Ethical issues in Covid policy

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August 13, 2020

Outline

Two approaches

- Cost-benefit analysis with value of statistical life
- Social welfare analysis based on distribution of individual well-being

Welfare evaluation: first approach

- Cost-benefit analysis:
  - $VSL \times$ Total Deaths Avoided $-$ Income Loss
  - $VSLY \times$Total Life-Years Saved $-$ Income Loss
  - $VSLY \times$ Total QALYs Saved $-$ Income Loss
- Orders of magnitude:
  - $VSL = 150$ income/capita, $VSLY = 3$ income/capita
  - Total Deaths: 1% of population without policy, 0.1% with policy: 0.9% gain
  - Life-years lost per death: 10 years
  - $VSL \times$Total Deaths Avoided $= 135\%$ income
  - $VSLY \times$Total Life-Years Saved $= 27\%$ income

Welfare evaluation: second approach

- Individual well-being ("utility") $U = \left(\frac{YL}{85}\right)\left(\frac{L}{85}\right)^{\alpha}$ where Y is yearly income, L is longevity, and 85 is a reference longevity
- The product YL is the total lifetime income of someone who earns Y every year for L years
- $U =$ "equivalent income", i.e., amount of yearly income Y^* that would make the individual indifferent between his current life and a hypothetical life in which he would earn Y^* for 85 years:
$$\left(\frac{YL}{85}\right)\left(\frac{L}{85}\right)^{\alpha} = \left(\frac{Y^*85}{85}\right)\left(\frac{85}{85}\right)^{\alpha} = Y^*.$$
- This is just a (convex) transform of the more usual $LY^{\frac{1}{1+\alpha}}$
- To obtain WTP for L in terms of YL equal to VSLY, calibrate $\alpha = VSLY/Y = 3$

Welfare evaluation: SWF cont'd

- Social welfare is the "equally-distributed equivalent" (EDE):

$$SW = \left(\frac{1}{5} \sum_i U_i^{1-\eta} \right)^{\frac{1}{1-\eta}}$$

- Thanks to homogeneity, evaluations do not depend on reference longevity (85)
- Final individual well-being:
  - survivors: $\left(\frac{YL-Y\Lambda}{85}\right)\left(\frac{L}{85}\right)^{\alpha}$ where Λ is economic loss in proportion of annual income
  - dead: $\left(\frac{YL-Y\Lambda}{85}\right)\left(\frac{L-LE}{85}\right)^{\alpha}$ where LE is years lost (10)
  - variant: survivors $\left(\frac{Y^{+}L-Y^{+}\Lambda}{85}\right)\left(\frac{L}{85}\right)^{\alpha}$, dead: $\left(\frac{YL}{85}\right)\left(\frac{L^{+}-LE}{85}\right)^{\alpha}$ (most survivors are young who benefit from economic growth; most victims are pensioners and do not live to bear the full economic costs)

Which approach is better?

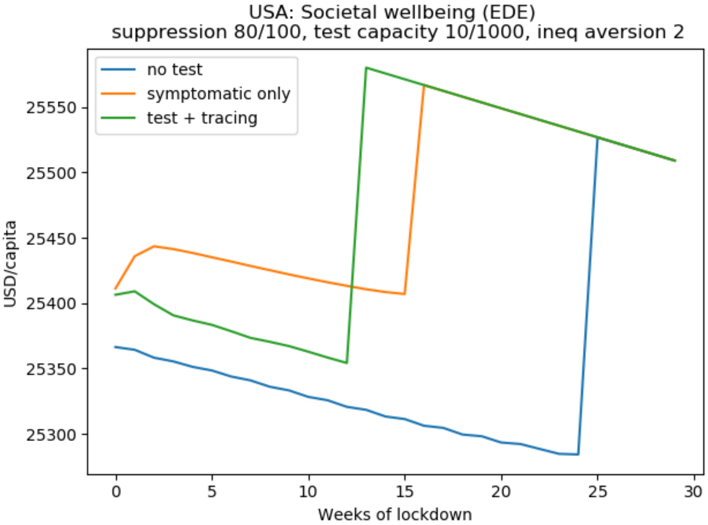
- Cost-benefit analysis ignores the distribution and makes a linear approximation (from marginal risk reduction to WTP for a year, or even a life)
- SWF approach alleviates these two problems, but requires more data (inequalities in initial incomes and longevity, in economic cost and in fatalities)
- The equivalent income utility scale, combined with $\eta = 0$ (i.e., no inequality aversion), addresses only the non-linearity issue: interesting for comparison with cost-benefit analysis (scoop: makes no difference)

Three policy questions

1. Suppression vs. control
2. How long the initial lockdown?
3. When to start the policy (eradication or control)?

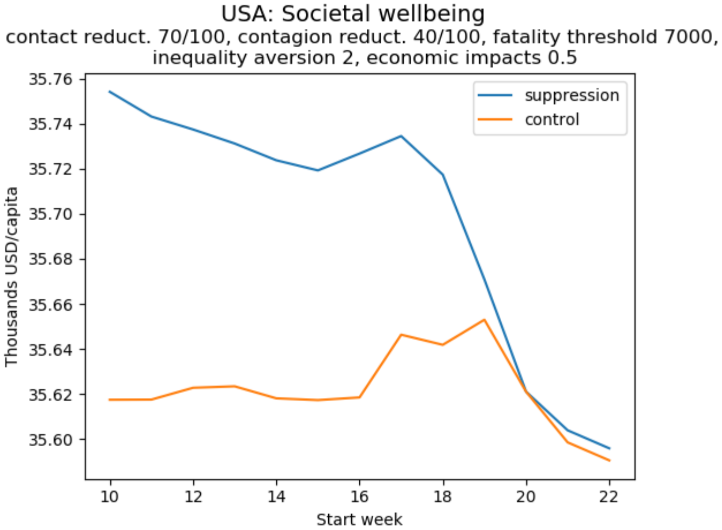
How long should the first lockdown be?

Assumption: no treatment, no vaccine, no repeated lockdown afterward



When to start the policy?

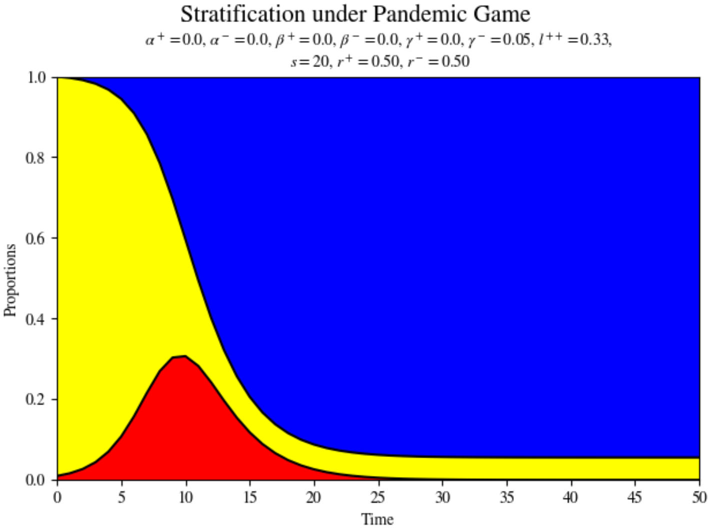
Economic cost: 0.5 elasticity with respect to income



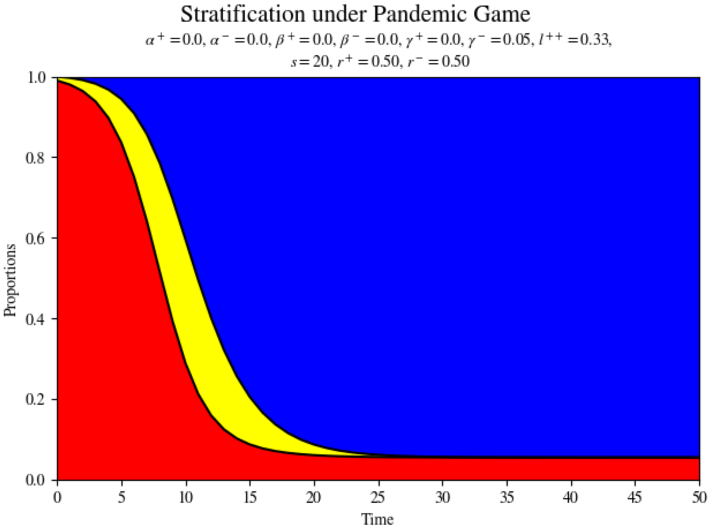
Conclusion: lessons?

- Simple SWF analysis is possible. Too simple? Other groups, other inequalities (e.g., social distancing unequally possible)
- Pandemic dynamics is interesting: contact changes people - “that’s the story of life”
  - social externalities: human beings are ultrasocial, dependent on others
  - implies vulnerability and resilience, multiple equilibria and multiplier effects
- Policy challenge: the jackpot is very painful to attain - but the blessed who reach it are better off in ALL respects, much fewer deaths and less economic cost

Contamination as a fall into sickness



Contamination as antibody learning



Thank you!

- Excel sheet on https://sites.google.com/site/marcfleurbaey/Home/covid
- Python version available upon request marc.fleurbaey@gmail.com
- With thanks to Richard Bradley, Mikaël Cozic, Koen Decancq, Sékou Doumbouya, Hélène Fleurbaey, Stéphane Zuber