

# Unpacking Diversity

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# Applications

NSF - IGERT: Institutions (IDEAS)

NSF - Bio: Sprawl (SLUCE)

Muri: Terrorism

# Diverse Agents

- Representative Agent
- Statistical Agents
- Typed Agents
- High Fidelity Agents

# Representative Agents

All agents have the same rules, preferences or endowments.

Each agent set to average

What difference we see comes from environmental diversity: prices, networks, and so on.

# Statistical Agents

Actions depend upon some vector of attributes that has a distribution.

We fit agents to the distribution

# Typed Agents

We create some finite number of types of agents.

Each type fits a mean or fits a distribution.

# High Fidelity Agents

We fit each agent in the model to the demographic characteristics, and to the extent possible preferences of a real agent.

# Representative vs Statistical

Advantage: Tail wags the dog

Riot if:  $\text{Number rioting} > \text{Threshold}$

Buy:  $\text{Lot size} > \text{threshold}$



# Statistical vs Types

Advantage: Capture cancelled movements

Minivan becomes Empty Nester

Newly Married become Minivan

Just Graduated become Newly Married

Overall preference profile unchanged, but lots of movement.

# Types vs Hi Fi

## Open Question

In the limit, the type model becomes the Hi Fi model.

Parsing into types loses information.

That information loss depends on size and number of externalities.

# Project SLUCE

Trying to fit land use patterns.

Representative agent models didn't work well.

Statistical models far better

Typed agent model gave more flexibility, but we felt that dubious science underpinned creation of types.

Hi Fidelity modeling really costly for large number s of agents.