

Statistical bulletin

International Comparisons of Productivity - First Estimates: 2013

An international comparison of labour productivity across the G7 nations, in terms of levels of and growth in GDP per hour and GDP per worker.



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1. Key points

- Output per hour in the UK was 17 percentage points below the average for the rest of the major G7 industrialised economies in 2013, the widest productivity gap since 1992. On an output per worker basis, UK productivity was 19 percentage points below the average for the rest of the G7 in 2013
- UK output per hour fell slightly in 2013 compared with 2012, contrasting with an increase of 1.0% across the rest of the G7
- In 2013 UK output per hour was roughly unchanged from its level in the pre-downturn year of 2007, but some 15-16 percentage points below a counterfactual level had the UK's strong productivity growth prior to the downturn continued. The productivity gap on the same basis for the rest of the G7 is around 6 percentage points
- As well as first estimates for 2013, this release includes revised GDP estimates for the UK, Germany, France and Italy resulting from adoption of new National Accounts reporting standards and other methodological changes

2. About this release

This bulletin contains annual estimates of labour productivity for the G7 developed countries (Canada, France, Germany, Italy, Japan, UK and USA) up to 2013. Labour productivity measures the amount of economic output that is produced by a unit of labour input, and is a key indicator of economic performance.

Output is measured by gross domestic product (GDP). Labour input is measured in two ways – by total hours worked and by numbers of workers in employment. These two measures of labour input can yield different results, reflecting differences in working patterns across countries and compositional movements over time, such as a shift towards part-time working.

Comparability across countries is achieved by converting local currency based measures of GDP using purchasing power parity (PPP) exchange rates. PPP exchange rates (usually referred to simply as PPPs) attempt to equalise the cost of a representative basket of goods and services in countries with different national currencies. An ONS article explaining the [uses and limitations of PPPs \(246.1 Kb Pdf\)](#) is available on our website.

The estimates in this release update those published on 20 February 2014. This release cycle reflects the publication and revision cycles of the component data series.

3. What's new?

This release includes first estimates for 2013. In addition, GDP estimates for the UK, Germany, France and Italy reflect the adoption of a new National Accounting standard known as ESA 2010. These revisions bring these countries GDP estimates broadly into line, methodologically, with those for the US and Canada, but the new accounting standard has not yet been adopted in Japan.

Estimates of constant price productivity in Tables 3 and 4 are now rounded to one decimal place, and revisions to previously published constant price estimates are now presented in terms of differences in annual growth rates.

4. Interpreting these statistics

The labour productivity measures in this bulletin are presented in terms of **current prices**, suitable for cross-country comparison of levels of productivity for a single year, and **constant prices**, suitable for analysis of productivity performance over a number of years. The current price estimates in Tables 1 and 2 should be read horizontally, while the constant price estimates in Tables 3 and 4 should be read vertically.

Current price productivity estimates are indexed spatially to UK=100 for each year and show each country's productivity relative to that of the UK in that year. Since productivity is a key determinant of living standards, these estimates also provide an indication of living standards relative to the UK.

In interpreting these estimates users should bear in mind that PPPs provide only an approximate conversion from national currencies and may not fully reflect national differences in the composition of a representative basket of goods and services. Additionally, care should be taken in interpreting movements in current price productivity estimates over time. For example, an increase in UK productivity relative to another country from one year to another could be due to UK productivity growing faster, or falling less, or due to changes in relative prices in the two countries, or some combination of these movements.

Constant price productivity estimates are indexed to a particular year. For each single country, these estimates are conceptually similar to national labour productivity series (minor differences from national sources are described in the Background Notes to this bulletin). The index year is set at 2007 in order to focus on movements in labour productivity over the economic downturn.

Constant price productivity estimates show the evolution of productivity for each country and for the G7 (and G7 excluding the UK) aggregates, but should not be used to compare productivity across countries at a point in time. Productivity growth can be decomposed into growth of output minus the growth of labour input, and these components can move in different directions within and across countries. This should be borne in mind in interpreting the constant price productivity estimates in this release.

More information on methodology and interpretation is available in the Background Notes to this bulletin. Additionally, the [Quality and Methodology Information paper \(123.8 Kb Pdf\)](#) for this release provides information on the quality of the estimates in this release, as well as providing a summary of methods used in compiling the estimates.

5. Current price productivity

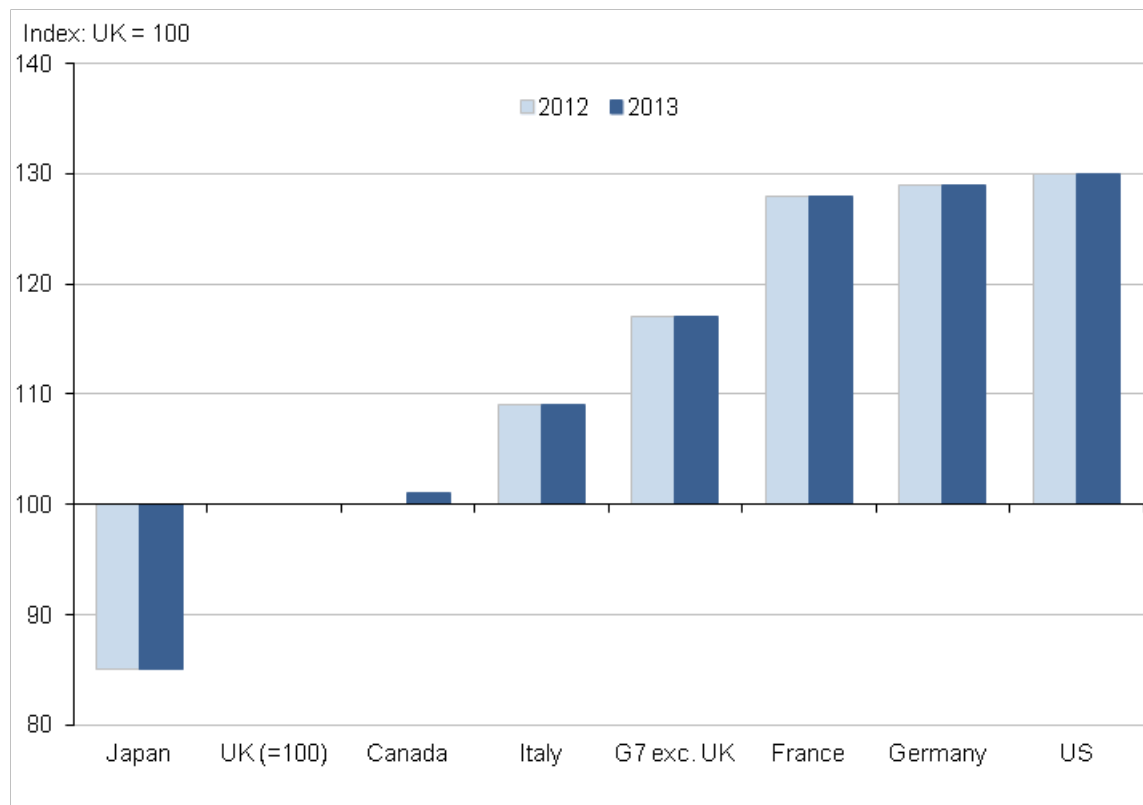
Current price productivity estimates allow for comparison of how much economic output, measured in common currency terms, is produced by each worker and hour worked across countries in a particular year, relative to the UK=100. Further information is available in Tables 1 and 2 in the [reference table \(128.5 Kb Excel sheet\)](#) component of this release and at the back of the PDF version of this statistical bulletin.

GDP per hour worked (Table 1)

On this basis, UK productivity in 2013 was:

- Above that of Japan by 15 percentage points
- Roughly equal to that of Canada
- Lower than that of Italy by 9 percentage points
- Lower than that of the remaining G7 countries by 28 to 30 percentage points

Figure 1: GDP per hour worked, G7 countries



Source: Office for National Statistics

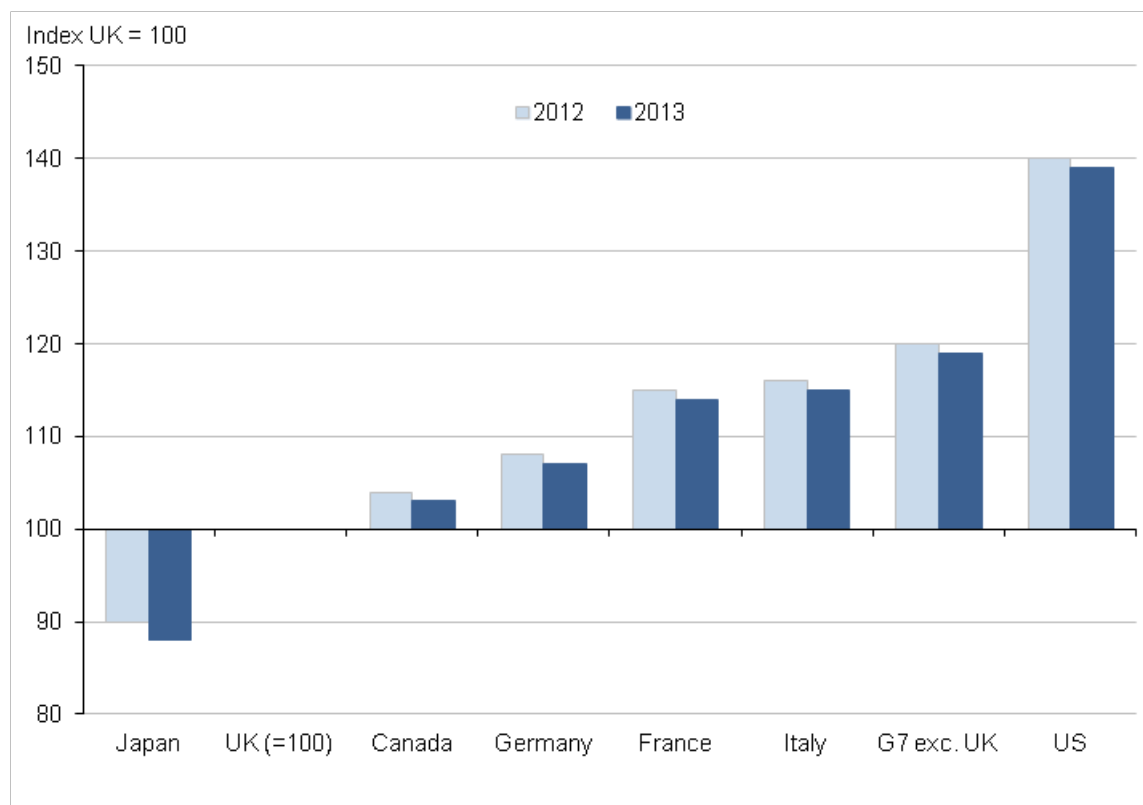
Comparing 2013 with 2012, these first estimates show very little change in relative UK productivity levels. The difference in productivity on this measure between the UK and the rest of the G7 was 17 percentage points in 2013, unchanged from 2012 and the widest differential since 1992.

GDP per worker (Table 2)

First estimates for 2013 show that UK output per worker was:

- Above that of Japan by 12 percentage points
- Below that of Canada and Germany by 3 and 7 percentage points respectively
- Below that of Italy and France by 14 to 15 percentage points
- Below that of the US by 39 percentage points

Figure 2: GDP per worker, G7 countries

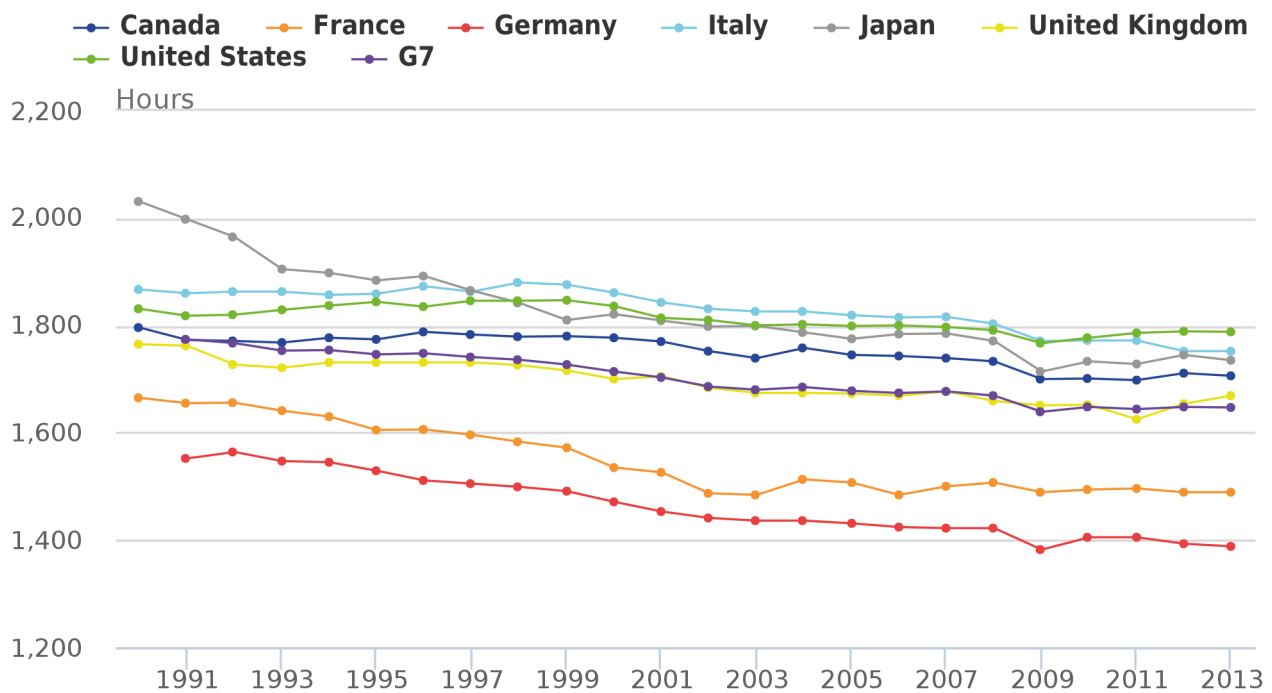


Source: Office for National Statistics

Comparing 2013 with 2012, the shortfall between output per worker in the UK and the rest of the G7 decreased by 1 percentage point, and there were relative improvements against each of the constituent countries.

As illustrated in Figure 3, there are significant differences in average hours worked across the G7, reflecting cultural and compositional differences between economies. The general trend across the G7 as a whole is towards lower hours. Different movements in average hours across countries account for differences in the patterns of productivity in Figures 1 and 2; in particular, there has been a distinct upturn in average hours worked in the UK in each of 2012 and 2013. The difference in average hours worked in 2013 between the US (where average hours are highest across the G7) and Germany (lowest) is equivalent to around 8 hours per week for the average worker. Average hours worked in the UK are close to the average for the G7 as a whole.

Figure 3: Average annual hours per worker, G7 countries



Source: Office for National Statistics

Notes:

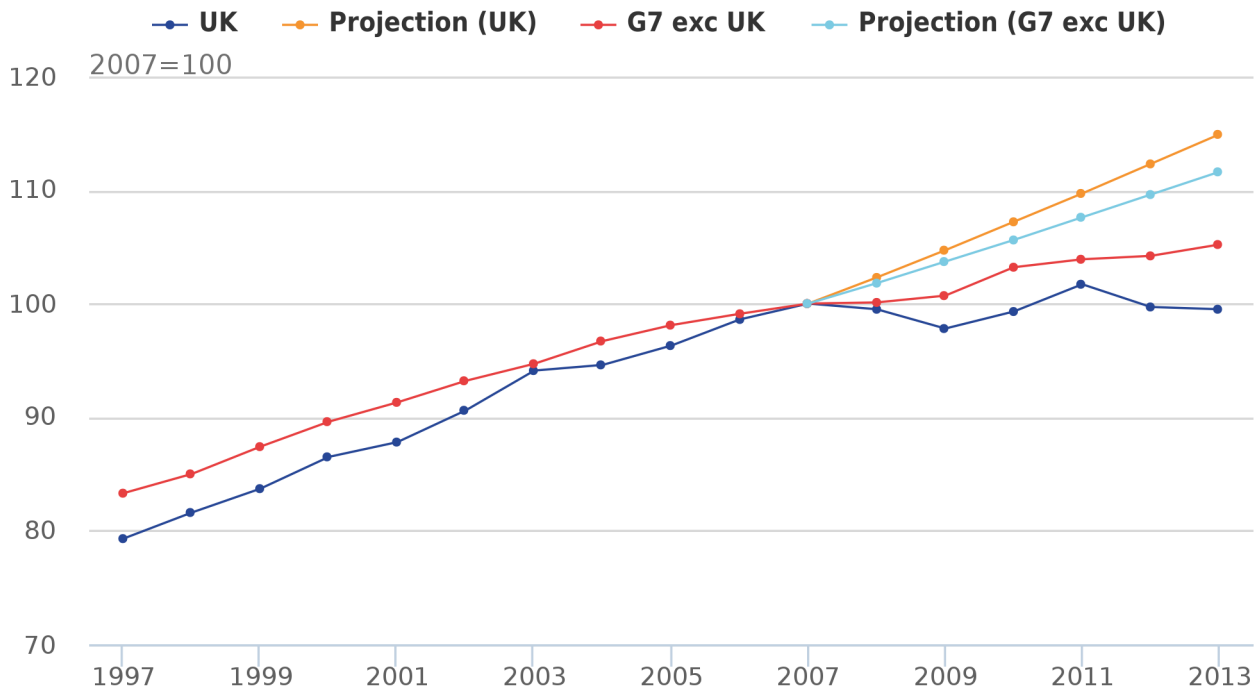
1. G7 average hours is unweighted

6. Constant price productivity

Constant price productivity estimates are indexed to 2007=100 and show the evolution of labour productivity for each country and group of countries over time. Further information is available in Table 3 (GDP per hour worked) and Table 4 (GDP per worker) in the [reference table \(128.5 Kb Excel sheet\)](#) component of this release and at the back of the PDF version of this statistical bulletin. The following commentary focuses on GDP per hour worked, which is a more comprehensive measure of productivity than GDP per worker.

Figure 4: Constant price GDP per hour worked, actuals and projections

GDP per hour worked (Table 3)



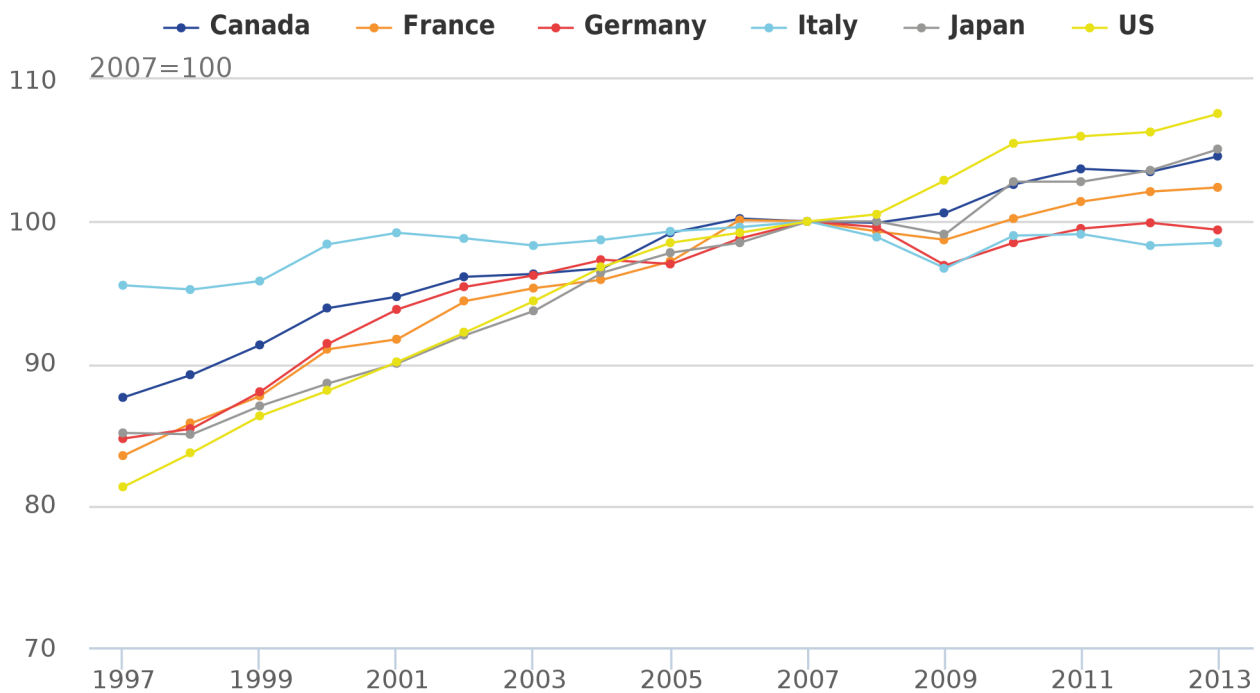
Source: Office for National Statistics

Figure 4 shows GDP per hour worked for the UK and an aggregated series for the rest of the G7, together with simple projections based on average productivity growth over 1997-2007, that is, before the global economic downturn. On this basis, the combination of strong UK productivity growth up to 2007 and weak productivity performance since 2007 implies a productivity gap of some 15-16% in 2013. Revisions to UK GDP have increased its level significantly, but revisions to GDP growth rates have been much more modest, such that the productivity gap on the latest estimates is only marginally narrower than on the previous estimates.

Average annual productivity growth between 1997 and 2007 for the rest of the G7 was lower than in the UK (around 1.8%, compared with 2.3% for the UK), and productivity performance since 2007 has on average been somewhat stronger, implying a productivity gap of around 6% in 2013.

Figure 5 illustrates the difference in productivity trajectories over recent years between the main European economies on the one hand, and North America and Japan on the other hand. Output per hour fell sharply in most countries over the 2008-09 downturn, but then rebounded sharply in Japan, Canada and especially the US, whereas the recovery in productivity has been more muted in France, and much weaker, in line with the UK experience, in Germany and Italy.

Figure 5: Constant price GDP per hour worked, selected G7 countries



Source: Office for National Statistics

However, converting the time series in Figure 5 into productivity gaps (calculated as in Figure 4) for 2013 would yield gaps of 11% for Germany but only 4% for Italy. This is because Italy's trend productivity growth in the period prior to the economic downturn (about 0.5% per year) was much weaker than Germany's trend productivity growth of 1.7% per year.

7. Revisions

The main revisions in this release are to GDP, including but not limited to changes reflecting new international reporting standards:

- Canada (in 2010) and the USA (in 2013) have already implemented changes under the System of National Accounts 2008 (SNA08)
- The four European members of the G7 (UK, Germany, France and Italy) implemented changes under the European System of Accounts 2010 (ESA10, which is broadly comparable with SNA08) in 2014, incorporated for the first time in this release
- Japan has not yet implemented SNA08 and will not do so until 2016
- One important feature of SNA08 and ESA10 is the re-classification of R&D expenditure as asset accumulation rather than current expenditure. This increases measured GDP
- In some cases, changes to the National Accounts go beyond those required under SNA08/ESA10. For example, the UK has introduced improvements to the estimation of gross fixed capital formation (separate from the capitalisation of R&D)
- Interpretation of SNA08/ESA10 can differ between countries

More information is available on the [OECD](#) website. Taking all National Accounts revisions together, France and Germany have revised the level of GDP (in both current prices and volume terms) upwards by about 3% on average over the period since 1990, while in Italy the upward revisions average 3.6%. UK current price GDP has

been revised upwards by 4.4% on average over this period, and the volume estimate has been revised upwards by 5.4%¹. Generally, revisions to GDP growth rates are much smaller than revisions to GDP levels. For Germany and Italy there are no significant changes to (constant price) GDP growth over the period since 1990. French average GDP growth has been revised up by 0.1% per year and UK average GDP growth has been revised down by 0.1% per year over this period.

Other revisions include:

- USA current and constant price GDP has been revised down in 2011 and 2012, reflecting the annual revision of the National Income and Product Accounts. A detailed explanation of these revisions is available on the Bureau of Economic Analysis [website](#)
- PPP exchange rates have been revised in 2012. The effect of these revisions is to reduce the value of GDP in US dollar terms for all countries other than the USA (thus tending to increase US productivity relative to other countries)
- French average hours worked have been revised up by about 1% on average over the entire time series
- There are no material changes to employment in any of the G7²

Tables R1 to R4 in the [reference table \(128.5 Kb Excel sheet\)](#) component of this release and at the back of the PDF version of this statistical bulletin compare the latest estimates data with the data from the previous release on 20 February 2014. Note that because Tables 1 and 2 are indexed to UK=100, revisions to the UK are zero by definition in Tables R1 and R2. Nevertheless, the largest factor in the revisions to other countries estimates (that is, in their relative productivity in relation to that of the UK) is the revisions to UK GDP series. For example, there are no revisions to the components of current price output per head and per worker in Canada or Japan prior to 2012, so all of the revisions for these countries in Tables R1 and R2 over the period 1990 to 2011 reflect UK revisions.

Revisions to constant price productivity in Tables R3 and R4 are now presented in terms of differences in growth rates. Revisions are dominated by changes in constant price GDP. On average over the whole period, growth of output per hour has been revised up by 0.1% per year in France and down by 0.1% per year in the UK. Growth of output per hour has been revised down by 0.5 percentage points in the US in 2012.

Notes for Revisions

1. At the time of preparing this release, OECD GDP data for the UK prior to 1997 reflected UK data as published on the ONS website on 31 September 2014. For these years, this release uses revised UK GDP data as published on the ONS website on 6 October 2014
2. Headline revisions to UK employment arising from revised population weights reflecting the 2011 Census were published by ONS on 23 September 2014. The re-weighted series are not incorporated in the employment series used in this release. The impact of the revisions is to increase aggregate employment since 2001 which, other things equal, implies lower levels of productivity. Revisions to employment growth rates are very small and will not materially change the path of productivity growth

8. Background notes

1. This Statistical Bulletin

ONS publishes annual estimates of International Comparisons of Productivity twice a year. Initial estimates are published approximately nine months after the reference year, with final estimates published approximately five months later. Exact publication dates vary subject to the availability of the source datasets.

2. Quality and methodology

The United Kingdom Statistics Authority has designated these statistics as National Statistics, in accordance with the Statistics and Registration Service Act 2007 and signifying compliance with the Code of Practice for Official Statistics.

Designation can be broadly interpreted to mean that the statistics:

- meet identified user needs
- are well explained and readily accessible
- are produced according to sound methods, and
- are managed impartially and objectively in the public interest.

Once statistics have been designated as National Statistics it is a statutory requirement that the Code of Practice shall continue to be observed.

A [Quality and Methodology Information paper \(123.8 Kb Pdf\)](#) for this release was published on 20 July 2012. This paper describes the intended uses of the statistics presented in this publication, their quality, and the sources and methods used to produce them. The paper also provides information on the uses and limitations of international comparisons of productivity.

For this release the base year for PPPs is 2011, which is the latest year for which the OECD PPP series have been benchmarked.

The output measure used here (GDP) differs from that used for the ONS headline measure of productivity (Gross Value Added (GVA)). In the National Accounts, GDP is valued at market prices and GVA is valued at basic prices. The principal difference is that basic prices exclude taxes and subsidies on products, such as VAT and excise duties. For further information on the relationship between GVA and GDP see Chapter 4 of the [ONS Productivity Handbook](#).

GVA is the preferred measure of output for productivity purposes. However, as the OECD does not produce output level series using basic prices over the necessary time period, and PPPs are based on market prices, GDP is used in this bulletin. Differences between growth rates of GVA and GDP are not normally significant.

3. Other data on productivity

ONS publishes a quarterly [Labour Productivity statistical release](#), which provides much more detailed information regarding UK labour productivity than this ICP release. As noted above, ONS labour productivity estimates use GVA rather than GDP as the numerator. ONS measures of employment and average hours also differ from OECD measures in terms of timing and seasonal adjustment.

ONS publishes annual [Multi-factor productivity](#) estimates for the UK, which decompose output growth into contributions due to changes in labour and capital inputs, and a residual component reflecting 'disembodied technical change'.

ONS also publishes a range of [public sector productivity measures](#) and related articles. These measures define productivity differently from that employed in the ONS Labour Productivity and MFP estimates. Further information can be found in [Phelps \(2010\) \(252.5 Kb Pdf\)](#).

More information on the range of ONS productivity estimates can be found in the [ONS Productivity Handbook](#).

The [OECD](#) publishes its own estimates of growth of GDP per hour worked for the G7 and two other aggregates: the EU and OECD. These OECD estimates for the G7 can be compared with the series in [Table 3 \(128.5 Kb Excel sheet\)](#) of this bulletin. The differences between the ONS and OECD productivity series are not large. They can be explained by the different sources used for the component data. In particular, ONS estimates use employment data that are based on countries' labour force surveys, whereas the OECD estimates use the National Accounts as the main source of employment data for most countries. There are also slight differences in the GDP data, as the OECD estimates use the Annual National Accounts with results in national currency, whereas ONS uses the Quarterly National Accounts for GDP data.

More international data on productivity are available from [Eurostat](#), and the Conference Board.

4. User engagement

ONS is keen to develop a greater understanding of the use made of ICP and other productivity statistics, and organises annual user group workshops. An information note on the latest Productivity Statistics User Group workshop is available [here](#). If you would like to be kept informed of future workshops and other productivity related information please email Productivity@ons.gsi.gov.uk.

You can follow ONS on [ONS Twitter](#) and [Facebook](#). This publication can be commented upon on social media using the hashtag [#UKproductivity](#).

5. Publication policy

A list of the job titles of those given [pre-publication access](#) to the contents of this Statistical Bulletin is available on the website.

6. Details of the policy governing the release of new data are available by visiting www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html or from the Media Relations Office email: media.relations@ons.gsi.gov.uk

These National Statistics are produced to high professional standards and released according to the arrangements approved by the UK Statistics Authority.