

Article

National Accounts articles: Impact of methodological changes to chain-linking on gross domestic product

This article illustrates the data impact of introducing the methodological changes to chain-linking on gross domestic product.

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1 . Authors

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2 . Executive summary

As announced in [National Accounts: proposed methodological changes to chain-linking for UK publications and international transmissions](#), this article will illustrate the impact of introducing the methodological changes to chain-linking, both annually and quarterly.

The introduction of this methodological change only impacts the "tail" of gross domestic product (GDP), that is, the years and quarters 2 years after the current last base year. The Blue Book 2016 dataset has been used to estimate the impact of this change, therefore only 2015 is affected and the impact is minimal and does not impact annual growth to 1 decimal point. The impact on quarterly growth could only be assessed on output data; the revisions again were small, having no impact on quarterly GDP growth to 1 decimal point.

We plan to implement these changes in Blue Book 2017 and the reference year and last base year will definitely move forward two years, to 2015, so that the weights better reflect the industrial structures and prices currently seen within the economy. We are still working on the feasibility of implementing the final change in Blue Book 2017, further moving the last base year on in a quarterly GDP production round when the data for the most recent year are formed e.g. moving the last base year to 2017 in the Quarter 1 (Jan to Mar) 2018 Preliminary GDP round. We will confirm whether this is possible in February.

3 . Background

These changes, to chain-linking of the UK gross domestic product (GDP) estimates, are to ensure consistency with international best practice (section 10.20 of the [European System of Accounts 2010 Manual](#)):

“The calculation of volume estimates is made only for two successive years, i.e. the volume is calculated at the prices of the previous year.”

The planned improvements will update the volume series calculation for UK GDP to the latest last base year as soon as data are available. Using 2018 as an illustration; this will mean that when the UK publishes preliminary GDP in April 2018 for Quarter 1 (Jan to Mar) 2018, the annual data for 2017 will be available and should be used for calculating the volume data using the prices of the newly available previous year.

It is worth noting that once a full year of data is available, for example when the Quarter 4 (Oct to Dec) 2017 data are released in January to March 2018, the last base year is not moved on, as the previous year is still 2016. It is only once estimates for the first quarter of 2018 are published that the last base year moves on to 2017.

The practice, up until Blue Book 2016, has been to set the last base year and the reference year to the year that has been through a second iteration of Supply and Use balancing. From Blue Book 2017 onwards, providing it is feasible to fully implement the change (see executive summary), the UK will separate the reference year from the last base year so that:

- the last base year is the latest full year before the reference period, in effect t-1 year
- the reference year moves to t-2 years, the first balanced year of Supply and Use Tables (SUT) data

4 . Impact assessment

For analysis purposes, the estimates of the impact of this improvement have been calculated using Blue Book 2016 consistent datasets.

Table 1 shows the reference year and last base year used for Blue Book 2016 and those used for the new methodology on the same datasets.

Table 1: Reference year and last base year for Blue Book 2016 and new methodology

	Blue Book 2016	New method
Reference year	2013	2014
Last base year	2013	2015

Source: Office for National Statistics

4.1 Weights

Currently, as part of the Blue Book process, the last base year and reference year for chained volume estimates are moved forward by one year so that the estimates better reflect the industrial structures and prices currently seen within the economy. Table 2 shows the updated weights used and published in Blue Book 2016 for the output components of GDP. The introduction of this new method will move the weights forward for each full year and only incomplete years will use the weighting structure of the previous year (until that full year becomes available). A comparison of the weights in the Blue Book 2016 estimates and those produced using the new methodology is also provided in Table 2.

In Blue Book 2016 the last base year was set to 2013 meaning the weights of the resultant years are set equal to the weights in 2013. Using the new methodology the last base year is set to 2015, therefore only the weights of 2016 are equal to those in the previous year as the full year of 2016 is not available.

Table 2: Weights in Blue Book 2016 and new methodology

	Agriculture		Production		Construction		Services	
	Blue Book 2016	New method	Blue Book 2016	New method	Blue Book 2016	New method	Blue Book 2016	New method
2013	7.1496	7.1496	146.4939	146.4939	58.5285	58.5285	787.8281	787.8281
2014	7.1496	6.7710	146.4939	141.9223	58.5285	59.5687	787.8281	791.7380
2015	7.1496	6.5374	146.4939	133.3179	58.5285	61.6467	787.8281	798.4981
2016	7.1496	6.5374	146.4939	133.3179	58.5285	61.6467	787.8281	798.4981

Source: Office for National Statistics

Notes:

1. Figures will be rounded when included in the GDP publication tables

A benefit of this new method is that the weights used in the compilation of the data are the most reflective of the economy and capture movements in the industrial structures for years beyond the supply and use balanced years. For example, if we had moved to the new method in Blue Book 2016 the weight for Production would have been 13 percentage points lower in 2015.

4.2 Annual impact

As a consequence of the current chain-linking process, volume data for years following the last base year (2013 for Blue Book 2016) are calculated using the prices of the last base year – rather than previous years' prices. The change in the treatment of the last base year will therefore introduce data revisions to the tail of the gross domestic product (GDP) series only.

Table 3 shows the annual revisions between the new method and Blue Book 2016 published estimates of GDP. Applying this change to the Blue Book 2016 dataset affects 2015 only and the revision impact was minimal and does not impact growth to 1 decimal point annually. The year 2014 is not affected since it already uses the previous year, 2013, as its base year and these weights are not affected by this methodological change.

Table 3: Revision to UK GDP, annual growth

Period	Revision
1998 to 2014	0.00
2015	0.01

Source: Office for National Statistics

The small revisions in the latest year will, in part, reflect a steady state economy and therefore we could expect larger revisions if this had been a more economically volatile period.

4.3 Quarterly impact

In the UK the output measure is taken as the best short-term estimate of GDP growth, and so the other 2 measures, expenditure and income, are aligned to this through a process known as the alignment adjustment.

The alignment adjustment is the final stage in producing a coherent set of quarterly accounts, offering a single growth rate for policy makers – this step was not taken during this impact assessment. For more information on quarterly alignment adjustments please see the following article: [The quarterly alignment adjustment](#).

We assessed the impact to quarterly output growths and the revisions do not impact on GDP growth to 1 decimal point. As a consequence, because of the alignment adjustment process described above, this methodological improvement is unlikely to have an impact on average GDP growth.

5 . Conclusion and next steps

This change to the calculation of chained volume measure (CVM) data brings the UK in line with international best practice and improves the international comparability for the tail of the series.

We plan to implement these changes in Blue Book 2017 and the reference year and last base year will definitely move forward 2 years so that the weights better reflect the industrial structures and prices currently seen within the economy. We are still working on the feasibility of implementing in Blue Book 2017 the final change, further moving the last base year on in a quarterly GDP production round when the data for the most recent year are formed, for example, moving the base year to 2017 in the Quarter 1 (Jan to Mar) 2018 Preliminary gross domestic product (GDP) round. We will confirm whether this is possible in February.

Applying this change to the Blue Book 2016 dataset affects 2015 only and the revision impact was minimal and does not impact growth to 1 decimal point annually. The quarterly revision impact could only be assessed on output data and the revisions do not impact on GDP growth to 1 decimal point.

Following the introduction of this methodological change the current method of calculating contributions to growth for CVM data, which relies on the additivity of the series, is no longer viable. In line with Eurostat's recommendations we will adopt the additive volume data method for calculating contributions to growth. We are currently working towards implementing the additive volume data method for calculating contributions in the Quarterly National Accounts publication on 29 September 2017.

6 . References

Drew S, Hughes M & Denley H (2016) [Proposed methodological changes to chain-linking for UK publications and international transmissions](#)

Drew S, Lewis P & McLaren C (2016) [Chain-linking methods used within the UK National Accounts](#)