

1 The standard model

- The traditional, or standard approach to economics assumes that people are *rational*, i.e.
 - ◊ people have well-defined preferences,
 - ◊ among the feasible choices, people pick what is best according to their preferences.
- Formally: let X be a set of actions/alternatives/choices ...
 - ◊ X can be complex: consumption paths over time, lotteries, ...
- Let \succeq be a *preference relation* over X .
 - ◊ $x \succeq y$ means that x is weakly preferred over y .
 - ◊ Aside: \succeq is a binary relation, i.e. is a subset of $X \times X$.
- \succeq is called *complete* if for all $x, y \in X$: $x \succeq y$ or $y \succeq x$.
- \succeq is called *transitive* if for all $x, y, z \in X$: $x \succeq y$ and $y \succeq z$ implies $x \succeq z$.
- A *choice problem* is any subset $A \subseteq X$.
- We identify an agent with a preference relation.

DEFINITION 1.1 *An agent is rational if his preferences are complete and transitive, and if for all $A \subseteq X$ he chooses the element $x^* \in A$ which is \succeq -optimal in A (i.e. $x^* \succeq x$ for all $x \in A$).*

- For the purposes of this introduction, let x^* be unique.
- Then we can define a choice function $C_{\succeq}(A)$ which assigns to each choice problem A ...
 - ◊ ... the agent's optimal choice: $C_{\succeq}(A) = x^*$.
- Under appropriate assumptions, a preference relation can be represented by a utility function u on X ...
 - ◊ ... so that $C_{\succeq}(A) = \arg \max_{x \in A} u(x)$. (We won't go into that.)
- The *assumptions* of the standard model appear unrealistic. In reality, ...
 - ◊ ... people don't know what they want/don't have stable preferences,

- ◇ ... people lack the skills to compute what is optimal (in particular, in complex environments),
- ◇ ... people don't optimize but act according to rules of thumb/heuristics,
- ◇ ... people's behavior is partially driven by erratic impulses and emotions,
- ◇ ... behavior is affected by how the problem is presented, i.e. two choice problems A and B ...
 ... might be the same, but if framed differently, people may act differently,
- ◇ ... etc.

- The standard model can be defended as follows:

- ◇ Your objections may all be true, ...
 ... but you must not take the assumption of the standard model *too literally*.
- ◇ The standard model does not posit that people *are* rational.
- ◇ *Rather*, the standard model assumes that people's ...
 ... **behavior can be portrayed AS IF it was rational.**

- This is the so-called “as-if approach”.

- To illustrate, consider the following example from consumer theory:

- ◇ A consumer with a budget m faces a choice between good 1 and good 2 at prices p_1 and p_2 .
- ◇ Suppose that the consumer spends
 ... the share α of his income on good 1, ...
 ... and the share $1 - \alpha$ on good 2.
- ◇ This behavior might be the result of using a rule of thumb, ...
- ◇ ... but it can also be portrayed as if resulting from maximizing the utility function $x_1^\alpha x_2^{1-\alpha}$.

- The main justification for the as-if approach is based on the ...

- ◇ ... *revealed preference approach to choice*.

- There are other justifications, which are more “ideological”.

1.1 The revealed preference approach to choice

- Instead of preferences, the primitives of the approach are ...
 - ◊ ... the agent's *observed choices*.
- Imagine that for every choice problem, you observe the actual choice of the agent.
- The *as-if question* is:
 - ◊ (When) can the agent's behavior be described as if it was the behavior of a rational agent?
- To formalize, let C be a function which assigns to every A an element in A .
 - ◊ $C(A)$ is the agent's (observed) choice in choice problem A .
 - ◊ Put differently, $C(A)$ is a record of the agent's choice.
 - ◊ In general, C is a correspondence (but we want to keep the argument simple).
- The formal version of the as-if question is:
 - ◊ Is there a complete and transitive preference relation \succeq so that $C_{\succeq}(A) = C(A)$ for all $A \subseteq X$?
- The answer is “yes” if C satisfies the following consistency condition:

DEFINITION 1.2 *The choice function C satisfies independence of irrelevant alternatives (IIA) if for all $A_1, A_2 \subseteq X$ with $A_1 \subseteq A_2$ we have*

$$\text{If } C(A_2) \in A_1, \text{ then } C(A_1) = C(A_2).$$

- IIA means that a choice should remain optimal if you remove some of the (unchosen) alternatives:
 - ◊ If you choose chocolate when also cake and cheese is available, ...
 - ... you should still choose chocolate when only also cake is available.
- Example: Let $X = \{x_1, \dots, x_N\}$ consist of N elements.
 - ◊ Suppose there is an number $V_n > 0$ attached to any x_n ,
 - ◊ Consider the following *satisficing* procedure:
 - (a) Fix a number $v > 0$ — the satisficing level.

(b) Given A , go through the elements of A in the order of ascending indices.

(c) Pick the first element which “satisfices”, i.e. the first x_i with $V_i \geq v$.

(d) If no element satisfices, lower the level to $V/2$ and begin again.

- The choice procedure satisfies IIA.
- IIA does not seem too implausible; in any case, much milder than rationality, but we actually have:

LEMMA 1.1 *Let C be a choice function. Then there is a complete and transitive preference relation \succeq such that $C_{\succeq}(A) = C(A)$ for all $A \subseteq X$ if and only if C satisfies IIA.*

- The strength of the revealed preference approach is that it is ...
 - ... *psychologically agnostic*, i.e. it does *not* rest on substantive assumptions about ...
 - ... the agent’s mind, psychology, decision making procedures.
 - ◊ instead, it relies only on a consistency condition pertaining to observed choice data.
- The fact that the satisficing procedure meets IIA illustrates that ...
 - ... perhaps seemingly non-rational choice procedures may, in fact, be consistent with maximization!
- If you want to reject the standard model, you have to reject IIA.

1.2 As-if as a methodological stance

- Another defense of the as-if approach holds that the realism of assumptions is irrelevant ...
 - ... as long as the predictions they deliver are *accurate*.
- Milton Friedman in a 1953 book¹ says that testing a theory’s assumptions is

fundamentally wrong and productive of much mischief It only confuses the issue, promotes misunderstanding about the significance of empirical evidence for economic theory,

¹Friedman, M., 1953, The Methodology of Positive Economics, in M. Friedman, *Essays in Positive Economics*, Chicago, University of Chicago Press, 3-43.

produces a misdirection of much intellectual effort The relevant question about the “assumptions” of theory is not whether they are descriptively “realistic”, for they never are, but whether they are sufficiently good approximations for the purpose at hand.

- Many economists presumably share Friedman’s view. The debate is then about ...
 - ◊ ... when are predictions accurate (what is “sufficiently good”)?
 - e.g. what is the role of experiments?
 - ◊ ... what is the right “purpose at hand”?
 - Is it the purpose of economics to study individual behavior or exclusively institutions and markets?
- At first glance, it might be surprising how “inaccurate” assumptions could lead to “accurate” predictions.
- A classical argument goes: even if on an individual level, behavior is not rational, ...
 - ... on an aggregate level, non-rationalities “wash out”.
- Becker (1962)² makes the argument (somewhat) more precise.

~~1.2.1 Becker’s aggregation argument~~

- ~~• One of the most fundamental economic laws is the ...~~
 - ~~◊ ... compensated law of demand (CLD).~~
- ~~• It says that, controlling for income effects, aggregate demand is downward sloping.~~

²Becker, G., 1962, Irrational Behavior and Economic Theory, Journal of Political Economy 70, 1-13.