

The Interdisciplinarity Journey of Agent-Based Models in Economics

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 - An increasing interdisciplinarity despite the insular reputation of economics (Fourcade et al., 2015; Angrist et al., 2020)
- These transformations are the results of a variety of research programs. Among them, we find Agent-Based Models (ABMs) which is defined by its methodology imported from other disciplines

Two Challenges to Better Situate ABMs

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- A first challenge is to characterize the cross-disciplinary nature of ABMs in economics: A transdisciplinary new field ? An approach at the frontiers of multiple disciplines ? A simple imported tool ?
- The second challenge emerging from the reflexive literature is to find a precise definition for complexity and ABMs in economics: there are no JEL codes, heterogeneity of approaches with many overlaps (econophysics, agent-based models, complexity), porous disciplinary frontiers...

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- Contribution 2: investigate the nature and homogeneity of the interdisciplinarity taking place
- Methodology: a quantitative citation-based analysis of the field to investigate its structure coupled with a qualitative epistemological analysis

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- (3) Articles tagged by “economics” and “agent based model” or “agent based computational economics”

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- Dynamic analysis: succession of networks for ten-years overlapping windows (2000-2009, 2001-2010, ..., 2010-2019);
- Dynamic cluster detection: identify persistent/dynamic community across windows

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- 1987: Workshop with ten physicists and ten economists, Arrow as leader for the economics side
- 1988: Beginning of the Complexity Economic program under Brian Arthur: “the economy as an evolving, complex system”

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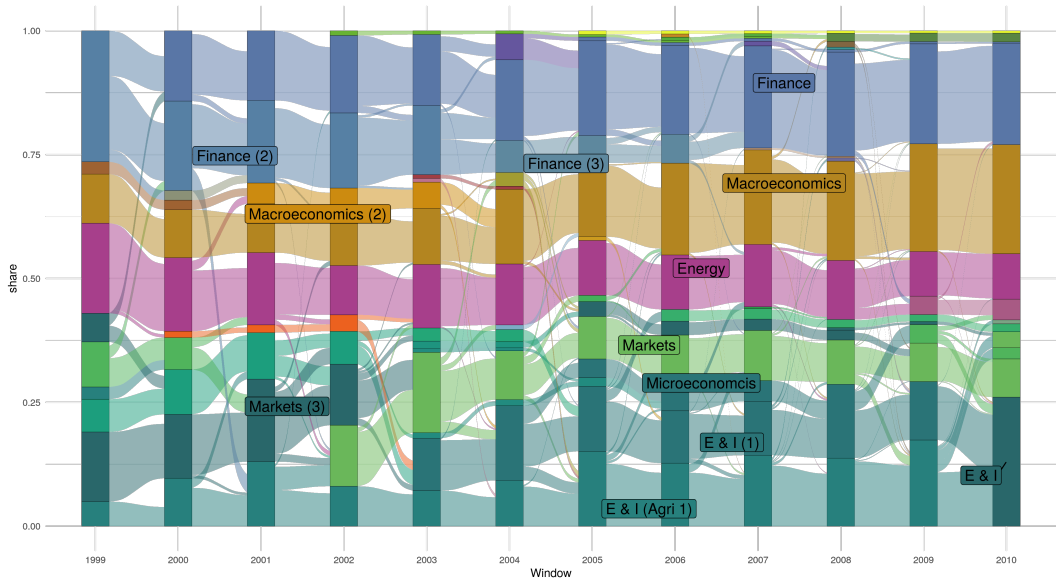
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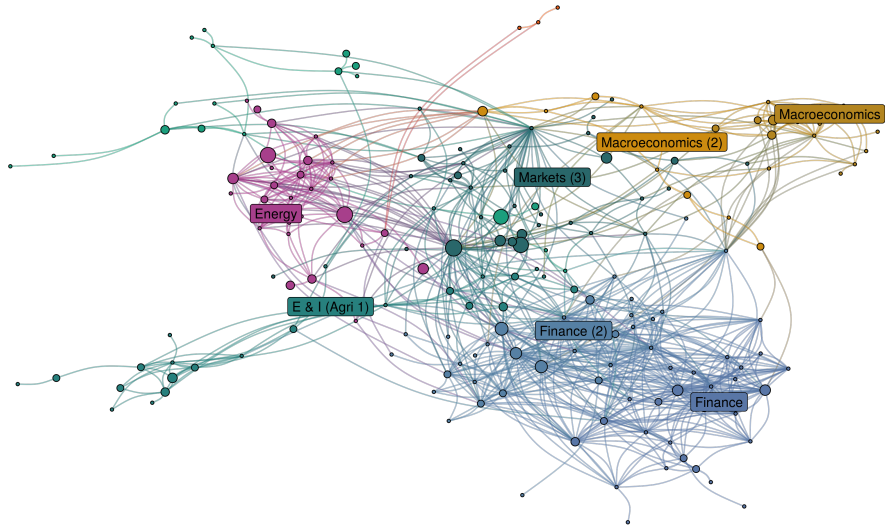
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 - “The models presented here do not represent any sort of rejection of neoclassical economics” (Blume and Durlauf in Fontana, 2010b, p.184)
- Since the early 2000s, spread of ABMs to different topics, journals and institutions and we find some of the first attempts at a classification.

Paper	Areas, topics, methods, or paradigms identified
Tesfason (2002)	<ul style="list-style-type: none"> - Learning and embodied mind - Evolution of behavioral norms - Bottom-up modeling of market processes - Formation of economic networks - Modeling of organizations - Design of computational agents for automated markets - Parallel experiments with real and computational agents - Building ACE computational laboratories
Squazzoni (2010)	<ul style="list-style-type: none"> - Industrial economics - Labour economics - Innovation - Macroeconomics - Financial markets
Chen (2012)	<ul style="list-style-type: none"> - Markets origin - Cellular-automata origin - Economic tournament origin - Experimental origin
Hommes and Lebaron (2018)	<ul style="list-style-type: none"> - Macroeconomics - Finance - Experiments - Networks - Other
Schinckus (2019)	<ul style="list-style-type: none"> - Deductive approach (rational ABM) - Abductive approach (adaptive ABM) - Metaphorical approach (bottom-up econophysics) - Phenomenological approach (top-down econophysics)





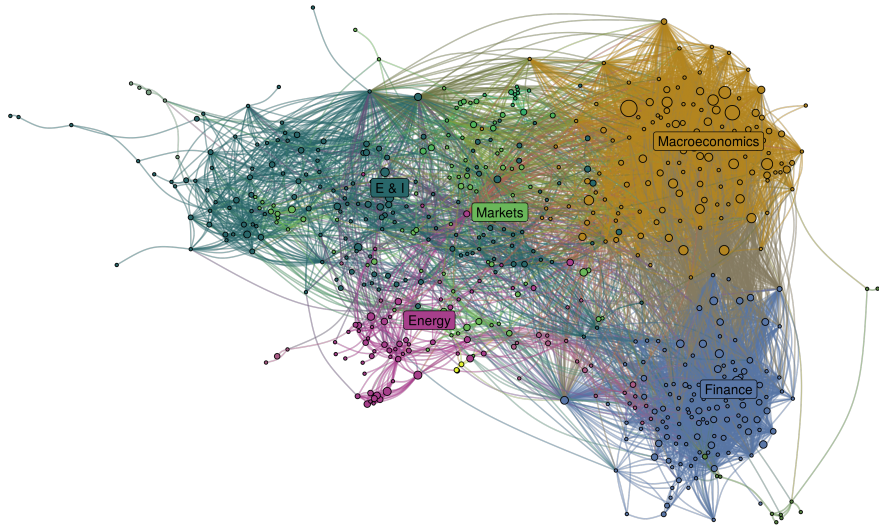


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- However, this perspective underestimate the actual tensions surrounding knowledge transfer
- Agent-Based Economics is both a research field with particular epistemic commitments (a community of researchers) and a method (a tool not bound to a theme or particular epistemological framework).

Clusters	Disciplines	2001-2010	2005-2014	2010-2019	Trend	Eco+Manag Trend
Finance	Economics	56	54.7	55.3	→	+4% ↗
	Management	16.8	20.1	20.5	↗	
	Physics	13.7	12.7	8.7	↘	
	General + Other NSE	10	9.5	10.5	→	
Macroeconomics	Economics	40	63	72	↗	+98.1% ↗
	Management	1.4	11.2	10	↗	
	Physics	39.7	12.5	3.3	↘	
	General + Other NSE	15.3	8.4	8.7	↘	
Energy	Economics	61	52.7	49.9	↘	-9.9% ↘
	Management	7.7	13.6	12	↗	
	Ecology and ES	0	3	4.8	↗	
	Computers	4.7	4.6	3	→	
	General + Other NSE	19	20.3	26	↗	
Env & Innov	Economics	44.6	35.8 (38.2)	26.6	↘	-30% ↘
	Management	12.8	7.4 (18.3)	13.3	→	
	Ecology and ES	10.2	14 (0.8)	13.5	↗	
	Other SSH	14.5	18.1 (15.3)	13.9	→	
	General + Other NSE	15.4	20.5 (13)	24.4	↗	

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■ Well-identified community, instrumental methodological borrowing, no disciplinary integration, theoretical critical perspective on economics

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 - In other cases, like Energy or E & I, the emphasis is on practical questions with a critical perspective of the traditional boundaries of the discipline.
 - In both cases, criticisms are directed at a particular idea of mainstream economics, but they are fundamentally different in nature.

Thank You