What drives innovation? Lessons from COVID-19 R&D

Ruchir Agarwal[1], Patrick Gaule[2]

[1]IMF [2]University of Bath

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Outline

- A quick summary of the paper
- Some thoughts on the third question: “There is a debate about the flexibility of the intellectual property framework around production and distribution of these goods? What are the key elements in this debate?”

The Focus of Our Paper

- How special was the R&D response to fight COVID-19?
- Where did the R&D response come from?

The Focus of Our Paper

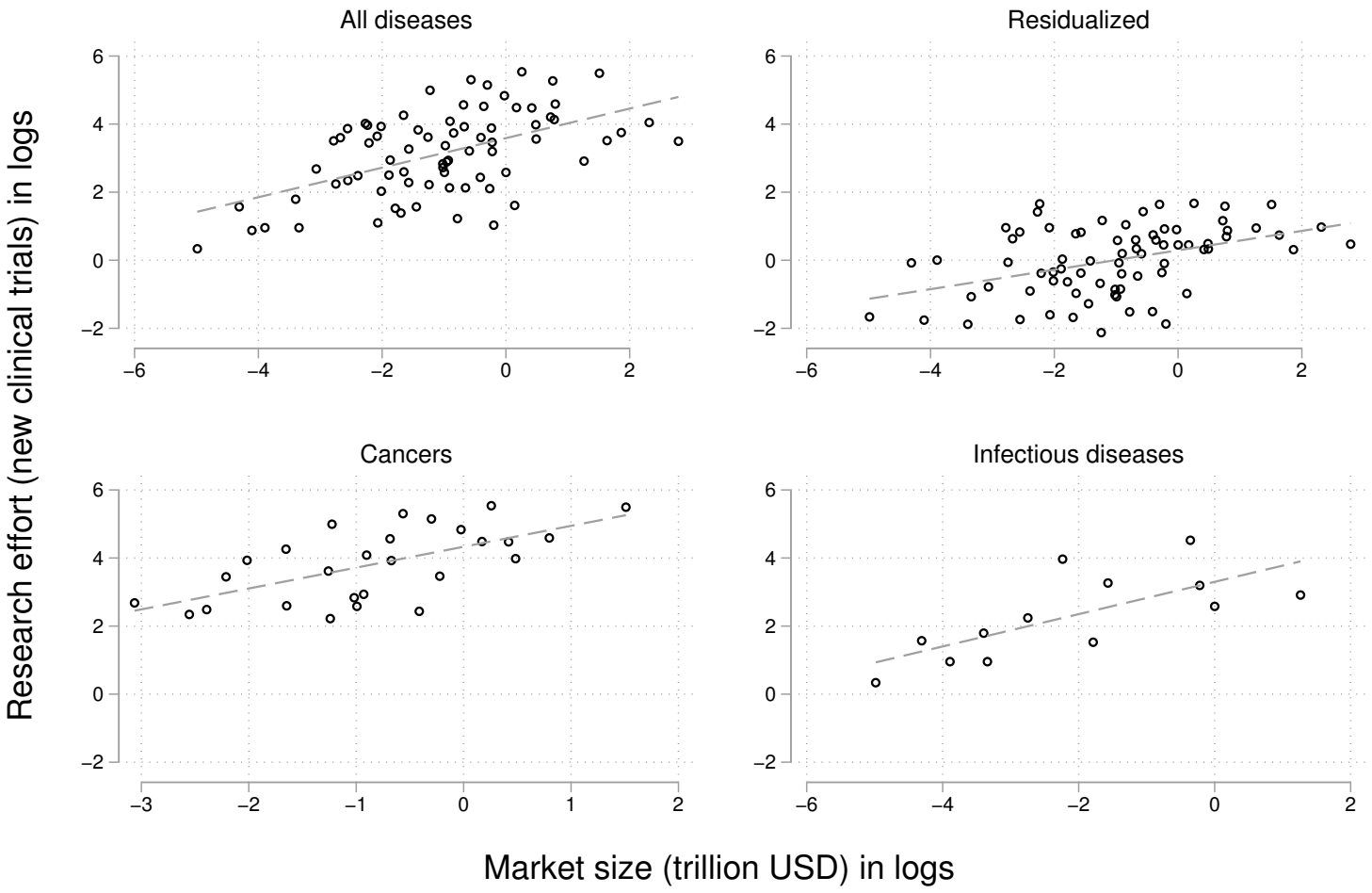
- How special was the R&D response to fight COVID-19?
  - To answer that question, we need a framework to specify what a 'normal' response would have been
  - Research effort depends on market size
- Where did the R&D response come from?

Measuring R&D effort and market size

- Our measure of R&D effort: number of new clinical trials
- Our measure of market size (all diseases except COVID-19): disease-level mortality data at the national level weighted by national GDP per capita
- For COVID-19, we estimate a market size corresponding to 10 times the realized COVID-19 mortality worldwide so far or 3.3. times the market size for coronary heart disease.

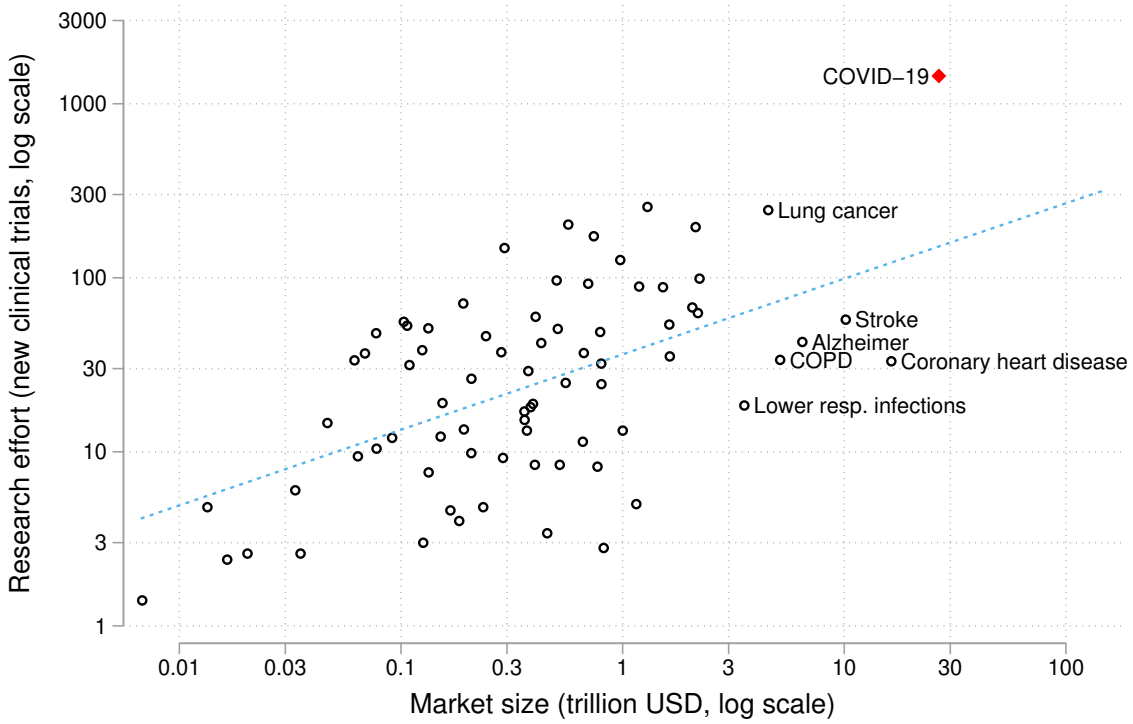
Historically, the elasticity of R&D effort with respect to market size is about 1/2 in the cross-section of diseases

Figure: R&D Effort across Diseases and the Law of Diminishing Effort



The number of COVID-19 trials has been much larger than that implied by its market size

Figure: Actual vs. Expected Number of COVID-19 Trials Based on its Potential Market Size



Notes: The potential market size for COVID-19 is 3.3 times the market size of coronary heart disease for the purposes of this exercise.

The Focus of Our Paper

- How special was the R&D response to fight COVID-19?
- **Where did the R&D response come from?**

Where did the R&D response come from?

- The aggregate flow of clinical trials increased by 38% in 2020, with limited crowding out of trials for non-COVID diseases
- Public research institutions accounting for 70 percent of all COVID-19 clinical trials globally and being 10 percentage points more likely to conduct a COVID-19 trial relative to private firms.
- COVID-19 vaccine candidates from the U.S. and China progressed faster than those from Europe, possibly thanks to early-stage incentives.

Potential implications

- The COVID-19 R&D response raises the possibility that global pharmaceutical innovation in the future can be scaled up significantly
- However, while economists are naturally in favor of market size as a driving force for innovation, policymakers may want to complement the market size effect with early-stage incentives

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Weakening IP for COVID-19: A classic trade-off between access and innovation incentives?

Conventional thinking suggest that weakening intellectual property would:

- enhance access
- but weaken incentives to innovate (vaccines for new variants, ...)

Weakening IP for COVID-19: enhanced access to COVID-19 vaccines not guaranteed

Vaccines are different from therapeutics drugs:

- Considerable tacit knowledge and know-how in the production process (both for vaccines in general or for particular vaccine)
- While one can produce a generic drug that contains the same chemical substance as the original, a copycat vaccine would necessarily be somewhat different, and hence likely require new clinical trials

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Whereas patents were the key barrier to accessibility for HIV antiretrovirals, I very much doubt that is the case for COVID-19 vaccines

Weakening IP for COVID-19: unclear effects on innovation incentives

If innovators anticipated lower profits due to weakened IP, this reduces future innovation incentives. However:

- As argued in the paper, the level of COVID-19 R&D far exceeds the historical relationship between market size and R&D effort
- A lot of COVID-19 R&D has been undertaken by public institutions or actors with non-monetary motivations
- The prevalence of early stage incentives may counteract a reduced market size