

Article

# Construction development: Impact of improvements to construction statistics: September 2017

Description of the improvements that have been incorporated into construction output, as part of Blue Book 2017, including the impact of the changes.

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## Table of contents

1. [Main points](#)
2. [Introduction](#)
3. [Nominal data improvements](#)
4. [Impact on nominal data series](#)
5. [Price indices improvements](#)
6. [Impact on price indices](#)
7. [Seasonal adjustment](#)
8. [Impact on headline figures](#)
9. [Impact on gross domestic product](#)
10. [Future work](#)
11. [References](#)

# 1 . Main points

- For the Quarterly National Accounts: April to June 2017 publication, improvements have been implemented to construction output from Quarter 1 (Jan to Mar) 2010, leading to revisions.
- These are as a result to improvements in nominal data, output price indices and seasonal adjustment.
- The annual growth rate for 2016 has been revised from 2.4% to 3.8%.
- There are implied revisions rounded to one decimal place of 0.1 percentage points to the output approach to gross domestic product (GDP) in three quarters, assuming all other components are equal: a negative revision to Quarter 1 (Jan to Mar) 2015; and an upward revision for Quarter 2 (Apr to June) 2016 and Quarter 4 (Oct to Dec) 2016.

## 2 . Introduction

This article will describe the improvements that have been incorporated into Construction output statistics, as part of the Blue Book 2017, and show the impact of the changes. These changes are the receipt of additional survey data, nominal data size band adjustments, improvements to the Construction Output Price Indices, and a review of seasonal adjustment.

[Construction output statistics](#) are published monthly, and follow the [standard revisions policy for national accounts](#). As a result, within the Quarterly National Accounts publication, and Blue Book 2017, Construction output is open to revisions for the entire monthly series. This is back to January 2010, when the monthly construction survey was introduced, replacing the previous quarterly survey.

This survey collects output by sector from businesses in the construction industry within Great Britain. The survey's results are used to produce seasonally adjusted monthly, quarterly and annual estimates of output in the construction industry at current price and at chained volume measures (removing the effect of inflation).

A common cause for revisions is the return of late data to the survey. Returns for businesses that have not responded are imputed and it is likely that there will be a difference between the imputation and the late returned value. Under the revisions policy, the 2016 reference period has not been open for revision for over six months, since the Construction output publication for January. This has allowed time for a number of late returns to be received, particularly for the latter months of 2016.

Nominal data can also be revised by changes in classifications and statistical methods. As it is not possible to survey every business in the population, it is necessary to weight the data from the sample of businesses to provide estimates for the full population. These weights depend upon the size band classification of the business and this classification has been reviewed for some businesses.

Construction Output Price Indices (OPIs) are used in the production of chained volume measures for construction output, to remove the effects of price change. They are used by both Construction output and Construction new orders, to deflate the nominal data.

In December 2014, the Department for Business, Innovation and Skills (BIS) announced the suspension of its publication of Construction Price and Cost Indices (CPCIs). This led to the suspension of the National Statistics status for Construction output, new orders, and prices. In April 2015, responsibility for the production of the CPCIs transferred from BIS to Office for National Statistics (ONS). We produced an interim solution for construction price indices in June 2015, which have been used for deflation from the January 2014 reference period onwards. These are available in the quarterly [Construction output price indices](#) articles. A work plan was published in December 2015, outlining the work plan for the development of these indices

The Construction output series is seasonally adjusted using a seasonal adjustment software tool called X-13ARIMA-SEATS. [Eurostat guidelines on seasonal adjustment](#) indicate that short time series (three to seven years) can be unstable, and the Construction output monthly series is now just seven and a half years in length. There is potential for large revisions to the seasonally adjusted data as more data becomes available and the series matures. The seasonal adjustment model for construction output is reviewed annually.

### 3 . Nominal data improvements

The receipt of late data, and adjustments as a result of size band reclassifications, are both causes of revisions in the latest data.

#### Late returns

Revisions to nominal data can be made for a variety of reasons, but one of the most common reasons is the receipt of late responses to surveys. These responses will replace the value that had previously been imputed for the business, and a difference between these two values will have an impact on the nominal data totals in a number of ways:

- individual impact on nominal data total for the period in question
- impact on impute for business in subsequent periods (if no returned data)
- impact on the imputation link for businesses still being imputed for the period in question

By following the national accounts revision policy, it is not possible for construction output to take on all late responses each month. These responses are held, until that period becomes part of the open period. Table 1 shows the last time that the most recent months were open for revision.

**Table 1: Most recent publication that a reference period was open for revision**

Reference Period	Most recent open publication
January 2016	Construction output in Great Britain: January 2017
February 2016 to October 2016	Construction output in Great Britain: January 2017
November 2016	Construction output in Great Britain: January 2017
December 2016	Construction output in Great Britain: January 2017
January 2017	Construction output in Great Britain: April 2017
February 2017	Construction output in Great Britain: April 2017
March 2017	Construction output in Great Britain: April 2017
April 2017	Construction output in Great Britain: June 2017
May 2017	Construction output in Great Britain: June 2017
June 2017	Construction output in Great Britain: June 2017

Source: Office for National Statistics

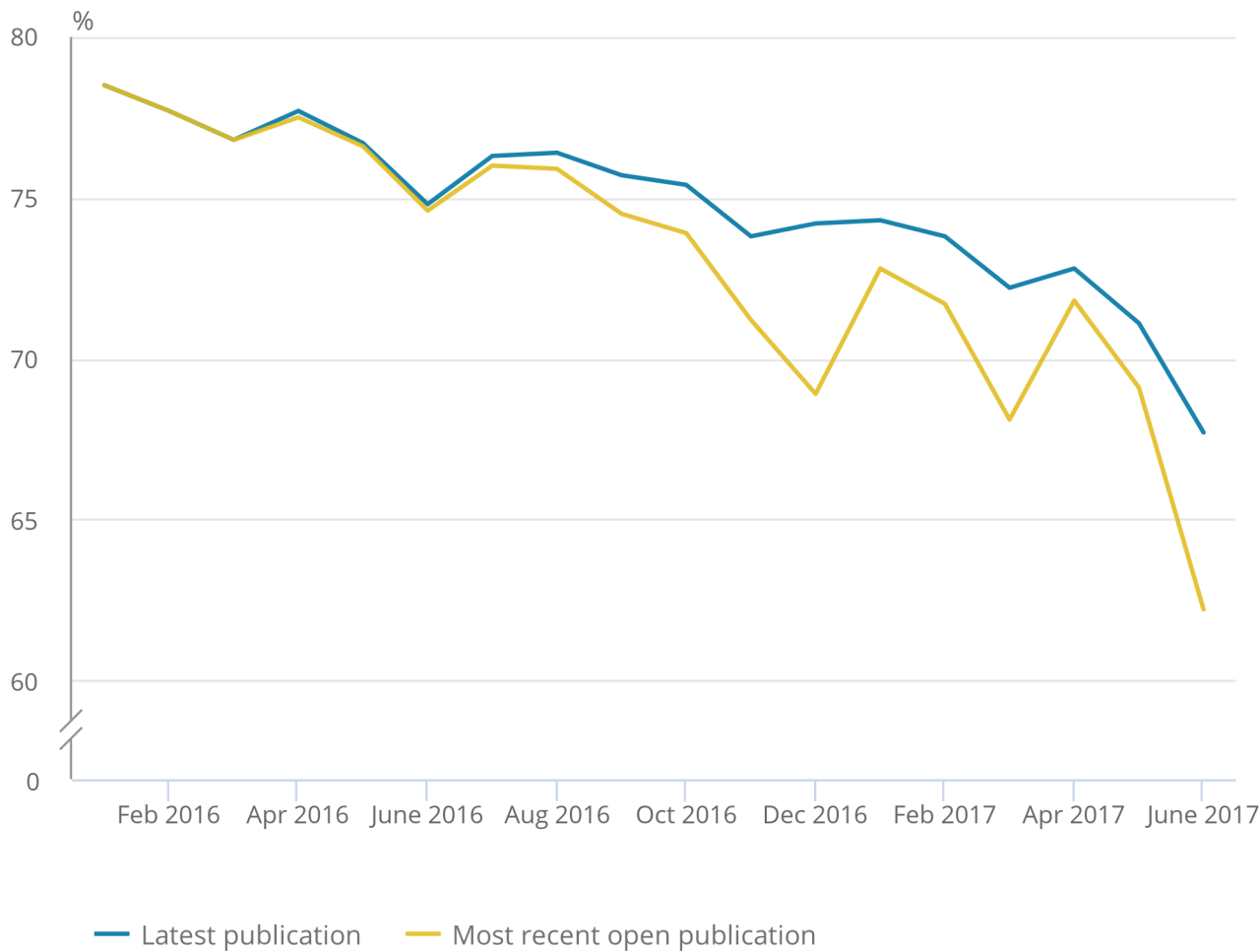
Figure 1 displays the percentage of returned forms for construction period, at the most recent open publication, as listed in Table 1, compared with the latest data.

Figure 1: Percentage of cleared returned forms, monthly construction survey

Great Britain, January 2016 to June 2017

Figure 1: Percentage of cleared returned forms, monthly construction survey

Great Britain, January 2016 to June 2017



Source: Office for National Statistics

Source: Office for National Statistics

Notes:

1. Cleared returned forms indicate that a response has been received from a business and has been accepted and processed. These rates differ from the published Construction output response rates, which just represent the amount of responses that have been received from businesses.

Where upward revisions have taken place in previous periods, this can lead to an increase in level for the most recent periods – regardless of whether there are also other revisions in these periods. In the monthly publications, construction output is constrained to the closed period by growth rate. This ensures that the monthly growth rates are correct, but can have an impact on the monthly levels and quarterly series.

For this publication, the months of November and December 2016 have had the largest upward revisions, as a result of processing the additional data. Across these two months, nearly 600 forms have been returned and cleared. In 53% of cases, the returned value was higher than the previously imputed value, compared with 44% of cases where it was lower. There is a net increase from returns replacing imputations as a result of these percentages, and this is the largest net cause for the overall upward revision, along with the consequential impact on the continued imputations.

## **Size band adjustments**

The monthly construction survey is sent to all businesses with 100 or more employees, as well as businesses with low employment and exceptionally large turnover. This is defined as an annual turnover of £60 million or more, with a minimum amount of 10 employees. A sample is made of all other businesses with fewer than 100 employees and their responses are multiplied by sampling weights, to account for the entire population. These weights are usually larger for the lowest 0 to 4 employees category, as only a small proportion of these businesses are included in the sample.

Analysis of this low employee category has found that from December 2014 to June 2016, a number of joint-venture businesses were included in the sample. These are partnerships between two larger companies, whose work is focused on the infrastructure sector. These businesses returned larger values than other low employment businesses, but were receiving the same sampling weights, resulting in an over-estimate of infrastructure work. These businesses have now been re-categorised as "low employment, and exceptionally large turnover businesses", to prevent sampling weights from being applied incorrectly.

## **4 . Impact on nominal data series**

Figures 2 and 3 display the latest versions of the nominal data series for the infrastructure sector and all construction work respectively.

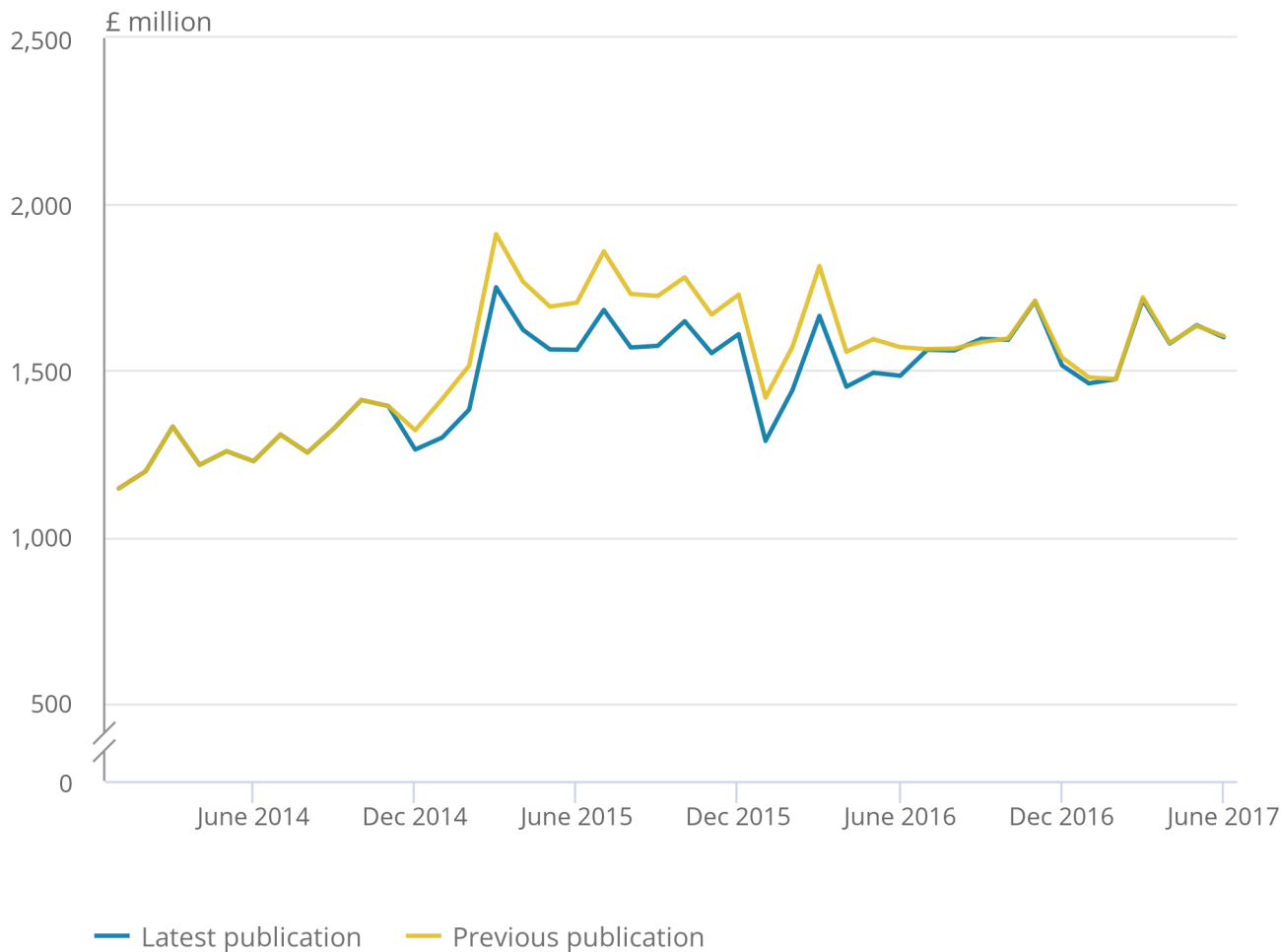
The size band adjustments affect the infrastructure series from November 2014 to June 2016, causing downward revisions across the period. The annual current price growth rate for 2015 has been revised downwards from 33.2% to 22.7% as a result. Figure 2 highlights the impact this has had on the time series. The similarity in series for recent months shows that the late returns have not had a notable impact on infrastructure.

**Figure 2: Comparison of construction output, infrastructure new work, current price, non-seasonally adjusted series**

Great Britain, January 2014 to June 2017

Figure 2: Comparison of construction output, infrastructure new work, current price, non-seasonally adjusted series

Great Britain, January 2014 to June 2017



Source: Office for National Statistics

**Source: Office for National Statistics**

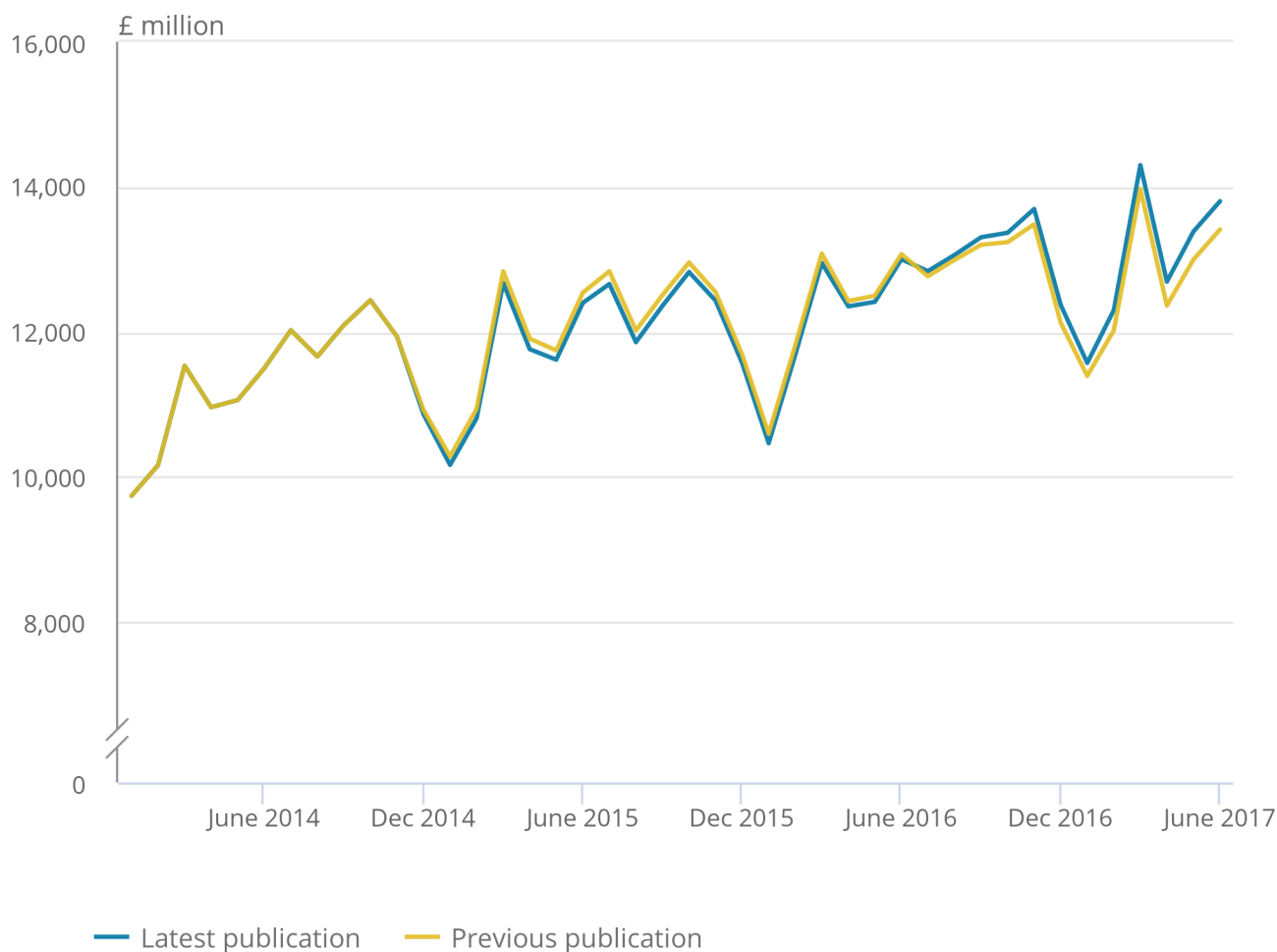
The impact of those adjustments on the all work series is that the 2015 annual current price growth rate is reduced from 6.5% to 5.3%. The impact of late returns becomes clear in the second half of 2016 and into 2017, as seen in Figure 3.

**Figure 3: Comparison of construction output, all work, current price, non-seasonally adjusted series**

Great Britain, January 2014 to June 2017

Figure 3: Comparison of construction output, all work, current price, non-seasonally adjusted series

Great Britain, January 2014 to June 2017



Source: Office for National Statistics

Source: Office for National Statistics

## 5 . Price indices improvements

Information on the [current methods used to compile the interim Construction Output Price Indices](#) (OPIs) is available. To measure price change for the new work projects, price changes for three categories of inputs are measured: labour, materials, and plants. A set of weights is then applied to combine these components together, to create the overall indices. Repair and maintenance indices only include the labour and materials series. A limitation of this approach is that it assumes that input costs move in the same way as output prices, meaning that the margins of construction companies are constant, and zero, through time.

The [Construction Statistic Development Programme work plan](#) highlighted three approaches for developing improvements to these indices:

- creation of a tender price index (TPI) using administrative sources with a view to converting to an output price index (OPI)
- using available data on construction inputs to create an input price series with a view to converting to an OPI
- collecting data from businesses, either through a survey or an administrative source, on output prices

Administrative data sources were investigated, with a view to developing a hedonic regression approach for creating a tender price index; alongside the option of conducting a survey on prices. Having reviewed the options available, and with agreement of the Construction Statistics Steering Group, the most viable approach has been to focus on the input cost indices and their conversion into output price indices.

The following improvements have now been implemented:

- new weights for the labour, materials and plant combinations
- revised methodology of the labour component for the new work indices
- review of the processes used in the materials component for the new work indices
- a new method for calculating the materials component for the housing repair and maintenance series
- the introduction of a plant component for repair and maintenance indices
- incorporation of a mark-up for profit margin, following collaboration with Dr. Xuxin Mao of University College London (UCL)

As a result of these changes, although further improvements are still planned, we no longer consider the OPIs to be an interim method.

## Labour, materials and plant weights

The weights for combining together the labour, materials and plant components of the price indices are determined using data from the Annual Business Survey (ABS).

**Table 2: Annual Business Survey questions used for price indices component weights**

Component	Annual Business Survey Question
Labour	Total employment costs
Materials	Goods and materials used in the running of your business (including raw materials, stationery, components and consumables)
Plant	Amounts payable for hiring, leasing or renting plant, machinery and vehicles

Source: Office for National Statistics



The previous method used the aggregated totals for these questions for category 42 (Civil Engineering) of the [Standard Industrial Classification](#) (SIC) to determine the weights for the infrastructure indices, and for SIC 41.2 (Construction of Commercial and Domestic Buildings) to determine the weights for the other indices. The construction sample also consists of businesses in SIC 43 (Specialised construction activities), who were not factored in to the original weights calculations.

Analysis of the monthly business survey data has identified the relationship between the SIC of a business and the sector of work for which they conduct. Table 3 shows that businesses in SIC 41.2 do the majority of housing work; businesses in SIC 42 do the majority of infrastructure work; and businesses in SIC 43 do the majority of other work. However, Table 3 also shows that a notable amount of work is also conducted by the other SIC categories.

**Table 3: Amount of work for each sector that comes from each Standard Industrial Classification (SIC) 2007 category, 2012 to 2016**

Sector	%		
	SIC 41.2	SIC 42	SIC 43
Housing (New Work)	50	13	37
Infrastructure (New Work)	13	63	24
Other Work (New Work)	29	15	58
Housing (Repair & Maintenance)	31	7	62
Non-Housing (Repair & Maintenance)	17	32	51

Source: Office for National Statistics

Notes:

1. The Standard Industrial Classification is used to classify business establishments.

It is also the case that many businesses will focus on one particular sector. Of the approximate 10,000 businesses that feature on the monthly construction survey for at least one month of 2016, 57% reported that 90% or more of their work was focused on just one of the five sectors included in Table 3.

A more appropriate method for creating the labour, materials and plant weights has therefore been developed. It combines the individual labour, materials and plant ratio for a business, from the ABS, with information from the monthly construction survey on their sector split of all construction work.

To calculate the labour, material and plant weights for the housing indices, the median is calculated from the labour, material and plant ratios of businesses that focus on housing work. The same process is repeated for the other sectors. The median measurement is used, rather than a weighted mean, due to the fact that there is already a potential bias towards large companies in making this calculation. The calculation requires data from both the annual and monthly survey for the same year, and it is only the largest companies that are fully enumerated in both surveys.

The resulting labour, material and plant weights are displayed in Table 4, for the 2015 reference year.

**Table 4: Weights used to combine the labour, materials and plant components for the new work indices**

Great Britain, 2015	%		
Index	Labour	Materials	Plant
Housing	44.3	50.2	5.5
Infrastructure	47.5	40.4	12.1
Other Work	54.5	39.9	5.7

Source: Office for National Statistics

## Labour component: new work

The seasonally adjusted [Average Weekly Earnings index \(AWE\) for construction excluding bonuses](#) continues to be used to measure changes in the price of labour for the new work price indices. AWE measures money paid to employees in Great Britain in return for work done, before tax and other deductions from pay.

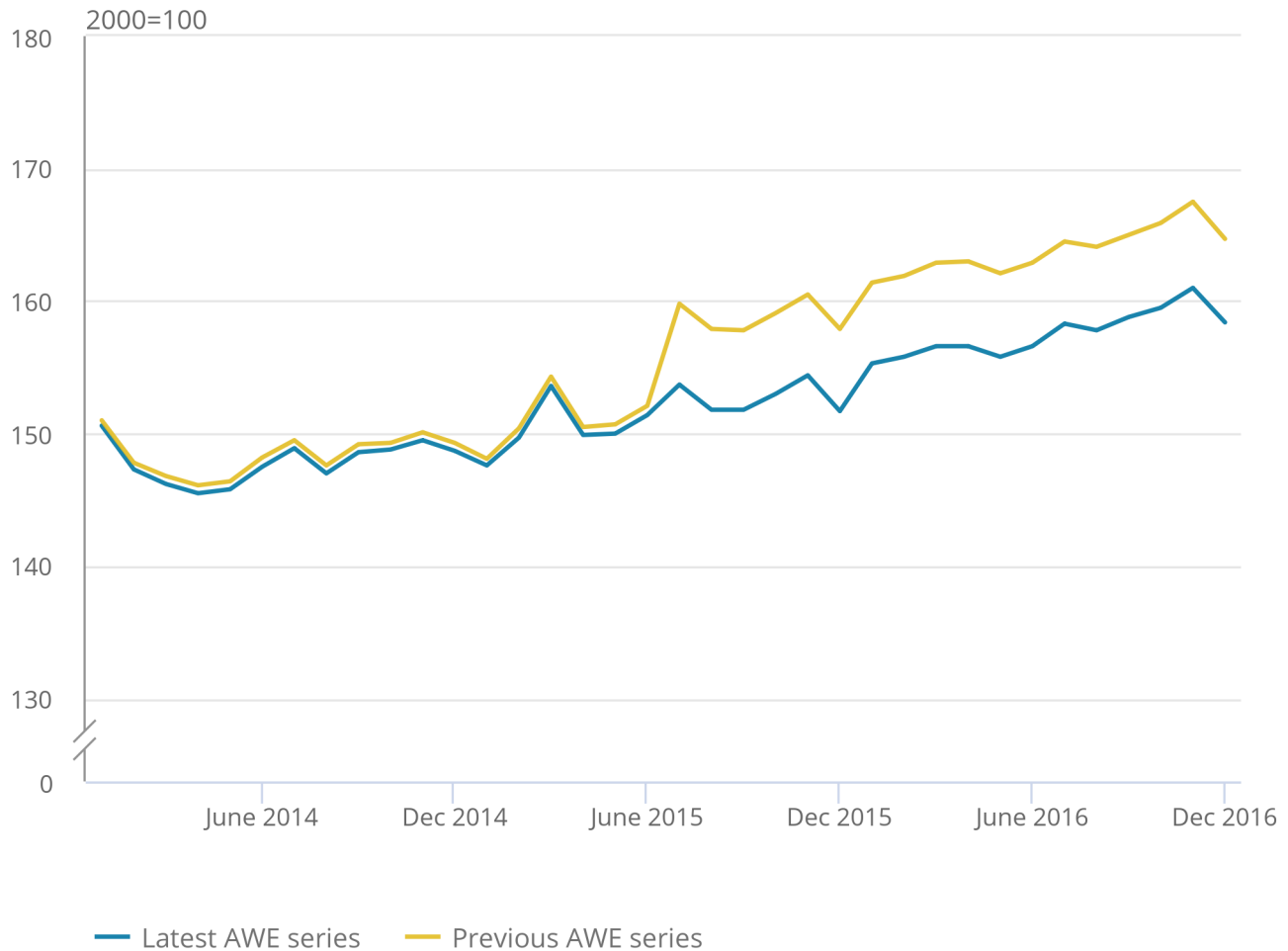
While the selection of these series has not changed, improvements to the earnings estimates of small businesses have been incorporated into the Average Weekly Earnings index, which has had an impact upon the new work price indices. A notable effect of the improvements is that there is a step change to the Construction series in July 2015, as highlighted in Figure 4. A main reason for why construction was impacted more than other sectors is the fact that the construction sector consists of a higher proportion of small businesses.

**Figure 4: Average Weekly Earnings index (AWE) for construction excluding bonuses, non-seasonally adjusted**

Great Britain, January 2014 to December 2016

Figure 4: Average Weekly Earnings index (AWE) for construction excluding bonuses, non-seasonally adjusted

Great Britain, January 2014 to December 2016



Source: Office for National Statistics

Source: Office for National Statistics

For more detail, see [Improvements to earnings estimates for small businesses in Average Weekly Earnings: 2017.](#)

## Materials component: new work

An aggregate of relevant individual Producer Price Indices (PPIs) is used to measure changes in material costs. PPIs measure changes in the price received by UK companies for goods they have produced that are sold to a range of business customers within the UK, including construction firms. The selection of PPIs used is based on the data from the Bills of Quantities (BoQs) that are used as part of the European Price Comparison Programme to calculate the Purchasing Power Parities (PPPs). The matching process between PPI series and the BoQs used has been reviewed, to ensure that the matching is appropriate and as accurate as possible. As a result, some new PPIs are now being used.

## Materials component: housing repair and maintenance

As with the new work materials component, the materials component for the housing repair and maintenance series also uses a selection of relevant PPIs. A new method has been created to select these PPIs, replacing the judgment previously made, which was felt to be too heavily weighted towards metal structures, doors and windows.

The [Annual Purchases Survey](#) was reintroduced for the 2015 reference year, with the aim to collect information about business' expenditure on energy, services, goods and materials that are used up or transformed by the business activity. This identifies the purchasing patterns of businesses. Of particular relevance to construction is the questionnaire section on the purchases of goods, materials and related services, which requests a breakdown of expenditure by a number of different materials.

Using a similar method to the labour, materials and plants weights approach, responses to the purchases survey were matched with the monthly construction survey data, to identify the purchases responses from those businesses that specialise in housing repair and maintenance work. These materials can directly be linked to PPIs, and PPI expenditure information is then used to weight the chosen materials.

**Table 5: Materials selected for housing repair and maintenance**

UK	
Materials Category	Weight
Plastic products	20.97
Fabricated metal products	20.46
Cement, plaster and concrete	11.75
Wood products	11.14
Furniture	10.09
Electrical equipment	9.9
Glass, porcelain and ceramic products	4.61
Textiles	3.97
Paints, varnishes, printing ink and mastics	3.34
Mining and quarrying products	2.67
Other basic metals and casting	1.11

Source: Office for National Statistics

## Plant component: repair and maintenance

The method described in the “Labour, materials and plant weights” section provided evidence that there are plant costs for businesses that focus on repair and maintenance work. Therefore, a plant component has now been added in to the repair and maintenance indices. This is the Services Producer Price Index (SPPI) for construction plant hire, which is the same plant component used in the new work indices.

**Table 6: Weights used to combine the labour, materials and plant components for the repair and maintenance indices**

Great Britain, 2015				%
Index	Labour	Materials	Plant	
Housing	60.6	35.8	3.6	
Non-housing	69.0	24.8	6.2	

Source: Office for National Statistics

## Mark-up for profit margin

In collaboration with Dr. Xuxin Mao of University College London (UCL), a mark-up method has been developed. This was to address a limitation of the existing approach, which assumes that input costs move in the same way as output prices meaning that the margins of construction businesses are constant, and zero, through time.

Gross profit was chosen as the most appropriate profit measure to base the mark-up on. This is because it is tailored only towards direct costs of goods sold and not indirect fixed costs such as rent and insurance, which are included in an alternative such as operating profit. According to economic theory, firms set a mark-up given labour, capital and intermediate inputs, with a view to maximise profits. The mark-up is the difference between the price that the firm charges and its marginal cost, that is, the cost of producing an additional unit of output. As marginal costs are not affected by changes in fixed costs, the gross profit measure is the “cleanest” measure of profits.

The Fame dataset, from Bureau van Dijk, has been used to access the financial information of Construction businesses. A criteria was defined to identify appropriate businesses, leading to the selection of 715 currently active firms, from which the mean average for turnover and gross profit has been calculated. The mark-up is then produced using the following formula:

$$M = \frac{AVG_{Turnover}}{(AVG_{Turnover} - AVG_{Gross Profit})}$$

The resulting annual mark-up figures are displayed in Table 7.

**Table 7: Annual mark-up figures, based on gross profit**

Great Britain, 2011 to 2015		%
Year	Mark-up	
2011	13.321	
2012	12.879	
2013	12.307	
2014	10.741	
2015	11.092	

Source: Fame dataset, from Bureau van Dijk

The non-parametric cubic spline approach is then used to fit a smooth curve between points on the annual series to calculate a quarterly series, taking into account movements in the mark-up in neighbouring periods. Linear interpolation is subsequently used to calculate a monthly mark-up figure.

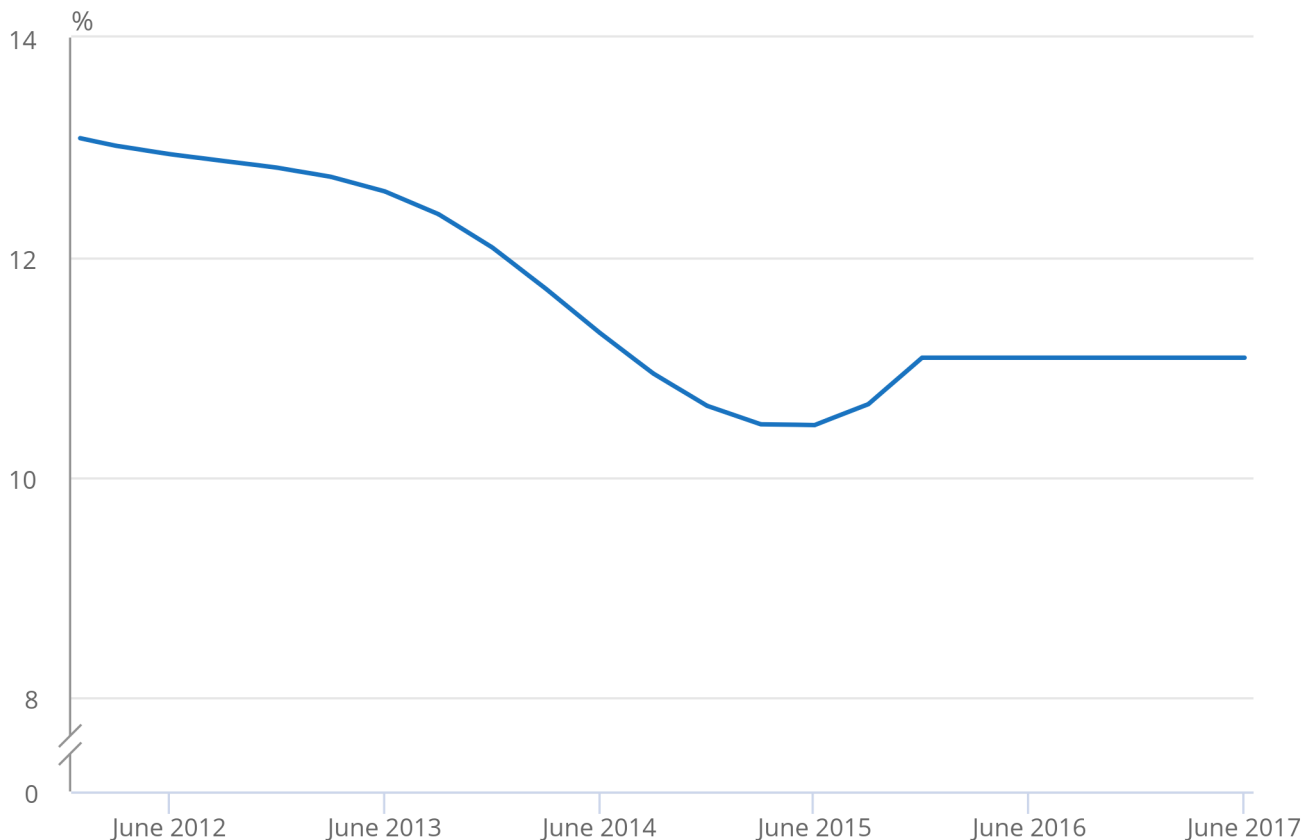
This transformation is shown in Figure 5, in the form of the resulting monthly mark-up values. A constant mark-up is currently used from the end of 2015 onwards, with a view to updating the values once sufficient information on 2016 is available. A forecasting approach has been considered as part of this work and will continue to be investigated as a future possibility.

## Figure 5: Monthly mark-up figures, construction industry

Great Britain, January 2012 to June 2017

### Figure 5: Monthly mark-up figures, construction industry

Great Britain, January 2012 to June 2017



Source: Office for National Statistics

Source: Office for National Statistics

#### Notes for: Price indices

1. The Construction Statistics Steering Group provides a forum for Office for National Statistics (ONS) to engage with main users of construction statistics on the development of ONS-published statistics on the construction industry.
2. All components of the Construction Output Price Indices cover the geographic region of either Great Britain or United Kingdom. The indices can be used as a proxy for both regions.

## 6 . Impact on price indices

As Table 8 highlights, not all of the improvements discussed in Section 5 will have an impact on all price indices.

**Table 8: Indication of which improvements affected which indices**

Sector	Work Type	Labour, Materials and Plant Weights	Labour Materials Plant			Mark-up
			Labour	Materials	Plant	
Housing	New Work	Yes	Yes	Yes	No	Yes
Infrastructure	New Work	Yes	Yes	Yes	No	Yes
Public other	New Work	Yes	Yes	Yes	No	Yes
Private industrial	New Work	Yes	Yes	Yes	No	Yes
Private commercial	New Work	Yes	Yes	Yes	No	Yes
Housing	Repair and Maintenance	Yes	No	Yes	Yes	Yes
Non-housing	Repair and Maintenance	Yes	No	No	Yes	Yes

Source: Office for National Statistics

Figure 6 uses the Housing New Work index to provide an indicative view of the difference in growth rates between the two different versions of the new work indices. The overall trends of the series remain the same, although growth was marginally stronger across the 2014 period in the previous price index. It is clear that the largest divergence between the two comes in July 2015, as a result of the methodology change in the Average Weekly Earnings Labour series.

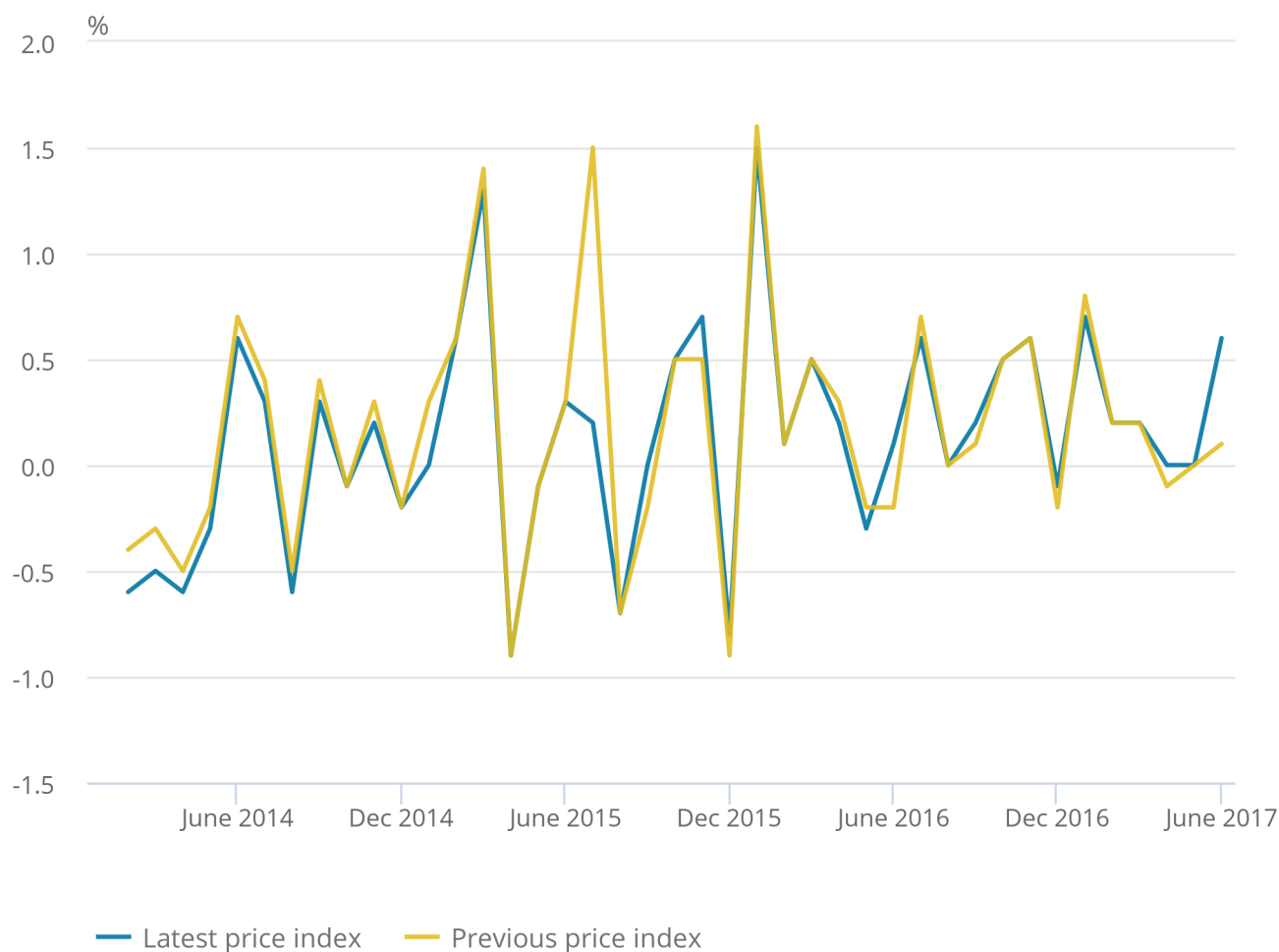


**Figure 6: Construction output price indices, housing new work, growth rates**

Great Britain, January 2014 to June 2017

Figure 6: Construction output price indices, housing new work, growth rates

Great Britain, January 2014 to June 2017



Source: Office for National Statistics

**Source: Office for National Statistics**

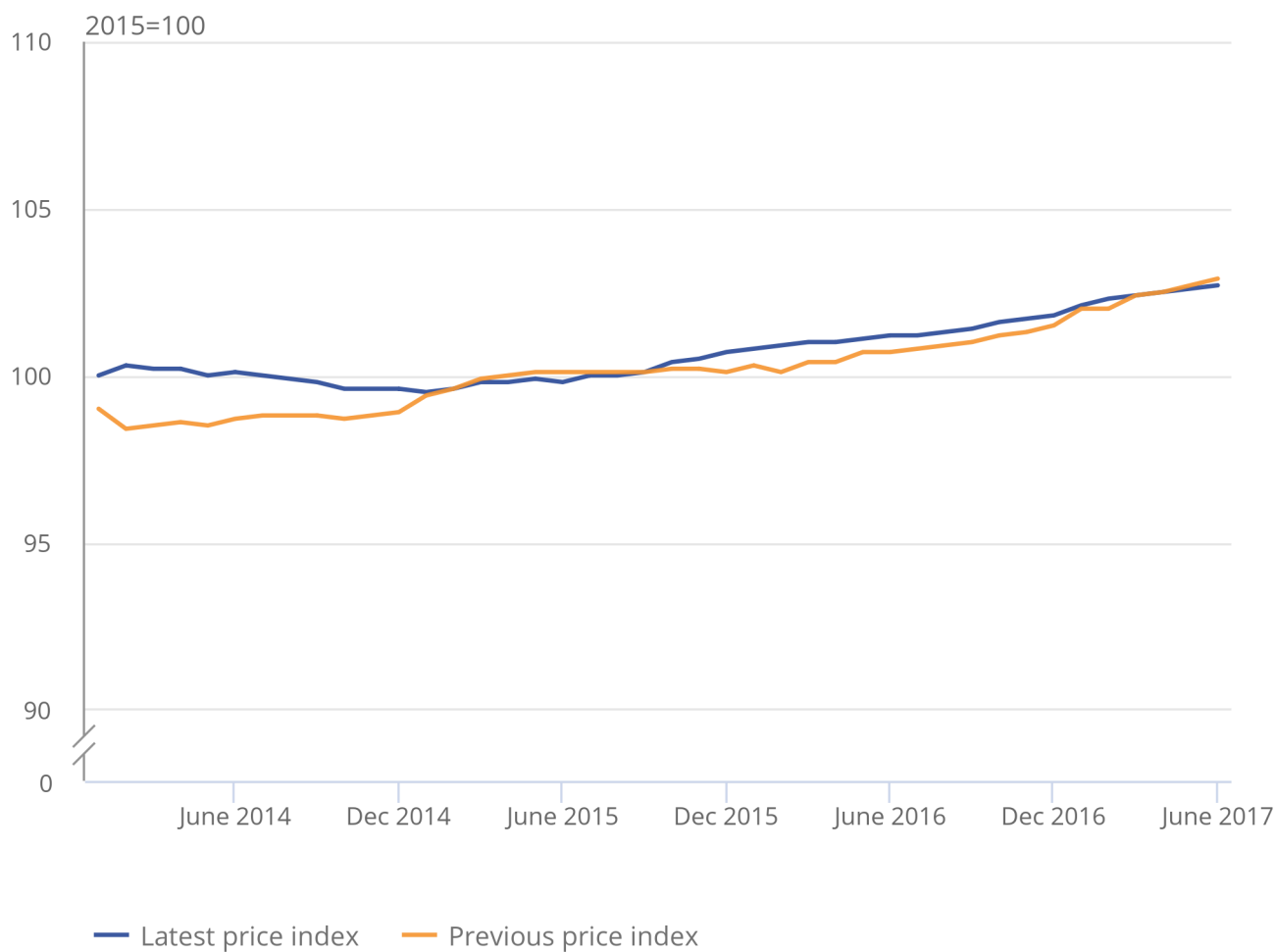
In Figures 7a and 7b, the difference in the non-housing repair and maintenance series is shown, both with and without mark-up. The other change for this series is the revision of labour, materials and plant weights methodology, which has led to an increased weighting for the labour component, and the addition of a plant series. The change in weights is most evident in the 2014 reference period.

## Figure 7a: Construction output price indices, non-housing repair and maintenance with mark-up

Great Britain, January 2014 to June 2017

### Figure 7a: Construction output price indices, non-housing repair and maintenance with mark-up

Great Britain, January 2014 to June 2017



Source: Office for National Statistics

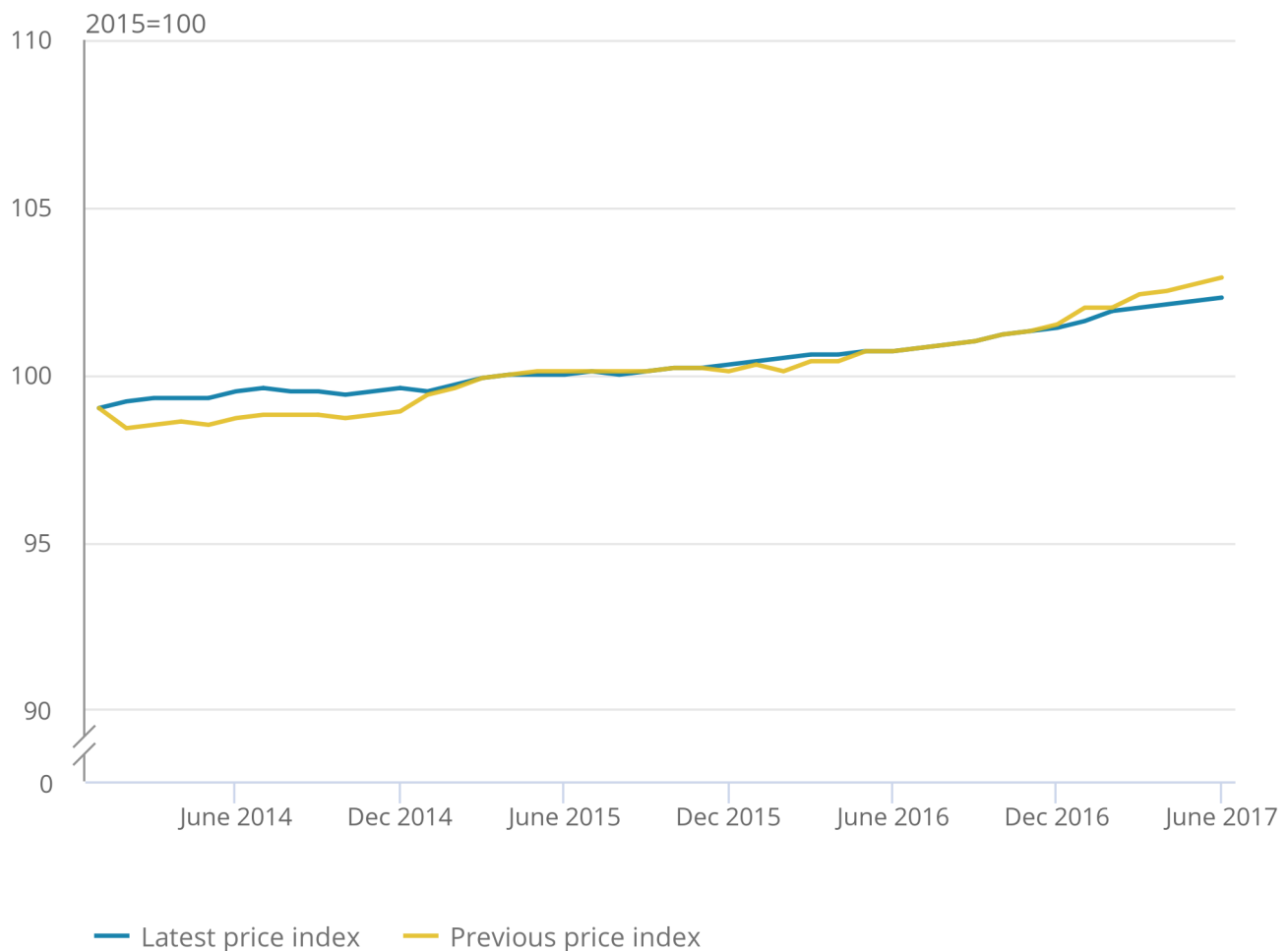
Source: Office for National Statistics

## Figure 7b: Construction output price indices, non-housing repair and maintenance without mark-up

Great Britain, January 2014 to June 2017

### Figure 7b: Construction output price indices, non-housing repair and maintenance without mark-up

Great Britain, January 2014 to June 2017



Source: Office for National Statistics

Source: Office for National Statistics

As Figure 7a shows, the nature of a decreasing mark-up in 2014 does also change the trend of the entire index to a decreasing trend for that period, compared to the version without mark-up (Figure 7b). As the price index is now decreasing for this period, this will result in a greater amount of growth through 2014 in the chained-volume series.

## 7 . Seasonal adjustment

The purpose of seasonal adjustment is to remove systematic calendar-related variation associated with the time of the year, that is, seasonal effects. Seasonal adjustment is important for construction output, as there are clear seasonal effects in the monthly series.

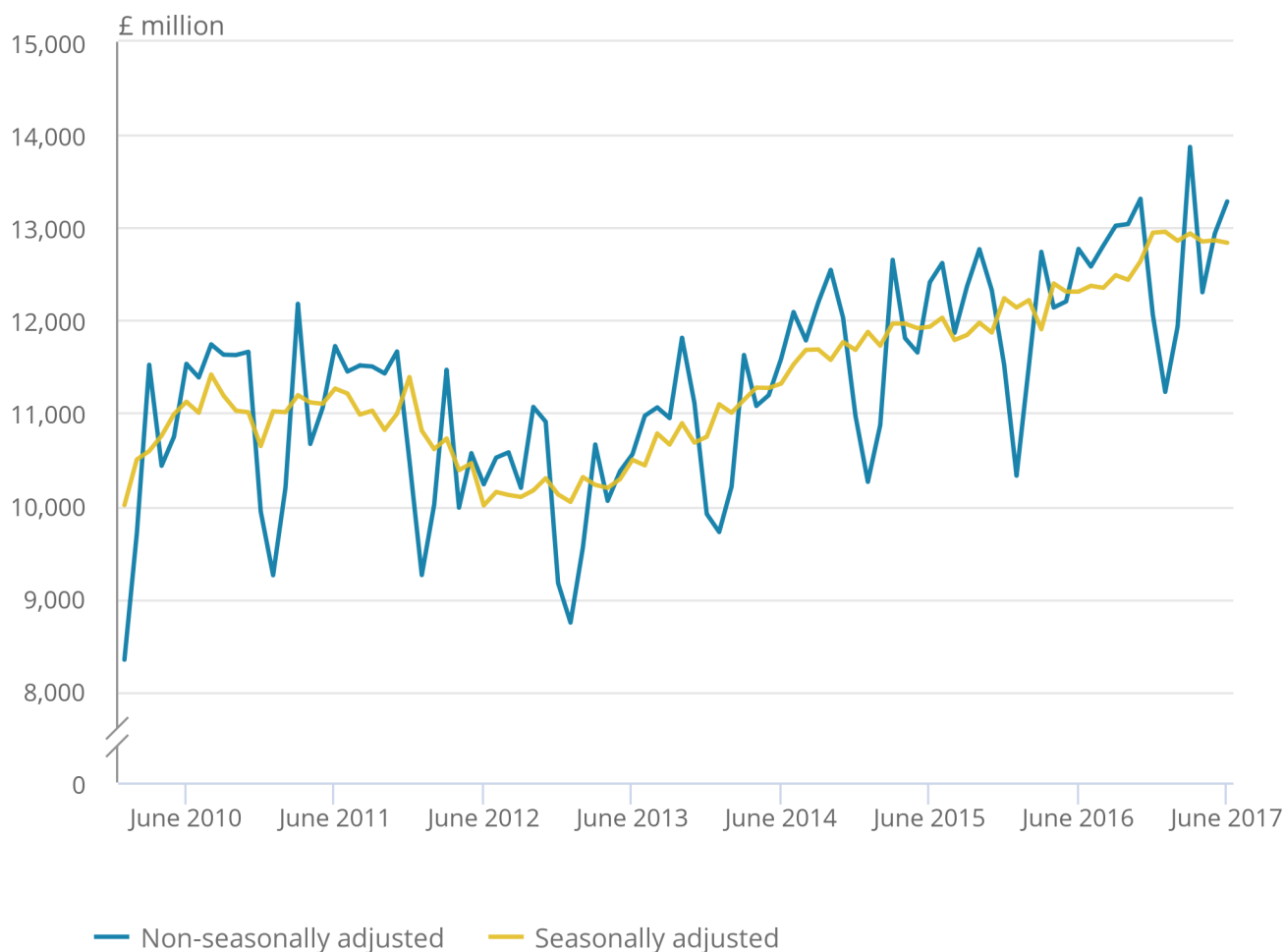
Figure 8 highlights that November, December and January are usually the three months with the lowest level of unadjusted construction output. The graph also shows another regular pattern, which is that March has always been stronger than April. The regular strength in March is in line with the end of the financial year and this could also be influenced by the timing of Easter. Figure 8 also shows how the seasonally adjusted series has accounted for these patterns.

**Figure 8: Construction output, all work, chained volume measure**

Great Britain, January 2010 to June 2017

## Figure 8: Construction output, all work, chained volume measure

Great Britain, January 2010 to June 2017



Source: Office for National Statistics

**Source: Office for National Statistics**

[Eurostat guidelines on seasonal adjustment](#) state that revisions of seasonally adjusted data can take place because of a better estimate or identification of the seasonal pattern, due to new information provided by new unadjusted data. The relatively short nature of the monthly Construction series means that it is particularly liable to revisions, as the addition of more months into the series will still have a strong influence on the estimation of the overall seasonal pattern of the series.

A seasonal adjustment review has been conducted for this release, reviewing all of the seasonally adjusted series in Construction output. This takes into account the revisions to the unadjusted series, which have been caused by the nominal data and price indices improvements, as well as the addition of more months into the series. Seasonal adjustment takes place at the sector level, for example, public housing new work; infrastructure; non-housing repair and maintenance. These series are then aggregated to create the seasonally adjusted all work series.

There are revisions to the seasonally adjusted data across the monthly series and Table 9 shows the revisions to the month-on-month growth rates for all months from 2010 to 2013. These months have had no revisions to the unadjusted data, so these changes are entirely as a result the updated seasonal adjustment parameters.

**Table 9: Revision to growth rates, most recent month on previous month, construction output, all work, chained volume measure, seasonally adjusted**

Great Britain, 2010 to 2013

<b>Month</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
January		-0.2	-0.4	-0.7
February	-0.1	0	-0.2	0
March	-0.1	-0.2	0.3	0.3
April	0.2	0.4	0.2	0.5
May	0.1	-0.2	-0.2	-0.2
June	-0.3	-0.2	0.1	-0.4
July	0.4	0.4	0.1	0.3
August	-0.4	-0.4	-0.2	-0.3
September	0.1	0.2	0.2	0.4
October	0.2	0.1	-0.2	-0.7
November	-0.1	0	0.3	0.5
December	0.1	0.2	0.1	0.1

Source: Office for National Statistics

The review has also impacted on data for 2014 to 2017, but this will be alongside other revisions to these periods, as explained in previous sections.

In the UK National Accounts, a seasonally adjusted annual series should always be equal to an unadjusted annual series. Due to a processing issue, this was not the case for 2015 or 2016 in the previously published data, with the seasonally adjusted series having been published as a higher value. This issue has now been addressed and these annual totals are now equal.

## 8 . Impact on headline figures

Table 10 shows the new quarter-on-quarter growth rates for total construction work and the revision from the previously published series. The revisions in the early years (2010 to 2013) are entirely down to seasonal adjustment; 2014's upward revisions are driven by the price indices; the drop in Quarter 1 (Jan to Mar) 2015 is due to it being the first quarter to include three months of size band adjustments; and the labour price indices methodology change contributes to the upward revision in Quarter 3 (July to Sept) 2015. Late data are the leading cause of the upward revisions seen in the most recent four quarters.

**Table 10: Revision to growth rates, most recent quarter on previous quarter, construction output, all work, chained volume measure, seasonally adjusted**

Great Britain, Quarter 1 (Jan to Mar) 2010 to Quarter 2 (Apr to June) 2017

Period	Latest Publication	Previous Publication	Revision
Q1 2010	4	4	0
Q2 2010	5.7	5.7	0
Q3 2010	2.3	2.2	0.1
Q4 2010	-2.8	-2.6	-0.2
Q1 2011	1.7	1.4	0.3
Q2 2011	0.8	0.9	-0.1
Q3 2011	-0.8	-0.8	0
Q4 2011	-0.1	0	-0.1
Q1 2012	-3.2	-3.5	0.3
Q2 2012	-4	-3.8	-0.2
Q3 2012	-1.6	-1.6	0
Q4 2012	0.7	0.8	-0.1
Q1 2013	0	-0.4	0.4
Q2 2013	1.3	1.7	-0.4
Q3 2013	2.9	2.8	0.1
Q4 2013	1.4	1.3	0.1
Q1 2014	2.9	2.4	0.5
Q2 2014	1.9	1.7	0.2
Q3 2014	3	2.6	0.4
Q4 2014	0.4	0.3	0.1
Q1 2015	1.6	2.7	-1.1
Q2 2015	0.7	0.6	0.1
Q3 2015	-0.4	-0.9	0.5
Q4 2015	1.2	1	0.2
Q1 2016	0.5	1.2	-0.7
Q2 2016	2.1	0.9	1.2
Q3 2016	0.5	-0.3	0.8
Q4 2016	2.2	1	1.2
Q1 2017	1.9	1.1	0.8
Q2 2017	-0.5	-1.3	0.8

Source: Office for National Statistics



When looking at the annual picture, there has been a notable revision of 1.4 percentage points to the annual growth rate for 2016. Of the improvements described in this article, the three leading causes are the size band adjustments, the impact of the revised methodology for the labour component of new work price indices, and the increases in 2016 resulting from late data.

**Table 11: Revision to growth rates, most recent year on previous year, construction output, all work, chained volume measure, seasonally adjusted**

Great Britain, 2010 to 2016

Period	Latest Publication	Previous Publication	Revision
2010	8.5	8.5	0
2011	2.2	2.2	0
2012	-6.9	-6.9	0
2013	1.5	1.5	0
2014	9	8.1	0.9
2015	4.4	4.9	-0.5
2016	3.8	2.4	1.4

Source: Office for National Statistics

The negative size band adjustments are evident in the revisions to 2015 growth, but do contribute towards the upward revision for the 2016 growth rate, as they only affected six months of 2016, rather than the whole year. The upward revisions from the labour change do affect the whole year of 2016 and only part of 2015, which also explains their contribution to the revision.

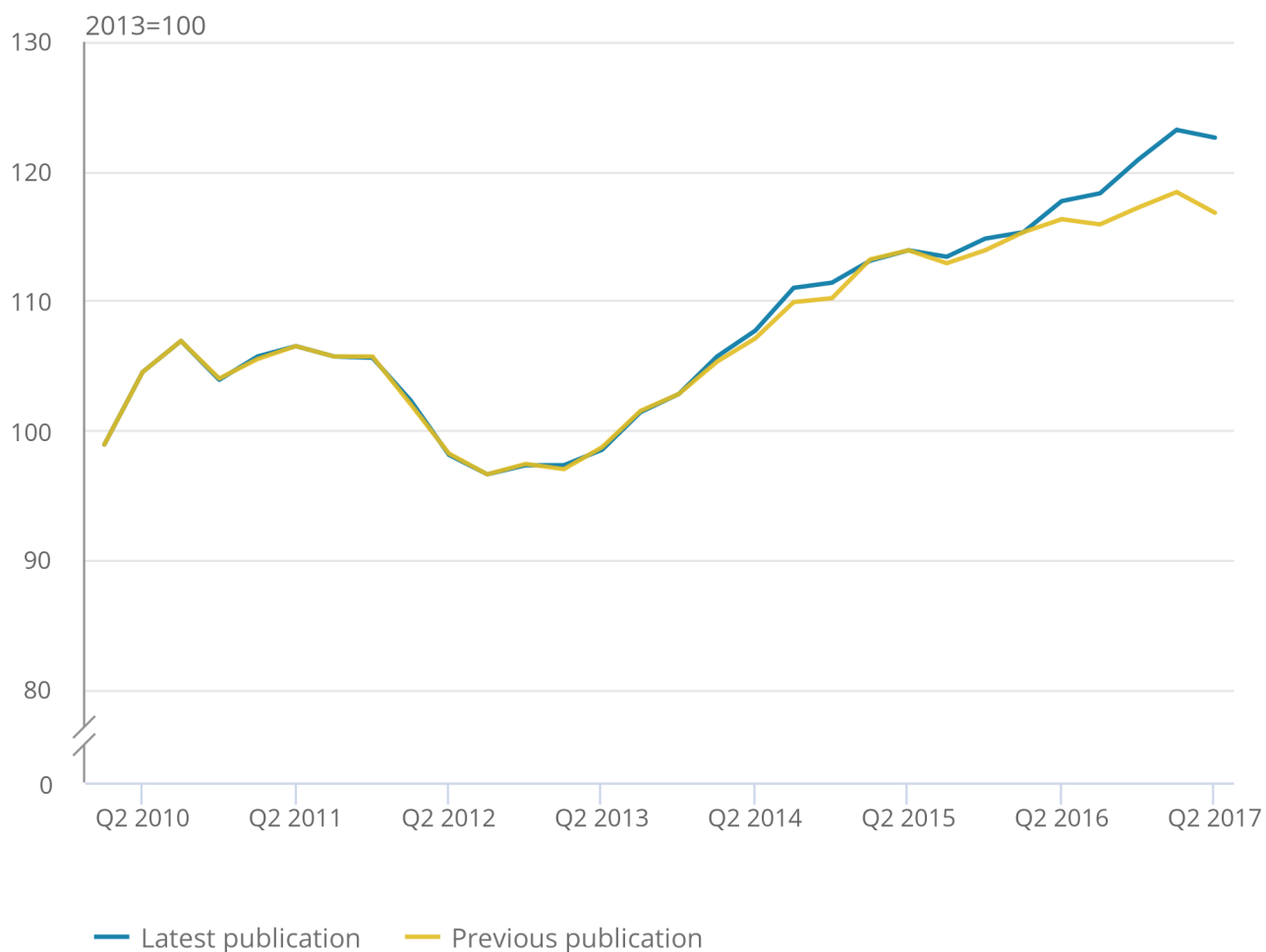
Figure 9 shows the index volume series for all construction work. For comparative purposes, both series are indexed to 2013 equals 100; however, the published construction series has now been re-referenced to the base year of 2015.

## Figure 9: Construction output, all work index, chained volume measure, seasonally adjusted

Great Britain, Quarter 1 (Jan to Mar) 2010 to Quarter 2 (Apr to June) 2017

### Figure 9: Construction output, all work index, chained volume measure, seasonally adjusted

Great Britain, Quarter 1 (Jan to Mar) 2010 to Quarter 2 (Apr to June) 2017



Source: Office for National Statistics

Source: Office for National Statistics

#### 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).

## 9 . Impact on gross domestic product

Construction output has a 6.1% weighting to the output measure of gross domestic product (GDP). Revisions to construction can therefore cause a revision to GDP, assuming all other components are equal. Table 12 contains the implied impact on GDP to two decimal places, calculated from unrounded construction output figures.

There are upward revisions in all quarters from Quarter 2 (Apr to June) onwards, and these are strong enough to cause an implied upward revision, rounded to one decimal place, of 0.1 percentage points for Quarter 2 2016 and Quarter 4 (Oct to Dec) 2016. There is an implied revision of negative 0.1 percentage points for Quarter 1 (Jan to Mar) 2015.

**Table 12: Implied impact to gross domestic product growth rates, most recent quarter on previous quarter**

Great Britain, Quarter 1 (Jan to Mar) 2010 to Quarter 2 (Apr to June) 2017

Period	Revision	Implied gross domestic product impact
Q1 2010	0	0
Q2 2010	0	0
Q3 2010	0.1	0.01
Q4 2010	-0.2	-0.01
Q1 2011	0.3	0.02
Q2 2011	-0.1	-0.01
Q3 2011	0	0
Q4 2011	-0.1	-0.01
Q1 2012	0.3	0.02
Q2 2012	-0.2	-0.01
Q3 2012	0	0
Q4 2012	-0.1	-0.01
Q1 2013	0.4	0.02
Q2 2013	-0.4	-0.02
Q3 2013	0.1	0.01
Q4 2013	0.1	0.01
Q1 2014	0.5	0.03
Q2 2014	0.2	0.01
Q3 2014	0.4	0.02
Q4 2014	0.1	0.01
Q1 2015	-1.1	-0.07
Q2 2015	0.1	0.01
Q3 2015	0.5	0.03
Q4 2015	0.2	0.01
Q1 2016	-0.7	-0.04
Q2 2016	1.2	0.07
Q3 2016	0.8	0.05
Q4 2016	1.2	0.07
Q1 2017	0.8	0.05
Q2 2017	0.8	0.05

Source: Office for National Statistics

## 10 . Future work

Going forward, our three main development priorities for Construction statistics are:

- further continuous improvements to the output price indices, including working on a back series to pre-date 2014
- analysis on the impact of data on revisions, including a review of the imputation methodology
- improving the modelling of output by type of work and by region

## 11 . References

The following links are used within the article:

[Annual Purchases Survey](#)

[Average Weekly Earnings time series dataset](#)

[Construction output in Great Britain: July 2017 and new orders April to June 2017](#)

[Construction Output Price Indices \(OPIs\), interim solution, further information](#)

[Construction output price indices \(OPIs\): UK, April to June 2017](#)

[Construction Statistics Development Programme – work plan](#)

[ESS guidelines on seasonal adjustment](#)

[Improvements to earnings estimates for small businesses in Average Weekly Earnings: 2017](#)

[Revisions policies for economic statistics](#)

[UK Standard Industrial Classification \(SIC\) 2007](#)