# Working Papers

Based on the feedback to your research design, after data collection has been completed, students move on to writing a working paper. While we can provide feedback on framing and analysis in the working paper stage, additional data collection is typically difficult. Therefore, some of the most important feedback from the group comes during the problem statement and research design stage. Students can, and are encouraged, to present iterative versions of research designs before conducting fieldwork or analysis.

Once students are ready to present a working paper, it must focus on work that has a reasonable hope of credibly claiming an estimate is causal. Thus, *before presenting a working paper you must send it to the faculty leaders to have it cleared.* We will discuss the timeline for this procedure in the group.

In order to provide a sense of the goals of a paper coming out of this workshop we describe what would and would not be an acceptable project for the workshop. We provide some guidelines below.

## 1 Acceptable Work

Speaking generally, working papers must propose a particular identification strategy, describe its assumptions carefully, and take every step possible to examine the credibility of those assumptions. In other words, this means rigorously adressing possible alternative explanations for your findings and give the reader a defensible reason to believe they are less likely than the causal interpretation you offer.

This is not about presenting only *perfectly identified* work – all papers have weaknesses. But it is about doing the best we can to answer interesting questions, and where possible focusing on the types of questions that can lead to more credible estimates.

What does this mean in practice? Here we describe the classes of projects that would generally be acceptable. Though we try to make the descriptions accessible, if you have not yet gone through a course like PS 200D, there may be some ideas in here that are new to you.

- *Experiments*. If you present an actual experiment, you are probably in good shape. Threats to inference will remain and some analyses you'd like to do besides simple treatment effect estimation may not be advisable. But typically an experiment will produce something well enough identified to present.
- *Natural Experiments and Quasi-Experiments*. You did not randomize a treatment yourself but have a compelling explanataion for why it was "as-if random", at least for some interesting sub-population. The burden is on you to explain why you think who got the treatment was as-if random, and to address possible alternative arguments. You must also show placebo tests, balance tests, and other supporting results.
- *Believable Instrumental Variables*. We won't explain instrumental variables here, but if you know are familiar with estimating treatment effects with instrumental variables, you'll know they require some stringent assumptions, such as the infamous "excusion restriction". Though there is a long history of instrumental variables being abused in studies where these assumptions are absurd, our standards will be higher. You must know the assumptions required and explain/show why you think they hold.
- *Regression Discontinuities*. Your treatment is not random, but you know a rule for who gets treated (probabilistically as least), and the determinant(s) on which it depends. If there is a sharp discontinuity in the probability of treatment as you move across this determinant, you may be able to estimate a causal effect at that discontinuity. Again, you should know and understand the key assupmtions. A number of placebo tests and tests of "sorting around the threshold" should be included to test the assumptions. Note that "event analysis" or "interupted time-series" are related and may also be acceptable.
- *Convincing Selection on Observables*. Your treatment is not randomized but you believe you know and can observe all the things on which it depends, such that conditional on those things, you recover an experiment. This is effectively

convincing us that you can find natural experiments in your data. This all comes down to a key assumption sometimes called conditional ignorability. Crudely, among units with the same value of the covariates, you assume the treatment is assigned randomly. This category is dangerous: many papers abuse it. Often these papers call upon matching or regression for estimation. To be acceptable in our workshop, you must have a convincing explanation as to why the covariates you condition on are enough. In other words, you must be able to tell us why the effect you estimate is not due to unobserved confounders. To this end, you should provide a variety of placebo tests, balance tests, and sensitivity analyses.

- *Difference in Difference, Synthetic Control, Convincing Panels*. In some cases, the availability of data at multiple time points provides opportunities for identificiation. We won't describe these approaches in detail here. Like the others, though, none of these methods are "plug-and-play". Credibliity comes from the assumptions they depend on being reasonable. Thus, using any of these requires that you carefully state the assumption and assess their crediblity.
- *Other*. You may have another solid identification strategy not on the list above. That is fine, but the burden is on you to explain the approach, the require assumptions, and why you think they are credible. For example, you may provide all (or as comprehensive of a list as possible) possible alternative mechanisms for your treatment, which you rule out with well designed statistical analyses.

If you are unfamiliar with the ideas and concepts referenced above, you will learn more about them in the methods sequence. However we also encourage you to meet with the faculty leaders to discuss anything that is unclear to you.

## 2 Essential Elements

For clarity and accountability in presentation, all working papers should include certain elements:

- A clear description of your identification strategy, and the assumptions it require in order to interpret your result as causal.
  - For a more detailed template, see the research design outline.
- A sober discussion of threats to your estimate, and alternative explanations.
- A section in which you perform additional tests and analyses in service of testing the assumptions we must believe. What these tests are depends on your circumstance, but generally they include tools like balance tests, placebo tests, and sensitivity analyses.

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