



ECONOMY AND LABOUR MARKET

Labour Productivity Statistics

2021 Quarter 4 (October to December)

22 June 2022

This publication includes annual and quarterly estimates of labour productivity for Scotland's onshore economy up to the fourth quarter of 2021 (October to December).

Main results

- In 2021, annual labour productivity as measured by output per hour worked remained flat (0.0% growth) compared to 2020. This follows an increase of 0.2% in 2020.
- In 2021 quarter 4, output per hour worked in Scotland has increase by 2.3% compared to the same quarter last year, and is 1.0% above pre-pandemic levels (2019 Quarter 4).
- Although there have been rises and falls in quarterly productivity during the last two years, overall output per hours worked has increased slightly over the course of the coronavirus pandemic. This reflects the fact that the reduction in output during this time was largely mirrored by changes in the amount of hours worked during periods of lockdown and other restrictions on economic activity.
- While output per hour worked remained relatively stable during the last two years, output per job has seen larger changes. This measure of productivity has increased by 8.7% in 2021, after a fall of 10.6% in 2020. This largely reflects the drop in average weekly hours during periods when workers were furloughed and economic activity was restricted.

Information about this release?

Labour productivity measures is the amount of economic output that is produced, on average, by each unit of labour input, and is an important indicator of economic performance.

This publication contains a brief summary of the key results from the latest productivity statistics, focussing in on the headline measures of change in output per hour worked.

Most of the key results are presented in volume (or real) terms, where the effect of price changes has been removed to allow for meaningful comparisons over time. All estimates are for Scotland's onshore economy.

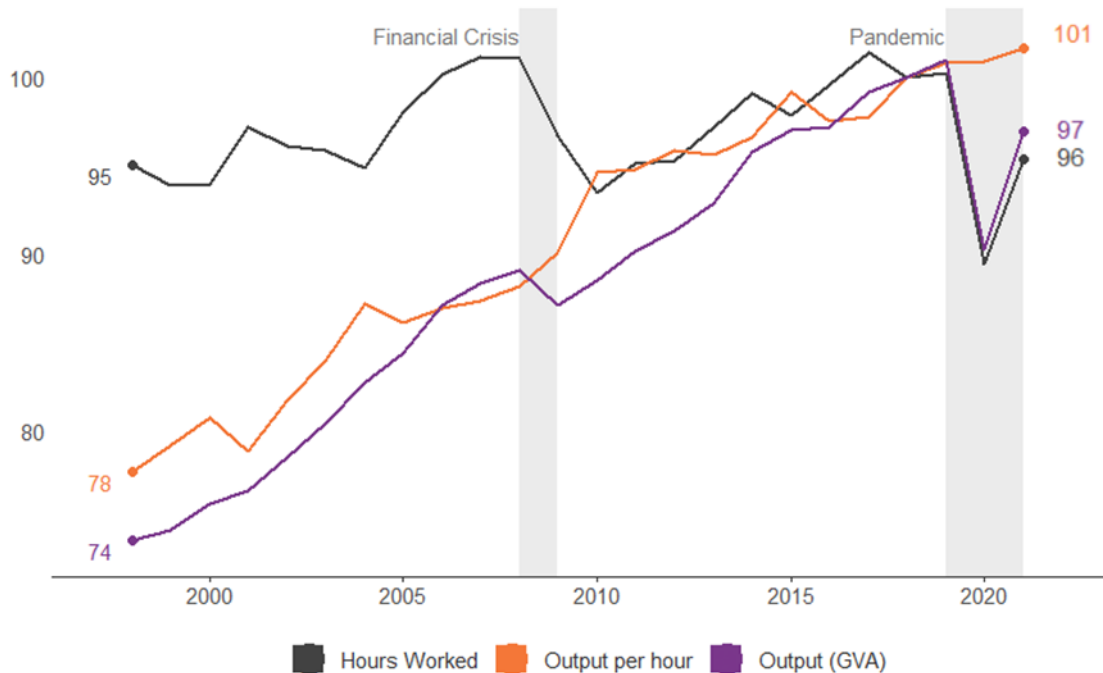
Data

Full results including estimates of output per hour worked, output per job, current price productivity measures (not adjusted for price changes) and estimates of labour productivity by industry are available in online tables.

Latest results

In 2021, annual labour productivity as measured by output per hour worked remained flat (0.0% growth) compared to 2020. This follows an increase of 0.2% in 2020. Annual labour productivity growth rates are based on results for the whole year compared to the previous year.

Chart 1: Annual output (GVA), hours worked and productivity levels, 1998-2021
Indices: 2018 = 100

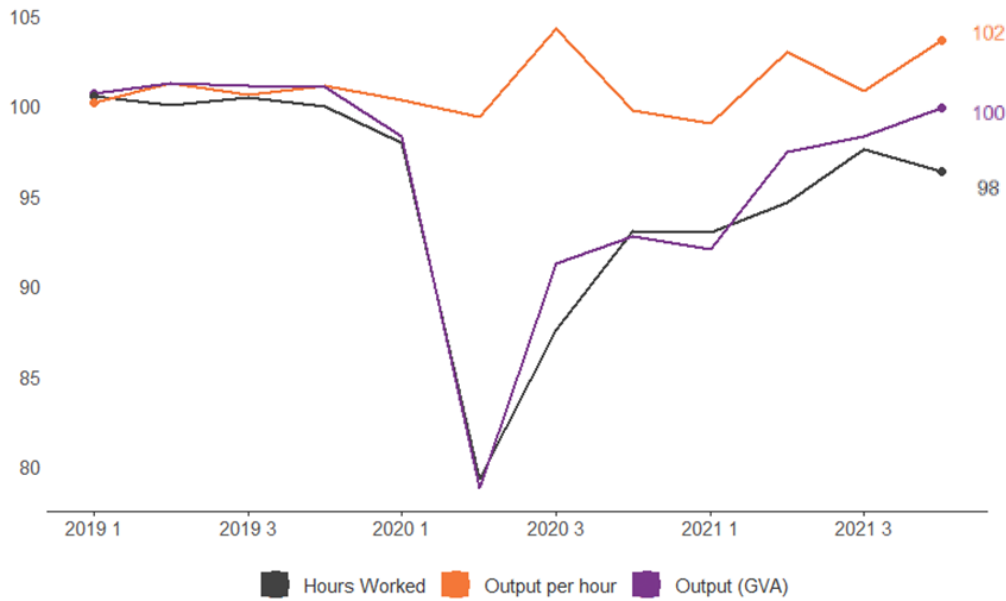


Although there have been rises and falls in quarterly productivity during the last two years, overall output per hours worked has increased slightly over the course of the coronavirus pandemic. This reflects the fact that the reduction in output during 2020, when GDP fell by 10.6%, was largely mirrored by changes in the amount of hours worked during periods of lockdown and other restrictions on economic activity.

In quarterly terms, output per hour worked in Scotland has increase by 2.3% over the year between 2020 Quarter 4 and 2021 Quarter 4. The growth rate over the year is based on how much output per hour worked has changed in total across the latest four quarters.

The increase over the latest 12 months follows a drop of 1.3% over the year to 2020 Quarter 4. Taken together, this means that output per hour worked is 1.0% above the pre-pandemic level of 2019 Quarter 4. This is despite both GVA and hours worked remaining below pre-pandemic levels at the end of 2021, as seen in Chart 2.

Chart 2: Quarterly output (GVA), hours worked and productivity levels, 2019-2021 Indices, 2018=100



Changes in productivity can be simply broken down into growth in output (GVA) minus growth in total hours worked. Therefore, when output grows faster than hours, productivity increases.

In 2021 quarter 4, the increase of 2.3% compared to the same quarter last year is due to GVA growth over the year (7.7%) after the easing of the second period of national lockdown in Scotland being faster than the increase in the total number of hours worked (5.2%). Looking back over the last two years in Chart 3, it can be seen that productivity remained broadly stable relative to the scale of movements in output and hours worked due to the levels of these components largely mirroring each other during the course of the pandemic.

Chart 3: Percentage change in productivity, output (GVA) and hours worked, compared to the same quarter in the previous year, 2019 Q1-2021 Q4



Industry breakdowns

Changes in overall labour productivity can be due to a combination of different factors, including pure productivity improvements (like for like changes) within industries, the allocation (or reallocation) effect of changes to the structure of the economy and labour market, or a combination of both. These effects can be broken down and analysed using the 'Generalised Exactly Additive Decomposition' (GEAD) methodology¹.

Table 1: Industry contributions to total productivity growth between 2019 and 2021

Broad Industry	Labour Productivity Growth	Contribution		
		Total	Pure	Allocation
Non-manufacturing production	-4.2%	0.0%	-0.3%	0.3%
Manufacturing	-7.9%	-0.5%	-0.8%	0.3%
Construction	11.6%	-0.2%	0.7%	-0.9%
Wholesale, retail & hospitality	0.1%	-1.0%	0.0%	-1.0%
Transport & communication	-6.0%	-0.3%	-0.5%	0.1%
Business & financial services	-0.5%	0.3%	-0.1%	0.5%
Public services	-0.7%	2.4%	-0.2%	2.6%
Other Services	9.9%	-0.5%	0.3%	-0.9%
Whole Economy	0.2%	0.2%	-0.9%	1.1%

Table 1 decomposes the cumulative change in productivity over the two years between 2019 and 2021 for each broad industry group, alongside their contributions to total growth in percentage points. Whilst labour productivity growth rates are not additive, the contributions in the table are additive both vertically (summing to the whole economy) and horizontally (summing to the total contribution for each industry).

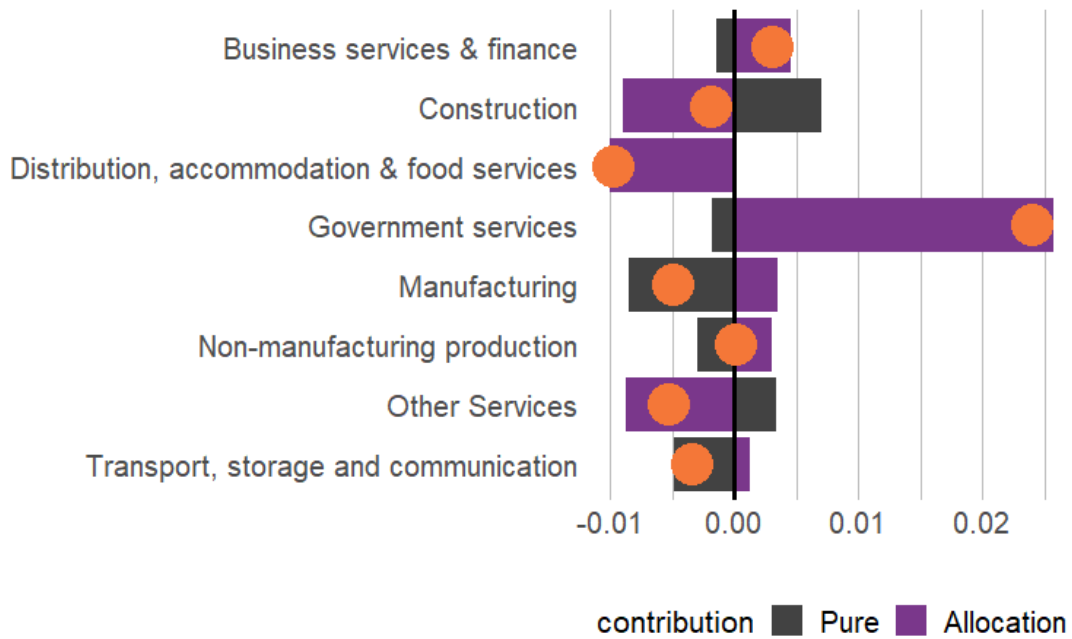
At the whole economy level, the 0.2% increase in productivity over the last two years is broken down into a decline of 0.9 percentage points in pure productivity offset by a positive reallocation effect of 1.1 percentage points. Broadly speaking, this indicates that changes in the relative size of industries and their shares of the labour market acted to increase productivity during the periods that some sectors were impacted by restrictions, despite productivity falling on a like for like basis in many industries and overall.

Between 2019 and 2021, public services (public administration, education and health) made the largest positive contribution to total productivity growth. This is driven by a large positive allocation effect, reflecting in part the increased activity for testing, tracing and vaccinations.

¹ Tang J and Wang W (2004), 'Sources of aggregate labour productivity growth in Canada and the United States', Journal of Economics, Volume 37, Number 2.

There were strong negative allocation effects in wholesale, retail & hospitality, and other services, which includes many of the sectors most strongly affected by lockdown restrictions, reflecting the reduced hours worked in these industries. The results in Table 1 are also shown in Chart 4 below.

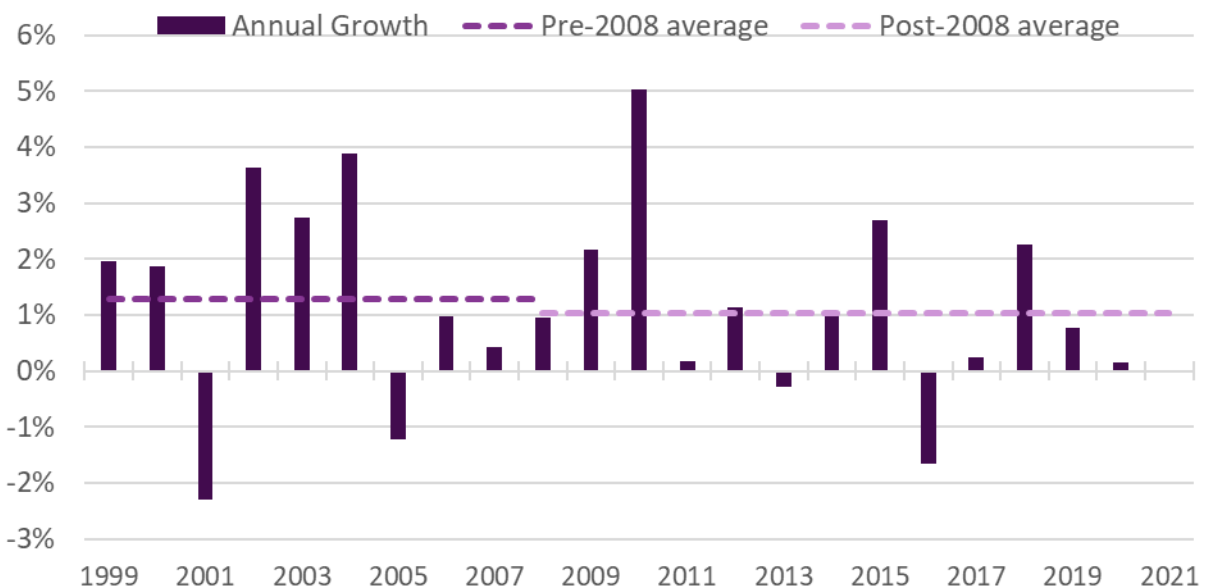
Chart 4: Industry contributions to total productivity growth between 2019 and 2021 (Percentage point contributions to total cumulative change)



Longer term trends

Annual productivity growth can vary widely from year to year. Looking over the longer term it has grown by an average of 1.0% per year since the 2008 financial crisis and onset of recession. In the decade prior to the recession, from 1998 to 2008, output per hour worked increased by 1.3% per year on average, as shown in Chart 5.

Chart 5: Output per hour, percentage change compared to the previous year



The industry decomposition analysis can also be used to look at how things have changed over the longer term. In the decade leading up to the financial crisis, overall productivity growth was 13.5% (1.3% on average, per year). This was driven by increases in pure productivity within industries, but with quite large negative contributions from the allocation effect partially cancelling this out. This can be interpreted as if the structure of the economy and labour market had stayed the same as in 1998 then overall productivity growth would have been 20.4% over this period (around 1.9% per year on average), but the changes in the structure of the economy dampened this growth.

Table 2: Pre-financial crisis industry contributions to total productivity growth between 1998 and 2008

Industry	Labour Productivity Growth	Contribution		
		Total	Pure	Allocation
Non-manufacturing production	14.1%	0.5%	1.1%	-0.6%
Manufacturing	82.1%	-4.3%	14.5%	-18.8%
Construction	-19.1%	1.8%	-1.2%	3.0%
Wholesale, retail & hospitality	7.6%	0.2%	1.1%	-0.9%
Transport & communication	72.5%	0.5%	5.7%	-5.2%
Business & financial services	5.3%	7.2%	1.3%	5.8%
Public services	-12.7%	6.9%	-2.4%	9.2%
Other Services	10.1%	0.8%	0.3%	0.5%
Whole Economy	13.5%	13.5%	20.4%	-6.9%

Table 2 shows that the strongest contribution to productivity growth over the decade was from business & financial services, with a strong positive allocation effect showing the impact of the expanding size of the industry in the lead up to the financial crisis. Public services had the single strongest positive allocation effect due to growth in the decade following devolution. The only industry sector to make a negative contribution to overall productivity growth during this decade was manufacturing, where strong pure productivity growth within the industry was offset by a very large negative allocation effect as the sector shrank from 18% of the economy in 1998 to 12% by 2008.

Between 2008 and 2019, in the years between the financial crisis and the coronavirus pandemic, overall productivity increased by 14.3% in total (1.2% per year, on average). Table 3 shows that this slight slowdown in productivity growth was primarily due to a reduction in the contribution from pure productivity increases. Unlike in the previous decade, the allocation effect makes very little overall contribution at all in these years, with the structure of the economy changing by less than in the previous decade. Business & financial services and public services continued to make the largest contributions to overall growth. Manufacturing made a positive contribution to overall productivity growth during this time, with continued pure productivity growth offsetting the much-reduced negative allocation effect during this time.

Table 3: Post-financial crisis industry contributions to total productivity growth between 2008 and 2019

Industry	Labour Productivity Growth	Contribution		
		Total	Pure	Allocation
Non-manufacturing production	22.3%	0.9%	1.6%	-0.7%
Manufacturing	20.9%	0.4%	2.5%	-2.1%
Construction	5.9%	-0.1%	0.4%	-0.5%
Wholesale, retail & hospitality	9.2%	1.4%	1.2%	0.2%
Transport & communication	50.1%	1.8%	3.7%	-1.8%
Business & financial services	16.0%	5.0%	4.5%	0.6%
Public services	5.7%	4.0%	1.3%	2.7%
Other Services	-16.5%	0.8%	-0.5%	1.3%
Whole Economy	14.3%	14.3%	14.6%	-0.4%

UK and International comparisons of productivity

Productivity data can take longer to compile than other economic statistics, so some of the latest international comparisons available at this time are for 2020 rather than 2021.

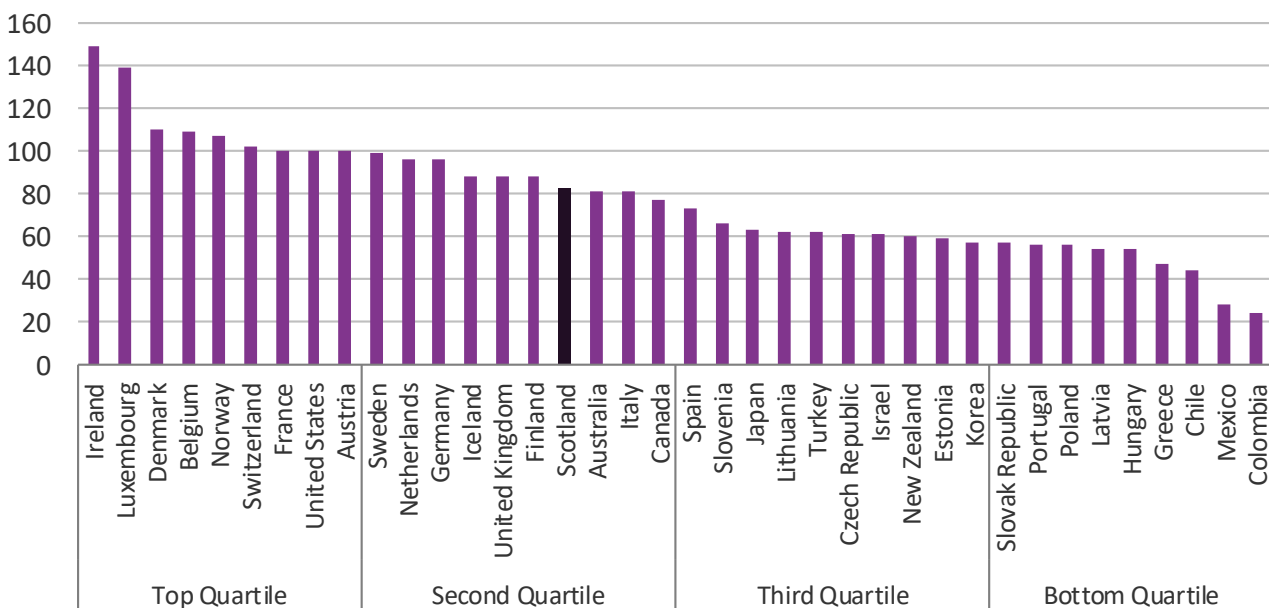
Scotland’s average productivity growth has slowed since the financial crisis, although the exact scale of the slowdown is quite sensitive to the start and end dates used for comparison. This is shown in Table 4 below. Many countries have similarly seen a slowdown in productivity growth during the last decade, particularly since the global financial crisis. Using the period ending in 2020 to allow comparison to the OECD as a whole, between 2008-2020, Scotland’s labour productivity has increased by an average of 1.1% per year. This compares to average annual productivity growth of 0.6% per year for the UK as a whole, and an average of 1.0% per year for both OECD members and the EU.

Table 4: Average annual growth in GDP per hour worked (%)

		1998-2008	2000-2008	2008-2020	2008-2021
Real terms	Scotland	1.3	1.1	1.1	1.0
	UK	1.7	1.4	0.6	0.6
	EU27	1.5	1.2	1.0	0.9
	OECD	n/a	1.2	1.0	n/a

Using the most recent data from the OECD, Scotland’s nominal productivity (the value not adjusted for inflation) was 83% of the level of the USA in 2020, and ranked in 16th place (out of 38 countries, including the UK as a whole) amongst the OECD member states. These comparisons are adjusted for Purchasing Power Parity (PPP) so that differing price levels and exchange rates between countries do not have an effect on the results.

Chart 6: Nominal GDP per hour worked in 2020, OECD countries (USA=100)



About Labour Productivity Statistics

Labour productivity measures the amount of economic output that is produced, on average, by each unit of labour input, and is an important indicator of economic performance.

Labour input is measured in terms of the number of jobs in the economy (giving a measure of output per job), and also the total number of hours worked (giving a measure of output per hour worked). Output per hour worked is usually viewed as the most comprehensive indicator of labour productivity and is thus taken as the headline measure.

Labour productivity statistics presented in volume or **real terms** (where the effects of price changes have been removed) are used to analyse changes in the level of activity over time within a particular country or industry, or to compare growth rates between countries or industries on a consistent basis. Results are indexed to a reference year, set at 2018=100 in this release for consistency with the GDP statistics published by the Scottish Government.

Results presented in nominal terms or **current prices** (unadjusted for the effects of price changes) are used to make comparisons of the relative level (not growth rate) between countries or industries at a particular point in time.

Quarterly movements of labour productivity can be volatile, making short term trends difficult to discern. This is seen even after seasonal adjustment of the series. In this release, all results are seasonally adjusted for the first time after we have stopped using a smoother trend-based labour input series. This is because the methodology used to produce the smoother trends would not give an accurate reflection of movements during the coronavirus pandemic.

Further information on the production and interpretation of these statistics is available [here](#).

What's changed in this release?

Labour productivity estimates are derived using simple calculations on other source statistics and any revisions to these sources of data have a consequent impact on the productivity estimates.

This publication includes revisions to the seasonally adjusted estimates of jobs and hours data due to updated parameters in the seasonal adjustment model. Revisions to GDP statistics are consistent with the latest GDP Quarterly National Accounts. The impact of these revisions can be seen in Tables R1 and R2.

Labour input data are constrained to the [ONS quarterly regional productivity jobs and hours](#). The latest two quarters labour input series are provisional, and based on underlying labour market data at the industry level, constrained to the ONS estimates up to 2021 Quarter 2.

Next publication

The work programme for labour productivity statistics is still being reviewed following changes to the production of GDP statistics starting in 2020. The next release is still to be confirmed.

Please contact us at economic.statistics@gov.scot for more information.

An Official Statistics publication for Scotland

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