Problem set 2

1. Randomized control trials

A. Basic income experiment

The Finnish government conducted a two-year field experiment to study how the introduction of a universal basic income affects labor supply. Under the scheme, which began on 1 January 2017, 2,000 unemployed Finns aged 25 to 58 received a guaranteed sum of €560 (£475). This income replaced their existing social benefits and was paid even if they found work.

i. Discuss the potential existence of a Hawthorne effect.

People may behave differently when they feel observed. We may care about others' perceptions and about our own self-image. It is not likely, but some people may try to influence the outcome of the experiment due to their own views about the policy

ii. Discuss the potential existence of general equilibrium effects.

– *Labour market effects: variation in the overall labor supply might affect equilibrium salaries; variation in the demand in the product market may affect labor demand*
– *Complementarities in leisure*
    • *e.g. Goux, Maurin and Petrongolo 2014: 35 hours reform - for each hour decrease in affected individuals' labor supply their spouses work 15 minutes less*
– *Social norms*
– *Tax/budgets*

iii. Design an RCT that would allow dealing with the existence of general equilibrium effects.

• *Two-stage design à la Crépon et al. 2013*
    1. *Select a large number of local labor markets, and randomly assign the share of people that will be treated in each one (eg. 0, 25%, 50%, 75%, 100%)*
    2. *Within each area, assign randomly individuals to the treatment and control groups*
    3. *Then, compare the outcome variable of interest (e.g. labor supply) across local markets with different shares of treated individuals and also within each local market, between the treatment and control group.*

iv. The RCT was implemented for only two years. Taking into account this feature, discuss whether the findings of the field experiment might be useful to predict the effect of introducing permanently a `basic income' in Finland.

Note: RCTs cannot be theory-less!
Friedman's Permanent income hypothesis: Differential impact of permanent vs. transitory income shocks. The impact of the policy might be very different if individuals expect to receive the basic income only for two years vs. the case whether they expect the policy to be permanent

B. COVID-19 Vaccines clinical trials

A number of clinical trials have been conducted to assess the efficacy of COVID-19 vaccines. In the standard clinical trial, individuals are randomly assigned to a treatment or a control group and to avoid a placebo effect, participants do not know if they are receiving the actual drug versus a placebo. Please discuss the potential limitations of clinical trials in terms of providing information about the impact of actual vaccination roll-outs, taking into account:

i. the potential existence of peer effects and general equilibrium effects.

In the context of a roll-out, when most of the population is vaccinated, there will be important positive externalities. The largest the number of individuals vaccinated the lowest the probability that non-vaccinated individuals get infected.
There are might be additional effects triggered by mass vaccination. For instance, roll-outs are likely to be relaxed, affecting the probability of transmission.

ii. the potential changes in behavior once individuals are aware that they are being provided an effective vaccine

In clinical trials participants ignore if they are receiving the vaccine or a placebo, or whether the vaccine is effective.

Instead, in an actual vaccination roll-out individuals know that they are being vaccinated with a vaccine that is presumably effective. As a result, they might decide to be less cautious and increase socialization. These changes in behavior in the "treatment" group may lead to higher infection rates compared to clinical trials

2. Heterogeneity of the treatment effect

We have discussed the difference between the "population average treatment effect", the "average treatment effect on the treated" and the "local average treatment effect". Please, explain which one of these concepts we identify when our empirical strategy is (i) a randomized control trial, (ii) instrumental variables, (iii) differences-in-differences, and (iv) a regression discontinuity design.

      (i)   population average treatment effect (which in this case happens to be similar to the average treatment effect on the treated)
      (ii)   local average treatment effect (for compliers)
      (iii)   average treatment effect on the treated

(iv)   local average treatment effect (for individuals around the threshold)

3. IV

Workers working from home and businesses limiting the number of staff on site are among the most important tools that have been used to slow the spread of the SARS-CoV-2 virus. This has taken the form both of individual actions, as workers choose to stay away from the workplace and businesses reduce on-site operations; and government mandates to close down particular types of business or lockdowns or shelter-in-place orders. A recent working paper titled "Effects of Reduced Workplace Presence on COVID-19 Deaths: An Instrumental-Variables Approach" studies how effective staying away from work has been in reducing COVID-19 mortality in the US.[1]

The paper first shows that, over the period under study, COVID-19 deaths are higher in US counties with a higher aggregate absence from work. Second, to deal with the potential endogeneity of workplace presence, they use an instrumental variables (IV) strategy based on an index of ability to work from home for each occupation. In particular, the index used as an instrument measures whether workers in a given county are in occupations that enable them to work from home. The IV estimate is negative, and indicates that moving 10 percent of a county's workers from the workplace would lower deaths by three quarters one month later.

a. Discuss possible explanations for why the OLS estimate differs from the IV estimate in this particular context.

There are least 3 possible explanations. The first possibility is that the OLS estimate is positively biased due to an omitted variable bias. In areas where the situation is worse, individuals are more likely to stay away from the workplace. Second, the IV and the OLS estimate the impact of the treatment on different populations. While the IV estimates the LATE on compliers, the OLS estimates the average treatment effect. Third, if the identification assumptions of the IV are not satisfied (e.g. exclusion restriction and exogeneity), the IV estimate may itself be biased.

b. In the IV strategy, would you expect the exogeneity assumption to be satisfied? How would you test this assumption?

A threat to the validity of the exogeneity assumption is the possibility that counties with a certain occupation structure also differ in other (unobserved) dimensions that affects the incidence of the pandemic. For instance, the quality of the health system may differ. A possible check would be to test whether the instrument is correlated with relevant observable dimensions.

c. Propose some possible violation of the exclusion restriction.

[1] McLaren, John, and Su Wang. *Effects of Reduced Workplace Presence on COVID-19 Deaths: An Instrumental-Variables Approach*. No. w28275. National Bureau of Economic Research, 2020.

A potential problem would be if the instrument affects the outcome variable through other channels. For instance, it may be possible that the possibility of contagion at the workplace varies for different occupations. Even if nobody worked from home (no impact of the instrument on the treatment) we would still find an impact on the outcome variable.

d. Discuss verbally who are the always-takers, the never-takers, the compliers and defiers.

Always-takers are counties where people work from home, independently of their occupation structure; never-takers are counties where nobody works from home, independently of their occupation structure; compliers are counties where people would only work from home under the appropriate occupation structure; and defiers are counties where people would only work from home if they had occupations which do not favor working from home.