The green transition and productivity

GFP conference
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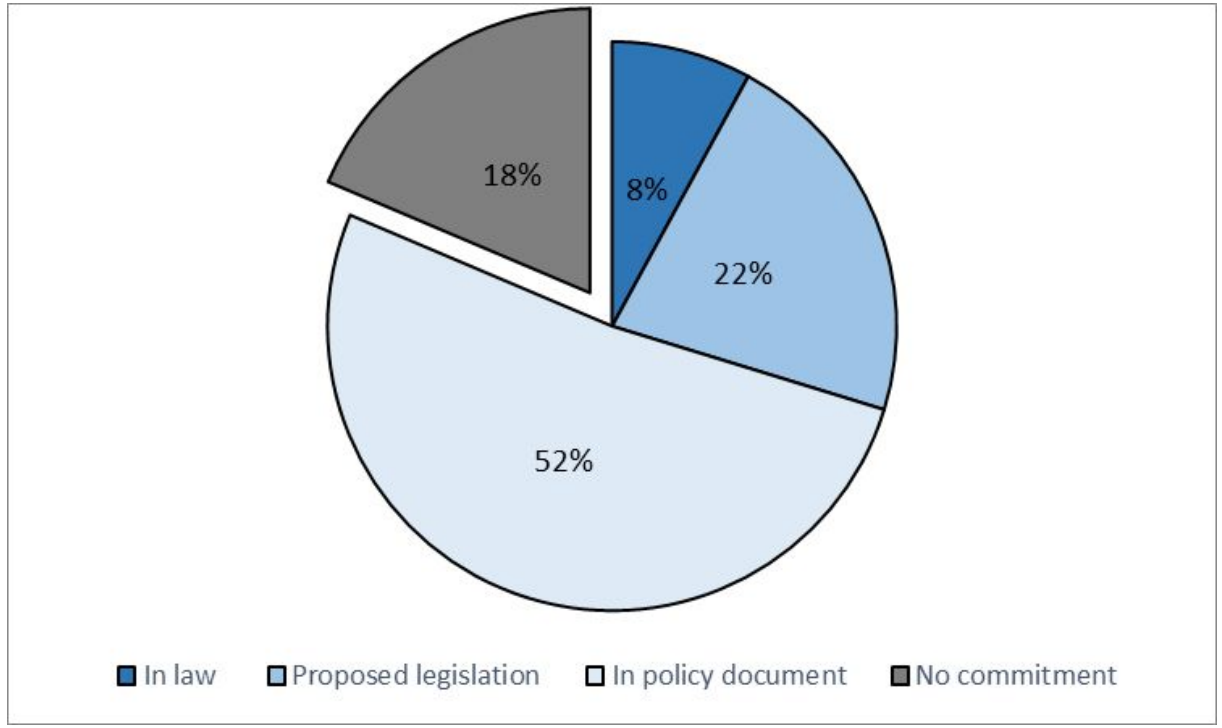
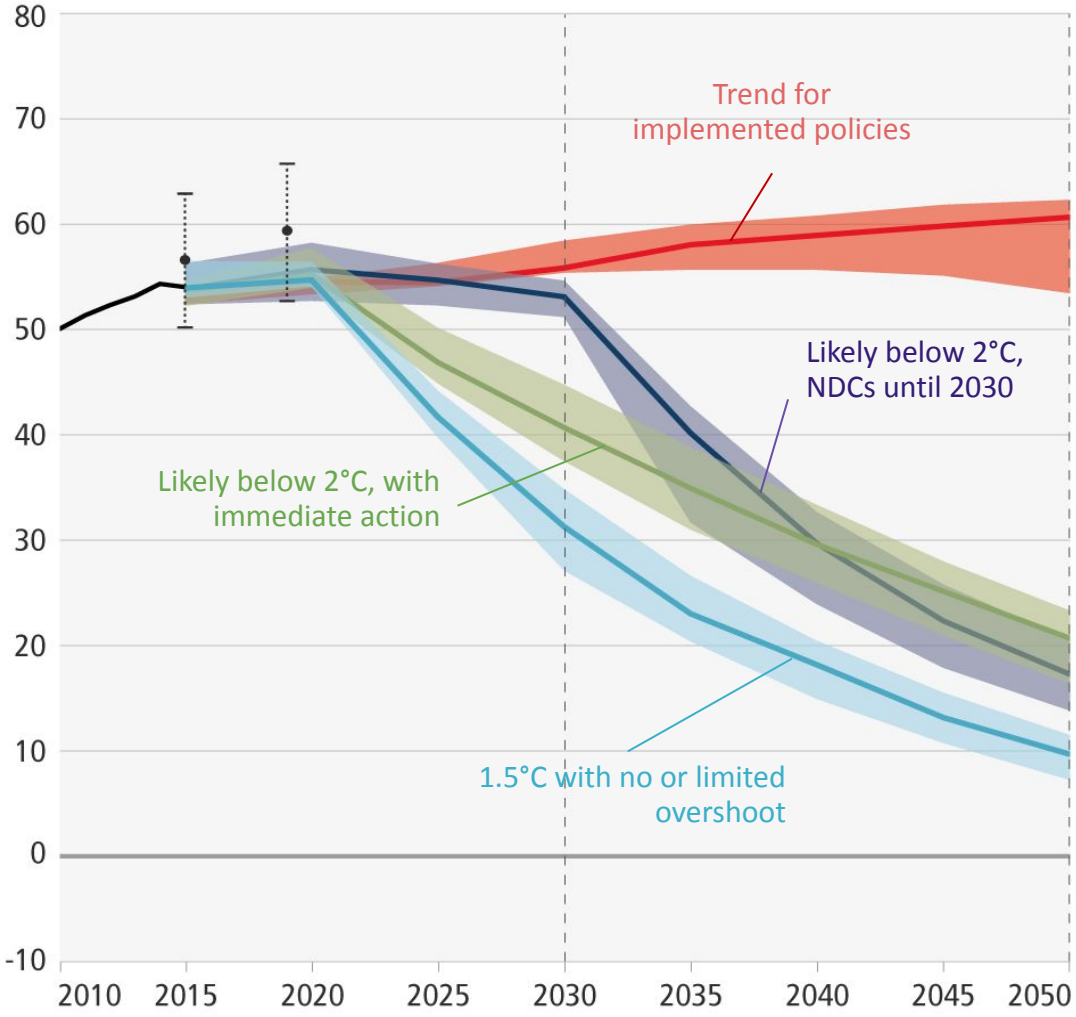
Climate policies will (need to) become more ambitious

Share of global economy that announced net-zero CO_2 or GHG emissions by mid-century





Source: Net Zero Tracker (https://eciu.net/netzerotracker). Share of global GDP is calculated based on GDP in 2017 taken from World Bank national accounts data and OECD National Accounts data (2021).

Source: IPCC 2022, Sixth Assessment Report, Working Group III – Mitigation of climate change

What impact on the economy?

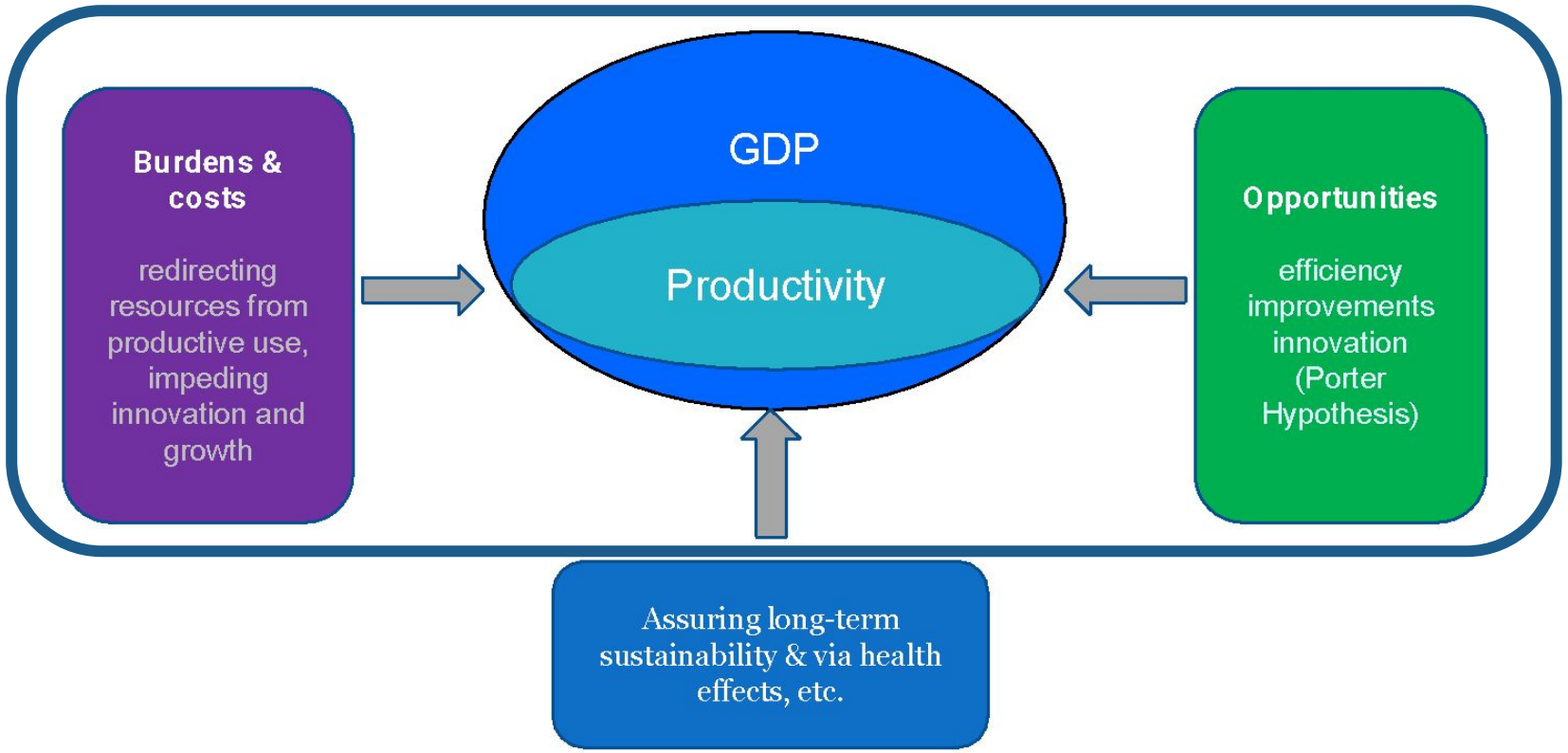
Environmental protection typically seen as a trade-off:

- benefits to health, biodiversity, etc
- but costs on the economy
- “Jobs versus the environment” (Morgenstern et al. 2002)

But as we have just seen:

- There are direct costs of inaction on the economy (**Paula**), so direct economic benefits of policy action
- Climate policies induce innovation in clean, energy-saving technologies and behavior (**David**), which can increase TFP

How can climate policies affect economic outcomes (including productivity)?



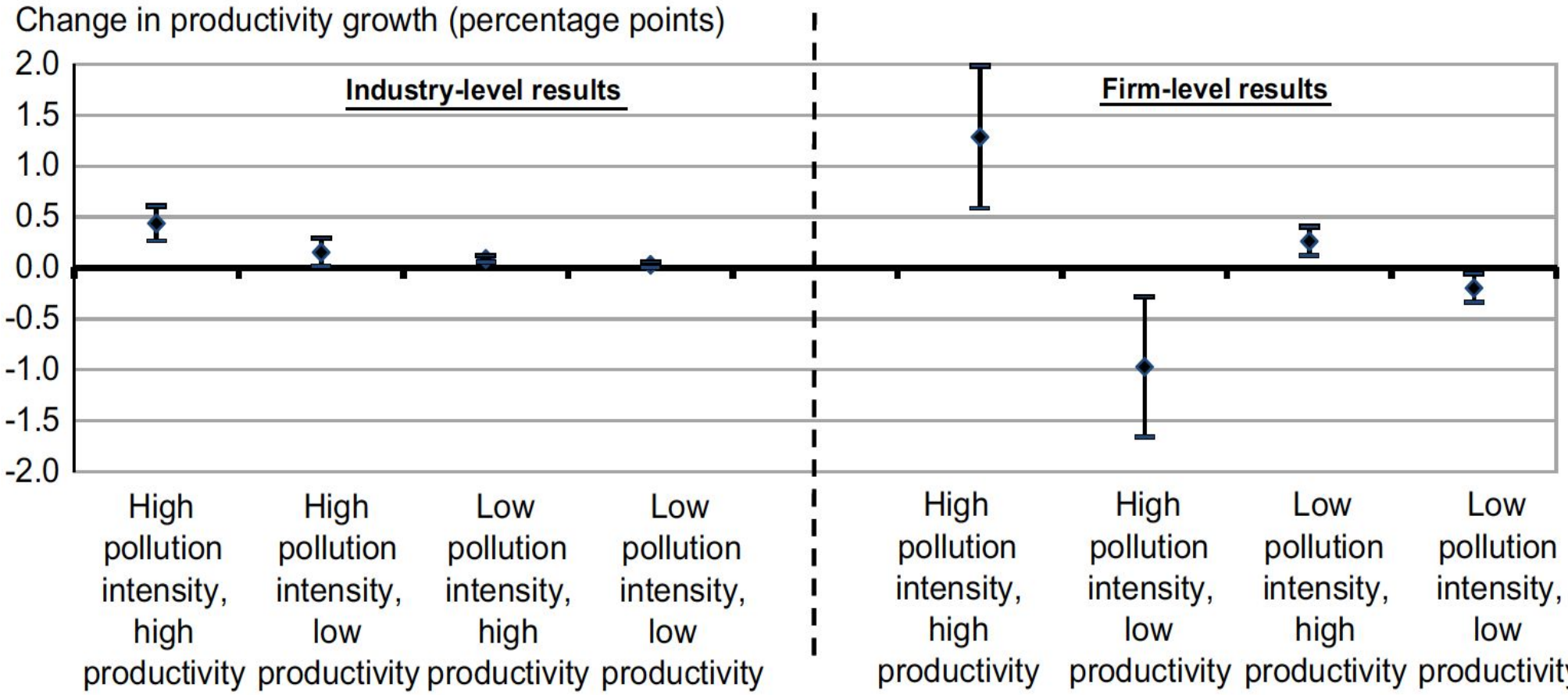
- Crowding out of more productive investment: productivity slowdown
- Efficiency improvements and induced innovation: productivity growth ("Porter hypothesis")

- Indirect benefits eg positive health effects from reduced pollution

Macro vs micro

- Sectoral outcomes can hide market dynamics and factor reallocation between individual firms
- At the aggregated industry level, productivity might still rise if the least productive firms are driven out of the market
- At the macro level, a sectoral decline can be counterweighed by another sector's improvement

Empirical evidence: small effects on aggregate, heterogeneous impacts across firms, and within-sector reallocations



Note: One-year effect of a mean in-sample increase in environmental policy stringency, i.e. 0.12 change in the value of the EPS index in one single year. Effects on productivity growth are estimated to last for three years after the policy change and then fade away:
Source: Albrizio, S., T. Koźluk and V. Zipperer (2014), "Empirical evidence on the effects of environmental policy stringency on productivity growth", OECD Economics Department Working Papers, Vol. 1179, https://doi.org/10.1787/5jxrjnb36b40-en.

Env'tal policy induces firm exit; can explain differences between firm-level and sector-level impacts

Table 8: Exit and Nonattainment

Pollutant	[1]	[2]
Any	0.0042**	
	(0.0021)	
O_3		0.0039*
		(0.0023)
TSPs		-0.0050
		(0.0038)
SO_2		0.0043
		(0.0055)
CO		-0.0115**
		(0.0050)
R^2	0.413	0.413

Source: Michael Greenstone & John A. List & Chad Syverson, 2012. "The Effects of Environmental Regulation on the Competitiveness of U.S. Manufacturing," NBER Working Papers 18392,

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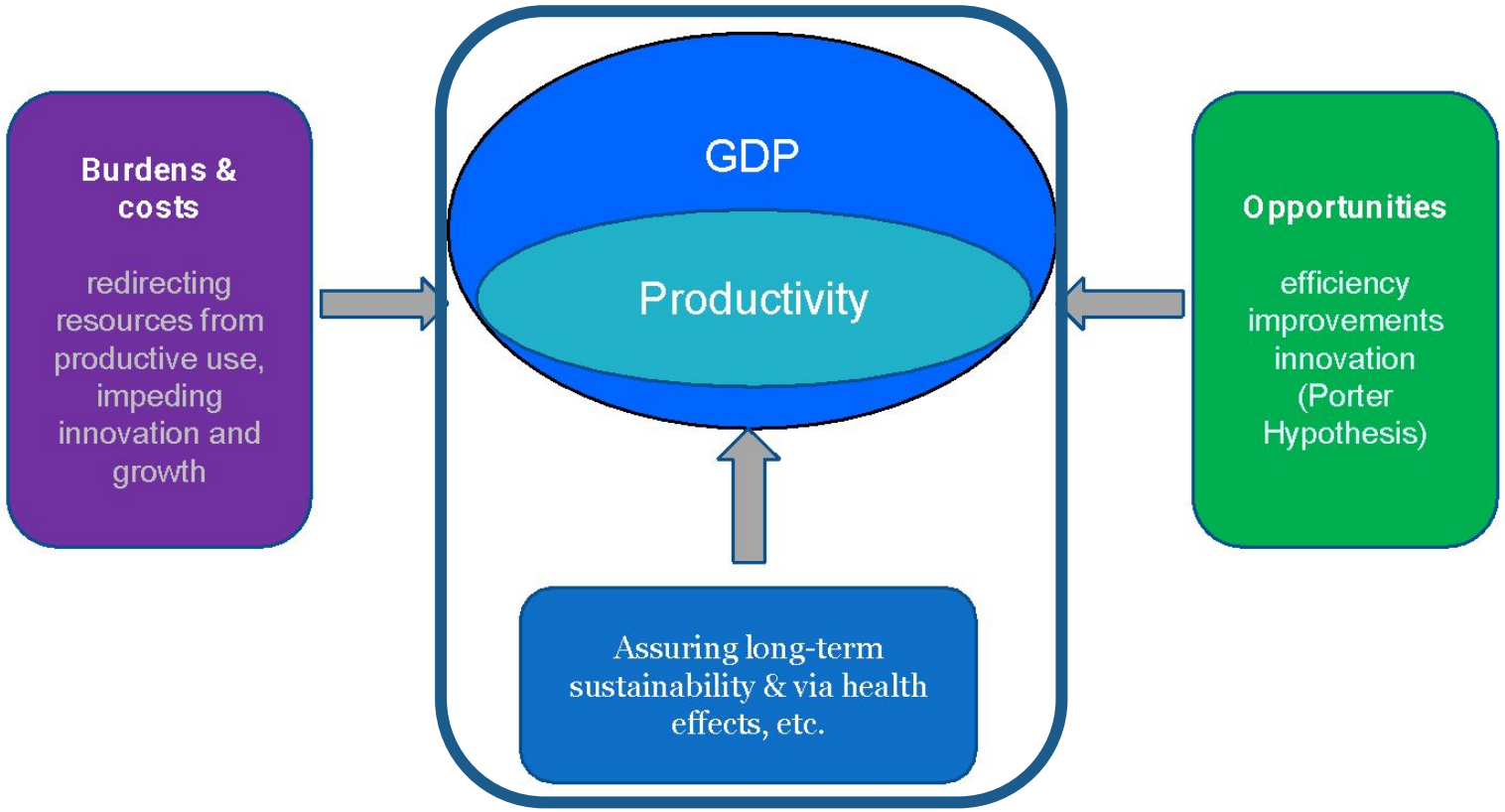

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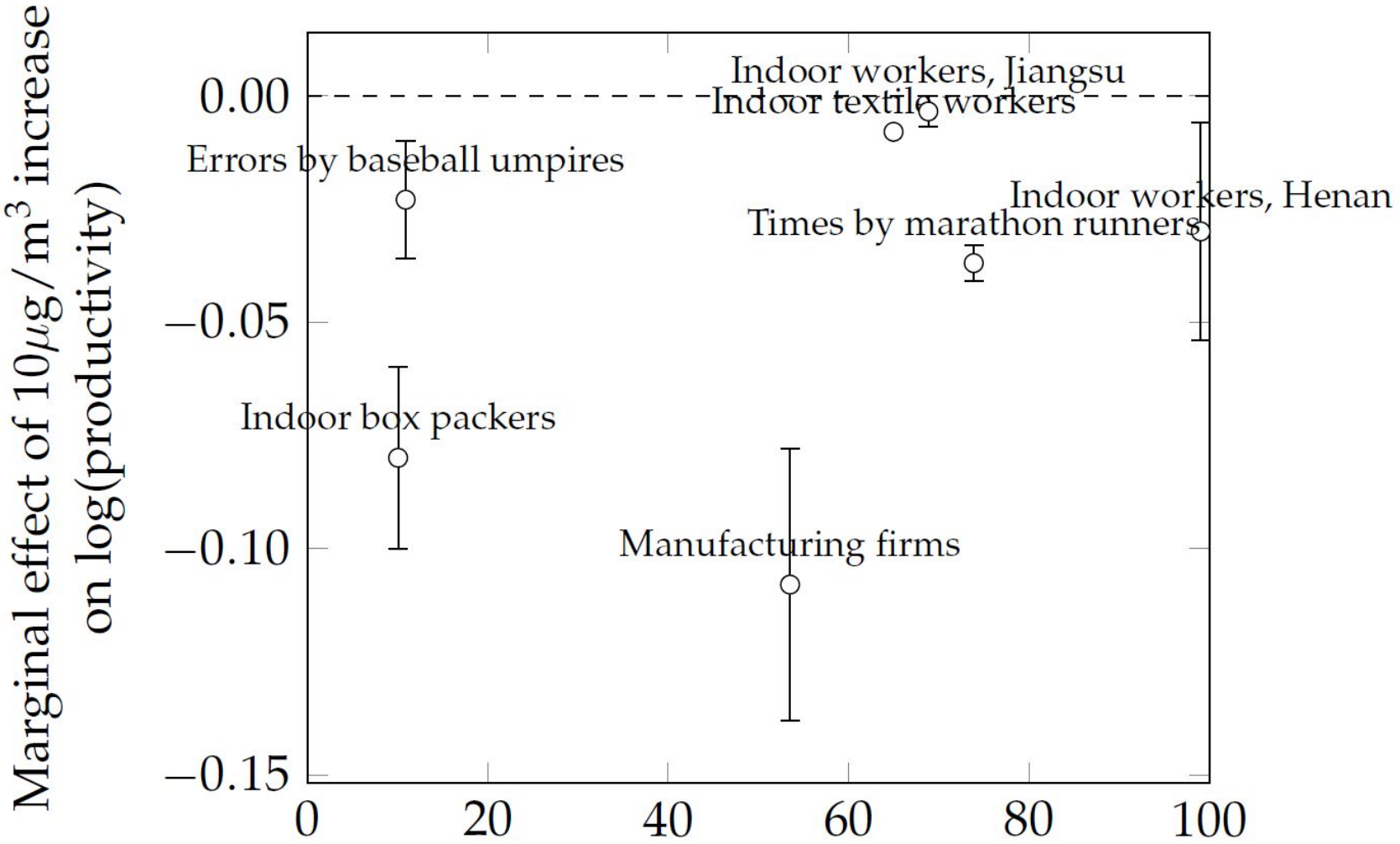
Empirical evidence that air pollution impedes productivity



These impacts translate into aggregate effects economy-wide

Table 4: Decomposition of PM2.5's effect into effect on productivity and population.

	(1) ln(GDP)	(2) ln(GDP/pop.)	(3) ln(GDP/work pop.)	(4) ln(Population)
$PM_{2.5}$	-0.0116 ***	-0.0111 ***	-0.0103 ***	-0.0005 *
	(0.0021)	(0.0021)	(0.0021)	(0.0003)
Observations	17099	17099	17099	16204
Weak id. stat.	107.0	107.0	107.0	100.3
Hansen J stat. p-value	0.242	0.0756	0.0754	0.0000183

- An increase of PM2.5 concentration by 1µg/m3 reduces real GDP by 1.1%
- 95% of the impact due to reduced output per worker

Source: Dechezleprêtre, A., N. Rivers and B. Stadler (2019), "The economic cost of air pollution: Evidence from Europe", OECD Economics Department Working Papers, No. 1584,

Take-away messages for policy

- Climate/environmental policies have small average effects on productivity, but heterogeneous impacts across sectors and firms
  - Pollution intensive, low-productivity firms lose; High productivity firms win (innovation?)
  - Some firms exit ; surviving firms take their market share: reallocations
  - These negative effects are local, sectoral and transitional
  - Climate policy may widen productivity gap
- Climate/environmental policies have important (and overlooked) health co-benefits, which affect productivity
  - Reduced air pollution increases output per worker (on the job presence + increased productivity in the workplace)
  - Regulations to improve air quality may contribute positively to economic growth

Thank you

For more information:

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