Health, Human Capital Formation and Knowledge Production

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Overview

- **Question:** What is relationship between health and growth?

- **Existing Literature:** Health, proxied by height or life expectancy, increases growth. But result is controversial.

- **This Paper:** should also focus on *morbidity*, not just *mortality*
Basic Story

• Lisa grows up malnurished, with parasites, or with infections

• Lisa therefore can’t focus in class, doesn’t study as much, skips high school, and won’t increase human capital stock or create patents/innovations

• But hookworm won’t kill Lisa. So life-expectancy measure used in prior work treats Lisa the same as health people

• Biases estimated impact of health and education on growth
Basic Specification

• How does author try to capture the impact of *morbidity* orthogonal to *life-expectancy*?

• The author does not have a direct measure of *morbidity*

• Constructs a *mortality*-adjusted stock of human capital:

\[
\int_{\text{age cohort}} \int_{\text{year}} F (\text{School Enrollment, Mortality}) \, d(\text{age cohort}) \, d(\text{year})
\]

• This is key innovation: “*morbidity*”-adjusted enrollment enters growth regressions more significantly than *standard variable*
Roadmap

My General Assessment:

- It is great that author is taking on big important topic
- Very generous interaction with literature
- Massive data project (20+ countries, 200 years) – lots of work

My comments will cover three things:

1. Better motivate and test that key innovation!
2. Some specifics on results and specification
3. Some thoughts on the approach from a complete non-expert
Motivate and test Morbidity-Adjusted Enrollment Variable

- Which countries, eras, and diseases are we worried about?

- In baseline specifications, where does your variable significantly outperform standard variables? Does it match with the above?

- Show us this matters for outcomes more direct than growth:
  - U.S. South around hookworm era
  - Construct your variable and standard variables
  - Can you better explain test scores or grades? IQ tests? Graduation rates?

- Can you get morbidity for some episode, just as motivation?
Estimated Functional Form on Key Variable

- Above, I wrote $F(Enrollment, Mortality)$, but really is $F(Enrollment, Health)$, where:

  $$\ln Health = \Phi \ln (1 - \text{mortality}_t^a)$$

  - Calibrates $\Phi$ by maximizing statistical significance of interaction of this and education for productivity growth

- How do you adjust all further inference?

  - $\Phi$ ranges from 0 to 500, but $\ln Health \approx 0$ for $\Phi > 50$

- Key variable, so more clarity would be useful
What Countries or Episodes are Driving Results?

- All Results Equally Weighted
- Most Health Variation from Flu Pandemics and Wars
- No Country Fixed Effects – Within or Between?
- How Compare Results Quantitatively with Rest of Literature? Life-expectancy?
- Why estimated in 5- or 10-year differences? If channel is through innovation, etc., should take dramatically longer
• R&D expenditures measured relative to GDP in nominal terms. Real R&D likely increasing significantly more?

• What is meant by TFP in PPP units? Why is PPP appropriate?

• Why are country labor shares averaged with U.S. labor share?

• Smoothed high-tech imports as measure of technology spillovers. How is this done historically?
Is this about Growth or Health?

• If this is about degree to which prior estimates of growth elasticity of health or schooling are incorrect, then need to better interact with existing literature in results section.

• But if this new measure really is the best new thing we’ve got (for this period), let’s use it for more:
  • More on patenting, secondary attendance
  • Crime or voting or social outcome
  • Workforce
  • Happiness

How does it perform relative simply to life-expectancy?

• More abstract concerns about measure of “growth” in this context. See Jones and Klenow, 2012.
For Policy, is Micro or Macro Variation Preferred

- Heckman, for instance, cares about pre-natal health among US poor. I think of this as idiosyncratic variation in health outcomes.

- Estimates in this paper come from common or macro variation in health outcomes – major disease waves, wars, etc.

- Seems like targeted policies for health to increase aggregates (like growth) should be motivated by studies estimated off this idiosyncratic variation.

- Policies to avoid a flu-pandemic (common variation) are obviously useful regardless of impact on growth.
To Conclude

- Big important topic

- Very extensive and massively data intensive work on growth, conditioning on all sorts of things I haven’t mentioned

- Develops a new variable aimed at distinguishing morbidity from mortality for growth

- Next step: Focus on that contribution:
  - Exactly what does it get us?
  - Exactly what doesn’t it get us?
  - Show us it works when we know it should and not otherwise
  - Then apply it elsewhere in your next papers!