Office for National Statistics

Article

Improvements in the estimation of product data for other mining and quarrying

The data source for the other mining and quarrying sector has changed from the Annual Minerals Raised Inquiry (AMRI) to Prodcom. This article provides a consistent back series.

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1 . Main points

- The data source for the other mining and quarrying sector (in Standard Industrial Classification 2007 division 8) has changed from the Annual Minerals Raised Inquiry (AMRI) to Prodcom.
- The change in data sources has taken place due to both the discontinuation of AMRI and to bring consistency in the publication of product data.
- Several options have been explored to link the two datasets to provide a consistent and comparable time series.
- Prodcom will now be publishing other mining and quarrying data from July 2018 onwards.

2 . Introduction

Understanding what products are being produced and sold by UK manufacturers provides an important insight into the economy. To obtain this information, Office for National Statistics (ONS) uses the Prodcom survey, which collects information from approximately 21,500 UK businesses, covering 25 manufacturing divisions, 234 industries and approximately 3,800 products. Prodcom covers product sales by UK manufacturers; this is not the same as UK retail sales, which refer to the sales of goods by retail businesses, or consumer purchases.

One of the sectors covered within the Prodcom survey is the other mining and quarrying sector (division 08 as part of the Standard Industrial Classification 2007). Prior to 2015, the data for the other mining and quarrying sector was collected as part of the Annual Minerals Raised Inquiry (AMRI) survey. AMRI data were collected by the Department of Communities and Local Government (DCLG), now known as the Ministry of Housing, Communities and Local Government (MHCLG). The inquiry provided data on non-energy mineral production in Great Britain, extracted sales of chalk, clays, crushed rock, dolomite, granite, limestone, peat, ore minerals, salt, sandstone, sand and gravel, slate and other minerals, together with employment for each quarry type.

The AMRI survey coverage only included Great Britain, so ONS separately sampled businesses in Northern Ireland. Aggregated figures from AMRI were then combined with the Northern Ireland aggregated estimates to create total values and volumes for the different products within the mining and quarrying sector for the UK.

The AMRI survey ceased after the 2014 survey period so an alternative approach was required to collect and capture the Great Britain element of this division to continue to produce UK estimates. As Prodcom has always collected data for Northern Ireland the Prodcom sample was extended to full UK coverage in the other mining and quarrying division from the 2015 survey period onwards to produce UK estimates to meet user and legislative requirements.

The change in source data for this division resulted in a level shift in the estimates between 2014 and 2015. To understand this and to construct a consistent time series, the estimates for this division have been suppressed within the Prodcom publication since the change.

The purpose of this article is to highlight the differences between the estimates from AMRI compared with those collected as part of the Prodcom survey, the reasons for these and to provide an estimate of the discontinuity and a linking factor to allow users to have a consistent time series on a consistent basis. Data for this sector will now be reinstated and published from July 2018 onwards.

3 . Background of Prodcom

Prodcom collects product-based statistics on industrial production. Businesses are therefore asked to provide information on:

- the value (in pounds sterling or euro) and the volume (kilograms, number of items and so on) of product sales; although the data collected are based on invoiced sales, for the relevant products collected, total production and production intended for sale are collected instead
- non-manufacturing income: merchanted goods; work done; sales of waste products; all other income; and total turnover

The provision of product sales information and non-manufacturing income, allows analysis of the proportion of manufacturing and non-manufacturing activity in each industry. Prodcom thus provides a comprehensive picture of industrial production in the UK. The sectors Prodcom covers meet international guidelines.

The information collected is used within the national accounts and the Producer Price Index (which is a primary measure of inflation). The statistics have a variety of uses such as policy-making and assessing trends in certain product sectors and are required by Eurostat, which collects and harmonises the data for the whole of the EU.

4 . AMRI collection of the other mining and quarrying sector

The Annual Minerals Raised Inquiry (AMRI) provided an alternative data source, reducing the burden on businesses. The end of AMRI in 2014 provided an opportunity for product data for all sectors to be collected on a consistent basis.

Several limitations had been identified with using AMRI data, which had impacted past Prodcom publications. Ministry of Housing, Communities and Local Government (MHCLG) only required the collection of the total volume data (tonnes) of a product; recording everything that was extracted from the ground. There was no requirement for their inquiry to collect value, only volume. The value was estimated by AMRI before delivery to Office for National Statistics (ONS), by allocating a nominal value to the mineral, which was usually the minimum value of the product range.

AMRI was also sourced separately to most business surveys in ONS, which use the Inter-Departmental Business Register (IDBR) as a sampling frame. This meant that there were some inconsistencies in the businesses that were included as part of division 8 within AMRI compared with what they would be classified under a Prodcom survey.

5 . Prodcom collection of the other mining and quarrying sector and differences with the AMRI source

The Prodcom survey questions differ from those collected as part of the Annual Minerals Raised Inquiry (AMRI) in terms of requirements of both volume and value of goods. The Prodcom survey asks how much of the materials are goods for resale, whereas AMRI collected the quantity of the materials extracted. This included companies who extract the materials and transform them into goods for their own use as well as for resale. Consequently, the estimates used prior to 2015 (from AMRI) overstated the true level of values required as part of Prodcom methodology.

Extending the Prodcom sample to cover this sector in its entirety was deemed to have several benefits:

- improved data for main users within Office for National Statistics (ONS) (for example, compilation of national accounts)
- reduced processing of the data as all collected on a standard basis (for example, previously any AMRI data had to be validated and elements removed where carried in from other Standard Industrial Classifications)
- consistency for industry and the survey as a whole – Great Britain and Northern Ireland collected from the same source

Due to the change in source data and the unknown impact, estimates were suppressed from 2013 onwards for this sector within the Prodcom publication. Data were treated as experimental for three annual survey periods until sufficient data were received and analysed.

After having now fully validated the data from 2015 onwards, including having spoken to any main contributors whose data has fluctuated year-on-year, it is clear the data collected through Prodcom more accurately reflects the true value level. It does, however, mean there is a break in the series for this sector resulting in a discontinuity. It is important to understand the new data source and how and why this differs from the previous estimates.

The main differences between the two sources are detailed in Table 1.

Table 1: Differences between data sources

	Previously (AMRI)	Currently (PRODCOM)
Design	Accounted for the entire volume of product extracted, whether it was sold or not – so it over estimated sales	Collects only the value of goods sold in the calendar year, and volume of sold goods
Units	Only collected total volume data (tonnes); value figures estimated for the business from this	Data collected for volume (in various measures) and value (sales)
Sampling	AMRI had a census of 1700 sites	Sample size for this sector of 100 for 2015, and an increased sample of 150 for 2016
Coverage	Only sampled Great Britain, Prodcom data for Northern Ireland was aggregated to create the total figure. Covered small quarries that were used for personal consumption, some that were not businesses, and included those that fell below VAT and PAYE thresholds	Samples from all the United Kingdom weighted to the business population on the business register

Source: Office for National Statistics and Annual Minerals Raised Inquiry

6 . How the linking factor for historic time series was calculated

Estimates for this sector were produced for 2015 and 2016 using the data collected as part of the Prodcom survey. Figures for both periods are at a consistent level of £1,607 million for 2015 and £1,721 million for 2016. However, this level is much lower than the previous estimates for 2014 (£2,208 million) and past periods when using the data collected from the Annual Minerals Raised Inquiry (AMRI). The reasons for this were detailed in previous sections.

To meet user requirements for comparable estimates over time, we reviewed potential options to provide a consistent back series, that is, to provide historical data back to and including 2008, presented within this article. To maintain continuity between the two time series and as data were not available on both basis for the same reference period, a linking factor[1] was needed, to allow for comparisons over time. There were different potential methods to link two series, this section highlights those that were trialled and the one that was the most appropriate to use in this case.

Methods of calculating a linking factor between 2014 and 2015 that were investigated included:

- sales per head, calculated by total turnover divided by employment, percentage change in line with Prodcom methods; this was trialled two ways:
    - employment and total turnover data from the Annual Business Survey (ABS)
    - employment data from the Business Register and Employment Survey (BRES) combined with ABS total turnover
- percentage change of total turnover from the ABS for the mining and quarrying division, broken down to industry (four-digit Standard Industrial Classification (SIC)) level
- use of a four-digit breakdown of the percentage change in Northern Ireland data between 2014 and 2015

Option 3 was deemed the most appropriate method to produce a linking factor, as Northern Ireland data for this sector have been collected consistently throughout the reference period by Prodcom. However, the linking factor assumes that Great Britain follows the same trends as Northern Ireland overall, which may not be the case for all products.

This approach has allowed for a more coherent and comparable time series for the mining and quarrying sector. The Northern Ireland percentage change provided an important indication on how the division may have behaved between the period where there was no overlap in AMRI and Prodcom data, in Great Britain. Although the Annual Business Survey was considered, due to methodological differences this option was eventually discounted.

The Northern Ireland percentage change was used to calculate the potential Prodcom data in years prior to 2015 and provided a relationship between the two datasets. Within this, there were also different options of which data to use: two-digit (division level), four-digit (industry level) and eight-digit SIC (product level).

- at eight-digit SIC level, the Northern Ireland sample size was smaller, meaning pairing was not available at every product level, leaving gaps
- at two-digit level, each product used the same percentage change; which was not reflecting the difference in how the different industry groups behave
- four-digit level was the best option; once selected this ensures there were no gaps and allowed the differences in behaviour between product groups to be mirrored in the results; these percentage changes can be seen in Table 2

The four-digit SICs presented are:

- 0811: quarrying of ornamental and building stone, limestone, gypsum, chalk and slate
- 0812: operation of gravel and sand pits; mining of clays and kaolin
- 0893: extraction of salt
- 0899: other mining and quarrying not elsewhere classified

Table 2: Percentage changes between 2014 and 2015 for classifications within the other mining and quarrying sector for Northern Ireland

4-digit SIC	0811	0812	0893	0899
Percentage Change	12.0	13.5	27.7	-20.1

Source: Office for National Statistics

From 2008 to 2014, percentage changes were calculated for the AMRI data across the rest of the time series. These percentage changes were then used to estimate historical Prodcom values, providing historical estimates for how the time series may have looked if the data had been collected using the same methods used by Prodcom. The results are shown for the division 08 in its entirety in Figure 2.

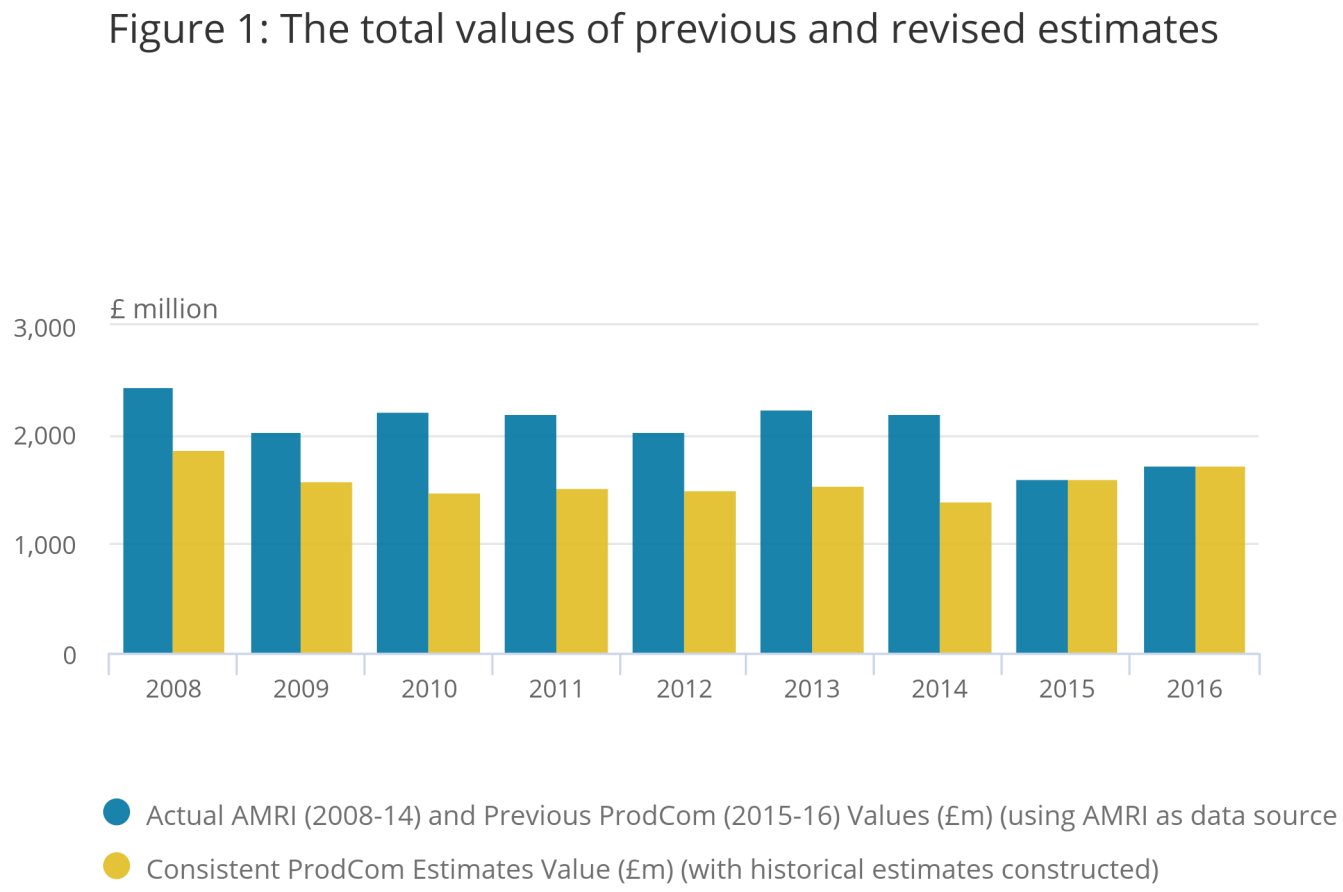
Notes for: How the linking factor for historic time series was calculated

1. A linking factor is the fixed relationship between two data series.

7 . Estimates for the other mining and quarrying sector

Analysis of previous estimates data for 2015 and 2016, shows lower total value compared with those collected prior to 2015 as part of the Annual Minerals Raised Inquiry (AMRI) survey. This difference is due to the over-coverage issues as identified in Table 1.

Figure 1: The total values of previous and revised estimates



Source: Office for National Statistics and Annual Minerals Raised Inquiry

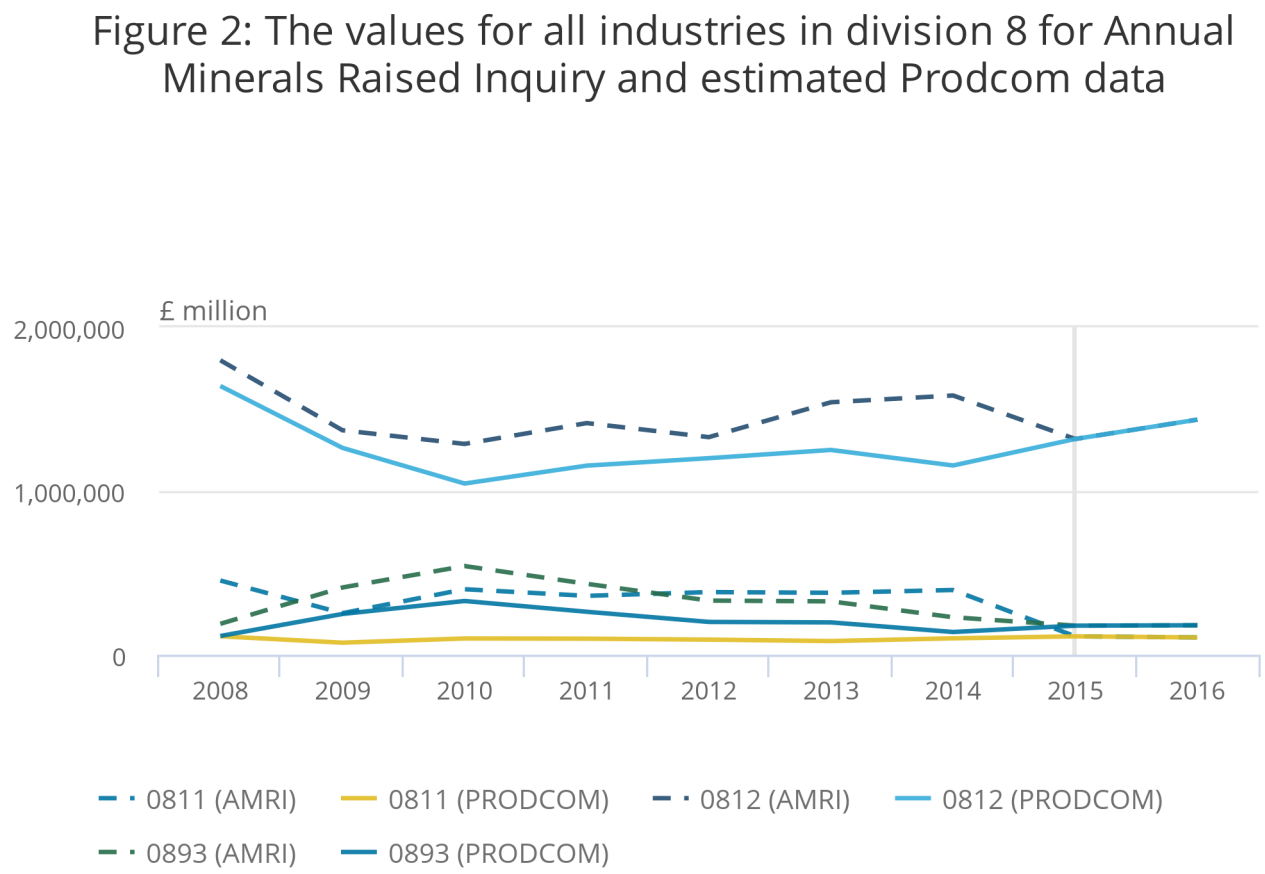
Table 3: Historical estimates of the average values for division 8

Year	Actual AMRI (2008-14) and Previous ProdCom (2015-16) Values (£ million) (using AMRI as data source)	Consistent Prodcom Estimates Value (£ million) (with historical estimates constructed)
2008	2,440	1,868
2009	2,035	1,586
2010	2,229	1,473
2011	2,207	1,515
2012	2,042	1,493
2013	2,246	1,531
2014	2,208	1,394
2015	1,607	1,607
2016	1,721	1,721

Source: Office for National Statistics and Annual Minerals Raised Inquiry

The approach maintains the growth rates seen previously at the product level up to 2014. The growth rate between 2014 and 2015 is the growth rate seen in the Northern Ireland businesses between these periods but applied at the UK aggregated level. Finally, the growth rate between 2015 and 2016 is that seen from the new source data (from the Prodcom survey). Whilst the approach preserves previous growth rates, this shifts the level of the back series onto a comparable basis with the current data source. These estimates are available within this note, while the published estimates will still be provided on the historical basis.

Figure 2: The values for all industries in division 8 for Annual Minerals Raised Inquiry and estimated Prodcom data



Source: Office for National Statistics and Annual Minerals Raised Inquiry

Notes:

Figure 2 shows a selection of products within the division, as some are suppressed or value zero and therefore cannot be included.

Through using AMRI percentage changes, the back series still replicates the trends from the AMRI data for each product. As shown in Figure 2 the trends at industry level follow similar patterns to previous trends but not match exactly due to the growth rates applied at product level. It is more consistent with the 2017 data currently being processed for Prodcom and allows for more appropriate comparison over time. Figure 2 shows comparable upward trends in line with Figure 1. A full series is available within the datasets attached.

8 . Next steps

Prodcom will continue collecting data on this new basis for the other mining and quarrying sector, with estimates for 2015 to 2017 to be published on 3 July as part of the 2017 provisional Prodcom publication. However, estimates within the Prodcom statistical bulletin and accompanying datasets will only be on the new basis with historical data remaining as previously published. This article and accompanying dataset containing the relevant linking factors should be used to produce any consistent back series.

9 . Acknowledgements

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10 . Useful links

Prodcom product list