

Getting Back to (Productivity) Growth

Government Economic Service Conference

Anna Valero and John Van Reenen,
Programme on Innovation and Diffusion, LSE
October 13th 2023

Roadmap

- UK faces a huge **growth challenge** following recent “polycrises”, but problems began earlier....
- What is productivity, and why is it key to growth?
- Where does the UK stand?
- What policies could help generate (equitable and sustainable) productivity growth?

OUTLINE OF TALK

Productivity Basics

Defending Productivity Growth

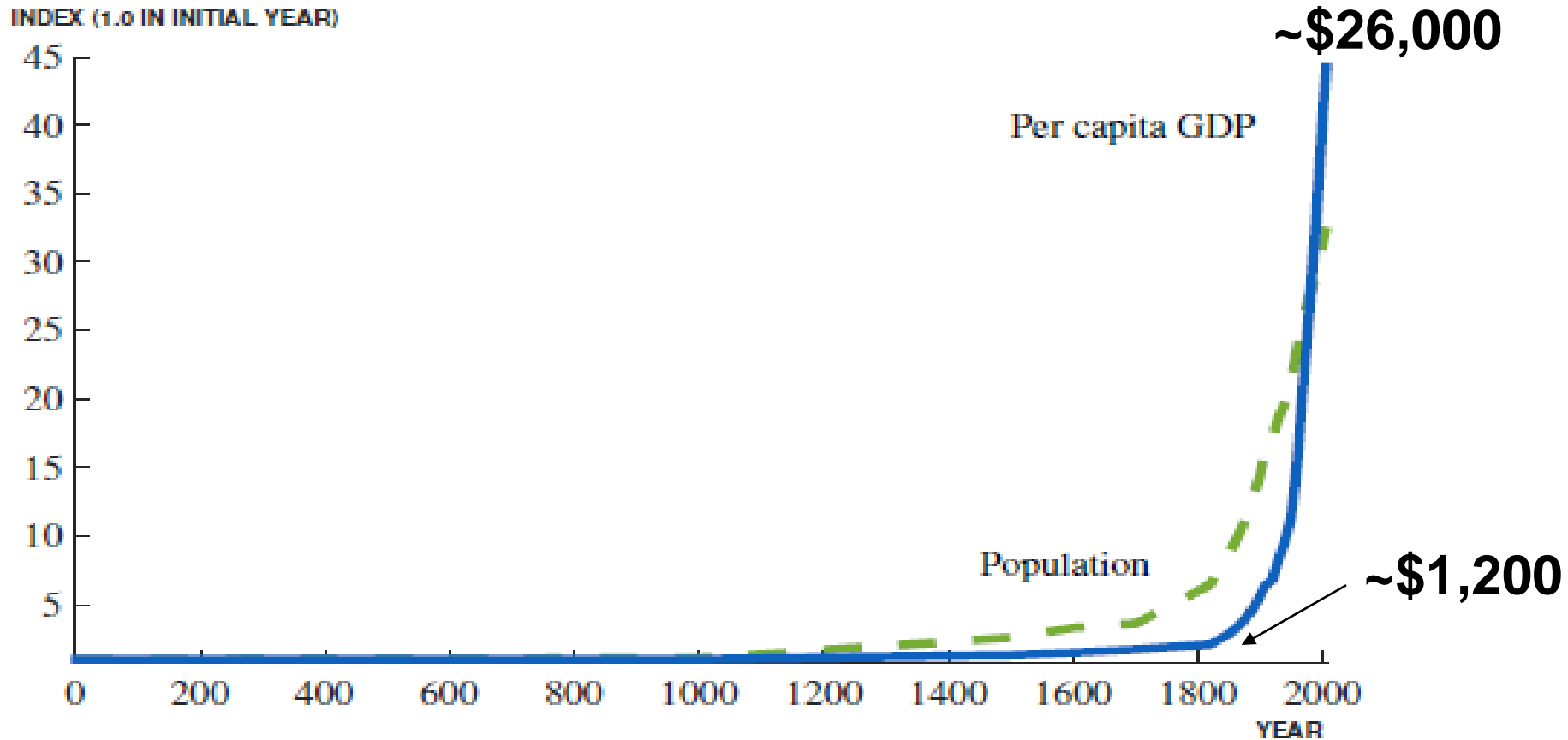
Explaining Productivity Growth

Productivity Policies

Why does Growth Matter?

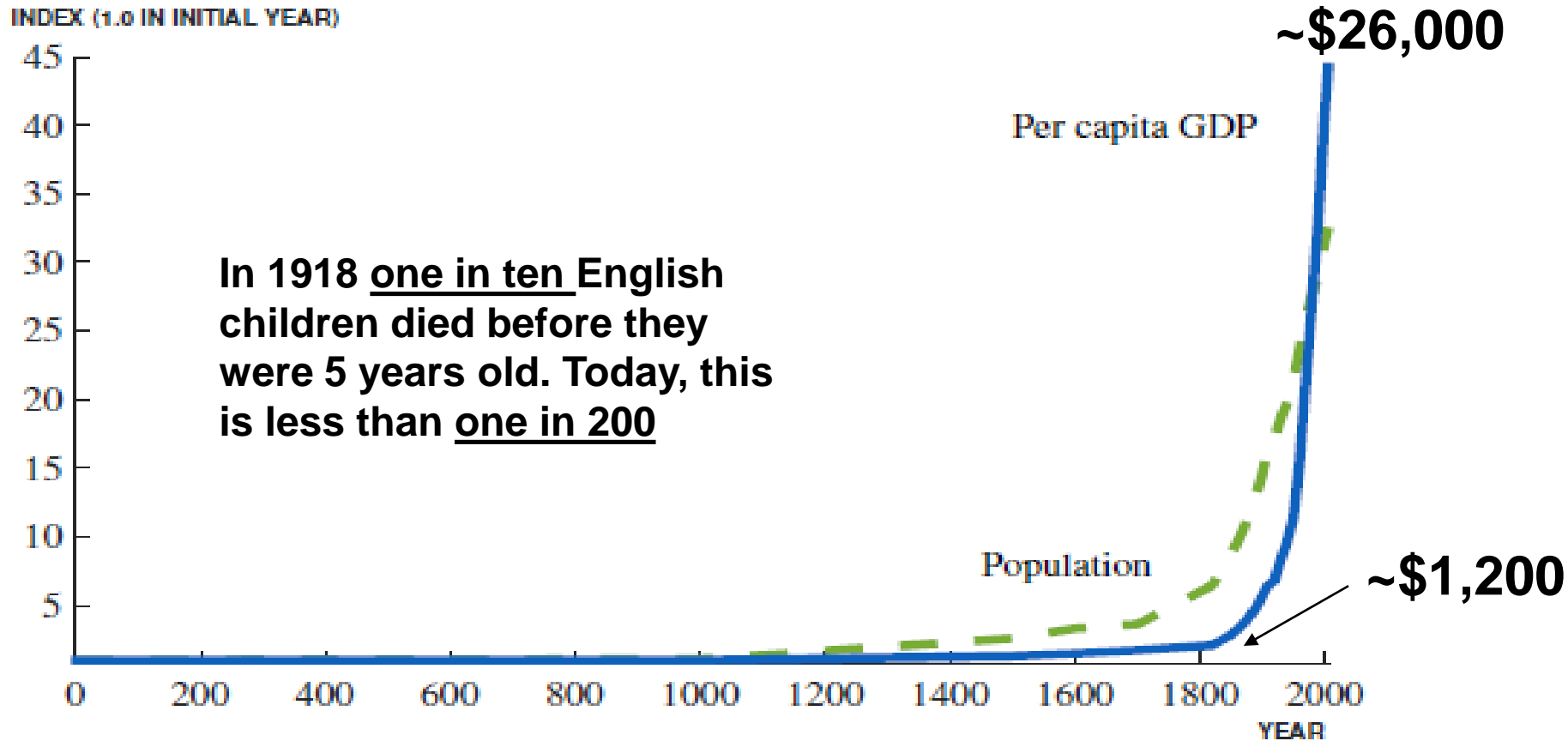
- Size of the economy (GDP) is not important *per se* for citizen wellbeing
 - Increasing GDP via more people or longer working hours unlikely to be good in itself
 - But increases in GDP **per capita** do matter
 - Note that GDP highly correlated with alternative measures like Net Domestic Product, Net Domestic Income, etc.

The “Hockey Stick”: Two millennia of Western Growth



Note: Data are from Maddison (2008) for the “West,” i.e. Western Europe plus the United States. A similar pattern holds using the “world” numbers from Maddison.

The “Hockey Stick”: Two millennia of Western Growth



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Why does Growth Matter?

- Productivity growth increases size of **economic pie** giving us more choices:
 - More public goods (health, education), leisure, consumption, environmental improvements, redistribution,..
- Can break down GDP per capita into:
 - **Labour Productivity**: Outputs per input, e.g. GDP per worker or GDP per hour
 - **Employment Rate** (e.g. lower unemployment)

Relating Output per Person to Productivity

Concept

**Output
per Person**

Math

$$\frac{\text{Output}}{\text{Population}} =$$

Words

e.g. per capita GDP

Relating Output per Person to Productivity

<i>Concept</i>	Output per Person	Productivity (per hour)
<i>Math</i>	$\frac{\text{Output}}{\text{Population}} = \frac{\text{Output}}{\text{Hours Worked}} \times$	
<i>Words</i>	e.g. per capita GDP	“Labour Productivity”

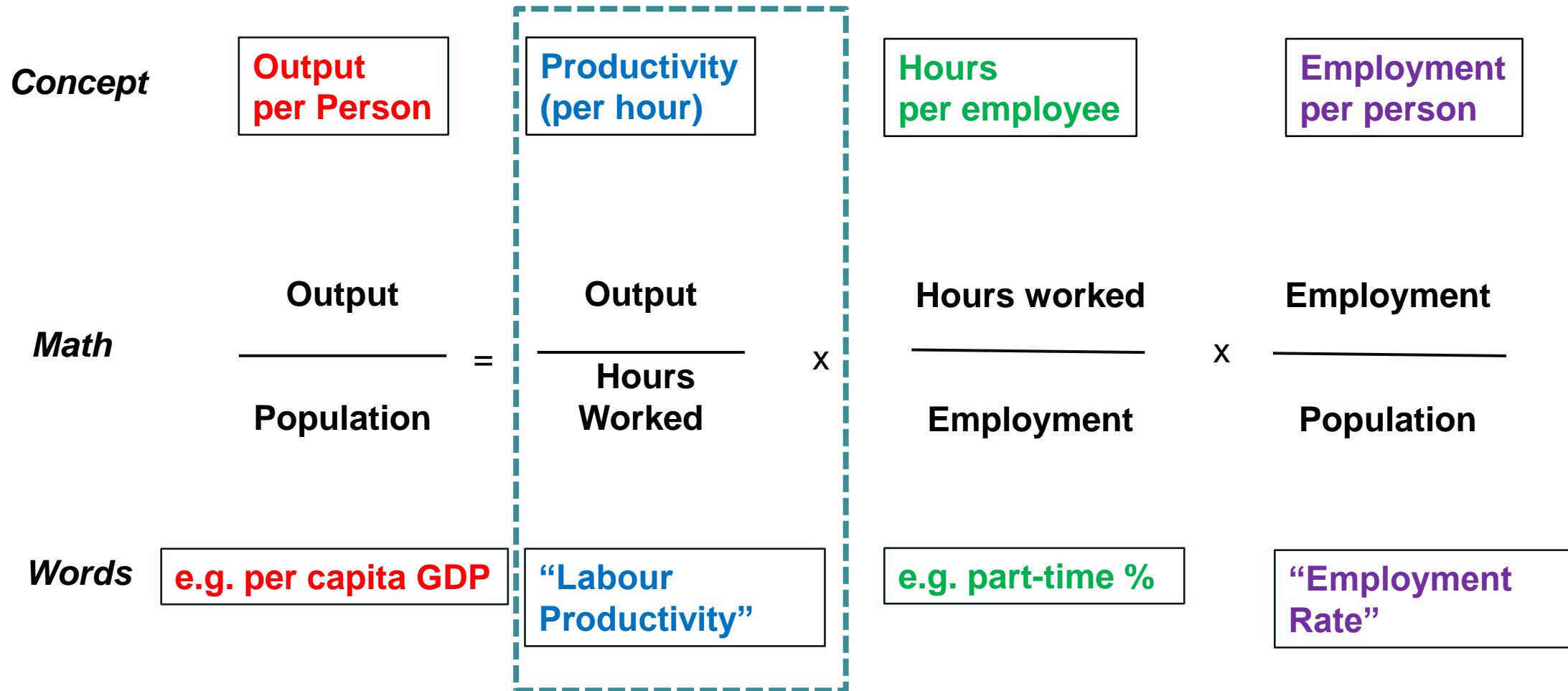
Relating Output per Person to Productivity

<i>Concept</i>	Output per Person	Productivity (per hour)	Hours per employee
<i>Math</i>	$\frac{\text{Output}}{\text{Population}} = \frac{\text{Output}}{\text{Hours Worked}} \times \frac{\text{Hours worked}}{\text{Employment}}$		
<i>Words</i>	e.g. per capita GDP	“Labour Productivity”	e.g. part-time %

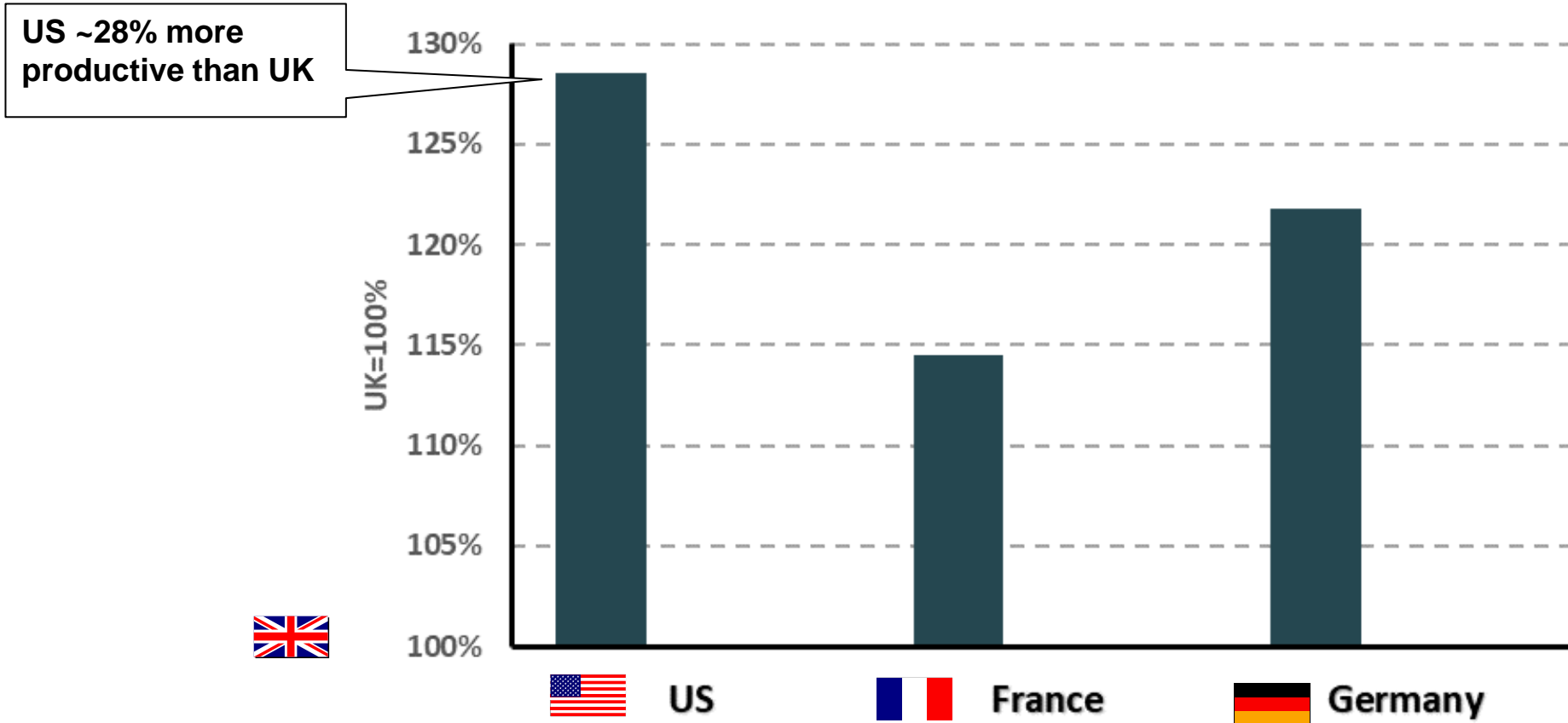
Relating Output per Person to Productivity

Concept	Output per Person	Productivity (per hour)	Hours per employee	Employment per person
Math	$\frac{\text{Output}}{\text{Population}}$	$= \frac{\text{Output}}{\text{Hours Worked}}$	$\times \frac{\text{Hours worked}}{\text{Employment}}$	$\times \frac{\text{Employment}}{\text{Population}}$
Words	e.g. per capita GDP	“Labour Productivity”	e.g. part-time %	“Employment Rate”

Relating Output per Person to Productivity Measures (see ONS Productivity Manual for more detail)



UK has long had a major deficit in productivity (GDP per hour) in levels compared to other countries



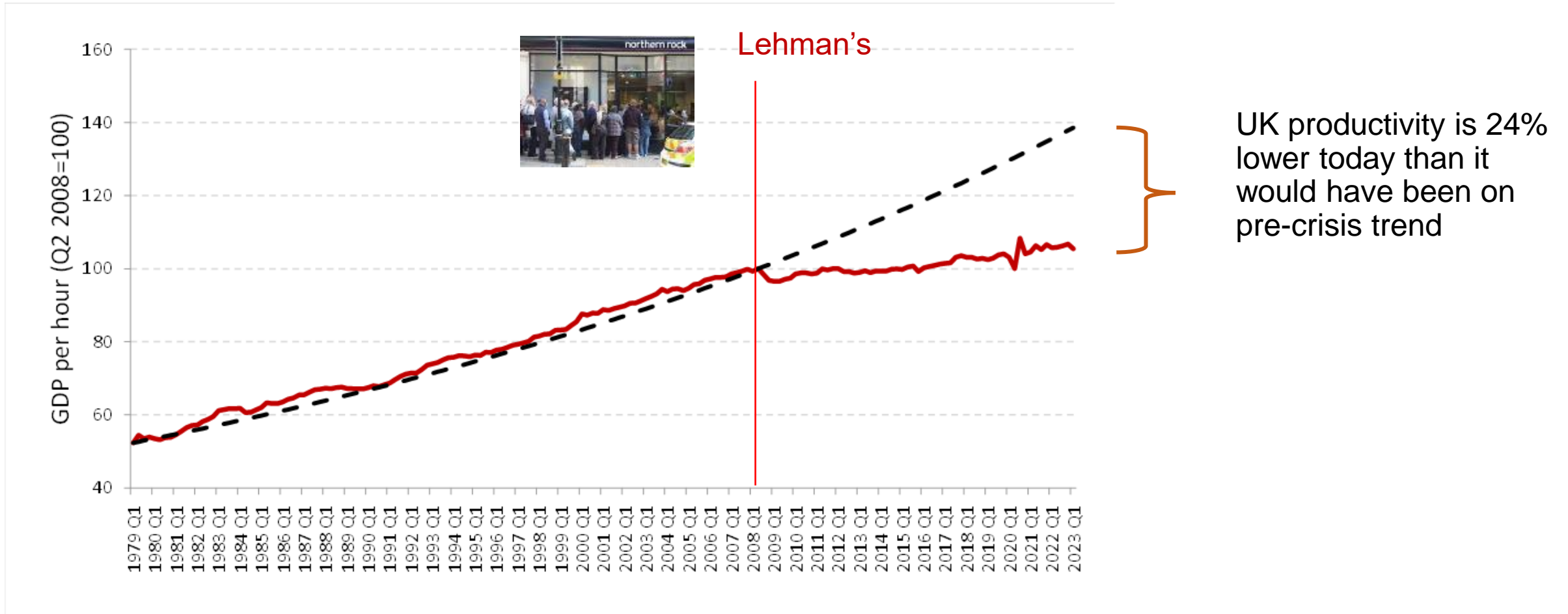
Note: 2019 data from “market economy” (i.e. drop public sector). EUKLEMS & INTANProd 2023 release; OECD (2014); PPP from OECD (2023) and other sources. Hours measured in consistent way across countries.

Source: Van Reenen and Yang (2023)

UK Labour Productivity since 1979

Big Slowdown since 2008-09 Global Financial Crisis

Whole economy output per hour worked (Q2 2008=100)



Source: ONS Output per hour worked, release date 29 September 2023, UK Whole Economy: Output per hour worked SA index (2008 Q2= 100). Note: predicted value after Q2 2008 is the dashed line calculated assuming a historical average growth rate of 2.2% (the 1979Q1-2008Q2 growth rate)

OUTLINE OF TALK

Productivity Basics

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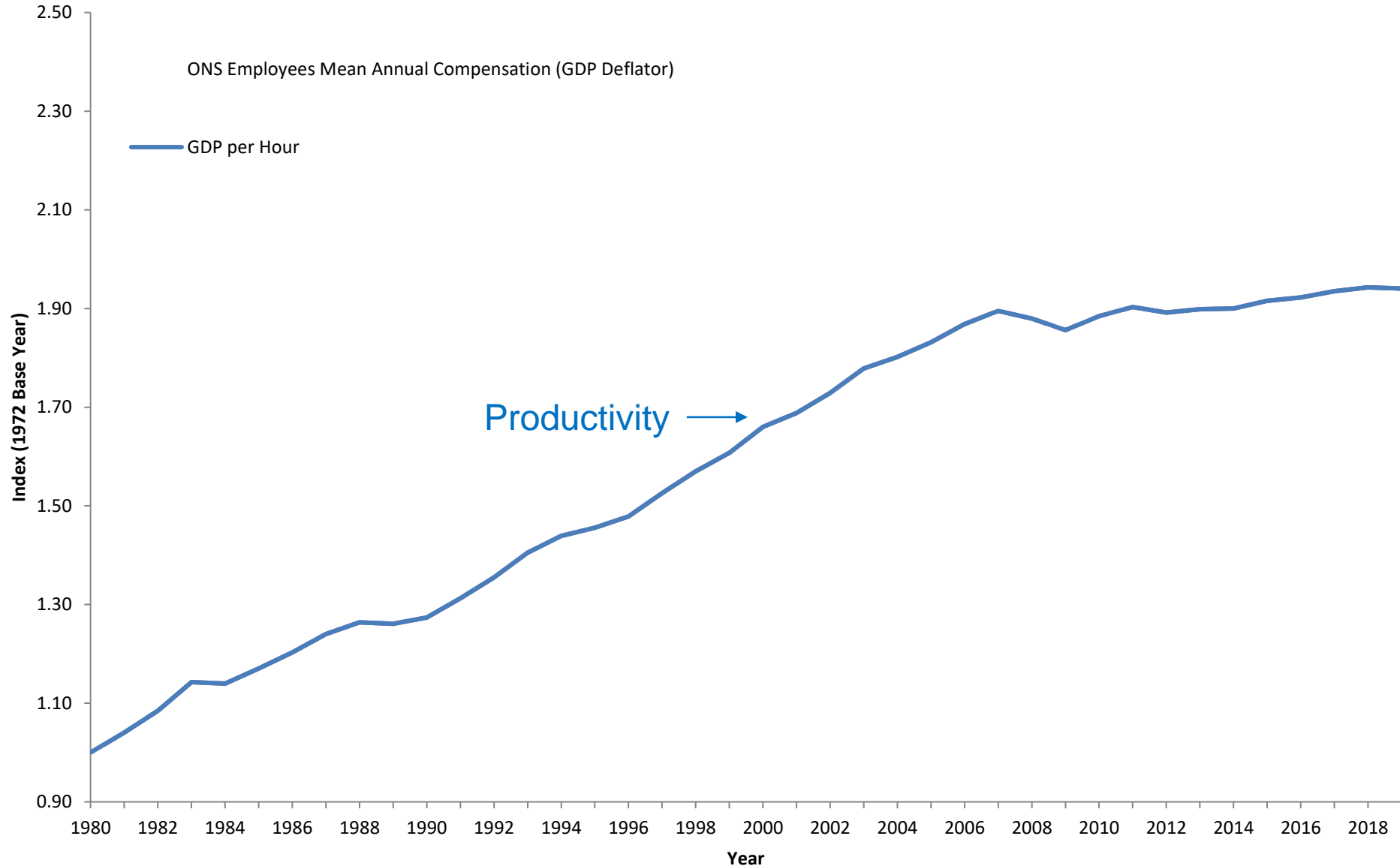
Explaining Productivity Growth

Productivity Policies

Defending Productivity Growth

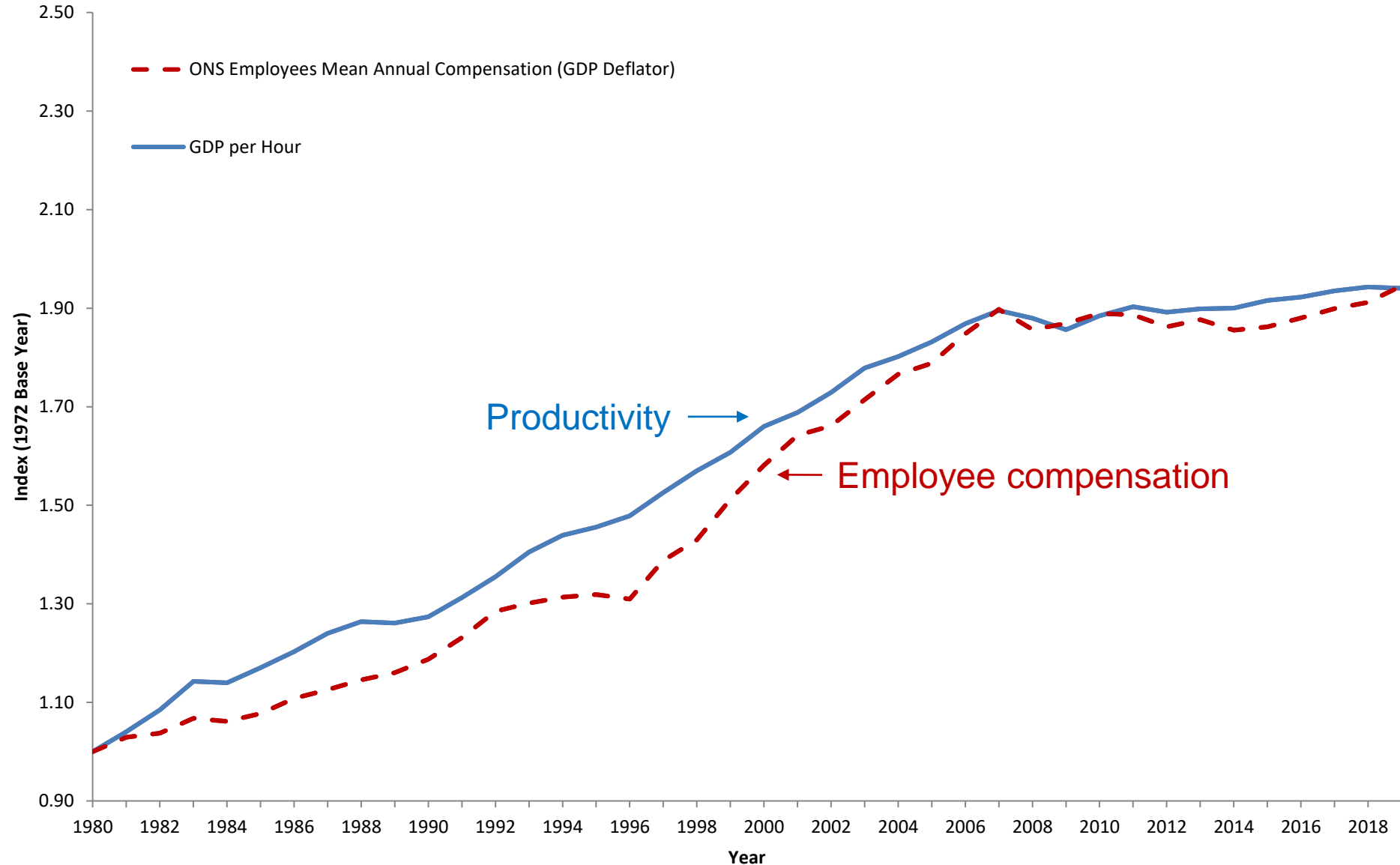
1. **“Capitalists get all the benefits of growth, not workers”**
2. “Faster growth means more inequality”
3. “Growth is bad for the environment”
4. “Growth doesn’t make us any happier”
5. “There’s nothing we can do to improve the growth rate”

UK Labour Productivity (again)



Source: ONS (2021); Series both based at 1 in 1980, both compensation and productivity approximately doubled over the four decades

UK Employee Average Compensation tracks UK Labour Productivity



Source: ONS (2021); Series both based at 1 in 1980, both compensation and productivity approximately doubled over the four decades

Defending Productivity Growth

1. “Capitalists get all the benefits of growth, not workers”
2. “Faster growth means more inequality”
3. “Growth is bad for the environment”
4. “Growth doesn’t make us any happier”
5. **“There’s nothing we can do to improve the growth rate”**
 - Traditional economics vs. modern growth theory
 - **UK experience:** after a century of relative decline UK GDP per capita caught up with peers in US, Germany and France for 30 years leading up Global Financial Crisis (1979-2008)



Alamy/Shutterstock

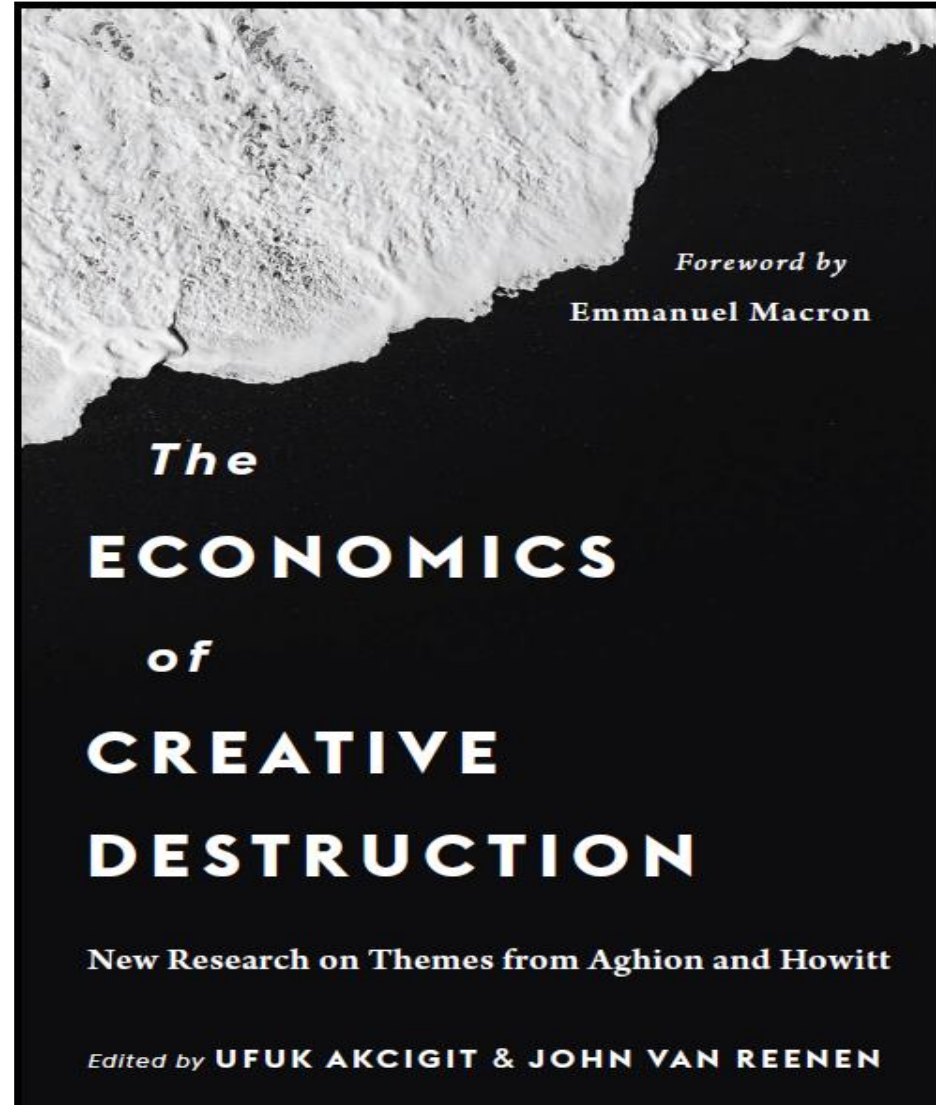
Philippe Aghion



Robert Gordon



Intellectual Framework: Modern Growth around Creative Destruction



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Decomposition of Productivity growth

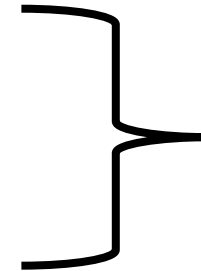
- Output per worker growth

+ Increase in **capital** per worker

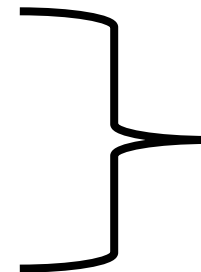
+ Increase in **skills** per worker

+ Increase in **technology**

+ Improvements in **management**



Quantity & Quality of Inputs
("Factors of Production")



Total Factor Productivity
("TFP")

Explaining Growth: A Hunting Economy



Decomposition of Productivity growth in a Hunting Economy

- Growth in food caught per hunter

+ More arrows per hunter (**K**)

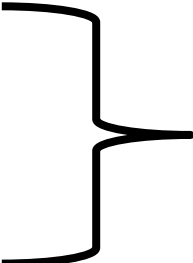
+ More years in hunting school (**H**)

+ Better arrows = **Technology**

+ Hunting in a pack = **Management**

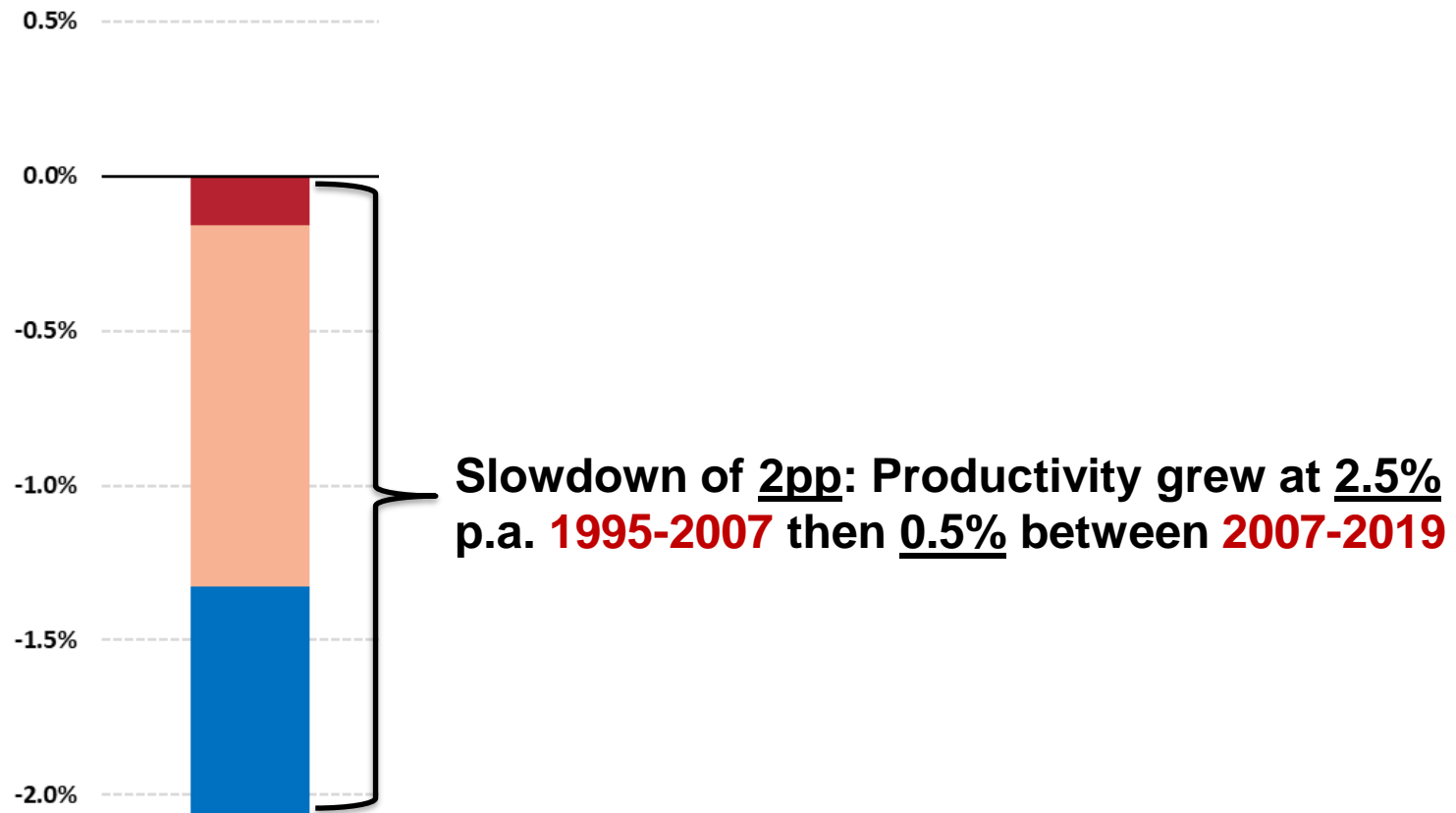


Quantity & Quality of Inputs
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Total Factor Productivity
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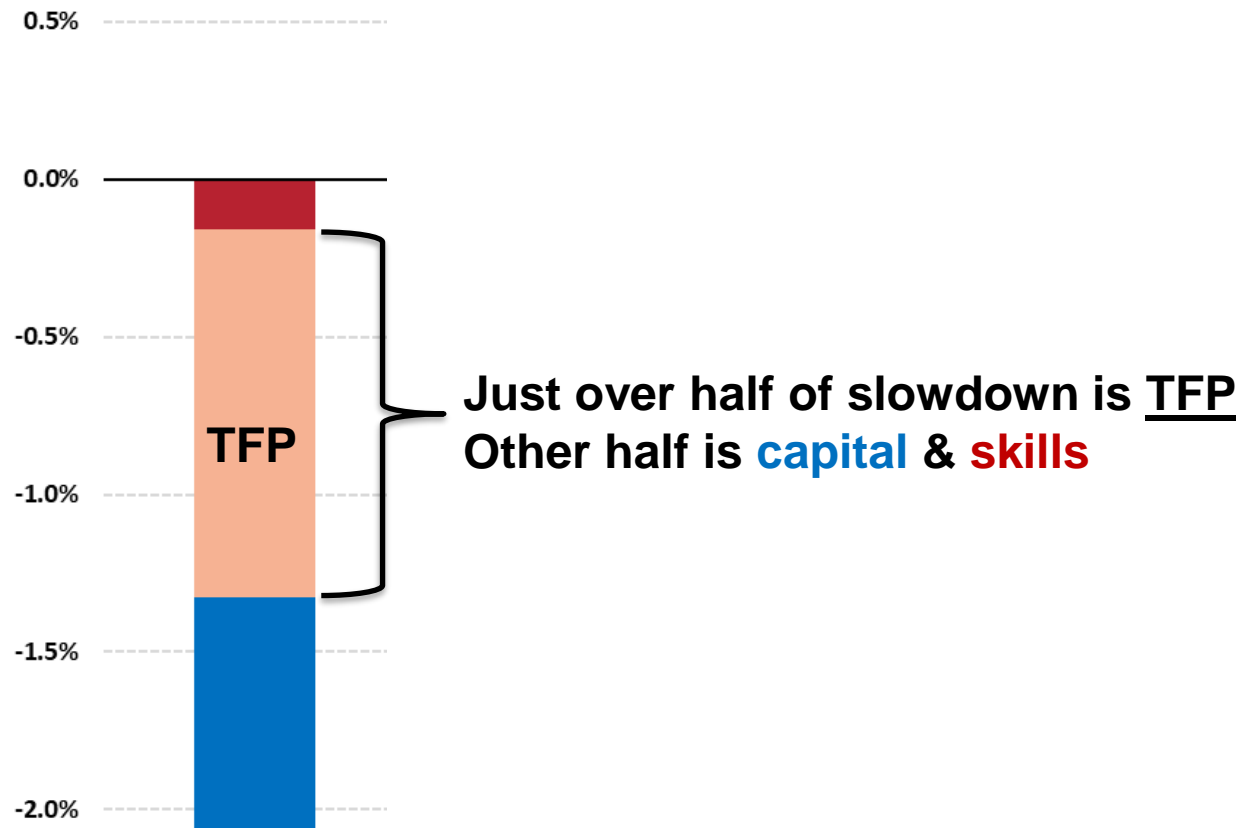
Accounting for the 2pp slowdown in UK Labour Productivity Growth after Financial Crisis



Note: Comparison of market-economy GDP per hour growth 2019-2007 vs. 2007-1995. EUKLEMS & INTANProd 2023 release; OECD (2014) and other sources.

Source: Van Reenen and Yang (2023)

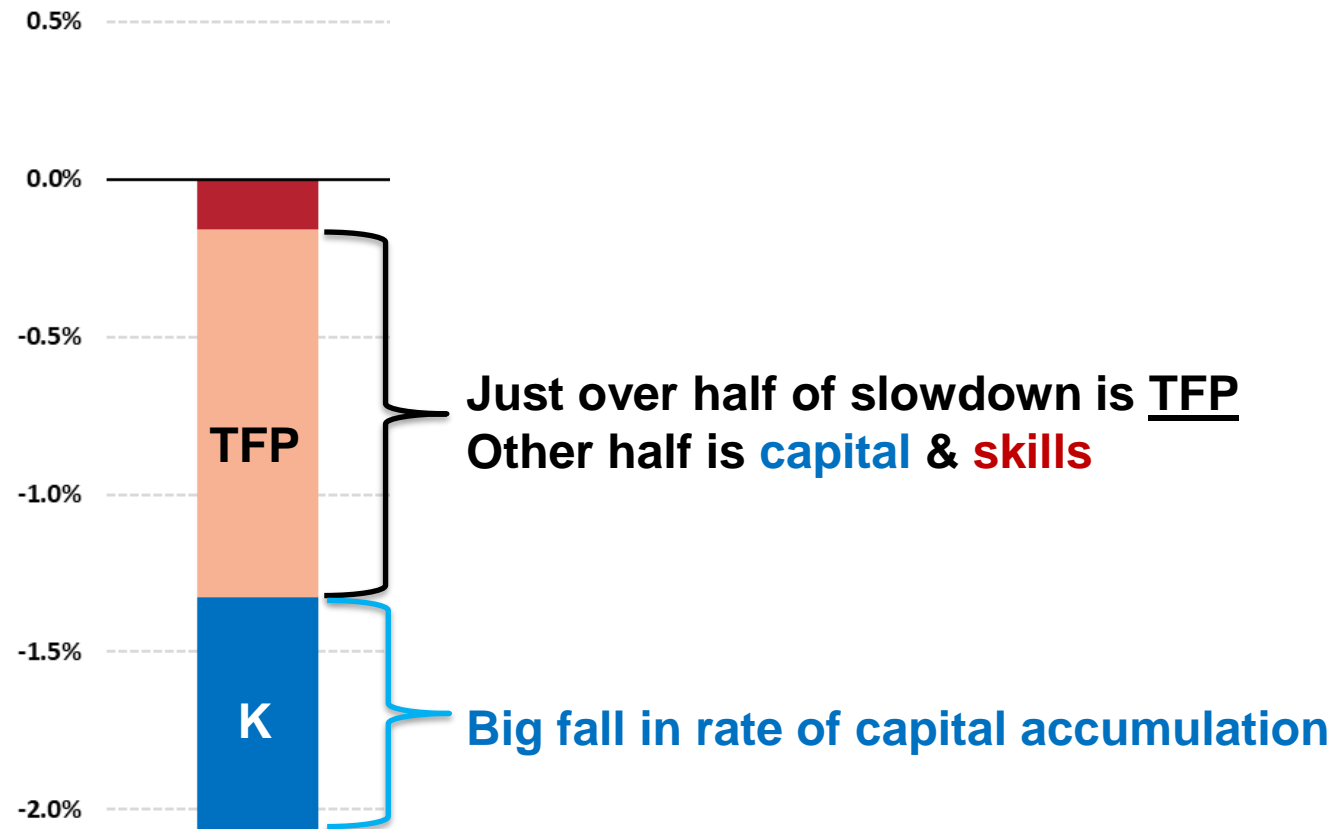
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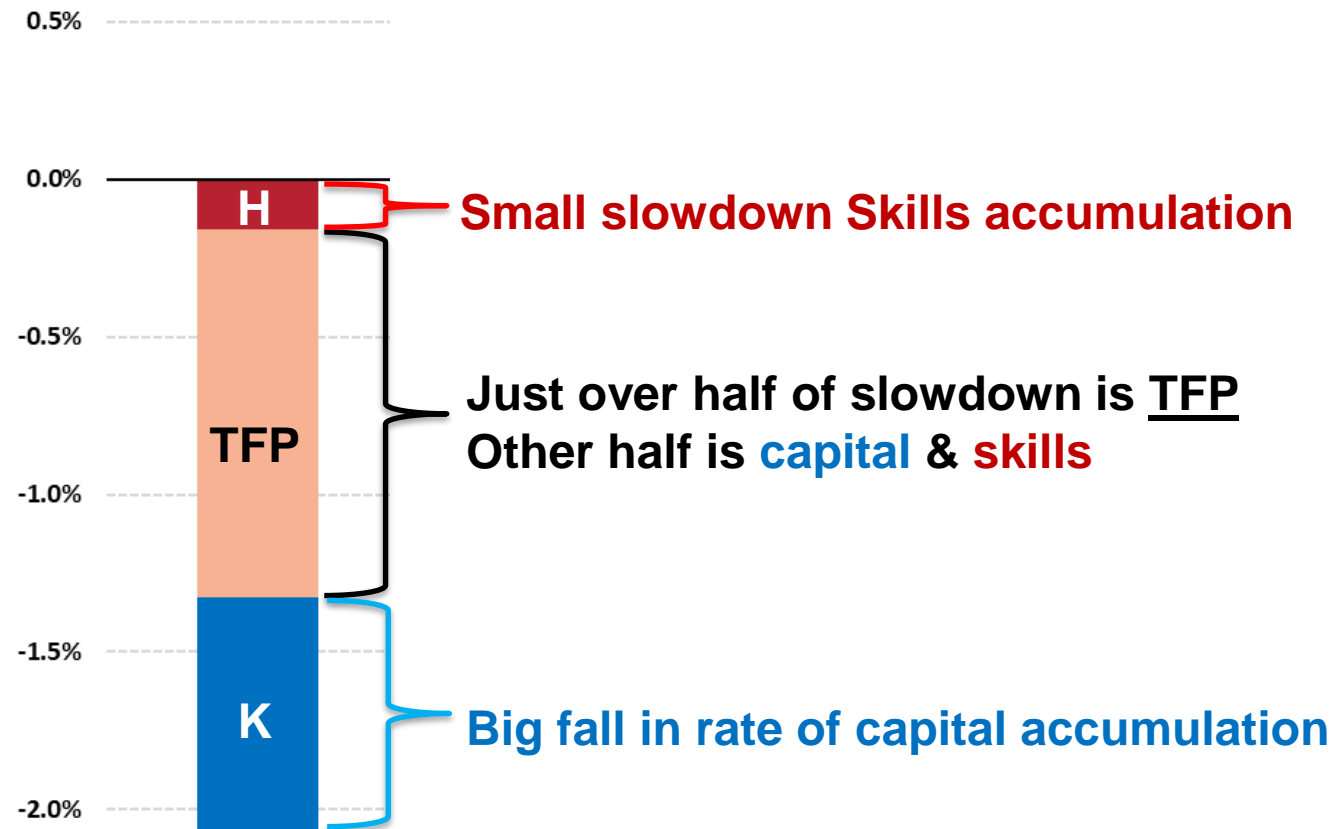
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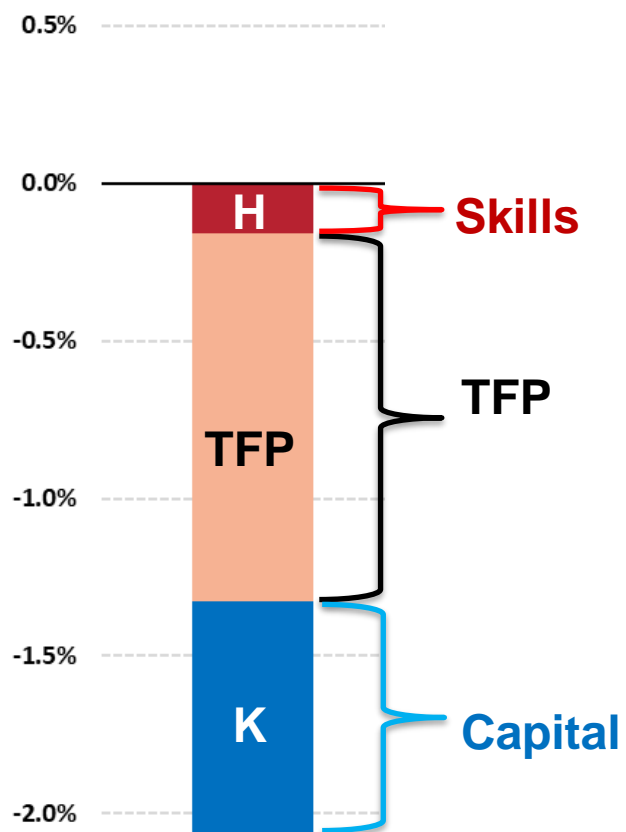
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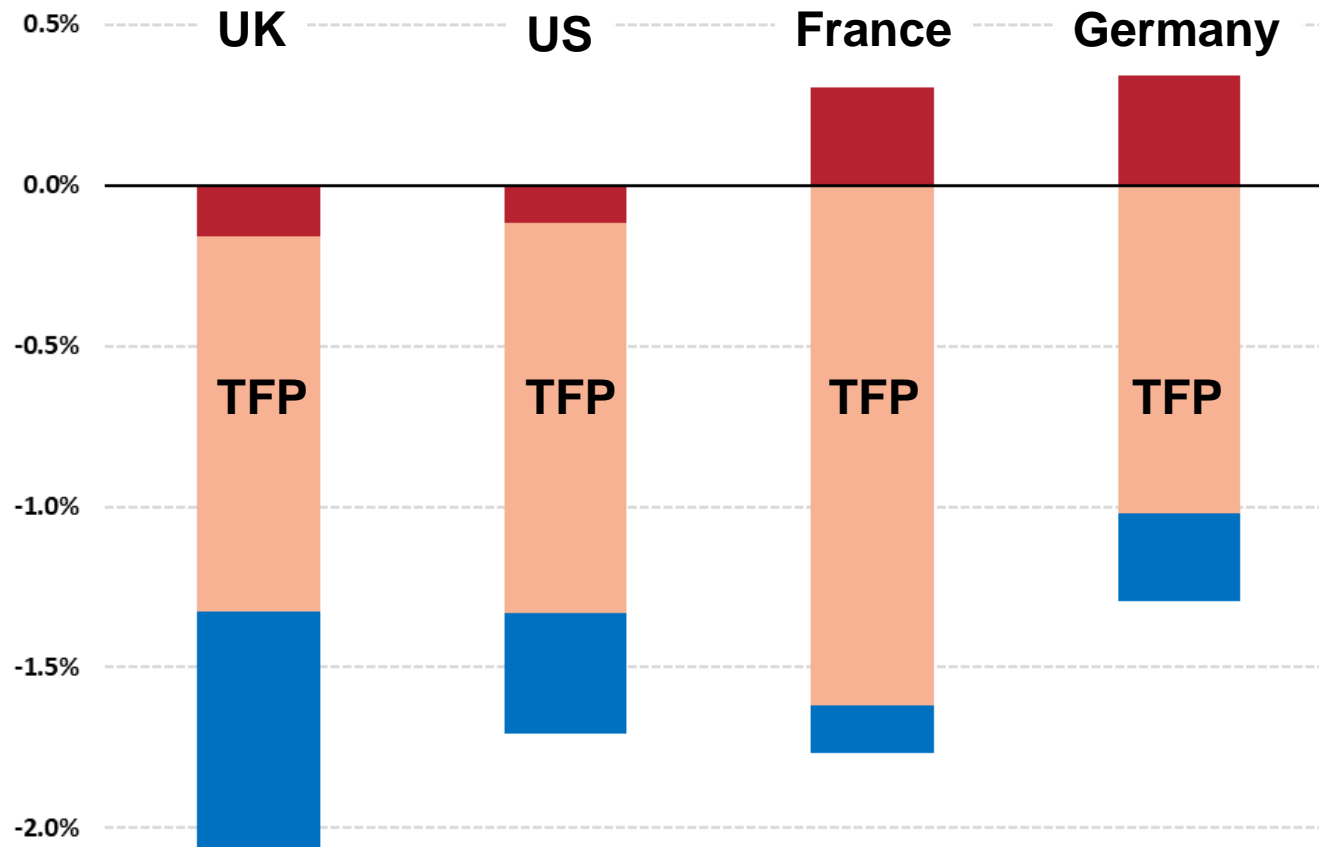
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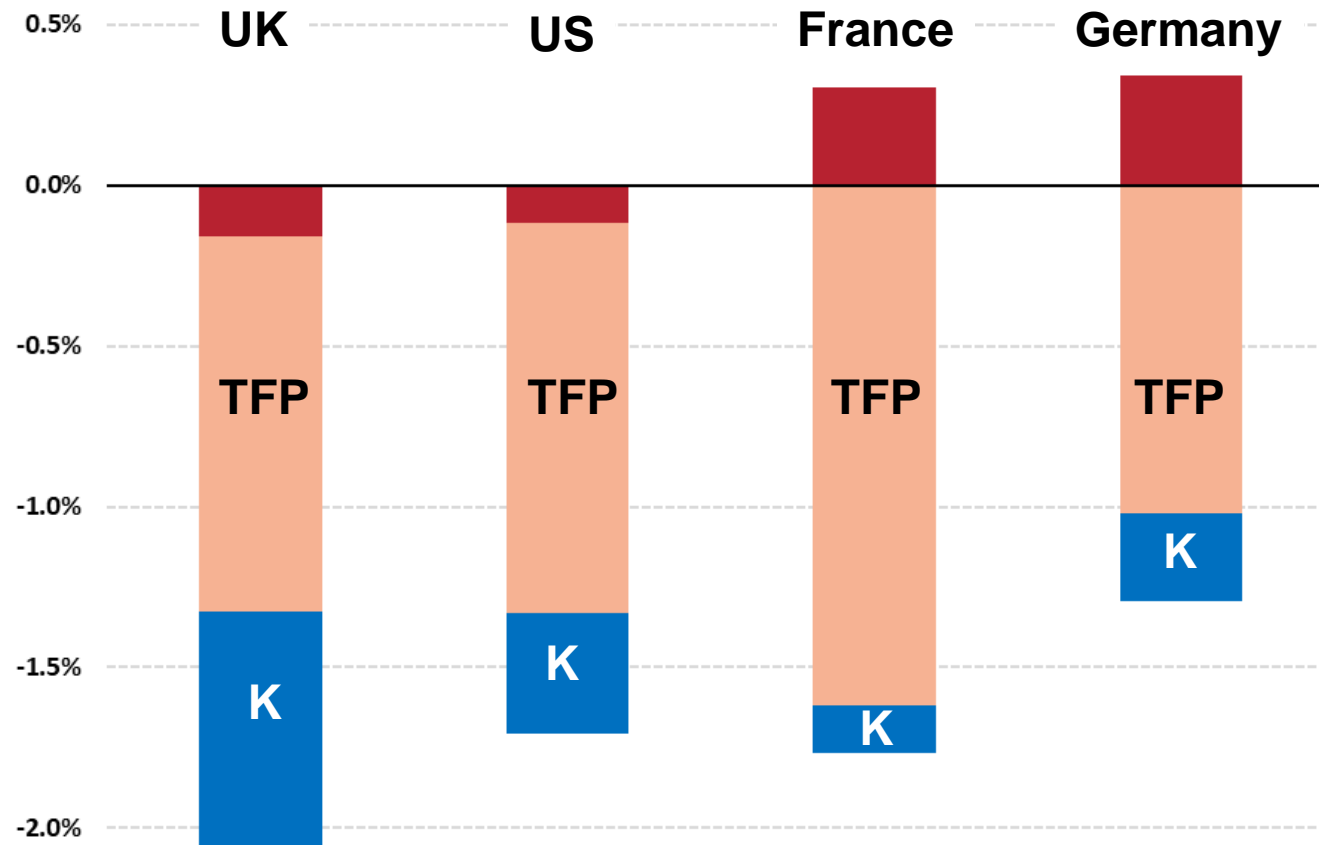
TFP slowdown pretty common across major economies....



Note: Comparison of market-economy GDP per hour growth 2019-2007 vs. 2007-1995. EUKLEMS & INTANProd 2023 release; OECD (2014) and other sources.

Source: Van Reenen and Yang (2023)

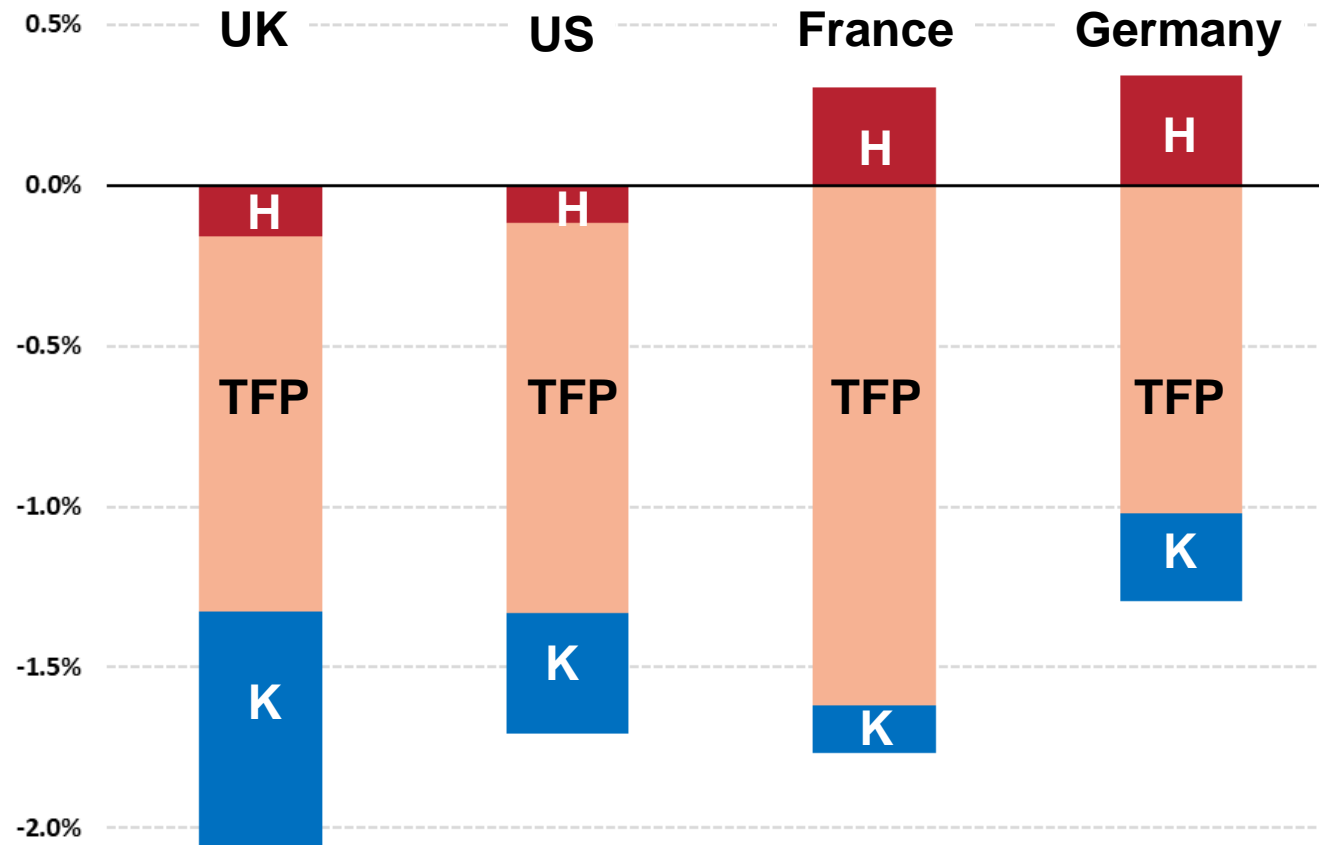
... But UK investment (K) particularly bad



Note: Comparison of market-economy GDP per hour growth 2019-2007 vs. 2007-1995. EUKLEMS & INTANProd 2023 release; OECD (2014) and other sources.

Source: Van Reenen and Yang (2023)

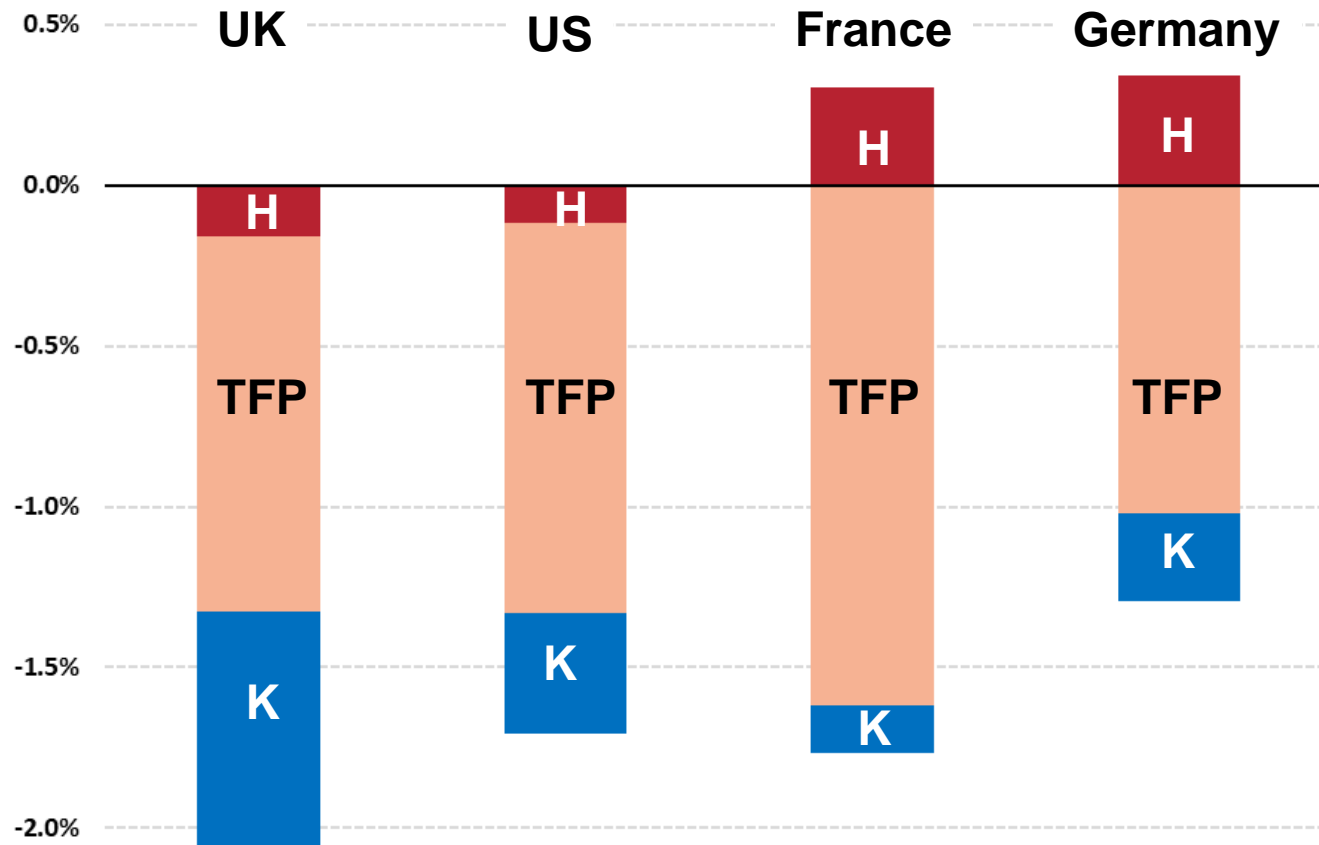
... And somewhat larger slowdown in human capital accumulation



Note: Comparison of market-economy GDP per hour growth 2019-2007 vs. 2007-1995. EUKLEMS & INTANProd 2023 release; OECD (2014) and other sources.

Source: Van Reenen and Yang (2023)

UK TFP slowdown similar to other countries, but capital (& skills) accumulation much worse



Note: Comparison of market-economy GDP per hour growth 2019-2007 vs. 2007-1995. EUKLEMS & INTANProd 2023 release; OECD (2014) and other sources.

Source: Van Reenen and Yang (2023)

Why has UK productivity been so poor since Financial Crisis?

- **Many factors**

1. Global problem of slowing productivity growth
2. Mismeasurement
3. High exposure to financial sector: e.g. SMEs, “Zombie” firms
4. Brexit (e.g. uncertainty, higher trade costs)
5. Low private and public investment
6. Low demand/Premature Austerity
7.

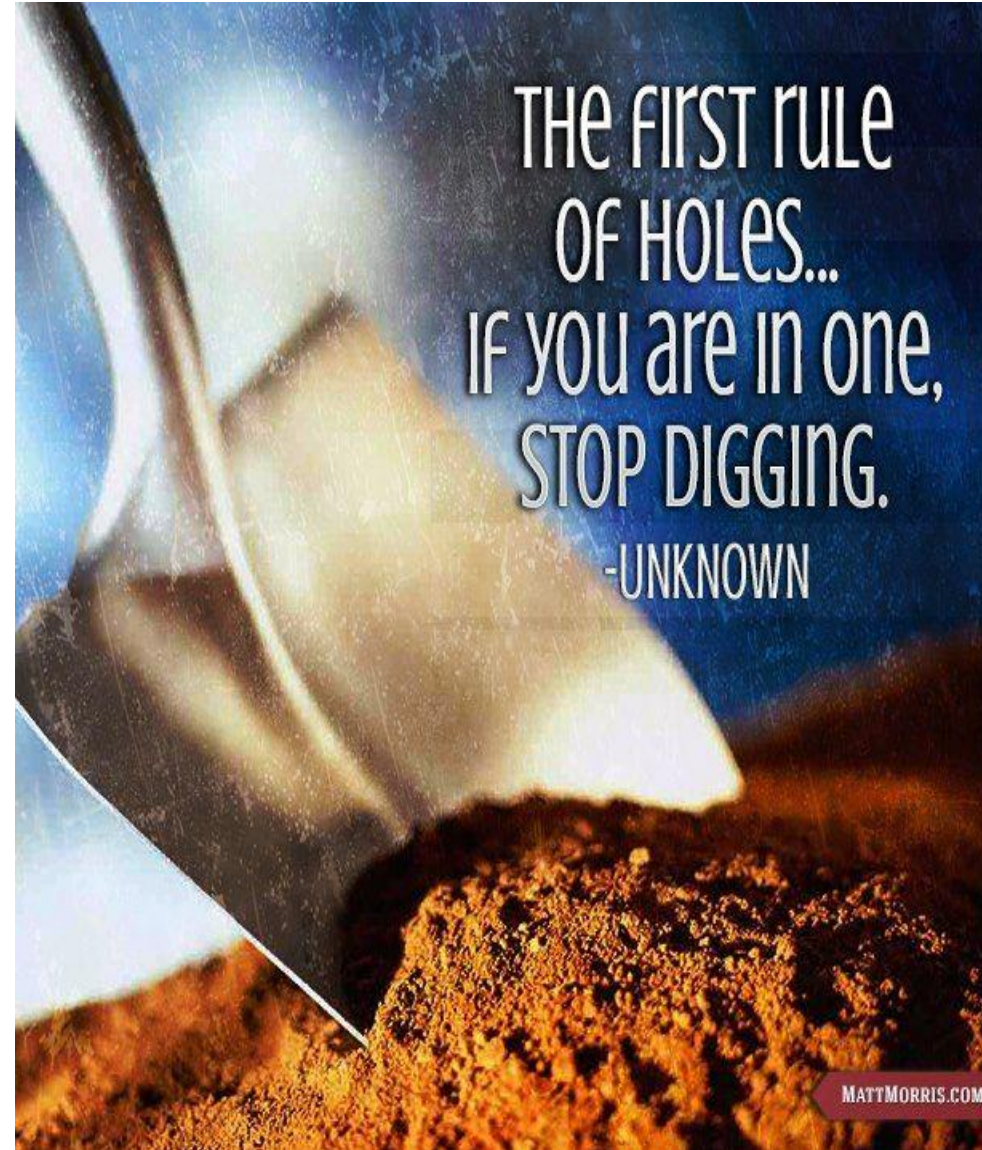
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But regardless of how we got into this mess, the main issue is how we get out of it.

Policy Advice



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Productivity Policies

The Importance of Policy Evaluation

- We rarely know with precision which policies will work
- Quantitative empirical evidence **very valuable** for productivity policies
- Major advances in empirical tools for policy evaluation: RCTs, RDDs, quasi-experiments, etc.

Josh Angrist



Claudia Goldin



Esther Duflo



David Card





Innovation Policy: The “Lightbulb” Table

(1)	(2)	(3)	(4)	(5)	(6)
Policy	Quality of evidence	Conclusiveness of evidence	Benefit - Cost	Time frame:	Effect on inequality



Source: Bloom, Van Reenen and Williams (2019, JEP)

Innovation Policy: The “Lightbulb” Table

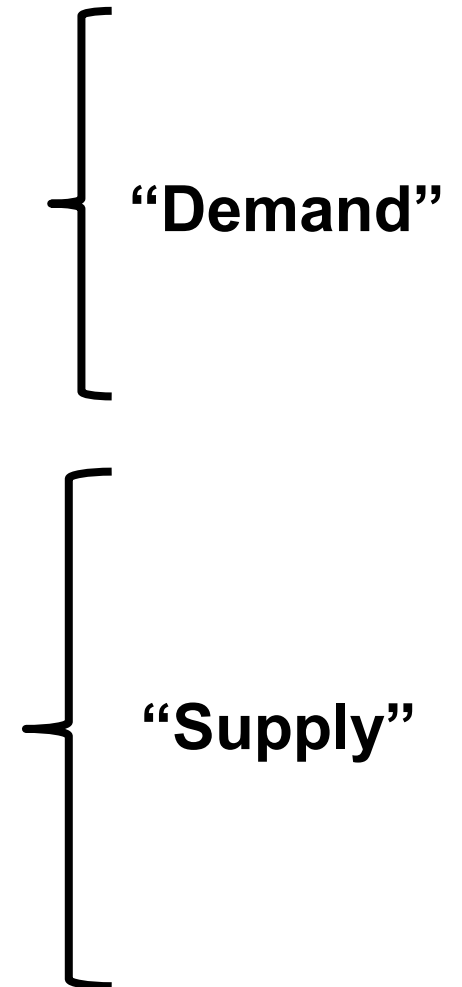
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Policy	Quality of evidence	Conclusiveness of evidence	Benefit - Cost	Time frame:	Effect on inequality
Direct R&D Grants	Medium	Medium		Medium-Run	↑
R&D tax credits	High	High		Short-Run	↑
Patent Box	Medium	Medium	Negative	n/a	↑

“Demand”

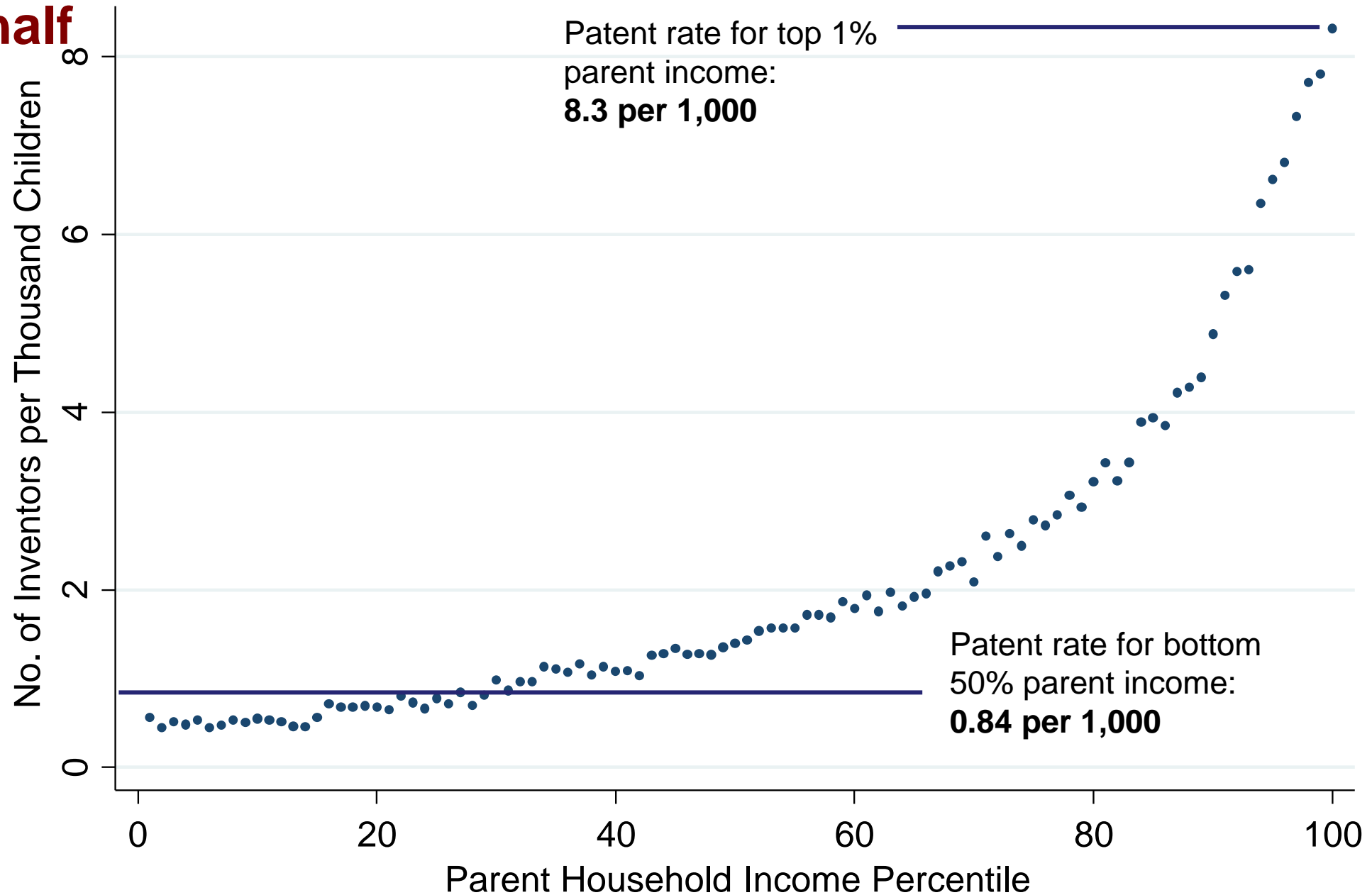


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R&D tax credits	High	High	💡💡💡	Short-Run	↑
Patent Box	Medium	Medium	Negative	n/a	↑
Skilled Immigration	High	High	💡💡💡	Short to Medium-Run	↓
Universities: incentives	Medium	Low	💡	Medium-Run	↑
Universities: STEM Supply	Medium	Medium	💡💡	Long-Run	↓
Exposure Policies	Medium	Low	💡💡	Long-run	↓
Trade and competition	High	Medium	💡💡	Medium-Run	↑



Kids of rich parents 10x more likely to become inventors than those in bottom half



Source: Bell, Chetty, Jaravel, Petkova & Van Reenen (2019, QJE); USPTO- IRS data

Finding the “Lost Einsteins and Marie Curies”

- Major impediment to innovation is that supply of talented potential inventors held back by race, gender, parental income (e.g. schools in disadvantaged areas, low exposure to role models, networks and mentors, etc.)
- Unlocking this hidden talent could **quadruple** innovation rate
- An example of policies that help growth and equity



Wanted: 'Lost Einsteins.' Please Apply.



Daniel Gries of Pioneer, center, with Heidi Hartung, left, the group's operations manager, and Lorea Dominguez, one of its advisors. Jason Hesser for The New York Times

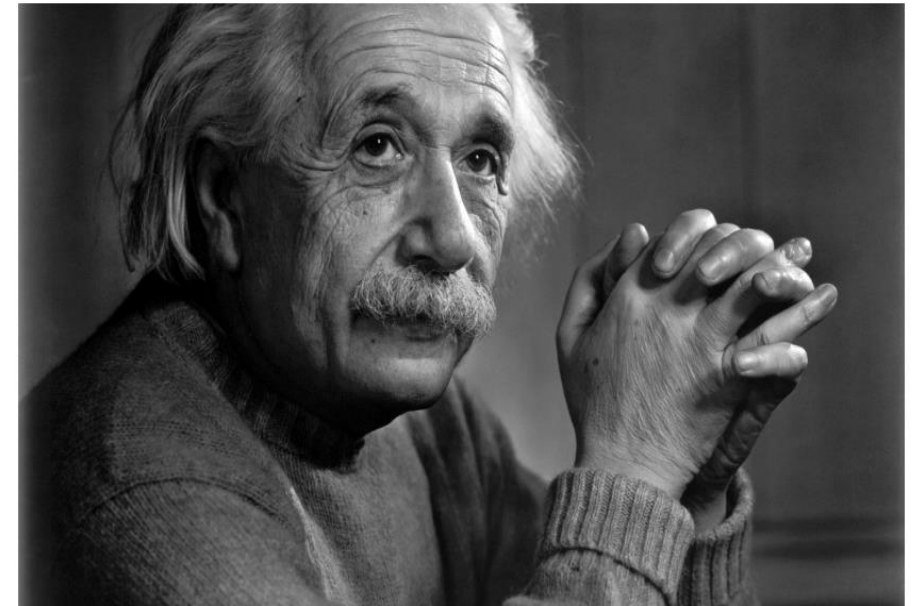
By Steve Lohr

Aug. 9, 2018

Learn in español

Silicon Valley has created a model for identifying and nurturing high-potential young companies. Pioneer, an experimental fund, hopes to do much the same thing for high-potential people.

The group, which is being announced on Thursday, plans to use the Internet-era tools of global communication and crowdfunding to solicit and help select promising candidates in a variety of fields, along with evaluations by experts. Its goal is to put more science and less happenstance into the process of talent discovery — and reach more



Getting Back to (Productivity) Growth

Government Economic Service

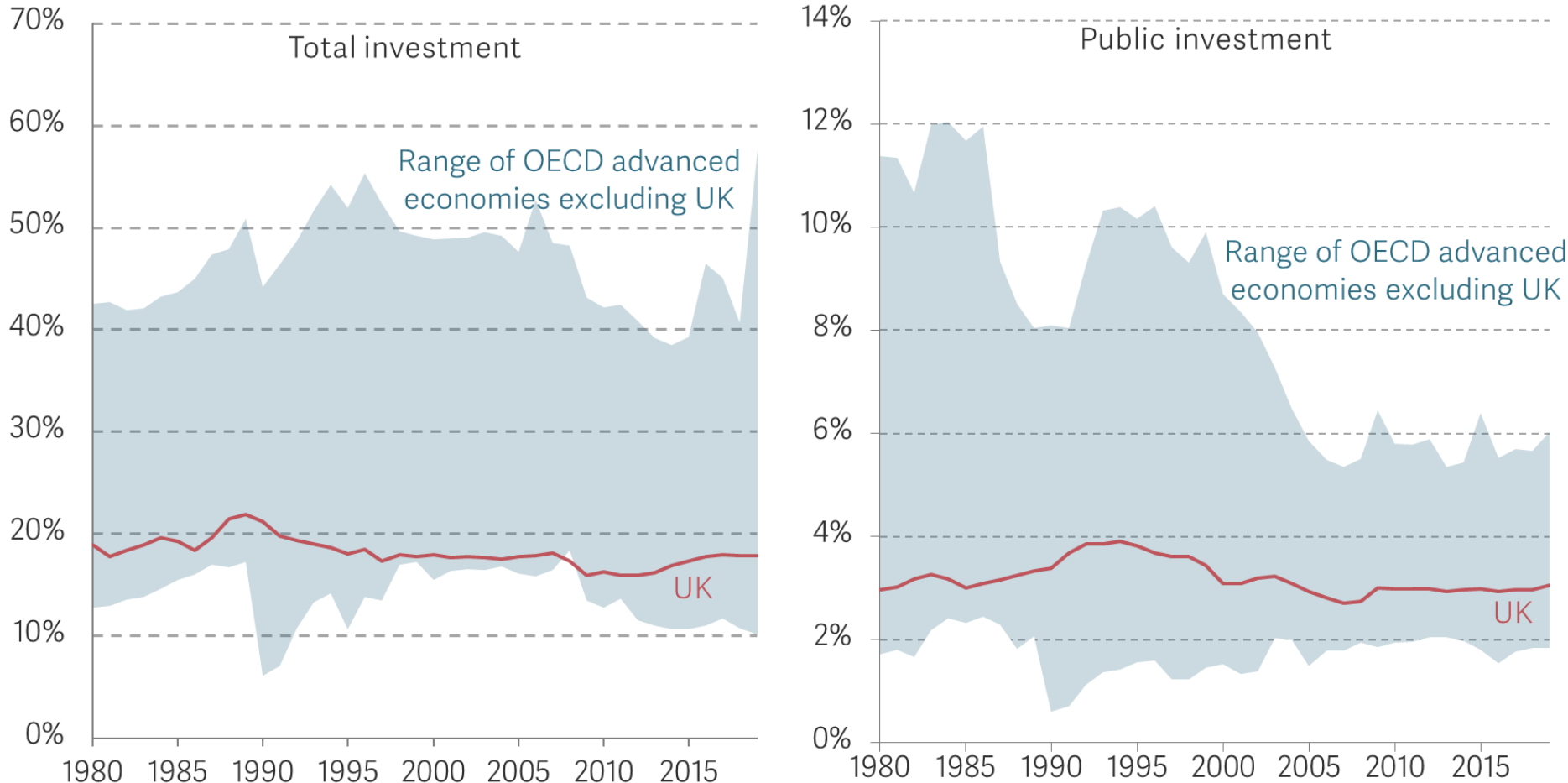
**Anna Valero and John Van Reenen,
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PRODUCTIVITY POLICIES, UK PRIORITIES

- The need for investment
- Policies for productivity
- The key role of institutions and strategy
- Conclusions

Capital investment has been low as a share of GDP for some time, both public...

Total (left) and public (right) GFCF as a proportion of GDP: selected Advanced Economies

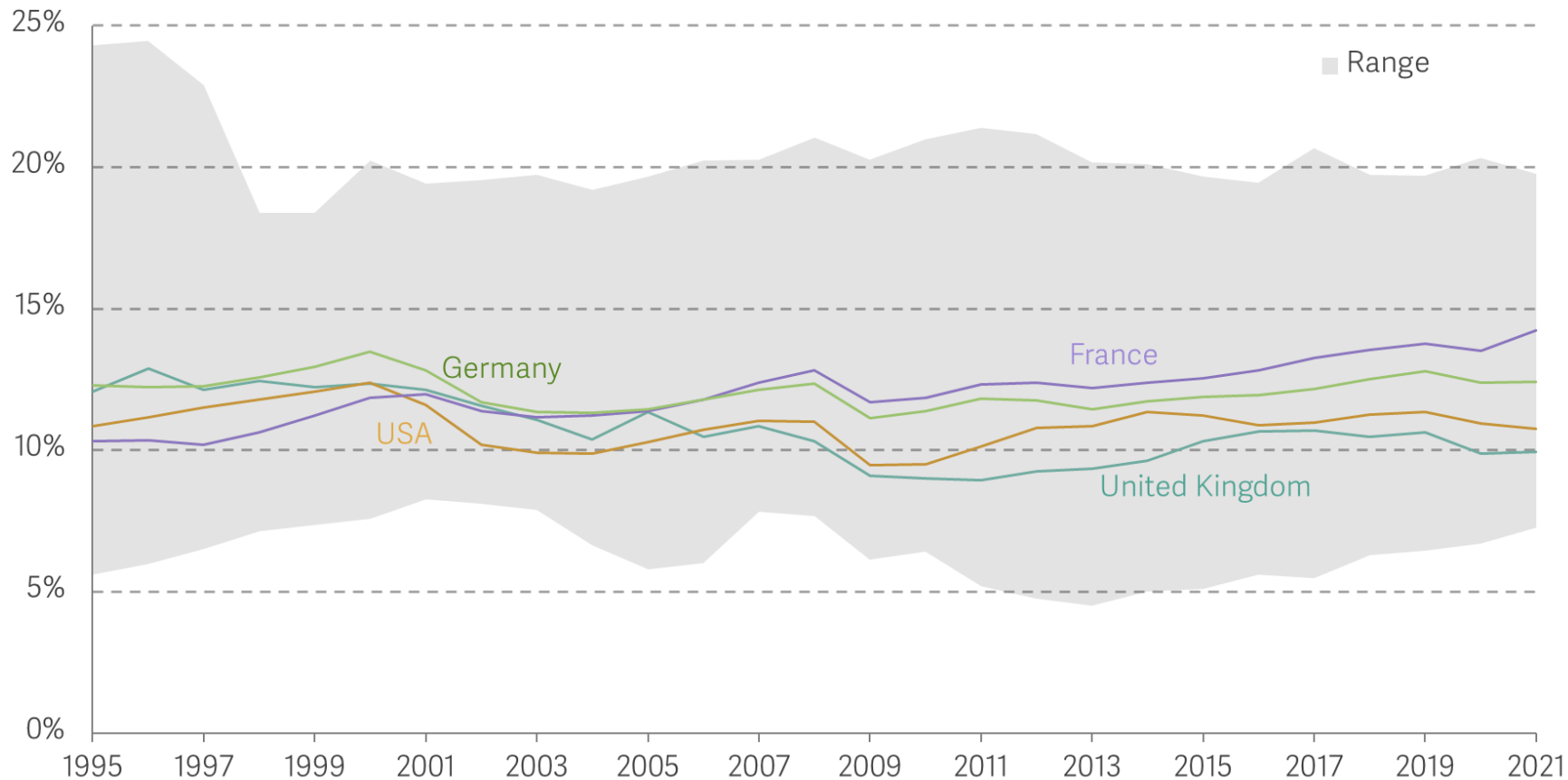


- Low investment has resulted in a large fall in the growth of capital per worker

Notes: Swathe includes Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom and United States. Gross fixed capital formation (GFCF) includes fixed assets such as buildings, and also investments in Information and Communication Technology (ICT) and Research and Development (R&D). Source: Analysis of IMF, Investment and Capital Stock Dataset: 1960-2019. Charts taken from [Cutting the Cuts](#), Economy 2030 Inquiry, March 2023.

And business investment rates have also been low

Corporate investment (% GDP)

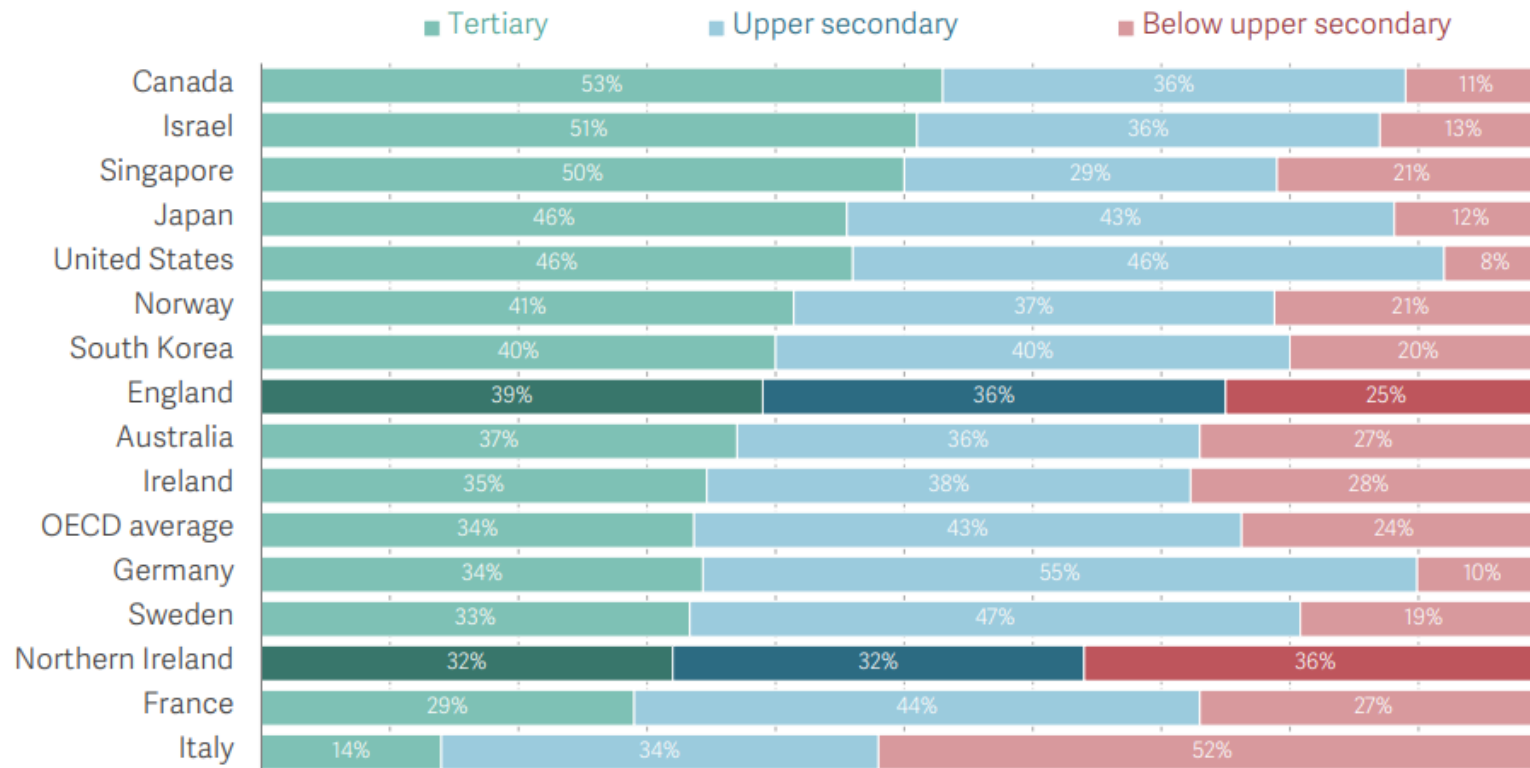


- Weak investment is not explained by sectoral mix
- UK does relatively better when investment in broader intangibles are taken into account, but outcomes are not best in class

Notes: Gross Fixed Capital Formation in the corporate sector as a share of GDP, ratio of series in current PPP dollars. Source: OECD. Chart taken from Business Investment work for the Economy 2030 Inquiry, report forthcoming.

There are skills gaps, particularly at mid-level

Highest qualification among working-age population in selected OECD countries: 2019

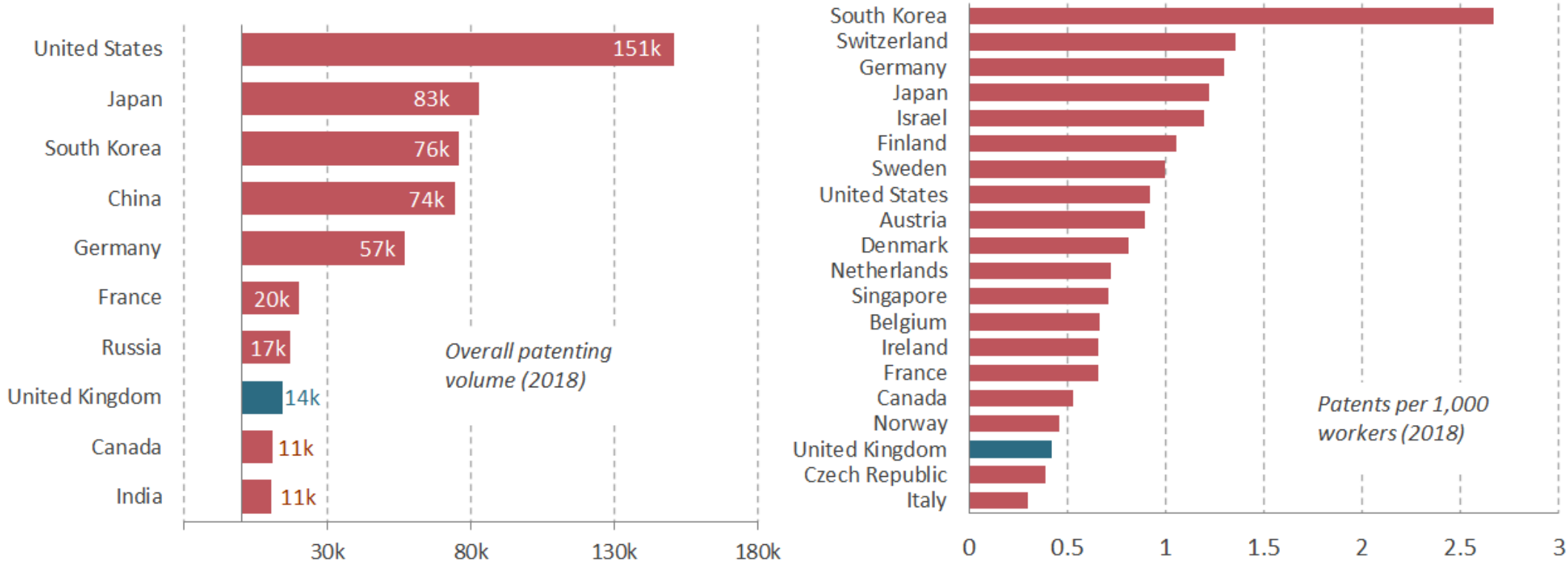


- Work related training has been in decline
- And consistently low for the least skilled

NOTES: The OECD data used to produce this graph are only available for England and Northern Ireland and not the United Kingdom as a whole. In addition, the OECD data do not disaggregate education levels into the four categories used in the previous subsection; instead, vocational qualifications and degrees are combined into tertiary education. SOURCE: Figure 8 in C Farquharson, S McNally & I Tahir, 'Education Inequalities', IFS Deaton Review of Inequalities, August 2022. Chart taken from: [Train in Vain](#), Economy 2030 Inquiry, December 2022.

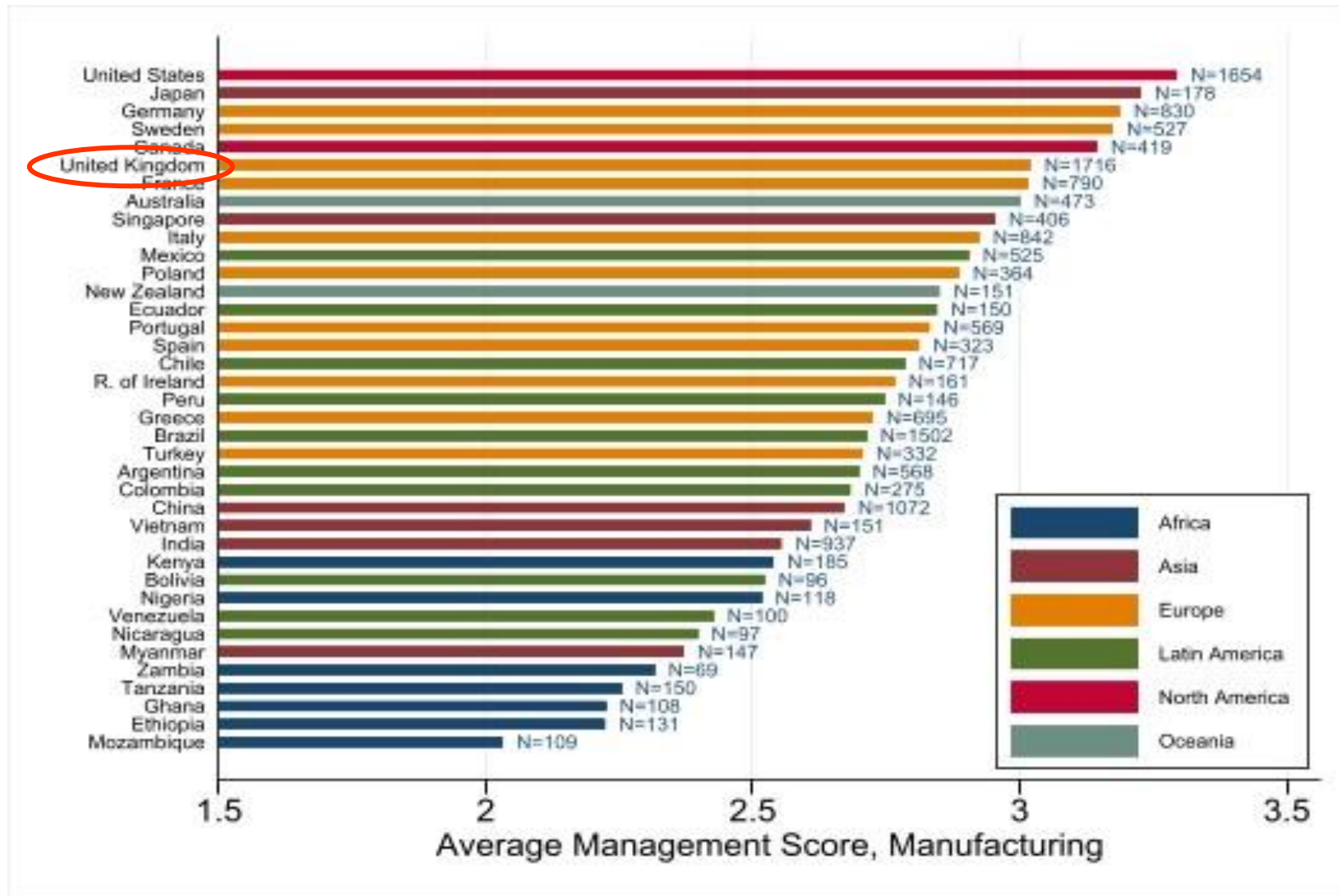
Technology: Patent intensity is relatively low

Total volume of patents and patents per thousand workers, by country: 2018



Notes: Countries with less than 1,000 patent families in 2018 are not included. Source: Analysis of PATSTAT 2021, Fall edition; World Bank, Total Labor Force, World Development Indicators (derived using data from International Labour Organization, ILOSTAT database). Chart taken from: [Enduring Strengths, Economy 2030 Inquiry](#), April 2022.

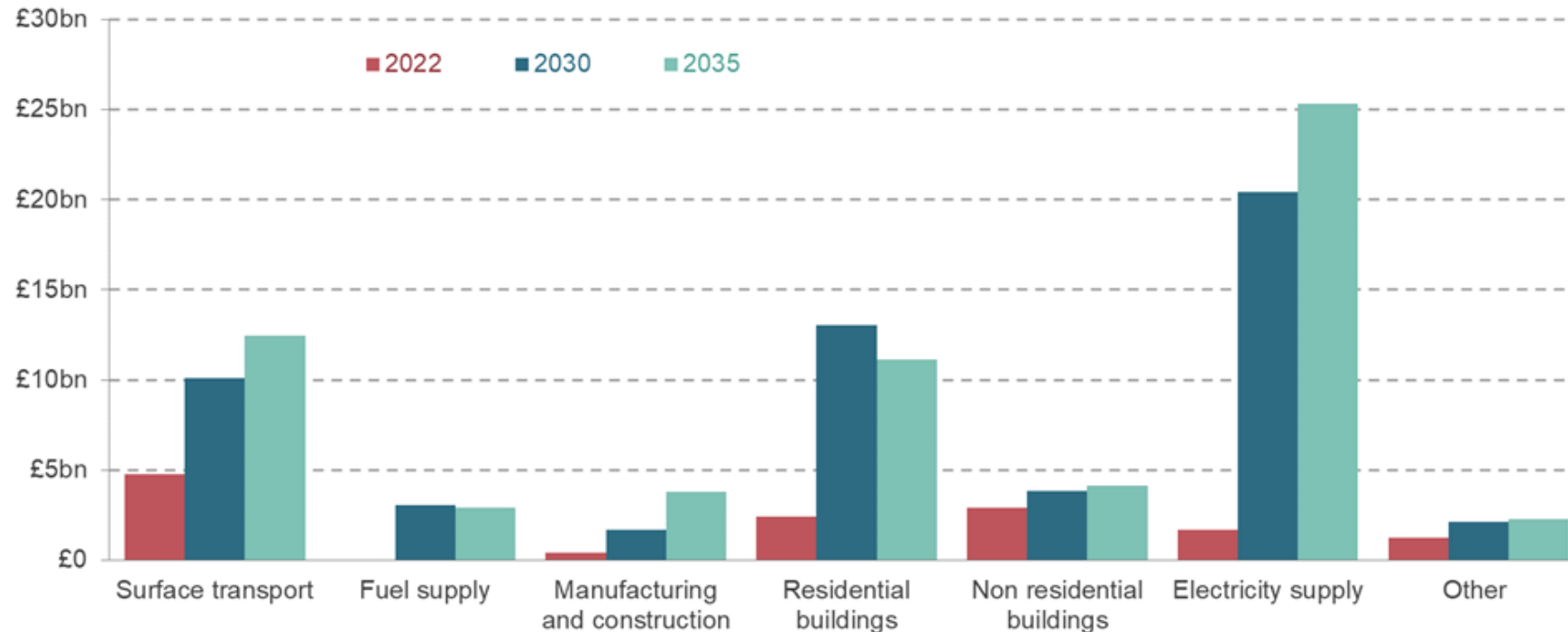
Management practices: UK is not in Premier League



Note: Unweighted average management scores; # interviews in right column (total = 17,783); all waves pooled (2004-2022). Source: Scur et al (2023)

Investment is needed for net zero

Annual additional capital investment for net zero

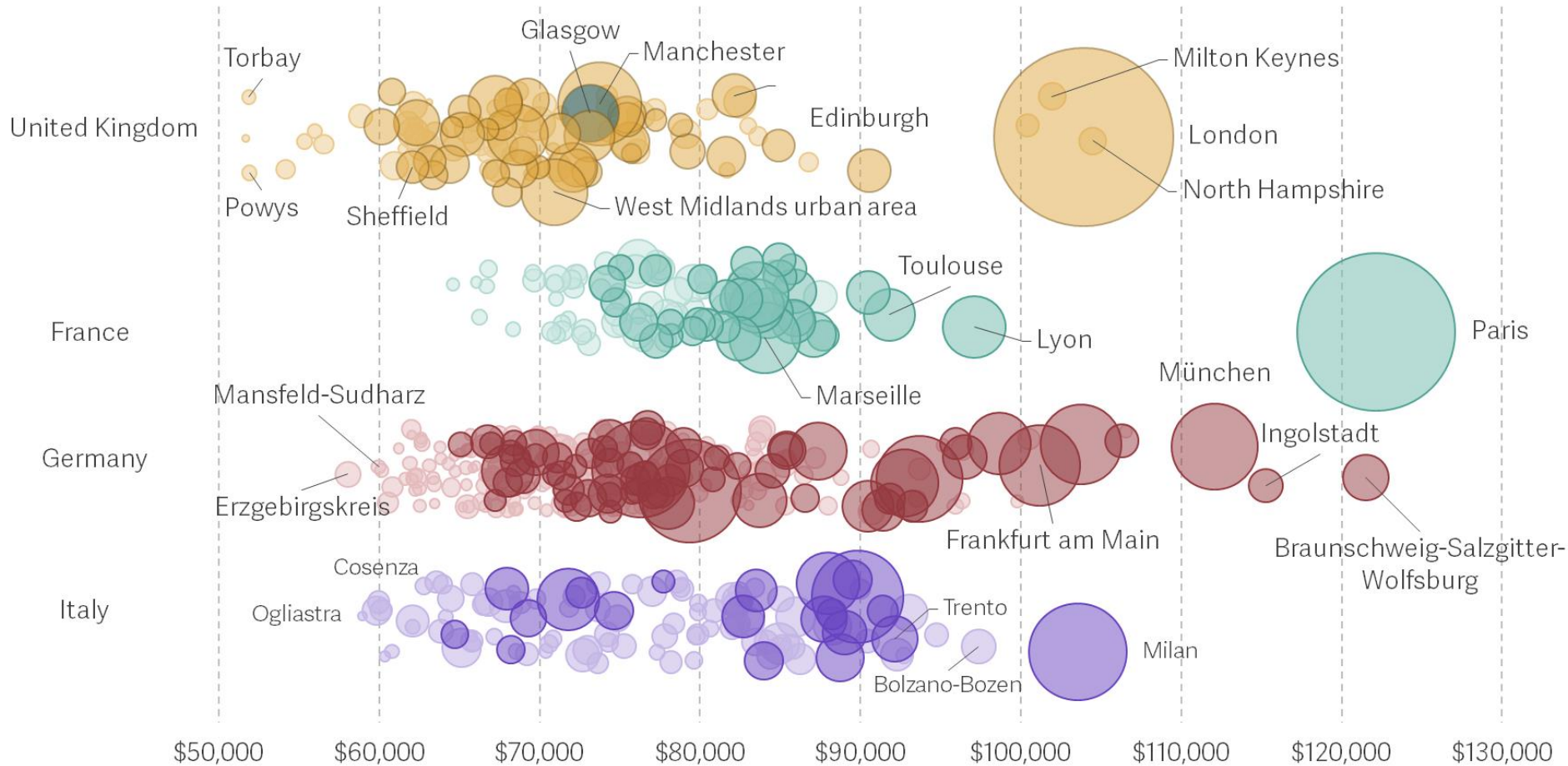


Notes: Other = Agriculture, aviation, shipping, waste, F-gases, LULUCF & removals.
Source: CCC, 2020. Chart taken from: [Growing Clean](#), Economy 2030 Inquiry, May 2022.

- Opportunities for productivity growth via resource efficiency, energy security, and for firms offering new products and services to serve growing demand
- But some firms and sectors will face a harder transition

Investment is needed to level up our second-tier cities

GVA per worker (PPP adjusted), by country and area: 2018

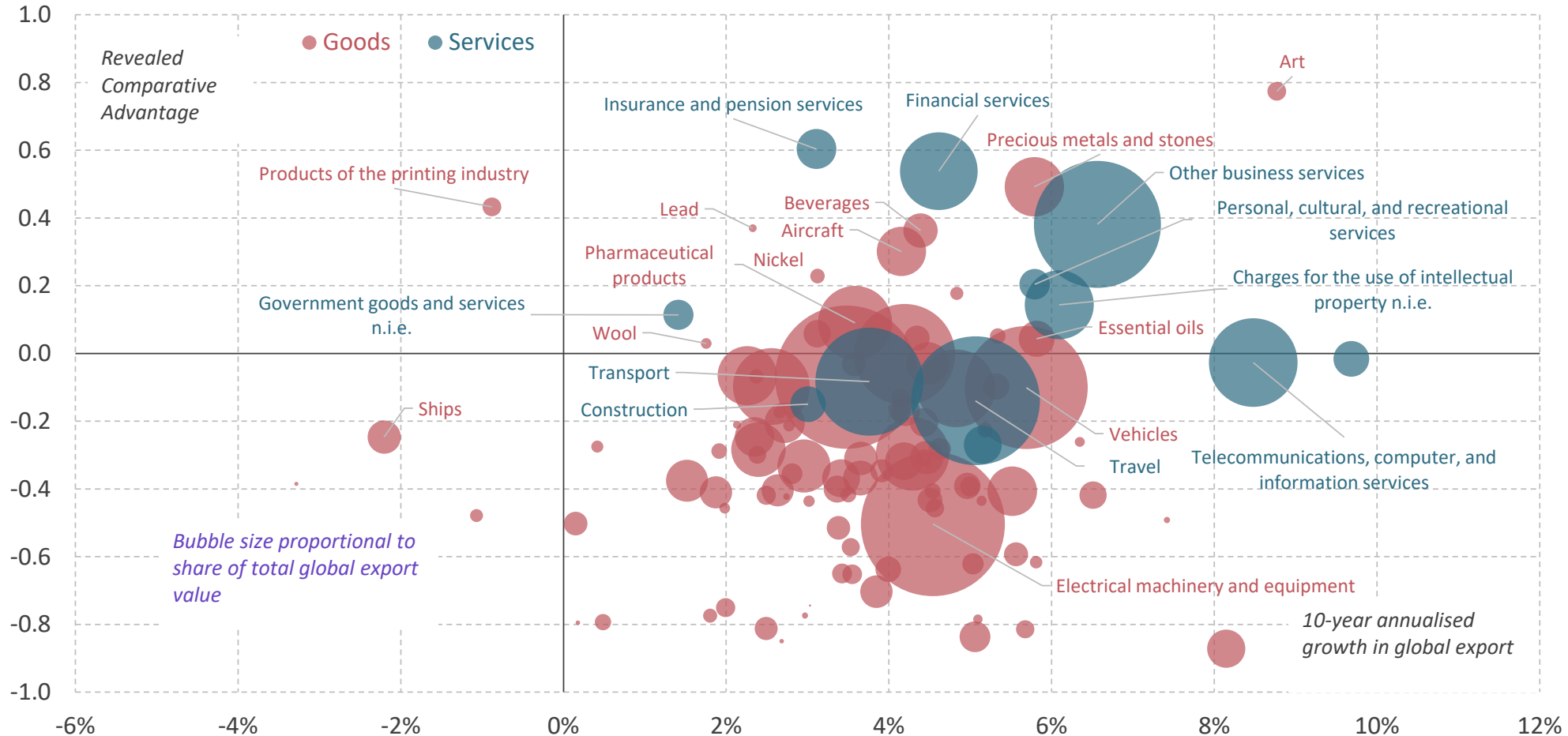


- To halve the gap between Manchester and London likely to require many tens of billions of pounds of investment, 1ppt increase in graduate share, and c.500,000 workers

Notes: 2018 levels of GVA per worker across areas for our set of comparator countries (adjusted to allow for comparability across different currencies). Metro areas are shown in darker bubbles. Foreign and extra-regio territories have been dropped. Bubbles proportional to number of workers in each area.
Source: Analysis of OECD Regional Economy Database. Chart taken from: [Bridging the Gap](#), Economy 2030 Inquiry, June 2022.

The UK has many “enduring strengths” to be built on

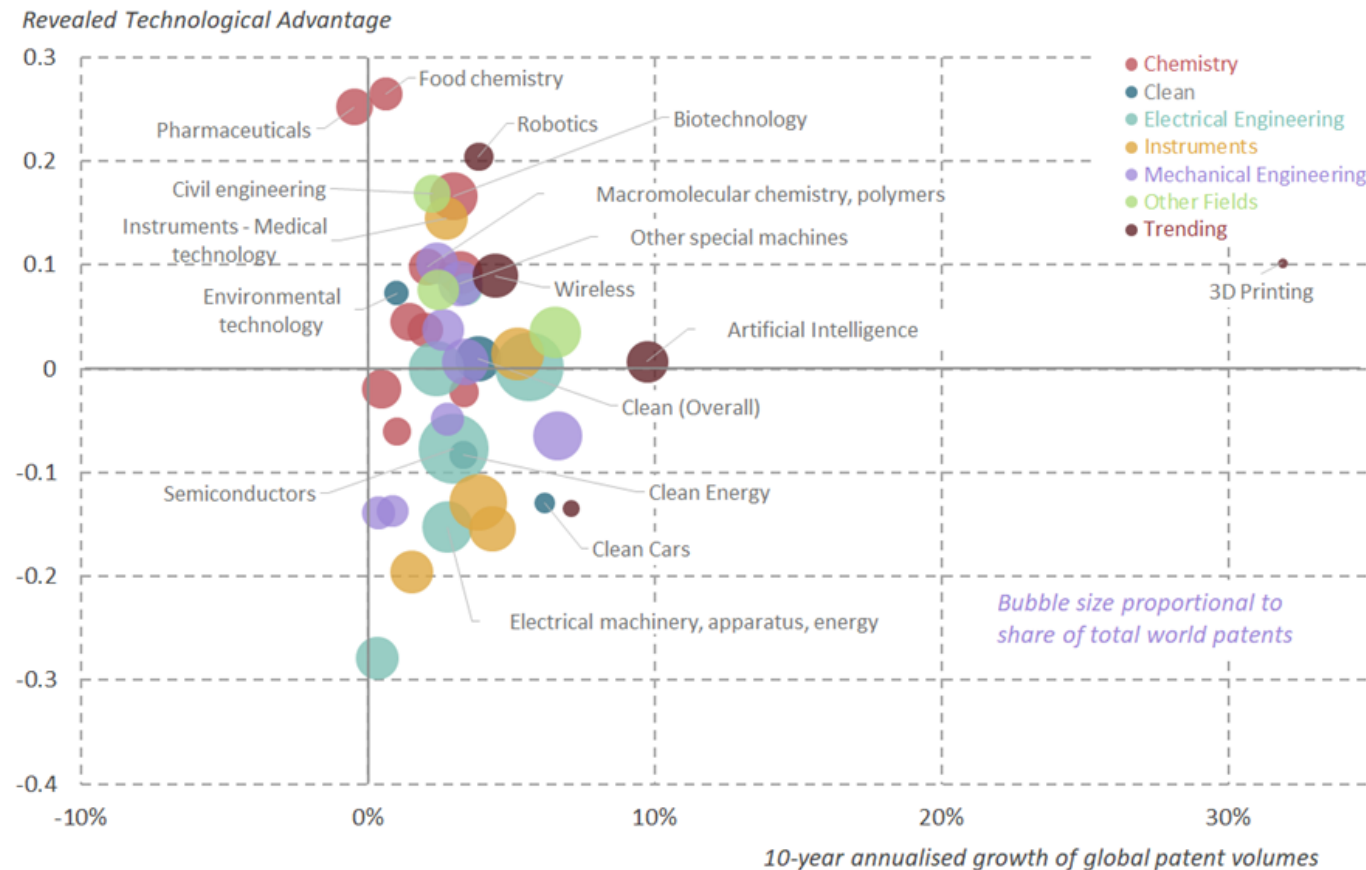
Revealed comparative advantage and 10-year annualised growth in global export value, by product category: UK, 2019



NOTES: The horizontal axis measures compound annual growth rates of volumes between 2009 and 2019. The vertical axis shows the revealed comparative advantage in 2019. The size of the bubbles corresponds to each product's share in world trade in 2019. SOURCE: Analysis of Harvard Growth Lab, Atlas of Economic Complexity (HS version) and OECD-WTO, Balanced Trade in Services.

Patents analysis can help identify future growth opportunities

UK RTA and 10-year annualised growth in global patenting, by broad technology



- UK has revealed technological advantage (RTA) in clean technologies and other growing areas
- Within clean tech, UK specialized in tidal stream, offshore wind, CCUS, nuclear

Notes: The vertical axis denotes the RTA bounded between -1 and 1, the horizontal axis represents the 10-year annualised growth for broad technological categories (2008-2018), and the size of the bubbles represents the share of the technological category in overall patenting activity between 2015-2018. Clean (overall) includes all patents under the CPC class 'Y02' i.e., climate change mitigation and adaptation technologies. These also include patents under the other technology categories such as clean cars, environmental technology and clean energy. Source: Analysis of PATSTAT 2021, Autumn edition. Chart taken from: [Growing Clean](#), Economy 2030 Inquiry, May 2022.

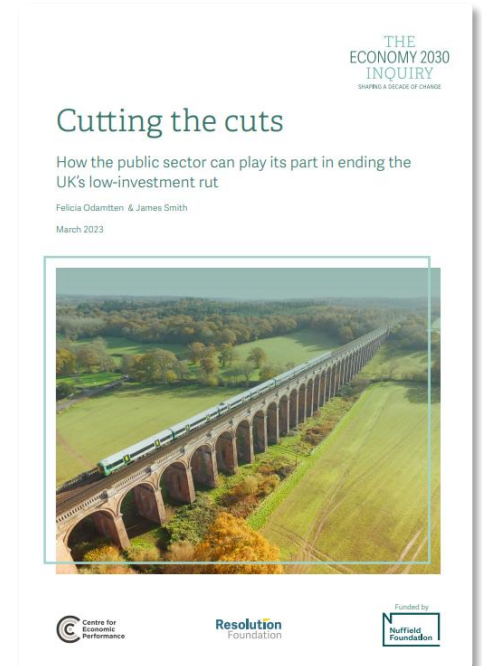
- The need for investment
- Policies for productivity
- The key role of institutions and strategy
- Conclusions

Reforming the UK's investment ecosystem

- Business investment is determined by
 - The profitable projects that businesses want to undertake
 - The supply of finance, skilled labour, land and other factors needed to realise the projects
- The UK has many sources of strength
- But various constraints are holding investment back, and a range of mutually-enforcing policies can address these

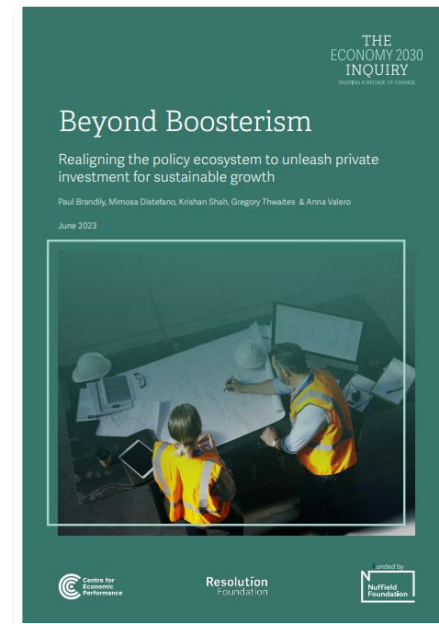
Public sector investment

- Public sector investment matters for growth
 - Tangible assets: e.g. roads, hospitals and schools
 - Intangible assets & innovation: e.g. government investment in R&D
- UK public sector investment is low and volatile (cut when times get tight)
- Policy options:
 - Changes to fiscal framework: treat investment spending differently from current spending, net worth target?
 - Commitments to a level of investment over parliamentary terms



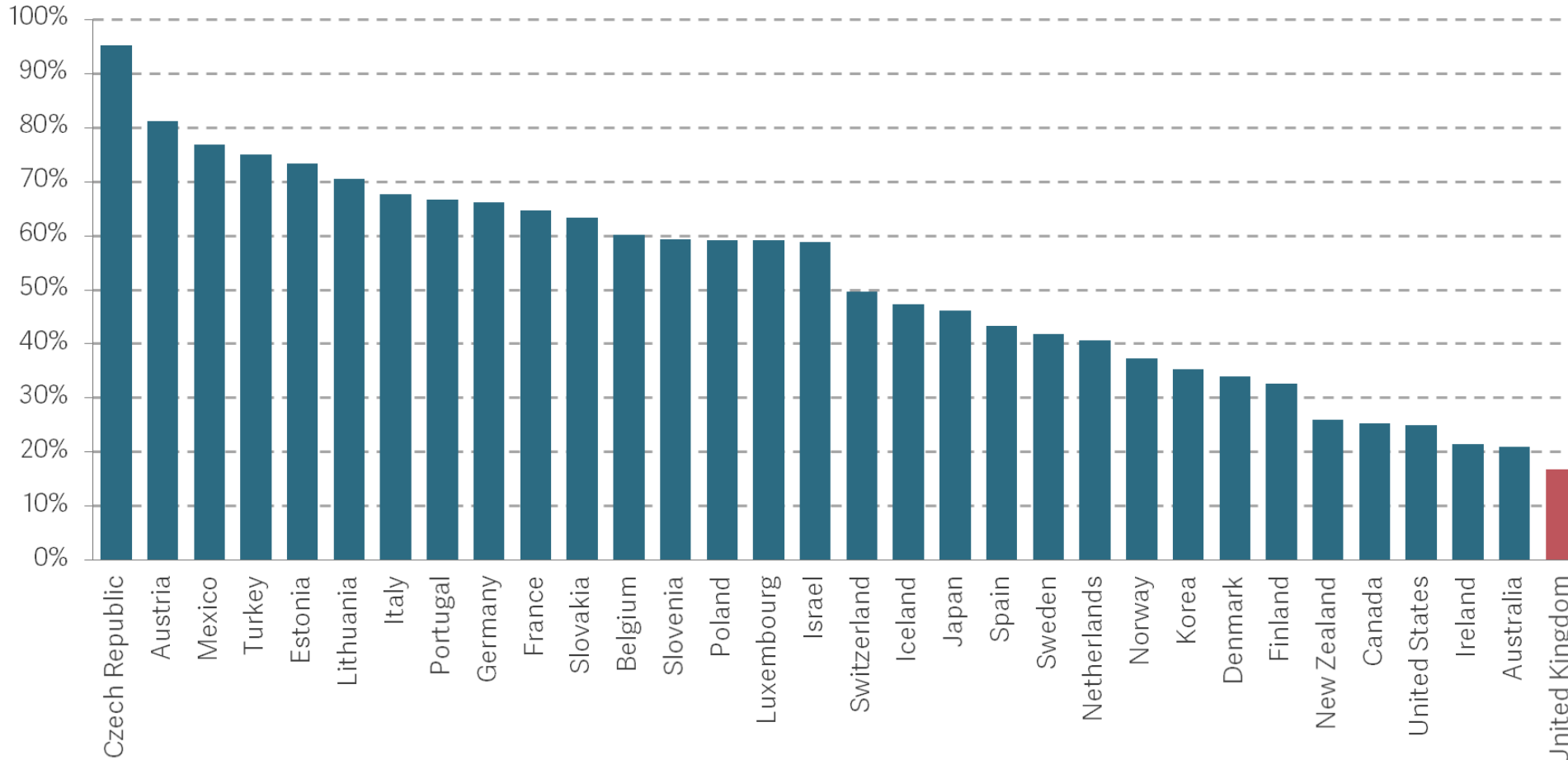
Business investment

- Raising firms' willingness to invest for long-term growth
 - Pressure from above: empowered owners
 - Pressure from below: empowered workers
 - Corporate tax: permanent full expensing, broader, stability
- Improving firms' ability to invest
 - Planning
 - SME support



Ownership of British firms is unusually dispersed

Proportion of listed companies that have a controlling shareholder, by country: 2012

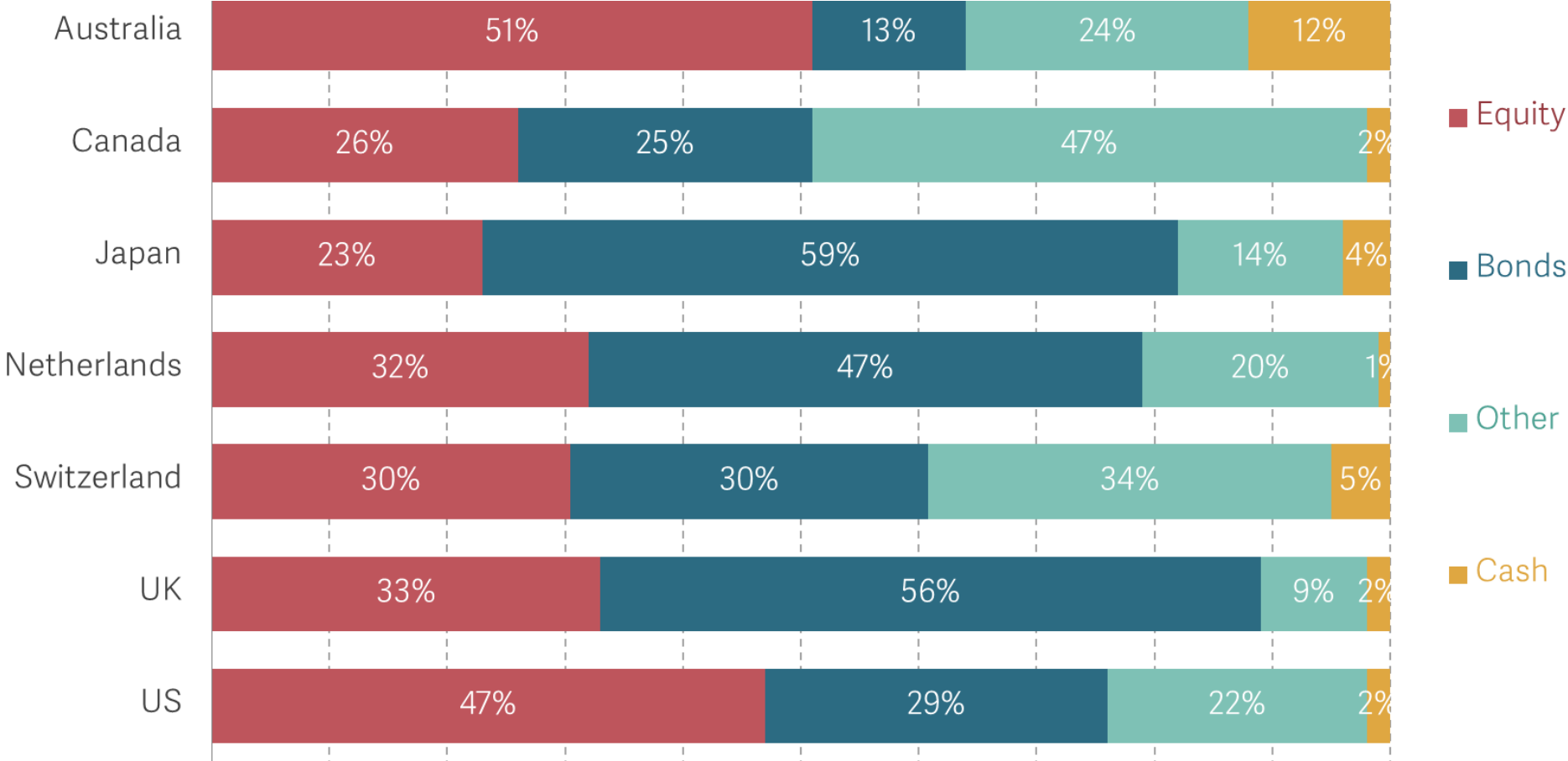


- Dispersed ownership is less engaged, **lack of pressure from above**
- Driven by exit of local institutional investors
- Pensions as a route to more engaged “blockholders” as in the past

Notes: Controlled firms identified using a Shapely-Shubik algorithm to identify owners that have enough votes to change a vote decision. The algorithm has been adjusted to allow for owners in the same corporation to act in unison. A firm is classified as controlled if its Shapley-Shubik power index is 75 per cent or greater. Source: G Aminadav & E Papaioannou, Corporate control around the world, The Journal of Finance 2020.

The UK pension system is under exposed to equity and productive assets

Total pension asset allocation, by country: 2022



Notes: Chosen countries represent the so-called P7 economies with the largest pension assets.
Source: Thinking Ahead Institute, Global Pensions Asset Study 2023.

Pensions reforms can deliver engaged ownership and investment into productive assets

- Defined Benefit (70% assets, majority in surplus): offer alternatives to insurance buyout for exiting funds that enable investment
- Defined Contribution (smaller but growing, fragmented): turbocharge consolidation
- Local Government Pension Schemes (spread across local pension boards): pool £300bn of assets

- These reforms will help drive scale in the active pension market
- At least as good outcomes for savers, and significantly better outcomes for the UK economy as a whole

Corporate governance

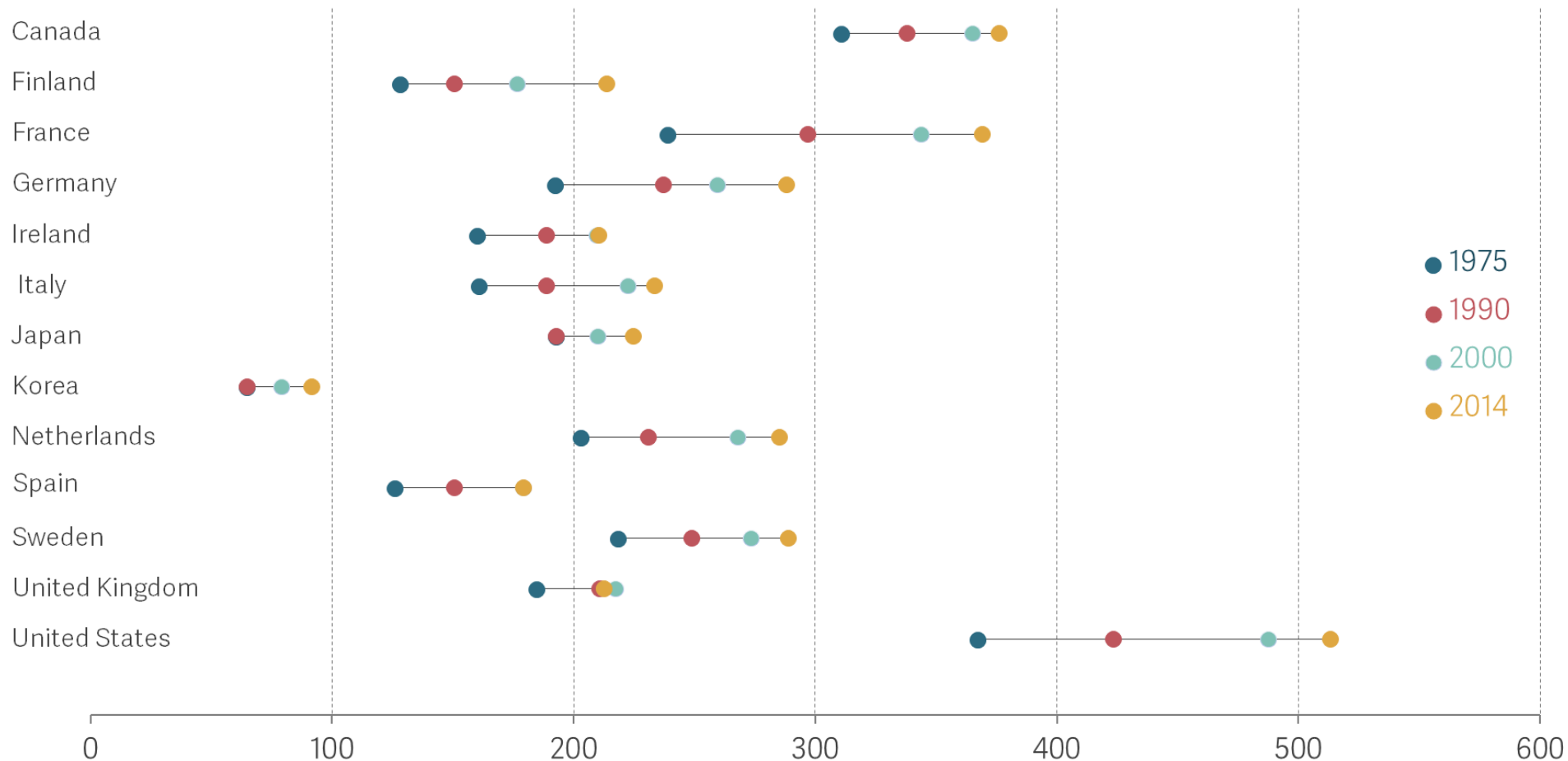
- The UK stands out amongst European countries for having no mandatory requirement for worker representation on corporate boards (less **pressure from below**)
- Evidence suggests this is good for investment, and does not lead to large pay hikes
 - Mechanism: repeated interactions between workers and managers facilitate cooperation, build trust, and improve decision-making for the longer term
- We propose mandatory representation (20%) in larger companies

Fiscal levers matter

- Without temporary full expensing for plant and machinery, the UK tax system has less generous incentives for investment vs OECD
- Build on Spring Budget 3-year full expensing of plant and machinery
 - Make permanent (lasting impact on investment)
 - Broaden to other assets (remove distortions that favour certain assets)
 - Help finance by limiting interest deductibility (removes debt bias)
- Consider further support for net zero investment and R&D, and skills via tax credits
 - Strong evidence on effectiveness of R&D tax credits on SMEs (Bloom et al., 2019)
 - Lessons from IRA?

Restrictiveness in planning is reflected in a lack of growth in built up land per capita

Sq m of built-up land per capita: selected OECD countries, 1975 to 2014



- Ex-post system, and lack of fiscal incentives for development in local areas
- Prevents investment in business structures and expansion of high growth areas
- Planning restrictions also hold back infrastructure

Planning reforms are needed to boost investment in business structures and allow productive areas to grow

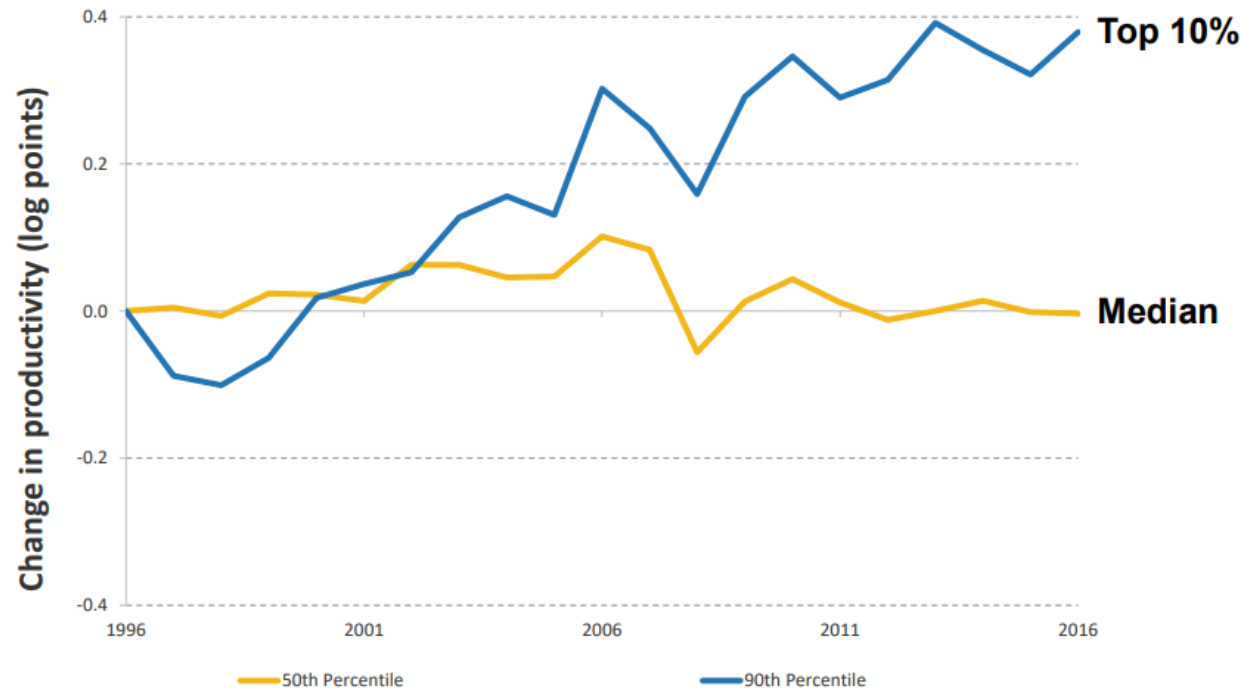
- Every area should have a plan, and this should lead the decision process
- Plan and decision making relating to commercial and business developments at the right level – reflecting functional economic areas
- Local authorities should have meaningful financial incentives for development, both commercial and residential
 - Accompanied by improved national coordination of land-use objectives, and removal of specific barriers for net zero

Building on existing SME programmes, reflecting the different barriers to investment faced

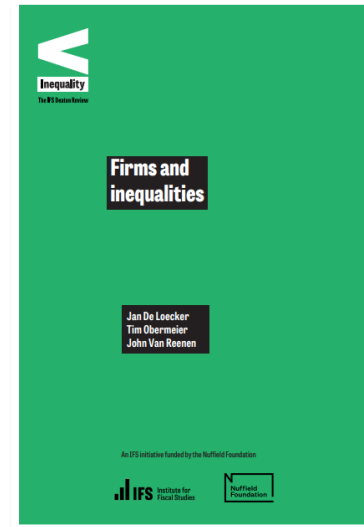
- **Allowing high growth firms to scale**
 - Improve scale and permanence of British Business Bank (borrow on markets with government guarantee) and offer a co-investment fund allowing pension funds to benefit from its expertise
- **Promoting the diffusion of digital technologies and management practices across broader set of SMEs**
 - Build on £500m Help to Grow framework, expanding experimentation and evaluation within the continuity of the broad programme

Business dynamism and reallocation

Ln(value added per employee), quantiles weighted by firm employment



Notes: Historical ORBIS, Ln(value added/employee), quantiles weighted by firm employment; values indexed to zero in 1996; Changes in log points, so 0.05 = about 5% growth; $0.4 = (e^{0.04} - 1) * 100 = 50\%$. Chart taken from: [De Loecker, Obermeier and Van Reenen \(2022\)](#), Firms and Inequalities, IFS Deaton Review.



- Rise of “superstar firms”, declining dynamism – technology a key driver
- Many ways to improve competition (e.g. removing planning barriers, trade policy, improving incentives for smaller firms to grow)
- Competition policy also important

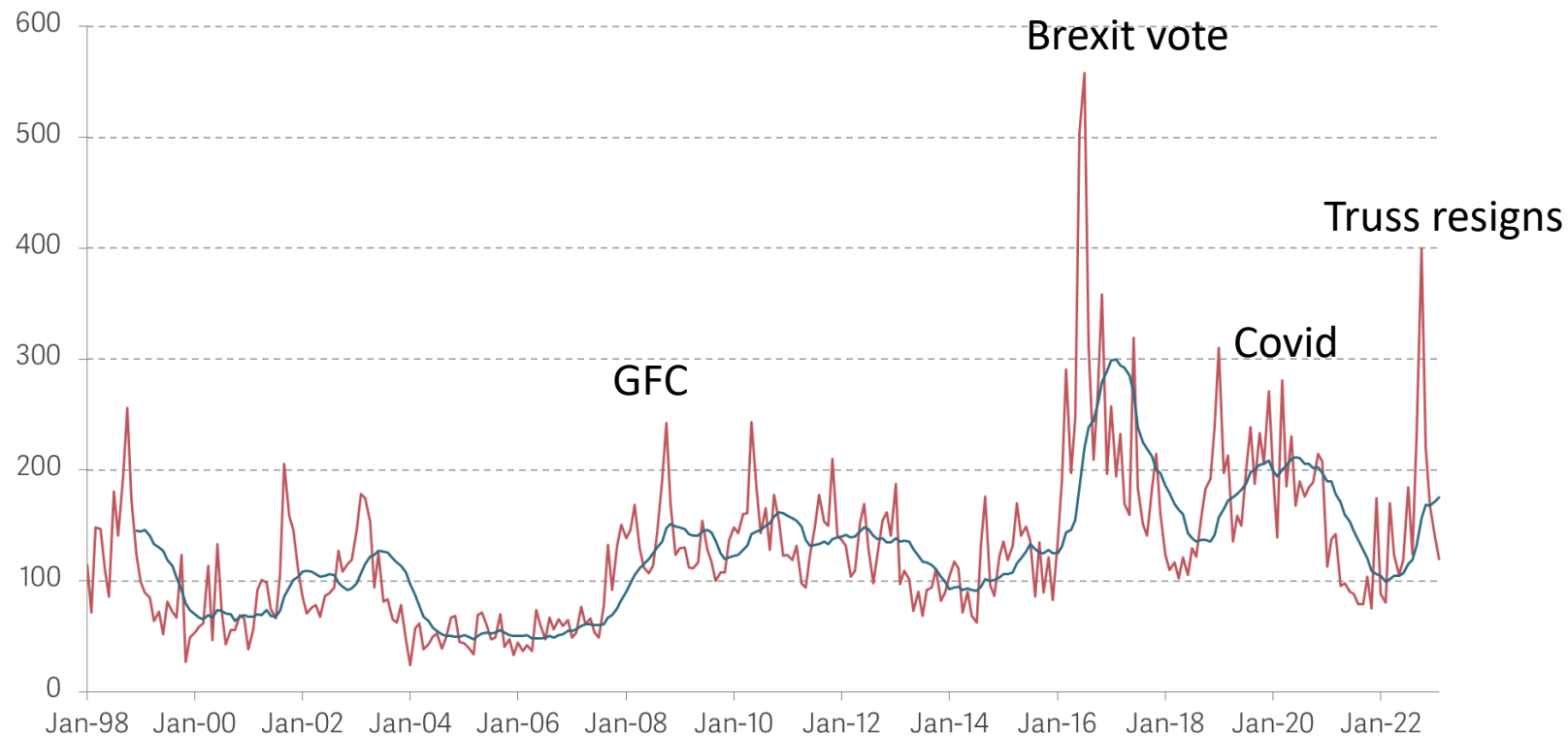
Human capital

- Human capital matters for growth
 - Direct impacts on worker/manager own productivity
 - Indirect impacts through technical change and externalities
- Need to improve outcomes for those that do not go to university, and address the misallocation of talent (Lost Einsteins, female talent, diversity)
- Ongoing skills gaps and reskilling needs due to digitisation and net zero imply training existing workforce is important
 - Human capital tax credits can improve incentives for firms to invest in people

- The need for investment
- Policies for productivity
- The key role of institutions and strategy
- Conclusions

Uncertainty chills investment, and we have had a lot of it

Index of economic policy uncertainty, monthly and 12-month moving average: UK, 1998-2023



- Baker, Bloom & Davis (2016): policy uncertainty shocks associated with reduced investment (firm level and macro analysis in US)

Source: Analysis of 'Measuring Economic Policy Uncertainty' by Scott Baker, Nicholas Bloom and Steven J. Davis at www.PolicyUncertainty.com.

Growth and business policies have been subject to a particularly high degree of churn, institutional reform could help

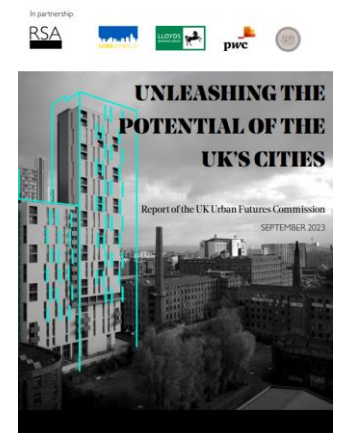
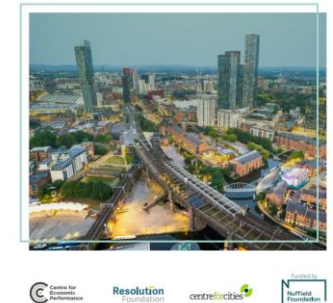
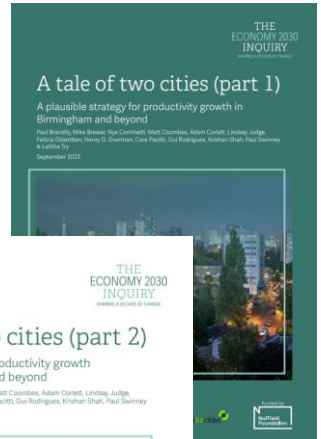


- Recent churn at the strategy and plan level
- Also features at a more "micro" business policy level
- Role for a new growth and productivity institution?



National – local, the importance of place

- National strategic frameworks for investment must be combined with effective place-based approaches
- The UK is highly centralised, more decision-making at the local level is likely to be needed to facilitate regional growth
- What do the UK's strengths and needs imply for local growth strategies?
 - High value services specialism (agglomeration) – big cities
 - High tech clusters, as well as net zero – Golden Triangle important but specialisation and opportunity is spread more widely across the UK



- The need for investment
- Policies for productivity
- The key role of institutions and strategy
- Conclusions

A strategic approach for improving UK investment and productivity

- No magic bullet, or short-term fix – coordinated, long-term approach is required
- Modern industrial strategy should target current potential strengths in areas that are large or expected to grow, or areas where (energy) security considerations are at play
- Institutional change likely to be needed in order to make progress

*“**Productivity** isn’t everything, but in the long run it is **almost everything**.”*

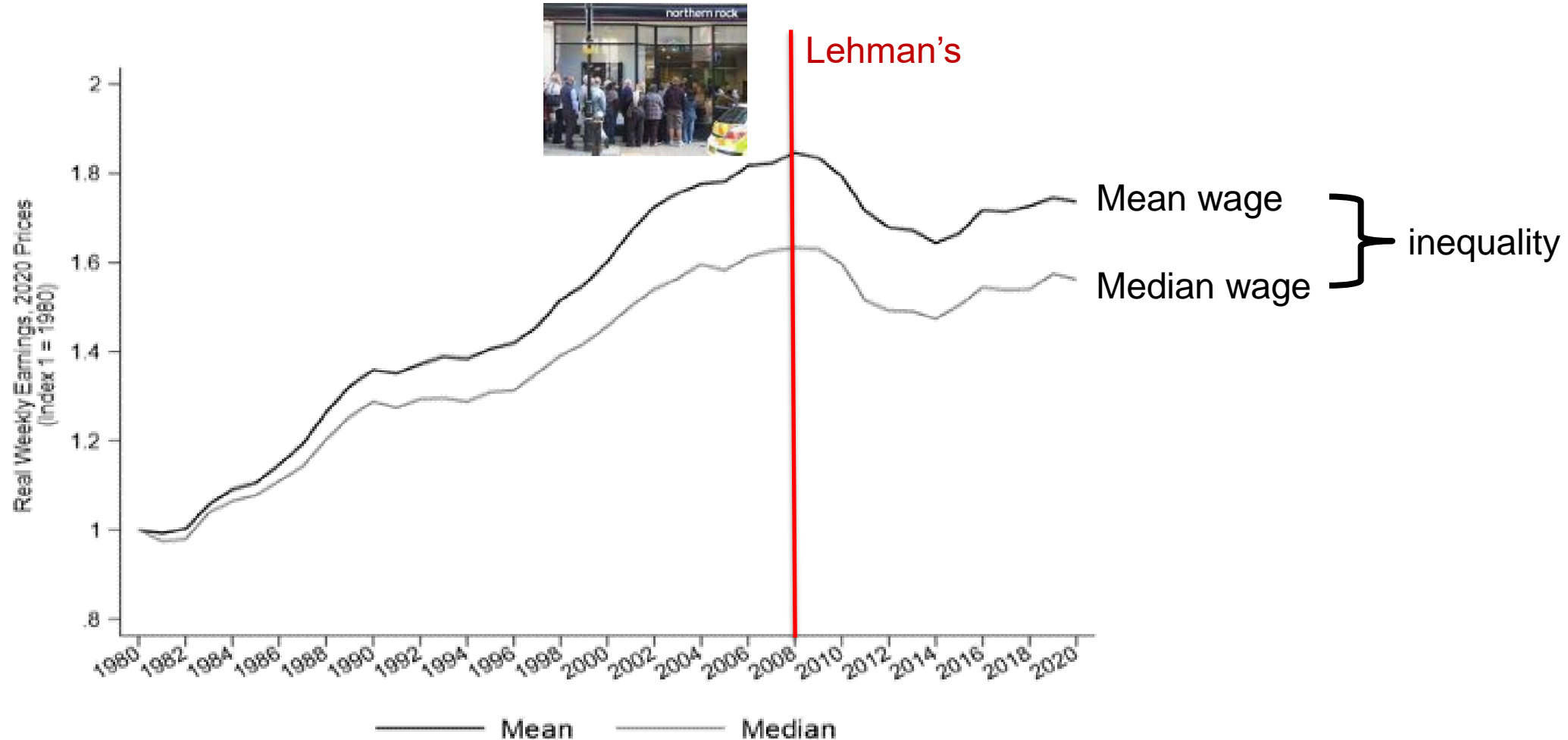
A country’s ability to improve its standard of living over time depends almost entirely on its ability to raise output per worker”

— Nobel Laureate, Paul Krugman



Back Up

Mean and median pay growth since 2008-9 Global Financial Crisis (follows productivity slowdown)



Notes: UK mean and median weekly earnings deflated by CPI. **Source:** Annual Survey of Hours and Earnings (ASHE)

Growth Accounting

Concept

**Labour
Productivity
Growth**

=

**Capital Intensity
Growth**

+

**Skills intensity
Growth**

+

**Total Factor Productivity
(TFP) growth**

Growth Accounting

Concept

$$\text{Labour Productivity Growth} = \text{Capital Intensity Growth} + \text{Skills intensity Growth} + \text{Total Factor Productivity (TFP) growth}$$

Decomposition

$$\text{Labour Productivity Growth} = \text{Capital weight} \times \text{Growth of capital per worker} + \text{Labour weight} \times \text{Growth of skills per worker} + \text{TFP growth (residual)}$$

UK Productivity Growth Decomposition

Time period	1995-2007
Labour Productivity Growth	2.54
<i>Contribution of:</i>	
Capital growth	0.93 (37%)
Skills growth	0.39 (15%)
TFP growth	1.22 (48%)

Note: Comparison of market-economy GDP per hour growth 2019-2007 vs. 2007-1995. EUKLEMS & INTANProd 2023 release; OECD (2014) and other sources.

Source: Van Reenen and Yang (2023)

UK Productivity Growth Decomposition

Time period	1995-2007	2007-2019	Fall
Labour Productivity Growth	2.54	0.48	2.06
<i>Contribution of:</i>			
Capital growth	0.93 (37%)	0.20	0.73
Skills growth	0.39 (15%)	0.23	0.16
TFP growth	1.22 (48%)	0.06	1.16

Note: Comparison of market-economy GDP per hour growth 2019-2007 vs. 2007-1995. EUKLEMS & INTANProd 2023 release; OECD (2014) and other sources.

Source: Van Reenen and Yang (2023)

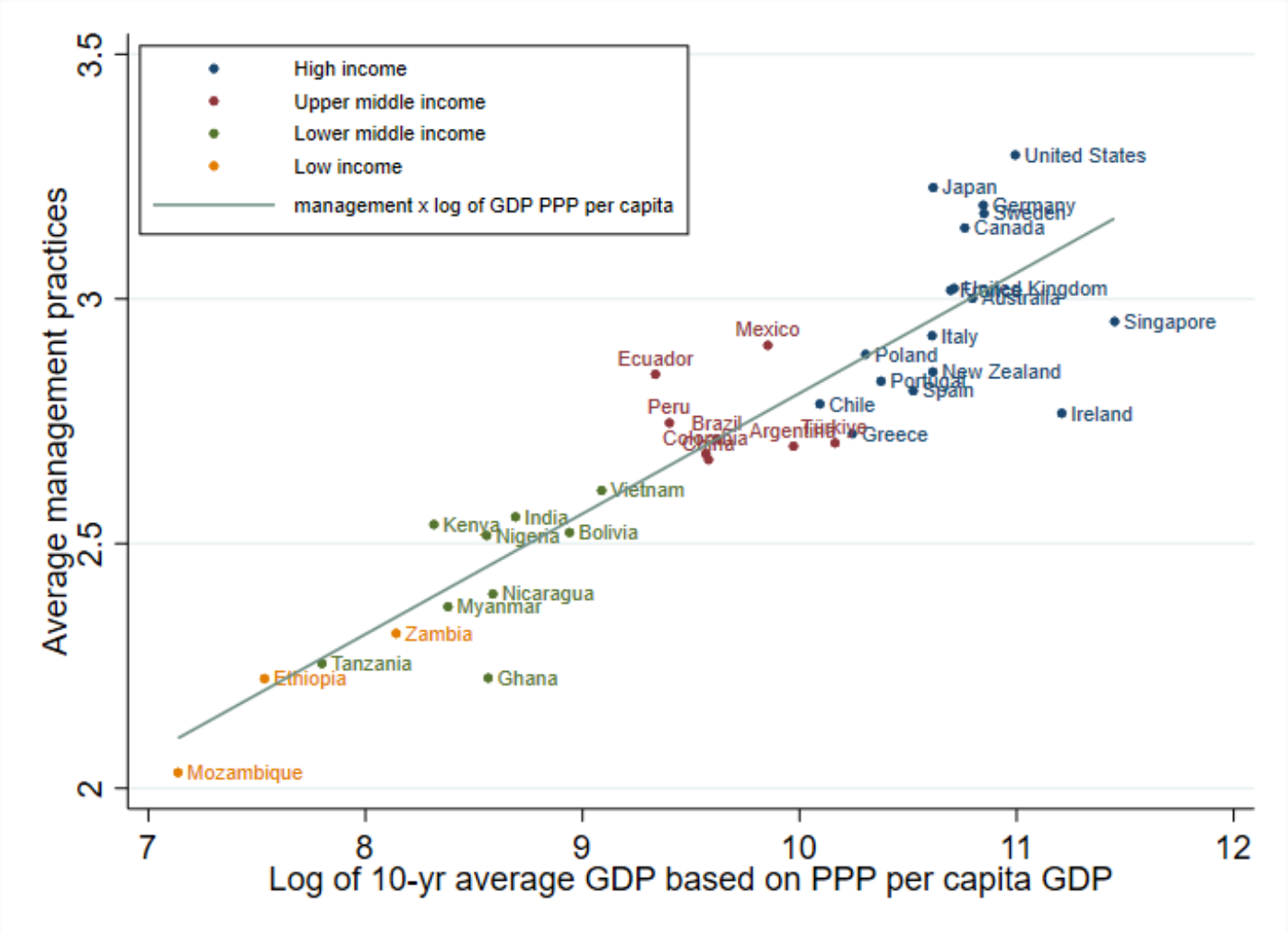
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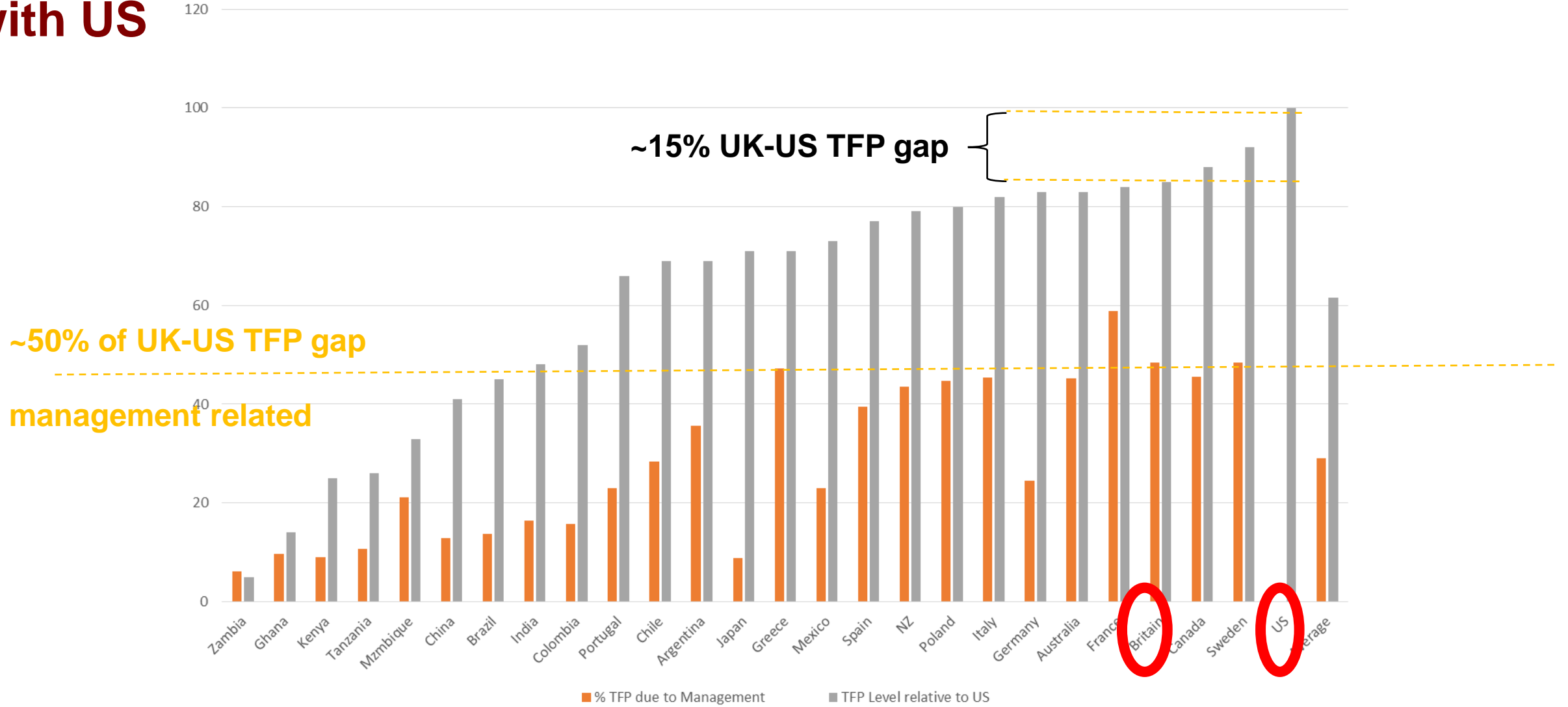
Source: Van Reenen and Yang (2023)

Management strongly correlated with GDP per capita (accounts for ~30% TFP differences cross countries)



Source: Scur et al (2023)

Poor Management accounts for just under half of UK productivity gap with US

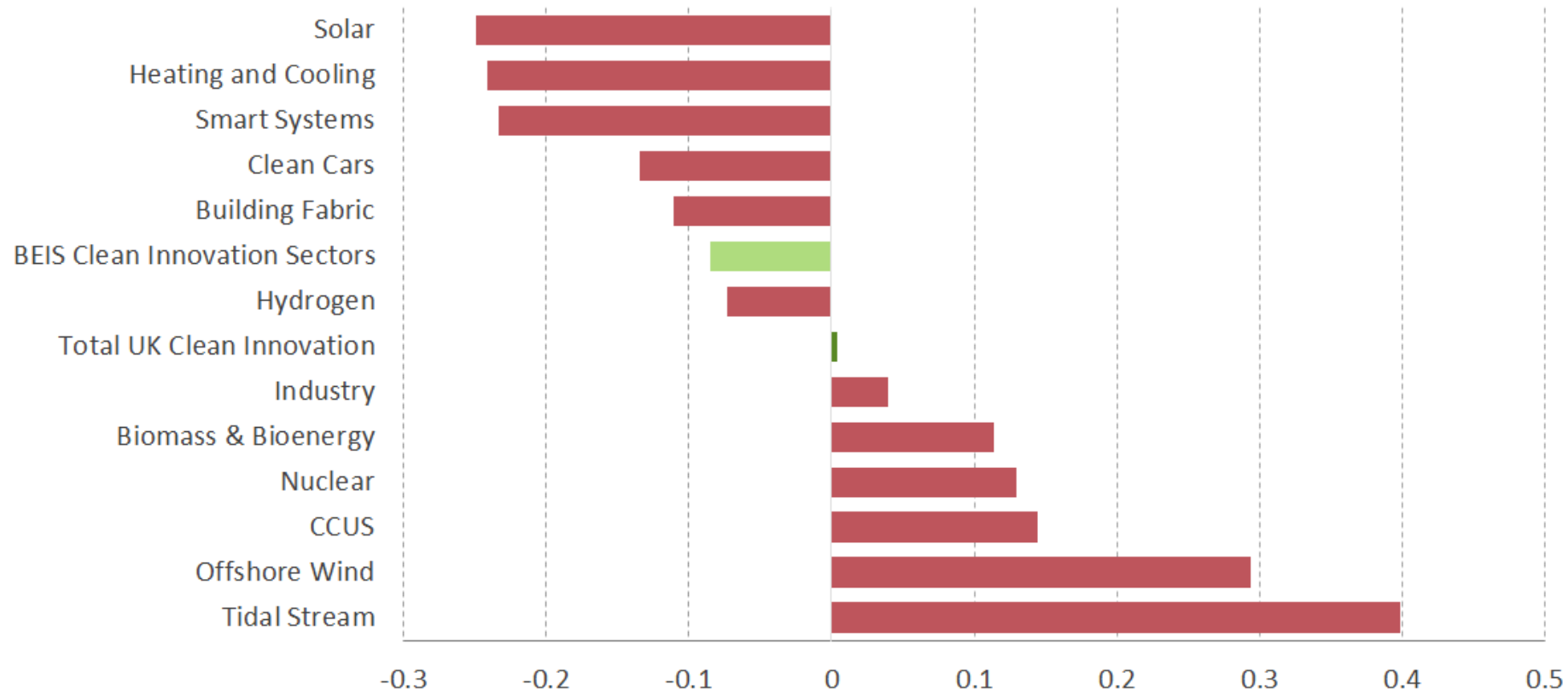


Source: Bloom, Sadun, Schuh & Van Reenen (2023) "Management as a Technology"

Notes: Productivity = TFP from Penn World Tables;

The UK is particularly specialised in some clean techs

RTA by selected clean technologies: UK, 2015-2018



- Differences within categories, e.g. in smart systems, the UK is specialized in a number of digital technologies

Notes: Revealed Technological Advantage for the categories in R Martin & D Verhoeven, Knowledge spillovers from clean and emerging technologies in the UK, CEP Discussion paper 1834, March 2022. Category 'clean cars' added. Total UK Clean Innovation refers to all patent families under the CPC class 'Y02'
Source: Analysis of PATSTAT 2021, Autumn edition. Chart taken from: [Growing Clean](#), Economy 2030 Inquiry, May 2022.