Introductory to empirics

Bernt Arne Ødegaard

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1 Introduction

It is natural when starting a sequence of lectures to think a bit deeply about where we are going, but I will delay the deep thoughts till later on. This is a course on empirical methods in finance. Most of it will be teaching building blocks for people who wants to implement empirical analysis, without too much reflection on placing it in context. The fact of the matter is that some methods and questions occur very often in empirical analysis in finance. This course will cover these standard methods in some detail. The course reflects (IMHO) that to understand the deeper issues behind empirics in finance it is necessary to actually first *do* the analysis yourself, at least in a simplified setting. That is what we will spend most of our time on, implementation examples, using realistic data, and also data which is familiar in the Norwegian context.

We will therefore return to a more reflective thinking about what we have done in the course at the end.

But it may be useful to take a broad set of issues, the typical deep thinking about research, and use it to place the course in context.

Angrist and Pischke (2008), in their introduction to econometric analysis, introduce what they call the four "FAQ of (econometric) research,":

1. What is the causal relationship of interest?
2. What is the experiment that could ideally be used to capture the causal effect of interest?
3. What is your identification strategy?
4. What is your mode of statistical inference?

These are the questions any researcher will have to deal with when taking on a research issue.

In this course we will spend time mainly on methods that have been used in the past to answer these questions. For example, the *event study* is a method very typical of finance research. Why?

Well, in finance we are concerned with the *firm* as a unit of study. We ask how a firm's decisions affect it. We need to choose what effect to look at, and typically we look at what theory tells us the firm *should* care about, its *value*. The experiment we *want* to run is to actually do the change in the firm, and then see what effect that has on value. The event study is an attempt to approximate such a controlled experiment. Since most researchers do not have access to firm's decision, we instead look at cases where a firm *has* made the decision we want to look at. What was the effect on firm value of this decision? Since we don't necessarily observe firm value we approximate it with something we do observe, namely the firm's *equity* value. What is the change in firm value as a result of the firm's decision? This is approximated using the change in the stock price at the time of the firm's decision.

So the event study can be thought of as an result of starting with the four FAQ's, and settling on the *feasible* approximation of the ideal experiment. That is the deep thought part of it. The part that is conceptually simpler, but in practice often hard, is the econometric implementation, or "mode of statistical inference." This is where we need the technical understanding of econometric methods to make informed choices of methods. It is that this course is trying to help students with, getting the technical (and computational) skill to implement their experimental designs.

Will for now stick to the simpler introduction, of econometris as the use of economic data to investigate an econonomic issue.

The purpose of any use of data is to move the beliefs of the investigator. Data can never prove anything, econometicians acts as bayesians, and use data to improve on the precision of estimates, from possibly no beliefs to a point estimate and an estimate of the uncertainty in that point estimate.

The distinction theory/sample

Econometrics can be thought of as a set of methods used to make probability statements in a formal way, where the probability statement is based on a formal model of reality.

Consider some statemtents

60% of people prefer beer to wine

We are making a number of implicit assumptions.

- There is some underlying preference in the population
- We, by sampling, can estimate this preference

The average world inflation this year has been 3%, down from 10% 10 years ago

Again, an implicit assumption:

- The existence of a "world inflation"

The measurement issue: How can this be estimated.

Typically

- Estimate inflation country for country
  - How to do this: price indices, consumption basket
- Aggregate in some way across countries
  - By GDP
  - Each country equal weight (LLN)

For the last six months bonds have yielded 5% while stocks have had a 10% return

- What bonds?
- What stocks?
- What return?
- What yield?

References

Joshua D Angrist and Jörn-Steffen Pischke. *Mostly Harmless Econometrics.* Princeton University Press, 2008.