GLOBAL CATASTROPHES: BEFORE, DURING, AND AFTER COVID

RIETI WEBINAR

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INTRODUCTION

- In an article for RIETI last year, I said we face numerous global catastrophic risks, one of which was "a major pandemic as bad as or even worse than 1918-19 Spanish Flu." Now COVID.
- Should we be so surprised? In 2017, the CDC wrote: "The threat of a 'mega-virus' that could cause widespread fatalities is considerable. While we can't predict exactly when or where the next pandemic will begin, we know one is coming. The reasons: Increased risk of infectious pathogens spilling over from animals to humans; development of antimicrobial resistance; spread of infectious diseases through global travel and trade; acts of bioterrorism; and weak public health infrastructures."
- What have we learned, and what should we do?
- We still face potential global catastrophes: new pandemics, nuclear or bioterrorism, a climate catastrophe, or a global financial collapse.
- Most people prefer not to think about these risks, and we are woefully unprepared to deal with them. We must get prepared.
- What fraction of GDP should be devoted to reducing our vulnerability to these risks? Answer depends in part on how we value the loss of human life, another problem most people prefer not to think about.

BACKGROUND: EVALUATING POLICIES

- Standard Framework: Cost-Benefit Analysis.
  - What is the benefit of averting (or reducing likelihood of) a potential catastrophe?
  - "Willingness to Pay" (WTP): Society's reservation price.
  - Might be based on sum of averted future losses of GDP, discounted. (Monetize and include indirect losses.) Express WTP as *annual percentage of GDP society is willing to sacrifice*.
  - What is the cost of the policy? Express as *required annual percentage tax* on consumption (or GDP).
  - Adopt policy if benefit > cost. OK for "marginal" projects.
- Problem: Social benefits and costs are not "marginal," so conventional cost-benefit analysis fails.
  - "Project" reduces GDP, raises marginal utility of consumption.
  - May not be optimal to avert catastrophe even if benefit > cost.
  - Which ones to avert? Solution: "Averting Catastrophes: The Strange Economics of Scylla and Charybdis," *American Econ. Rev.*, Oct. 2015, and my web page.

BEFORE COVID: SEVEN POTENTIAL CATASTROPHES

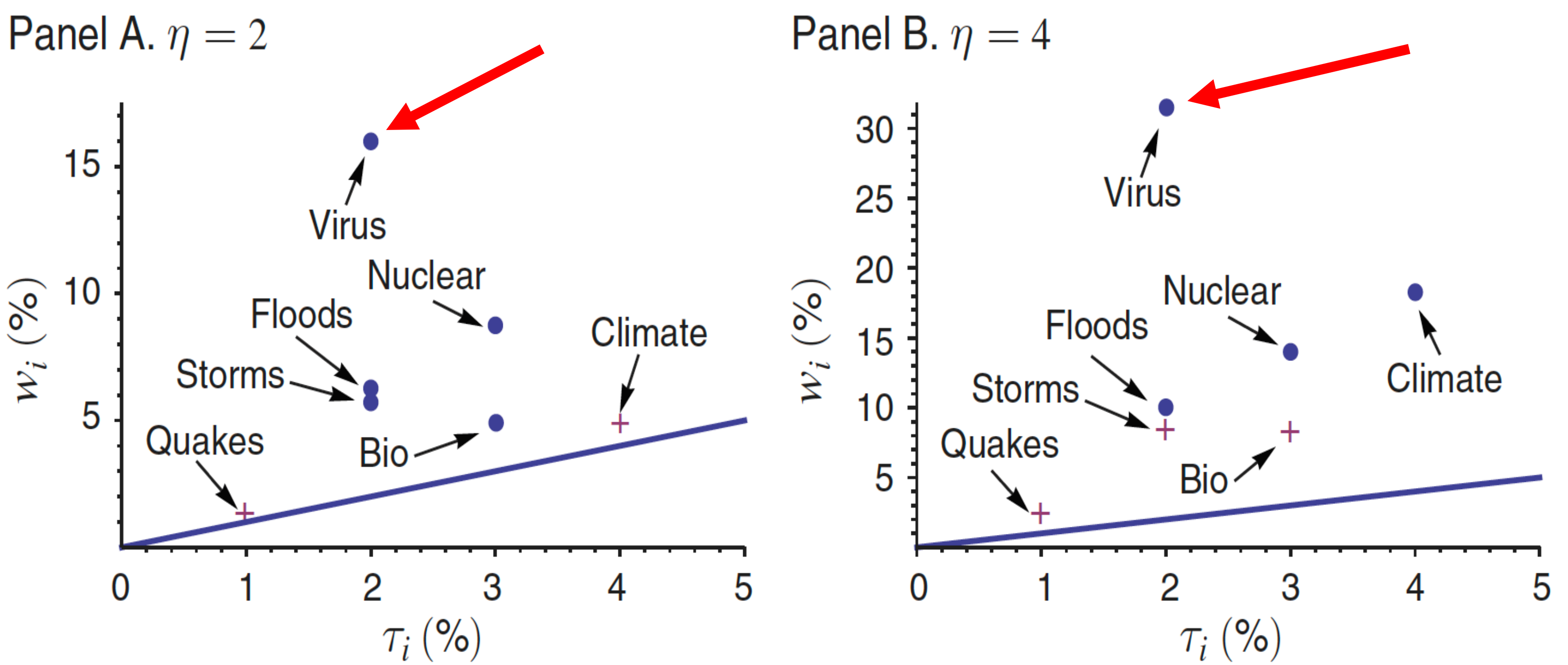


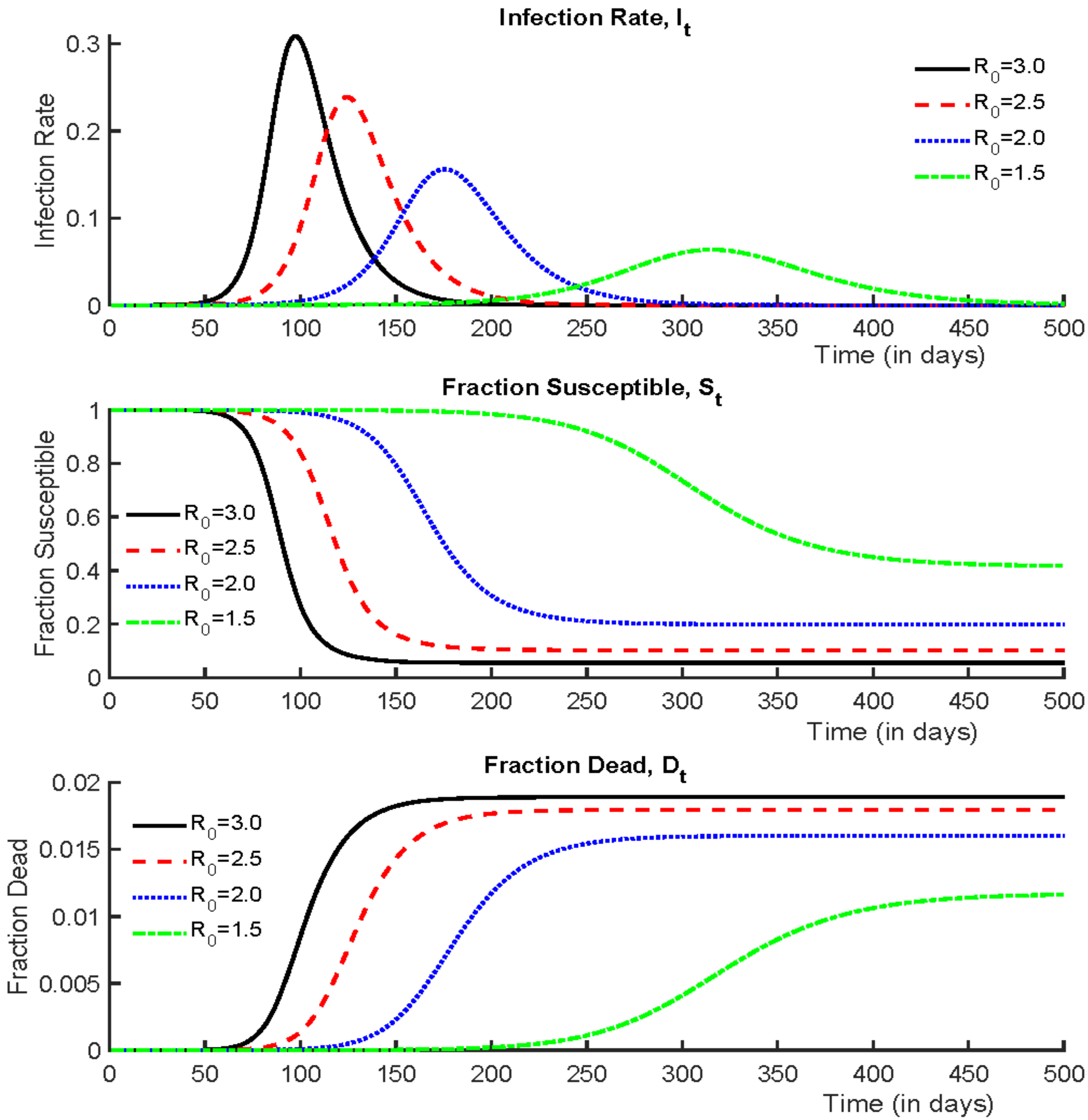
FIGURE 6

Notes: The figures show which of the seven catastrophes summarized in Table 1 should be averted. Catastrophes that should be averted are indicated by dots in each panel; catastrophes that should *not* be averted are indicated by crosses.

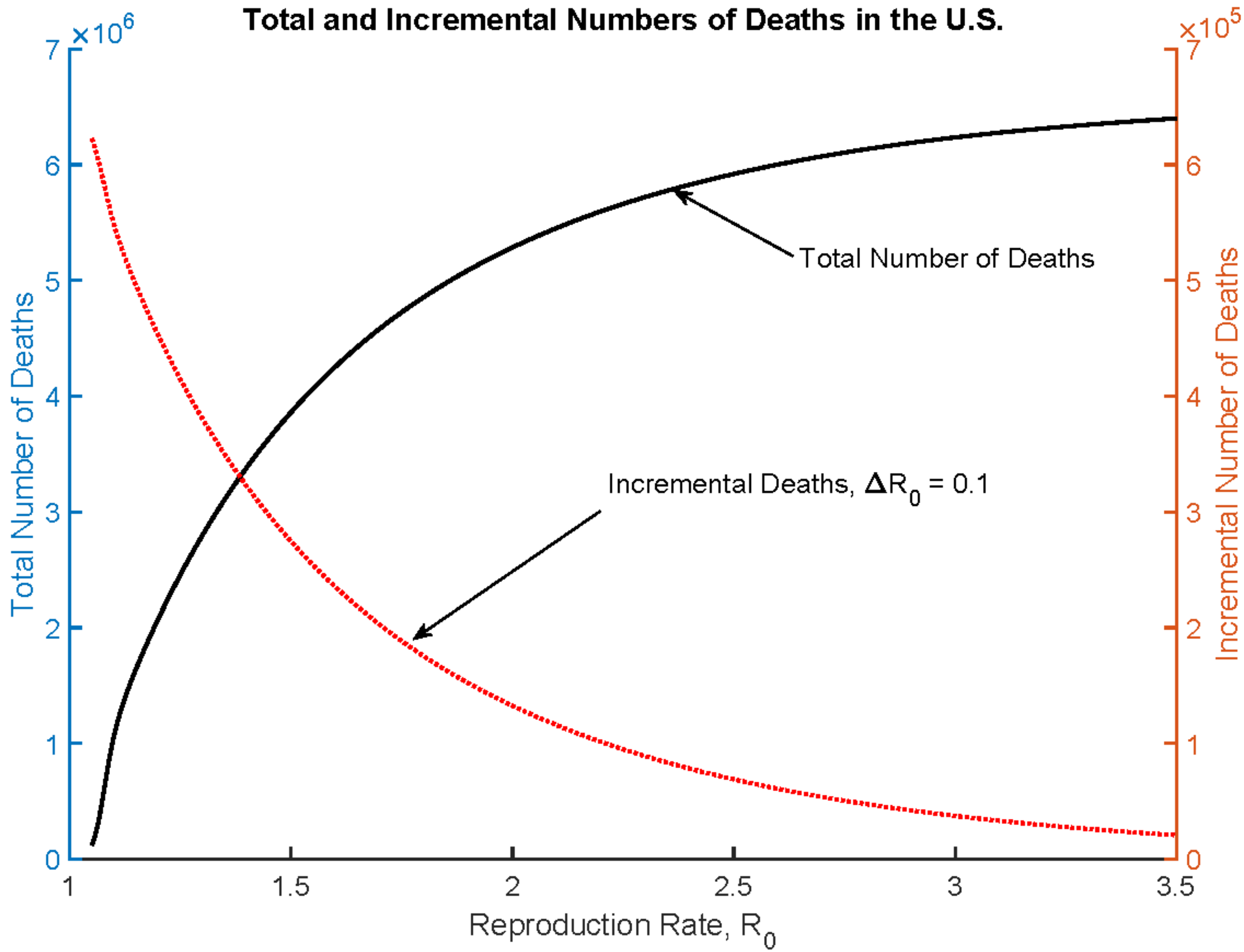
DURING COVID

- In the short-run (next 12 months, no vaccine):
  - Lock-downs, social distancing, school closures, … . But how strict and for how long? We face a cost-benefit problem.
    - The cost: The economy, education. Summarize as lost GDP.
    - The benefit: Lives saved.
    - The problem: How to put a value on lives saved?
  - Recent studies show B >> C for most countries.
  - But those studies use estimates of VSL – Value of a Statistical Life – to set value of each life saved at about $10 million. Is this number right? Problems with VSL.
  - Another problem: Strict social distancing reduces infection rate but lengthens the horizon. "COVID-19 and the Welfare Effects of Reducing Contagion," NBER Working Paper No. 27121, May 2020.

CONTROL OF CONTAGION



INCREASING RETURNS TO REDUCING R_0



VALUE OF LIFE

- Widely used in economics: Value of a Statistical Life (VSL).
  - Basic idea: Suppose your probability of dying this year is .020. Would you take a risky job that will pay 50% more than you now earn, but raise chance of death to .025. Depends on how you value a .020 versus .025 chance of death.
  - Using data on millions of decisions of this kind, estimate VSL. Current estimates around $10 million. But there are problems:
  - VSL based on small increase in chance of death, not big increase.
  - VSL increasing in wealth. Is higher value on lives of the rich OK?
  - VSL doesn't aggregate. For U.S., $10 million X 330 million = $3,300 trillion, about 150 times U.S. GDP.
- More generally, how should society value increases and decreases in population. We don't know.
- "Welfare Costs of Catastrophes: Lost Consumption and Lost Lives," (with Ian Martin), *The Economic Journal*, in press.

WTP (PERCENT OF CONSUMPTION) TO AVOID PANDEMIC AND/OR ECONOMIC DEPRESSION

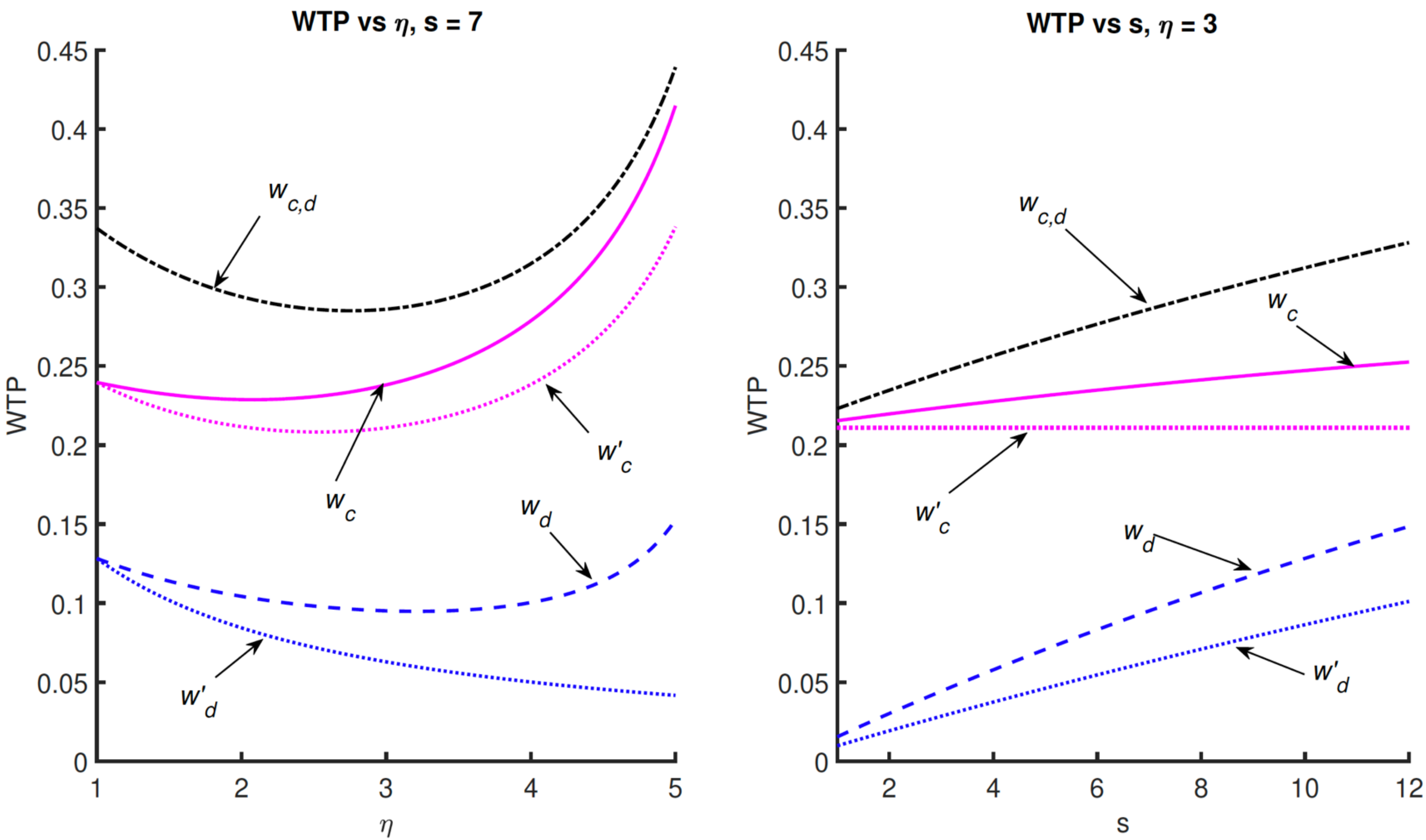


Figure 2: WTP vs η and s, $(\lambda_c, \beta_c) = (.08, 7.3)$ and $(\lambda_d, \beta_d) = (.02, 24)$.

VALUING CHANGES IN POPULATION

- Society values changes asymmetrically.
- Increases in population might be good or bad:
  - Good: Key determinant of technological change (and thus growth); essential to "young-old transfers," welfare of 10 people greater than welfare of 1; … .
  - Bad: Crowding and congestion; environmental and resource burden; fragility of social welfare systems; … .
  - Good or bad on net? No consensus.
- Decreases in population: Bad, based on social policy.
  - We try to save lives, including very old and very young.
  - We try to prevent loss of life, from traffic accidents to disasters large and small.
- So how to value increases or decreases in population? Open problem in economics.

AFTER COVID

- Suppose we have a vaccine, and can distribute it widely.
  - How long will the immunity last?
  - How effective (flu vaccine only provides 50% immunity)?
  - We may have multiple strains of COVID?
- Virus evolution (mutations):
  - Viruses with large complex genomes (many genes) tend to be less deadly. They often evolve to less complex genomes.
  - Smallpox: 1200 years ago (Vikings), large genome, 1% death rate. Evolved to much smaller genome, 30% death rate.
  - COVID: We don't know how it might evolve.
- What to do? We are back to the pre-COVID problem:
  - Must spend much more preparing for next pandemic.
  - Must face the fact that we face other potential catastrophes, and spend much more to avert them.

SUMMARY

- Before COVID: Should we have been so surprised? No.
  - CDC, WHO, and many others told us a major pandemic was just a matter of time. And other catastrophic threats (nuclear terrorism, climate, …) were clear.
  - But governments are unwilling to do much to prepare. Sad.
- During COVID: Lock-downs, school closures, etc. But how strict and for how long? We face a cost-benefit problem.
  - Benefit is lives saved. How to value those lives? Use VSL?
  - Strict social distancing reduces infection rate but lengthens horizon.
- After COVID: Hopefully we will have a vaccine.
  - How will it last? How effective? Multiple strains of COVID?
  - Virus mutates. We don’t know how COVID might evolve.
- What to do? We are back to the pre-COVID problem:
  - Must spend much more preparing for next pandemic.
  - Must face the fact that we face multiple potential catastrophes, and spend more to avert them.