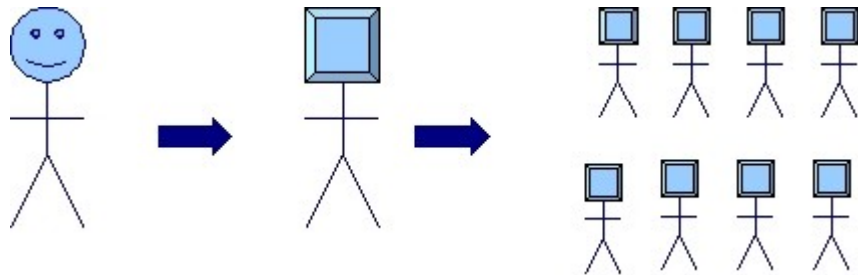


# *Traders imprint themselves by adaptively updating their own avatar*



*The Avatar-Based Method*

Artificial Economics 2005

September 15-16, 2005

Lille, France

G. Daniel

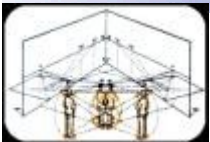
L. Muchnik

S. Solomon



# Overview

- ◆ Agent-based market models
- ◆ Capturing traders behaviour
- ◆ Avatar-based method
- ◆ Preliminary results
- ◆ Advantages and drawbacks of the method
- ◆ Conclusion



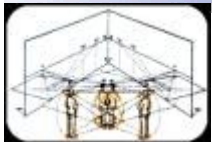
# *Agent-based market models*

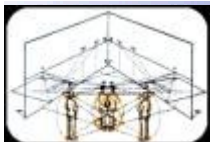
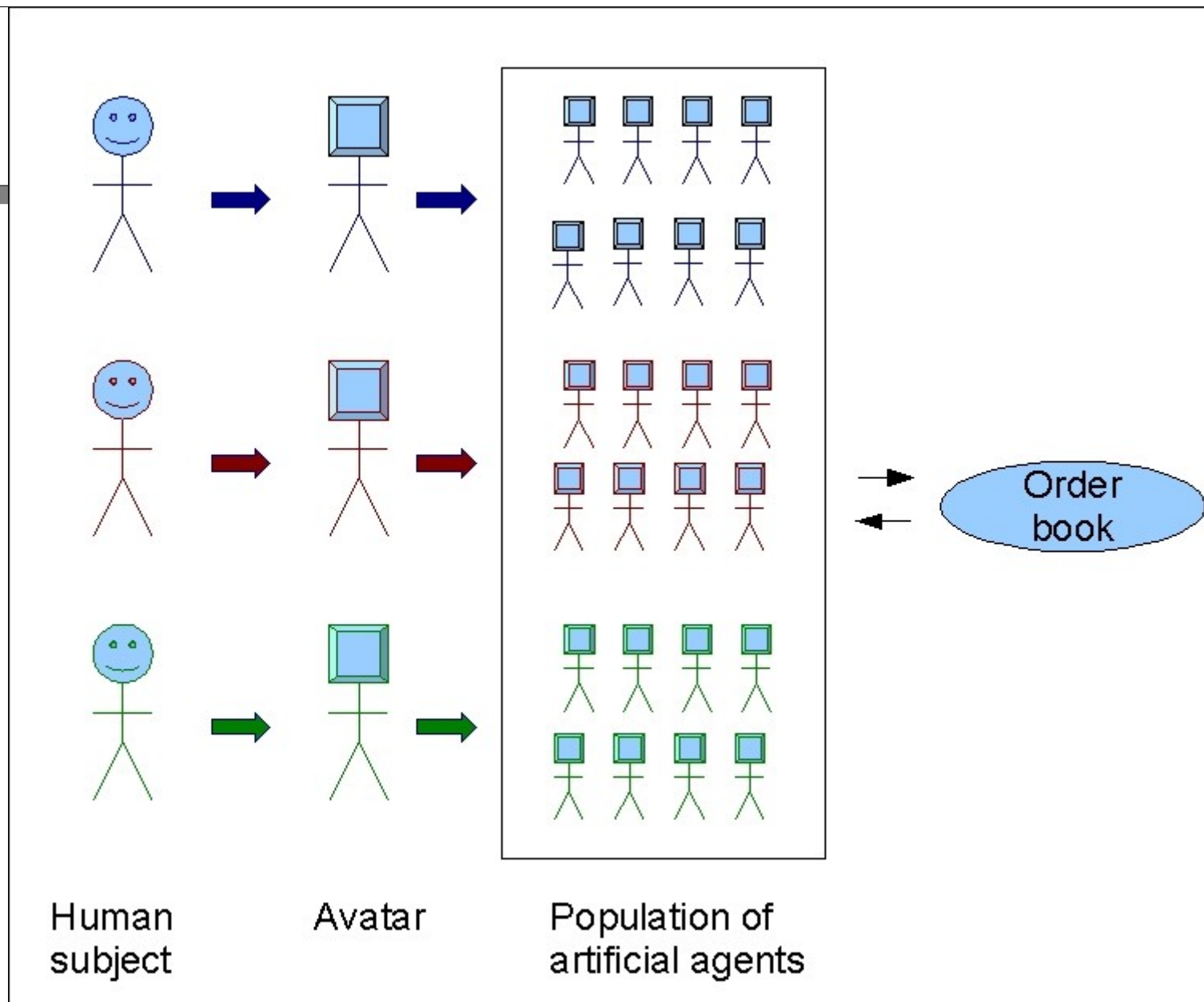
- ◆ Non-orthodox financial market models investigate the impact on the price dynamics of
  - Markets rules (Markets Microstructure)
  - Agents behaviour (Behavioral Finance)
- ◆ Artificial Stock Markets can help but ... how to design agents?
  - Axtell: 'what rules to write for our agents?' is the primary challenge facing our research community*
- ◆ Is there room between ZI (*insects*) and RE (*over-cognitive*) agents?



# *Capturing traders behaviour*

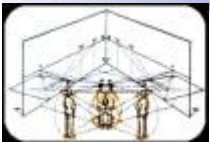
- ◆ Usually modelers
  - postulate arbitrary departures from rationality
  - use results from experimental laboratories (e.g. Prospect Theory), obtained in very simple setups
  - conduct field studies, make use of questionnaires
- ◆ Look for alternative ways
- ◆ We propose the 'Avatar-based method' to capture humans behaviour and plug it into our simulation framework





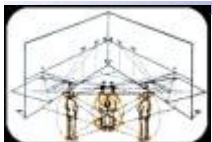
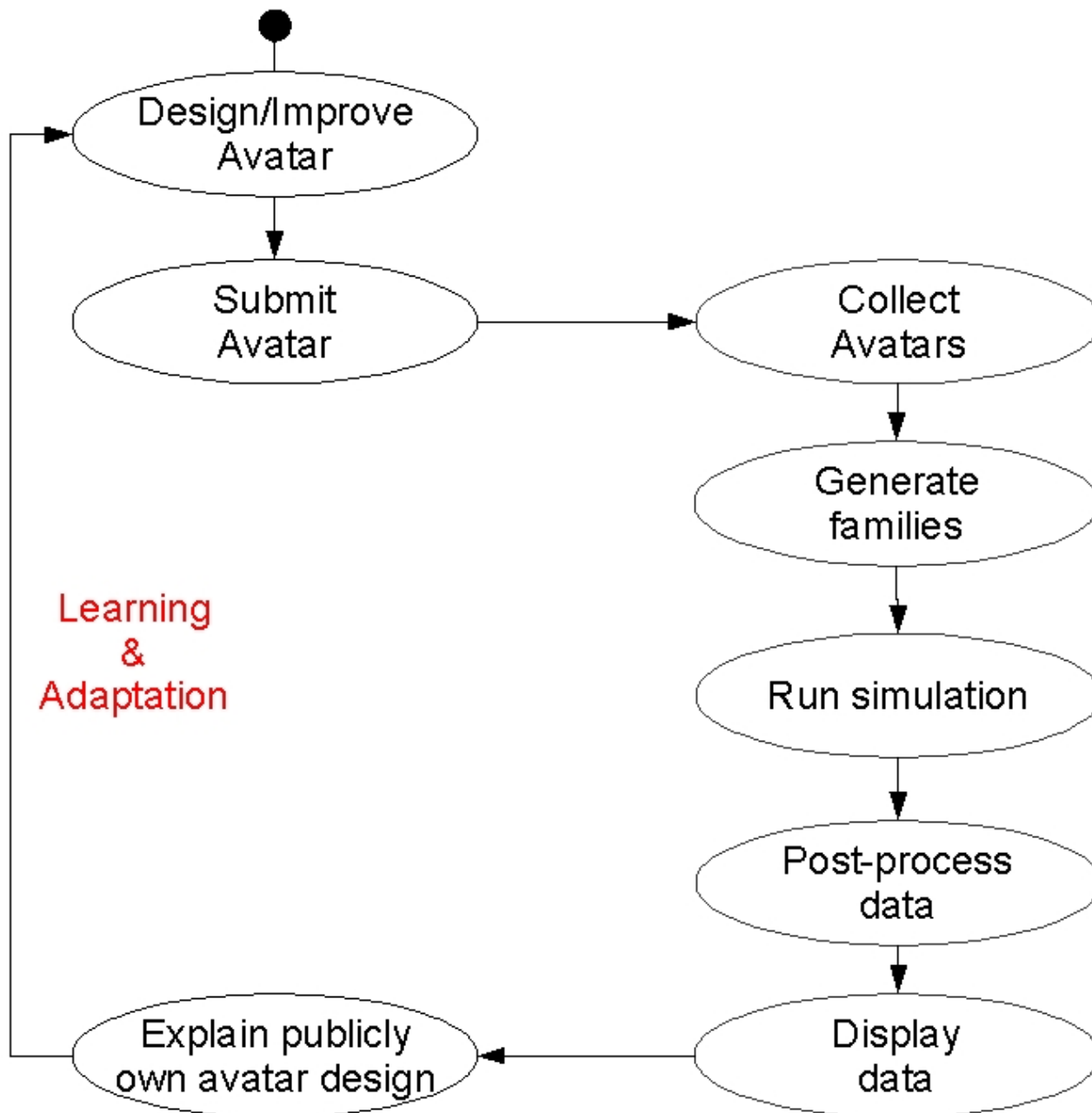
# *Avatar-based method*

1. Subjects imprint themselves directly into their avatar
- ▶ 2. Avatars are validated through blank simulations
3. Populations of agents are generated from each avatar and compete against each other in an artificial market
4. Results are analysed in common
5. Avatars content is described publicly
6. Subjects update their avatar



Participant

Facilitator



# *Preliminary results*

- ♦ 2 experiments: Lyon 2004 and Torino 2005
- ♦ Using the NatLab platform (asynchronous double auction)
- ♦ Subjects: practitioners, academics and students
- ♦ We observed

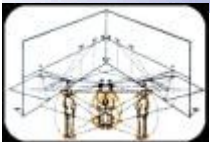
Subjects identify themselves strongly with the successes and failures of their avatar

Large diversity of strategies

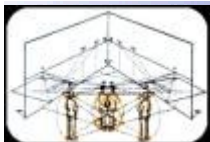
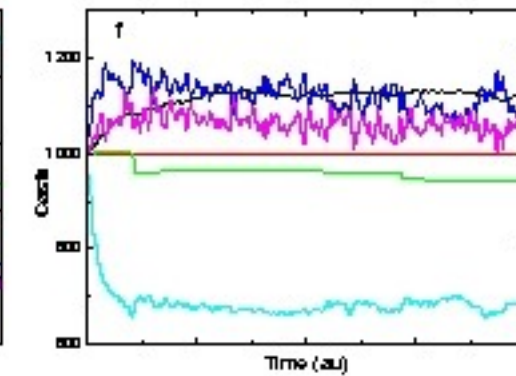
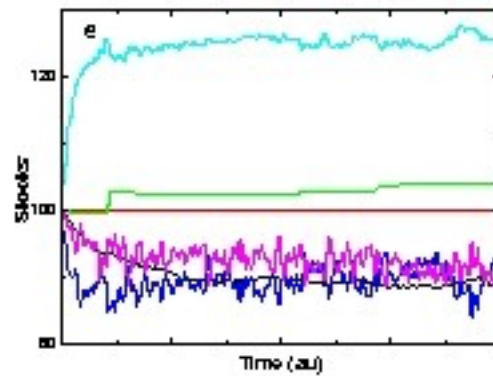
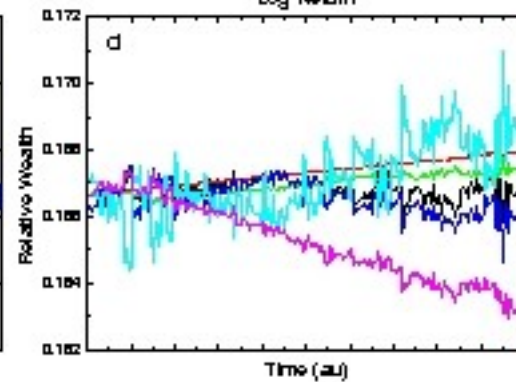
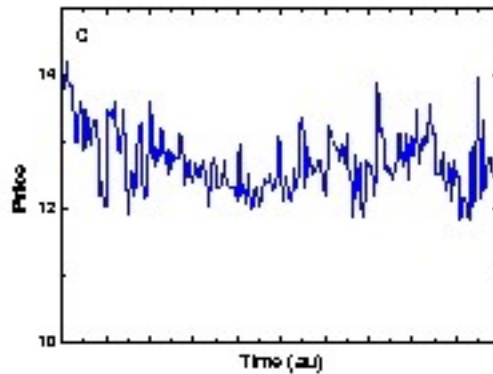
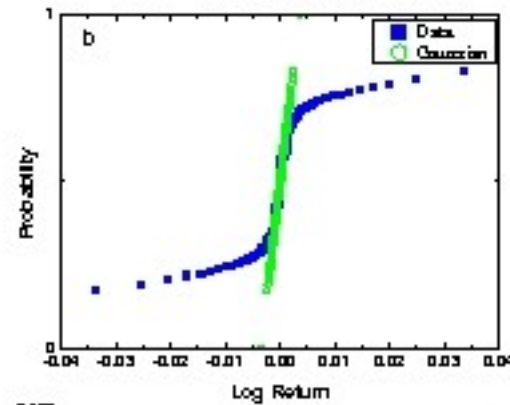
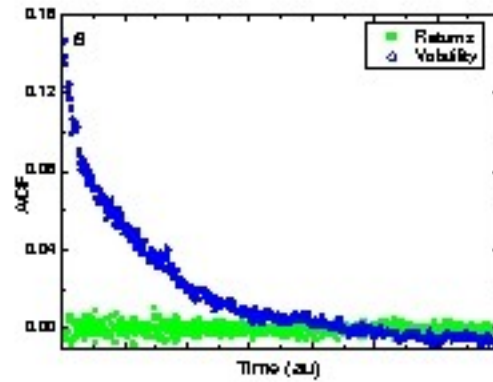
'Out of the box' strategies offered by practitioners

Co-evolution of strategies (more refined, imitation, cooperation)

Capture some qualitative features of real markets







# *Advantages*

- ▶ What the avatar-based method brings:

Obtain refined representations of subjects decision making process

Get a detailed documentation of the co-evolution of their strategies

... without relying on external records or post-experiment  
introspection on state of mind and motivations

... while keeping the emergence of macroscopic dynamics

Put the complicated learning & adaptation issues back into the  
humans

Use incentives not dissimilar to real world (ego motivation)



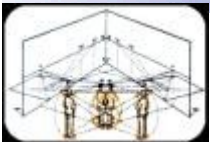
# *Drawbacks*

- ♦ But ...

Some subjects faced problem expressing themselves in a computer feedable format

When they could, the convergence toward a satisfactory avatar was a slow process

Avatars capture only the conscious part of human decisions: to what extent are markets dynamics driven by unconscious, intuitive decisions?



# *Conclusions*

- ◆ ACE comes as a complementary approach to Markets Microstructure and Behavioral Finance
- ◆ We propose a method and a tool linking computer simulations and experimental laboratories
- ◆ We consider avatars as a medium to capture subjects cognitive behaviour in an objective and documented way
- ◆ We welcome on board economists, experimentalists in Behavioral Finance, psychologists and computer scientists

