

Science and innovation in times of Covid-19 and policy responses

Sandra Planes-Satorra

Policy Analyst, Directorate for Science, Technology and Innovation, OECD

IfTI Global Symposium – 16 September 2020





- 1 **The short-term effects of the Covid-19 crisis on S&I**
- 2 STI policy responses (as of September 2020)
- 3 Longer-term opportunities and challenges for STI



The Covid-19 crisis has affected the entire science and innovation ecosystem

1

Quick **mobilisation** of R&D and innovation efforts to **address Covid-19**



2

Disruption in research & innovation activities of universities, research centres & businesses



1

Quick **mobilisation** of R&D
and innovation efforts to
address Covid-19



2

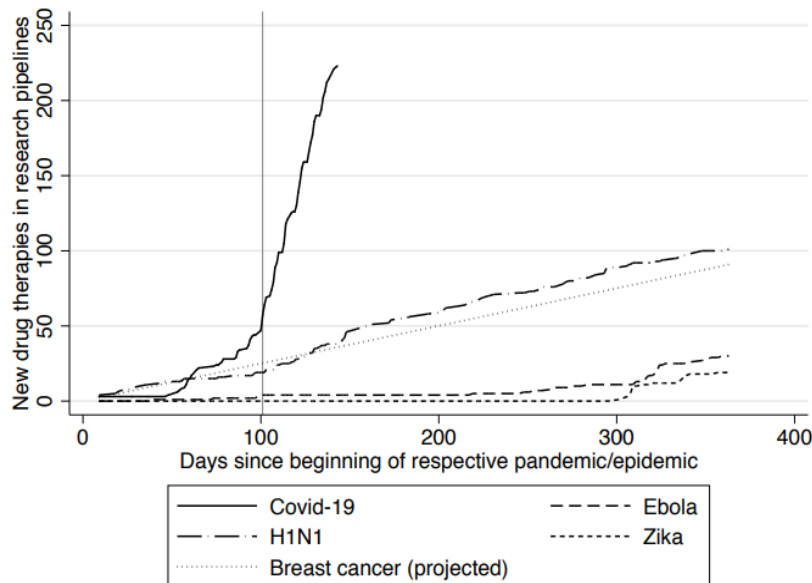
Disruption in research &
innovation activities of
universities, research centres &
businesses



Large R&D efforts to address the Covid-19 health challenge

- Governments, foundations & industry (often in PPPs) have engaged in R&D efforts to develop Covid-19 **vaccines** (180 candidates in Sept 2020 – 35 in clinical evaluation), **treatments & diagnostics**
- Surge of **scientific publications** related to the virus

Number of drug therapies (all stages of development) in research pipelines, by disease



Source: Bryan, Lemus and Marshall (2020_[2])



Open science & innovation initiatives have proliferated

- **Data sharing initiatives**, e.g. [Covid-19 Open Research Dataset \(CORD-19\)](#) with +50,000 machine-readable scholarly articles on Covid-19 and other coronaviruses
- **Online collaborative platforms**, e.g. [Coronavirismakers](#) with + 20,000 volunteer researchers, developers and engineers to produce emergency medical equipment
- **Distributed computing projects** that encourage citizens to donate their spare computing power to run complex modelling for Covid-19 research (e.g. [Folding@home](#))



coronavirismakers
OPEN SOURCE TO LIVE



Rosetta@home



Innovators also mobilised to provide quick responses to the Covid-19 challenge

- **Frugal innovations**
(e.g. ventilator masks built from snorkelling mask)
- **Use of new digital tools**
(e.g. 3D-printing to produce respirator valves)
- **Repurposing production lines** (e.g. automotive & consumer goods manufacturers producing medical equipment & hand sanitizer)



1

Quick mobilisation of R&D
and innovation efforts to
address Covid-19

2

**Disruption in research &
innovation** activities of
universities, research centres &
businesses





Universities and research institutions were highly disrupted by lockdown measures



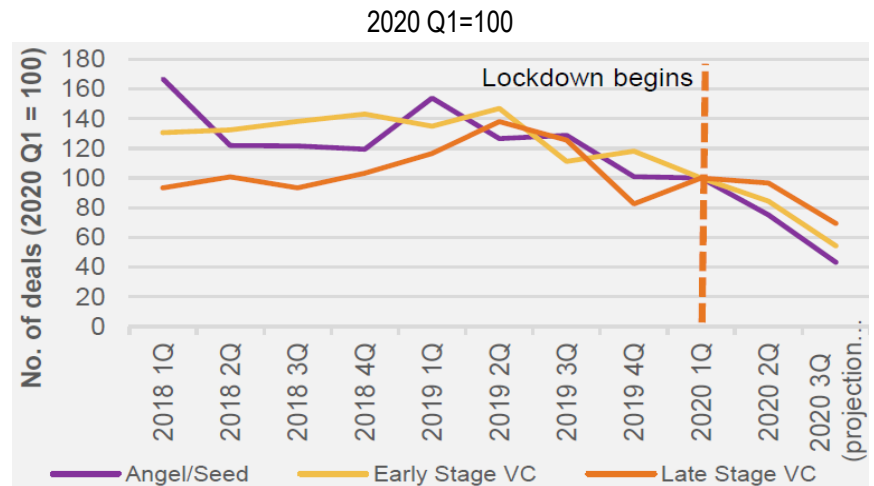
- **Interruption of projects** requiring access to research facilities or involving field work & clinical trials
- Reduction in **labour productivity**, and risks of increased gender inequalities
- Restricted **research mobility**
- Disruption in **human capital training** & quick shift to online learning
- **Diversion of research efforts** towards Covid-19



Liquidity constraints and market uncertainty reduce business investments in R&I

- Many R&I projects are **suspended or terminated**
- **Decline in number of investments in innovative start-ups** (particularly early-stage venture capital)
- **Lower market entry** & more bankruptcies in Q1 & Q2 of 2020

Number of VC deals by investment stage, United Kingdom



Source: Ipsos Mori (2020) based on Pitchbook data

Reduction in businesses' **willingness to introduce new products** or processes in the short run...

... but the crisis (as past ones) **also offers opportunities** for some innovative businesses



Some actors benefitted from increased demand for some innovative (digital) products



- Teleworking tools
- Online shopping
- Video streaming & online gaming
- Online learning
- Telemedicine
- Cybersecurity
- ...



Innovation investments in those areas are likely to increase



1

The short-term effects of the Covid-19 crisis on S&I

2

S&I policy responses (as of September 2020)

3

Longer-term opportunities and challenges for S&I

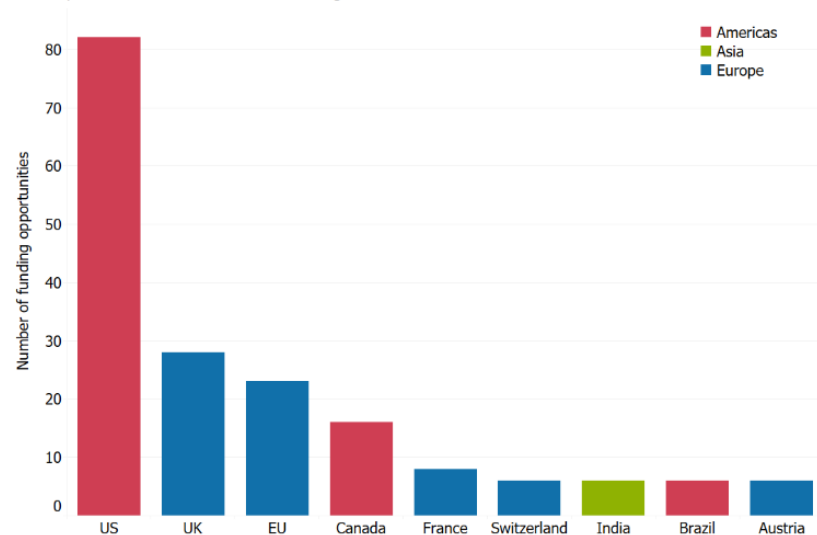


Large amounts of funding for R&D have been mobilised at unprecedented speed

The US National Institutes of Health (NIH) spent **USD 1.8 billion** to Covid-19 research and the EU mobilised **EUR 1 billion** under Horizon 2020 (as of April/May 2020)

- **Fast-track competitive research funding** to develop Covid-19 vaccines, treatments & diagnostics
- Part of the support is channelled through **existing funding mechanisms**
- Some calls encourage existing grant holders to **repurpose** their research and innovation activities.

Countries that published the most COVID-19 research funding opportunities
Science/Business COVID-19 research funding database

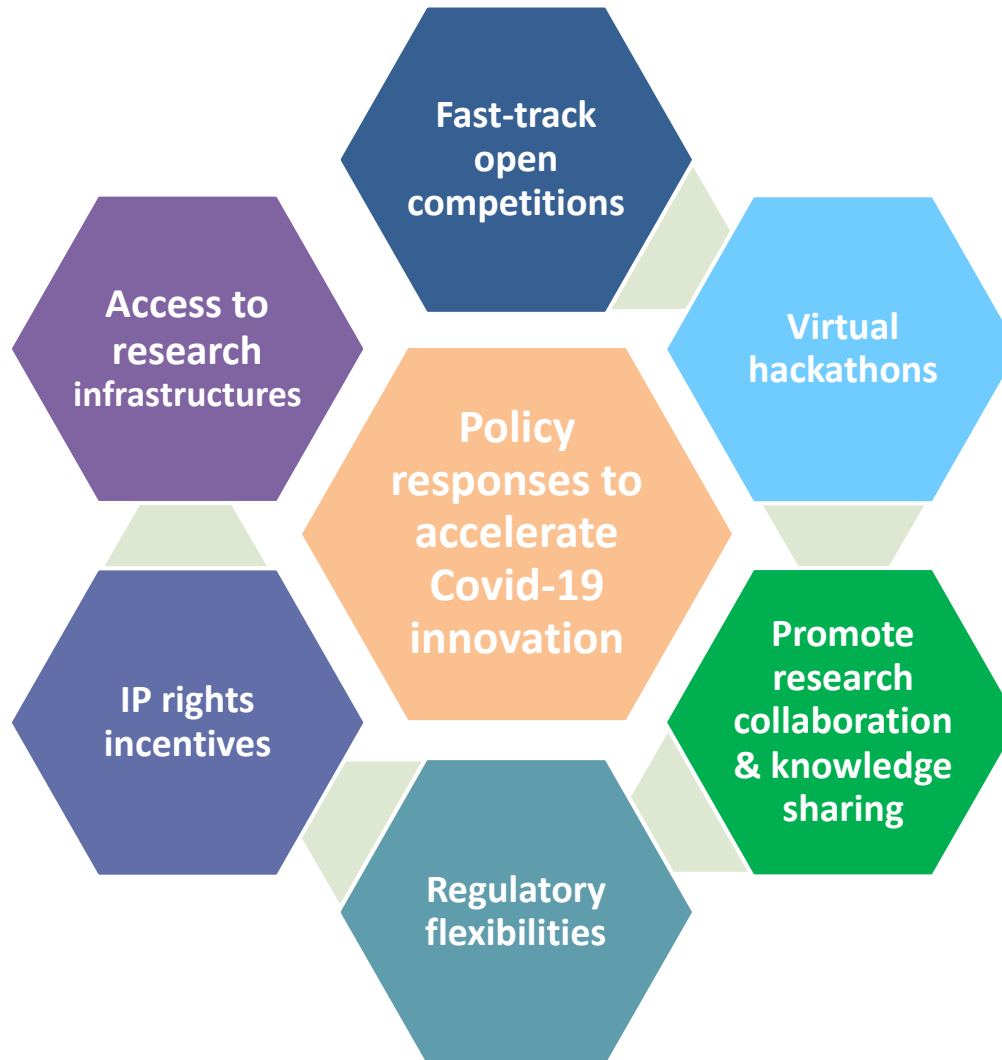


Source: [ScienceBusiness](https://www.sciencebusiness.com), 2 June 2020

Note: The graph illustrates the number of published funding opportunities as of 22 May; it does not illustrate amounts of allocated funding. The full database reports more than 270 funding calls from 44 countries.



A diversity of policy instruments encourage quick innovation responses





Examples of fast-track open competitions



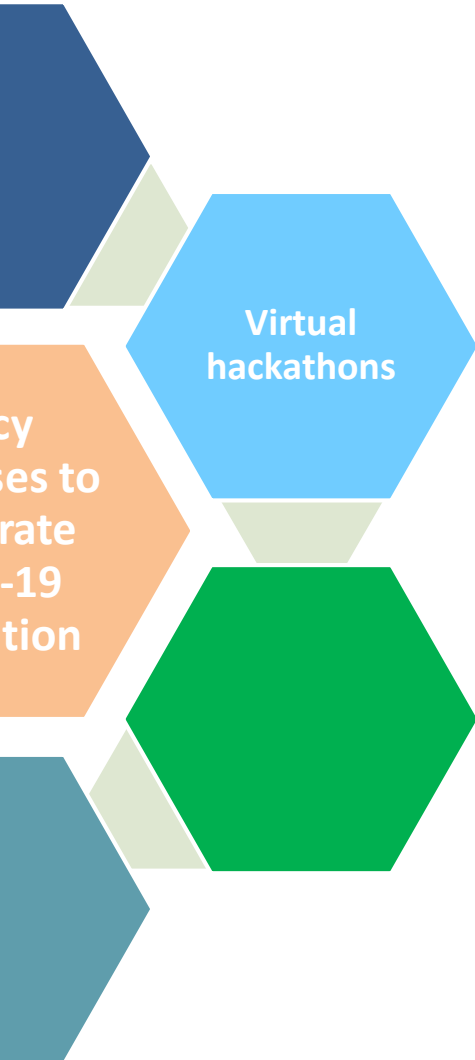
Fast-track
open
competitions

Policy
responses to
accelerate
Covid-19
innovation

- Canada's [Covid-19 Challenge programme](#) posts specific challenges seeking near-to-market solutions from firms with less than 500 employees
- “[Innovate for Italy](#)”, a fast call competition to identify best digital solutions available for telemedicine and monitoring applications for patients
- [Ireland's COVID-19 Rapid Response Call](#)
- [UK's fast-track competition for business-led innovation](#)



Examples of virtual hackathons



- [EUvsVirus Hackathon](#), European Commission (April 2020), had +2,000 solutions submitted and 117 winners
- [#BuildforCOVID19](#) World Health Organisation with the support of technology firms
- [MIT Covid19 Challenges](#)
- [Hack the crisis](#) Accelerate Estonia and Garage48
- [CoVent-19](#) Massachusetts General Hospital to design a rapidly deployable mechanical ventilator.



Measures to address immediate negative impacts of Covid-19 on **innovative businesses**

- **Facilitate access to funding** to entrepreneurs & innovative firms to mitigate liquidity problems, e.g.:
 - France: EUR 4 billion for Emergency Startup Relief Plan
 - Germany: EUR 2 billion to expand venture capital to support start-ups
- **Support businesses (incl. SMEs) adapt to Covid-19** context, e.g.:
 - Ireland: Lean Business Continuity Vouchers & Business Improvement Grants





S&I policy responses to Covid-19 have raised some debates

1) Has research funding for Covid-19 vaccines and treatments been **appropriate**?

- Too much (e.g. Younes et al, 2020) vs not enough (e.g. Azoulay and Jones, 2020)
- Winner-take-all races and duplication of efforts?
- How to ensure global and fair access to solutions?



2) Have resources for S&I to address Covid-19 been **spent efficiently**?

- Possible duplications & insufficient quality in research efforts
- Speedy allocations risk rewarding “superstars” only but reduce diversity of contributions
- Funding agencies face operating challenges



1

The short-term effects of the Covid-19 crisis on STI

2

STI policy measures (as of September 2020)

3

Longer-term opportunities and challenges for STI



The longer-term impacts of Covid-19 on S&I are uncertain & will depend on characteristics of the recovery





1) Will the crisis accelerate the digitalisation of research and innovation?

AI applications at different stages of the Covid-19 crisis:

Accelerating research Open data projects and distributed computing to find AI-driven solutions to the pandemic, e.g. <i>drug and vaccine development</i>	Detection	Early warning Detecting anomalies and digital “smoke signals”, e.g. <i>BlueDot</i>	Diagnosis Pattern recognition using medical imagery and symptom data, e.g. <i>CT scans</i>	
	Prevention	Prediction Calculating a person’s probability of infection, e.g. <i>EpiRisk</i>	Surveillance To monitor and track contagion in real time, e.g. <i>contact tracing</i>	Information Personalised news and content moderation to fight misinformation, e.g. <i>via social networks</i>
	Response	Delivery Drones for materials’ transport; robots for high-exposure tasks at hospitals, e.g. <i>CRUZR robot</i>	Service automation Deploying triaging virtual assistants and chatbots, e.g. <i>Canada’s COVID-19 chatbot</i>	
	Recovery	Monitor Track economic recovery through satellite, GPS and social media data, e.g. <i>WeBank</i>		



Positive experiences using digital technologies & services may accelerate business adoption



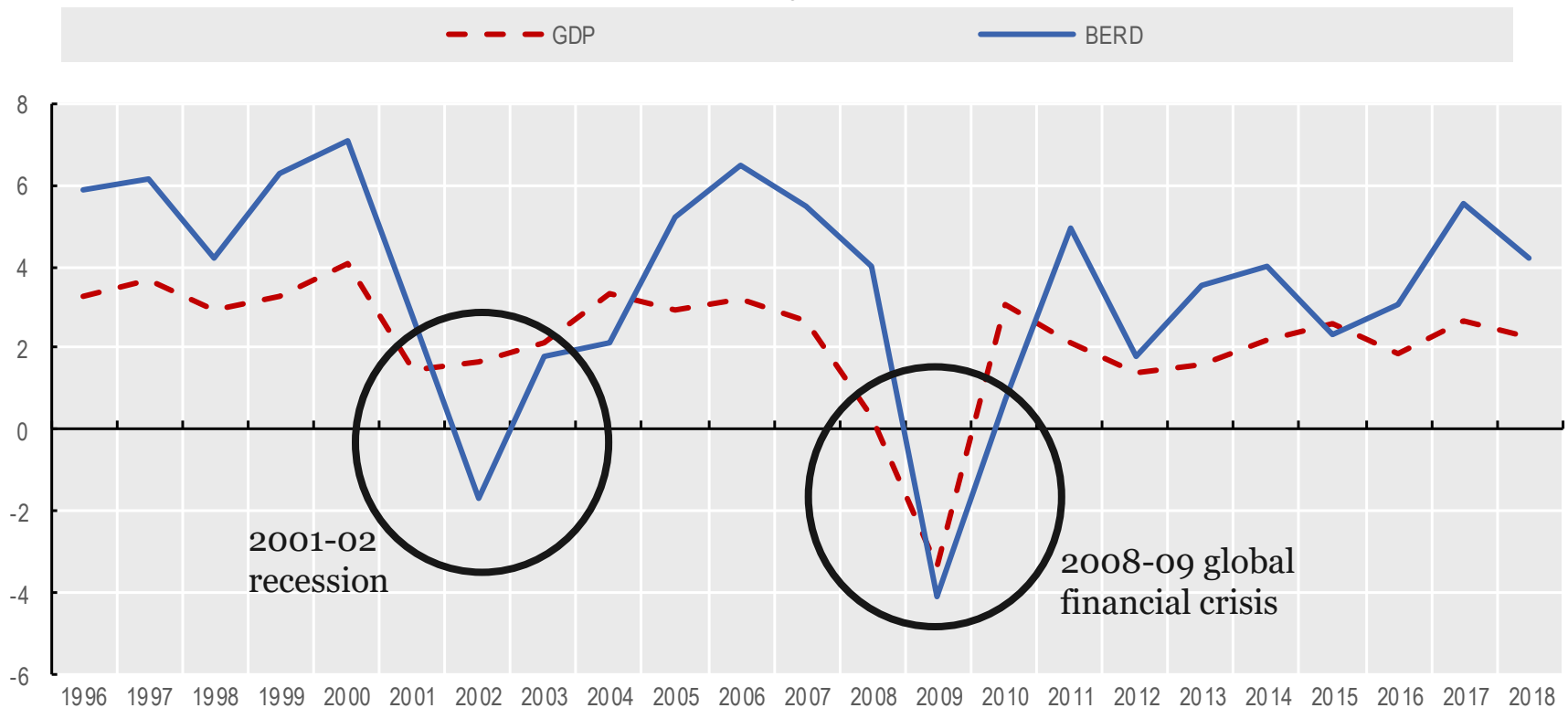
But **insufficient absorptive capacities** (skills), access to infrastructure & financial resources for investments **may prevent wider uptake**



2) Will private R&D and innovation investments resist the business cycle?

The impact of the business cycle on business R&D investments, OECD countries

Annual growth rate



Note: BERD stands for Business expenditure on R&D.

Source: OECD (2020), "Main Science and Technology Indicators", OECD Science, Technology and R&D Statistics (database), <https://doi.org/10.1787/data-00182-en> and OECD (2020) "National Accounts at a Glance", OECD National Accounts Statistics (database), <https://doi.org/10.1787/data-00369-en> (accessed on 11 May 2020).



3) Will gaps across industries, regions and research institutions widen?

Unequal effects
risk leaving lasting
traces

- Unequal preparedness of businesses & research institutions to leverage **digital tools**
- Some **sectors** are severely hit (e.g. tourism, automotive) while others thrive during the crisis (digital sector)
- Possible reinforcement of **large players** at the expense of small players
- Gap may widen between **leading universities** and others

But some factors could **reduce inequalities**:

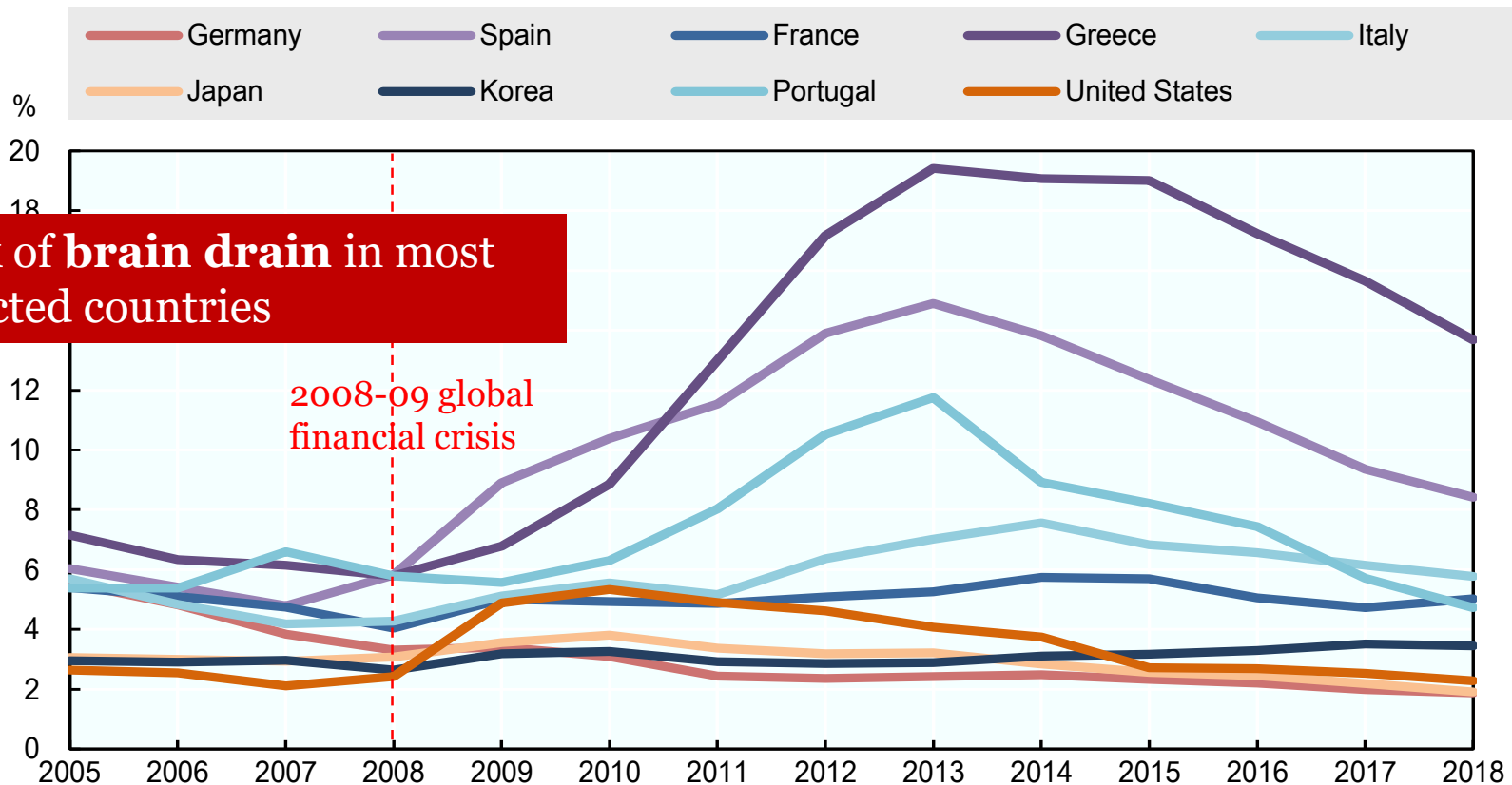
- Digital technologies & new work arrangements can contribute to **more evenly spread innovation activities** across regions ('the death of distance')
- **Incentive to reduce global concentration** of production to be less vulnerable to shocks (possible push back to globalisation)



4) What may be the impacts on S&I labour force?

Unemployment rate of tertiary educated, selected countries, 2005-18

Percentage



Note: Age group 25-64.

Source: OECD (2020), "Education at a glance: Educational attainment and labour-force status", OECD Education Statistics (database), <https://doi.org/10.1787/889e8641-en> (accessed on 26 August 2020).



Future S&I policy will have to address a more complex set of policy goals



**Economic
growth &
competitiveness**



Resilience



**Environmental
sustainability**



Inclusiveness

Complementarities & trade-offs

Thank you

Draft report

(updated version will be available soon):

<https://oe.cd/tip-covid19>

OECD Survey

on STI policy responses to Covid-19:

<https://stip.oecd.org/Covid.html>

OECD Digital Hub “Tackling the Coronavirus”:

<http://www.oecd.org/coronavirus/>

Caroline Paunov,
Caroline.Paunov@oecd.org

Sandra Planes-Satorra,
Sandra.PlanesSatorra@oecd.org

Science, technology and innovation in times of COVID-19

What policy responses for the recovery?

Virtual workshop / 17 and 24 June 2020 / oe.cd/tip-covid19

BACKGROUND REPORT

