

Dimensions of change in economic thought

The SFI Case

Magda Fontana



Old Economic thinking and Old Economic Problems

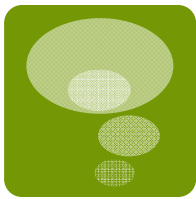


1988
Kenneth Arrow

- **There was a generally held point of view, which indeed goes back to the origins of economics as a systematic discipline, that solutions that were not constant would tend to the constant solution or steady state.** But more recent research [...] has demonstrated that there are solutions to the same equations with cycles and even with chaotic behavior. The multiplicity of solutions is itself an embarrassment, since it suggests that economic theory even if accurate, does not yield a unique pattern of dynamic behavior and hence its predictions are far from sharp”

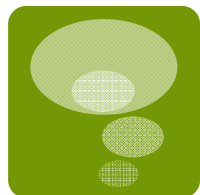
2008
Adair Turner,
Head of the U.K. Financial Services Authority

- But there is also a strong belief, which I share, that bad or rather over-simplistic and overconfident economics helped create the crisis. **There was a dominant conventional wisdom that markets were always rational and self-equilibrating, that market completion by itself could ensure economic efficiency and stability,** and that financial innovation and increased trading activity were therefore axiomatically beneficial.

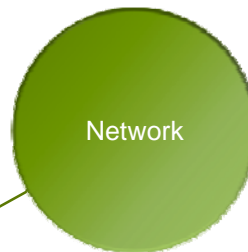


- Is there any actual change in economics?
- What are the features of the process of change?
- **COMPLEXITY ECONOMICS is NEW ECONOMIC THINKING**
- out-of-equilibrium behaviour, heterogeneity, adaptation, connections and procedural rationality, nonlinearity.

THE PROJECT



- Process of (relative) diffusion
- P. Terna University of Turin



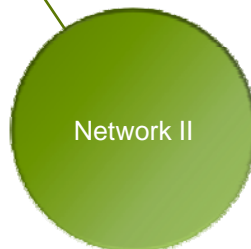
- Complexity Community -
- S. Solomon
- Hebrew University of Jerusalem



- Standing on academic shoulders
- T. Corsatea



- M. Fontana



- Cultural themes -
- Y. Neuman
- Ben-Gurion University of the Negev

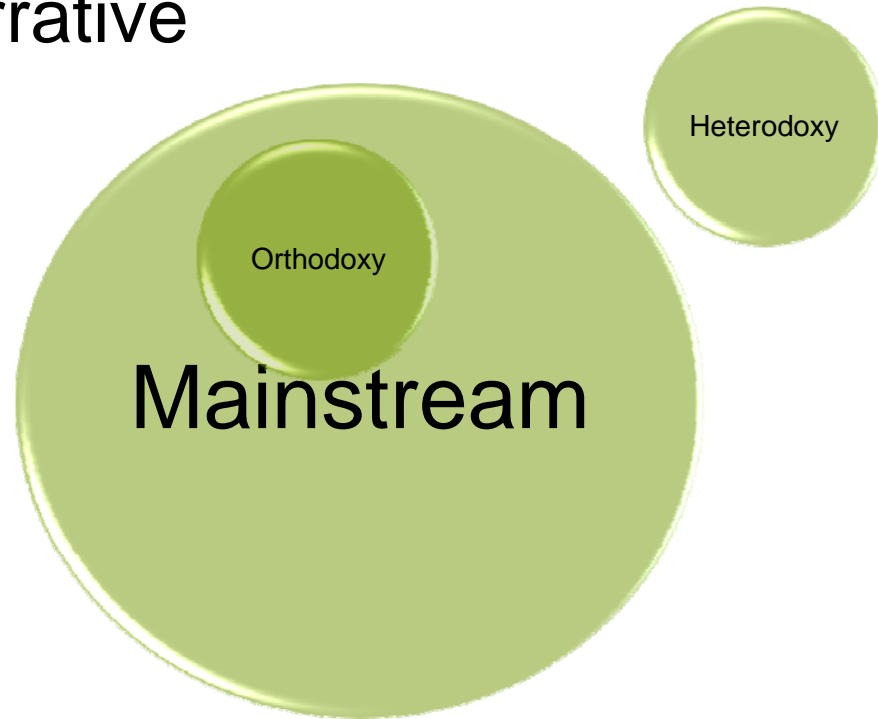
DATA

- Working papers published by economists OR on economic issues by the participant to the Economics Program (1988-2004)
- Citations received by the WPs (from publication date to July 2012 – ISI/WoS and Scopus) (citing papers)
- References of the WP (cited papers)
- Texts of the WPs

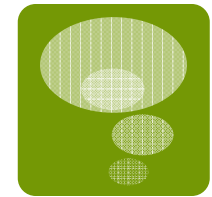
Jargon



Narrative

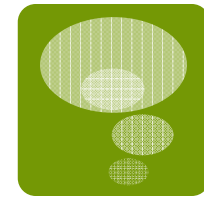


The SFI's EconProg (1988-2004)



Workshops	1987	1995	2001
Proceedings	1988 EECSI	1996 EECSII	2006 EECSIII
Narrative	Weakly Heterodox period 1984-1988	Strongly Heterodox period 1989-1996	Synthesis Period 1997-2004

EECSI...



1987

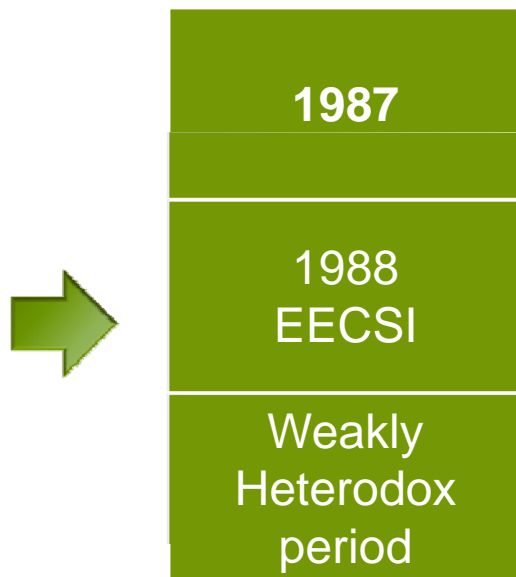
1988
EECSI

Weakly
Heterodox
period

Co-Chairs: Phil Anderson and Ken Arrow

The workshop has been a preparatory meeting: physicists and economists tried to set forth a program to ameliorate economics.

EECSI: economics as it is...

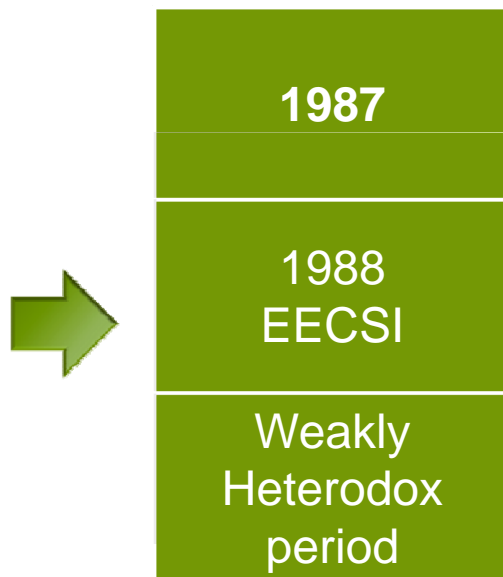
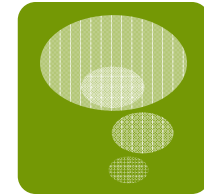


Arrow depicts economics as moving towards **dynamic analysis** (the theoretical side via nonlinear equations and the empirical side via linear stochastic analysis).

Emphasis is on **negative feedback**

The hard core of economics is **general competitive equilibrium**, plus **rational expectations** and **complete market hypothesis**

EECSI: economics needs to change because....

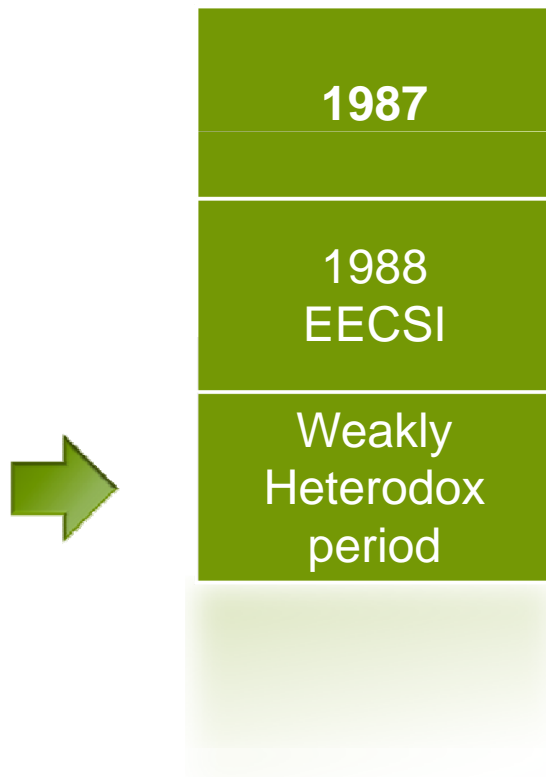
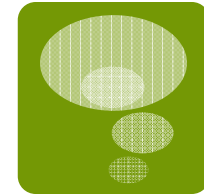


“The general perspective of mainstream (the so-called neoclassical) economic theory had certainly had some empirical success. [...] But it is clear that **many empirical phenomena are not covered well by the theoretical or the empirical analyses.**

The idea was “that solutions that were not constant would tend to the constant solution or steady state. But more recent research [...] has demonstrated that **there are solutions to the same equations with cycles and even with chaotic behavior.**

The multiplicity of solutions [...] suggests that economic theory even if accurate, does not yield a unique pattern of dynamic behavior and hence its **predictions are far from sharp”**

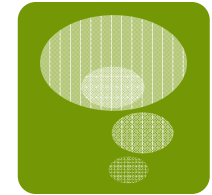
The **Weakly Heterodox Period:** economics needs to change but...



Arrow is not expecting the birth of an entirely new approach: **the general framework should remain as it is**, with the role for the 'new economics' being that of improving the *status quo ante*.

SFI's effort must remain an addition, and not an alternative, to the neoclassical framework. According to him, the '**new economics**' tools and **theories have to be adopted only in specific cases when neoclassical economics fails.**

Which Narrative should we trust?



THE OFFICIAL REPORT

“Quite generally, the economists at the workshop were eager to learn as much as possible about the limits of applicability of the various kits of possible applicable complex systems tools provided by the non-economists, while the natural and biological scientists took every opportunity to inquire about the possible time dependence of models of the economy” (D. Pines)

THE PHYSICIST’S REPORT

“And you guys really believe that?”
(P. Anderson)

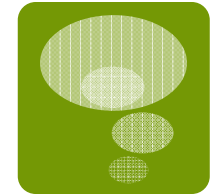
THE ECONOMIST’S REPORT

“There were obviously a number of different aspects, and the truth is that we never really cohered to these days” (K. Arrow)

THE HISTORIAN’S REPORT

“Economists mostly attempted to defend their axiomatic approach, facing sharp challenges and ridicule from the physicists for holding relatively simplistic views” (D. Colander)

EECSII: Economics is changing because...



1995

Shared notion of Complex Adaptive Systems

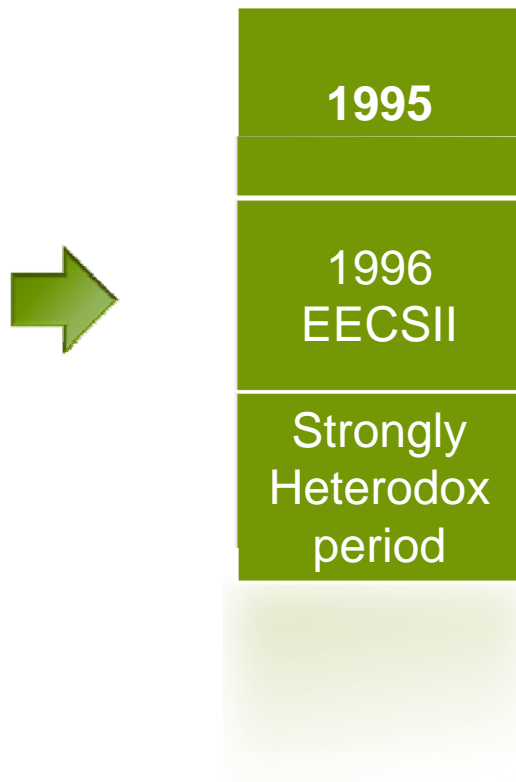
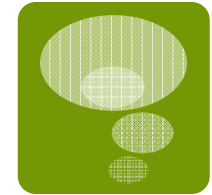
1996
EECSII

Dawning of an unitary view on economic phenomena

Strongly
Heterodox
period

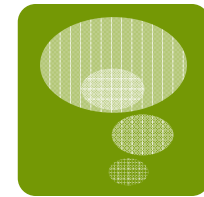
Family resemblance

EECSII: Economics is changing because...



- “1. Because it included heterogeneous agents together creating the patterns they reacted to, models could not easily be “solved” analytically. **The natural approach was agent-based modeling**
2. Because agents in most models attempted to formulate decisions in a problem where other agents were trying to do the same **Decision making could best be seen as inductive, not deductive.**
3. Because agents reacted to the patterns they co-created, **by definition the problems we investigated started out of equilibrium** (i.e. not at a static solution point)” (B. Arthur).

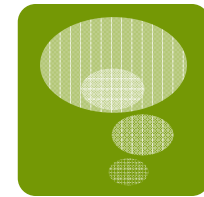
The **Strongly Heterodox Period**: the initial project is overturned



“In this context standard-equilibrium economics became a special case, and we often used it for a benchmark. ”

(B. Arthur)

EECSIII: Neoclassical Economics strikes back



2001

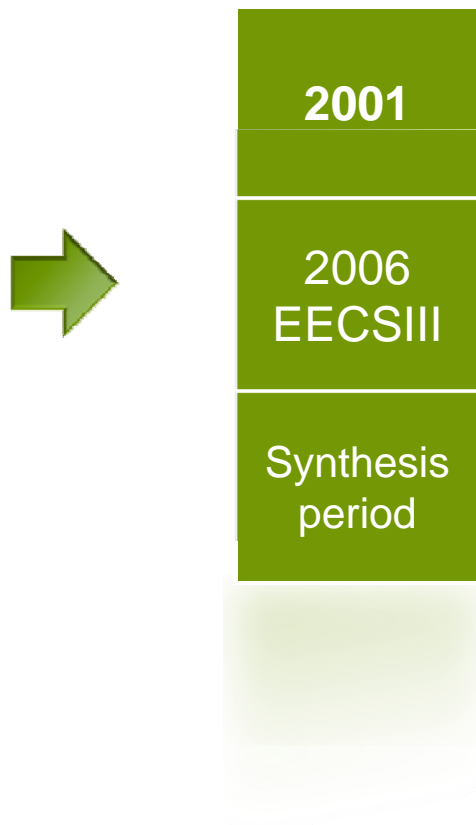
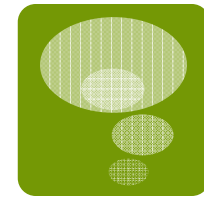
Many external scholars

2006
EECSIII

Few original works

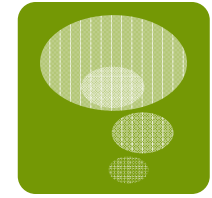
Synthesis
period

EECSIII: Neoclassical Economics strikes back



“The models presented here do not represent any sort of rejection of neoclassical economics” (L. Blume and S. Durlauf).

“The theory was able to absorb SFI-type advances without changing its fundamental nature” (L. Blume and S. Durlauf).



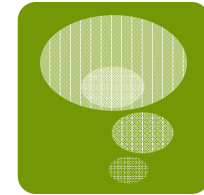
An unsophisticated empirical analysis

DATA

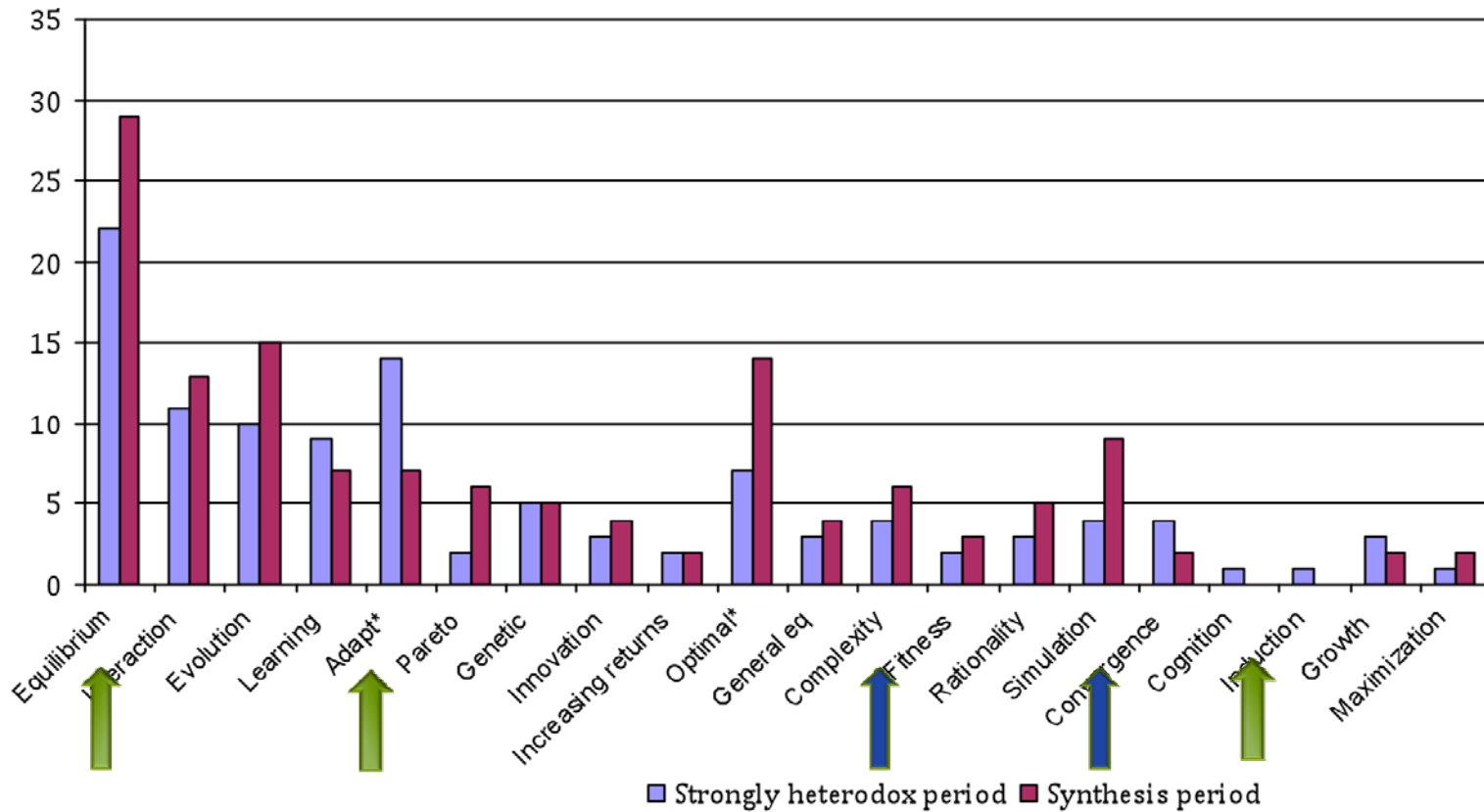
- 198 WPs published by SFI and written by economists or on economic topics.
- Info on:
 - Author
 - Field of Author's Ph D
 - Publication outlet (if any)
 - N° of citations (Google Scholar – ISI WoS)
 - Publication lags
 - Keywords



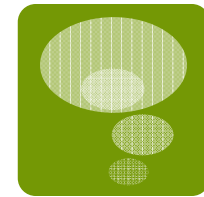
Check n° 1: do intellectual differences actually exist?



Frequency of keywords in titles and abstracts

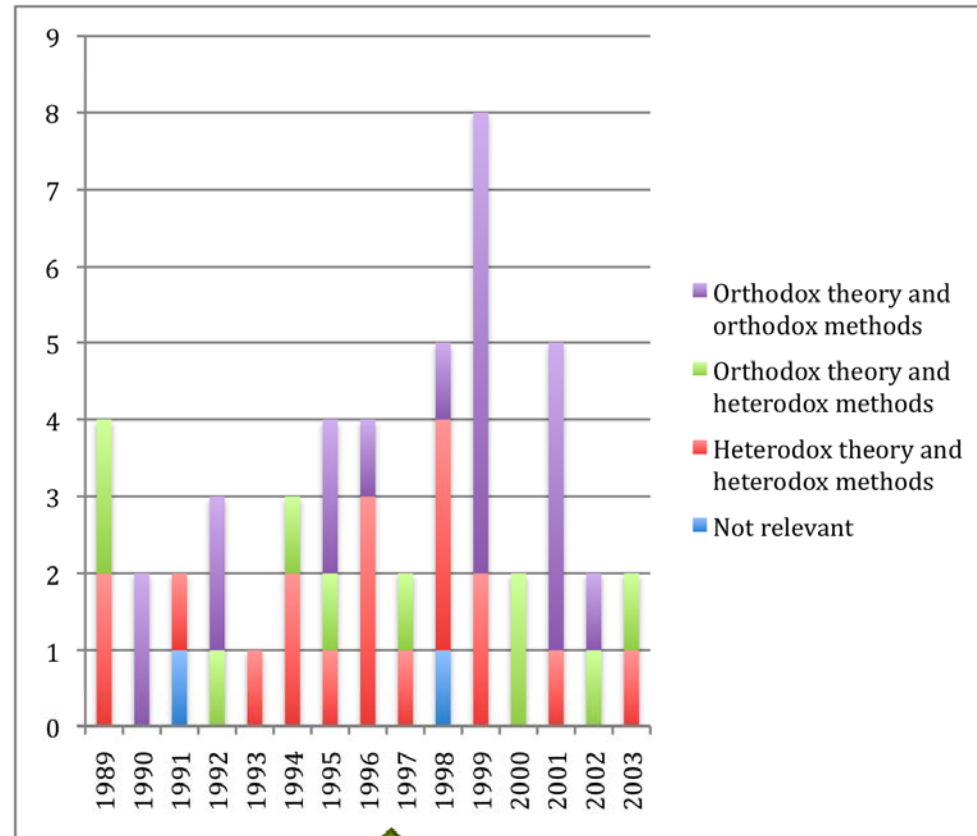


Check n° 2: do intellectual differences actually exist?

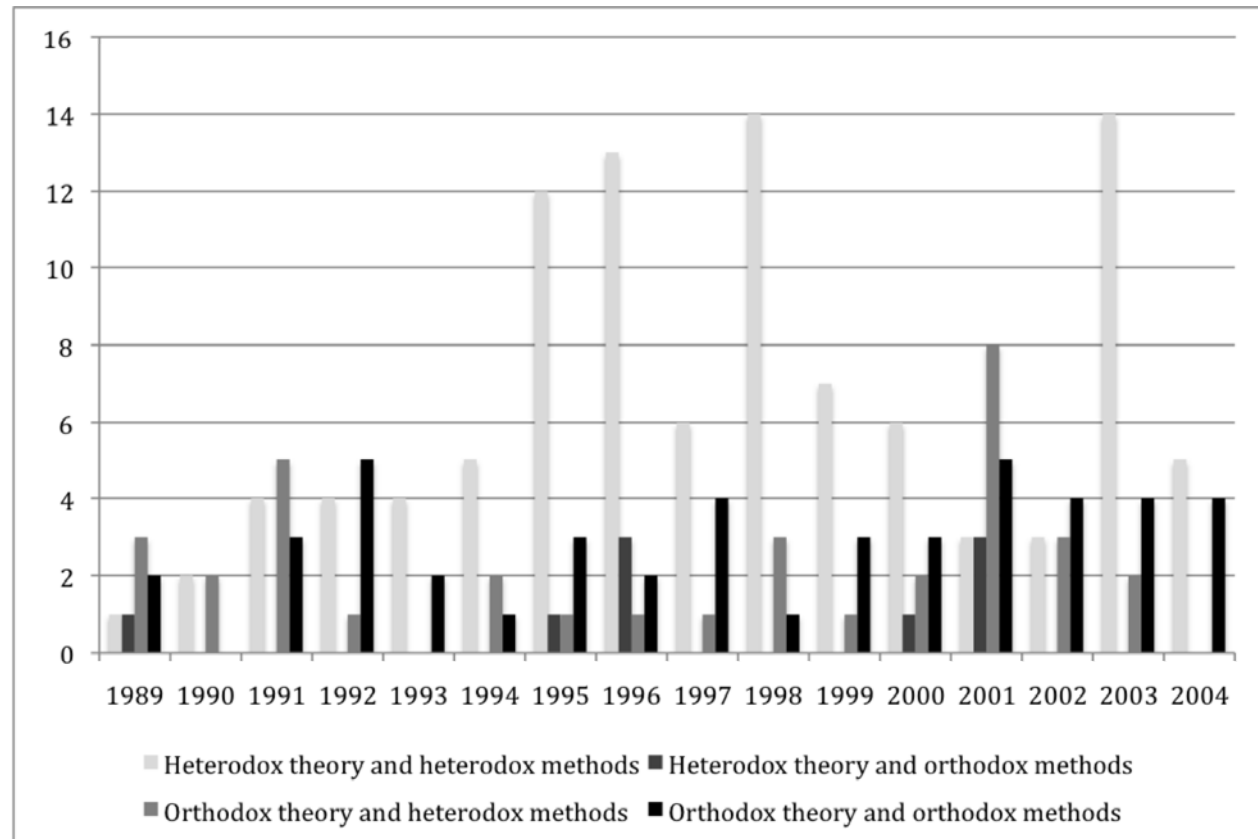


Use of the concept of equilibrium

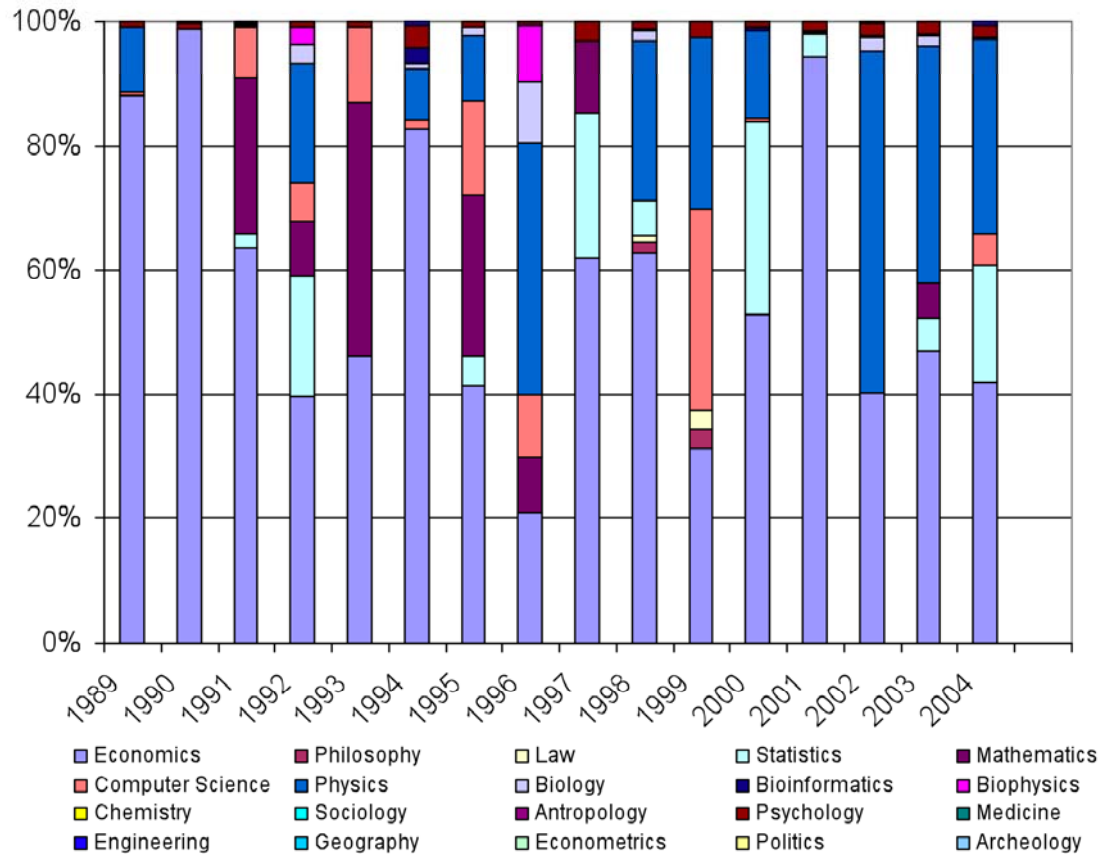
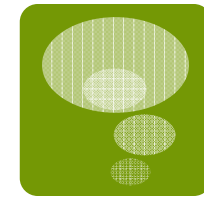
N. of papers



Theories and methods



Check n° 3: Are there differences in the research team across periods?



Van Damme (1996):

$$\sum_i \sum_t k_{it} m / n$$

k citations received by paper i at time t , m , disciplines, n authors.

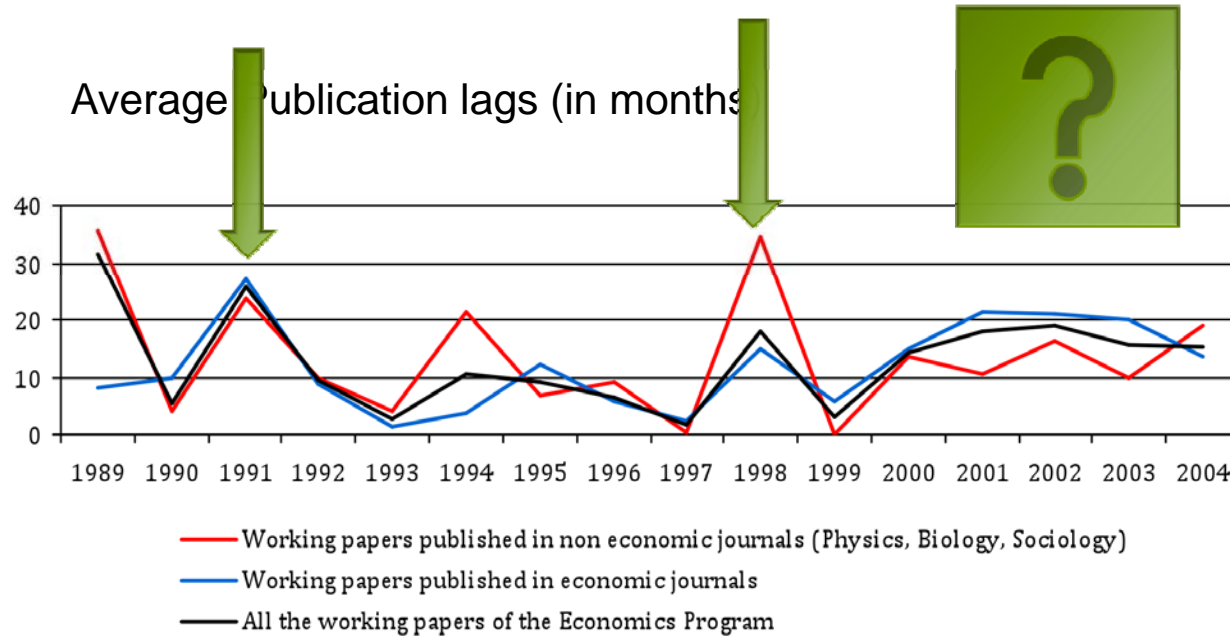
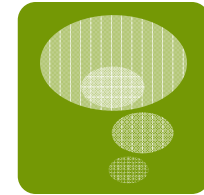
Check n° 4: Are there differences in the impact on economics?

Mean of Google Scholar Citations (from year of publication to 2012) weighted by number of publications per type

Type of publication	Str. Heterodox Period	Synthesis Period
Book	126.64(11)	167.33(12)
Working paper (unpublished)	66.83(30)	11.83(40)
Journal article	286.60(45)	86.98(60)
All papers	189.48(86)	68.75(112)

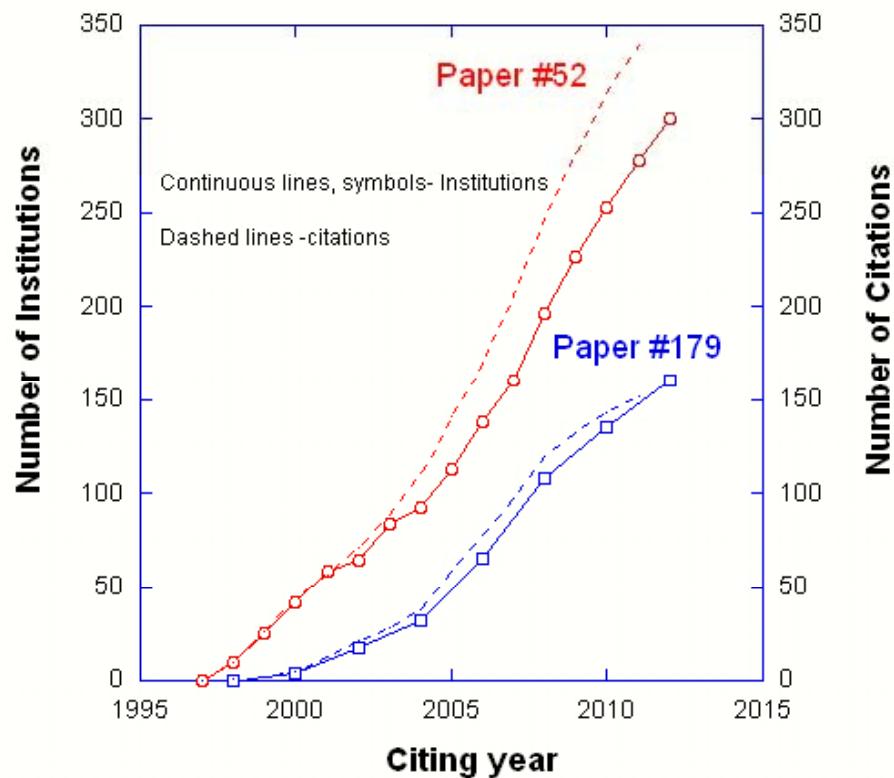
In brackets number of publications per type

Check n° 5: Are there differences in the impact on economics?

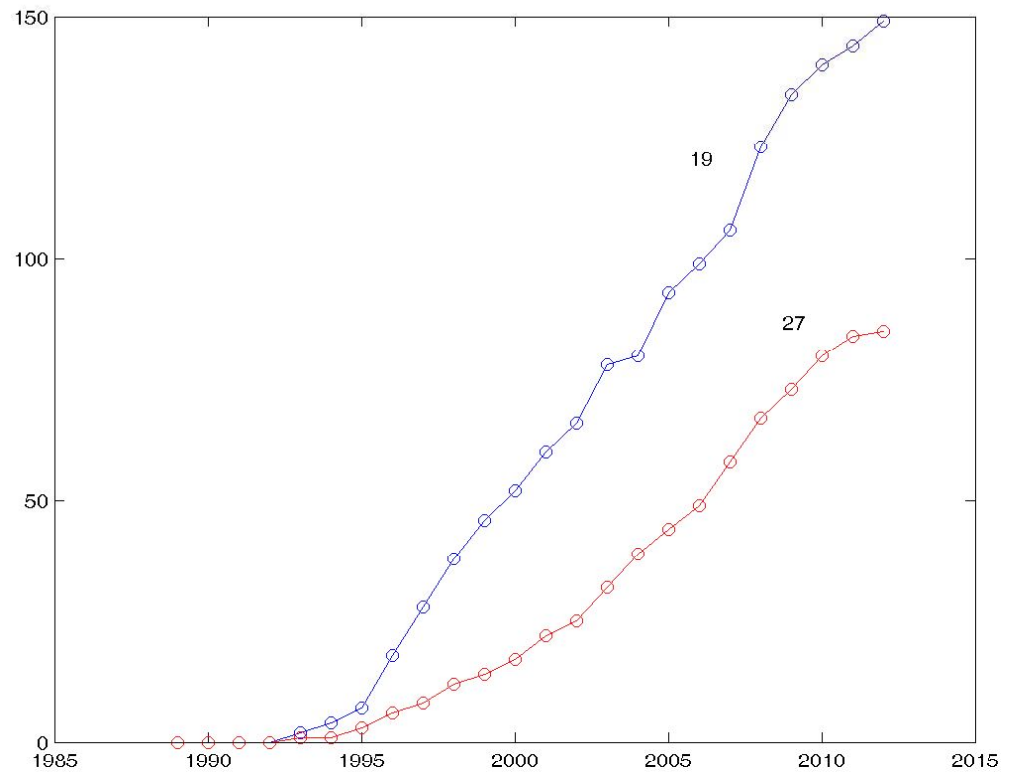


Is Complexity Economics still alive?

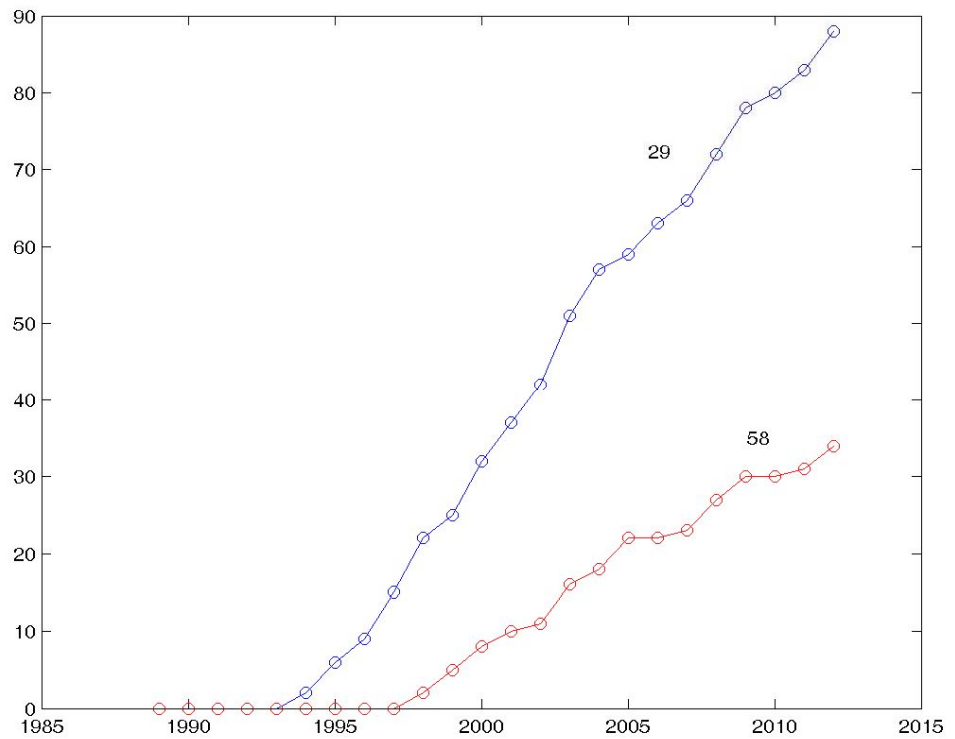
#52 W. Brock- C. Hommes,
Rational Route to
Randomness, Econometrica
1997 (SHP- HH)



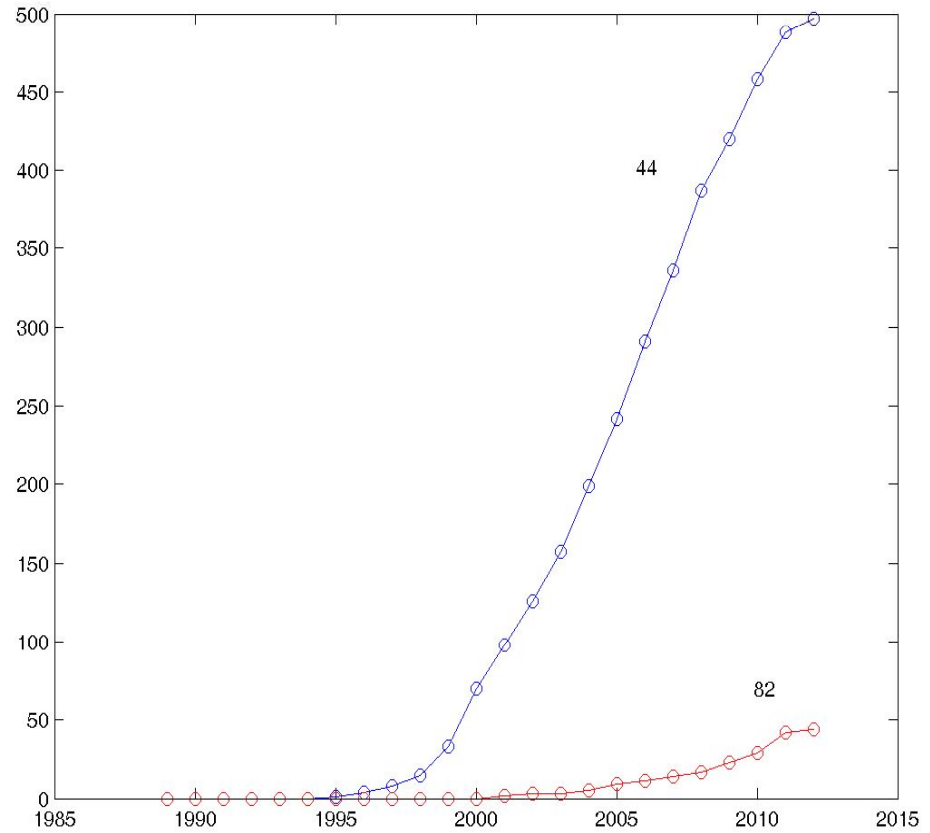
#19 J.Holland- J. Miller Artificial Adaptive Agents in Economic Theory AER 1991 (SHP- HH)



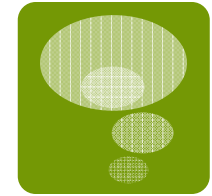
#29 P. Bak, K, Chen Self-Organized Criticality and Fluctuations in Economics 1994, AER, (SHP- HH)



#44 W.B. Arthur Inductive Reasoning, Bounded Rationality and the Bar Problem 1994 AER (SHP-HH)



To sum up...



My three-period narrative is confirmed, but what about the process of change?

The complex dynamics of change



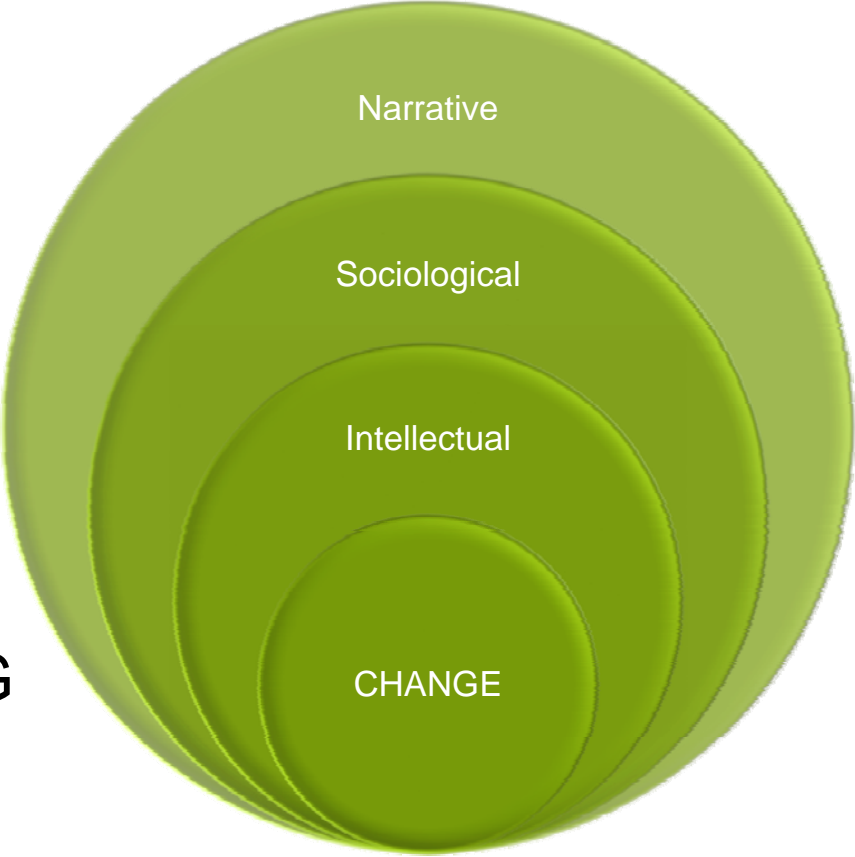
1° Intellectual dimension -> heterodox ideas

2° Sociological dimension -> mainstream controls the leaking of heterodox concepts

3° Narrative dimension -> follows and reinforces 2° in non-obvious directions

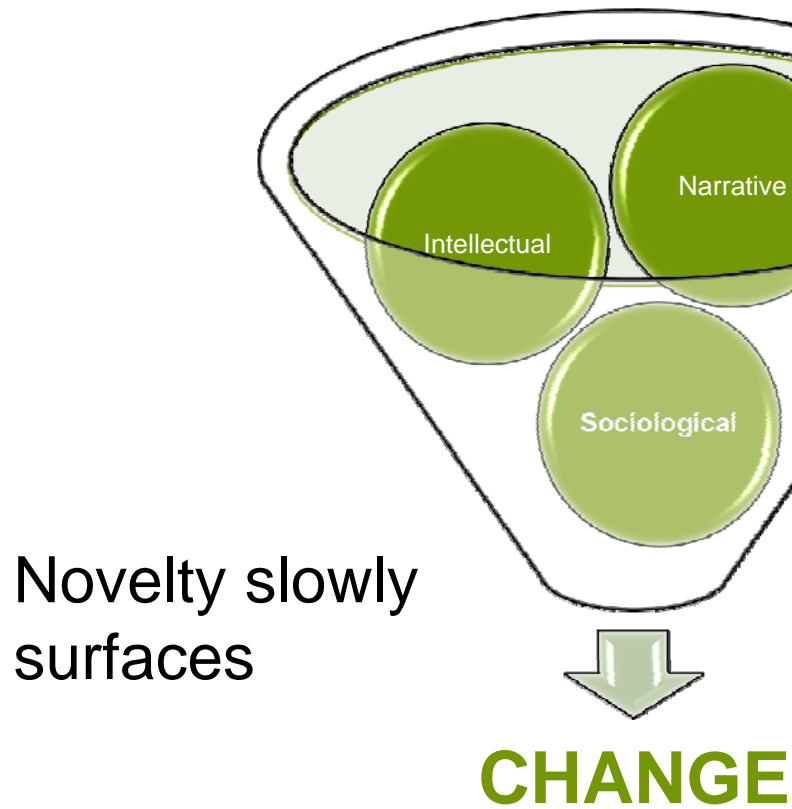
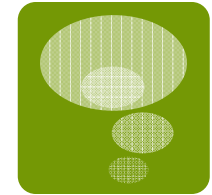


In a nutshell...



**DOVETAILING
PROCESS**

In the complexity approach the dimensions do not dovetail





Thank you for your attention!