

## Problem set 2

Please send your answers to manuel.bagues@gmail.com by Sept. 10 at midnight, indicating the name of the (up to) three group members.

### 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.
- ii. Discuss the potential existence of general equilibrium effects.
- iii. Design an RCT that would allow dealing with the existence of general equilibrium effects.
- 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.

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

### 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.

### 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.<sup>1</sup>

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 (which yields a positive estimate) differs from the IV estimate in this particular context.
- b. In the IV strategy, would you expect the exogeneity assumption to be satisfied? How would you test this assumption?
- c. Propose some possible violation of the exclusion restriction.
- d. Discuss verbally who are the always-takers, the never-takers, the compliers and defiers.

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<sup>1</sup> 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.