Economics 97: Economic Toolkit

Introduction

This course intends to cover the basic tools of economic analysis, expression, and inference. Though many of the concepts should be of a certain familiarity, our aim is to recast them in terms of economic thought. Moreover, communicating mathematical concepts in an economically-relevant and -informative manner is a challenge that all economists must at some point overcome; the converse, bringing economically-intuitive arguments to a mathematical space for analysis is an equal challenge.

No ex ante knowledge of economics is required; we will be introducing simple takes on standard economic tenets as we go. This course is not a nitty-gritty “how do I solve X?” session, but a collection of general tools which can be applied to nearly any economic situation or model. We will apply these skills to a variety of simple economic scenarios, which — with luck! — will yield insight into both how we think the economy works, and how we could more accurately describe how the economy works.

Lastly, this course will give you the ability to communicate economics in the standard way. Economists draw language from a broad pool of existing economic intuitions, among which you must become conversant to use and understand economics proper. This is not to say that economists fear novelty! Rather, new concepts, models, and methods should be compared and contrasted with existing concepts, models, and methods in a manner which is standard to all in the field. Think of it this way: the number “3” represents some philosophical quantity, upon which we all agree; no one thinks that “3” is a tree, or a Diet Coke, or a lepton. The common agreement on this concept allows us to communicate without having to redefine “3” each time we use it; economic language is no different, although it is certainly more obscure. As budding economists, it is important to gain facility with this language and these standards, so as to better communicate and understand our body of thought.

We will cover:

- Plotting/graphing things informatively
- Geometric inference and communication
- The relevance and application of calculus
- Solving systems of equations
- Using Excel to make simple inferences
- Not using Excel to make bad inferences
- The importance of modeling
- Applying the language of economics to remove extraneous features

See the syllabus for more information.

Evaluation

This course is offered pass/fail, and letter grades will not be available. To pass, you are expected to complete each of three weekly assignments to a degree of accuracy and lucidity. You are welcome to work in groups of up to three total members.

1Although, perhaps, we do.
Without letter grades, of course, your incentives to “go the extra mile” are skewed, but it is our intention to keep the class engaging and useful enough to encourage your extra effort even in the absence of this external validation.

Syllabus

Course content is organized by Week [1-4], and Monday or Wednesday class.

**W1M “Salience and Standards”**
What makes a feature notable, particularly in a mathematical function? How do conventions shape this notability, and how are they shaped by it? When describing data or a model, what should we make as accurate as possible and what can we leave rough-hewn?

**W1W “Margins and Exploitability”**
Standard calculus gives tools for understanding how a function changes at an infinitesimal level; how do these topics map into common economic notions? What makes these notions relevant? What are the essentialities assumed away? Does anything change if we use partial versus total differentiation?

*Assignment due W2W*

**W2M “Being Realistic: Constrained Optimization”**
Among the standard set of economic assumptions is the platitude that *more is better*. If this is the case, why don’t people buy fifty Bentleys? What mathematical tools do we have for dealing with this situation? How can we mathematically represent the will of individuals, or of society?

**W2W “The Geometry of Economic Balance”**
Neoclassical economists rely heavily upon charts and graphs to express their insights; how do they structure their results in this fashion, and what are the notable features of such expression? In an indelidealized market, how can graphs help us describe the effects of government intervention and/or regulation?

*Assignment due W3W*

**W3M “Excel: Inference’s Workhorse”**
Although there are a number of high-quality tools for statistical analysis, the accepted tool for everyday analysis is none other than Microsoft Excel. How can we make Excel work for us? What features and methods does it make available that make it so useful for simple analyses?

*Note: this session will be much more informative if you bring a computer with Excel. If you do not have one, one may be borrowed through CLiCC.*

**W3W “Managing Messy Data”**
Real-world data analysis is not as simple as $P = 10 - Q$. How can Excel be used to clean information for analysis? What are the possible pitfalls of cleaning data? When can we work with summaries and when are details necessary?

*Note: this session will take place in the SSC Computer Lab in 2041 Public Affairs.*

*Assignment due W4W*

**W4M “Interaction, Communication, and Manipulation”**
Used properly, Excel is an effective tool for conveying ideas. How can we use ideas of salience to find straightforward representations of our conclusions? How can interaction make our results more forceful? Does enabling interaction and manipulation in this way make us more confident in our own inferences?
Note: this session will take place in the SSC Computer Lab in 2041 Public Affairs.

**W4W** “To a First Approximation: The Relationship between Modeling and Back-of-the-Envelope-ing”

By some accounts, the economy is a deterministic beast: if we knew all of the features, we could correctly compute all the implications and therefore make optimal policy choices. Even making this assumption, the antecedent is practically invalid: plugging the entire economy into a model of the economy is a computational nightmare! Part of the art of economics is knowing what to ignore; how can we make this decision? Is it absolute or contextual? What are the implications for “professional” economics?