

Written evidence submitted by the Office for National Statistics

I write in response to the Treasury Committee's call for evidence for its inquiry into *Jobs, growth and productivity after coronavirus*.

As the Committee will be aware, the Office for National Statistics (ONS) is the UK's National Statistical Institute and the largest producer of official statistics. The ONS aims to provide a firm evidence base for sound decisions and develop the role of official statistics in democratic debate.

Our submission focuses on the following questions in the terms of reference:

- What are the causes of the gap in the UK's level of productivity compared to other advanced economies, and why has productivity growth been persistently weak in the aftermath of the 2007-09 financial crisis?
- Do economic statistics adequately capture growth in the modern economy, and what lessons can be learned from the pandemic about the measurement of economic activity?

I hope this is useful to the Committee, and please do let me know if we can provide any further assistance to this inquiry.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Jonathan Athow', written in a cursive style.

Jonathan Athow

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Office for National Statistics written evidence: Jobs, growth, and productivity after coronavirus inquiry, May 2021

What are the causes of the gap in the UK's level of productivity compared to other advanced economies, and why has productivity growth been persistently weak in the aftermath of the 2007-09 financial crisis?

The UK's productivity performance

Productivity in the UK has grown slowly since the 2008/09 economic downturn, a phenomenon often referred to as “the productivity puzzle”. Before this, productivity growth was typically around 2% per year for the economy as a whole in the UK, although productivity levels were slightly lower than other comparable developed economies. The slowdown in growth since 2008/09 is not unique to the UK, but among the sharpest of developed countries.

During 2020, UK productivity (using the headline measure, output per hour worked) increased slightly, by 0.4% on 2019¹. Many industries experienced a fall in productivity because of the coronavirus pandemic, as ‘furlough’ and lockdown made operations more difficult and costly. However, those industries most affected by the pandemic tended to be lower-productivity industries, such as the accommodation and food services and entertainment industries. As a result, a larger share of the economy in 2020 was in higher productivity industries, and this increased aggregate average productivity – known as a positive ‘re-allocation effect’ - even though many industries did not see significant growth in their productivity.

The Office for National Statistics (ONS) publish a range of statistics on productivity, with industrial and regional breakdowns. The simplest measures are ‘labour productivity’ - the amount of output (measured by gross value added, GVA) produced per unit of labour employed. Labour measures are typically either the number of workers (including the self-employed), or the number of hours worked. The output per hour worked measure is preferred since it accounts for changes in working patterns (e.g. changes in rates of part-time working). Labour productivity measures are published quarterly by the ONS, with an early estimate around 45 days after the end of the reference quarter, and a revised and more detailed estimate around 100 days after the end of the reference quarter.

More complex measures include multi-factor productivity (MFP), which accounts for both labour and capital inputs. Capital assets are those used in production for a year or more, such as buildings, machinery, computer hardware, and some intangible assets such as software. The preferred measure of capital input for productivity statistics is capital services, which is complex to measure, but accounts for the contribution a

¹<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/ukproductivityintroduction/octobertodecember2020>

capital asset makes to the production process. Labour input measures for MFP account for the skills of the workforce as well as their hours worked. MFP estimates produced by the ONS are published quarterly around 100 days after the end of the reference quarter – amongst the most timely in the world. They cover the market sector (excluding government and the charity sector) with a 19 industry breakdown.

The ONS also publish productivity estimates for public services, compiled in a specialist framework given the nature of public service delivery. These are published quarterly in line with other productivity statistics as detailed above, and annually with an approximate 2-year lag². The annual estimates account for changes in the quality of service provision, which requires more data to be gathered³.

During the pandemic, challenges in how we measured productivity have emerged. First, measures of output per hour worked and output per worker have diverged substantially, which is unusual historically. This has been driven by workers on furlough, who are still counted as employed but work no hours – as such, they are included in output per worker, but not within output per hour worked. Adjusting for furloughed workers increases the level of output per worker during 2020, evidencing that furlough has been disproportionately used in less productive industries. The result is similar to the increase in output per hour worked already described.

The productivity puzzle

The causes of the “productivity puzzle” are complex and disputed – the very reason it is known as a puzzle. The academic literature has proposed a range of potential causes or contributing factors, none of which have been found to completely explain the slowdown in growth. A range of popular theories have been summarised in an article by the ONS⁴.

It is beyond the scope of this response to set out all the theories fully, but a summary of popular theories is as follows:

- Structural arguments – the decline of the North Sea oil and gas industry, or changes in financial regulation since the global financial crisis.
- Labour hoarding - businesses held onto workers due to their investments in training and skills, and the costs of staff turnover, reducing reallocation of resources and increasing misallocation of resources.
- ‘Zombie’ firms – low interest rates have enabled low productivity businesses to survive, weighing down aggregate productivity.

²<https://www.ons.gov.uk/economy/economicoutputandproductivity/publicservicesproductivity/articles/publicservicesproductivityestimatestotalpublicservices/totaluk2018>

³<https://www.ons.gov.uk/economy/economicoutputandproductivity/publicservicesproductivity/articles/aguidetoqualityadjustmentinpublicserviceproductivitymeasures/2019-08-07>

⁴<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/productivitymeasurementhowtounderstandthedataaroundtheuksbiggesteconomicissue/2020-03-13>

- Mis-measurement – the growth of the digital economy may have made it harder to measure goods and service in GDP and increased the amount of economic activity outside of GDP.
- Low levels of capital investment – as a result of reduced bank lending in response to the 2008/09 financial crisis, banks’ inability to lend against intangible assets which were becoming increasingly important, large pension deficits reducing available funds for investment, or persistent business and macroeconomic uncertainty.
- Reduced technology diffusion and an increase in productivity dispersion – a slowdown in the rate of ‘catch up’ by businesses at the bottom end of the productivity distribution, relative to the rest of the business population.
- A longer-term slowdown associated with slower technological progress – modern innovations are less substantial than in the past, and/or the rate of adoption of new technologies is slower than before.
- Weak demand – due to higher levels of uncertainty, or for some other reasons, economic demand has been lower and grown slower than in the past, limiting the scope for productivity growth,

The ONS publishes regular analysis on productivity and the productivity puzzle and has invested in data collection to help shed light on these issues. We have run a new wave of the Management and Expectations Survey, which collects valuable data on management practices and business uncertainty. In addition, research using microdata has enabled analyses of “productivity laggards”⁵, business dynamism⁶, and firm-level productivity⁷.

Looking forward, the impact of EU Exit and recovering from the 2020 recession may alter our understanding or perspective of the productivity puzzle.

International comparisons of productivity

International comparisons of all manner of economic statistics are challenging because of differences in data sources, methods and statistical infrastructure across countries. International comparisons of productivity are no different, and indeed perhaps even more challenging since they require production of comparable statistics on output (GDP or gross value added), labour inputs (employment or hours worked), and currency conversions.

When last published in 2018, ONS statistics showed the UK around 30% less productive than the US, Germany and France on an ‘hours worked’ basis⁸. The UK was

⁵<https://www.ons.gov.uk/economy/economicoutputandproductivity/productivitymeasures/articles/understandingfirmsinthebottom10ofthelabourproductivitydistributioningreatbritain/jantomar2017>

⁶<https://www.ons.gov.uk/businessindustryandtrade/changestobusiness/businessbirthsdeathsandsurvivalrates/bulletins/businessdynamismintheukeconomy/quarter1jantomar1999toquarter4octodec2019>

⁷<https://www.ons.gov.uk/economy/economicoutputandproductivity/productivitymeasures/articles/firmlevellelabourproductivitymeasuresfromtheannualbusinesssurveygreatbritain/1998to2018>

⁸<https://www.ons.gov.uk/economy/economicoutputandproductivity/productivitymeasures/bulletins/internationalcomparisonsofproductivityfinalestimates/2016>

also around 10% less productive than Italy, at a similar level to Canada, and about 10% more productive than Japan. The degree of dispersion among developed countries that these estimates imply seems implausibly large - suggesting Japan is 40% less productive than the USA - so the ONS has suspended publication of these statistics since then.

The OECD, part-funded by the ONS, published a report on the comparability of hours worked measures used in productivity statistics across countries⁹. They found that different methods, data sources and adjustments made in different countries led to substantial variation in estimates of hours worked - with implied average working weeks as long as 34 hours in the US (equivalent to an average working day of 6.8 hours), and as short as 27 hours in Germany (equivalent to an average working day of 5.4 hours).

After attempting to align approaches, the differences in estimates of hours worked between countries were generally smaller. The alternate measure of hours worked for the UK was lower, and hence output per hour worked higher, closing the gap between the UK and comparator countries. While these estimates remain uncertain, more work is required to ensure comparable measures are needed to compare variation in levels of productivity between similar economies.

The ONS intends to re-commence publication of statistics on international comparisons of productivity later this year, using a format that better reflects the inherent uncertainty in the comparability of the measures. We are also reviewing our methods for measuring hours worked for productivity calculations and will look to make any necessary changes to improve their quality in due course. Longer term, a collaboration between national statistical institutes and international bodies such as the OECD may help to improve comparability of productivity statistics.

Despite improved measurement, the UK is still thought to be less productive than comparable developed economies. This could be for a range of reasons, including differences in industry composition across countries, low investment levels, the quality of infrastructure, differences in international trade exposure and foreign direct investment, or differences in labour market flexibility or education. Experimental analysis by the ONS for 2014 suggests that the UK exhibits lower productivity than other developed countries in many industries¹⁰. Different experimental ONS analysis also suggests that many regions of the UK are less productive than the majority of regions in other developed European countries, with London and the South East the only exceptions¹¹.

⁹[https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=SDD/DOC\(2018\)12&docLanguage=En](https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=SDD/DOC(2018)12&docLanguage=En)

¹⁰<https://www.ons.gov.uk/economy/economicoutputandproductivity/productivitymeasures/articles/internationalcomparisonsoflabourproductivitybyindustry/2014>

¹¹<https://www.ons.gov.uk/economy/nationalaccounts/uksectoraccounts/compendium/economicreview/apri/2018/regionalandsubregionalproductivitycomparisonsukandselectedeucountries2014>

Do economic statistics adequately capture growth in the modern economy, and what lessons can be learned from the pandemic about the measurement of economic activity?

Capturing growth in the modern economy

Developments in the modern economy present two separate but related problems for measurements of economic growth. Firstly, ensuring our National Accounts sources and methods are equipped to both capture and reveal the sources of economic growth within the well-established boundaries of what constitutes “the economy” within the National Accounts, and secondly, re-examining the extent to which recent developments have fundamentally re-shaped what “the economy” is, such that a substantial portion of what people think of as “the economy” falls outside the traditional scope of National Accounts.

A key feature of the modern economy which lies within the boundaries of GDP is the proliferation of digital goods and services, known as the “Digital Economy”. The ONS are engaged in international efforts, such as the Digital Economy Task Force and the OECD’s Working Party for Measuring and Analysing the Digital Economy, to both better define as well as measure the digital economy. Definitionally, what is thought of as the “digital economy” presents an issue for statistical offices as it is often contextual and evolves quickly over time. There is a broad consensus in the internal community (e.g. exemplified by the Roadmap Toward a Common Framework for Measuring the Digital Economy¹²) that any definition needs to support a framework of digital-economy measurements, which can then be used to tailor relevant domestic measures of the digital economy. These dimensions include whether products are digital in nature, use digital products in their production process, or are sold via Digital Intermediary Platforms. The central framework to deliver this tailored approach is through a Digital Supply-Use Table (DSUT), which extends traditional Supply-Use tables by breaking them down further by these additional dimensions. We are engaging both with the international work to develop the framework of these tables, as well as research into the feasibility of their application within the UK.

Moving beyond, but still building upon, the current international framework for measuring the economy (the System of National Accounts 2008), the ONS are undertaking research into additional Intellectual Property Products - commonly referred to as intangible capital. Investment in intangible capital is often theorised as a key source of economic growth for high income, service-led economies. The current status of intangible assets for which we have produced estimates¹³, as well as whether these are currently included within National Accounts, are summarised in the table below.

Broad category	Type of Intangible Asset	Capitalised in the National Accounts?
¹² http://www.oecd.org/sti/roadmap-toward-a-common-framework-for-measuring-the-digital-economy.pdf	¹³ https://www.ons.gov.uk/economy/gdp/grossdomesticproductandproductivity/tables/supply-use-tables/experimental-estimates-of-investment-in-intangible-assets-in-the-uk-2015/2018	

Computerised Information	Software and databases	Yes
	Research and development	Yes
	Mineral exploration and evaluation	Yes
Innovative Property	Entertainment, literary and artistic originals	Yes
	Design	No
	Financial product innovation	No
	Branding	No
Economic Competencies	Organisational capital	No
	Firm-specific training	No

Estimates for investment in these intangible assets (capitalised and uncapitalised) over the past decade suggest they may constitute around half of all investment in the UK, and so could play a central role in understanding and capturing growth in the modern economy.

In addition to these categories of intangibles for which we have been able to produce estimates, we are also engaged in an international discussion around the definition and possible measurement of data within the National Accounts. While the proliferation of data and its importance within the modern economy is well documented (e.g. in the recent OECD paper *Perspectives on the Value of Data and Data Flows*¹⁴), national statistics institutes and international organisations are working in collaboration to identify how data, as an asset, can be included in a National Accounting framework. Some of the key questions under review are whether data are produced assets (i.e. fixed capital) or whether they are non-produced (i.e. not capital), whether data (e.g. the recorded temperature outside, one's GPS co-ordinates, an online movie review) can be sufficiently distinguished from the 'observable phenomenon' (e.g. the actual temperature outside, one's location, or one's opinion about a movie) they are recording, and how these can be valued. Given the increasing prominence of data in production and consumption processes across the economy, the outcome of these questions may have an important impact on the measurement of economic growth in the future.

The ONS also have several workstreams looking beyond GDP to broader measures of what constitutes 'the economy', and what a modern approach to measuring it should look like. Our Spectrum framework¹⁵ seeks to place GDP as just one point on a continuum of what constitutes 'the economy' – from a restrictive definition including just the market economy on one side, to an expansive definition including household production, additional intangible investment, environmental asset degradation, and

¹⁴ <https://www.oecd-ilibrary.org/docserver/a2216bc1-en.pdf?expires=1619776726&id=id&accname=guest&checksum=88B8D5F81B40C5EB18D85527EA35DCDB>

¹⁵ <https://www.escoe.ac.uk/publications/gdp-and-welfare-a-spectrum-of-opportunity/>

more. We plan to release a paper soon which provides estimates for these different definitions of ‘the economy’, their trends over time, and as a result shed light on the extent to which the extent of growth over the past decade depends on which of these definitions we choose.

We are currently seeking funding for research into the measurement of inclusive wealth, as recommended by the Dasgupta Review¹⁶. Using this as a primary measure of the economy would shift focus away from flows of income, production, and expenditure in a particular year – as is the case for GDP – to the stock of resources available to the UK in a particular year, and how this may have changed. According to the report, this shift in perspective may place greater emphasis on the sustainability of the economy. Inclusive wealth includes within it the productive capital already measured as part of the National Accounts and adds Natural Capital and Human Capital. The ONS already publishes estimates for both. However, the Dasgupta Review proposes extending beyond the traditional National Accounts approach of measuring using market prices, instead advocating ‘accounting prices’, which would include the value of externalities associated with different capitals. Researching this approach to measuring the economy may help understand the extent to which previous economic growth, as defined by GDP, may have been founded on unsustainable practices. As a result, this could help indicate whether shifting production and use of produced, natural, and human capital could cause traditional, GDP-like measures of the economy to suggest a slowdown in economic growth, while the improved sustainability of those practices could show an improvement to the economy as measured by inclusive wealth.

Measurement of economic activity during the pandemic

The first key lesson from the pandemic is that headline volume or “real” estimates of GDP may be less comparable between countries than usual. Whilst all countries comply with the same international statistical guidance, differences in the methods used to estimate non-market output such as healthcare and education can significantly impact relative GDP performance. Understanding the relative impacts of these methodological differences, as described in our February 2021 analysis¹⁷, is important for measures of productivity as these National Account measures define the measure of output used in productivity calculations.

The second key lesson has been around the need to consider the degree to which capital is utilised. A machine in a factory which employees cannot enter due to furlough will still exist but will no longer be contributing towards the production of output. We therefore need to discount the quantity of capital services from capital items which are not being utilised. This acts to reduce the contribution from capital and commensurately increase the contribution from multi-factor productivity, which is often considered akin to

¹⁶ <https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review>

¹⁷ <https://www.ons.gov.uk/economy/grossdomesticproductgdp/articles/internationalcomparisonsofgdpdurinthe冠onaviruscovid19pandemic/2021-02-01>

the recipe by which capital and labour are combined to produce output. The best way to undertake this utilisation adjustment is a subject currently under review. Whilst we have implemented a simple method using weighting for hours worked¹⁸, our researchers will shortly publish further work into this question via the Economic Statistics Centre of Excellence (ESCoE), which we can send to the Committee.

The third lesson relates to public service productivity. This series accounts for government output adjusted for the quality of the outcome achieved. We quality adjust to account for the fact that when a service is free at the point of delivery, there is no price to reveal whether consumer's valuation of the product has changed in the light of improvements in quality.¹⁹ Using methods developed following the Atkinson Review²⁰ and described in a recent ONS journal article²¹, the UK is a world-leader in quality adjusting public services. The key question the pandemic asks us is whether the measures we use to quality-adjust services in normal times are equally applicable to the 2020-21 pandemic, or should be revised to reflect those unique circumstances and the changes in public services offered in this period. We are in the process of establishing an academic working group to support ONS development in this area.

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¹⁸<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/ukproductivityintroduction/julytoseptember2020#multi-factor-productivity>

¹⁹ An example we may illustrate this problem looks at the three methods to value public services: assuming inputs equal outputs, directly measuring outputs or adjusting measures of output for quality change. Taking an example of 100 operations delivered for £100 each in year 1, where all the patients show health improvements, let's imagine that in year 2, 200 operations are delivered, each costing only £50, but all patients experience extremely negative health impacts. If one just measures inputs, total spend remains the same, so there is no output growth. If one measures the output (number of operations), output has doubled, but if one quality adjusts for the health impacts, one can see that output has collapsed. In this example, the three methods give radically different results which may distort how one views the service.

²⁰ <https://webarchive.nationalarchives.gov.uk/20160105160709/http://www.ons.gov.uk/ons/guide-method/method-quality/specific/public-sector-methodology/articles/atkinson-review-final-report.pdf>

²¹ Grice, J., Foxton, F., Heys, R., & Lewis, J. (2019) 'Measuring Government Output: Twenty Years Of Lessons following the Atkinson Review' https://ec.europa.eu/eurostat/cros/content/measurement-public-goods-lessons-10-years-atkinson-united-kingdom-fred-foxton-joe-grice-richard-heys-james-lewis_en