Writing economics

William Thomson

University of Rochester

October 25, 2016

“I like what is structured, clear and precise” (Henri Tomasi, composer, 1909-1971)

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GENERAL PRINCIPLES

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HOW TO ACHIEVE IT?

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Through clarity

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HOW TO ACHIEVE IT?

Through clarity

BUT HOW TO ACHIEVE CLARITY?

1. GO FROM SIMPLE TO DIFFICULT

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2. GO BACK AND FORTH BETWEEN THE PARTICULAR AND THE GENERAL

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4. SHOW STRUCTURE

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Good structure allows you to address several constituencies (from superficial readers to researchers in the area)

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   "Don't believe everything you think" (bumper sticker)

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INTRODUCTION

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- Literature review: not enumeration, but a story that ends with a question, yours.

INTRODUCTION AS ENUMERATION (BAD)

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Our objective here is to study the *n*-person case.

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This is the question that we address here.

AN ASIDE ON GIVING TALKS

By the way,

1. never, under any circumstances,
2. and I mean NEVER, under ANY circumstances,

SHOULD YOU SHOW ENTIRE PAGES OF TEXT IN A SEMINAR PRESENTATION

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BODY OF PAPER

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- HOW LONG should a paper be? No rule, however...

BODY OF PAPER

- HOW LONG should a paper be? No rule, however...
- HOW MANY RESULTS? No rule, however...

CONCLUSION

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DO NOT

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1. repeat entire introduction.

CONCLUSION

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2. add formal definitions, formal results.

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DO

1. Summarize (very briefly)

CONCLUSION

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DO

1. Summarize (very briefly)
2. Draw lessons

CONCLUSION

DO NOT

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DO

1. Summarize (very briefly)
2. Draw lessons
3. Raise open questions (danger here)

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MINIMIZED

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MINIMIZED

$\sum_{i\in N} x_i, \sum_{i=1}^{i=n} x_i, \sum_{i=1,\ldots,n} x_i$	$\varphi^W(N, R, \omega)$
$\sum_N x_i$	$W(N, R, \omega)$
$\sum x_i$	$W(R, \omega)$ [where $(R, \omega) \in \mathcal{E}^N$]
	$W(R)$ [where $(R \in \mathcal{R}^N$]

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   - Two groups, N and N', and two allocations $x \equiv (x_i)_{i \in N}$ and $x' \equiv (x'_i)_{i \in N}$ feasible for N. Restrictions to N' are x_N and $x'_{N'}$.

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   Use x and y for the allocations; then, you have $x_{N'}$ and $y_{N'}$.

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   - Two agents, agents 1 and 2, with preferences R_1 and R_2. Two endowments Ω^1 and Ω^2, even better Ω and Ω'.

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4. AS YOU WILL USE IT

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   - Two agents, agents 1 and 2, with preferences R_1 and R_2. Two endowments Ω^1 and Ω^2, even better Ω and Ω'.

4. AS YOU WILL USE IT

   - Initial group called N, subgroup called N'. In your application, do not have N' as the initial group and N the subgroup.

1. MNEMONIC

   p is price, q is quantity

2. RESPECT UNIVERSAL CONVENTIONS

   ϵ goes to zero; you can't make ϵ arbitrarily large

3. LOGICAL

   - $z \in Z$, not $Z \in z$
   - x goes with y, $\tilde{x}$ goes with $\tilde{N}$
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9. BUT CONFLICTS ARE UNAVOIDABLE
    1. E is for *efficiency*, E is for *egalitarian*
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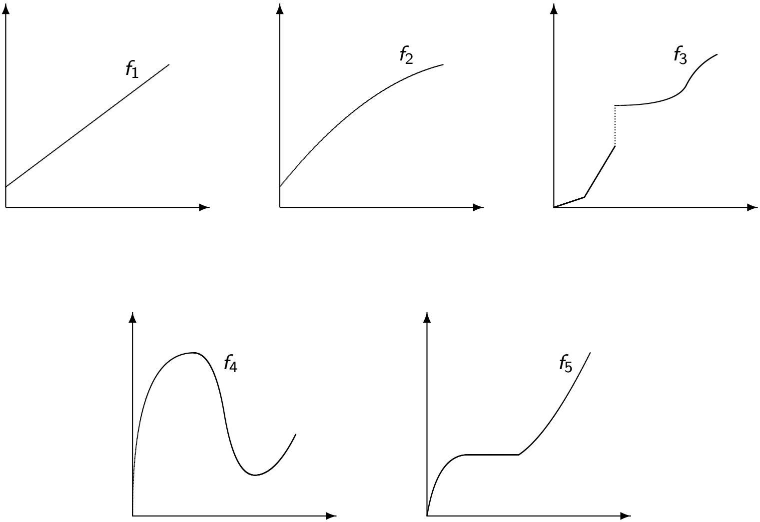
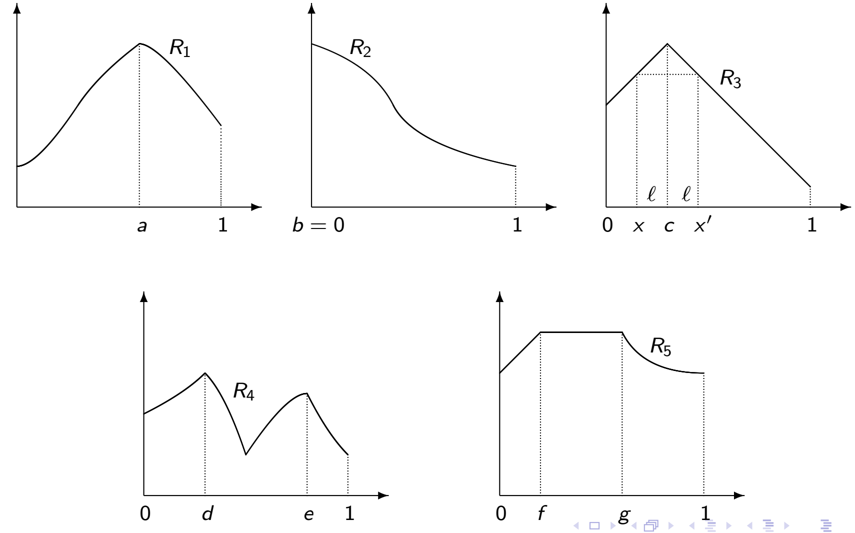
Increasing functions.



Single-peaked preferences



NAMING THINGS

“If language is not correct, then what is said is not what is meant;
if what is said is not what is meant, then what must be done remains undone;
if this remains undone, morals and art will deteriorate;
if justice goes astray, the people will stand about in helpless confusion.
Hence there must be no arbitrariness in what is said.
This matters above everything.” (Confucius, 6-5-th Century bc)

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"Misnaming an object adds to misery in this world" (Camus, 20th Century)

NAMING THINGS

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HAVE ONLY ONE NAME PER CONCEPT

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allocation rule	individual
solution	agent
mechanism	person
	consumers
	players

CHALLENGE TERMINOLOGY, EVEN IF DOMINANT

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initial endowment

endowment

CHALLENGE TERMINOLOGY, EVEN IF DOMINANT

initial endowment	endowment
fair	envy-free and efficient

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marginal contribution	contribution
homogeneous	same
hedonic (coalition)	?

AVOID NAMING CONCEPTS AFTER PEOPLE

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Maskin invariance invariance under monotonic transformations

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Maskin invariance	invariance under monotonic transformations
Davis-Maschler consistency	max consistency

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HOWEVER

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HOWEVER

Arrow's theorem	Arrow's theorem
Gibbard-Satterthwaite theorem	Gibbard-Satterthwaite theorem

AVOID JARGON AND BAD ENGLISH

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order-preservingness   order preservation

AVOID JARGON AND BAD ENGLISH

order-preservingness	order preservation
elicitate	elicit

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elicitate	elicit
prefers	finds at least as desirable

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SHORT NAMES?

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SHORT NAMES?

Sergei Alexeich Karenin	Independence of irrelevant alternatives
Prince Alexander Dmitrievich Shcherbatsky	Invariance with respect to linear transformations
Elizaveta Fyodorovna Tverskaya	Strict disagreement point monotonicity

USE NAMES THAT SUGGEST

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- RELATIONS

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Pareto and strong Pareto (implication)

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- CONTENT

Independence
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priority rule
sequential priority rule
conditional priority rule
previous-assignments–conditional sequential priority rule
previous-assignments-and-previous-assignees(papa)–conditional sequential priority rule

USE TECHNICAL TERMS CORRECTLY

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vector of preference relations   list (or profile) of preference relations

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Nash solution $N(S)$	Nash solution N

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BAD: Defining A as a function of B, which in turn is defined as a function of C.

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GOOD: Introduce C; then introduce B (in terms of C); then introduce A (in terms of B)

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The function $f : \mathbb{R} \to \mathbb{R}$ *is increasing (resp. decreasing, weakly decreasing), if for each pair* $x, y \in \mathbb{R}$ *with* $x > y$, $f(x) > f(y)$ *(resp,* $f(x) < f(y)$*;* $f(x) \geq f(y)$*).*

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GIVE INTUITION

- for definitions, axioms, proofs (in fact everything)

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- do so **before** formal statements, **not after**

SIMPLIFY LANGUAGE

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2. When introducing a definition, give examples.
3. When defining, illustrate.
4. Illustrate definitions.

A characterization result

A characterization

A characterization result

making use

A characterization

using

A characterization result	A characterization
making use	using
departing from the truth	lying

A characterization result	A characterization
making use	using
departing from the truth	lying
In this paper, we show...	We show...

A characterization result	A characterization
making use	using
departing from the truth	lying
In this paper, we show...	We show...
There is no solution satisfying ...	No solution satisfies ...

A characterization result	A characterization
making use	using
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In this paper, we show...	We show...
There is no solution satisfying ...	No solution satisfies ...
Equilibrium fails to exist	There is no equilibrium

A characterization result	A characterization
making use	using
departing from the truth	lying
In this paper, we show...	We show...
There is no solution satisfying ...	No solution satisfies ...
Equilibrium fails to exist	There is no equilibrium
If the equality $A = B$ holds, ...	If $A = B$, ...

A characterization result	A characterization
making use	using
departing from the truth	lying
In this paper, we show...	We show...
There is no solution satisfying ...	No solution satisfies ...
Equilibrium fails to exist	There is no equilibrium
If the equality $A = B$ holds, $\ldots$	If $A = B$, $\ldots$
Suppose not. Then, there would exist...	Suppose not. Then, there exists...

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making use	using
departing from the truth	lying
In this paper, we show...	We show...
There is no solution satisfying ...	No solution satisfies ...
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A member of the class of parametric rules	A parametric rule

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An element of the set of men?	

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An element of the set of men?	A man

STATE ASSUMPTIONS IN THE ORDER OF DECREASING PLAUSIBILITY

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PREFERENCES	AXIOMS
continuity	efficiency
monotonicity	equal treatment of equals
convexity	resource monotonicity
differentiability	contraction independence

GROUP OBJECTS IN CATEGORIES

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  - about producers
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    - about consumers.
- Axioms:

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- Axioms:
  - normative
  - strategic

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  - variable-population
  - universal
  - model-specific

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(BETWEEN ASSUMPTIONS, AXIOMS, RESULTS)

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$$\begin{cases} \text{inclusion relations} \\ \text{size} \\ \text{mathematical structure (convexity, lattice)} \end{cases}$$

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  size

  mathematical structure (convexity, lattice)

Examples: Stable matchings, Claims problems

WHEN NUMBERING OBJECTS, HAVE ONE LIST FOR EACH CATEGORY OF OBJECTS

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$$\begin{cases} \text{Lemmas 1-5} \\ \text{Propositions 1-3} \\ \text{Theorems 1-3} \end{cases}$$

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$$\begin{cases} \text{Lemmas 1-5} \\ \text{Propositions 1-3} \\ \text{Theorems 1-3} \end{cases}$$

Compare to single list: Lemma 1-to Theorem 11.
(Theorem 5 is first theorem. There are only 3 theorems.)

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STATE THEOREMS SO THAT THEY CAN BE UNDERSTOOD ON THEIR OWN (ALMOST)

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- **Theorem 1:** The Nash solution is the only one to satisfy Axioms 1-4.
- **Theorem 1:** The Nash solution is the only one to satisfy

efficiency,
symmetry,
invariance under linear rescaling,
and *contraction independence*.

WRITING PROOFS

AVOID LONG SENTENCES
(helps with grammar; sequencing)

AVOID LONG SENTENCES

(helps with grammar; sequencing)

Let (S, h) *be a game form. Let* $\mathcal{R}^N$ *be a domain of preference profiles. Given a game form* (S, h) *and a preference profile, the list* (S, h, R) *is a game. Let* $N(S, h, R)$ *be its set of equilibria. . . .*

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- If A and B, then C and D.

QUANTIFICATIONS

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5. FACTOR OUT "FOR":
   "For each $N \in \mathcal{N}$, for each $S \in \mathcal{E}^N$, and for each $x \in X$,..."
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7. COLLECT QUANTIFIED VARIABLES:
   - For each $x \in X$, $x_i > y_i$ for each $i \in N$.
   - For each $x \in X$ and each $i \in N$, $x_i > y_i$.
   - For each $x \in X$ and each $i \in N$, we have $x_i > y_i$.

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$$\left\{\begin{array}{l}\text{who the strategic agent is}\\ \text{what his true preferences are}\\ \text{what lie he is contemplating}\\ \text{what the announcements the other agents make}\end{array}\right.$$

SHOW STRUCTURE OF PROOFS

Theorem: The uniform rule is the only rule satisfying *efficiency*, *equal treatment of equals* and *strategy-proofness*.

Proof:

Step 1: U satisfies the three properties.

- **Efficiency:**................
- **Equal treatment of equals:**.................
- **Strategy-proofness:**.................

Step 2: if rule φ satisfies the three properties, $\varphi = U$.

Step 2.1: φ is continuous..................

Step 2.2: φ is given by a median expression..................

Step 2.3: Deriving a book-keeping equation..................

Step 2.4: Concluding..................

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- Experiment with
  1. notation
  2. format
  3. typesetting

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$$\textbf{Theorem:}\ \left\{\begin{array}{l}\text{STRUCTURE}\\ \text{PRECISION}\\ \text{CONSISTENCY}\\ \text{LACK OF JARGON}\\ \text{ILLUSTRATIONS}\end{array}\right. \Longrightarrow \text{CLARITY.}$$

Personal statement: I like clarity.

THANK YOU