

## International Comparisons of Productivity



### Revised estimates for 2009

**Date:** 15 February 2011

**Coverage:** United Kingdom

**Theme:** The Economy

### Comparisons of productivity levels

Revised estimates for 2009 show that UK Gross Domestic Product (GDP) per worker was:

- Above that of Japan;
- Similar to that of Canada and Germany;
- Lower than that of France, Italy and the US, which continues to lead the G7 countries;
- Lower than the average of G7 countries excluding the UK.

GDP per worker, 2009

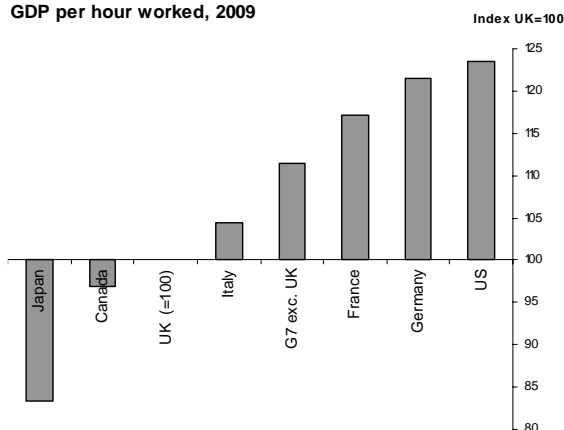


International comparisons of GDP per hour worked are also published in this bulletin. This approach yields different results from GDP per worker, taking into account differences in working patterns across countries.

On this basis, UK productivity is:

- Above Japan;
- Similar to that of Canada and Italy;
- Lower than France, Germany and the US;
- Lower than the average of G7 countries excluding the UK.

GDP per hour worked, 2009

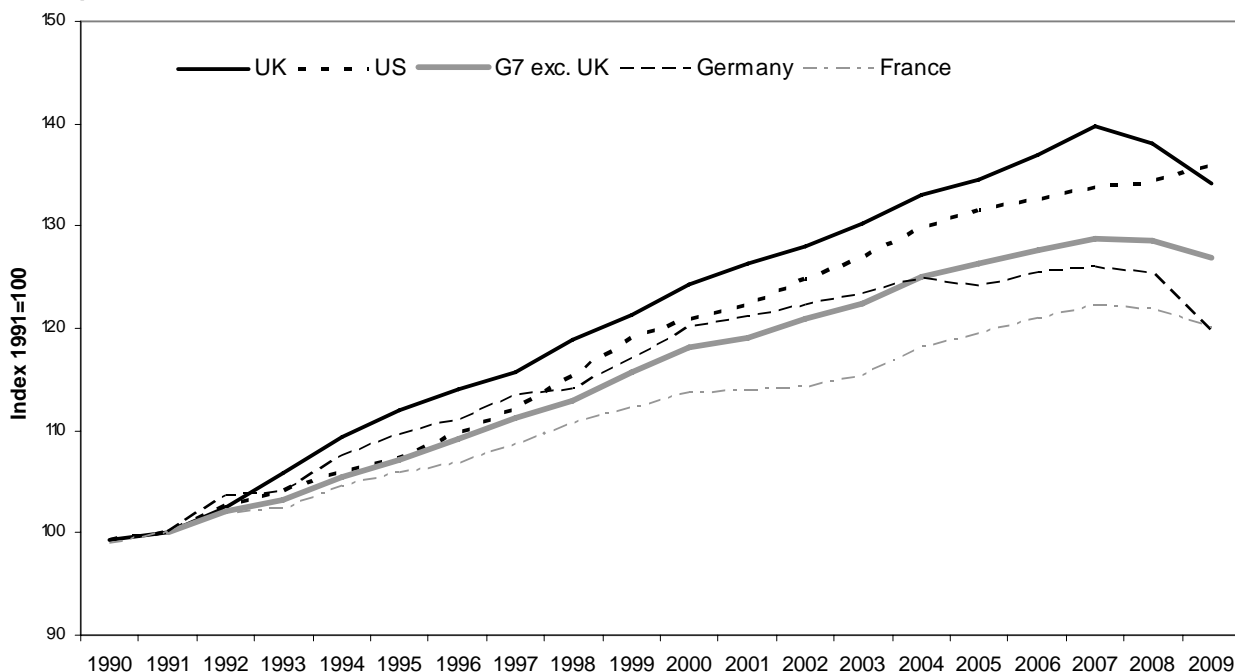


## Comparisons of productivity growth

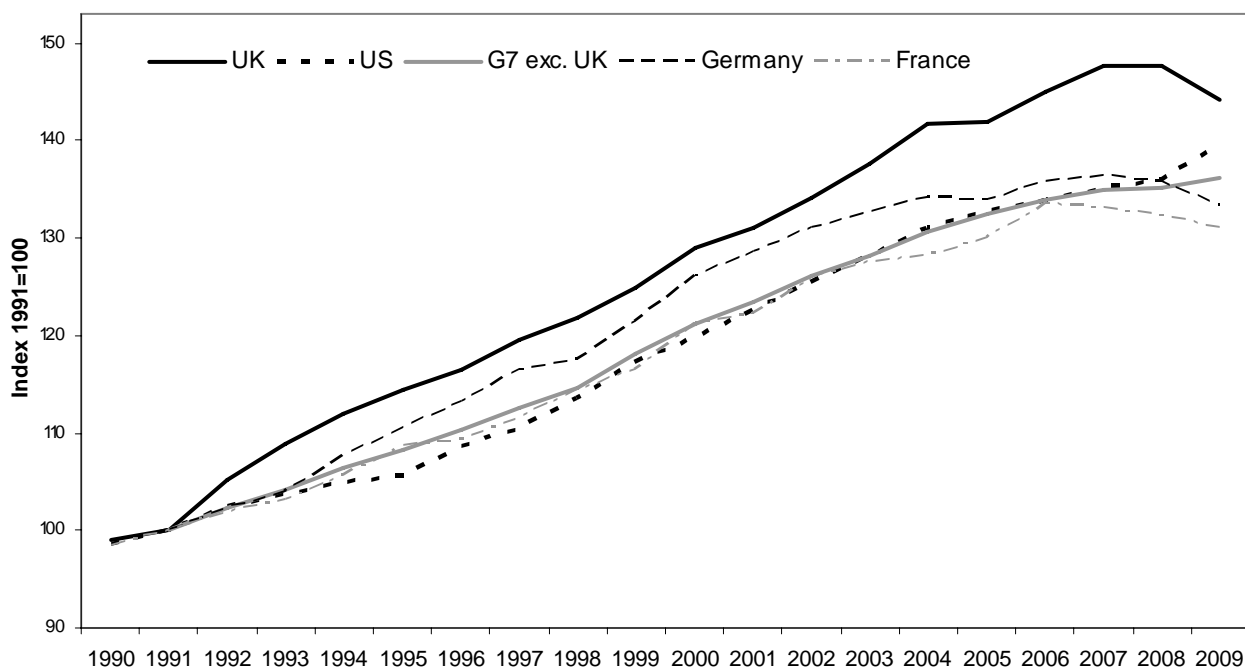
This Bulletin also documents productivity growth since 1991 for the G7 countries. In terms of GDP per worker (Table 3), UK productivity increased by 40 percentage points between 1991 and 2007, the fastest of all G7 countries. However, UK GDP per worker growth fell by 6 percentage points between 2007 and 2009. Similar falls in GDP per worker occurred in Germany, Italy and Japan. GDP per worker fell slightly in France and Canada over 2008 and 2009. The US was the only country of the G7 to experience an increase in GDP per worker over the past two years. Over the entire period 1991 to 2009 UK GDP per worker grew by 34 percentage points, compared with the US figure of 36 percentage points, and 27 percentage points for the G7 excluding the UK.

On an alternative measure, growth in GDP per hour worked (Table 4), the UK's cumulative growth over the period 1991 to 2009 continues to exceed that of all other countries under comparison. At 44 percentage points, it remains well above the G7 (excluding the UK) average of 36 percentage points. However, the inclusion of 2009 data highlights a degree of convergence between the UK and US growth rates: while the UK experienced the largest fall in GDP per hour of all the G7 countries in 2009, the US experienced the largest increase.

### GDP per worker



### GDP per hour worked



## Revisions

Data covering the period 1990 to 2009 have been subject to revision in this Bulletin (Tables R1 to R4). The sources of the changes are:

- Revisions to purchasing power parity (PPP) data for the entire period, with the most notable revisions applying to the years 2007 to 2009;
- Revisions to GDP at current prices for Japan in 2008 and 2009 and for the UK in 2009;
- Revisions to GDP at constant prices for Japan for 2007 to 2009 and for the UK in 2009;
- Revisions to French employment for the entire period and to US employment for 2005 to 2009.

The revisions that are presented in this bulletin (Tables R1 to R4) are predominantly driven by revisions to the PPP data, reflecting the publication of 2008 benchmarked PPPs in December 2010 by the OECD-Eurostat programme. While the ranking of countries (in other words, the relative productivity level comparisons) on both productivity measures has largely been unaffected, there are absolute changes in the level estimates for 2007 to 2009 (Table R1 and R2) due to the change in benchmark year. This affects how the UK's productivity gap with the other G7 countries is interpreted. For 2009, the shortfall compared with the US on the GDP per worker measure is now 33 percentage points, an upward revision of 5 percentage points from the previously published estimate in October 2010.

Note that because Tables 1 and 2 are indexed to the UK = 100, revisions to the UK are zero by definition. Thus, revisions to other countries may represent a combination of revisions to UK data and other countries' data. The most important example of this is with respect to purchasing power parity data. For the most recent years the revisions mentioned above have amounted to a weakening of UK purchasing power relative to the other G7 countries: the value of UK output relative to the output of the other G7 countries has declined. This has driven an upward revision in productivity relative to the UK for the other G7 nations compared to the previous set of estimates in October 2010.

In the constant price tables (Table 3 and 4), PPPs are only used to compute the series for the aggregate G7 and the G7 excluding the UK. Revisions for these are accordingly less pronounced (Table R3 and R4).

## Background Notes

1. Further information about International Comparisons of Productivity (ICP) can be found on the National Statistics website at <http://www.statistics.gov.uk/cci/nugget.asp?id=160>
2. All these productivity measures are National Statistics.
3. ONS publishes ICP biannually, in spring and autumn, providing comparisons of real GDP per worker and real GDP per hour worked across the G7 countries, in both levels (current PPPs) and growth rates (constant PPPs). This release cycle reflects the publication and revision cycles of the component data series.
4. ICP estimates are published to the nearest whole number. However, differences of a few percentage points between the productivity estimates for individual countries should not be seen as significant because of the difficulties in obtaining directly comparable data across countries.
5. Results are presented for the UK relative to the US, France, Germany, Japan, Canada and Italy and the G7 in aggregate, including and excluding the UK (UK=100).
6. Data sources for this bulletin are as follows: GDP from the OECD Main Economic Indicators, January 2011; Purchasing Power Parity (PPP) estimates from the OECD PPP website (updated continuously); employment from the OECD Annual Labour Force Statistics, January 2011; average hours worked from OECD Employment Outlook, July 2010.
7. Due to a break in the series currently available from the OECD, UK employment and hours data have been derived directly from the latest Labour Force Survey data, following the OECD method of compilation. These have not yet been submitted to the OECD.
8. GDP data for each country in local currency prices are converted using PPPs to make them internationally comparable. GDP at purchasing power parity is effectively a relative volume measure of GDP. For each country, GDP at purchasing power parity is divided by either an employment or total hours worked measure to produce a labour productivity estimate.
9. International comparisons of productivity levels use current PPPs, which measure the relative price across countries of a basket of goods and services in a specific year. Since this representative basket of goods and services changes over time, current PPP-based ICP estimates are suitable only for point in time estimates, and should not be used for time series or growth analysis.

10. To compare growth rates of productivity between countries, constant PPP-based ICP estimates are used. These measures fix GDP at purchasing power parities to a base year for each country, then extrapolate forwards and backwards by applying annual volume growth rates for each country to produce comparable measures of output for each year. This allows for intertemporal analysis as the price structure of constant PPPs does not vary over time – only volume changes are captured in the ICP data. Using the constant PPP approach is not necessary for calculating volume growth for any given country, but is necessary for calculating growth for the G7 group as a whole. Further details on the methodology can be found on the National Statistics website at <http://www.statistics.gov.uk/cci/article.asp?id=1844>
11. To derive an index for each country relative to the UK (=100) in current PPP terms, the derived labour productivity measure for each country in each year is divided by the UK estimate for that year and multiplied by one hundred. Numbers in excess of 100 indicate that productivity is higher in that country compared to the UK. Numbers below 100 indicate that productivity is higher in the UK. For constant PPP-based ICP estimates, data for all countries are indexed to 100 in 1991, enabling comparisons of productivity growth relative to this reference period for any given year.
12. The OECD also publishes international comparisons of GDP per hour worked. The differences between the ONS and OECD 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 is based on countries' Labour Force Surveys, whereas the OECD uses 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 uses the Annual National Accounts, whereas ONS uses the Quarterly National Accounts for GDP data.
13. The output measure used here (GDP at market prices) differs from that used for the ONS headline measure of productivity (Gross Value Added (GVA) at basic prices). Although GDP and GVA are equivalent at the whole economy level, there is a difference between market prices and basic prices: basic prices exclude the taxes and subsidies placed on products, taxes and subsidies on imports and trade and transport costs. As the OECD does not produce output level series using basic prices over the necessary time period, market prices are used here.
14. Further details about the international comparisons of productivity methodology, the compilation process, and a detailed analysis of past revisions, can be found at <http://www.statistics.gov.uk/cci/article.asp?ID=1069>
15. A Summary Quality Report for this Statistical Bulletin can be found on the National Statistics website at: <http://www.ons.gov.uk/about-statistics/methodology-and-quality/quality/qual-info-economic-social-and-bus-stats/quality-reports-for-economic-statistics/index.html>
16. The ONS consultation on its work programme for the next four years closed on 24 December 2010. ONS is currently considering responses to the consultation.

17. Details of the policy governing the release of new data are available from the Media Relations Office.
18. National Statistics are produced to high professional standards set out in the Code of Practice for Official Statistics. They undergo regular quality assurance reviews to ensure that they meet customer needs. They are produced free from any political interference.
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**Table 1: GDP per worker - Current PPPs**

Note: index, UK = 100.

Year	Canada	France	Germany	Italy	Japan	UK	USA	G7	G7 exc. UK
1990	118	123		131	107	100	138		
1991	116	123	117	131	108	100	138	123	125
1992	116	122	118	130	105	100	138	123	125
1993	114	119	115	131	102	100	136	121	122
1994	114	117	115	132	99	100	134	119	121
1995	112	116	114	133	99	100	132	118	120
1996	109	113	112	130	97	100	130	117	118
1997	108	112	109	127	94	100	129	115	116
1998	107	112	107	128	91	100	130	114	116
1999	108	112	108	125	90	100	132	115	117
2000	105	110	104	123	90	100	129	113	114
2001	103	109	103	121	88	100	126	111	112
2002	99	109	102	114	88	100	126	110	111
2003	100	106	104	112	88	100	127	111	112
2004	98	103	103	106	87	100	126	109	110
2005	101	106	103	106	89	100	129	111	112
2006	99	105	102	106	87	100	126	109	110
2007	100	108	103	109	89	100	128	111	112
2008	98	108	103	111	88	100	128	111	112
2009	100	111	103	113	87	100	133	113	114

Source: Office for National Statistics

**Table 2: GDP per hour worked - Current PPPs**

Note: index, UK = 100.

Year	Canada	France	Germany	Italy	Japan	UK	USA	G7	G7 exc. UK
1990	117	127		124	93	100	133		
1991	117	128	133	125	95	100	134	120	122
1992	114	124	130	120	92	100	131	117	119
1993	112	121	127	121	92	100	128	116	117
1994	111	121	128	123	90	100	126	115	116
1995	110	122	129	124	91	100	124	114	116
1996	106	119	127	120	89	100	123	113	114
1997	104	117	124	117	87	100	119	110	111
1998	104	118	122	118	85	100	121	111	112
1999	105	118	124	115	86	100	123	112	113
2000	101	118	121	112	84	100	119	109	110
2001	99	118	120	112	83	100	119	109	109
2002	96	120	119	105	82	100	117	107	108
2003	96	115	121	102	82	100	118	107	108
2004	93	110	118	96	81	100	116	105	105
2005	98	114	121	98	84	100	120	108	109
2006	95	115	119	97	82	100	116	106	107
2007	96	116	120	100	84	100	119	108	109
2008	94	115	119	101	82	100	117	107	108
2009	97	117	122	104	83	100	123	111	112

Source: Office for National Statistics



**Table 3: GDP per worker - Constant PPPs**

Note: index, 1991 = 100.

Year	Canada	France	Germany	Italy	Japan	UK	USA	G7	G7 exc. UK
1990	100	99		99	99	99	99		
1991	100	100	100	100	100	100	100	100	100
1992	102	102	104	101	100	102	103	102	102
1993	104	102	104	106	100	106	104	104	103
1994	107	104	108	110	101	109	106	106	105
1995	108	106	110	114	102	112	107	108	107
1996	108	107	111	115	105	114	110	110	109
1997	111	109	114	116	105	116	112	112	111
1998	112	111	114	117	104	119	115	113	113
1999	116	112	117	117	104	121	119	116	116
2000	119	114	120	119	108	124	121	119	118
2001	120	114	121	119	108	126	122	120	119
2002	120	114	122	118	110	128	125	121	121
2003	120	115	123	117	112	130	127	123	122
2004	121	118	125	117	115	133	130	126	125
2005	123	120	124	117	116	134	132	127	126
2006	124	121	125	117	118	137	133	128	128
2007	124	122	126	118	120	140	134	130	129
2008	123	122	125	115	120	138	134	129	129
2009	122	120	120	111	114	134	136	127	127

Source: Office for National Statistics

**Table 4: GDP per hour worked - Constant PPPs**

Note: index, 1991 = 100.

Year	Canada	France	Germany	Italy	Japan	UK	USA	G7	G7 exc. UK
1990	99	98		99	97	99	99		
1991	100	100	100	100	100	100	100	100	100
1992	102	102	102	101	101	105	103	102	102
1993	104	103	104	106	105	109	104	105	104
1994	106	106	108	110	106	112	105	107	106
1995	107	109	111	114	109	114	106	109	108
1996	107	109	113	114	110	116	109	111	110
1997	110	112	117	116	113	120	110	113	113
1998	112	114	118	115	112	122	114	115	115
1999	115	117	121	116	115	125	117	119	118
2000	118	121	126	119	118	129	120	122	121
2001	119	122	129	120	120	131	123	124	123
2002	121	126	131	120	122	134	125	127	126
2003	121	128	133	119	124	138	128	129	128
2004	121	128	134	119	128	142	131	131	131
2005	124	130	134	120	131	142	133	133	132
2006	125	133	136	120	132	145	134	135	134
2007	125	133	136	121	135	148	135	136	135
2008	125	132	136	119	135	148	136	136	135
2009	126	131	133	117	133	144	140	137	136

Source: Office for National Statistics

**Table R1: Revisions to GDP per worker - Current PPPs**

Year	Canada	France	Germany	Italy	Japan	UK	USA	G7	G7 exc. UK
1990	0	0		0	-1	-	0		
1991	0	0	0	0	0	-	0	0	0
1992	0	0	0	0	0	-	0	0	0
1993	0	0	0	0	0	-	0	0	0
1994	0	0	0	0	0	-	0	0	0
1995	0	0	0	0	0	-	0	0	0
1996	0	0	0	0	0	-	0	0	0
1997	0	0	0	0	0	-	0	0	0
1998	0	0	0	0	0	-	0	0	0
1999	0	0	0	0	0	-	0	0	0
2000	0	0	0	0	0	-	0	0	0
2001	0	0	0	0	0	-	0	0	0
2002	0	0	0	0	0	-	0	0	0
2003	0	0	0	0	0	-	0	0	0
2004	0	0	0	0	0	-	0	0	0
2005	0	0	0	0	0	-	0	0	0
2006	0	0	0	0	0	-	0	0	0
2007	1	1	1	1	1	-	1	1	1
2008	1	0	2	3	1	-	1	1	1
2009	3	2	4	6	2	-	5	4	4

Note: Revisions refer to the difference in index points between the data released on 15 February 2011 and the data released on 12 October 2010.

Source: Office for National Statistics

**Table R2: Revisions to GDP per hour worked - Current PPPs**

Year	Canada	France	Germany	Italy	Japan	UK	USA	G7	G7 exc. UK
1990	0	0		0	-1	-	0		
1991	0	0	0	0	0	-	0	0	0
1992	1	1	1	1	0	-	1	0	0
1993	0	0	0	0	0	-	0	0	0
1994	0	0	0	0	0	-	0	0	0
1995	0	0	0	0	0	-	0	0	0
1996	0	0	0	0	0	-	0	0	0
1997	0	0	0	0	0	-	0	0	0
1998	0	0	0	0	0	-	0	0	0
1999	0	0	0	0	0	-	0	0	0
2000	0	0	0	0	0	-	0	0	0
2001	0	0	0	0	0	-	0	0	0
2002	0	0	0	0	0	-	0	0	0
2003	0	0	0	0	0	-	0	0	0
2004	0	0	0	0	0	-	0	0	0
2005	0	0	0	0	0	-	0	0	0
2006	0	0	0	0	0	-	0	0	0
2007	1	1	1	1	1	-	1	1	1
2008	1	0	2	3	1	-	1	1	1
2009	3	2	4	5	2	-	4	3	4

Note: Revisions refer to the difference in index points between the data released on 15 February 2011 and the data released on 12 October 2010.

Source: Office for National Statistics

**Table R3: Revisions to GDP per worker - Constant PPPs**

Year	Canada	France	Germany	Italy	Japan	UK	USA	G7	G7 exc. UK
1990	0	0		0	0	0	0		
1991	-	-	-	-	-	-	-	-	-
1992	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0
2009	0	-2	0	0	-1	0	0	-1	-1

Note: Revisions refer to the difference in index points between the data released on 15 February 2011 and the data released on 12 October 2010.

Source: Office for National Statistics

**Table R4: Revisions to GDP per hour worked - Constant PPPs**

Year	Canada	France	Germany	Italy	Japan	UK	USA	G7	G7 exc. UK
1990	0	0		0	0	0	0		
1991	-	-	-	-	-	-	-	-	-
1992	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0
2009	0	-2	0	0	-1	0	0	-1	-1

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