

# Comments on

“A Dynamic Model of Household Location, Regional Growth and  
Endogenous Natural Amenities with Cross-Scale Interactions”  
by Irwin, Jayaprakash, and Chen

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# Overview

- Why at the frontier?
  - In general
  - For regional economics
- Suggestions
  - Digest policy findings
  - Clarifying the tradeoffs in modeling
  - Endogenous politics



# The frontier of ecological realism and modeling complexity

- Economic models simplify for clarity  
(ex: smooth functions, CRS, equilibrium, interior solutions)
- Have we simplified too much?
- In many cases, **yes**
- Great need to try more realism
- Identify when simplifications yield badly wrong answers

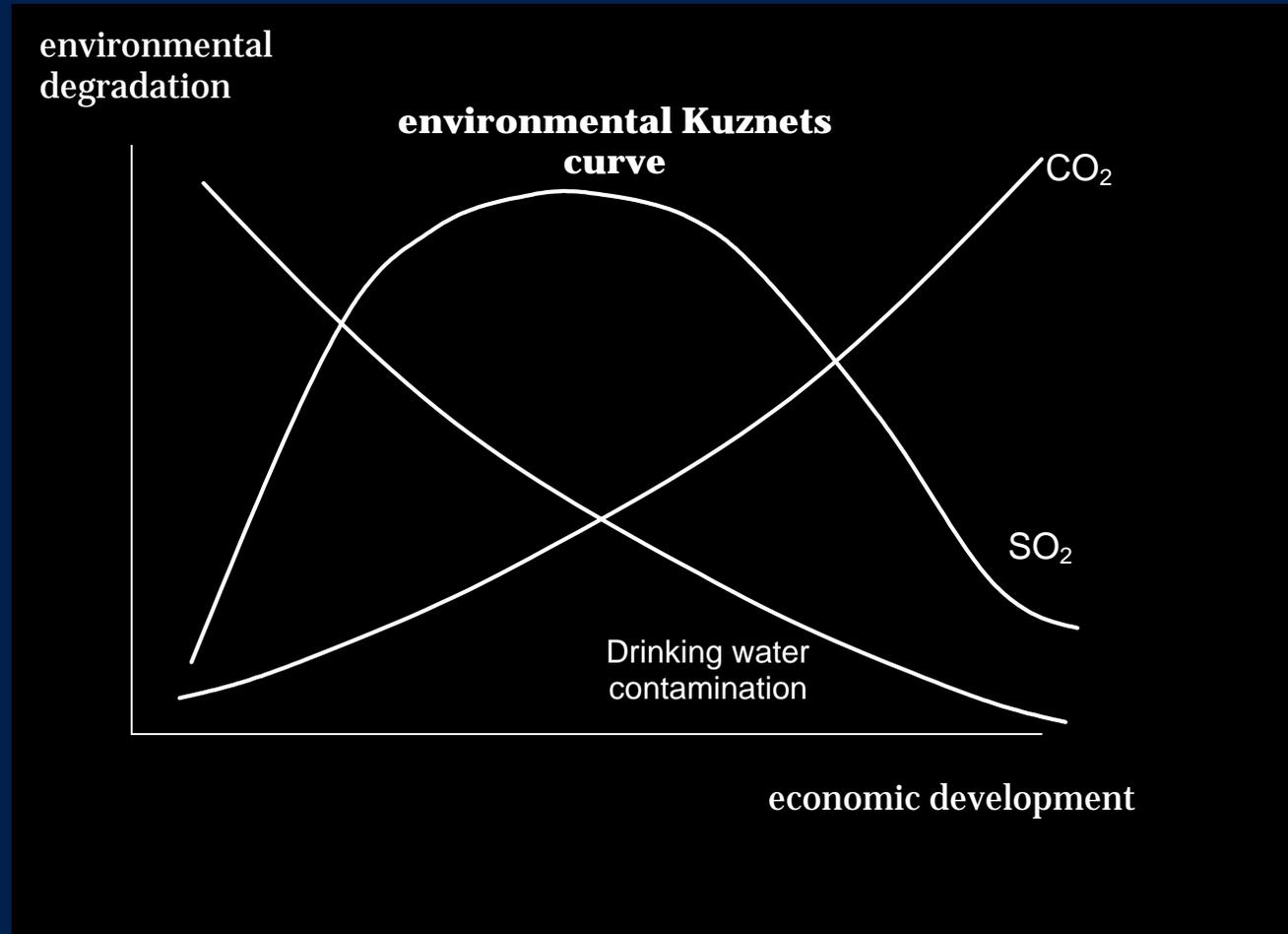


- This paper is at the frontier of new complexity:
  - Coupled model – **feedbacks** between humans and ecosystem
  - More attention to multiple scales (time)
  - Heterogeneous agents
  - Multiple stable states, transient dynamics
  
- What does it NOT do?
  - Spatial complexity
  - Uncertainty
  - Realistic ecological model
  - **Endogenous policy**



# Old concept of regional growth and ecosystem change

- Static
- Varies between pollutants – why?
- Some have tried to make models consistent with it
- Only just beginning to include important endogeneities
- Irwin et al. tackles feedbacks and dynamics with new sophistication



## Some key findings

- If your model ignores interactions:
  - It may misjudge propensity of system to stay in some equilibria
  - It may misjudge effects of policies caused by feedbacks
- Relative time scales have big impact on features of the system:
  - Resilience
  - Nature of good equilibrium
- Agent heterogeneity matters if system near threshold



# Suggestions

- Split paper up to make each part more effective
  - Technical content deserves its own forum
  - Paper has a nice survey that could be a note somewhere in its own right
  - Two areas need more rounding out:



## Policy content

- Needs to be digested more for policymakers
- Do policy simulations in de-coupled model to illustrate how qualitative findings might be wrong
- Highlight any divergence from classic policy prescriptions (is it still true we want to impose Pigouvian tax on activity with negative externality?)
- You find tax on recreation makes matters worse – but why would we tax recreation if degradation is only caused by land use?



# When does complexity matter?

- No one can model everything
  - Benefit of complexity: more accurate results
  - Costs of complexity:
    - *Hurdle to getting research done*
    - *Becomes hard to generalize to other cases*
- Work more to help analysts identify priorities
- Work more to help us identify likely biases when complex features are ignored



## Try endogenous policy

- Model has scenarios where welfare declines over time due to population growth → degraded amenities
- We observe endogenous reactions to that
  - Zoning changes limit density of development (Lewis and Provencher)
  - Greenbelts
  - Conservation easements to protect lands in area
- These might alter the dynamics, could even change supported steady states



# Summing Up

- Great paper
- Good survey of this facet of frontier in environmental economics
- High-quality work that pushes that frontier forwards
- NSF should give more grants to fund teams to do this kind of work

