

# **Tracking Oil Well Drilling Dynamics in the United States**

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# Motivation

- New oil and gas boom in US
- Environmental concerns
- Economic concerns
- Political concerns

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- New oil and gas boom in US
  - Environmental concerns
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- What factors lead to oil and gas well citing decisions?

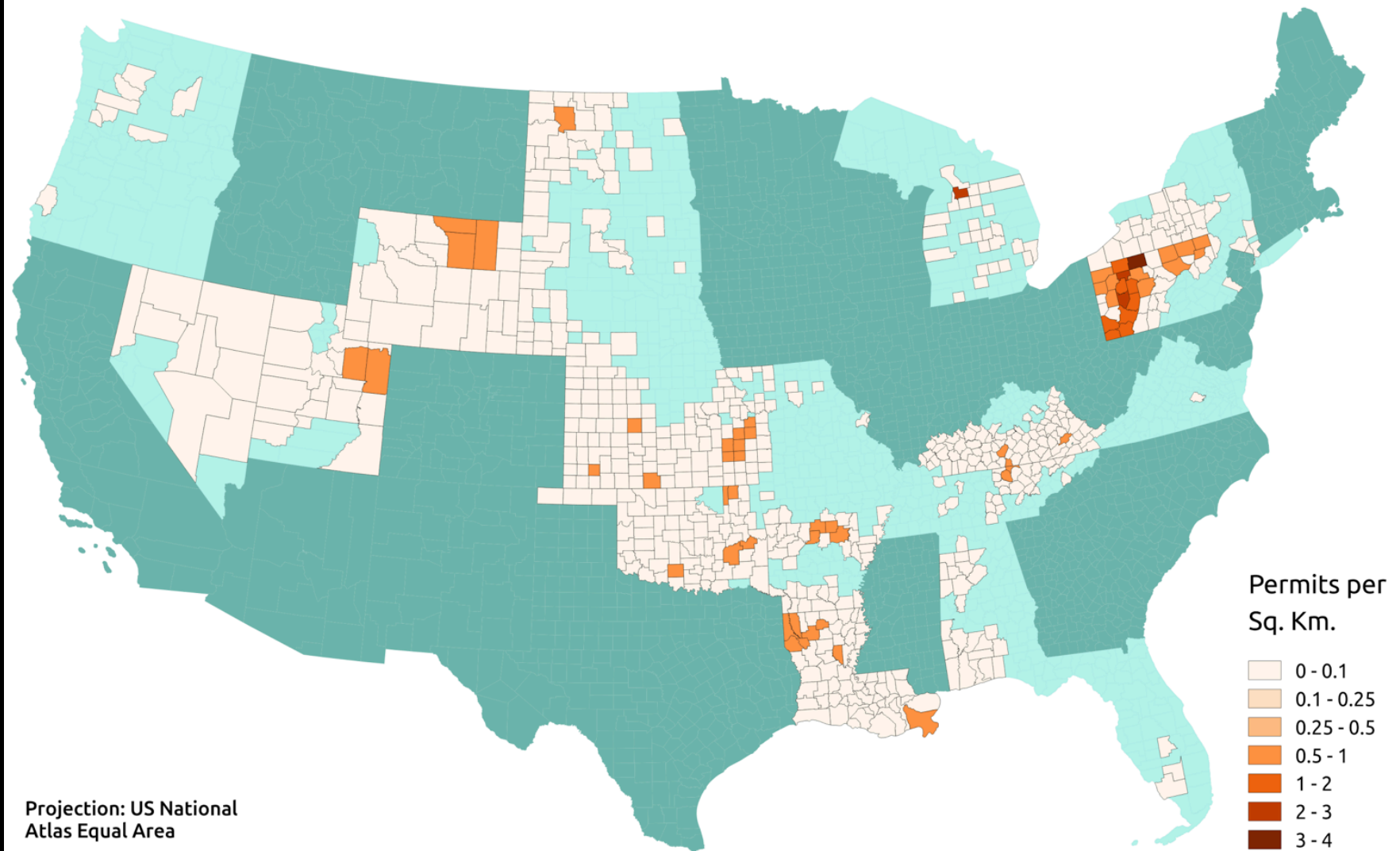
# Assembling Oil and Gas Well Data

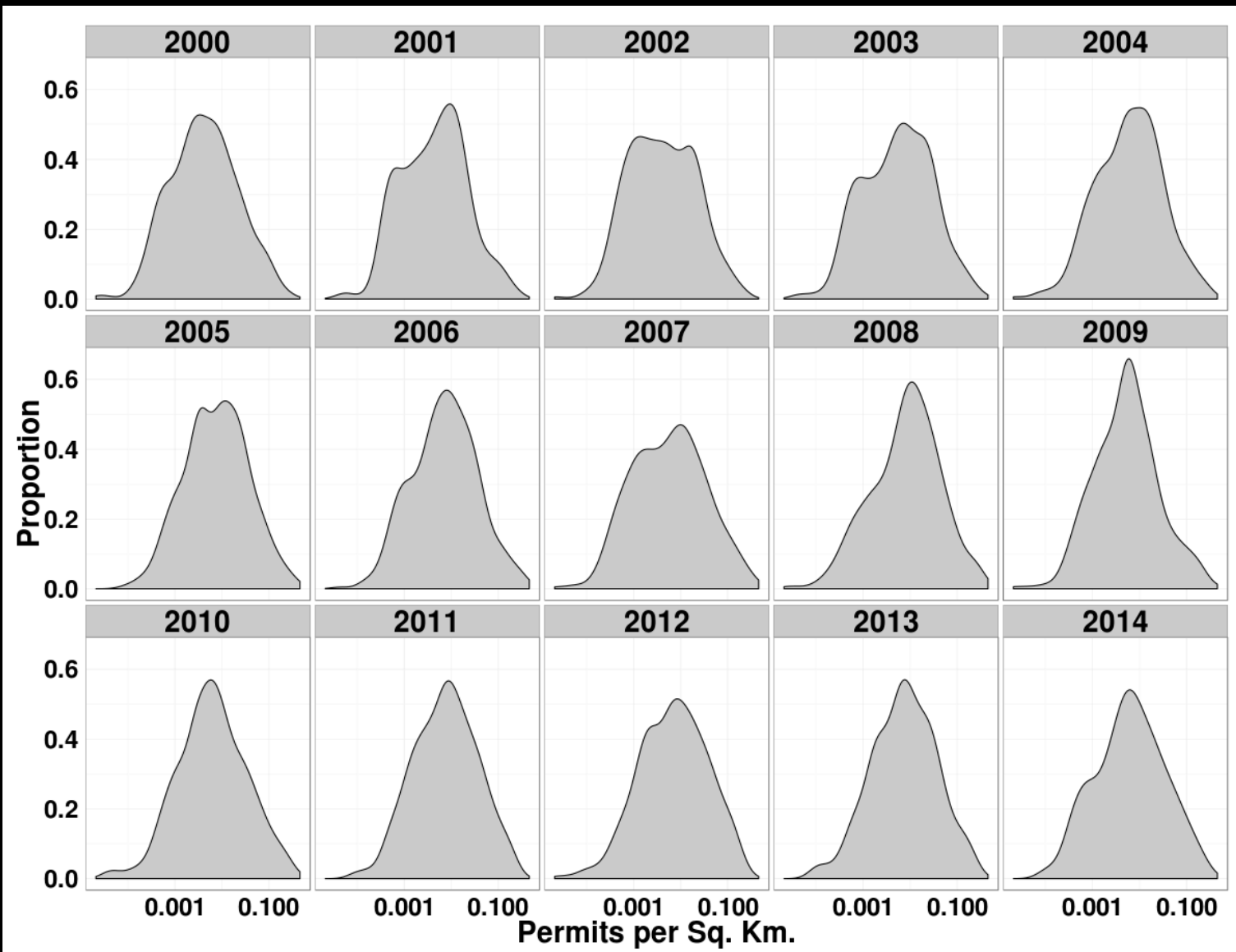
- Best source: data on drilling permits
- Held by state governments
- Often very different coding systems
- Questionable data quality
- Challenging to get datasets to play well together
- Some major players (Texas, California, Ohio, Illinois, West Virginia) yet to be acquired

# Assembling Oil and Gas Well Data

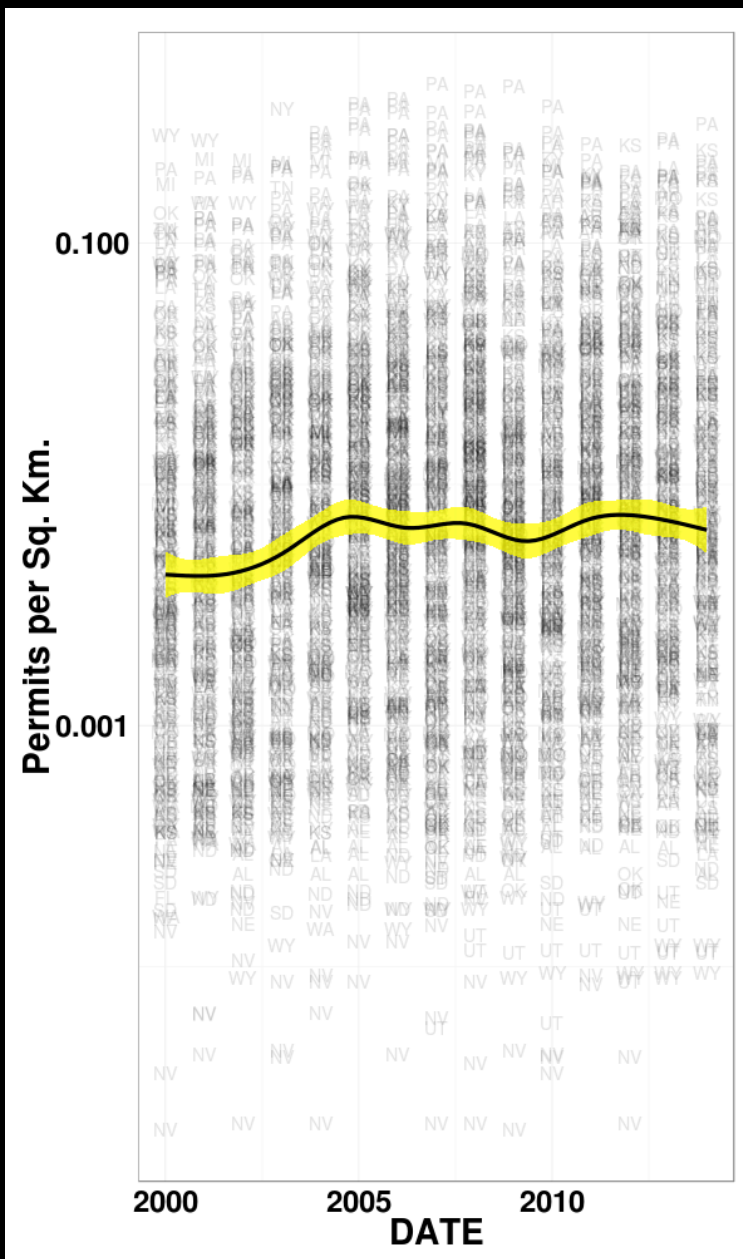
- Assembling data on oil and gas well permitting at county level, 2000-2014
- Code year of permit application or, when unavailable, SPUD date
- Aggregate to county level (least likely to be incorrect)
- While data are noisy, large-scale, long-run trends should be discernable

# Counties in Current Dataset





**Distribution of Permitting over Time**

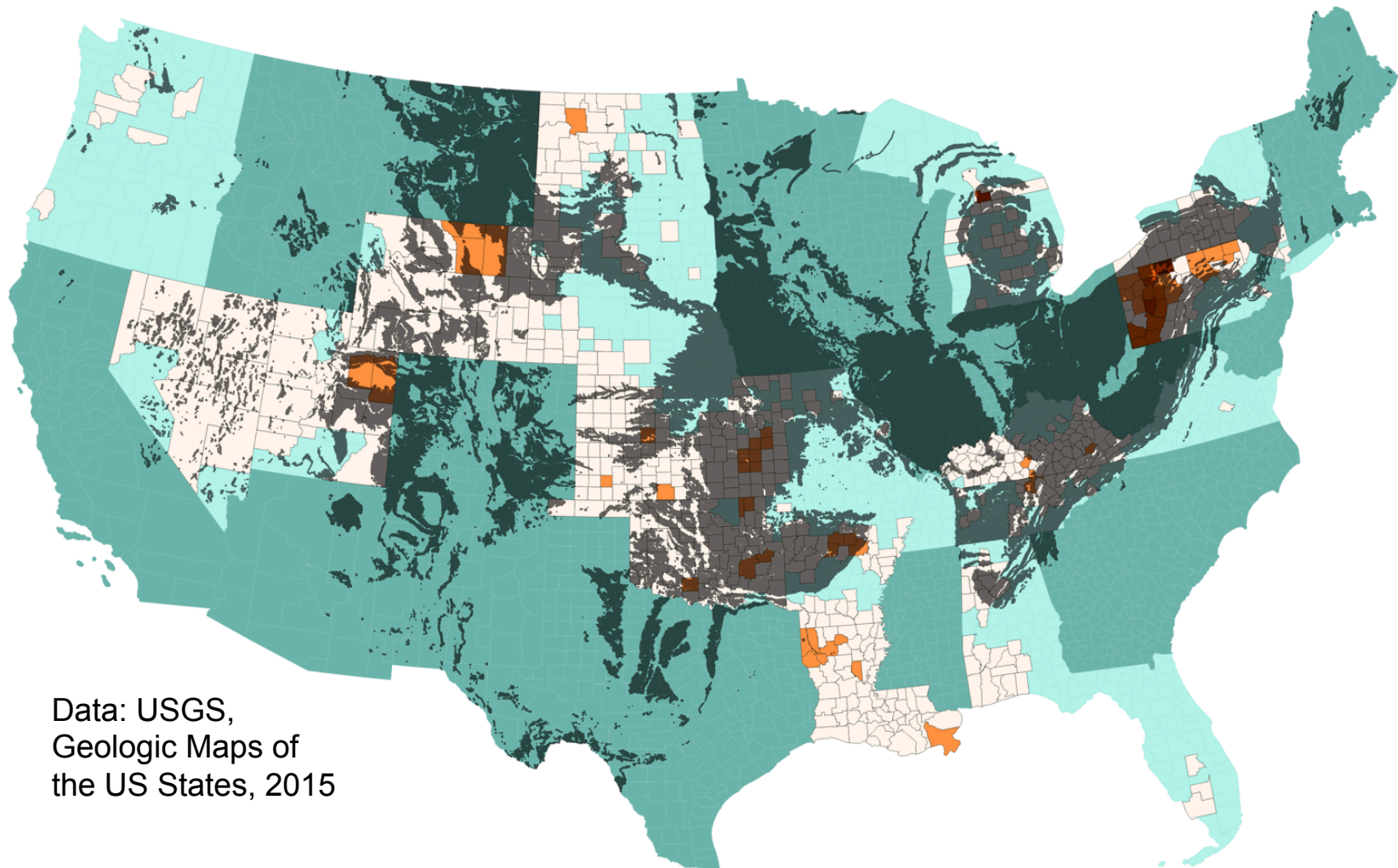




# Possible Factors

- Favorable geology
- Contracting
  - Bargaining power
  - Transaction costs
- State and local policy
- Local public opinion

# Shale Areas in the United States



Data: USGS,  
Geologic Maps of  
the US States, 2015

## Favorable Geology Cannot Explain Everything

**Permits per Sq. Km.**

0.100

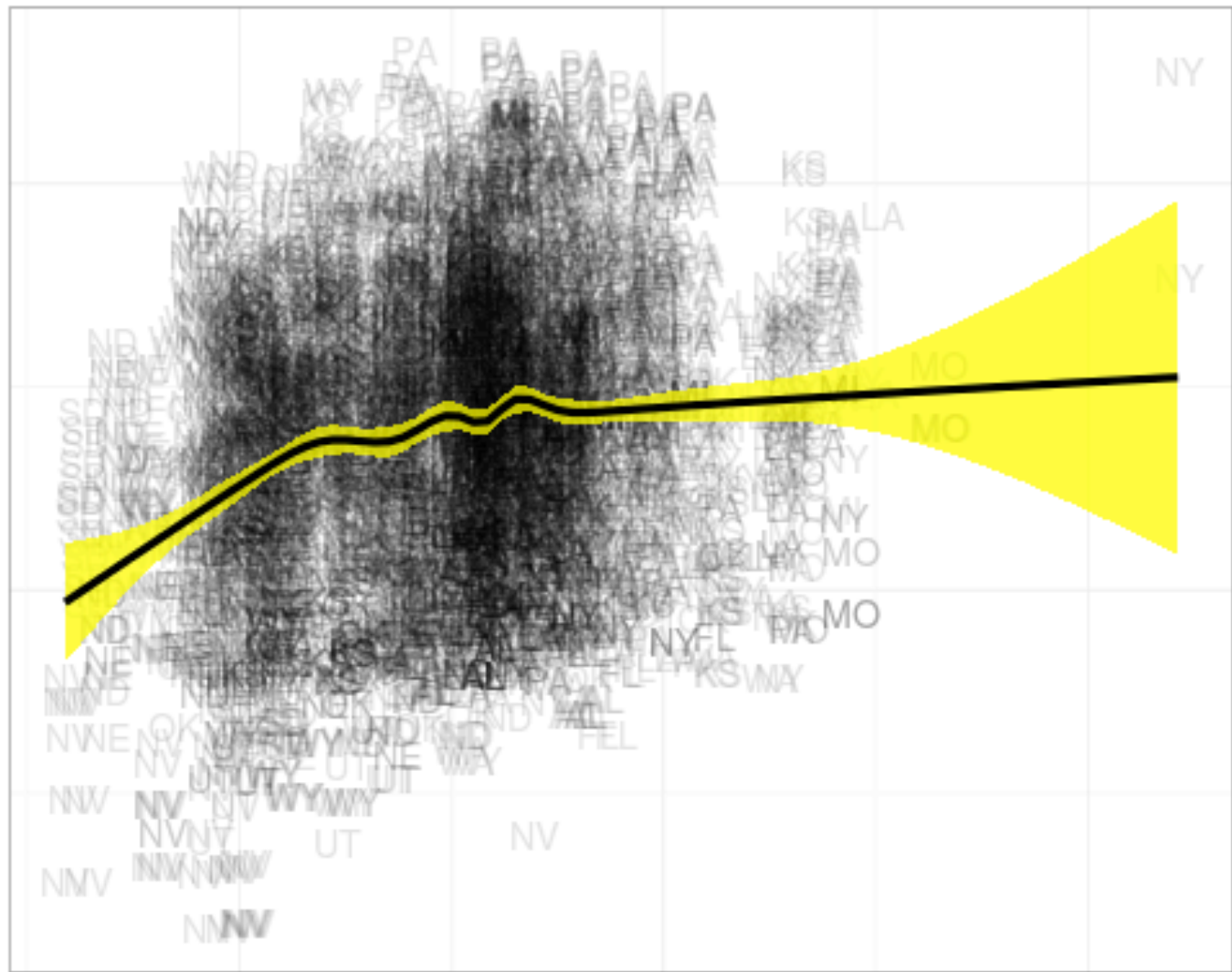
0.001

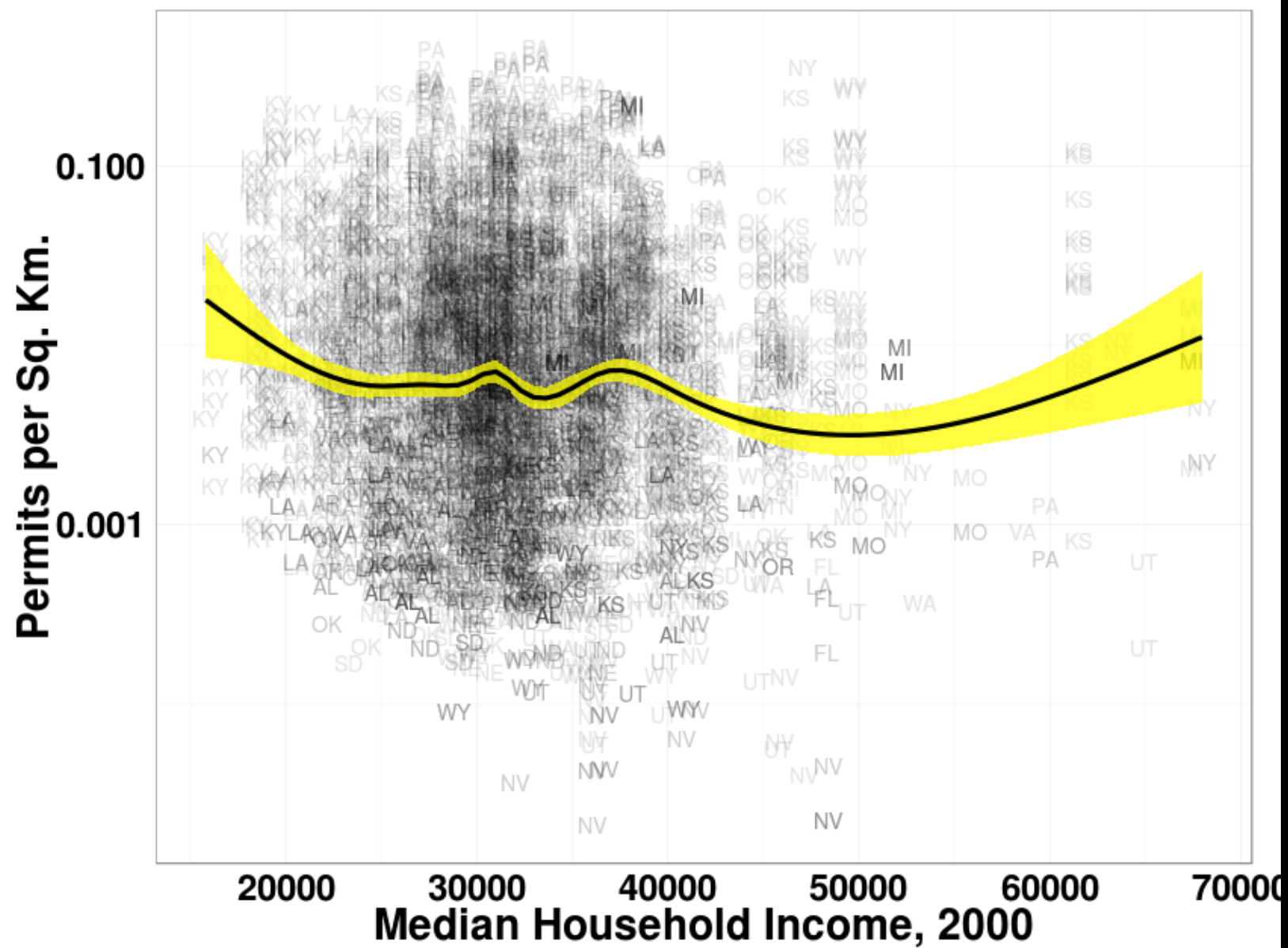
1

100

10000

**Persons per Sq. Km.**

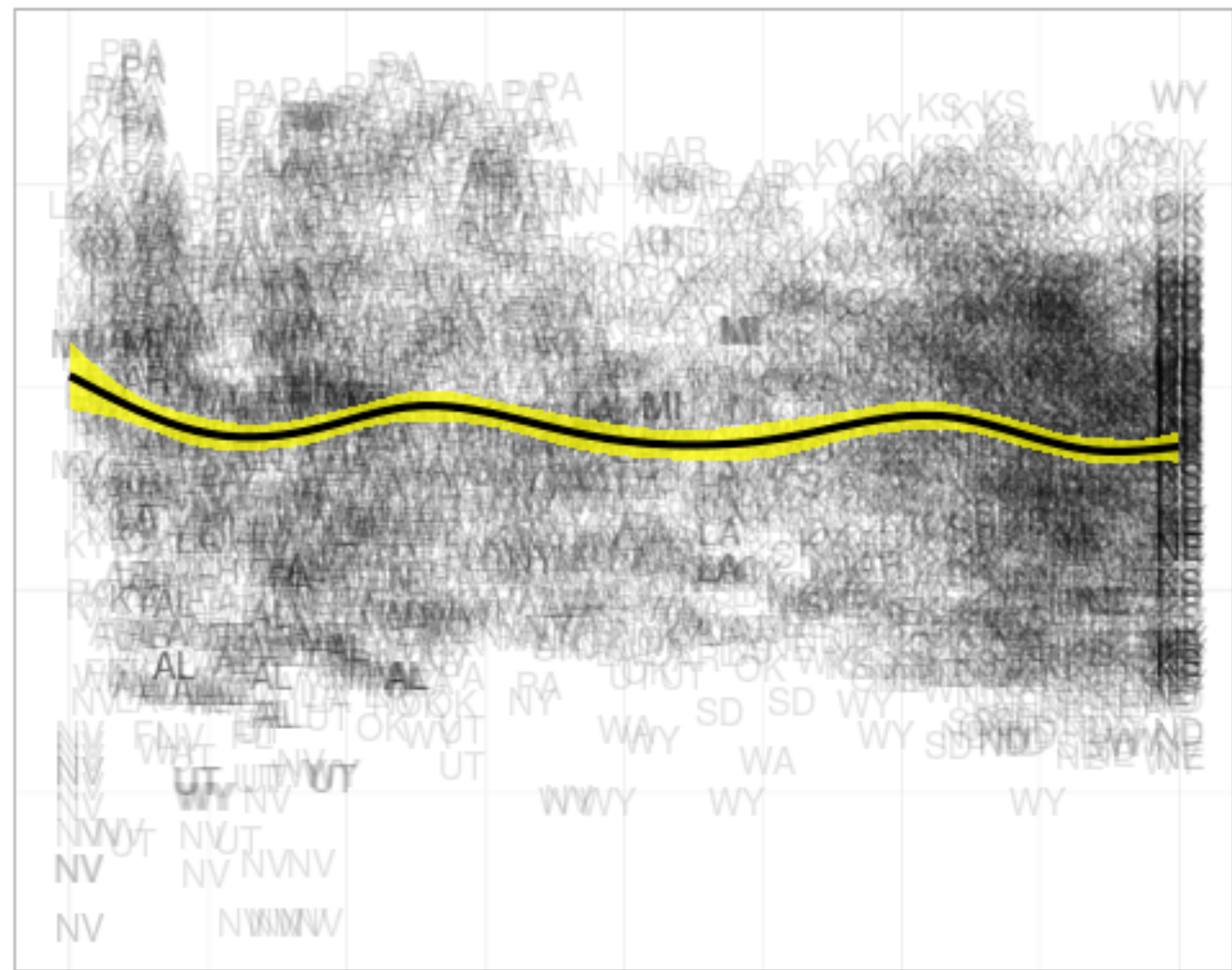




**Permits per Sq. Km.**

0.100

0.001



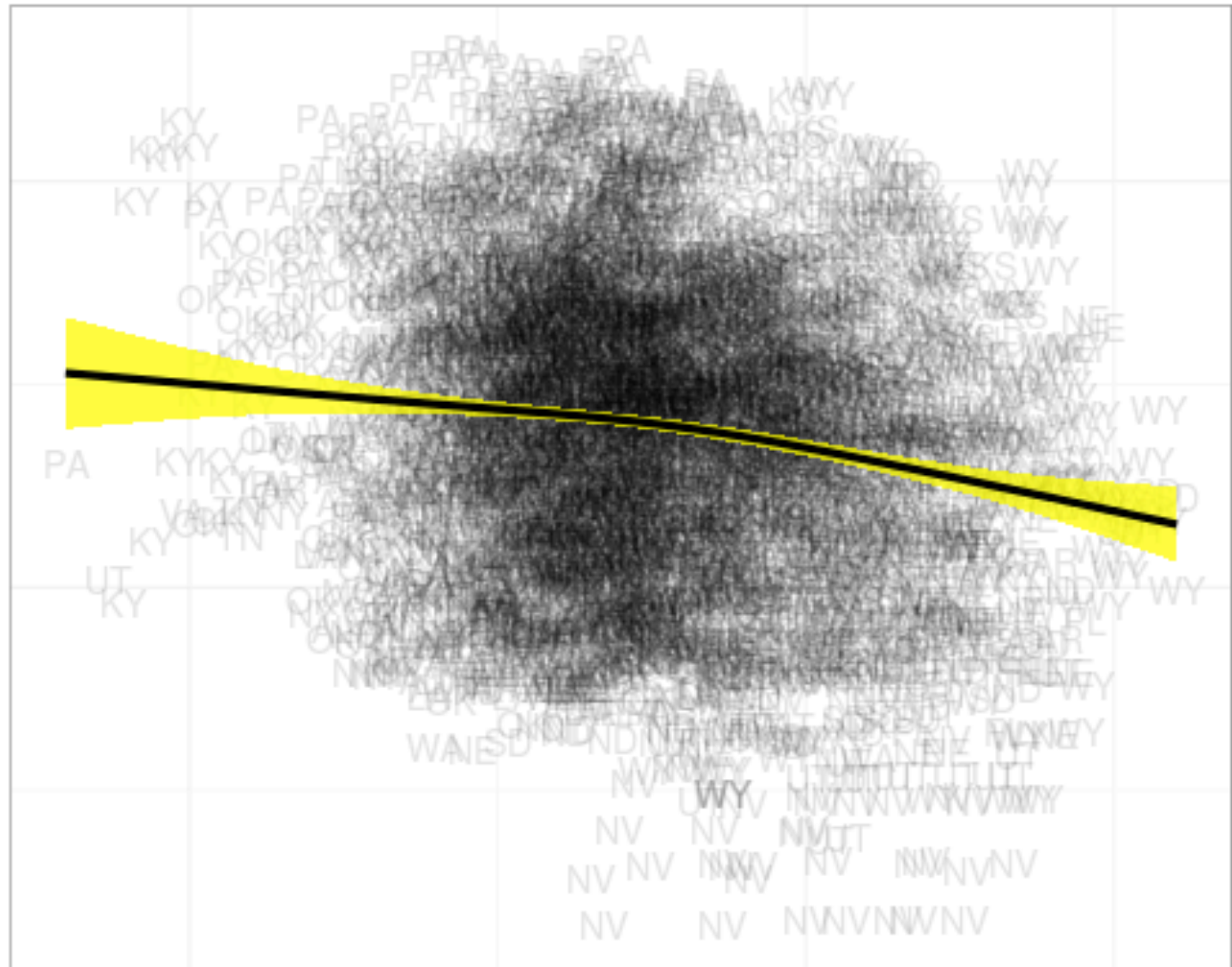
**0.00 0.25 0.50 0.75 1.00**  
**Proportion of Land Under Agriculture**



**Permits per Sq. Km.**

**0.100**

**0.001**



**$1e+05$**

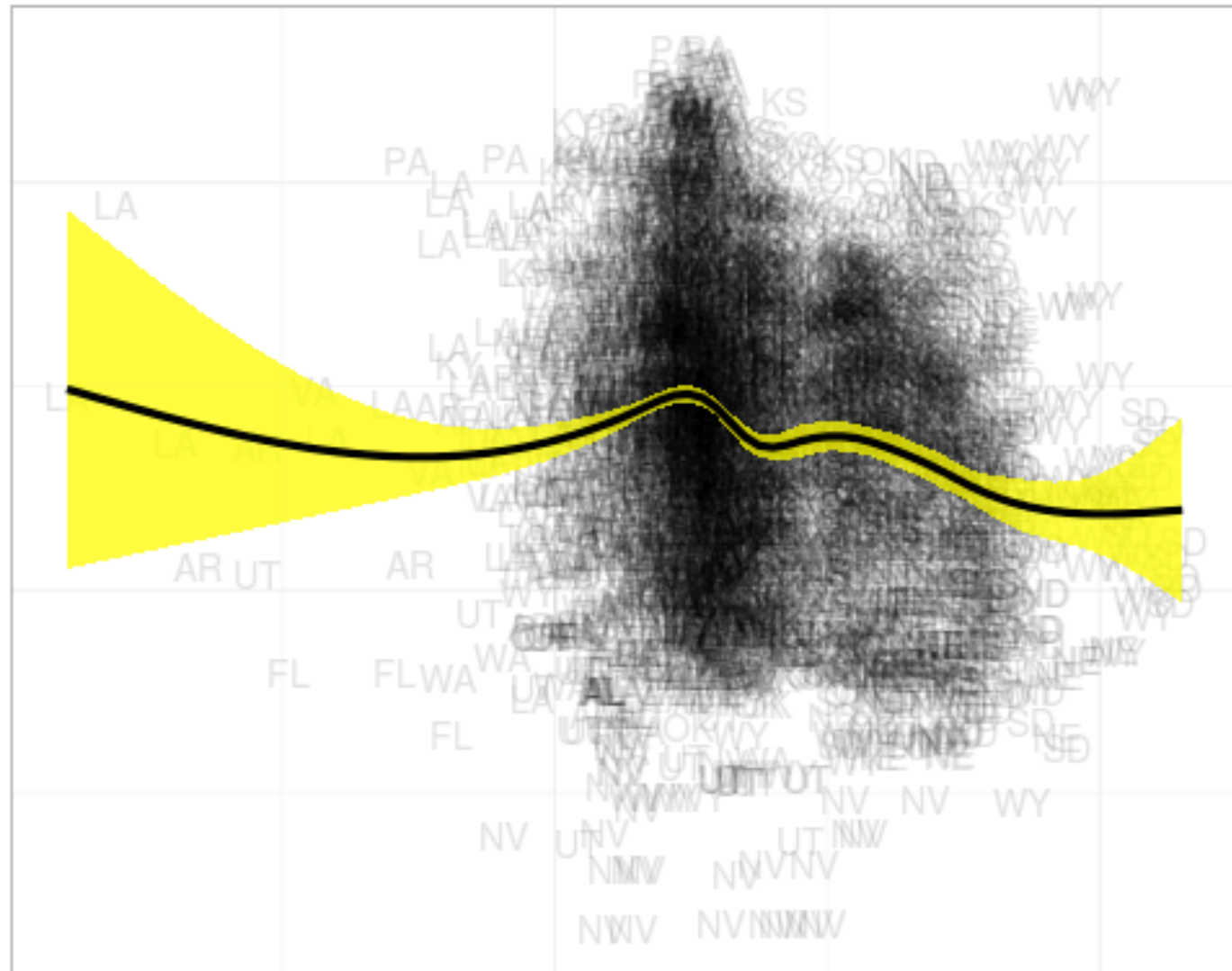
**$1e+06$**

**Mean Farm Value (\$)**

**Permits per Sq. Km.**

0.100

0.001



1e+05

1e+07

**Median Farm Size (Sq. M.)**





# Reflections

- Patterns of drilling activity not just about geology
- Opportunity cost of agriculture
- Bargaining power and alternative opportunities

# Further Work

- Complete data collection
- Estimate hierarchical negative binomial model to incorporate state variables and variance

# Data Sources

- Chetty, et al., Where is the Land of Opportunity? The Geography of Intergenerational Mobility in the United States. *Quarterly Journal of Economics*, Online September 14, 2014.
- USGS. Geologic maps of US states. USGS Website, 2015. [online] URL: <http://mrdata.usgs.gov/geology/state/>.
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