Mathematical Modeling of Social Phenomena

What is a good model?

Overview of this lecture

- Mäki on isolation

- Sugden on a good model

- Cowen on a good model

- You guys, what is a good model?

Uskali Mäki - Introduction

"Here and there in the paper I do not distinguish between the object and our linguistic representation of it, in order not to make the exposition too tedious. Thus, it is usually the case that when I talk about 'the deformation of reality' or the like, I intend it to encompass 'the deformation of our image of reality' or the like."

- Uskali Mäki (Footnote 1)

Sugden: Style

"My starting point is that model-building in economics has serious intent only if it is ultimately directed towards telling us something about the real world. In using the expression 'the real world' – as I shall throughout the paper – I immediately reveal myself as an economic theorist"

- Sugden

Cowen: Style

"Economics, if practiced properly, can for the most part overcome the pitfalls of inhumanity, verbosity, and undue obfuscation. Here are three principles for distinguishing good economics from bad."

No excuses.

What is a good model?

What is the best counter-question to that?

What is your purpose?

- Truth providing
  - Demarcation, not religion, art or ethics
- Engineering
  - Instrumentalism
  - Realism - "Too look under the hood"
- Politics
  - Rhetorics
  - Professional - i.e. how to get ahead

Sugden on Akerlof's Lemon-paper

"It is a theoretical paper that almost all economists, however untheoretical they might be, would now recognize as important. It is also a paper that just about every economic theorist would love to have written."

The market for lemons

$Q_i \leq P \leq 3/2\ Q_i$

U = 3/2 Q

U = Q
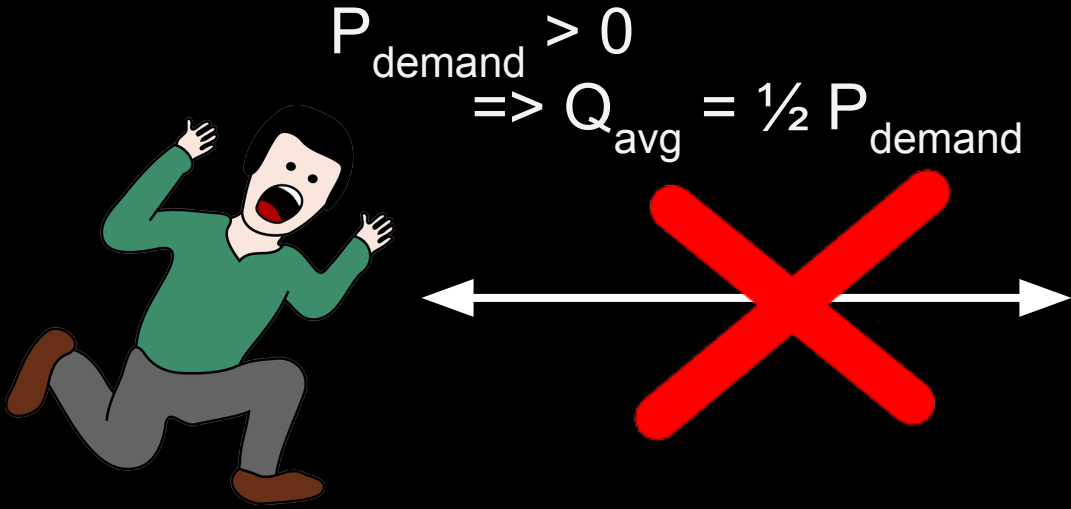
[0

Q_i

1]

The market for lemons

$P_{demand} > 0$

$\Rightarrow Q_{avg} = \frac{1}{2} P_{demand}$

$U = 3/2 \ Q$

$P_{reservation} = 3/2 \ \ \ \ = \frac{3}{4} P_{demand}$

Q_{avg}

$U = Q$

[0]

Q_i

[1]
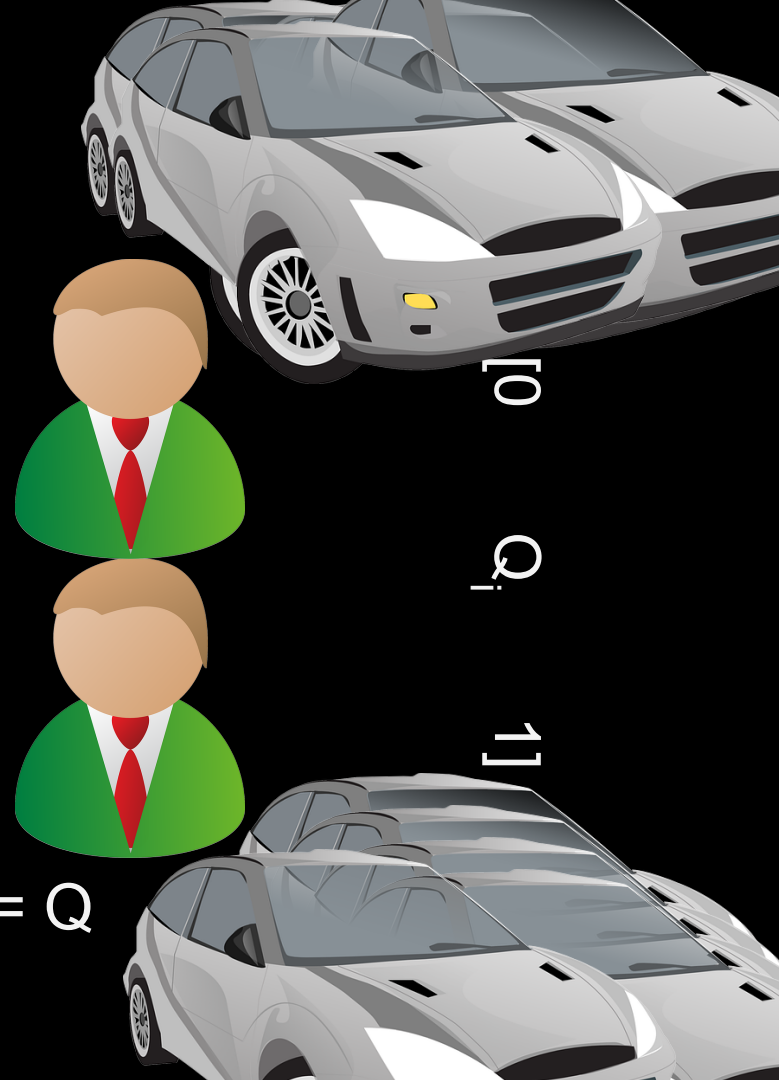
Sugden: Conceptual exploring

- "Rather than, 'empirical theorizing'", what does Hausmann mean by this?
- Why, and when is it a good thing to be doing?
  - Kenneth Arrow's Impossibility theorem
  - Game theory

Sugden: Conceptual exploring

- To what degree does X conceptually explore?

  - Granovetter

  - Akerlof

  - Schelling

Sugden: Instrumentalism

- Why and when is it great?
- Why and when is it not so great?
- To what extent does X's model instrumentalist?
  - Akerlof
  - Schelling
  - Granovetter

Sugden: Metaphor and caricature

- Difference between Gibbard and Varian's caricature compared to McCloskey's metaphor?
- Which one do you prefer, and why?
- Does either concept apt for describing X's model?
    - Akerlof
    - Granovetter
    - Schelling

Sugden: The inexact deductive method

1. Formulate credible (ceteris paribus) and pragmatically convenient generalizations concerning the operation of relevant causal variables.
2. Deduce from these generalizations, and statements of initial conditions, simplifications, etc., predictions concerning relevant phenomena.
3. Test the predictions.
4. If the predictions are correct, then regard the whole amalgam as confirmed. If the predictions are not correct, then compare alternative accounts of the failure on the basis of explanatory success, empirical progress, and pragmatic usefulness.

Sugden: Hausmann's inexactness

Can you imagine that X seem to have followed Hausmann's process?

- Schelling

- Akerlof

- Granovetter

Will you?

Sugden: Induction

Let R be a regularity and F be causal factors.

E1 - in the model world, R is caused by F.

E2 - F operates in the real world

E3 - R occurs in the real word.

Therefore, there is reason to believe:

E4 - in the real world, R is caused by F

Is there reason to believe?

Sugden: Induction

- J.S. Mill's mechanical v. chemical distinction
- Robustness to reintroduction of real factors
- Credible world
  - non-theoretical models - "model cities"
  - 'credibility in models is like realisticness in novels', i.e. believeable - thus coherent and relatable
  - referentially realistic - if you will

Sugden: Either model measure up?

E1 - in the model world, R is caused by F.

E2 - F operates in the real world

E3 - R occurs in the real word.

Therefore, there is reason to believe:

E4 - in the real world, R is caused by F

- Akerlof
- Schelling
- Granovetter

Uskali Mäki: Introduction

He intend to be precise about:

- isolation
- abstraction
- idealization
- omission

and, their interconnectedness.

Mäki: The issue of realisticness

- Legit to assume: max U?

- McCloskey

- Methodenstreit

- Friedman

Mäki: Realisticness

- Referential realisticness
  - representation refers to real things
- Representational realisticness
  - represents features had by the real referent
- Veristic realisticness
  - represent truly features had by the real referent

Mäki: Implicit meanings of 'realism'

- are observational
- are comprehensive
- are complex
- are concrete
- are well confirmed empirically
- are plausible
- are practically relevant

Mäki: Implicit meanings of 'unrealistic'

- do not refer to anything real
- do not represent any feature of the referent
- are false
- are non-observational
- are non-comprehensive
- are simple
- are abstract
- fail in empirical tests
- are implausible
- are practically useless

Mäki: Isolation

Let X be the <u>isolated field,</u>

and let Y be the <u>excluded field,</u>

such that X union Y is the universe

- Naturalistically: "isolation is ubiquitous in human cognition"
- Contrast to exogeneous and endogeneous variables

Mäki: Realism as 'is comprehensive'

- "covers only a relative small segment of elements in a given situation"

- "realisticness" = size(X)/size(Y)

- not dichotomous, rather a continuum

Maki: Ex. of comprehensive realism

Horizontal isolation
Also, *abstraction*

(1) q = f(p)

(2) q = f(p_1, ..., p_n)

Maki: Ex. of comprehensive realism

Vertical isolation
And, level of abstraction

(1) q = f(p)

(2) q = a + bp

(3) q = 10 - 3p

Maki: Idealization

Asymptotic behavior

$p(x) = 0$, $p(x) = -\infty$, $p(x) = +\infty$

Realistic? More so, than omisson?

Maki: Kinds of isolation

- Theoretical/Ideal isolation
  - "Thought experiments"
- Material isolation
  - Experimental isolation
    - Better than "thought experiments"?
  - Spontaneous isolation
    - Can we generalize?

Maki: Kinds of isolation

- Internal isolation
  - Ex. macro isolation from micro
- External isolation
  - Ex. partial equilibrium
- Interdisciplinary isolation
  - it changes; psychology, biology, chemistry, physics
- Scientific isolation
  - aesthetics, ethics, metaphysics

Maki: Idealization v. omission

When to use what? And why?

How can we view ceteris paribus in the light of this?

Till next time

1. Think about a question you want to answer with a model, let that direct where you read.
2. Read! Absolutely no less than 2 hours of stuff. News articles, blogs, interviews, etc.. (Just not science.)
3. Summarize your readings, the summaries will be shared in the class. Provide proper citations.
4. Prepare to present and discuss your readings.

Parenthesis: Conway's Game of Life

http://pmav.eu/stuff/javascript-game-of-life-v3.1.1/