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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Correction

23 January 2023 09:30

We have identified and corrected a manual error in relation to output per hour worked growth rates in this publication. The error was because the estimates of output per hour worked of the countries, in constant prices, had been generated using input from two different years, instead of the same year. The error does not affect any other data reported as part of this publication. The error has been corrected and the corresponding dataset has been updated. We are adopting additional quality assurance checks to ensure that this does not happen in the future. We apologise for any inconvenience caused.

The corrections change some of the previous main conclusions:

- the previous version suggested that the UK's average output per hour worked growth rate was 5.0% during the coronavirus (COVID-19) period of 2020 and 2021. The corrected version shows that the UK's average output per hour growth rate was -0.3% over this period. Canada's average output per hour growth rate has now changed from 6.1% to 0.8% and Italy from 5.9% to 0.9%. The UK also grew more slowly than Germany and the US, which were up by 0.9% and 2.3%, respectively.

- the previous version suggested that the UK output per hour worked in 2021 (excluding Japan) had the fastest growth of the G7 countries. This has now been corrected to the second slowest. The previous version also suggested that in 2020 the UK had a fall of 12%, which is now corrected to a 1.2% increase.

The other main points of the bulletin are unchanged.

This correction only affects this bulletin and does not impact on estimates of GDP or productivity as published in other ONS bulletins.

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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 was -0.3% over the coronavirus (COVID-19) period (2020 and 2021), behind Canada (0.8%), Germany (0.9%), Italy (0.9%) and the USA (2.3%) when using the component method.
- UK output per hour worked had the second slowest growth of the G7 countries in 2021 (excluding Japan because of a lack of data), this followed a 1.2% increase in output per hour growth in 2020, the fourth highest growth rate among the G7 nations that year, according to the component method.
- Average output per worker for the G7 nations (excluding Japan and the UK) was 16% above the UK level in 2021, using an unweighted average.
- Average output per worker growth rates over the coronavirus pandemic period were negative for all G7 countries except Canada and the United States.

2 . Labour productivity levels

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 Group of 7 (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 and collated by the Organisation of Economic Co-operation and Development (OECD). The data used in this bulletin were 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.

Users should note that countries and the OECD may have made different decisions on which components to include in their component method. For international comparability we use the OECD measure of hours for the UK, which they derive from the EU Labour Force Survey, as opposed to national labour force surveys.

Output per hour worked: direct method

In current prices (pound sterling, Purchasing Power Parity converted), annual output per hour worked was £43.59 in the UK 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, 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	35.13	43.70	42.66	36.35	30.91	38.69	46.23
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	41.00	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 Dollarswhich is converted into pound sterling, using Purchasing Power Parities (PPPs) from the OECD., 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 have been more productive than the UK in 2021, but this could range from (19%) more productive to (9%) more productive depending on which method is used to calculate the hours worked.

Output per worker

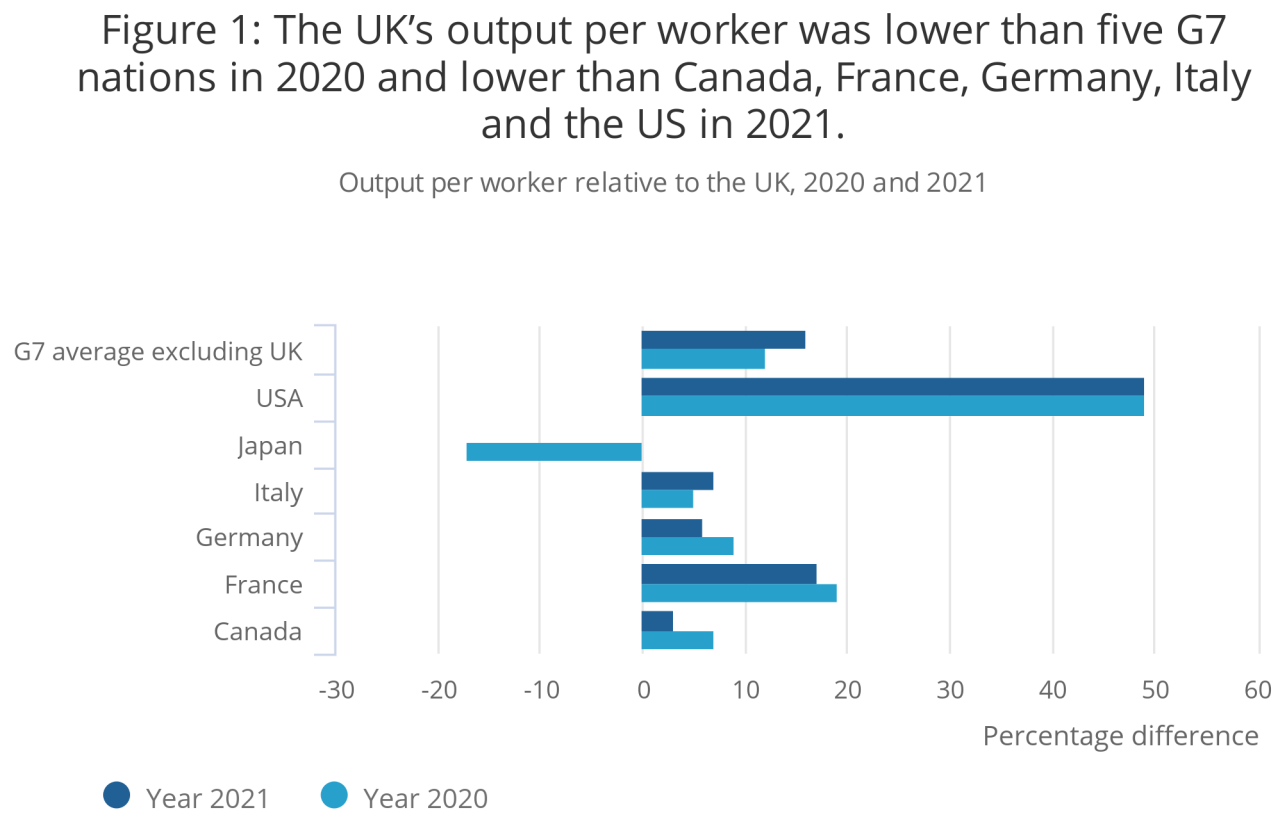
Estimates of workers are more easily compared across countries, as there is greater uniformity in methods to calculate the number of workers.

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 in current prices.

3 . Labour productivity growth

Output per hour worked

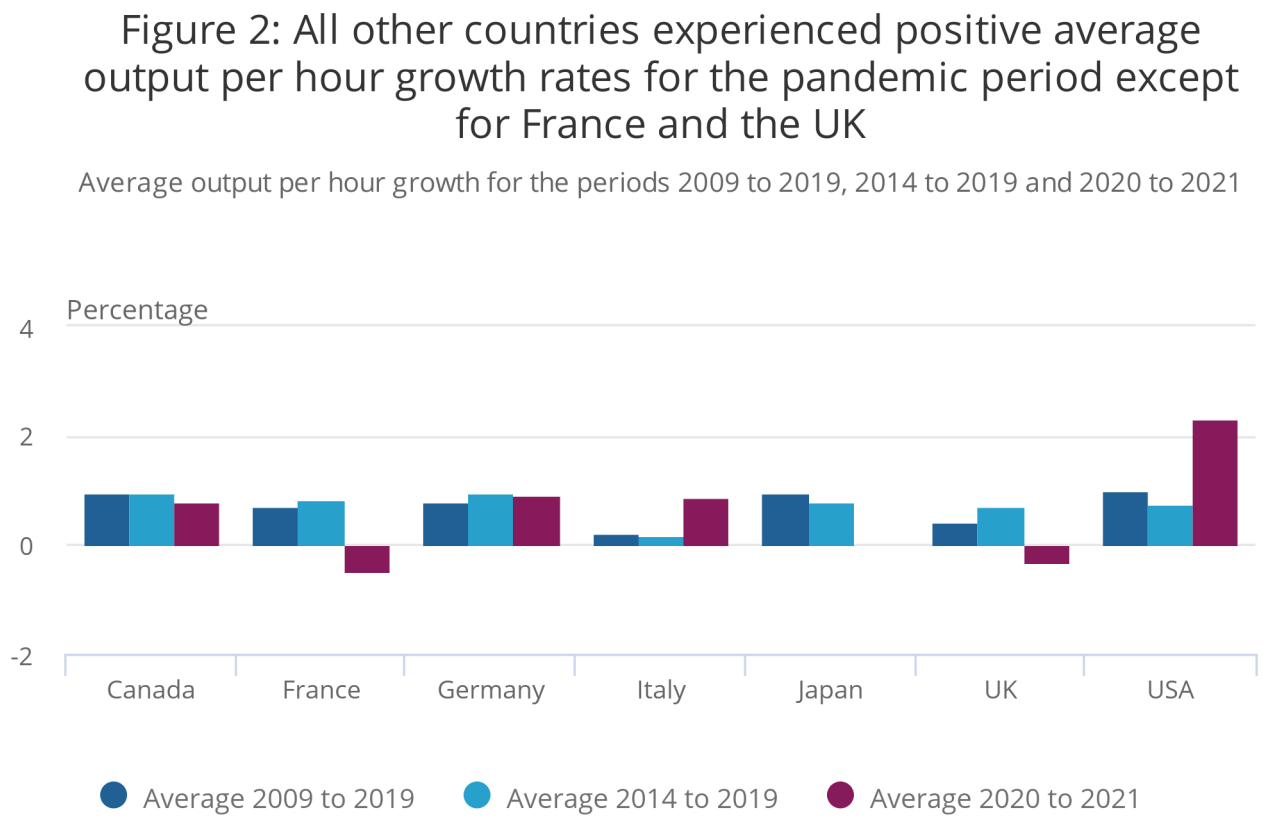
Regardless of which method is used to calculate hours worked, the corresponding growth rates are very similar. Labour productivity growth as measured by output per hour worked (GDP in constant prices) increased for all countries in 2020 except Japan. This is because the most productive sectors of the economy were more likely to remain open during the first year of the coronavirus (COVID-19) pandemic.

In 2020, the first year of the coronavirus pandemic, annual output per hour worked growth increased by 1.2% year-on-year in the UK, which experienced one of the largest falls in GDP growth and hours worked among the G7 nations.

With the easing of lockdown restrictions across countries, output per hour worked growth was negative for Canada (5.7%), France (1.5%), Italy (1.3%) and the UK (1.8%), but positive for Germany (0.9%) and the United States (1.2%) in 2021.

Figure 2: All other countries experienced positive average output per hour growth rates for the pandemic period except for France and the UK

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.

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

Output per worker

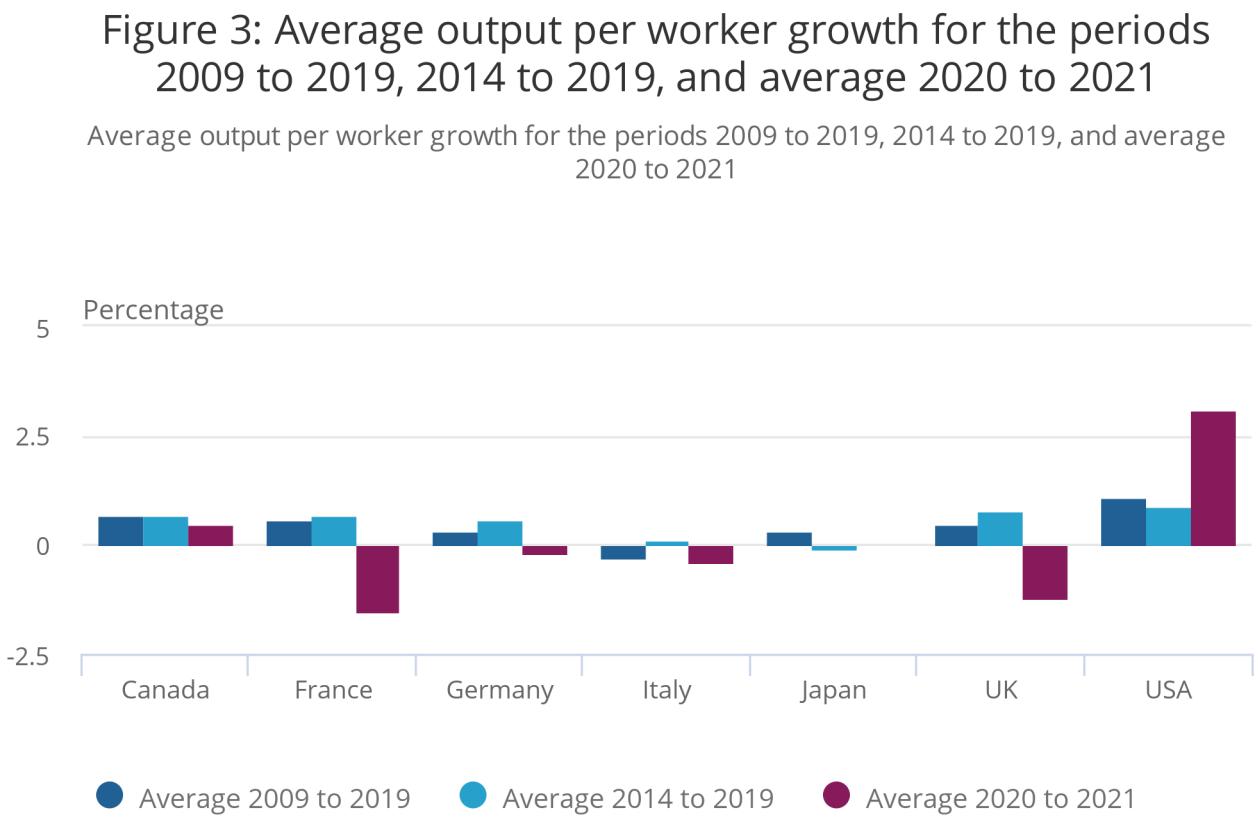
Average output per worker in the UK fell by 1.2% over the two pandemic years 2020 and 2021, compared with 2019 levels. Over the same period, output per worker growth was 1.5% in France, 0.2% in Germany, and 0.4% in Italy.

Average output per hour worked grew by 0.5% in Canada and 3.1% in the USA over the two pandemic years 2020 and 2021. Annual output per worker growth fell by 4% for Japan in 2020, the latest year for which we have data. This may reflect different pandemic responses, where for example 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, on average, higher among workers in industries with lower levels of productivity, this would reflect a temporary "sorting effect." This means that while individual productivity was relatively unchanged, the average jumped because of more productive 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.

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

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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