from negative 1.9 to positive 2.2 percentage points.

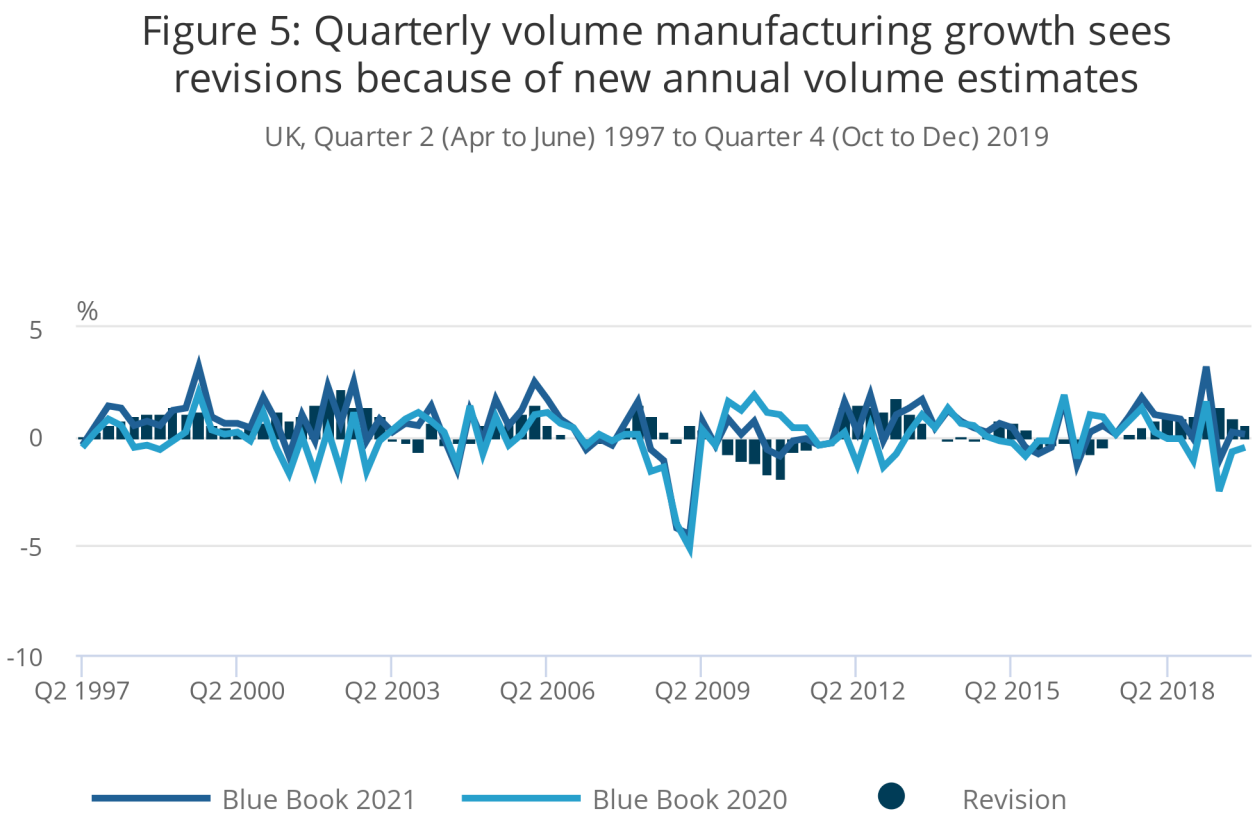
Over this period, the manufacturing series sees an average 0.5 percentage point upward revision, where in the period Quarter 2 (Apr to June) to 1997 to Quarter 4 (Oct to Dec) 2007 the manufacturing series sees an average 0.7 percentage points upward revision. This is compared with an average 0.3 percentage point upward revision from Quarter 1 (Jan to Mar) 2010 to Quarter 4 (Oct to Dec) 2019.

The quarterly profile of manufacturing in 2010 is now weaker because of a downward annual revision of 4.0 percentage points; this is broad-based across the manufacturing industries. For full details, please refer to the accompanying dataset.

Previous analysis showed that the implementation of double deflation and reconciliation of volume estimates at a detailed product by industry level has had a larger impact on the pre-crisis years.

Figure 5: Quarterly volume manufacturing growth sees revisions because of new annual volume estimates

UK, Quarter 2 (Apr to June) 1997 to Quarter 4 (Oct to Dec) 2019



Source: Office for National Statistics – UK National Accounts

Notes:

1. Q1 refers to Quarter 1 (Jan to Mar), Q2 refers to Quarter 2 (Apr to June), Q3 refers to Quarter 3 (July to Sept) and Q4 refers to Quarter 4 (Oct to Dec).

Elsewhere in the production sector, the mining and quarrying sub-sector has also seen notable annual revisions because of the implementation of double deflated estimates. In the pre-crisis years of 1998 to 2007, there has been a large downward impact of 3.7 percentage points on the annual average growth rate for this sub-sector. In contrast, the change is only 0.8 percentage points in the annual average growth rate in the period 2010 to 2019.

Previous analysis showed that the move from official single-deflated GVA estimates to double-deflated GVA has had an impact that reflects the contrasting product mix of the output and input for that industry. For example, crude petroleum and natural gas account for over 80% of this industry output, so the change in its output price index is strongly correlated with the price of oil and gas. In contrast, its inputs largely comprise of mining support activities and machinery, where there is much less of a correlation with the price of oil and gas. As such, the changes in output and input prices have not been correlated with one another. This lack of correlation is then reflected in double-deflated annual estimates of gross value added (GVA).

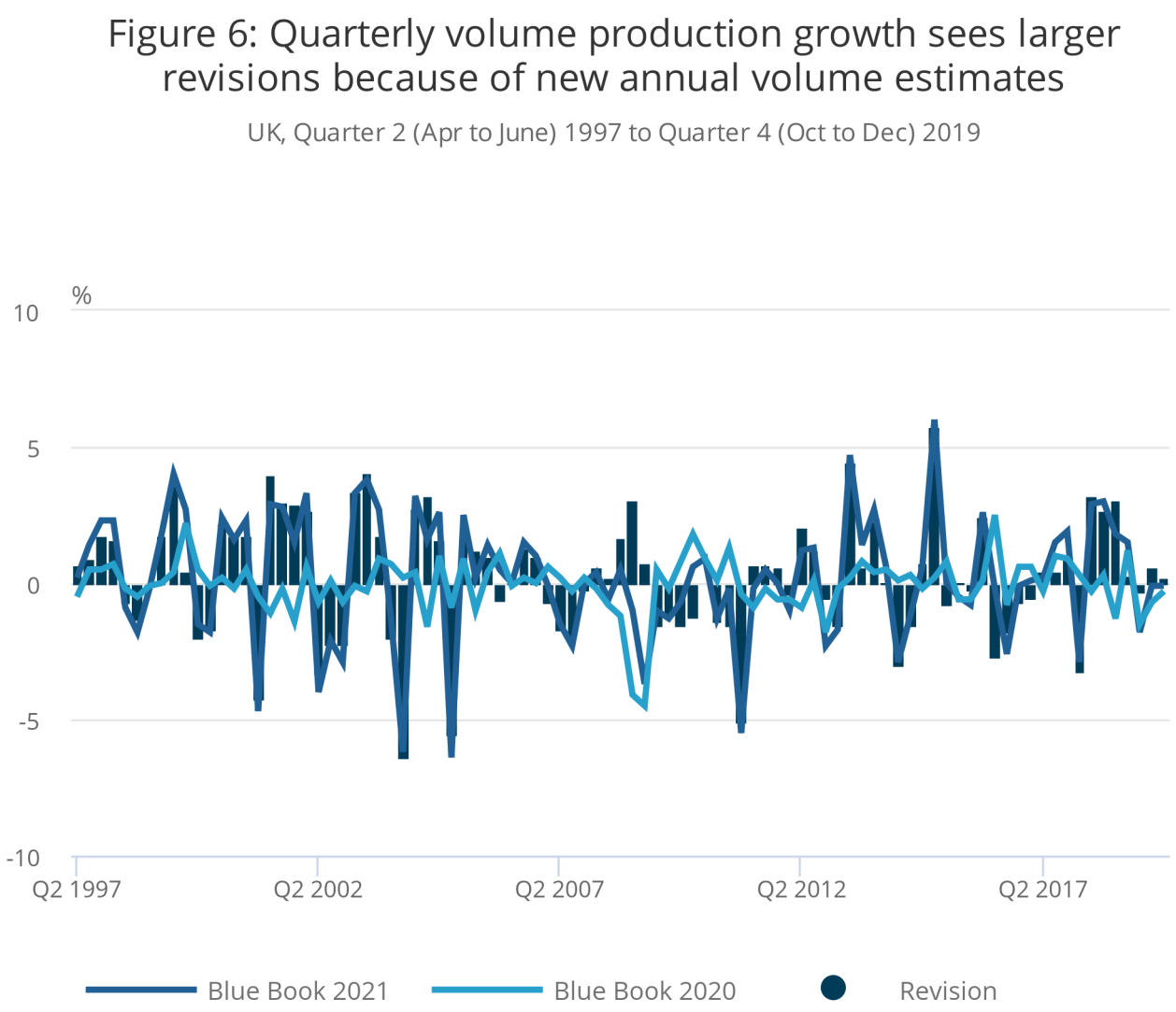
Alongside this new double deflated GVA volume estimates, we had faced some challenges in reconciling the quarterly and monthly trends to the new annuals. As previously stated in the scope of Blue Book 2021, industry chained volume measures are now benchmarked to newly available annual data. This has resulted in some challenges around the confrontation of these data, whereby monthly and quarterly data from the short-term measures of output are benchmarked to annual GVA. This is particularly pronounced in the production industries, which can be impacted because of the contribution of the non-manufacturing components. For example, mining and quarrying can be impacted by unseasonal maintenance, disruption to the extraction and transportation of oil and/or gas, and the price of oil and gas.

As a result of these challenges, quarterly and monthly data for several industries in the production sector show larger growth movements than previously published, impacting on the headline production growth profile (Figure 6). This is particularly pronounced in the earlier pre-2008 years where annual growth across production sees annual revisions to individual years, ranging from negative 2.1 to positive 3.8 percentage points.

While these changes introduce many improvements to the process of producing the national accounts in the UK, we do recognise this challenge in reconciling these new annual GVA volume measures with quarterly and monthly series, and as part of Blue Book 2022 we will continue this transformation and confront the challenges in this particular sector.

Figure 6: Quarterly volume production growth sees larger revisions because of new annual volume estimates

UK, Quarter 2 (Apr to June) 1997 to Quarter 4 (Oct to Dec) 2019



Source: Office for National Statistics – UK National Accounts

Notes:

1. Q1 refers to Quarter 1 (Jan to Mar), Q2 refers to Quarter 2 (Apr to June), Q3 refers to Quarter 3 (July to Sept) and Q4 refers to Quarter 4 (Oct to Dec).

For full information on these challenges and for detail on the monthly and quarterly breakdown of the production sector, please refer to the accompanying dataset.

6 . Impact of Blue Book 2021 on the construction sector

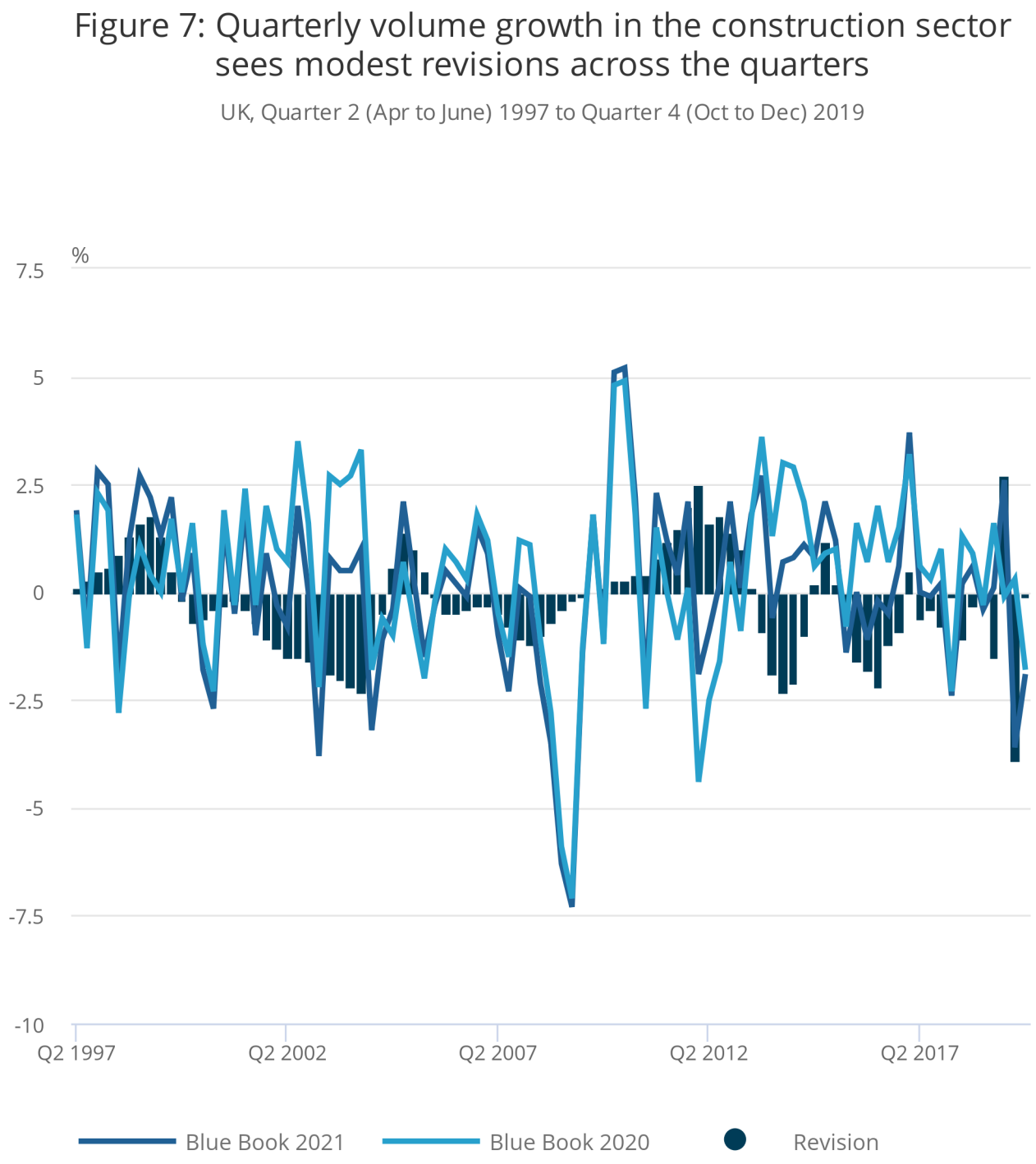
The construction sector sees revisions to volume quarterly and monthly growth. This is because of new volume estimates at the annual level on gross value added (GVA). Previously, annual volume growth was inferred from output, using data from the construction output release. In the new approach in Blue Book 2021, balanced estimates of GVA now account for both the outputs produced and inputs consumed by the industry. There are also some coverage differences given the use of the Annual Business Survey in their compilation. As a result, GVA estimates published in the gross domestic product (GDP) releases will be different from the construction output release. Previous experimental analysis showed that the construction sector has a relatively high level of intermediate consumption and was more likely to be impacted by double deflation.

Figure 7 shows the revisions to the quarterly profile of the construction sector.

Quarterly volume construction growth over the period Quarter 2 (April to June) 1997 to Quarter 4 (October to December) 2007 sees an average 0.3 percentage point downward revisions. For the period Quarter 1 (January to March) 2010 to Quarter 4 (October to December) 2019, quarterly volume GDP growth sees an average 0.1 percentage point downward revision. Over the entire data time series, the revisions to individual quarters range from negative 3.9 to 2.7 percentage points.

Figure 7: Quarterly volume growth in the construction sector sees modest revisions across the quarters

UK, Quarter 2 (Apr to June) 1997 to Quarter 4 (Oct to Dec) 2019



Source: Office for National Statistics – UK National Accounts

Notes:

1. Q1 refers to Quarter 1 (Jan to Mar), Q2 refers to Quarter 2 (Apr to June), Q3 refers to Quarter 3 (July to Sept) and Q4 refers to Quarter 4 (Oct to Dec).

For full information on the monthly and quarterly breakdown of the construction sector, please refer to the accompanying dataset.

7 . Future developments

Blue Book 2021 delivers planned transformational changes of the UK National Accounts and brings us in-line with international best practice. Producing volume estimates of gross domestic product (GDP) in an annual Supply and Use Tables (SUT) framework has led to improvements in the balancing of current price and volume GDP estimates, including the implementation of double deflation. Further improvements to specific data sources and the introduction of new methods in some components of the national accounts have also provided improved estimates. While these changes introduce many improvements to the process of producing the national accounts in the UK, we do recognise there are some challenges in reconciling these new annual GVA volume measures with quarterly and monthly series, which measure changes in output and may not capture intermediate consumption, in particular in the production industries. As part of Blue Book 2022, we will continue this transformation and confront the challenges in this area of the economy.

The changes introduced in Blue Book 2021 have also impacted on productivity. Indicative estimates on labour productivity were published on 28 June 2021, and the quarterly productivity estimates released in October 2021 will reflect these changes.

We have also published indicative annual impacts on the sector and financial accounts and the balance of payments estimates.

8 . Related links

Impact of Blue Book 2021 changes on current price and volume estimates of gross domestic product
Methodology Article | Released 28 June 2021
Methodological and data improvements that affect current price and chain volume measure of gross domestic product (GDP), 1997 to 2019.

Financial services sector methods changes: 1997 to 2019
Methodology Article | Released 28 June 2021
Improvements in calculating financial services estimates for Other Financial Institutions by basing the calculation of output and intermediate consumption of Other Financial Institutions (in NACE 64.2 to 64.9), and financial auxiliaries (in NACE 66) on the industry-specific data, and applying output valuation for the financial services that these units provide.

Impact of double deflation on industry chain volume measure annual estimates 1997 to 2018: Blue Book 2021
Article | Released 28 June 2021
Indicative impacts of a new framework which will be implemented in Blue Book 2021, including the first official estimates of double-deflated gross domestic product.

Impact of Blue Book 2021 changes on average quarterly gross domestic product
Article | Released 28 July 2021
Methodological and data improvements that affect current price and chain volume measure of quarterly gross domestic product (GDP), 1997 to 2019. We also include indicative annual impacts on the services, production, and construction sectors and expenditure components contribution to revision.