ESRC Conference on Diversity in Macroeconomics: Discussion on Dealing with Complexity and Uncertainty in Macro Dynamics

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Discussion on *"Endogenous Macro Dynamics From Large Numbers of Simple Agents"* by R. Axtell (I)

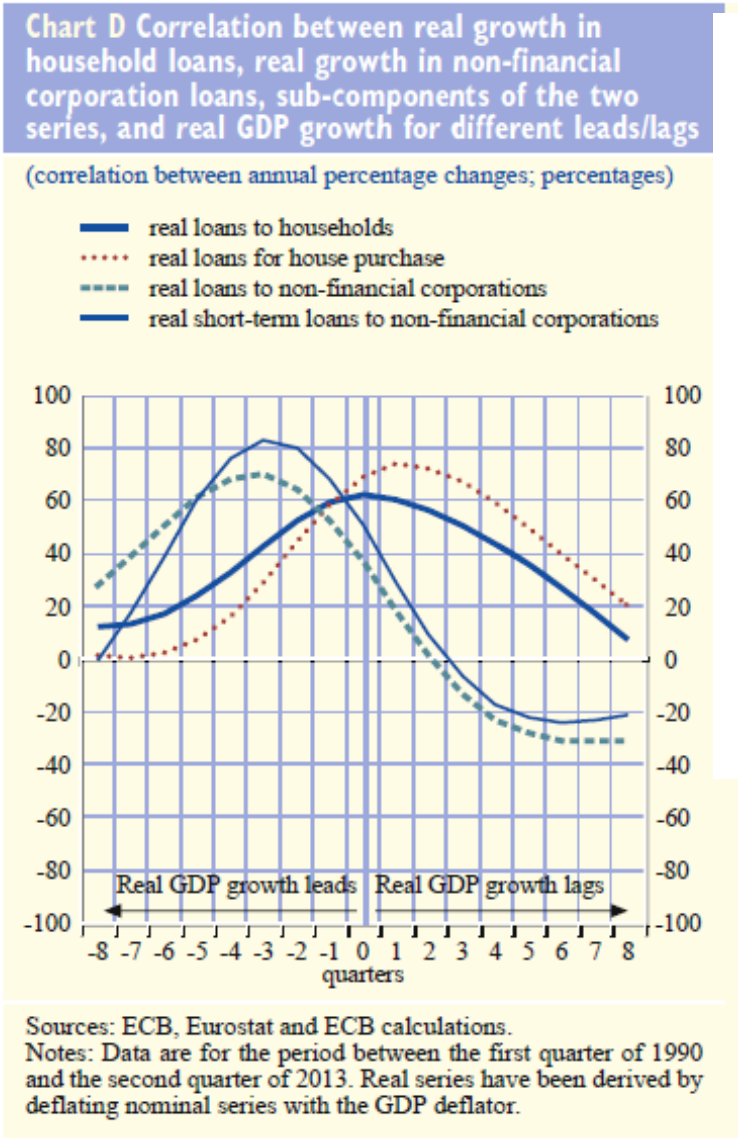
- Large-scale (millions of agents) AB macro model
- New and interesting features:
  - team production
  - increasing returns to scale
  - endogenous business cycles caused by labor flows
- Remarkable results:
  - dis-equilibrium at the agent level but steady state at the macro level
  - stylized facts of firms' distributions

Discussion on *"Endogenous Macro Dynamics From Large Numbers of Simple Agents"* by R. Axtell (II)

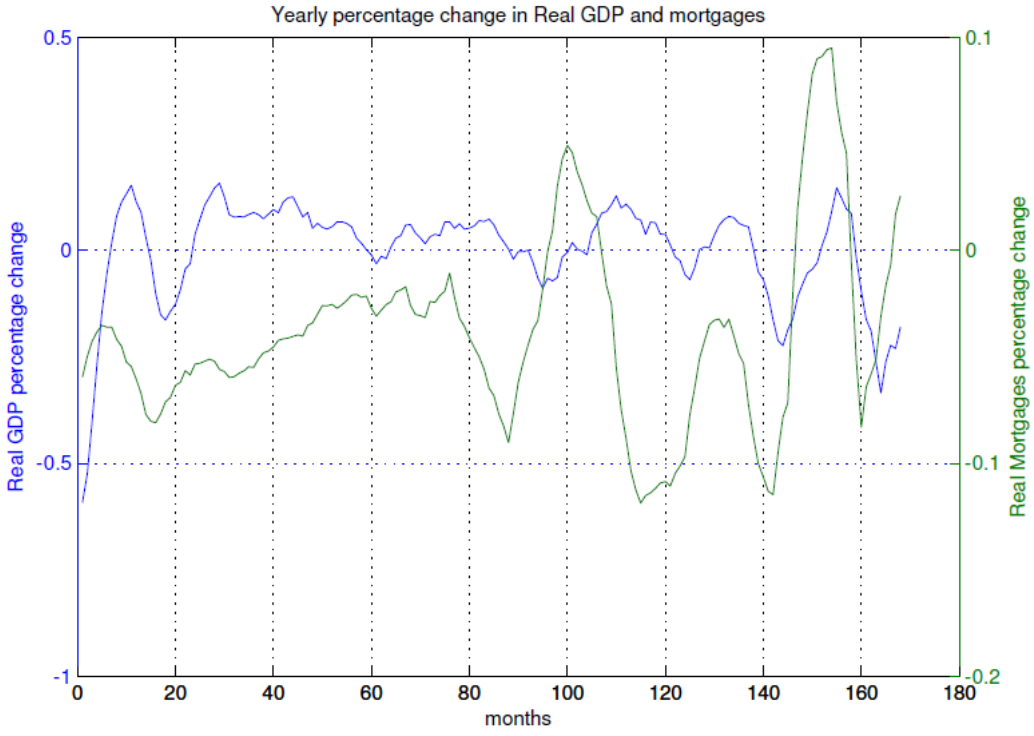
- Questions:
  - what is the added value of the 1-to-1 scale with the US economy?
  - could you define better what is the steady state in this model?
  - there are capital goods, why we can not observe long-run growth?

- Concerns:
  - remind me the approach of real business cycles models
  - what about money and debt?
  - no credit-driven business cycles ...

Eurozone data (ECB):



Iceace model data:



http://iceace.github.io/home/

The balance sheet perspective in agent-based models (ICEACE)

Agent	Assets	Liabilities
Household *abbrev.*: Hous *index*: $h = 1, \ldots, N_{Hous}$	housing X^h liquidity, M^h equity fund shares, V_d^h	mortgages, U^h *equity*, E^h
Firm *index*: $f = 1, \ldots, N_{Firm}$	capital goods, K^f inventories, I^f liquidity, M^f	debt (loans from banks), D^f *equity*, E^f
Construction firm *abbrev.*: TFirm *index*: $s = 1, \ldots, N_{TFirm}$	capital goods, K^s inventories, I^s liquidity, M^s	debt (loans from banks), D^s *equity*, E^s
Bank *index*: $b = 1, \ldots, N_{Bank}$	loans, $\mathcal{L}^b = \sum_{f,s} D_b^{f,s}$ mortgages, $U^b = \sum_h U_h^b$ liquidity, M^b	private sector deposits, $\mathcal{D}^b = \sum_{h,f,s} M_b^{h,f,s}$ debt with the central bank, D^b *equity*, E^b
Equity Fund *abbrev.*: Fund *index*: e	liquidity, M^e firms' shares, V_f^e construction firms' shares, V_s^e banks' shares, V_b^e	*equity*, E^e
Government *abbrev.*: Gov *index*: g	liquidity M^g	debt to the central bank, D^g *equity*, E^g
Central Bank *abbrev.*: CB *index*: c	liquidity, M^c loans to banks, $\mathcal{L}_b^c = \sum_b D^b$ loans to the government, $\mathcal{L}_g^c = D^g$	outstanding fiat money banks liquidity, $\sum_b M^b$ government liquidity, M^g fund liquidity, M^e *equity*, E^c

Discussion on *"Taking Uncertainty Seriously: Simplicity versus Complexity in Financial Regulation"* by S. Kapadia et al. (I)

- Background:
  - revival of the long debate between risk vs Knightian uncertainty
  - bias-variance trade-off in prediction errors
- Interesting message:
  - in a world with uncertainty, simple heuristics can sometimes perform better than more complex models
  - the variance of the more flexible complex models is often so large for small sample sizes (overfitting) that it overshadows the error of heuristics due to bias
  - less information is more
- Applications:
  - determination of capital requirements for banks
  - prediction of bank failures

Discussion on *"Taking Uncertainty Seriously: Simplicity versus Complexity in Financial Regulation"* by S. Kapadia et al. (II)

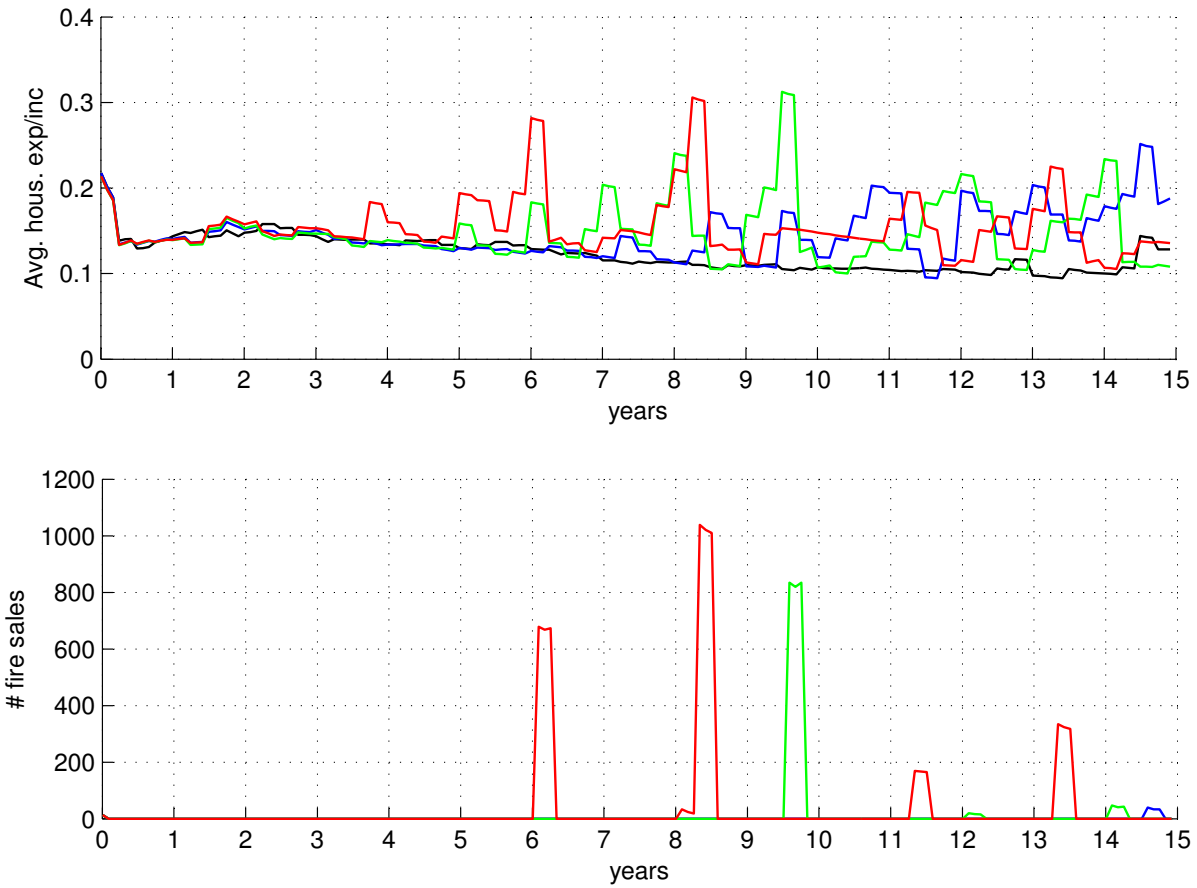
- Remarkable results via Monte Carlo simulations on real data bases
  - capital requirements: naive $1/N$ methods (Basel I) can outperform complex internal ratings Based approach Basel II
  - bank failure prediction: fast and frugal decision trees may outperform regression methods

- Concerns:
  - the leverage ration is not predictiove in the case of US vbanks
  - Goodhart law
  - regulatory arbitrage may be easier with simpler regualtory prisions

Discussion on *"Modern Macroeconomics after the Crisis: Hedgehog or Fox?"* by M. Miller and L. Zhang)

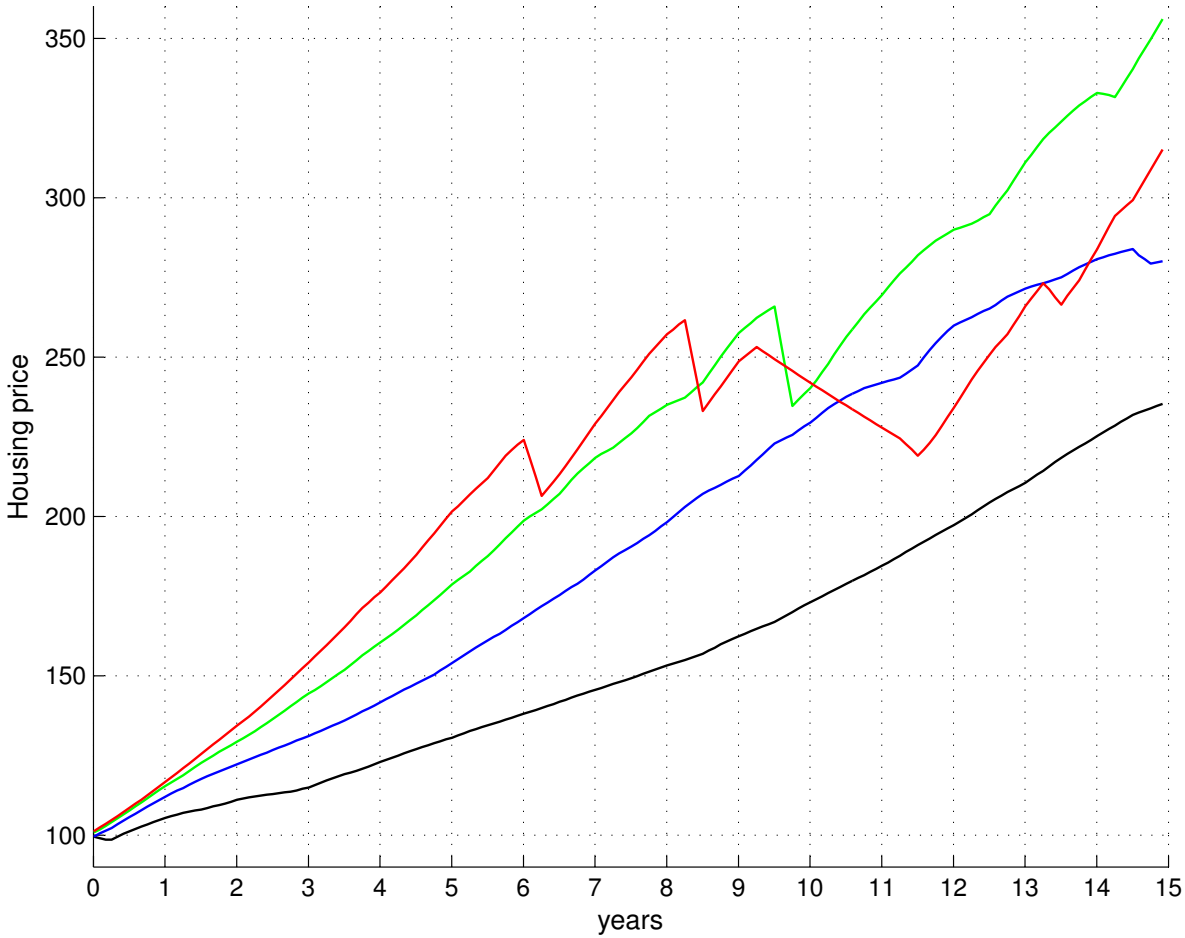
- Review about pecuniary externalities that affect borrowers and lenders balance sheets in procyclical fashion:
  - demand side pro-cyclicality with financial accelerator
  - procyclical changes to risk premia on the supply side,
- Very elegant and technically sophisticated review
- Outlook for future research:
  - how to deal with these concepts in dise-equilibirum?
  - how to endogenize shocks?,

Iceace: ffinancial fragility of households



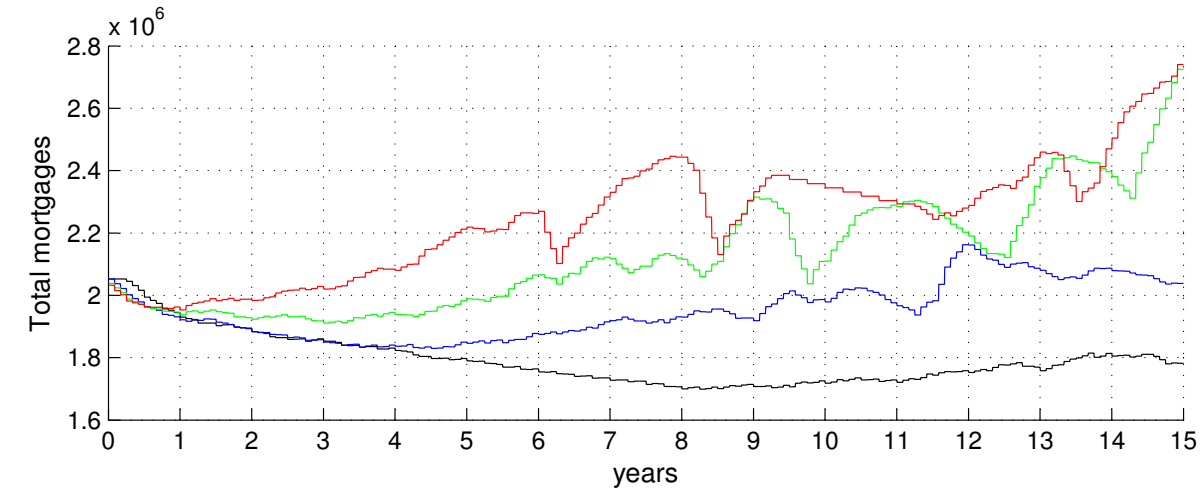
$\beta = 0.2, 0.25, 0.3, 0.4$

Iceace: Housing price



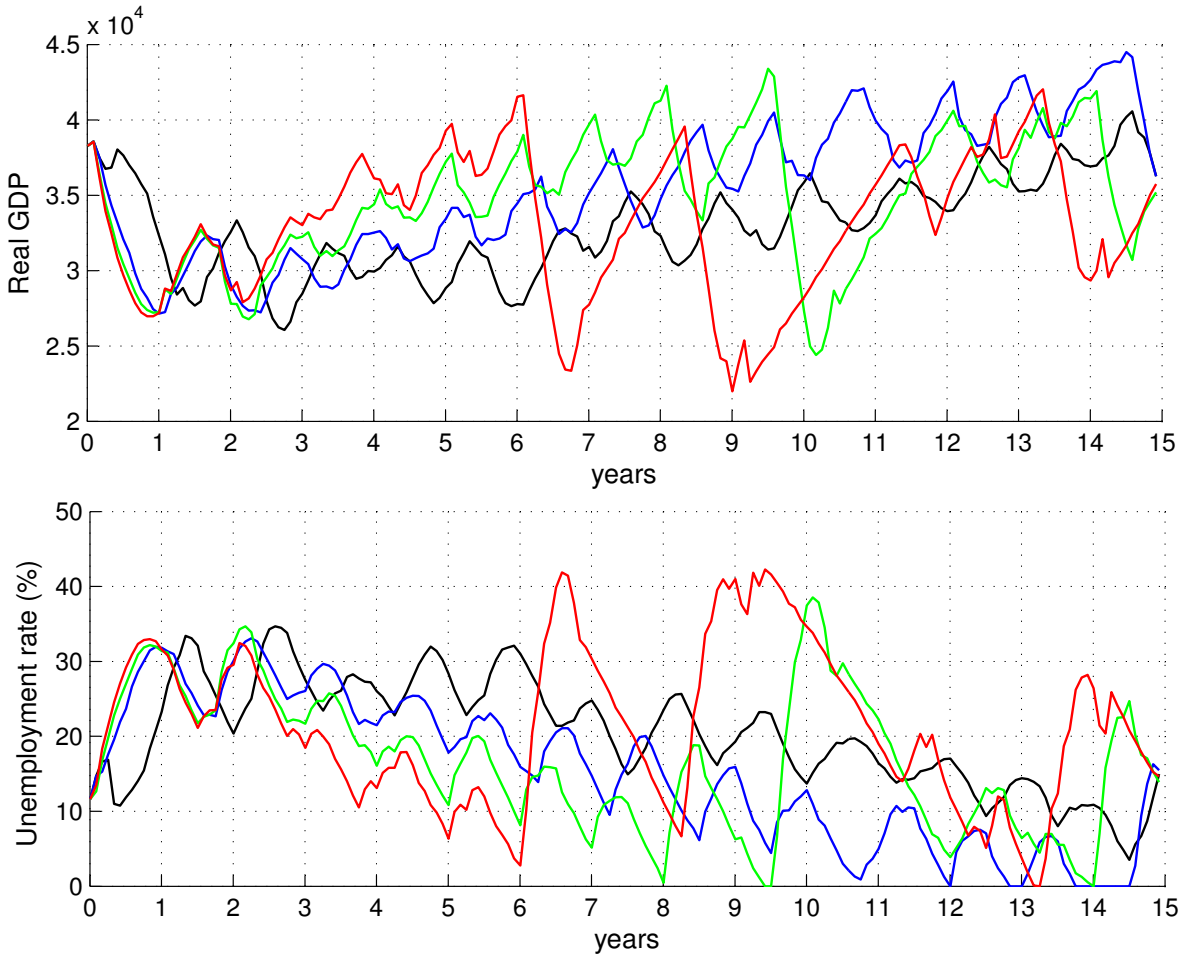
β = **0.2**, **0.25**, **0.3**, **0.4**

Iceace: Mortgages



$\beta = 0.2, 0.25, 0.3, 0.4$

Iceace: Real GDP and unemployment rate



β = **0.2**, **0.25**, **0.3**, **0.4**