



# Access and Usage of Productivity Data

Richard Heys, ONS  
Rebecca Riley, King's ESCoE, and TPI  
Raquel Ortega-Argiles, Manchester and TPI  
Paul Mizen, ESCOE and Nottingham  
Bart van Ark, Manchester and TPI



# Session Purpose



Understanding and addressing the causes of the UK's productivity challenges is the aim of ESRC's multi-year investment in productivity research via the TPI.

This session aims to highlight some of the emerging findings from this research—which are more important in the context of the current uncertain global economic situation—and the implications of the research for policymakers, business and places.

- New evidence from linked business data
- New laboratory possibilities and regional data
- Evidence from new data sources
- New international comparisons

# Panellists



Richard Heys, Deputy Chief  
Economist, ONS  
*Chair*



Rebecca Riley, King's  
College London, ESCoE, TPI  
*New evidence from linked  
business data (pp. 4-9)*



Raquel Ortega-Argiles,  
University of Manchester, TPI  
*TPI Productivity Lab: Sub-national  
productivity data (pp. 10-31)*



Paul Mizen  
University of Nottingham  
*Measuring Productivity Using  
Decision Maker Panel Data  
(pp. 32-47)*

Bart van Ark  
University of Manchester, TPI  
*Data for International  
Productivity Comparisons  
(pp. 48-59)*



# New Evidence from Linked Business Data

Rebecca Riley

TPI/ESRC Special Session: Access and Usage of Productivity Data  
Royal Economic Society Annual Conference

3 April 2023

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*Disclaimer: This work was produced using statistical data from ONS. The use of the ONS statistical data in this work does not imply the endorsement of the ONS in relation to the interpretation or analysis of the statistical data. This work uses research datasets which may not exactly reproduce National Statistics aggregates.*

# New longitudinal survey data on management practices for GB

Large business survey on management and expectations, multi-sector - Executed by ESCoE and ONS

**Wave 1** dispatched in July **2017** (ONS)

25,000 firms sampled from Annual Business Survey

**Wave 2** dispatched in November **2020** (UKRI-ESRC)

50,000 firms sampled from Annual Business Survey, the IDBR and MES Wave 1 respondents

**Wave 3** likely dispatch in Summer **2023** (HMT)

Questions on:

Management practices (WMS, MOPS)

Subjective expectation questions, asking probability distributions of forecasts

Additional Covid related questions in Wave 2

In 2016, how many days training and development, on average, have managers and non-managers undertaken within this business?  
Include: formal training and informal 'on the job' training.

Please  one box for each column

	Managers	Non-managers
a. Less than a day.....	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
b. 1 day.....	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
c. 2 - 4 days.....	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
d. 5 - 10 days.....	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
e. More than 10 days.....	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

In 2016, how many key performance indicators were monitored within this business?  
Examples: Sales, cost, quality, customer satisfaction, timely service delivery, waste.

Please  one box only

a. 1-2 key performance indicators.....	<input checked="" type="checkbox"/>	} Go to Question 7
b. 3-9 key performance indicators.....	<input checked="" type="checkbox"/>	
c. 10 or more key performance indicators.....	<input checked="" type="checkbox"/>	
d. No key performance indicators.....	<input checked="" type="checkbox"/>	} Go to Question 8

# Structured management practices help firms adapt to unexpected shocks ...

## Collect detailed novel data to investigate how management practices may allow firms to adapt their working practices

Data pre/post-pandemic on MP, working practices, outcomes for 12k GB firms

Link MES to BICS (Business Insights and Conditions Survey), outcomes for 1k GB firms

## Covid-19 pandemic provides large, unforeseen pressure to adapt

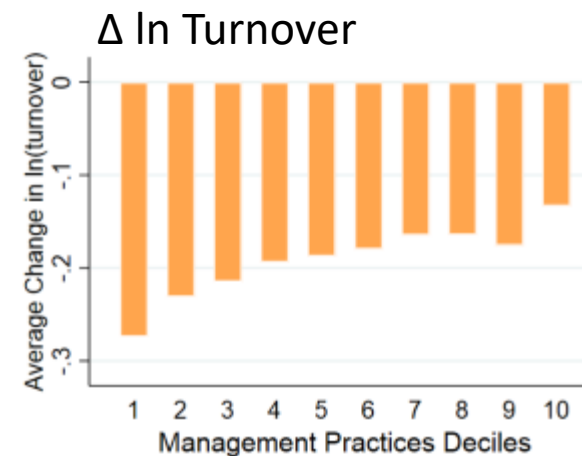
Natural experiment, comparing outcomes of more and less well managed firms before and during/after the pandemic

## Better managed firms adopt homeworking and online sales more extensively and see smaller fall in turnover

They adopt many ancillary innovations to make change stick

## Effect is significant, robust, stronger in more exposed industries, and persists in the long run

In the long run, better managed firms adopt hybrid model



*Li, Mizen, Riley,  
Schneebacher (2023)  
"Are Better Managed  
Firms more Resilient and  
Adaptable to Shocks?"*

... and help firms make better predictions, enabling better decisions,

### Collect novel data to investigate how management practices may support firms' decision making

Data on MP and micro and macro expectations for 20k GB firms (8k 2017 and 12k 2020)

### Measure firms' ability to forecast future outcomes that affect ability to make good business decisions

Link MES to ABS/BSD in later years to recover prediction errors

### Better managed firms knowingly make more accurate micro and macro predictions

Exploit cross-sectional differences in forecast accuracy to study the relationship with management capabilities

Stylised facts consistent in two MES cross-sections

*Bloom, Kawakubo, Meng, Mizen, Riley, Senga, Van Reenen (2021) "Do Well Managed Firms Make Better Forecasts?", NBER 29591*

The example below will help you to complete questions 22, 24, and 26

**Example A:**

Jane Smith is filling out this survey for Business A. In 2016, Business A had approximately £4,500,000 in turnover, with a forecast of £4,750,000 in 2017.

For calendar years 2016 and 2017, what are the approximate values of turnover, including exports and other receipts within this business? If applicable exclude freight charges, excise taxes and value added tax.

For 2016 calendar year..... £    4,  5 0 0,  0 0 0

Forecast for 2017 calendar year..... £    4,  7 5 0,  0 0 0

The example below will help you to complete questions 23, 25, 27 and 29

**Example B:**

Jane also knows that turnover at Business A is forecast to grow approximately an additional 5% in 2018, with predicted annual value of turnover of £5 million. However, Jane knows there is some uncertainty with that forecast and that the value of turnover next year could be more or less than £5 million depending on consumer demand, changes in prices, and other uncertainties in the market. Given this uncertainty, Jane estimates that turnover will be between £2.8 million and £7.5 million, and thinks the likelihood of each scenario is as shown in the table below.

Looking ahead to the 2018 calendar year, what is the approximate value of turnover you would anticipate for this business in the following scenarios, and what likelihood do you assign to each scenario?

2018 scenarios, from lowest to highest	Approximate turnover in 2018	Percentage likelihood (values in this column should sum to 100)
LOWEST	£ <input type="text"/> <input type="text"/> <input type="text"/> 2, <input type="text"/> 8 0 0, <input type="text"/> 0 0 0	<input type="text"/> <input type="text"/> 5 %
LOW	£ <input type="text"/> <input type="text"/> <input type="text"/> 4, <input type="text"/> 2 0 0, <input type="text"/> 0 0 0	<input type="text"/> <input type="text"/> 1 0 %
MEDIUM	£ <input type="text"/> <input type="text"/> <input type="text"/> 5, <input type="text"/> 0 0 0, <input type="text"/> 0 0 0	<input type="text"/> <input type="text"/> 6 0 %
HIGH	£ <input type="text"/> <input type="text"/> <input type="text"/> 6, <input type="text"/> 3 0 0, <input type="text"/> 0 0 0	<input type="text"/> <input type="text"/> 2 0 %
HIGHEST	£ <input type="text"/> <input type="text"/> <input type="text"/> 7, <input type="text"/> 5 0 0, <input type="text"/> 0 0 0	<input type="text"/> <input type="text"/> 5 %
	<b>Total</b>	<input type="text"/> <input type="text"/> 1 0 0 %

## ... but wide dispersion of management quality persists

### Collect novel data to explore why few firms seek to improve their management practices

Longitudinal data on changes in MP from two waves of the MES, 2500 firms 2016-2019 and 12000 firms 2019-2020

Offer feedback to survey respondents, construct a website to deliver feedback, and offer a free mentoring programme

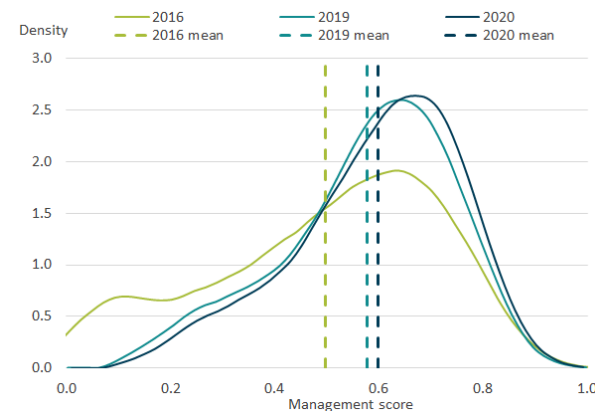
Qualitative questions on barriers to management added to BICS, 6000 firms

### Within firm improvements in management scores

Correlate with lower scores (mean reversion), qualified management and investment in consultancy services

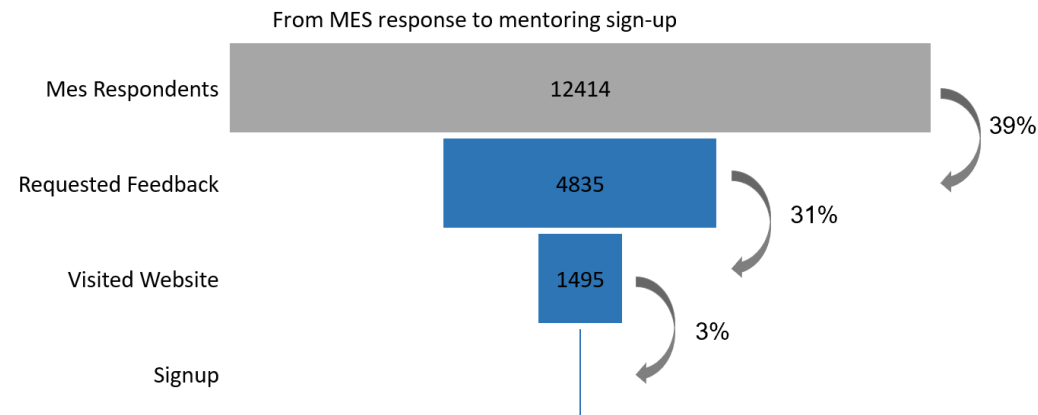
### The worst managed firms are least likely to seek help and more likely to claim not to face any barriers to improving their management practices

*Meng, Mizen, Riley, Schneebacher (2023) "Who Wants to Improve their Management? Evidence from UK Microdata"*



Overall, management practices have improved since 2016

### The leaky pipeline





# Concluding remarks

## Business data collection & linking

- New analysis suggests the ability of firms to anticipate and adapt, or resilience, is enhanced by structured management practices
- Policy response should consider selection and other barriers
- MES is available for wider use in the Secure Research Service

## Benefits

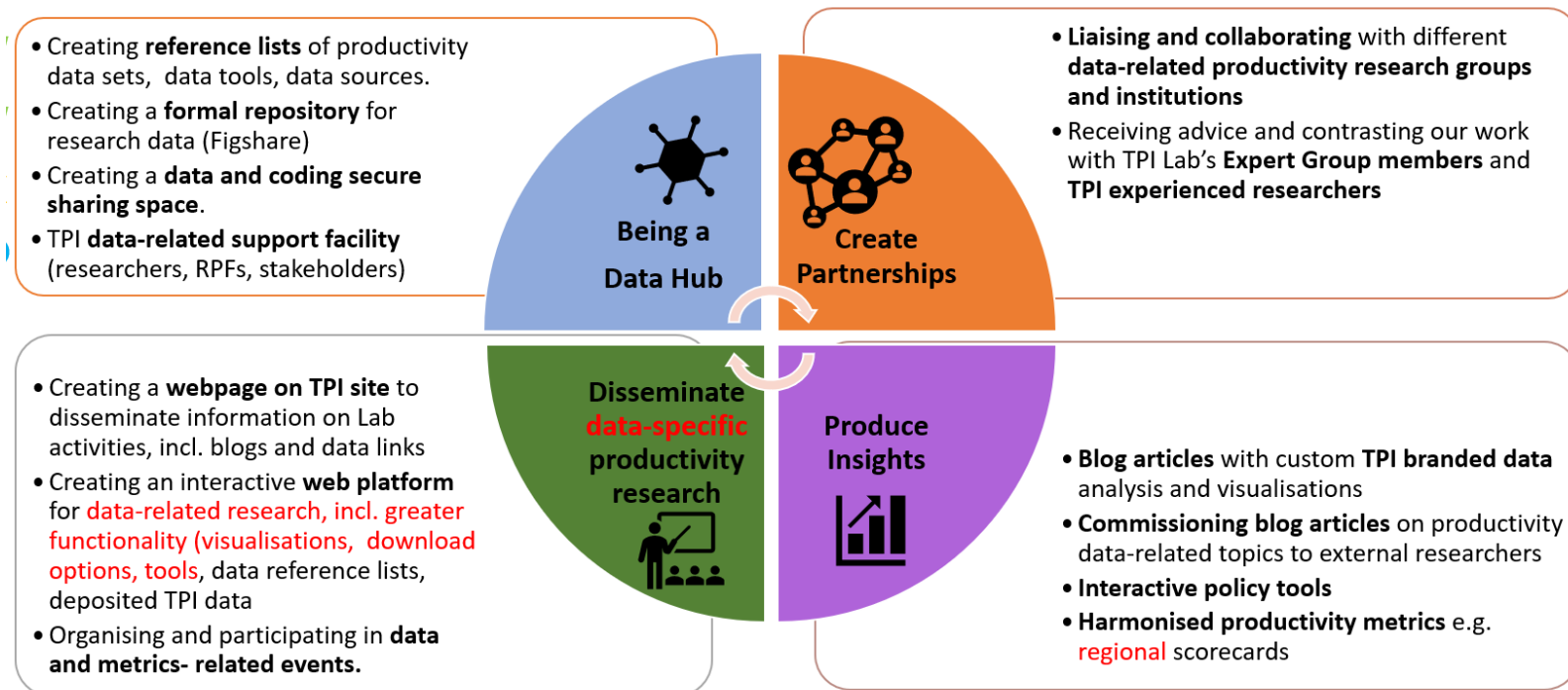
- Of academic collaboration with statistical agencies
- Of enhancing UK business data for unlocking productivity puzzles
- Of facilitating wider access and reducing cost of use, if we want to encourage study of UK issues

# TPI Productivity Lab

## Sub-national productivity data

Professor Raquel Ortega-Argilés

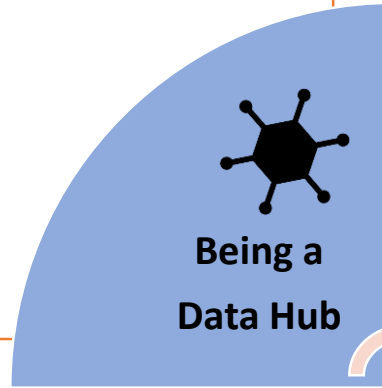
The TPI's **data science centre of excellence**, the “engine room” for data-related activities.



*A scientific platform for **collecting, disseminating, and producing productivity data**, and experimenting with different analytical methods rooted in econometrics and data science.*

# Productivity Lab's Main Areas of Activity

- ✓ • Creating **reference lists** of productivity data sets, data tools, data sources.
- ✓ • Creating a **formal repository** for research data (Figshare)
- X • Creating a **data and coding secure sharing space**.
- • TPI **data-related support facility** (researchers, RPFs, stakeholders)



- • **Liaising and collaborating** with different **data-related productivity research groups and institutions**
- ✓ • Receiving advice and contrasting our work with TPI Lab's **Expert Group members** and **TPI experienced researchers**

- ✓ • Creating a **webpage on TPI site** to disseminate information on Lab activities, incl. blogs and data links
- • Creating an interactive **web platform** for **data-related research**, incl. **greater functionality (visualisations, download options, tools, data reference lists, deposited TPI data)**
- X • Organising and participating in **data and metrics- related events**.



- ✓ • **Blog articles** with custom **TPI branded data** analysis and visualisations
- ✓ • **Commissioning blog articles** on productivity data-related topics to external researchers
- X • **Interactive policy tools**
- ✓ • **Harmonised productivity metrics** e.g. **regional** scorecards

✓ ongoing

○ under development

X planned

# TPI Lab website

Member Login

UKRI Economic and Social Research Council

[Research](#) [Business](#) [Policy](#) [The Productivity Lab](#) [Our People](#) [Resource Centre](#) [About us](#)

## The Productivity Lab

The Productivity Laboratory is our data science centre of excellence, the “engine room” for collecting, disseminating, and producing productivity data. We provide data-based insights for researchers, policymakers and business strategists, employing analytical methods rooted in econometrics and data science.

[Home](#) > The Productivity Lab

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# TPI Lab: Regional focus

HIGHLIGHTS **REGIONAL** NATIONAL INTERNATIONAL ABOUT

Filter by scale **FIRM-LEVEL** INDUSTRY-LEVEL MACRO-LEVEL

## Overview Regional Databases

A list of worldwide databases with information on regions.

READ MORE >



The TPI Productivity Scorecards for English Regions and Devolved Nations

REGIONAL | MACRO-LEVEL



Analysing sub-national productivity in the UK: Controlling for the 'London effect', ONS Subregional Productivity 2022 release

REGIONAL | MACRO-LEVEL



Overview Regional Databases

REGIONAL |

# UK Subnational Data

UK “Subnational” – statistically international comparable - data include:

The ones provided for the 12 International Territorial Level 1 (ITL1) **areas in the UK**, including Northern Ireland, Scotland, Wales and the nine English regions.

The 41 ITL2 **UK areas** - English counties and groups of counties; Scottish combinations of council areas; groups of unitary authorities in Wales and Northern Ireland.

The 179 ITL3 **UK areas** – English counties, unitary authorities, local authority districts, some grouped; Scottish combinations of council areas; groups of unitary authorities in Wales and local government districts in Northern Ireland.

The “**local administrative units**” (LAUs) – LAU1. They act as a building block to ITL and NUTS geographies and also to the functional urban areas and OECD metropolitan areas typologies. England and Wales ~ Local Government Districts.

The next review exercise is expected to be in 2024.



Level	Minimum population	Maximum population
ITL 1	3 000 000	7 000 000
ITL 2	800 000	3 000 000
ITL 3	150 000	800 000

Source: ONS

# Overview of UK Sub-national (Official) Databases

## [ONS Regional Productivity Database](#)

This dataset provides information on productivity per job and per hour basis, at three different levels of geographical aggregation ([ITL1, 2 and 3](#)), for the period 2002-2020.

## [ONS Subnational Indicators Explorer](#)

Compare a local authority and the UK average (median) local authority by indicators such as weekly pay and healthy life expectancy.  
You can also add and compare up to three other local authorities.

## [ONS Region by Industry labour productivity](#)

Productivity hours, productivity jobs, output per hour, and output per job by UK ITL1 regions (and devolved nations) and industry section. Quarterly Experimental Statistics 1998-2019.

## [ONS Quarterly country and regional GDP](#)

Covering economic activity across the UK up to the end of the second quarter (Q2) of 2021 (April to June). It cover the nine regions of England plus Wales, with data for Scotland and Northern Ireland provided by the devolved administrations.

## [OECD regional productivity](#)

The OECD Regional Database provides a unique set of comparable statistics and indicators on about 2000 regions in 30 countries.

## [OECD municipal productivity](#)

Compare the performance of nearly 300 metropolitan areas in OECD countries on 45 key indicators.

## [Eurostat regional productivity](#)

## [European City Statistics \(Urban Audit\)](#)



# New additions: UK Sub-national Data, examples

<b>UK Government Policy Departments</b>	<a href="#">House of Commons Library – Regional and National Economic Indicators</a> Summary tables providing the latest key economic data for the regions and nations of the UK (GDP growth, GDP per head levels, average earnings levels, etc.) mainly from ONS or government departments. Forecasts of Economic Growth from Oxford Economics	<a href="#">Labour market statistics: UK regions and countries - House of Commons Library (parliament.uk)</a>
		<a href="#">House of Commons Library – Average earning by age and region</a>
		<a href="#">Rural Productivity and Gross Value Added (GVA) statistics</a> , Department for Environment, Food and Rural Affairs
<b>Experimental Data</b>	<b>ESCoE – Early estimates (“nowcasts”) of regional gross value-added quarterly data for 2021.</b> Estimates for the regions and the nations of the UK that match up to the time period over which equivalent UK data is currently available.	
	<b>Urban Big Data Centre; Alan Turing Institute; Urban Observatory</b>	
	<b>Input-Output regional attempts: Scottish (Strathclyde), Wales (Cardiff), 4 devolved administrations (ESCoE), 41 UK ITL2 regions (SEIM-UK).</b>	

- The UK exhibits some of the **highest regional and subregional productivity inequalities** among industrialised countries.
- There is a very **wide variation in productivity levels between London and its hinterland and the rest of the UK**, except for some parts of eastern Scotland.
- The UK is characterised by **significant differences in productivity over very short distances** by international standards.

Regional – Jan 9th, 2023

# Analysing sub-national productivity in the UK: Controlling for the ‘London effect’, ONS Subregional Productivity 2022 release

This blog describes the latest UK sub-national statistical productivity data released by the Office for National Statistics (ONS), the [ONS Subregional Productivity July 2022 release](#). This dataset provides information on productivity per job and per hour basis, at three different levels of geographical aggregation (ITL1, 2 and 3), for the period 2002-2020. Based on this dataset, we will focus in this first blog on productivity across UK regions at the ITL2 level (of which there are 40 and include Northern Ireland, counties in England, groups of districts in Greater London, groups of unitary authorities in Wales and groups of council areas in Scotland).

Subsequent blogs will leverage the more detailed regional information at the ITL3 level to delve deeper into the relative productivity performance within sub-regions in the UK (of which there are 174, including counties, unitary authorities, or districts in England, groups of unitary authorities in Wales, groups of council areas in Scotland and groups of districts in Northern Ireland). The latter level of productivity measurement has also been used in the Insights Papers for the [Regional Productivity Forums](#) of The Productivity Institute.

## Authors

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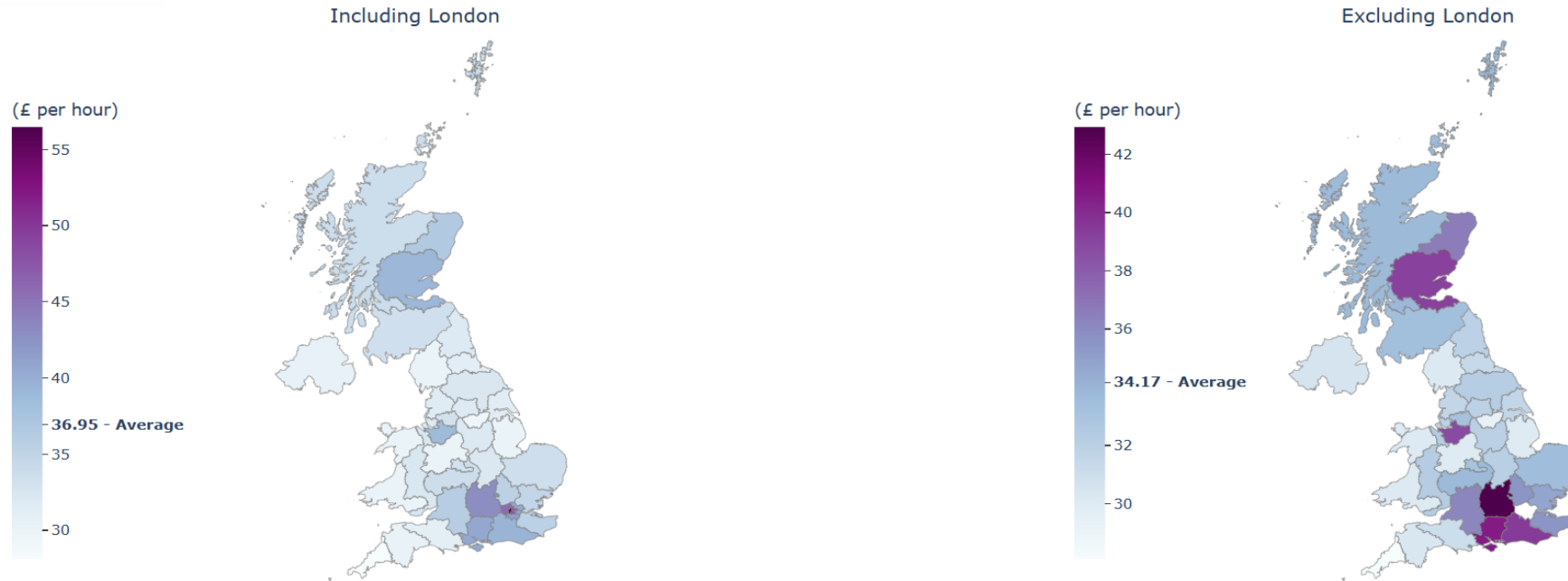
## Published

16/01/2023

# UK Interregional productivity differences



2019 Nominal (smoothed) GVA per hour worked by ITL2 sub-region



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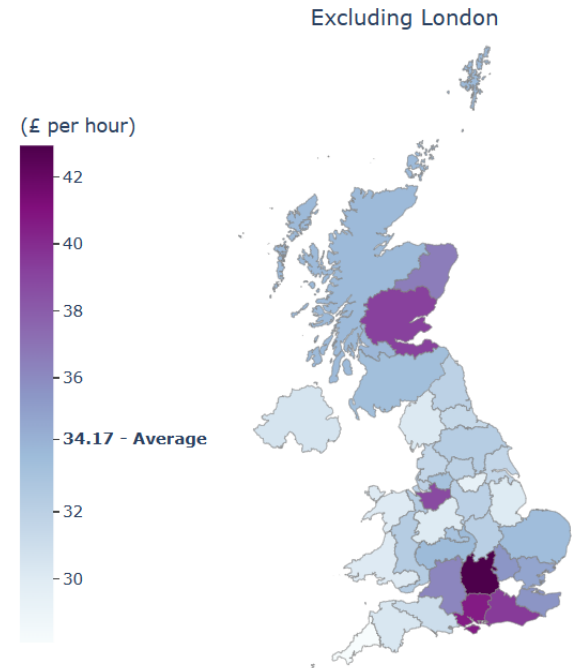
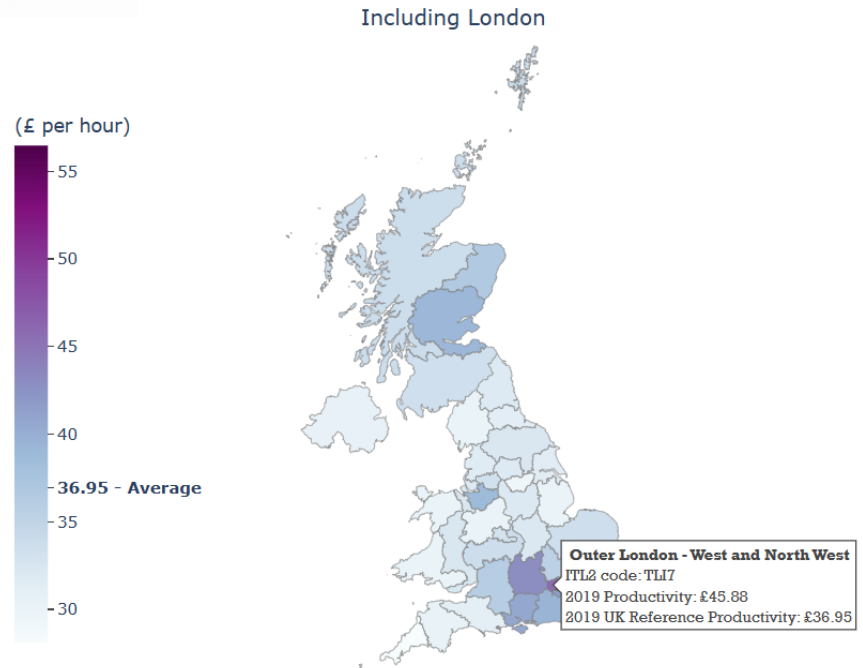
Notes: UK reference productivity is the weighted average productivity of the ITL2 regions included in each map. Aggregations based on TPI calculations. The excluded London region is defined as the ITL1 region with code "TL1"

Source: TPI visualisation, based on ONS Subregional Productivity July 2022 release

We compare the regional variation in ITL2 productivity levels relative to the national UK ITL2 productivity level average, measured as gross value added per hour worked (£36.95) with the same figure **EXCLUDING ITL1 London (£34.17)** based on ONS 2022 values.

# UK Interregional productivity differences

2019 Nominal (smoothed) GVA per hour worked by ITL2 sub-region



Notes: UK reference productivity is the weighted average productivity of the ITL2 regions included in each map. Aggregations based on TPI calculations. The excluded London region is defined as the ITL1 region with code "TL1"

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Source: TPI visualisation, based on ONS Subregional Productivity Julv 2022 release

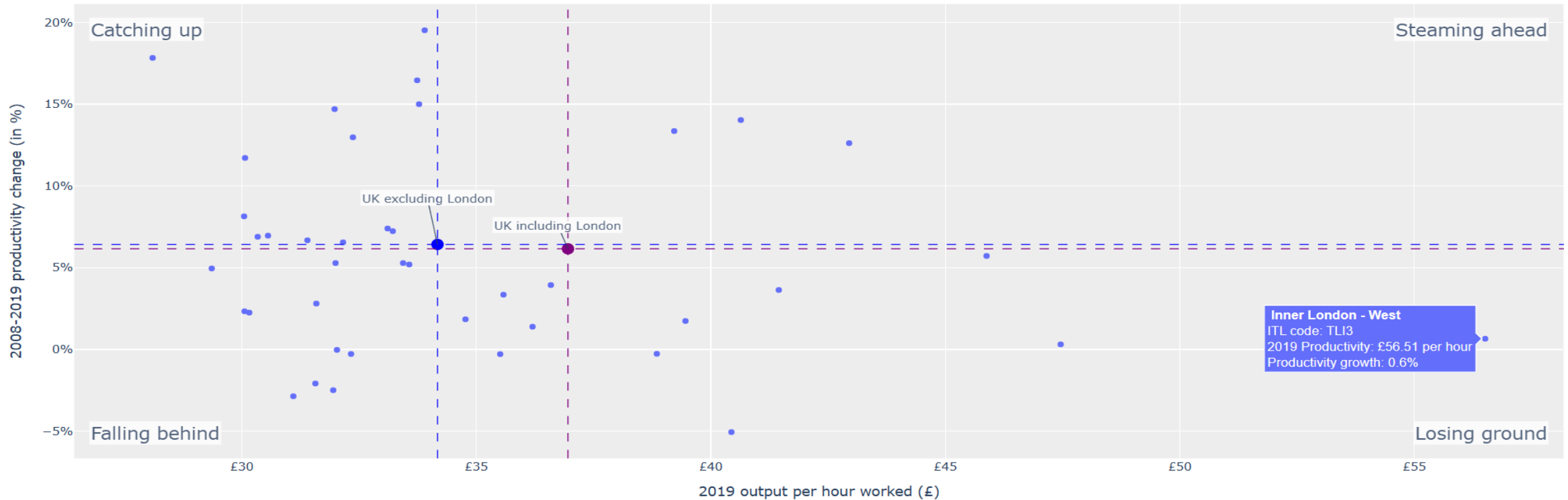
Excluding the “London effect” allows us to (1) understand the “**hidden granularity**” behind the London productivity dominance, (2) compare sub-national regional productivity relative to a “**fairer**” comparable average productivity level.

# Changes in UK sub-national productivity

## 2008-2019 UK Productivity Matrix



2019 Nominal smoothed GVA per hour, vs. average 2008-2019 productivity change  
By ITL2 region



Notes: UK reference productivity is the weighted average productivity of the ITL2 regions included in the aggregate. Aggregations based on TPI calculations. The included London region is defined as the ITL2 region with code "TL1".

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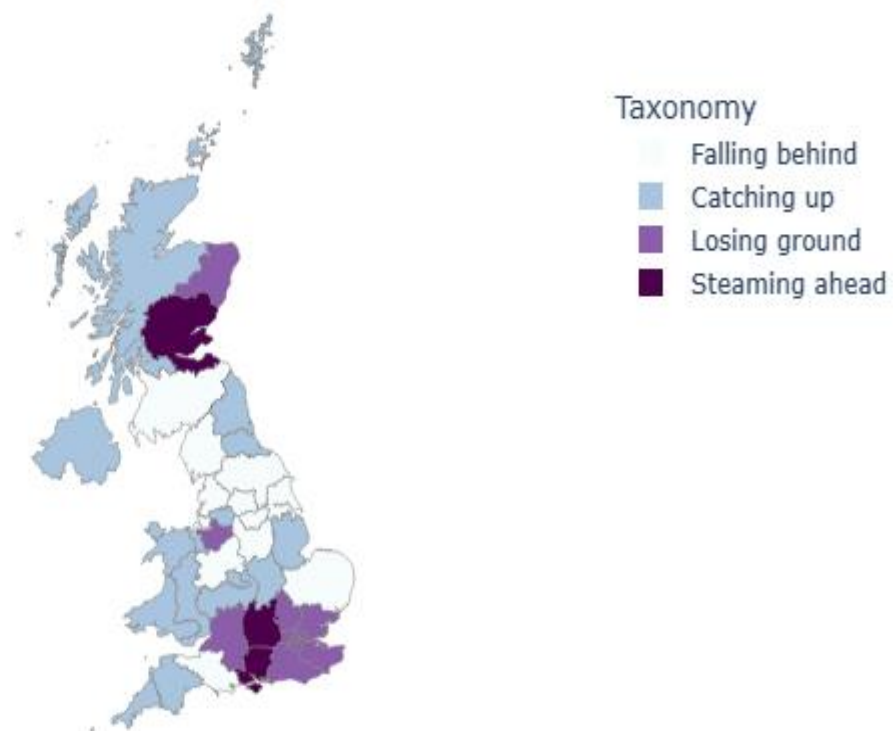
Source: TPI visualisation, based on ONS data, 2019, 2008-2019, 2022-1

UK ITL2 regions are plotted according to **their nominal productivity level in 2019 and their 2008-19 change in productivity**. We use the four-type taxonomy of UK regions (Zymek and Jones, 2020) to build **the UK Productivity Matrix: Losing Ground, Catching Up, Falling Behind and Steaming Ahead**.

# Changes in UK sub-national productivity

## 2008-2019 UK Productivity Matrix

2008-2019 Productivity Growth Taxonomy by ITL2 region  
Controlling for the 'London Effect'



Even after controlling for London, the UK still exhibits a **core-periphery structure** to its economic **geography of productivity**.

In particular, most of the **falling behind areas** are **clustered in the Midlands, the North of England and the South of Scotland**.

Falling Behind/Steaming ahead: productivity divergence processes while Catching Up and Losing Ground: productivity convergence processes.

Notes: UK reference productivity is the TPI calculated weighted average productivity of the ITL2 regions excluding London (ITL1 code TLI).

Productivity measured per hour worked, and corrected for price changes. Source: TPI visualisation, based on ONS Subregional Productivity July 2022 release

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# UK Subnational Data

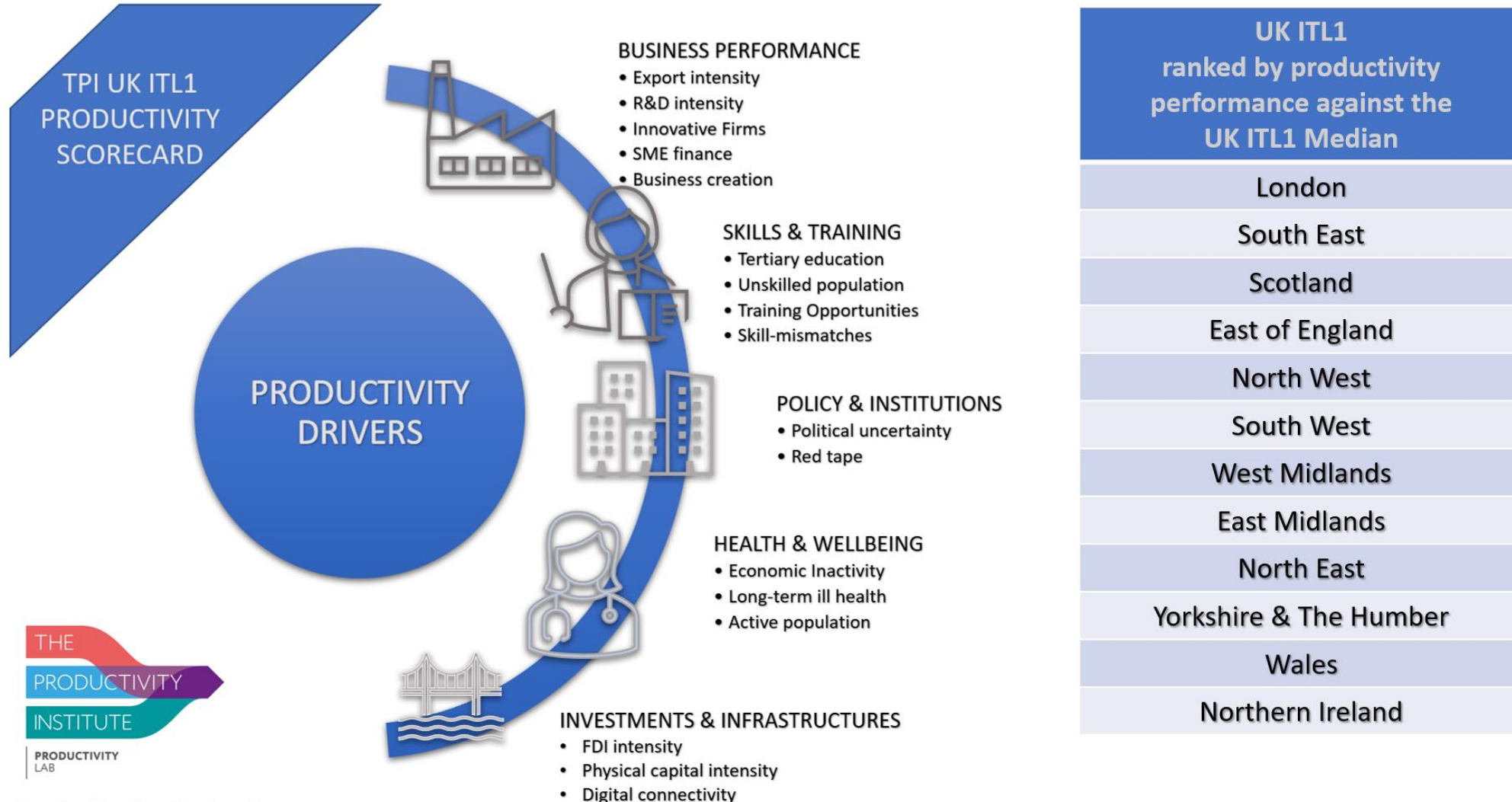
## Advantages:

- ✓ ITL and LAU statistical data **allow international and national regional peer comparisons.**
- ✓ Efforts to ensure **comparability** in the last years:
  - ✓ Geographical
  - ✓ Temporal
  - ✓ Methodologies around index construction, aggregation
- ✓ **Limited geographical granularity**
- ✓ **Continuity** of data products can be a real problem

## Disadvantages:

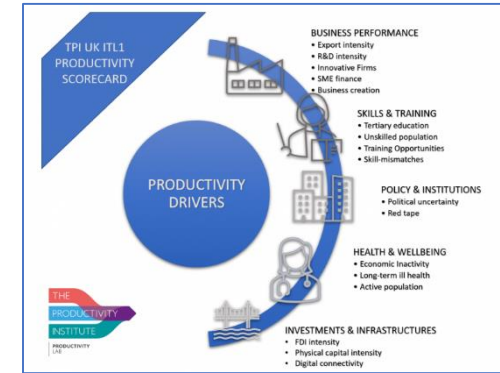
- ✓ Statistical data **cannot be easily used for policy.**
- ✓ **Fail to overlap administrative areas** where the funding is allocated (counter-example NUTS2 and EC, ERDF and ESF).
- ✓ Difficult to deal with **Uncertainty** (e.g. Brexit, Covid, energy shock)
- ✓ **Complex situations** (drivers of productivity)  
Where rapid reaction – timeliness, and great granularity are needed.

# The TPI Productivity Scorecards for English Regions and Devolved Nations





# The TPI Productivity Scorecards for English Regions and Devolved Nations



Scorecard\_median

Ordered by productivity rank		London	South East	Scotland	East of Engla	North West	South West	West Midland	East Midlands	North East	Yorkshire andWales	Northern Irela		
Category	Driver of productivity (relative to the mean of ITL1 regions in the UK)	ITL1 median 2020	London	South East	Scotland	East of England	North West	South West	West Midlands	East Midlands	North East	Yorks & The Humber	Wales	Northern Ireland
Productivity of UK's twelve regions			1 <sup>a</sup>	2 <sup>a</sup>	3 <sup>a</sup>	4 <sup>a</sup>	5 <sup>a</sup>	6 <sup>a</sup>	7 <sup>a</sup>	8 <sup>a</sup>	9 <sup>a</sup>	10 <sup>a</sup>	11 <sup>a</sup>	12 <sup>a</sup>
Business performance & characteristics	Exports as % of GDP	24.2%	Teal	Teal	Teal	Yellow	Red	Red	Yellow	Yellow	Teal	Red	Teal	Yellow
	R&D per job (real)	£631.55	Red	Teal	Red	Teal	Red	Teal	Teal	Teal	Red	Red	Red	Teal
	Innovation active businesses	45.3%	Red	Yellow	Red	Teal	Yellow	Yellow	Teal	Yellow	Red	Teal	Yellow	Red
	% of SMEs where finance is a major obstacle	8.0%	Red	Teal	Yellow	Teal	Red	Teal	Yellow	Red	Red	Yellow	Red	Red
	Business births as % of all active enterprises	11.6%	Teal	Red	Red	Red	Teal	Red	Teal	Yellow	Teal	Yellow	Yellow	Red
Skills & training	% of population with tertiary education (NVQ4+)*	39.3%	Teal	Teal	Teal	Yellow	Yellow	Teal	Yellow	Red	Red	Yellow	Yellow	Teal
	% of population with no or low skills (NVQ1 or lower)*	17.5%	Teal	Teal	Teal	Yellow	Yellow	Teal	Yellow	Red	Yellow	Red	Red	Red
	% of employers providing training in past 12 months**	50.0%	Teal	Yellow	Teal	Yellow	Yellow	Yellow	Yellow	Yellow	Teal	Yellow	Yellow	Yellow
	% of vacancies which are skill shortage vacancies**	5.0%	Yellow	Red	Teal	Red	Red	Red	Red	Yellow	Teal	Yellow	Yellow	Teal
Policy & institutions	% of SMEs where polit. uncertainty & gov. policy is a major obstacle	24.0%	Red	Yellow	Red	Teal	Yellow	Teal	Teal	Yellow	Yellow	Yellow	Yellow	Red
	% of SMEs where legislation & regulation is a major obstacle	21.0%	Red	Teal	Red	Yellow	Teal	Red	Teal	Yellow	Yellow	Teal	Red	Red
Health & wellbeing	Economic inactivity rate	21.6%	Teal	Teal	Red	Teal	Red	Teal	Yellow	Teal	Red	Yellow	Red	Red
	% of economic inactivity due to long-term ill health	24.6%	Teal	Teal	Red	Teal	Red	Yellow	Yellow	Red	Yellow	Red	Red	Red
	% of population aged 16-64	62.0%	Teal	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Investment, infrastructure & connectivity	FDI per job (real)	£30,858	Teal	Teal	Teal	Yellow	Red	Yellow	Teal	Yellow	Red	Red	Red	Red
	Gross fixed capital formation per job (real)	£10,122	Teal	Teal	Yellow	Teal	Red	Yellow	Red	Yellow	Red	Yellow	Red	Yellow
	Access to Gigabit-capable internet services*	66.6%	Teal	Yellow	Red	Red	Yellow	Red	Teal	Yellow	Yellow	Yellow	Red	Teal



# TPI London Productivity Scorecard

**134.4%** London's productivity relative to UK average  
**1<sup>st</sup>** of the UK's twelve regions for productivity performance

Category	Driver of productivity	Relative to UK median	Change over time	
			Short-term	Long-term
<b>Business performance &amp; characteristics</b>	Exports as % of GDP	<span style="background-color: #008080; width: 20px; height: 10px;"></span>	<span style="color: green;">↑</span>	<span style="color: red;">↓</span>
	R&D per job	<span style="background-color: #ff4500; width: 20px; height: 10px;"></span>	<span style="background-color: #ffcc00; width: 20px; height: 10px;"></span>	<span style="color: green;">↑</span>
	Innovation active businesses	<span style="background-color: #ff4500; width: 20px; height: 10px;"></span>	<span style="color: green;">↑</span>	<span style="color: red;">↓</span>
	% of SMEs where finance is a major obstacle	<span style="background-color: #ff4500; width: 20px; height: 10px;"></span>	<span style="background-color: #ffcc00; width: 20px; height: 10px;"></span>	<span style="color: red;">↓</span>
	Business births as % of all active enterprises	<span style="background-color: #008080; width: 20px; height: 10px;"></span>	<span style="color: red;">↓</span>	<span style="color: red;">↓</span>
<b>Skills &amp; training</b>	% of population with tertiary education (NVQ4+)	<span style="background-color: #008080; width: 20px; height: 10px;"></span>	<span style="color: green;">↑</span>	<span style="color: green;">↑</span>
	% of population with no or low skills (NVQ1 or lower)	<span style="background-color: #008080; width: 20px; height: 10px;"></span>	<span style="background-color: #ffcc00; width: 20px; height: 10px;"></span>	<span style="color: green;">↑</span>
	% of employers providing training in past 12 months	<span style="background-color: #008080; width: 20px; height: 10px;"></span>	<span style="background-color: #ffcc00; width: 20px; height: 10px;"></span>	<span style="color: green;">↑</span>
	% of vacancies which are skill shortage vacancies	<span style="background-color: #ffcc00; width: 20px; height: 10px;"></span>	<span style="background-color: #ffcc00; width: 20px; height: 10px;"></span>	<span style="color: green;">↑</span>
<b>Policy &amp; institutions</b>	% of SMEs where political uncertainty & government policy is a major obstacle	<span style="background-color: #ff4500; width: 20px; height: 10px;"></span>	<span style="color: red;">↓</span>	<span style="color: red;">↓</span>
	% of SMEs where legislation & regulation is a major obstacle	<span style="background-color: #ff4500; width: 20px; height: 10px;"></span>	<span style="color: red;">↓</span>	<span style="color: red;">↓</span>
<b>Health &amp; wellbeing</b>	Economic inactivity rate	<span style="background-color: #008080; width: 20px; height: 10px;"></span>	<span style="color: green;">↑</span>	<span style="color: green;">↑</span>
	% of economic inactivity due to long-term ill health	<span style="background-color: #008080; width: 20px; height: 10px;"></span>	<span style="color: green;">↑</span>	<span style="color: red;">↓</span>
	% of population aged 16-64	<span style="background-color: #008080; width: 20px; height: 10px;"></span>	<span style="background-color: #ffcc00; width: 20px; height: 10px;"></span>	<span style="color: red;">↓</span>
<b>Investment, infrastructure &amp; connectivity</b>	FDI per job	<span style="background-color: #008080; width: 20px; height: 10px;"></span>	<span style="color: green;">↑</span>	<span style="color: green;">↑</span>
	Gross fixed capital formation per job	<span style="background-color: #008080; width: 20px; height: 10px;"></span>	<span style="color: red;">↓</span>	<span style="color: green;">↑</span>
	Access to Gigabit-capable internet services	<span style="background-color: #008080; width: 20px; height: 10px;"></span>	<span style="background-color: #cccccc; width: 20px; height: 10px;"></span>	<span style="background-color: #cccccc; width: 20px; height: 10px;"></span>

**Key**

- Better: higher than 105% of UK ITL1 median
- Equal: within 95% - 105% of UK ITL1 median
- Worse: lower than 95% of UK ITL1 median
- ↑ Improvement over time
- No change over time
- ↓ Worsening over time
- Data unavailable

Cite as Menukhin, O.; Gouma, F.R.; Ortega-Argiles, R. (2023), *TPI UK ITL1 Scorecards*, TPI Productivity Lab, The Productivity Institute, University of Manchester. DOI: 10.48420/21931770

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# TPI South West Productivity Scorecard

**88.6%** South West's productivity relative to UK average  
**6<sup>th</sup>** of the UK's twelve regions for productivity performance

Category	Driver of productivity	Relative to UK median	Change over time	
			Short-term	Long-term
<b>Business performance &amp; characteristics</b>	Exports as % of GDP	<span style="background-color: #ff4500; width: 20px; height: 10px;"></span>	<span style="color: red;">↓</span>	<span style="color: red;">↓</span>
	R&D per job	<span style="background-color: #008080; width: 20px; height: 10px;"></span>	<span style="color: red;">↓</span>	<span style="color: green;">↑</span>
	Innovation active businesses	<span style="background-color: #ffcc00; width: 20px; height: 10px;"></span>	<span style="color: green;">↑</span>	<span style="color: green;">↑</span>
	% of SMEs where finance is a major obstacle	<span style="background-color: #008080; width: 20px; height: 10px;"></span>	<span style="color: red;">↓</span>	<span style="color: red;">↓</span>
	Business births as % of all active enterprises	<span style="background-color: #ff4500; width: 20px; height: 10px;"></span>	<span style="color: red;">↓</span>	<span style="color: red;">↓</span>
<b>Skills &amp; training</b>	% of population with tertiary education (NVQ4+)	<span style="background-color: #008080; width: 20px; height: 10px;"></span>	<span style="color: green;">↑</span>	<span style="color: green;">↑</span>
	% of population with no or low skills (NVQ1 or lower)	<span style="background-color: #008080; width: 20px; height: 10px;"></span>	<span style="background-color: #ffcc00; width: 20px; height: 10px;"></span>	<span style="color: green;">↑</span>
	% of employers providing training in past 12 months	<span style="background-color: #ffcc00; width: 20px; height: 10px;"></span>	<span style="color: red;">↓</span>	<span style="color: red;">↓</span>
	% of vacancies which are skill shortage vacancies	<span style="background-color: #ff4500; width: 20px; height: 10px;"></span>	<span style="color: green;">↑</span>	<span style="color: red;">↓</span>
<b>Policy &amp; institutions</b>	% of SMEs where political uncertainty & government policy is a major obstacle	<span style="background-color: #008080; width: 20px; height: 10px;"></span>	<span style="color: green;">↑</span>	<span style="color: red;">↓</span>
	% of SMEs where legislation & regulation is a major obstacle	<span style="background-color: #ff4500; width: 20px; height: 10px;"></span>	<span style="color: red;">↓</span>	<span style="color: red;">↓</span>
<b>Health &amp; wellbeing</b>	Economic inactivity rate	<span style="background-color: #008080; width: 20px; height: 10px;"></span>	<span style="color: red;">↓</span>	<span style="color: red;">↓</span>
	% of economic inactivity due to long-term ill health	<span style="background-color: #ffcc00; width: 20px; height: 10px;"></span>	<span style="color: green;">↑</span>	<span style="color: red;">↓</span>
	% of population aged 16-64	<span style="background-color: #ffcc00; width: 20px; height: 10px;"></span>	<span style="background-color: #ffcc00; width: 20px; height: 10px;"></span>	<span style="color: red;">↓</span>
<b>Investment, infrastructure &amp; connectivity</b>	FDI per job	<span style="background-color: #ffcc00; width: 20px; height: 10px;"></span>	<span style="color: green;">↑</span>	<span style="color: green;">↑</span>
	Gross fixed capital formation per job	<span style="background-color: #ffcc00; width: 20px; height: 10px;"></span>	<span style="color: red;">↓</span>	<span style="color: red;">↓</span>
	Access to Gigabit-capable internet services	<span style="background-color: #ff4500; width: 20px; height: 10px;"></span>	<span style="background-color: #cccccc; width: 20px; height: 10px;"></span>	<span style="background-color: #cccccc; width: 20px; height: 10px;"></span>

**Key**

- Better: higher than 105% of UK ITL1 median
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## Productivity Scorecards Categories and Drivers ANEX

The Productivity Scorecards are produced for the UK's devolved nations and England's regions to create an overview of productivity performance for the UK regions.

The most recent data shows that productivity measured as output per hour worked in most of the UK regions is below the UK's average in 2020. The chart on this page is provided for illustrating each region's position relative to the UK's average (UK=100). Compared to the Q1 value of productivity, the UK lags behind by 3.9%.



A series of Productivity Forum's Insights Papers explore the issues of productivity gap in each TPI's Regional Productivity Forum (RPF). While some aspects can be specific to a particular region, common themes include economic structure, peripherality, capital and investment, human capital, infrastructure, public policy, and institutions and governance.

The regional scorecards were adapted from the Northern Ireland's productivity dashboard published by the team from the Northern Ireland Forum. The regional scorecards measure how each region performs across key drivers of productivity relative to the UK median and over time. The region's performance for each productivity driver is compared to the median of the UK ITL1 region. The colour codes indicate whether it is better (green), worse (red), or equal to this value (orange). Green indicates performance higher than 105% of UK ITL1 median. Orange shows a value of a productivity driver between 95% and 105% of UK ITL1 median. Red indicates performance lower than 95% of UK ITL1 median. Using the median as the reference value for each productivity driver reduces a potential bias towards London, the area with the highest productivity in the UK. The UK median and regional data for comparison are 2020 for consistency across all twelve regions; however, for a small number of productivity drivers the reference year is either 2019 or 2021 due to unavailability of 2020 statistics as indicated in each productivity driver description. Performance across short-term (1-year) and long-term (5-years) periods shows whether there has been an improvement (green), worsening (red), or no change (orange) over time. The key for 'no change over time' is based on an assumption that changes between -0.5% and 0.5% from the base year values constitute no significant change. For consistency, all short-term estimates are provided for 2019-2020 and long-term estimates are given for 2015-2020. The method, data sources and reference year for each productivity driver are provided below.

**Business performance & characteristics**  
**Exports as % of GDP**  
 Higher regional export intensity is important as local firms which export tend to have higher productivity. Comparison to the UK median is based on a combination of ONS data on subnational trade in goods and subnational trade in services measured as percentage of ONS subnational GDP. Change over time (short-term) is estimated based on the same ONS data as it is available for 2019 and 2020. Change over time (long-term) measured using HMRC regional trade data for consistency, as ONS subnational trade data for trade in goods and trade in services is not available prior to 2019.  
 Sources: ONS (2022) Subnational trade in goods; ONS (2022) Subnational trade in services; ONS (2022) Regional gross domestic product; HMRC (2020) Regional trade data, 2015-2020.

**R&D per job**  
 Levels of R&D expenditure are linked to productivity levels. ONS data on BERD provides a breakdown of R&D performed in UK businesses by country/region. Real R&D per job is estimated as R&D expenditure relative to regional jobs and using GDP deflator.  
 Sources: ONS (2022) Business enterprise research and development; UK (2020) Productivity; ONS (July 2022) Subnational productivity; HM Treasury (2022) GDP deflators at market prices, and money GDP March 2022 (Source Statement).

**Innovation active businesses**  
 Being innovation active measures businesses' approach to continual improvement, which is an important driver of productivity growth. This measure of innovation includes introducing a new or significantly improved product or process; engaging in innovation projects; improving organisational structures, processes, and strategy; and/or generating or acquiring knowledge or equipment linked to innovation activities.  
 Sources: BEIS UK Innovation Survey, 2017, 2019, 2021.

**% of SMEs where finance is a major obstacle**  
 Access to finance can place a constraint on a firm's growth, creating a barrier to improving productivity. The percentage of SMEs who rated access to external finance as a major obstacle to running their business over the next 12 months exceeded UK's 8% in all regions, except South East, South West and East of England where it was lower than the UK value indicating that businesses in these three regions had better access to external finance.  
 Source: EYIA, BDRG (2021) SME Finance Monitor 2020 Annual Report.

**Business births as % of all active enterprises**  
 The rate of new enterprises being created is an indicator of the level of entrepreneurial activity in the local economy. This performance was a decline in 2020 compared to 2019 in all UK regions, likely as a result of the Covid-19 pandemic. Over the long-term, business births remain lower than the 2015 values.  
 Source: ONS (2022) Business demographics, UK.

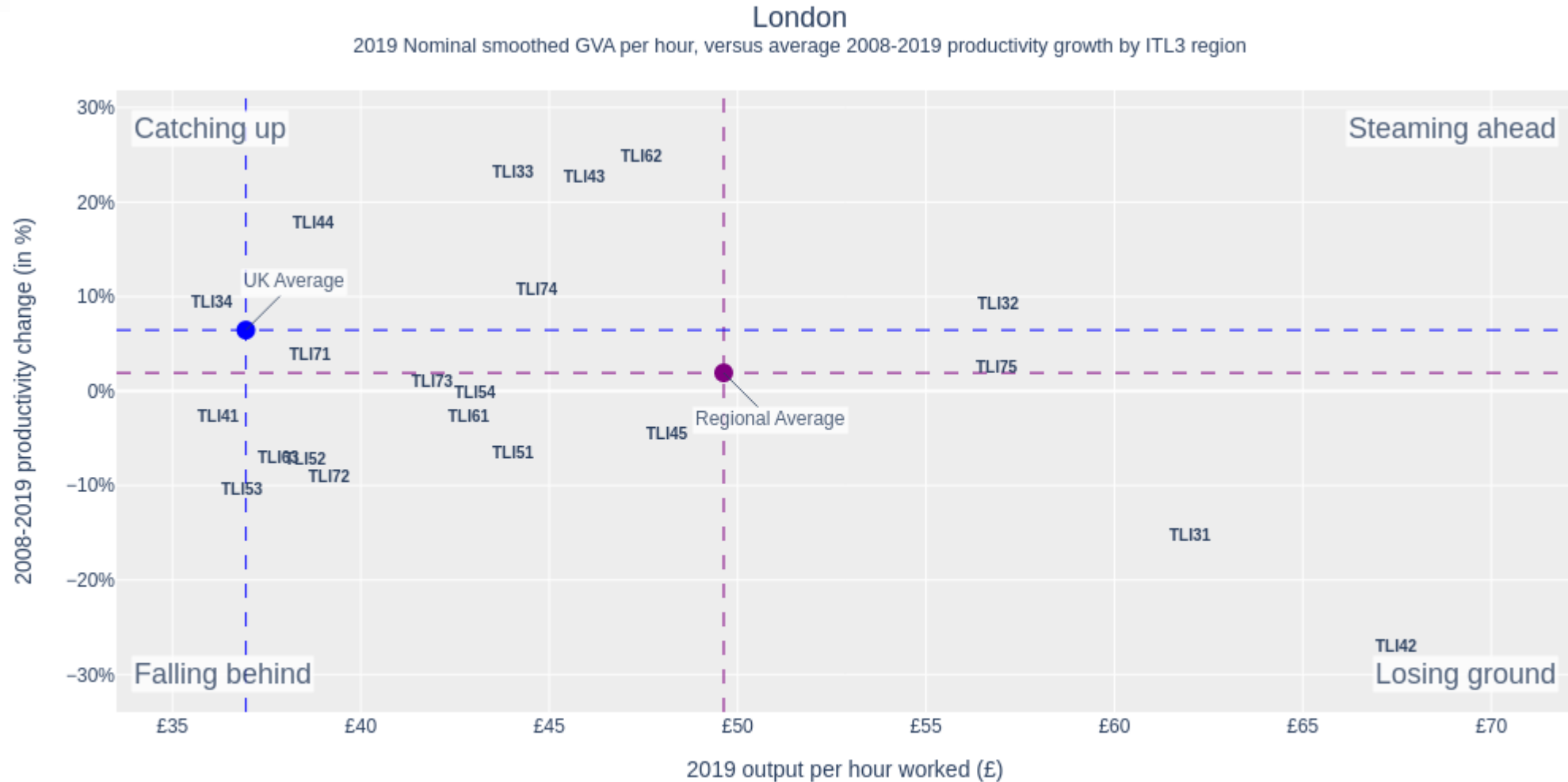
**Skills & training**  
**% of population with tertiary education (NVQ4+)**  
 Represents a percentage of working age population (aged 16-64) with qualification at NVQ4+. Only five regions, London, South East, South West, Scotland and Northern Ireland have a rate of highly-skilled population higher than the UK median of 38.3%. All other regions show either equal to or lower than the UK value. The latest 2021 Labour Force Survey data is used to compare regions to the UK median, 2020-2021 (short-term), 2016-2021 (long-term).  
 Source: Herts (2022) Labour Force Survey.

**% of population with no or low skills (NVQ1 or lower)**  
 Represents a percentage of working age population (aged 16-64) with qualifications at NVQ1 or no qualifications. London, South East, South West and Scotland have levels of no or low skilled working age population (aged 16-64) lower than the UK median of 17.9%. The other regions are equal to or lower than the UK value. The latest 2021 Labour Force Survey data is used to compare regions to the UK median, 2020-2021 (short-term), 2016-2021 (long-term).  
 Source: ONS (UK) (2020) Employee Skills Survey 2019; 2017; 2015; ONS (England) (2020) Employee Skills Survey 2019; 2017; 2015; Scottish Gov. (2021) Scottish Employee Skills Survey 2020.

**% of employers providing training in past 12 months**  
 Only 50% of employers in the UK provided training within the last 12 months in 2019. With the exception of London, Scotland and the North East, change over long term has been negative. Latest Employee Skills Survey data for 2019 is used to compare regions to the UK median, 2015-2019 (short-term), 2015-2019 (long-term).  
 Source: ONS (UK) (2020) Employee Skills Survey 2019; 2017; 2015; ONS (England) (2020) Employee Skills Survey 2019; 2017; 2015; Scottish Gov. (2021) Scottish Employee Skills Survey 2020.

**% of vacancies which are skill shortage vacancies**  
 The proportion of vacancies which are skill shortage vacancies was 5% for the UK in 2019. Over the long-term, skills shortage vacancies in the UK have improved from 6% of total vacancies in 2015. Latest Employer Skills Survey data for 2019 is used to compare regions to the UK median, 2017-2019 (short-term), 2015-2019 (long-term).  
 Source: ONS (UK) (2020) Employer Skills Survey 2019; 2017; 2015; ONS (England) (2020) Employer Skills Survey 2019; 2017; 2015; Scottish Gov. (2021) Scottish Employee Skills Survey 2020.

# UK Intraregional heterogeneity: London

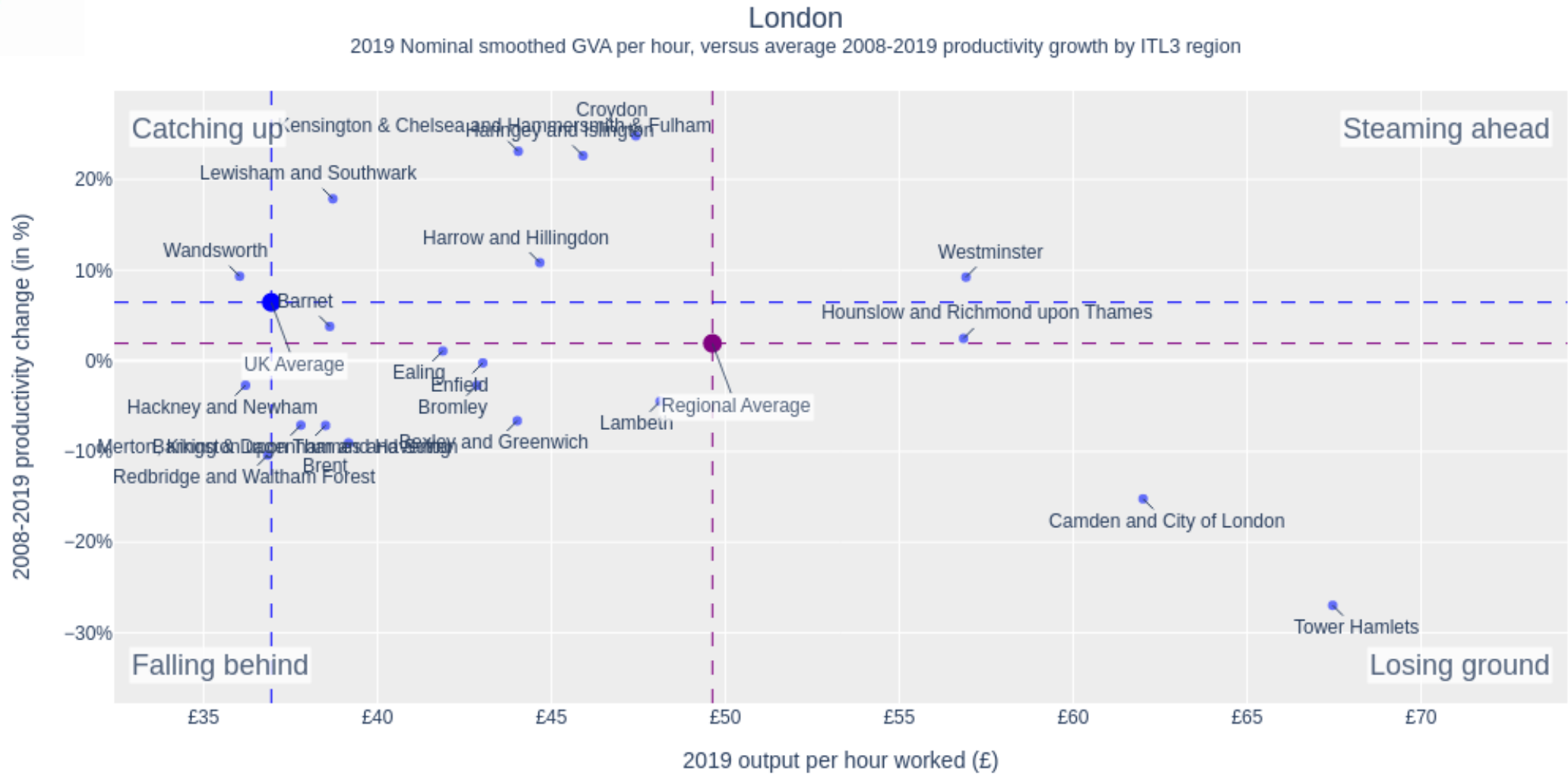


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Notes: ITL1 and UK reference productivity are taken directly from ONS.

Source: TPI visualisation, based on ONS Subregional Productivity July 2022 release

# UK Intraregional heterogeneity: London



Notes: ITL1 and UK reference productivity are taken directly from ONS.

# UK Intraregional heterogeneity: London

## ITL3 Scorecards Preliminary analysis

### Indicators for the following London boroughs (Falling behind):

TLI41	Hackney and Newham
TLI51	Bexley and Greenwich
TLI52	Barking & Dagenham and Havering
<b>TLI53</b>	Redbridge and Waltham Forest
TLI54	Enfield
TLI61	Bromley

### Additional for contrast (Steaming ahead and Losing ground)

TLI31	Camden and City of London
TLI32	Westminster
TLI42	Tower Hamlets
TLI75	Hounslow and Richmond upon Thames

### Others to consider (Catching up)

TLI33	Kensington & Chelsea and Hammersmith & Fulham
TLI43	Haringey and Islington
TLI62	Croydon



Notes: ITL1 and UK reference productivity are taken directly from ONS.

CC BY  
Source: TPI visualisation, based on  
ONS Subregional Productivity July 2022 release

# UK Intraregional heterogeneity: London

## ITL 3 Scorecards Preliminary analysis

Indicators\_table2020

category	indicator	TLI London	TLI42 Tower Hamlets	TLI31 Camden and City of London	TLI32 Westminster	TLI75 Hounslow and Richmond upon Thames	TLI62 Croydon	TLI43 Haringey and Islington	TLI33 Kensington & Chelsea and Hammersmith & Fulham	TLI51 Bexley and Greenwich	TLI54 Enfield	TLI61 Bromley	TLI52 Barking & Dagenham and Havering	TLI53 Redbridge and Waltham Forest	TLI41 Hackney and Newham
Productivity	Productivity (GVA/H)	£50.70	£67.60	£63.54	£58.07	£57.82	£49.67	£47.06	£44.79	£44.50	£43.31	£42.93	£38.87	£37.07	£36.74
Business Performance	Export Intensity	35.8%	48.1%	42.4%	68.5%	37.2%	6.6%	36.3%	33.8%	4.8%	16.8%	8.1%	10.9%	6.5%	
	Percentage business births	13.3%	13.6%	11.5%	11.2%	11.5%	13.0%	14.7%	12.0%	13.1%	16.0%	10.7%	15.7%	15.5%	17.2%
Skills&Training	Percentage of workforce with no or low skills (NVQ1 + NVO1-)	10.7%	15.2%		8.4%	12.6%	12.4%	9.6%	7.3%	12.1%	13.4%	9.1%	17.4%	13.2%	12.3%
	Percentage of workforce with tertiary education (NVO4+)	58.9%	59.3%	67.4%	65.7%	58.2%	49.0%	63.4%	66.5%	51.2%	46.0%	53.0%	43.1%	55.2%	60.2%
Health & Well-being	% of economic inactivity due to long-term ill health	16.7%	18.7%		19.0%	15.6%	15.0%	18.0%	12.4%	15.3%	21.1%	15.2%	20.9%	12.3%	22.8%
	% of population aged 16-64	84.9%	91.9%	82.9%	82.1%	83.3%	80.7%	88.3%	83.8%	82.6%	83.9%	79.7%	81.7%	85.6%	90.3%
	Economic inactivity rate	19.2%	22.4%		24.1%	19.7%	19.0%	21.8%	19.5%	18.9%	27.4%	19.7%	21.7%	22.6%	21.8%
Investment, infrastructure & connectivity	4G mobile coverage (but no 5G)	98.2%	100.0%	99.7%	100.0%	98.2%	95.7%	99.4%	99.9%	97.3%	98.2%	92.4%	96.3%	94.5%	99.4%
	Access to Gigabit-capable internet services (only from 2020)	81.2%	74.9%	88.0%	70.6%	87.2%	84.5%	85.3%	78.9%	84.0%	86.6%	88.9%	84.2%	87.4%	78.4%
	Gross fixed capital formation per job	£14,085	£20,788	£15,928	£18,289	£11,189	£11,942	£12,030	£17,146	£14,061	£9,249	£6,656	£13,570	£7,943	£15,117
	ICT Gross fixed capital formation per job	£590	£273	£993	£650	£714	£452	£510	£526	£339	£699	£241	£206	£259	£360

# Conclusions

The UK is among the **most interregional and intraregional unequal** countries in productivity performance by international standards.

Having good sub-national productivity data is a must to understand the bottlenecks and drivers of local productivity in the UK.

Sub-national data in the UK (ONS) has improved notably in the last decades in terms of quality and comparability; however, there are still **many problems associated** with it that should be improved.

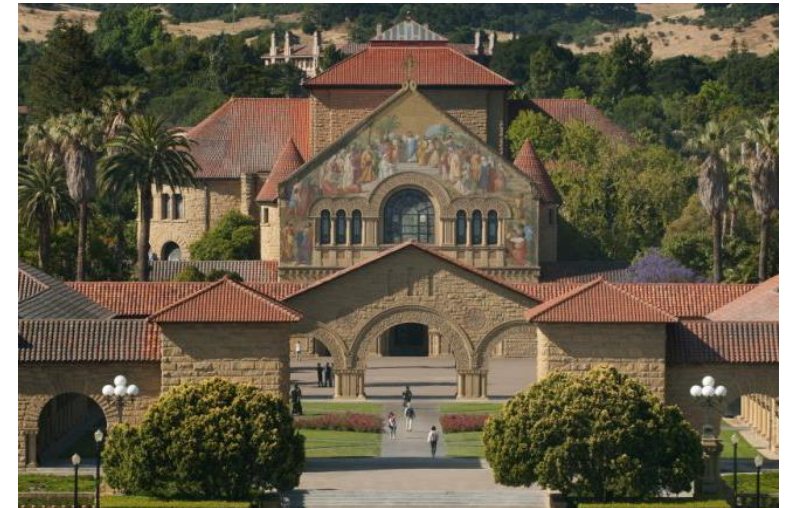
New **data sources and analysis** offering more geographical granularity, more continuity, better correspondence/translation between administrative and statistical units, a combination of different data sources/ mix-methods and more international collaboration to ensure comparability can help solve the situation.

# Measuring Productivity Using Decision Maker Panel Data

Paul Mizen (Nottingham)

**Glasgow**

**April 3, 2023**





# **The Decision Maker Panel survey**

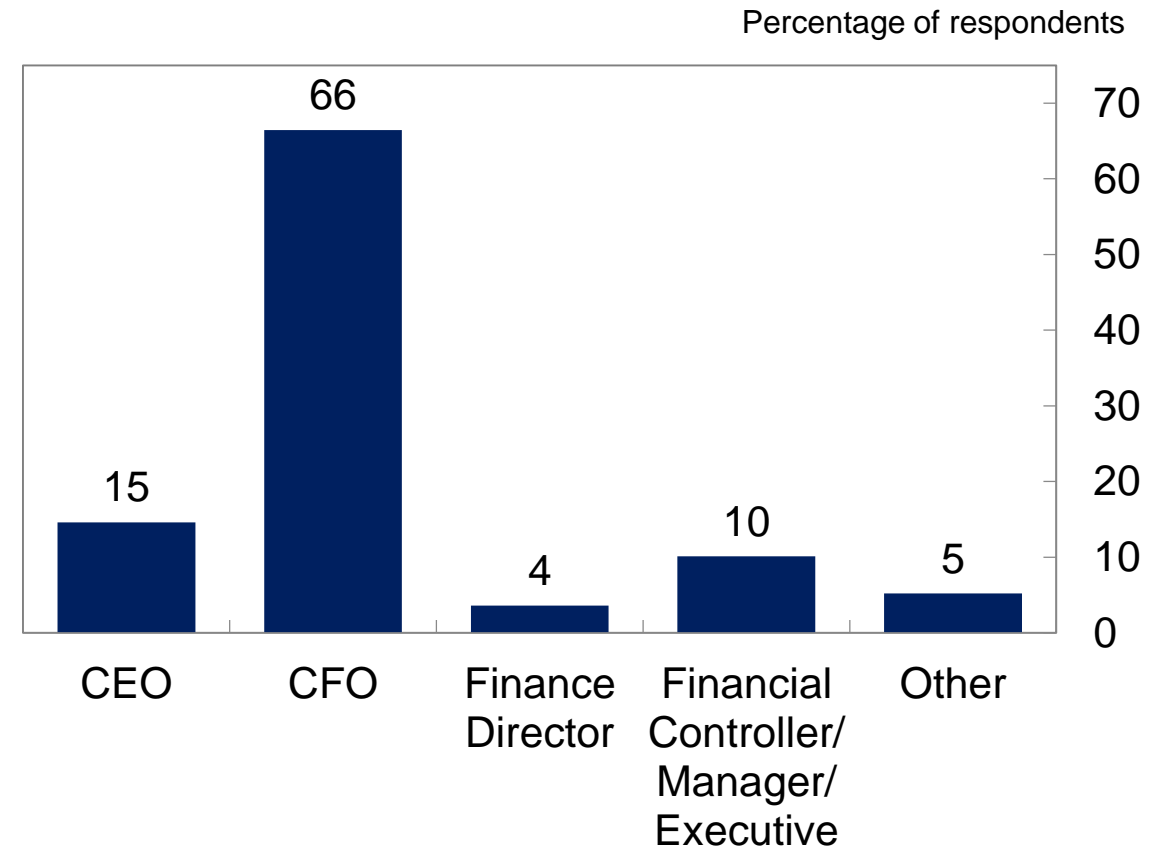
Brexit and Productivity

Covid and Productivity

# Overview of the DMP

- Launched in August 2016 by Bank of England, Nottingham and Stanford
- Recruit from BvD population  $\approx$  70,000 firms with 10+ employees
- 10,000+ CEO/CFOs agreed to be in the DMP, about 3,000 respond each month
- Monthly 5 minute survey on sales, prices, employment etc + topical questions

# Respondents to DMP survey



# Survey measures of Productivity (LP and TFP)

We explore labor productivity (LP) and total factor productivity (TFP) using survey data.

Advantages.

**Timeliness.** DMP survey data are available in close to real time, whilst administrative data typically lag by one to two years.

**Frequency.** DMP estimates are quarterly, whereas administrative data are typically only annual.

**Decomposition.** Aggregate impacts split into 'within-firm' and 'between-firms' effects using the accounting framework of Baily et al. (1992).

**Accuracy.** Marginal impact of Brexit and Covid-19, so our data abstract from the effects of other firm specific shocks

**Forward-looking.** We calculate medium-term impacts using firms' forecasts.

# Decomposition – Bailey et al. (1992)

‘within effect’  $\Delta\Pi_t = \sum_{i \in Surv} \bar{\varphi}_i \Delta\pi_{i,t}$  ... within firms (1)

‘between effect’  $+ \sum_{i \in Surv} \Delta\varphi_{i,t}(\bar{\pi}_i - \bar{\Pi})$  ... reallocation between surviving firms (2)

‘entry effect’  $+ \sum_{i \in \Delta Entry} \varphi_{i,t}(\bar{\pi}_i - \bar{\Pi})$  .... reallocation to new firms (3)

‘exit effect’  $- \sum_{i \in \Delta Exit} \Delta\varphi_{i,t-1}(\pi_{i,t-1} - \bar{\Pi})$  .... reallocation from exiting firms (4)

Where  $\pi_{i,t}$  is GVA per head in firm  $i$  at time  $t$ ,  $\Pi_t$  is aggregate GVA per head at time  $t$ ,  $\varphi_{i,t}$  is the employment share of firm  $i$  at time  $t$  and a bar over a variable indicates the average of the variables across times  $t-1$  and  $t$ .

# **The Decision Maker Panel survey**

Brexit and Productivity

Covid and Productivity

# Hypotheses through which Brexit impacted Productivity

## Productivity

- **Hypothesis : Second moment shock** => Positive uncertainty due to Brexit reduced UK business productivity directly.
  - **Hypothesis : Capital shallowing/Skills shortages** => lower inv/emp growth = less tangible/ intangible capital & skilled labour => lower productivity (output per hour).
  - **Hypothesis : Diversion.** Management time/resources spent planning for Brexit not growth
  - **Hypothesis : Higher costs.** More paperwork, border delays, transport costs – importers and exporters affected.
-

# DMP productivity regressions

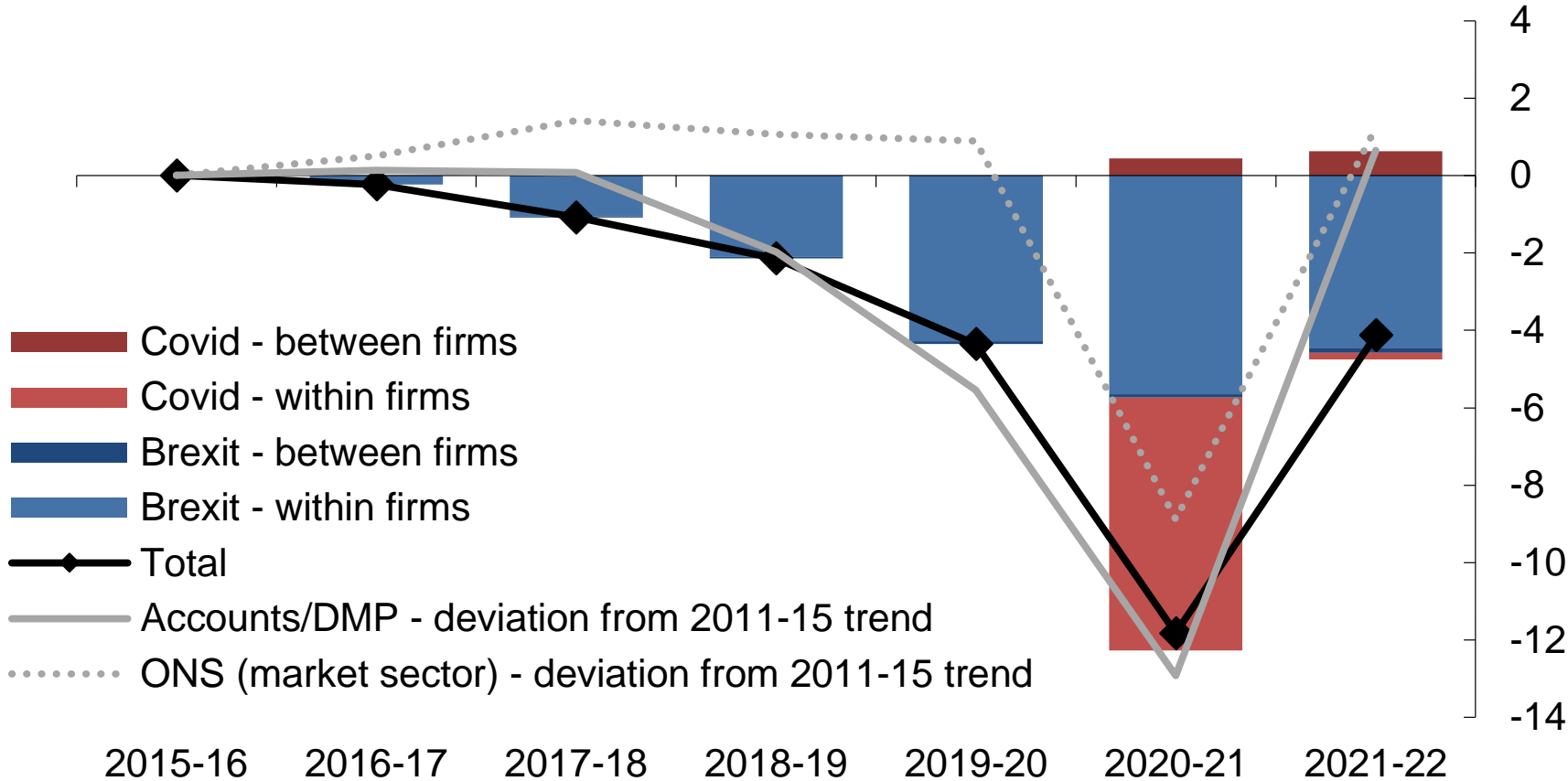
Dependent variable (all in growth terms):	Sales	Value-added	Labour productivity	TFP	TFP	Labour productivity	TFP
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
All equations estimated 2011-2021		OLS	OLS	OLS	IV	OLS	OLS
Brexit uncertainty*all years post referendum	-0.506** (0.207)	-0.800*** (0.259)	-0.597** (0.243)	-0.575** (0.268)	-1.622** (0.787)		
Brexit uncertainty*2016 dummy						-0.162 (0.500)	-0.146 (0.540)
Brexit uncertainty*2017 dummy						-0.619 (0.439)	-0.894* (0.478)
Brexit uncertainty*2018 dummy						-0.773* (0.426)	-0.598 (0.465)
Brexit uncertainty*2019 dummy						-1.652*** (0.431)	-0.877* (0.487)
Brexit uncertainty*2020 dummy						-1.068* (0.561)	-0.775 (0.562)
Brexit uncertainty*2021 dummy						0.829 (0.571)	-0.167 (0.603)
Covid uncertainty*2020 dummy						-1.553* (0.886)	0.021 (0.925)
Covid uncertainty*2021 dummy						2.416** (0.943)	1.559 (0.976)
Covid 2020 sales impact*2020 dummy						0.375*** (0.045)	0.204*** (0.043)
Covid 2021 sales impact*2021 dummy						-0.106** (0.047)	-0.041 (0.045)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	60,884	60,884	60,884	60,884	60,884	60,884	60,884

- TFP effect is around 4.5% (0.575 x 7.5 years). Productivity effect started to unwind in 2021-22. Mostly **second moment shock**
- Haskel part of the UK's recent productivity slowdown "really goes back to Brexit" consistent with **capital shallowing and skills shortage**, with the UK in last place among G7 members for investment growth since 2016.
- Effect on market sector value added is just over 6% (5% for the whole economy, assuming no public sector effect).

**Notes:** Sample uses company accounts data from the Bureau Van Dijk FAME database for value-added, labour productivity and TFP. Observations in the top and bottom 2.5% of distribution of growth rates for sales, value added, labour productivity and TFP in each year are excluded. . Data from 2011-2021 (financial years). Labour productivity is defined as real value-added (operating profits plus total labour costs divided by the aggregate GDP deflator) per employee using accounting data. TFP is calculated as the residual from a production function  $\ln(Y_{it}) = 0.63\ln(L_{it}) + 0.37\ln(K_{it})$  where  $Y_{it}$  is real value-added of firm  $i$  in year  $t$ ,  $L$  is labour input (total real labour costs) and  $K$  is capital (total real fixed assets), nominal values from accounting data are deflated using the GDP deflator. TFP data are normalised by 4 digit industry (using data for the full DMP sampling frame) within each year. Standard errors are clustered at the firm level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

# Labour productivity estimated to be 4.5% lower due to Brexit

Impact on level of labour productivity per head (%)

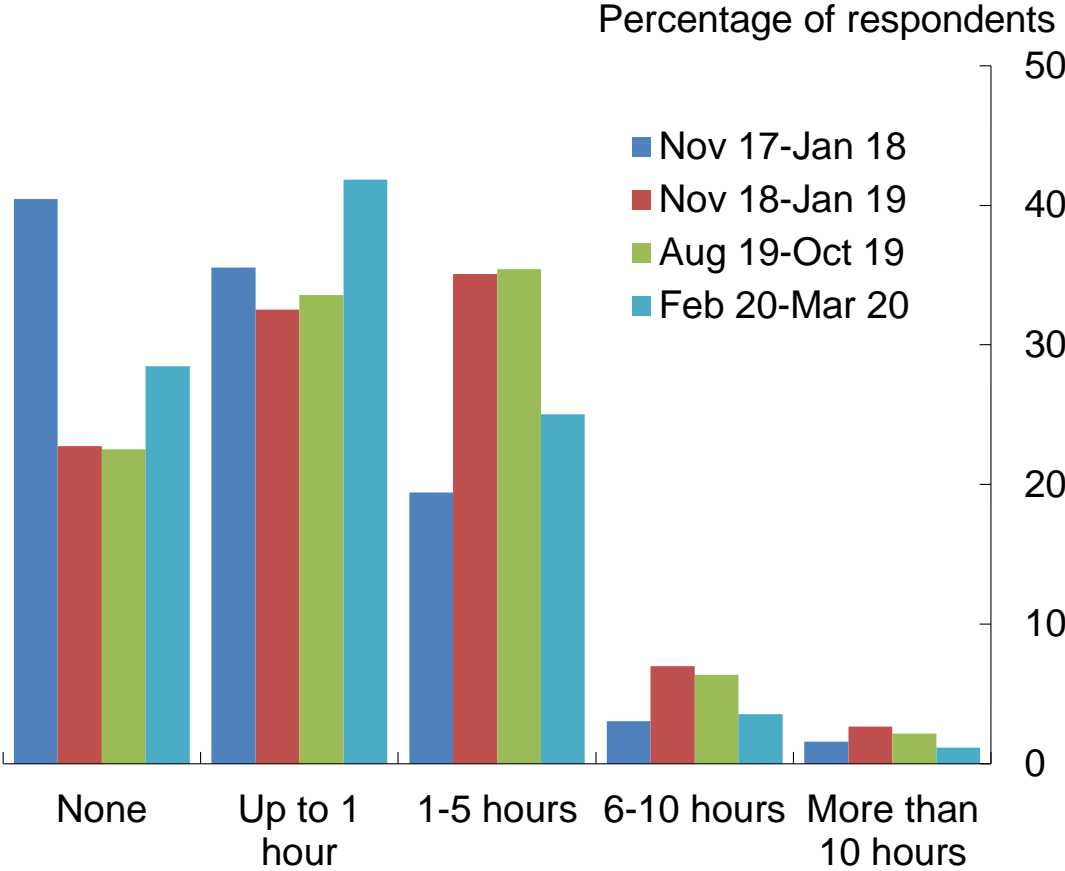


Key findings:  
 Impact effect on LP from two components  
Within firms: LP multi year declines 2016-2022, higher costs  
Between firms: LP smaller declines.

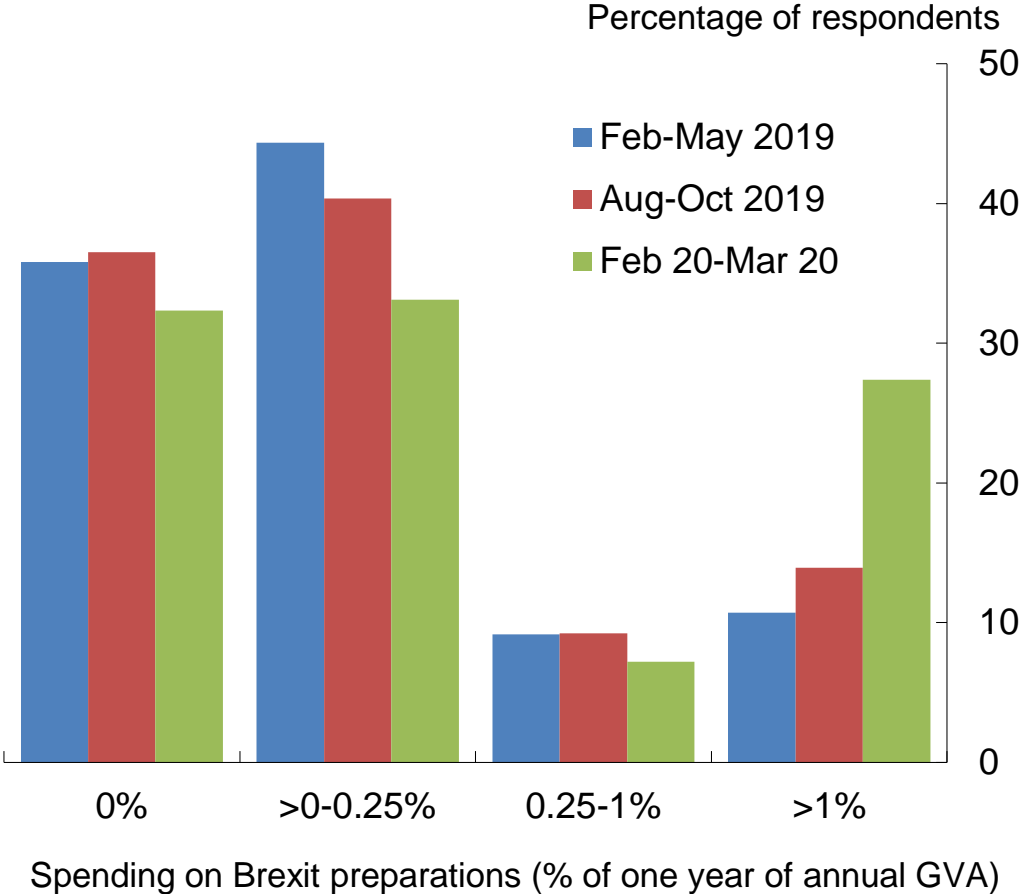


# Firms have spent significant time and resources planning for Brexit

## Weekly CFO hours



## £ amount spent



**Source:** Bureau van Dijk FAME dataset, Decision Maker Panel and authors' calculations.  
**Notes:** Results are based on the questions 'On average, how many hours a week are the CEO and CFO of your business spending on preparing for Brexit at the moment?' and 'Approximately how much do you estimate that your business has spent on preparing for Brexit so far?'.

# Potential channels through which Brexit lowered productivity

Dependent variable:	(1) LP growth	(2) TFP growth	(3) LP growth	(4) TFP growth	(5) LP growth	(6) TFP growth	(7) Stocks/total assets
Time spent planning for Brexit*all years post referendum	-0.376*** (0.126)	-0.460*** (0.149)					
Spending on Brexit planning*all years post referendum			-0.065 (0.141)	-0.270* (0.162)			
Share of sales to EU					4.724*** (1.248)	3.349** (1.444)	
Share of costs from EU imports					-3.939*** (1.006)	-4.525*** (1.186)	
Brexit uncertainty*all years post referendum							0.173 (0.123)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	31,185	31,185	20,774	20,774	47,919	47,919	40,973

**Hypothesis: Diversion.**  
Management time/resources spent planning for Brexit not growth

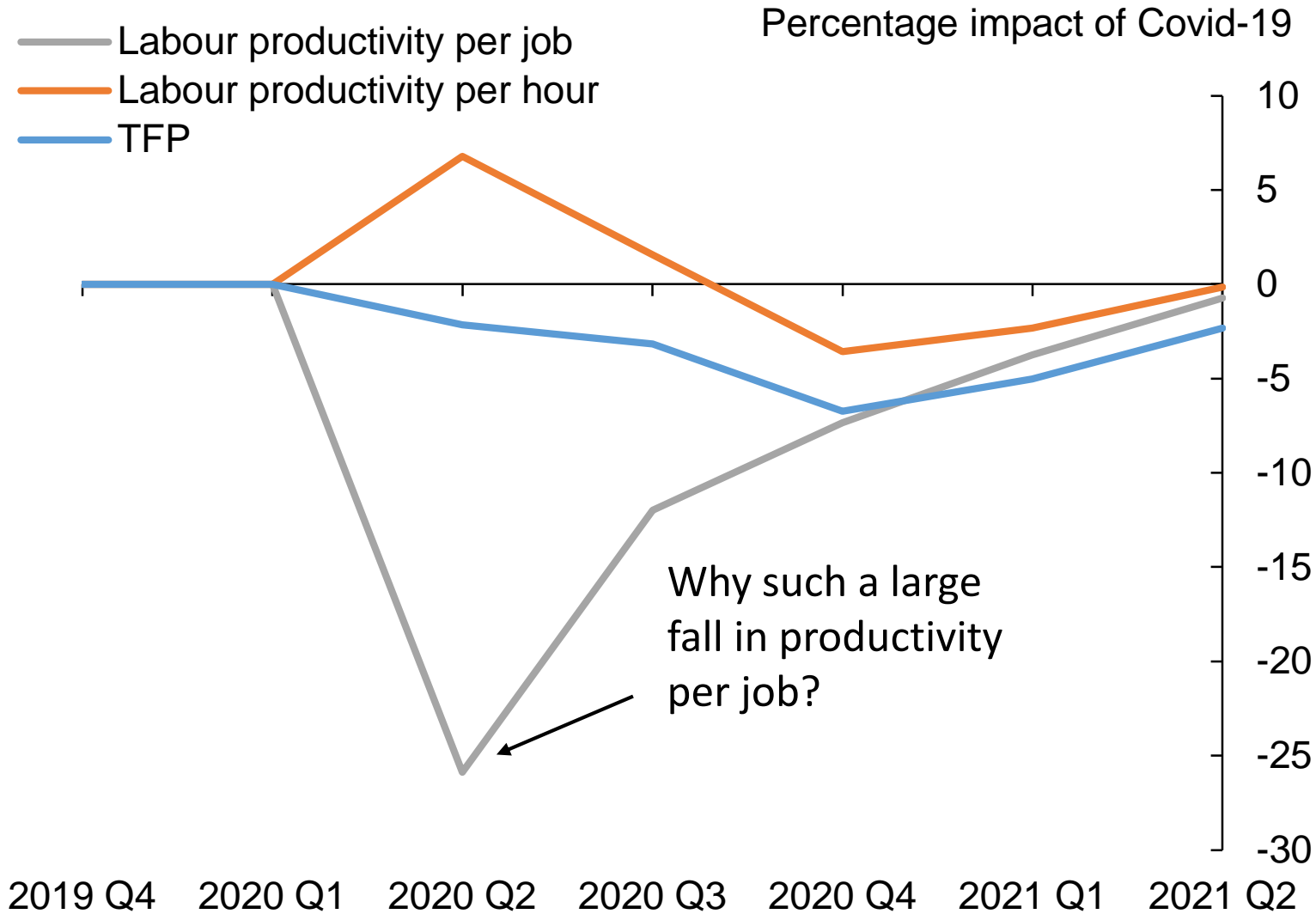
**Hypothesis : Higher costs.** More paperwork, border delays, transport costs – importers and exporters affected.

# **The Decision Maker Panel survey**

Brexit and Productivity

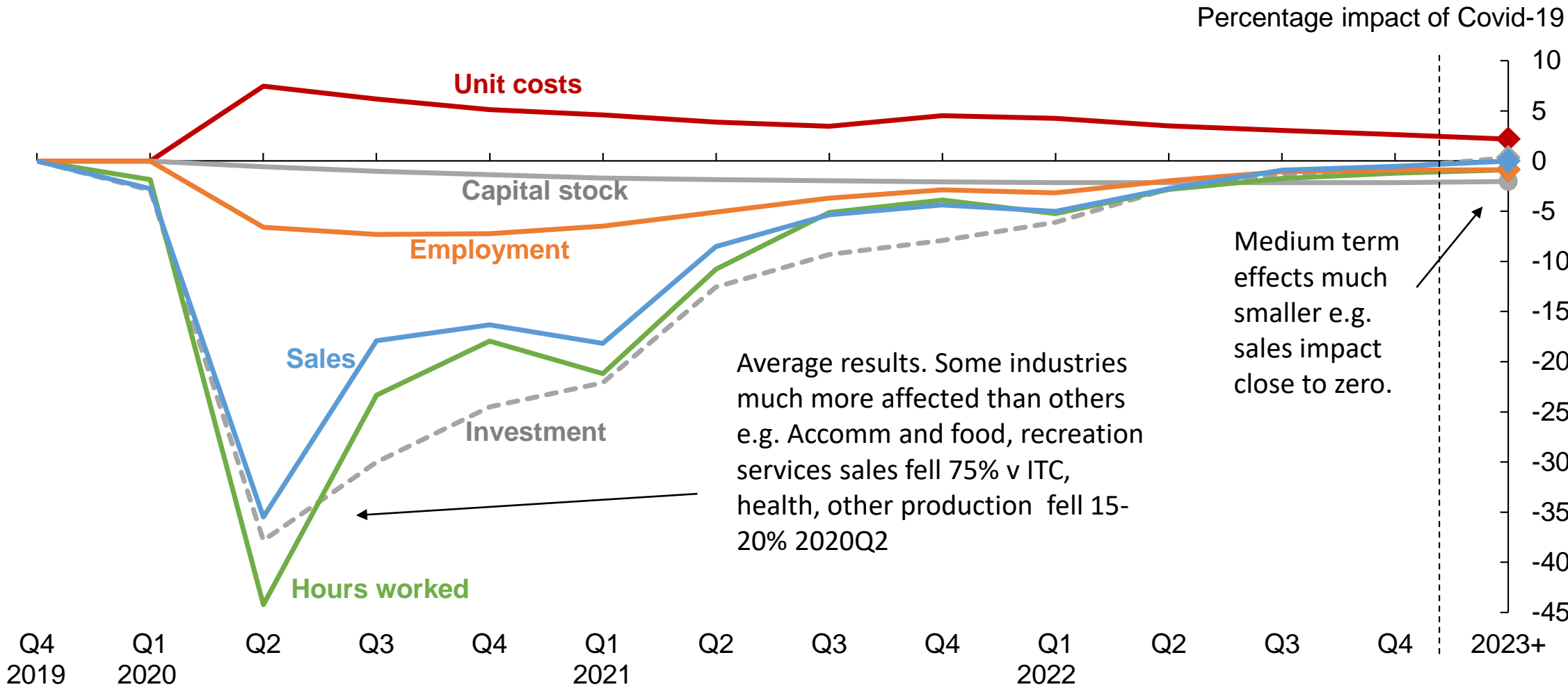
Covid and Productivity

# Key (Short-Run) Results in One Figure – United Kingdom



Source: Decision Maker Panel, Bank of England

# Figure: Impact of Covid-19 on businesses (survey data inputs)



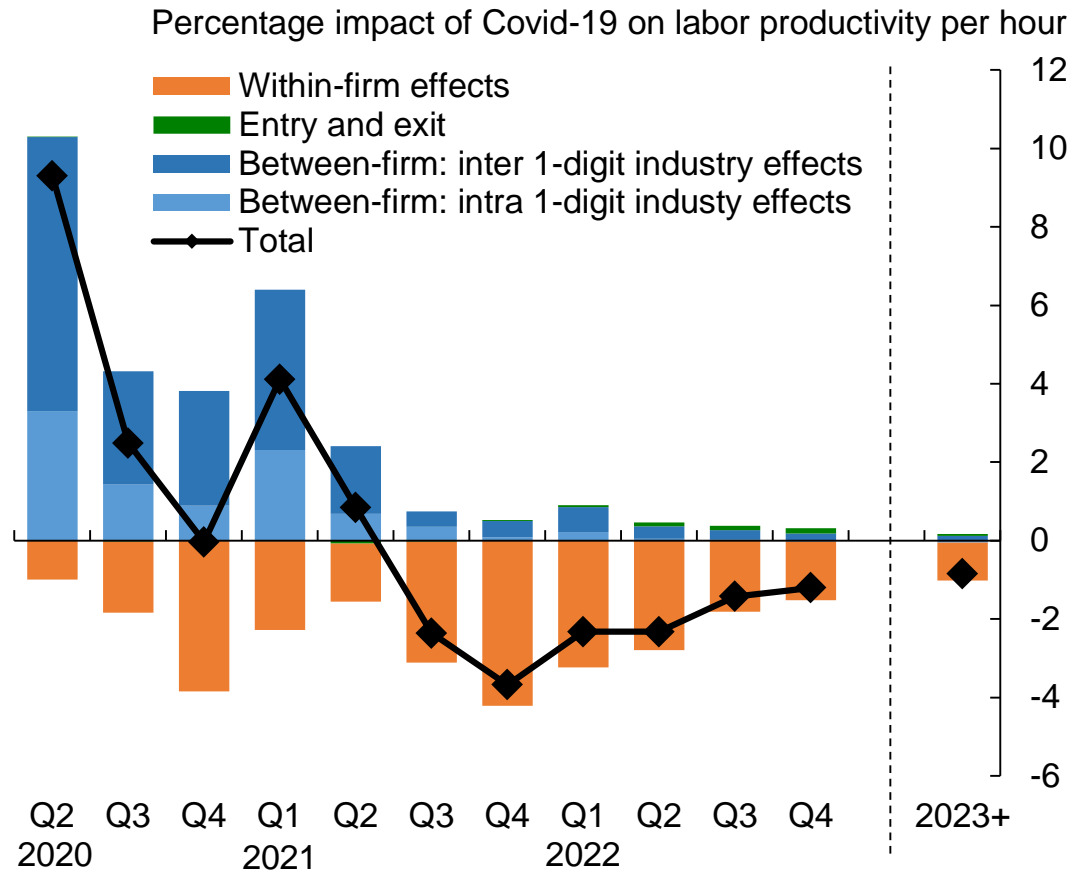
Average results. Some industries much more affected than others e.g. Accommodation and food, recreation services sales fell 75% v ITC, health, other production fell 15-20% 2020Q2

Medium term effects much smaller e.g. sales impact close to zero.

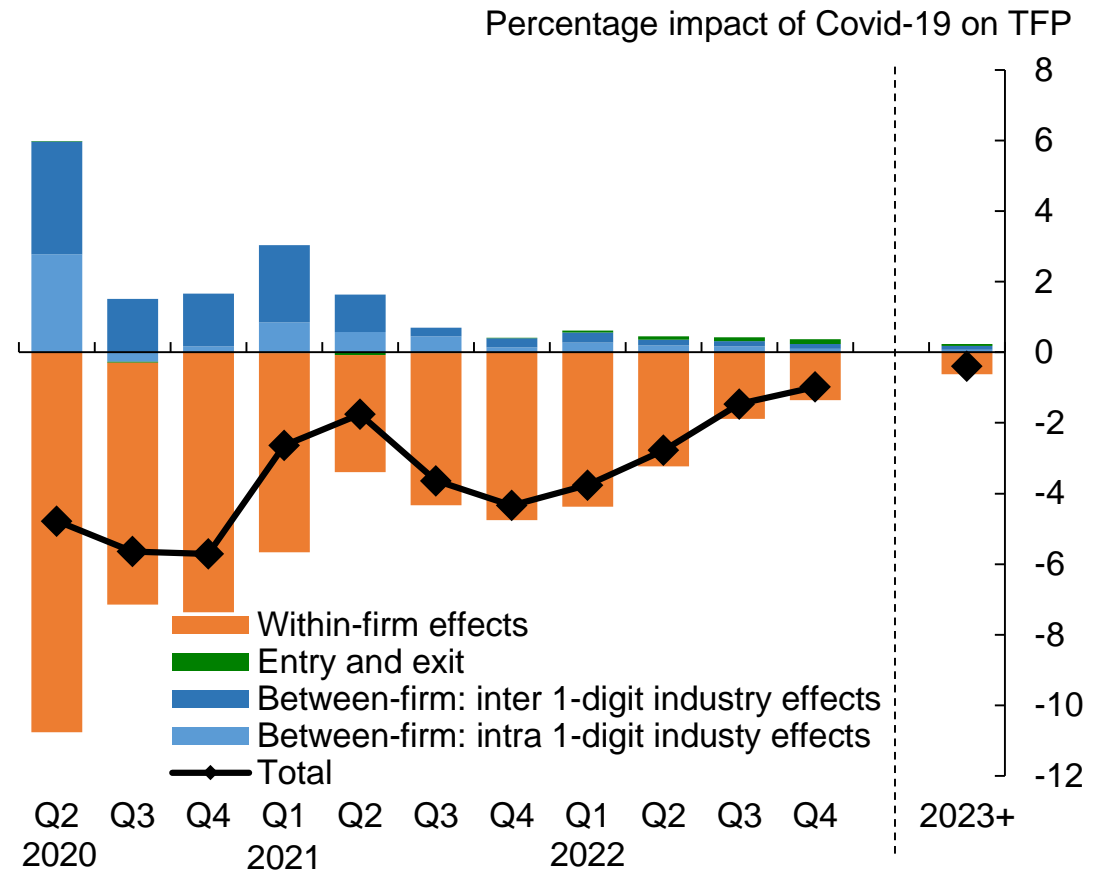
**Notes:** Data are the most recent observation per firm for each period collected between July 2020 and April 2022. Data on the impact of Covid-19 in 2020 Q1 have not been collected in the DMP. Data shown for 2020 Q1 are absolute changes in aggregate ONS data for private sector output, business investment, private sector employment and hours worked between 2019 Q4 and 2020 Q1. The impact on unit costs is assumed to be zero in 2020 Q1. Effects on the capital stock are estimated using by cumulating the investment impacts.

# Figure: Within and between-firm contributions to Covid-19 productivity impact

## Panel A: Labor productivity per hour



## Panel B: TFP



Within effects -ve, Between effects +ve, entry and exit negligible.

# Conclusions

Our unique survey approach reveals Brexit and Covid had an important effect on productivity.

Brexit reduced LP and TFP by about -4.5% over a 7 ½ year period.

## Covid

- A. Within firms: LP -2.6%; TFP -5.9%, largely from higher costs
- B. Between firms: TFP +0.1 to +0.2% increase from two sources:
  - inter-industry, lower TFP firms shrink fastest (accommodation, food & entertainment)
  - intra-industry, lower TFP firms shrink fastest (badly managed firms struggle more)
- C. Medium term effects LP -1% and TFP -0.5% (despite huge shock and initial impact)

Heterogeneity reveals winners and losers, linked to WFH, online sales, skills.



PRODUCTIVITY  
LAB



Economic  
and Social  
Research Council

# Data for International Comparisons of Productivity

## Bart van Ark





## Productivity Lab

- The Productivity Lab webpage went live on 25<sup>th</sup> January 2023 ([link](#))
- The Lab's pages structures the datasets and additional content by their spatial dimension, providing information at the:
  - Regional or sub-national level
  - National or country level
  - **International or cross-country level**
- Within these spatial dimensions, the Lab further subdivides the content along three economic dimensions:
  - Micro or Firm-level
  - **Sector, or Industry-level**
  - **Aggregate, or Macro-level**

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## The Productivity Lab

The Productivity Laboratory is the TPI's data science centre of excellence, the "engine room" for collecting, disseminating, and producing productivity data. We provide data-based insights for researchers, policymakers and business strategists, employing analytical methods rooted in econometrics and data science.

Home > The Productivity Lab

HIGHLIGHTS REGIONAL NATIONAL INTERNATIONAL ABOUT

Filter by scale INDUSTRY-LEVEL MACRO-LEVEL

Analysing sub-national productivity in the UK: Controlling for the 'London effect', ONS Subregional Productivity 2022 release

Analysing income and productivity across the globe: The Conference Board Total Economy Database

Measuring industrial intangible intensity in the UK: the TPI UK Intangibles Growth-Accounting dataset

# KEY DATA SOURCES FOR INTERNATIONAL COMPARISONS

## Total Economy Database

- Total economy, 130 countries
- Annually updated, including projection (2023)
- Data from 1950 onwards
- GDP, population, labor inputs (hours and persons, and labor composition), capital inputs (broken down into ICT and non-ICT) and TFP
- Also PPPs and labour productivity levels
- <https://www.conference-board.org/data/economydatabase/>

## Penn World Tables 10.01 university of groningen

- 213 countries
- Regularly updated, currently up through 2019
- Data from 1950 onwards
- GDP, population, labor inputs (hours and persons, and labor composition), capital inputs (broken down into 4 asset categories) and TFP
- Also PPPs and TFP levels
- <https://www.rug.nl/ggdc/productivity/pwt/>

## OECD

- Sector (1-digit), business sector and total economy, about 45 countries
- Regularly updated, coverage varies per country
- GDP, population, labor inputs (hours and persons), capital inputs and TFP
- <https://www.oecd.org/sdd/productivity-stats/>

## EU KLEMS LUISS

- Industry (2 digit), market economy and total economy, EU economies + Japan, UK and US
- GDP, labor inputs (hours and persons, and labor composition), capital inputs (by various asset types) and TFP
- Latest version also includes intangibles (INTANPROD)
- Various related datasets (LA-KLEMS, ASIA-KLEMS, etc.) and country specific (US, Mexico, Japan, India)
- <https://euklems-intanprod-lee.luiss.it/>

# CRITICAL ISSUES IN INTERNATIONAL COMPARISONS

- **GDP** and **employment** data are mostly well aligned, though **hours worked** can be an issue (direct actual hours worked method based on LFS vs. component method based on usual hours plus adjustments)
- **Labour composition effects** can differ depending on detail of educational attainment levels, but impact relatively small
- Differences in **capital** measurement account for most of cross-database differences:
  - All databases except EUKLEMS use harmonized measures of capital stock across countries
  - All databases except OECD use ex-post rate of return where capital services contributions are based on reported capital stocks by asset and a harmonised ex-post capital services method)
  - OECD uses ex-ante method, computing an exogenous nominal rate of return
- Differences in **weights of labour and capital** services also play a role
- As **TFP** is residual, issues in measurements of GDP and factor input affect measure of TFP
  - About 1/3<sup>rd</sup> of range of TFP growth rates affected by capital measurement (Gouma and Inklaar 2022)
- **Levels** of labour productivity (TED) and total factor productivity (PWT) can depend heavily on measure of PPP

# CRITICAL ISSUES IN INTERNATIONAL COMPARISONS

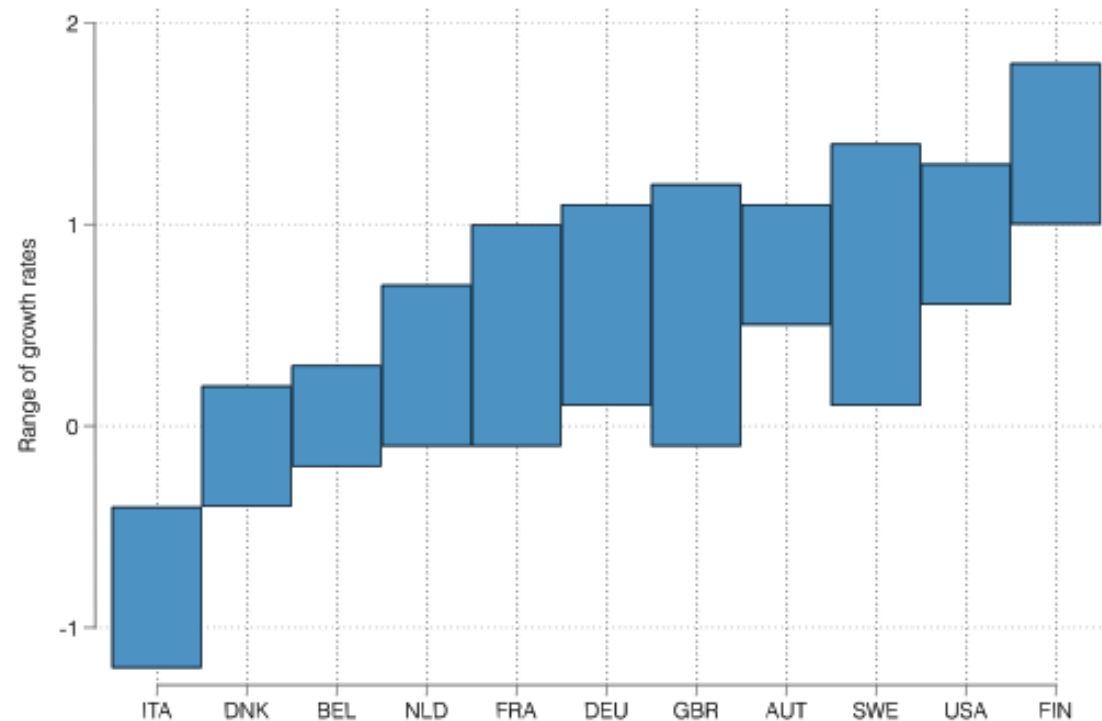
*Table 2 Capital stock estimation, methodology overview*

	PWT	TED	OECD*	EU KLEMS
<b>Initial capital stock</b>	1950 capital/output ratio <sup>8</sup> with long run PIM approach	Harberger steady-state assumption	Long run PIM approach, based on (confidential) historical GFCF data <sup>9</sup>	EUKLEMS takes the investment and capital stock series directly from EUROSTAT, for the derivation of the rental price, geometric depreciation is used, see table 3
<b>Build up capital stock</b>	Geometric depreciation rates, see table 3; half of current year's investment is depreciated	Geometric depreciation rates, see table 3	Hyperbolic age-efficiency profile; retirement profile normal distribution; average service life, see table 3. <sup>10</sup>	
<b>Deflators</b>	Investment prices, hedonic adjustments for ICT	Investment prices, special hedonic adjustments for ICT <sup>11</sup>	Investment prices, hedonic ICT deflators <sup>12</sup>	

Source: Reitze Gouma and Robert Inklaar, Comparing productivity growth across Databases, October 2022, [https://www.worldklems.net/conferences/worldklems2022/paper\\_Gouma.pdf](https://www.worldklems.net/conferences/worldklems2022/paper_Gouma.pdf) (update February 2023)

# VARIATIONS IN TFP GROWTH RATES BETWEEN 0.5- AND 1%-point

Figure 1. Range of average annual MFP growth across databases, 2000–2007

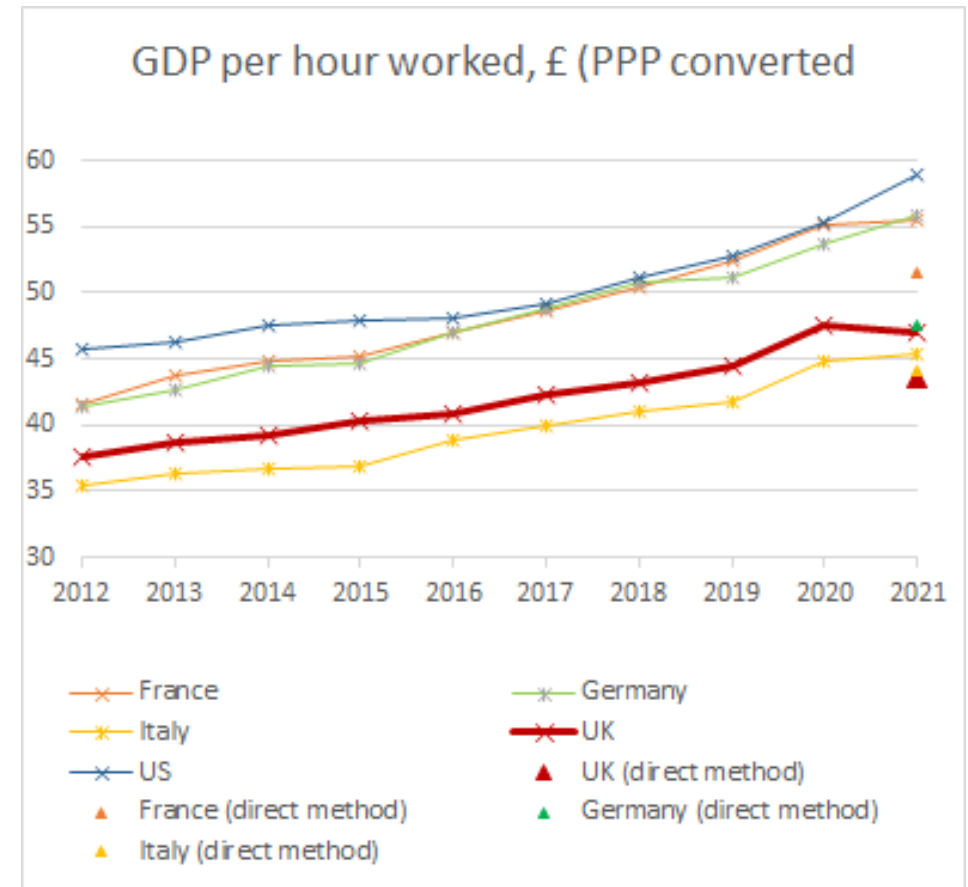


*Notes:* the figure shows for each country a bar ranging from the smallest to the highest average annual growth rate for the 2000–2007 period across the four databases, PWT, TED, EU KLEMS and OECD. Countries are ordered by the average growth rate across the four databases, see Appendix Table 1 for the full data.

Source: Reitze Gouma and Robert Inklaar, Comparing productivity growth across Databases, October 2022, [https://www.worldklems.net/conferences/worldklems2022/paper\\_Gouma.pdf](https://www.worldklems.net/conferences/worldklems2022/paper_Gouma.pdf) (update February 2023)

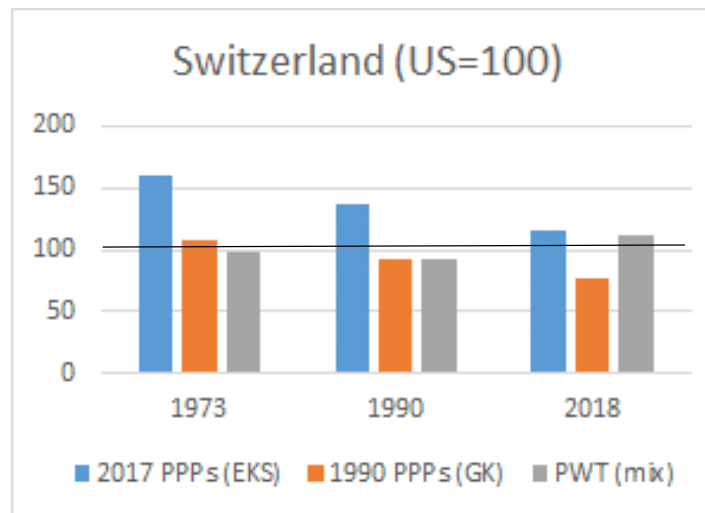
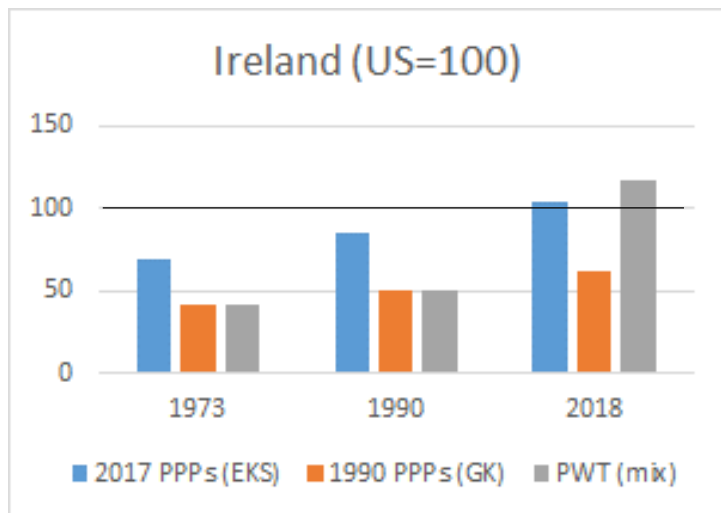
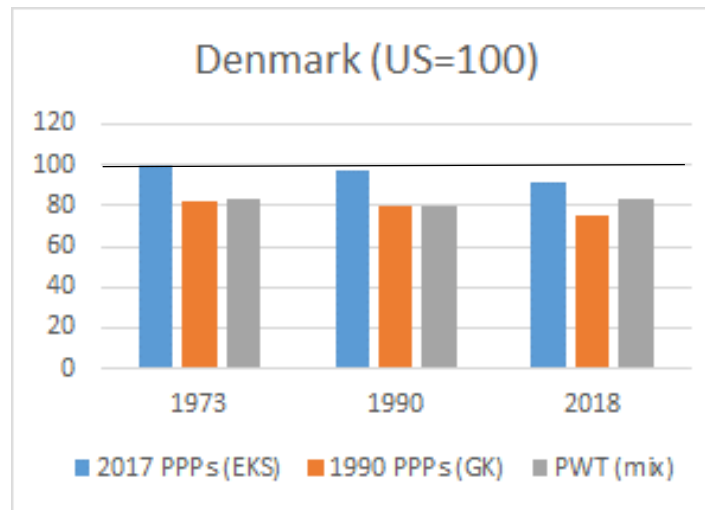
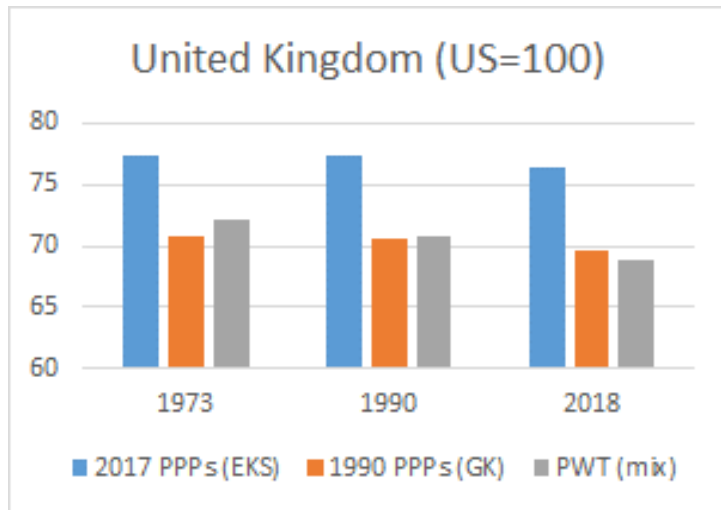
# UK IN INTERNATIONAL COMPARATIVE PERSPECTIVE

- Blue Book 2021 improvements in output measurement:
  - Introduction of double deflation in UK national accounts through use of supply and use tables has improved comparability with other OECD countries
  - Improved price deflators for telecommunication services and clothing
- Quality adjustment public sector productivity, especially health care and education, more advanced than in other countries
- UK hours worked are based on direct actual hours method (LFS) whereas many other countries use component method. This may bias up the estimate of UK hours worked, and thus lead productivity to be understated
- Investment in UK strongly has fallen behind other countries



Source: ONS, [International comparisons of UK productivity \(ICP\), final estimates: 2021](#) (January 2023),

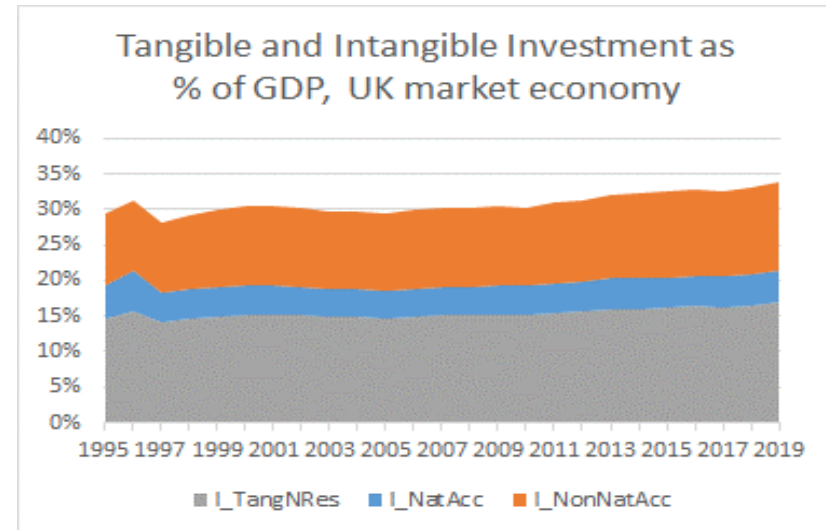
# LONG-TERM TIME SERIES OF LEVELS ARE STRONGLY DEPENDENT ON CHOICE OF PPPS



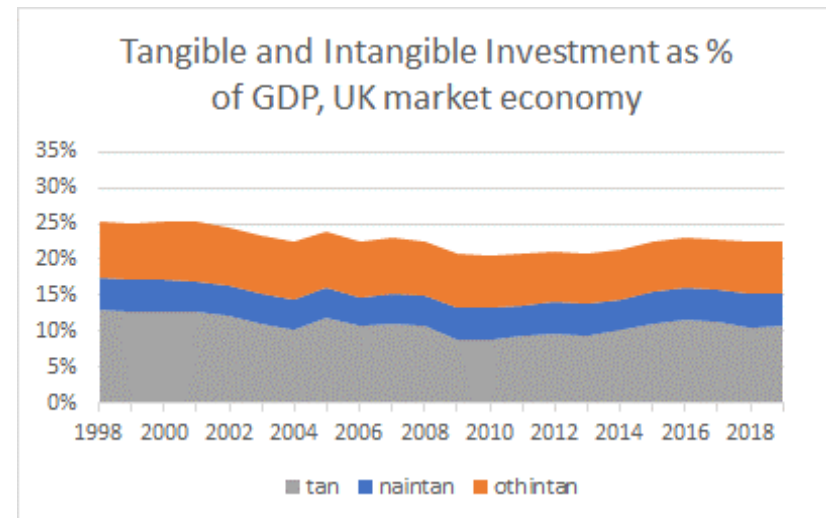
- **Purchasing power parities (PPPs)** for productivity level comparisons correct for differences in international price levels
- Levels are very sensitive for choice of PPPs as a **constant PPP** fixes the price structure of the economy
- **Recent PPPs** (e.g. 2017) tend to upwardly bias earlier years, especially in rapidly changing economies (e.g. Ireland or Switzerland)
- **Historical PPPs** (e.g. 1990) tend to downwardly bias later years
- PWT uses a **mix of PPPs** over time, but this changes the implicit growth rates of productivity

# INTANGIBLE CAPITAL IS AN INCREASINGLY IMPORTANT DRIVER OF PRODUCTIVITY

Category	Asset	Included in national accounts
Computerised information	Software and databases	✓
Innovative property	R&D (incl. non-scientific R&D)	✓
	Artistic originals	✓
	Mineral Exploration	✓
	Design	✗
	Financial product innovation	✗
Economic competencies	Firm-specific training	✗
	Branding (advertising and market research)	✗
	Organisational capital	✗



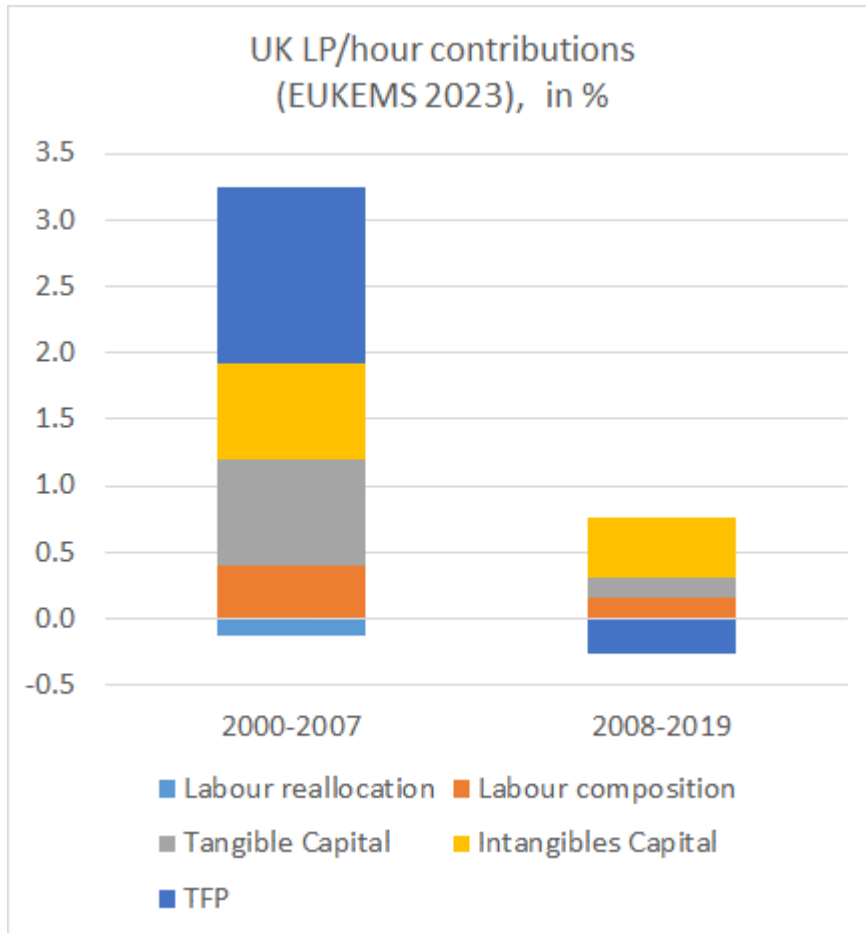
Source: EUKLEMS-INTANProd, Luiss, 2023



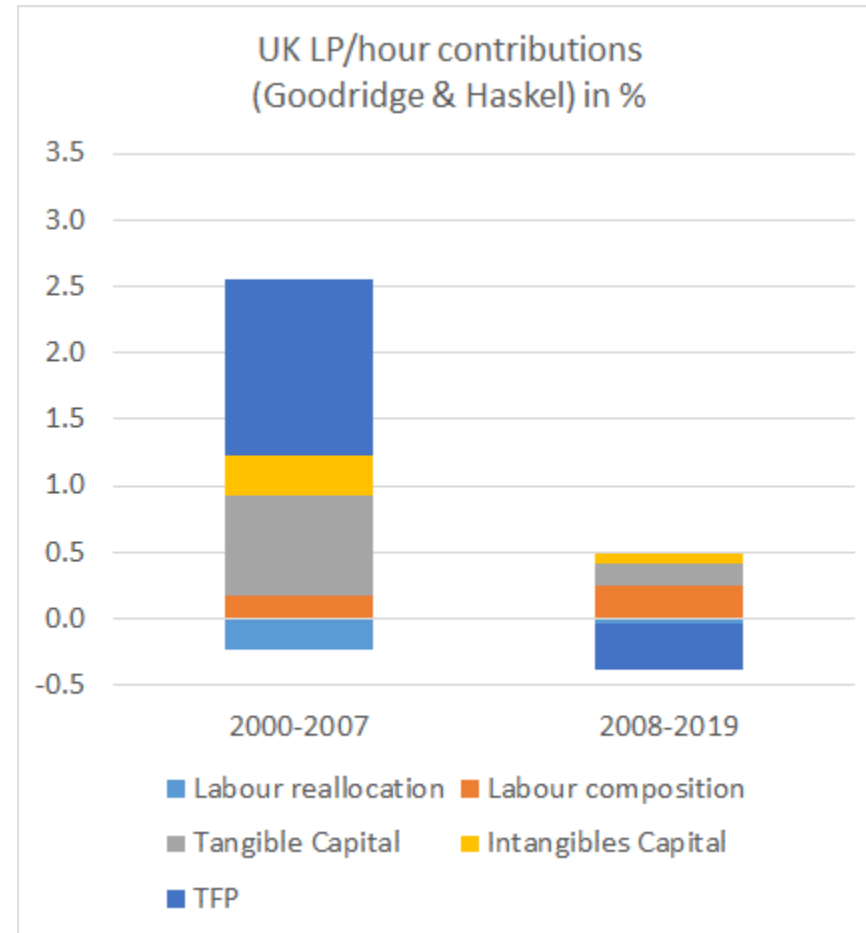
Source: Goodridge and Haskel, TPI, 2022



# INTANGIBLES ARE SOURCE OF DIFFERENCES IN EXTENDED ESTIMATES OF LABOUR PRODUCTIVITY GROWTH

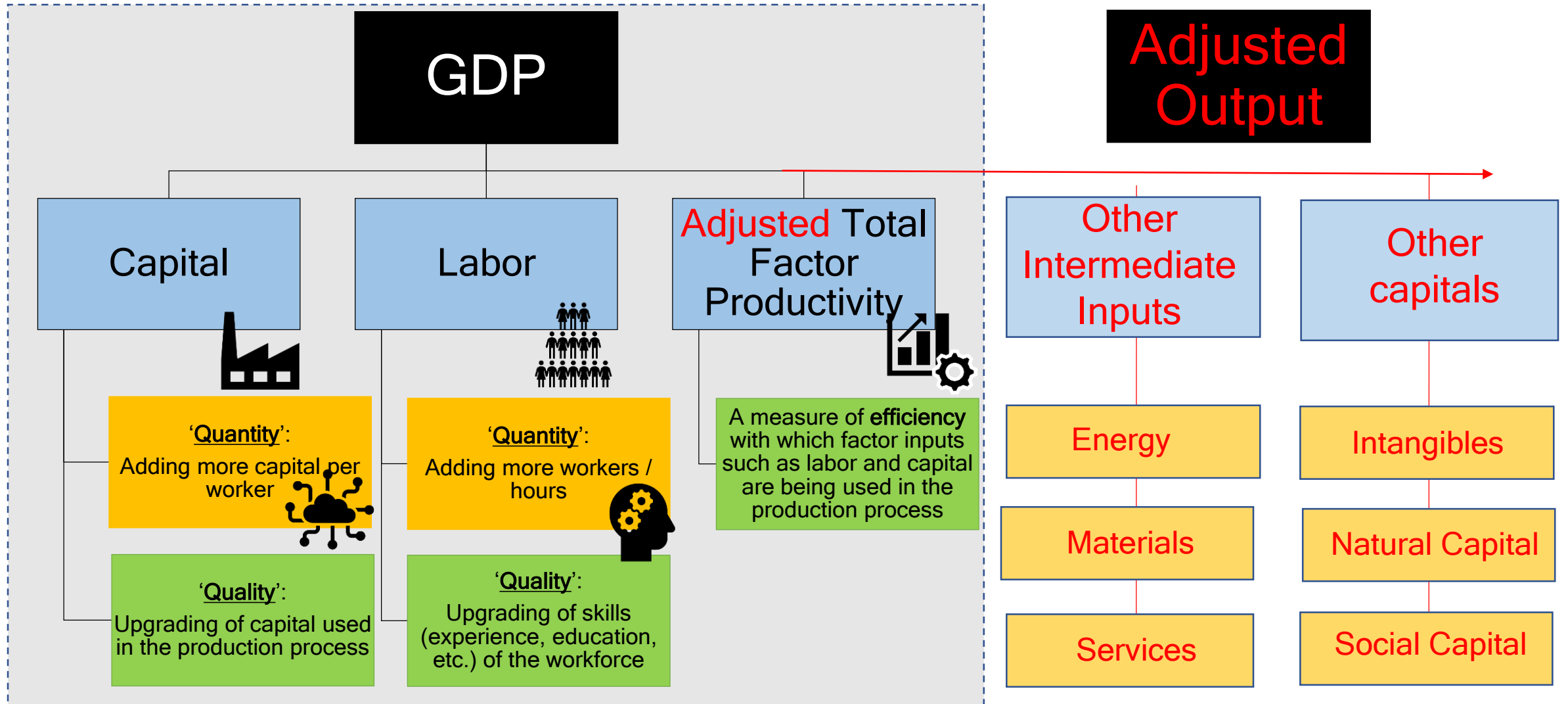


Source: EUKLEMS-INTANProd, Luiss, 2023



Source: Goodridge and Haskel, TPI, 2022

# EXPAND GROWTH ACCOUNTING FRAMEWORK TO NEW GDP CONCEPTS AND INCLUDE NEW CAPITALS



- Good selection of **international data sources of productivity** now available, and be made accessible through TPI Productivity Lab
- **Differences in measures of productivity growth** are due to:
  - Largely differences in measurement of contribution of capital services to productivity
  - Differences in hours worked, labour composition and measurement of quality changes
- Measurement of **intangible investment and capital** (to the extent not included in national accounts) is still a source of large differences
- Comparisons of **productivity levels** are highly sensitive to PPPs, especially for longer time series
- Important steps for future work are **expansion of capital concept**, also to get to better measures of productivity reflecting inclusiveness and sustainability