Office for National Statistics

Statistical bulletin

International comparisons of UK productivity (ICP), final estimates: 2021

A comparison of productivity across the G7 nations, including analysis of levels and growth rates of labour productivity (output per worker and output per hour worked). We are not publishing multifactor productivity comparisons which are experimental statistics.

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1 . Main points

- In 2021, the UK’s output per hour worked was lower than France, Germany and the United States, but higher than Canada and Italy when using the component method.
- The UK's average output per hour growth rate (5.0%) over the coronavirus (COVID-19) period (2020 and 2021) was the third fastest behind Canada (6.1%) and Italy (5.9%) when using the component method.
- UK output per hour worked had the fastest growth of the G7 countries in 2021 (excluding Japan because of a lack of data), but this followed the largest fall (12%) in output per hour growth of the G7 nations in 2020, when using the component method.
- Average output per worker for the G7 nations (excluding Japan and the UK) was 16% above the UK in 2021.
- Average output per worker growth rates over the COVID-19 pandemic period were negative for all G7 countries except Canada and the United States.

2 . Labour productivity measures

Output per hour worked

Output per hour worked is the ratio of gross domestic product (GDP) to the number of hours worked. GDP is calculated using consistent international guidelines across all G7 nations, under the System of National Accounts 2008. However, there is variation in the methods used to estimate the number of hours worked, which can affect comparability.

Hours worked are calculated by different countries using the direct method or the component method. The data in the main points have been calculated using the component method; more information on the two different methods is in Section 5 and Section 6, and in our International comparisons of productivity (ICP) methodology updates: labour input measurements February 2021 article.

Output per hour worked: direct method

In current prices (pound sterling, Purchasing Power Parity converted), annual output per hour worked was £43.59 in 2021, compared with £51.45, £47.57 and £44.20, respectively, for France, Germany and Italy over the same period when using the direct method. This represented a 1.2% increase in output per hour worked for the UK relative to 2020 during the first year of the coronavirus (COVID-19) pandemic. Over the same period, output per hour worked increased by 0.6% in France, 4.1% in Germany and 1.3% in Italy. The growth in output per hour reflects the easing of lockdown restrictions in 2021, and the subsequent recovery in economic activity and labour markets across the different countries. Data for direct hours worked are unavailable for Canada, Japan and the US. For information on how we estimate hours worked direct, please see Section 6.

Output per hour worked: component method

In 2021, the UK's output per hour worked was lower than France, Germany and the United States, but higher than Canada and Italy when using the component method. Output per hour worked in current prices was £46.92 in the UK in 2021, 10% lower than the other G7 nations' average (excluding Japan for which 2021 GDP data are not available).

Table 1: Annual output per hour worked (component method), whole economy, current price (CP) in GBP

Year	Canada	France	Germany	Italy	Japan	UK	US
2012	33.76	41.51	41.36	35.48	29.74	37.68	45.65
2013	35.12	43.70	42.66	36.35	30.91	38.69	46.22
2014	36.76	44.81	44.45	36.76	31.08	39.28	47.48
2015	35.56	45.24	44.58	36.86	31.97	40.26	47.82
2016	36.96	47.00	47.07	38.96	31.35	40.87	48.17
2017	38.12	48.58	48.86	39.88	31.55	42.35	49.24
2018	39.25	50.40	50.80	40.99	32.15	43.29	51.22
2019	38.89	52.49	51.21	41.81	32.66	44.41	52.80
2020	42.15	55.14	53.63	44.76	33.57	47.58	55.38
2021	42.94	55.50	55.83	45.33	-	46.92	58.88

Source: Organisation for Economic Co-operation Development data, Office for National Statistics calculations.

Notes

1. The estimates reported in the table above use GDP (output approach) estimates in current prices US Dollars, which is converted into pound sterling, using Purchasing Power Parities (PPPs) from the OECD.

2. GDP data for Japan in 2021 are not available.

The variation in output per hour worked using the direct method and the component method for all countries is taken into account in relation to the UK, where the necessary data are available.

For example, Germany appears to be more productive than the UK in 2021, but this could range from 28% more productive to 1% more productive. The median of all the different estimates suggests that Germany is around 14% more productive per hour worked than the UK.

Output per worker

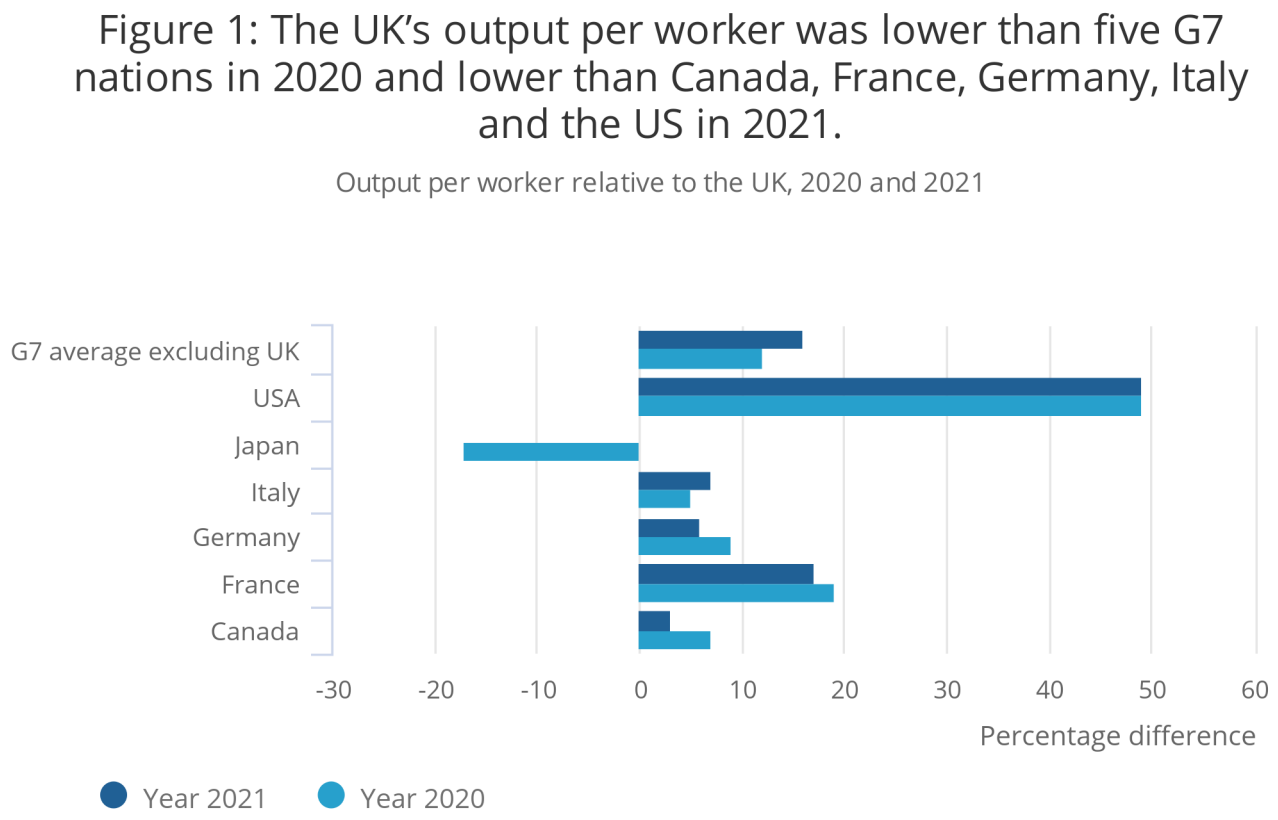
Estimates of workers are more easily compared across countries, as there is greater uniformity in methods to calculate the number of workers.

The relative difference between output per worker estimates are therefore more robust. However, these do not account for differences in working patterns, which explain some of the variation between countries in these estimates. Such differences include the levels of part-time and casual work completed in the country. There are also differences in labour policies, including holiday, sick and maternity leave, or legislation on working hours.

Output per worker was higher in all other G7 nations (excluding Japan, for which we have no data) than in the UK in 2021. The best performer on this measure was the United States at almost 1.5 times higher output than the UK. Similarly, in 2020, Canada, France, Germany, Italy and the United States produced more output per worker than UK in 2020, though Japan produced less.

Figure 1: The UK's output per worker was lower than five G7 nations in 2020 and lower than Canada, France, Germany, Italy and the US in 2021.

Output per worker relative to the UK, 2020 and 2021



Source: Organisation for Economic Co-operation Development (OECD), Office for National Statistics calculation

Notes:

1. Data on the number of workers are collected from the OECD productivity database, which is consistent with domestic concept estimates from the OECD national accounts database and thus more consistent with the gross domestic product (GDP) boundary. It was previously collected from the OECD labour database, which is on a national basis and not adjusted to the GDP boundary. This source change has resulted in changes to our estimates.

2. GDP data for Japan in 2021 are not available.

3 . Labour productivity growth

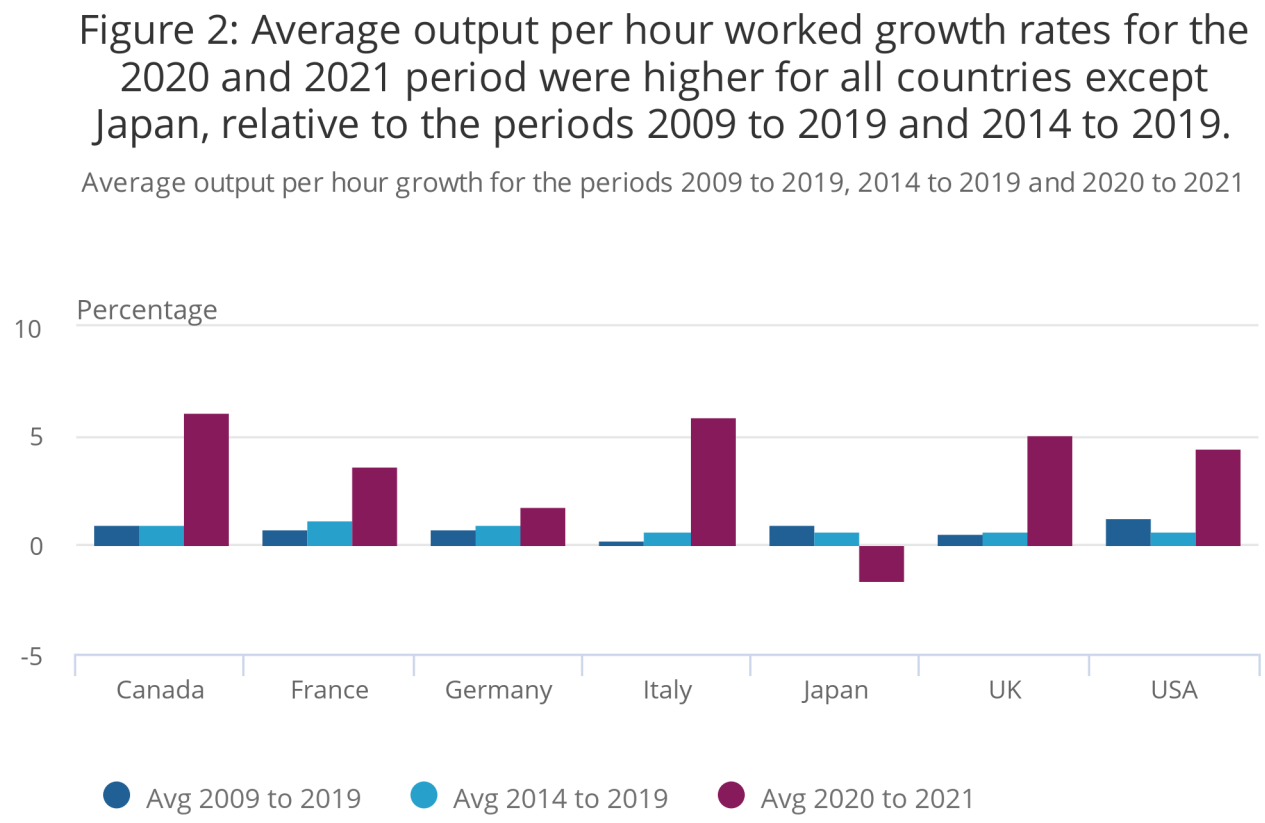
Output per hour worked

Regardless of which method is used to calculate hours worked, the corresponding growth rates are very similar. Labour productivity growth as measured by output per hour worked (GDP in constant prices) declined for all countries in 2020. In 2020, the first year of the coronavirus (COVID-19) pandemic, annual output per hour worked growth declined by (12%) year-on-year, reflecting larger falls in GDP growth and hours worked relative to the other G7 nations.

With the easing of lockdown restrictions across countries, output per hour worked growth was positive for all G7 nations in 2021, with the UK experiencing the largest year-on-year increase (22%).

Figure 2: Average output per hour worked growth rates for the 2020 and 2021 period were higher for all countries except Japan, relative to the periods 2009 to 2019 and 2014 to 2019.

Average output per hour growth for the periods 2009 to 2019, 2014 to 2019 and 2020 to 2021



Source: Organisation for Economic Co-operation Development (OECD), Office for National Statistics calculation

Notes:

1. The figures for the UK in this table differ to the ONS National Statistics estimates of output per hour worked, which use gross value added (GVA) instead of gross domestic product (GDP) in the numerator. GDP is used here for international comparability.

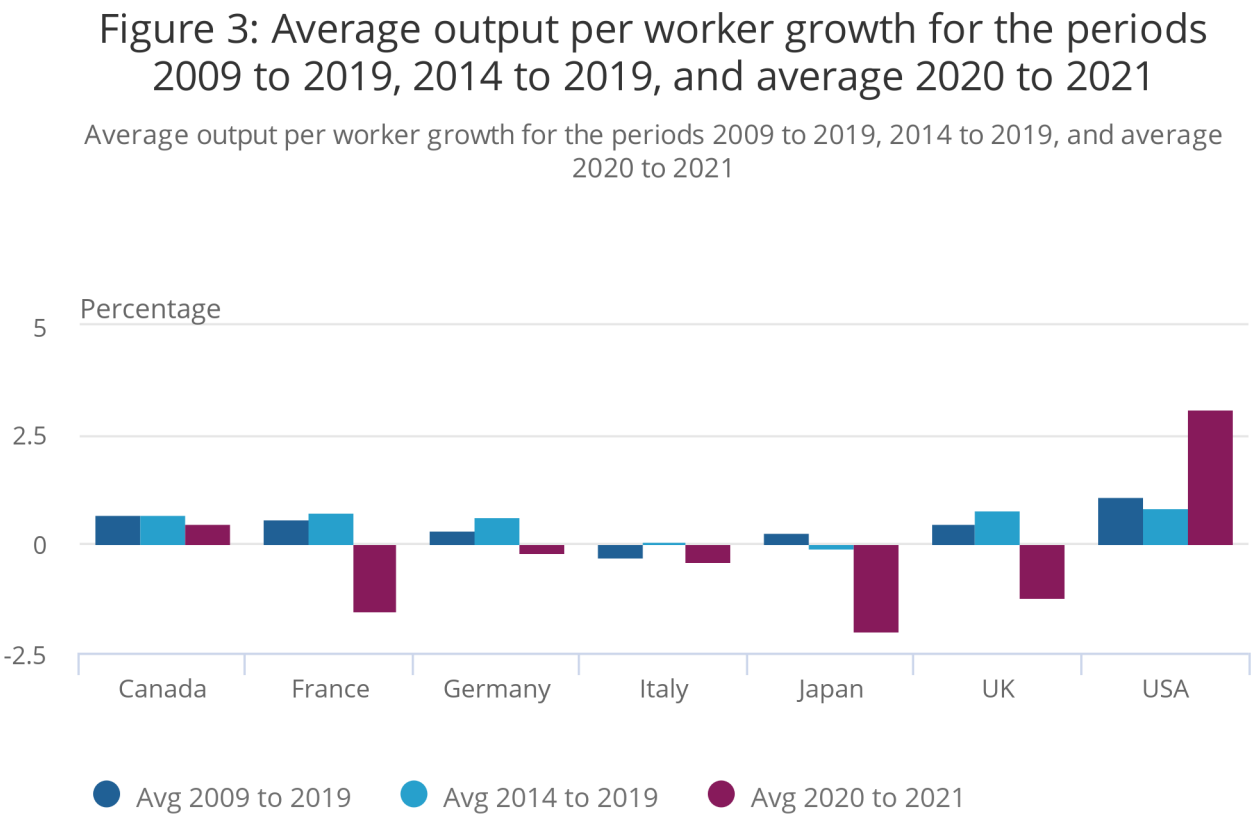
Output per worker

The change in output per worker growth from 2020 to 2021 in the UK was negative 1.2%. Over the same period, output per worker growth was negative for France (1.5%), Germany (0.2%), Italy (0.4%) and Japan (2.0%), but positive for Canada (0.5%) and the USA (3.1%). This may reflect different COVID-19 responses, where furlough schemes which retained workers were deployed in Europe, whereas Canada and the United States did not intervene, leading to increased unemployment.

Assuming unemployment was focused on those workers with lower levels of productivity, this would reflect a temporary “sorting effect.” This means that individual productivity was relatively unchanged, but the average jumped because of higher productivity workers being retained at a higher rate. Five of the seven G7 nations saw output per worker growth rates fall year-on-year in 2020, while Canada and the United States were the only countries to record growth relative to 2019.

Figure 3: Average output per worker growth for the periods 2009 to 2019, 2014 to 2019, and average 2020 to 2021

Average output per worker growth for the periods 2009 to 2019, 2014 to 2019, and average 2020 to 2021



Source: Organisation for Economic Co-operation Development (OECD), Office for National Statistics calculation

Notes:

1. The figures for the UK in this table differ to the ONS National Statistics estimates of output per hour worked, which use gross value added (GVA) instead of gross domestic product (GDP) in the numerator. GDP is used here for international comparability.

4 . International comparisons of UK productivity final estimates data

International comparisons of productivity Dataset | Released 11 January 2023 This dataset is published as part of our International comparisons of UK productivity article. These data include gross domestic product (GDP), hours worked (both direct and component methodologies), workers, output per hour (both direct and component methodologies), and output per worker level estimates for all G7 nations. Growth rates for GDP, hours worked, workers, output per hour, output per worker, for all G7 nations are also included.

5 . Glossary

Labour productivity

Labour productivity measures how many units of output are produced for each unit of labour input and is calculated by dividing output by labour input.

Labour inputs

The preferred measure of labour input is hours worked ("productivity hours"), but workers and jobs ("productivity jobs") are also used.

Output

Output refers to gross value added (GVA), which is an estimate of the volume of goods and services produced by an industry, and in aggregate for the UK.

Direct method

A method of estimating hours worked, which annualises "reported weekly hours actually worked" data collected from a data source, usually a continuous labour force survey, for all weeks of the calendar year.

Component method

A method of estimating hours worked. The method starts with normal, usual, paid or contractual hours and then moves to the concept of hours actually worked through a series of explicit adjustments called components, which account for holiday, sickness, maternity leave, and so on. For more information on the differences between the direct method and the component method, see our International comparisons of productivity (ICP) methodology updates: labour input measurements February 2021 article.

Simplified component method (SC)

A method for estimating hours worked, developed by the Organisation for Economic Co-operation and Development (OECD), which uses EU Labour Force Survey (LFS) data for each country. It is designed to illustrate the variation in sources and methods across countries, but is second best to national efforts that make use of all available sources.

Labour Force Survey (LFS)

The UK's Labour Force Survey (LFS) is a continuous quarterly household survey, which captures data about the labour market including employment and hours worked. Many countries have their own labour force surveys.

6 . Measuring the data

The Organisation for Economic Co-operation and Development's (OECD) produced much of the data analysed in this release through their productivity database. For specific data sources, see our International comparisons of productivity dataset.

Gross domestic product

The numerator of the productivity equation is measured using gross domestic product (GDP) in most of this bulletin. GDP is measured by the national statistical institutes of each country and reported to the OECD. GDP is measured according to international guidance; European countries (including the UK) follow the European System of Accounts (ESA) 2010, and non-European countries largely follow the System of National Accounts (SNA) 2008, which is very similar.

For comparisons of levels of productivity, we use current price GDP, converted to a common currency using purchasing power parities (PPPs). For comparison of growth rates of productivity, we use constant price (volume measure) GDP, measured in national currencies.

Workers

Estimates of the number of workers are sourced from the OECD productivity database. These data are based on the domestic concept, and adjusted to meet the national accounts production boundary. They therefore include employees, the self-employed, and all other workers contributing to GDP.

Hours worked

In Section 2, we presented multiple comparisons of levels of output per hours worked, where hours worked statistics were calculated using a direct method, simplified component method (UK only) or component method. For more information about direct, simplified component and component methods, see our International comparisons of productivity (ICP) methodology updates: labour input measurements February 2021 article. The difference in methodology results in a substantial difference in the level of hours worked analysis.

7 . Strengths and limitations

Strengths

Most of the data in this publication are sourced from the Organisation for Economic Co-operation and Development (OECD), which in turn sources most of its data from national statistical institutes. The measurement of gross domestic product (GDP) is governed by international standards, which are very similar across all G7 countries. This ensures a high degree of consistency of GDP across countries, ensuring a fair comparison in the productivities of different countries.

This release better reflects the variation in output per hour worked estimates than previous publications, by comparing different methods with one another and showing the range of possible differences between UK productivity and that of other countries. We researched presentation options in collaboration with the Economic Statistics Centre of Excellence (ESCoE) by running an online experiment, and we found that this presentation supported a better understanding of the data.

Limitations

The UK constructs its hours worked estimates differently to other G7 nations, using a direct method rather than a component method. The OECD found evidence that using a direct method may bias the estimate of hours worked up, and thus lead productivity to be understated. This makes comparisons in the level of output per hour worked between the UK and other countries difficult.

To compare the level of productivity across countries, the output measure (gross domestic product) for each country must be converted to a common currency. We use purchasing power parities (PPPs) to convert from national currencies to pound sterling. PPPs are preferred to market exchange rates as they are typically more stable and better represent economic output, allowing for easier comparisons of productivity over time. However, PPPs are measured with error and, as such, may not fully account for differences in currency between countries and over time.

8 . Related links

Improving estimates of labour productivity and international comparisons Article | Released 9 January 2019 Analysis of how the methodologies, data sources and adjustments used internationally to estimate the number of persons, jobs and hours worked affect our international comparisons of UK productivity statistics.

International comparisons of productivity (ICP) methodology updates: labour input measurements February 2021 Article | Released 15 February 2021 An update on the work in progress to develop a UK-tailored component method for estimating labour inputs for productivity estimates.

Productivity overview, UK: April to June 2022 Article | Released 7 October 2022 A summary of economic productivity measures, including output per hour, output per job and output per worker for the whole economy and a range of industries. This article also includes information about productivity in the public sector and international comparisons of productivity across the G7 nations.

Productivity development plan: 2021 to 2023 Article | Released 6 October 2021 This development plan builds on recent improvements to Office for National Statistics (ONS) productivity statistics and looks at introducing new outputs, further improving our productivity statistics, and consolidating our improvements to date.

9 . Cite this statistical bulletin

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