

Causes and Consequences of Local Ordinances Regulating Forestry in Florida

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Outline

- Motivation
 - Ordinances
 - Florida
- Determinants of local regulation
 - Theory/ literature
 - Initial results for Florida
- Interpretation and next steps

Motivation

Table 1: Florida's Forest in a Regional Context

Forces of Change	South	Florida
Land Markets	5 million private owners control 89%	350,000 private owners control 81%
	Forest loss @ 1.1 million acres/year	80,000 acres/year
	Est. loss of 16 million acres by 2030	2-3 million acres by 2030
Timber Markets	Most intensive management in world	5 million acres of plantations
	Timber production to increase 33% by 2040	Production falling/global market
Social Institutions (Taxes, regulations, etc)	Mixed impact, generally favorable	Mixed impact
	Local regulations having negative impact	Same
	Land protection on increase	Same; protection rates approaching rate of loss
Biological factors	Concentrations of pine forests	Non-native plants a big problem
	Increased risk to disease agents	One-third in pine plantations
	Southern Pine Beetle/ Fusiform Rust	Same concerns
Physical factors	Ozone & CO2 increase, temps rise, forest productivity decreases	Same concerns
	Extreme weather events could increase with climate change	Same concerns
	Prescribed fire important to restore fire-adapted species such as longleaf pine	Same concerns

Motivation

Increasing rapidly

- 1970s and 1980s: mostly in northern states (NJ, PA, NY, ME), driven by environmental motivations
- 1980s: became more common in southern states (VA, GA), often focused on protecting public property (especially roads)
- 1990s: number of ordinances in southern states more than doubled, often attributed to urbanization and ex-urbanization

Motivation

Concerns with local ordinances

- “Fragmented” or “disjointed”
- Poorly designed to address perceived problems
- Passed without consideration of economic and long-run ecological impacts
- Reflect new rural residents’ lack of familiarity with forestry
- “where relatively intense development pressures coexist with a vigorous forest products industry, local governments may find themselves enacting ordinances designed to protect natural resources but that may instead have unintended and perhaps undesirable effects on active forest management”
(Mortimer et al. 2006)

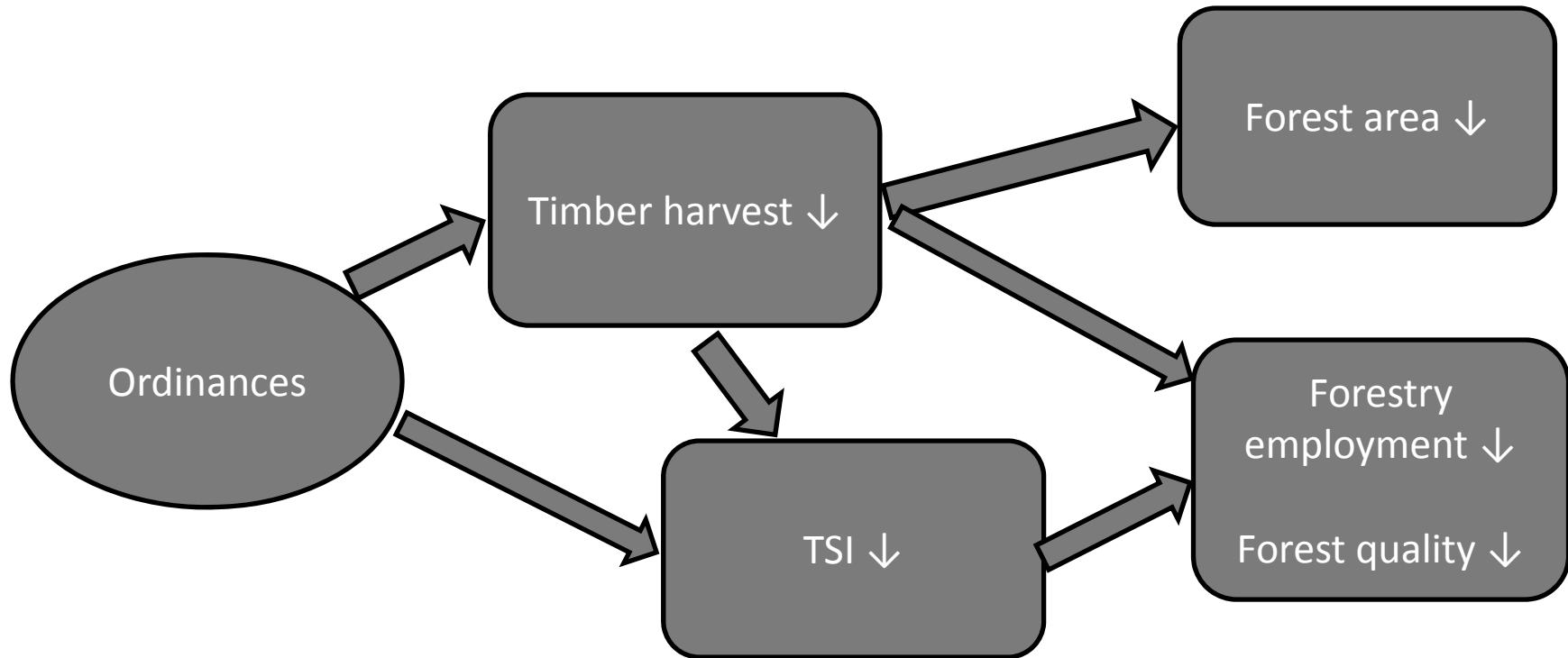
Alternative interpretation

- Local ordinances reflect local preferences and knowledge of local conditions
- Both ordinances and forest production are affected by similar economic, political, and social factors

Evidence

- Prisley et al. 2006: local ordinances in 4 VA counties restrict timber harvesting in 17% of forest area
- Henderson et al. 2009: road bond ordinance in LA associated with pre-emptive spike in harvest and then statistically significant decline in timber production

Motivation



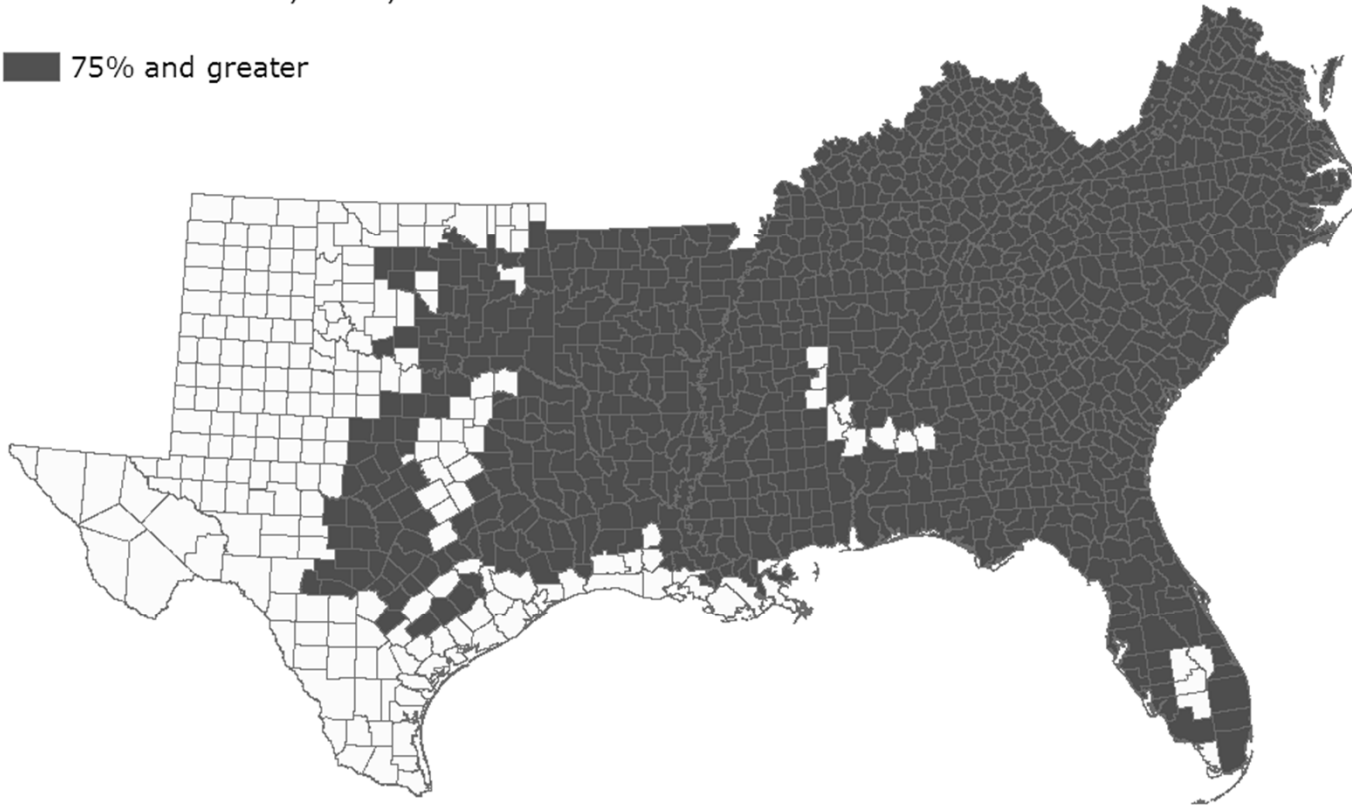
Florida

Extent of Potential Forest Cover in the South (c. 1630)*

Percent forest cover by county



■ 75% and greater



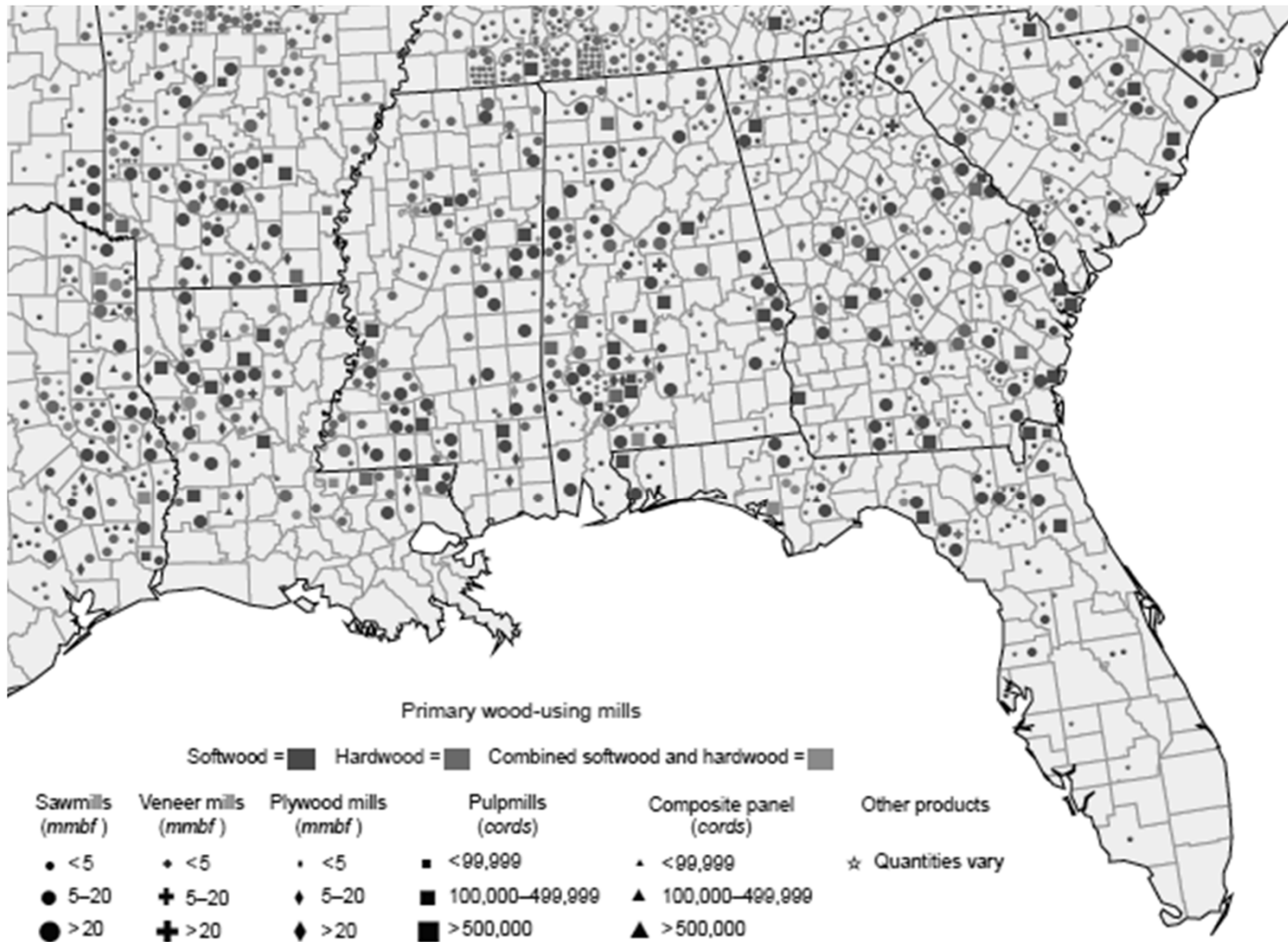
* Based on estimates and mapped onto modern county lines to serve as a reference. Southern forests were most likely not a single contiguous block of tree cover in 1630. Like other forests, southern forests are naturally dynamic. Natural and human-induced fires and other natural disturbances such as hurricanes and ice storms likely created periodic openings in the tree canopy. Where these openings were in 1630, however, is unknown. Canopy openings shift over time due to new disturbances and regrowth via natural succession.

Sources: WRI analysis on potential forest cover (Global Forest Watch, 1997), administrative boundaries (ESRI Data and Maps 9.3.1, ESRI, 2008).

0 50 100 200 300 400 Miles



Florida



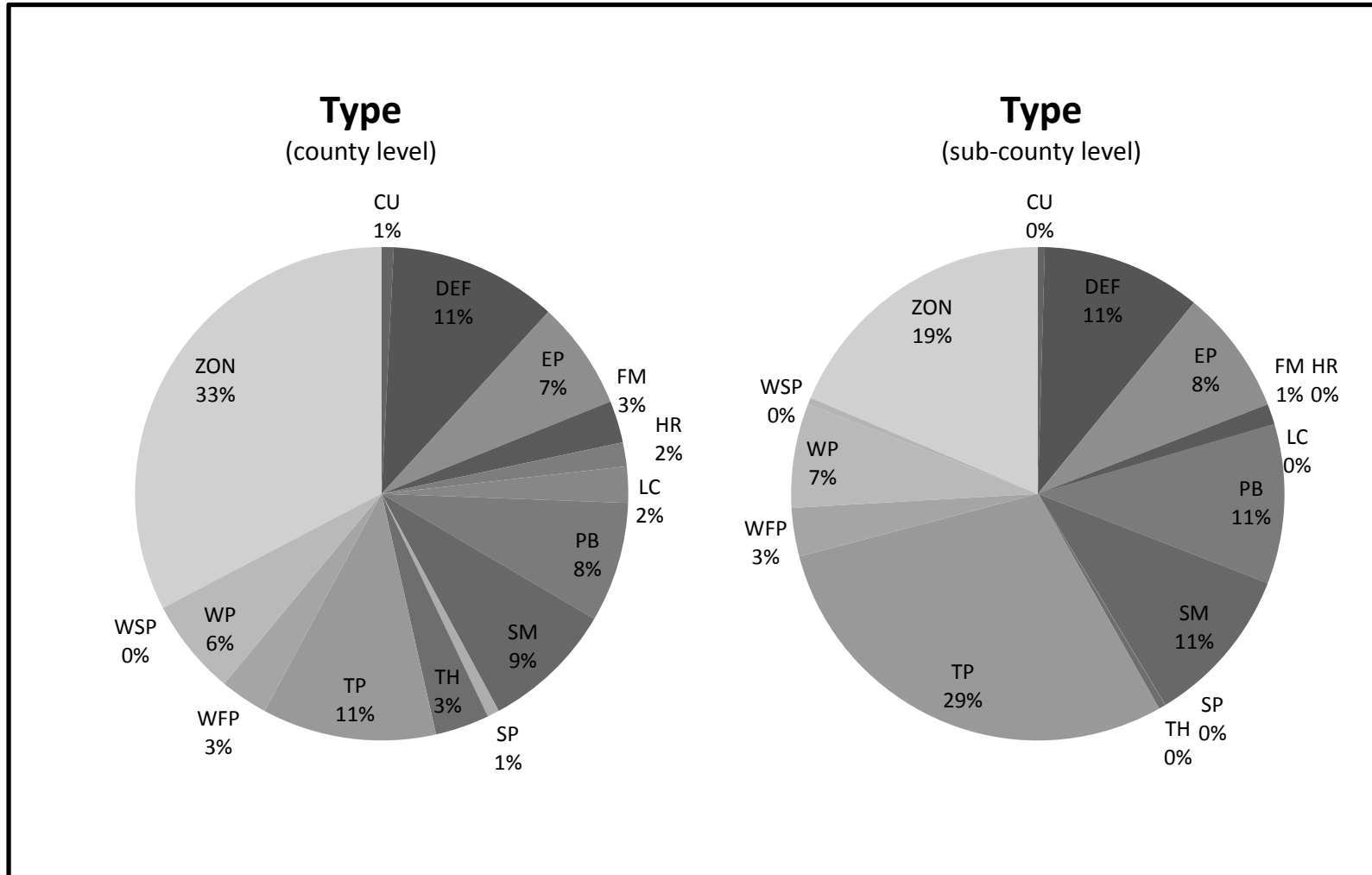
Ordinances in Florida

- Municipal Code Corporation's electronic database
 - 61% of municipalities
 - 79% of counties
 - Others (e.g. LDRs) obtained directly from county govts
- 443 ordinances in 63 counties (out of 67)
- Categorized by
 - Topic
 - Intended effect (based on written code)
 - Level of govt (county vs. municipal)

Ordinances in Florida

- Topics:
 - Zoning, definitions, land clearing
 - Tree protection
 - Environmental (general or specific)
 - Forestry (harvest, chemicals, roads, burning)
- Effects
 - Promote or exempt forestry
 - Place restrictions, requirements, or external rules on forestry

Ordinances in Florida

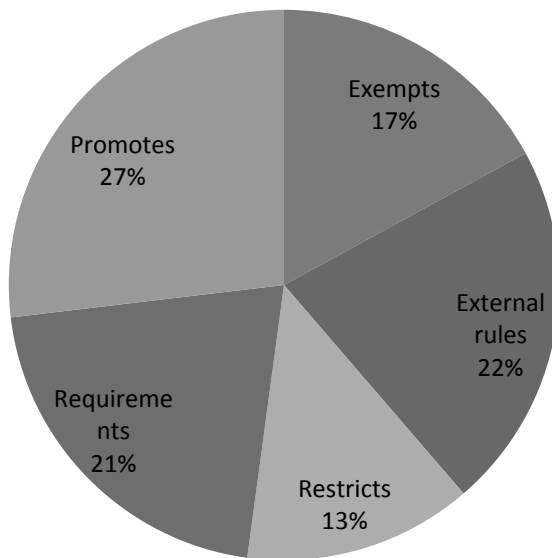


Ordinances in Florida

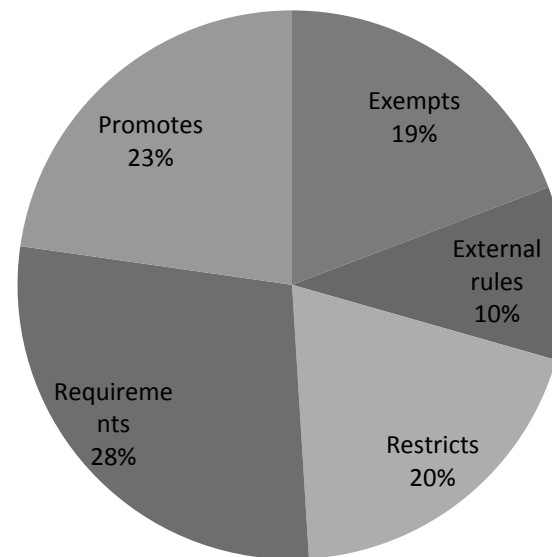
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Ordinances in Florida

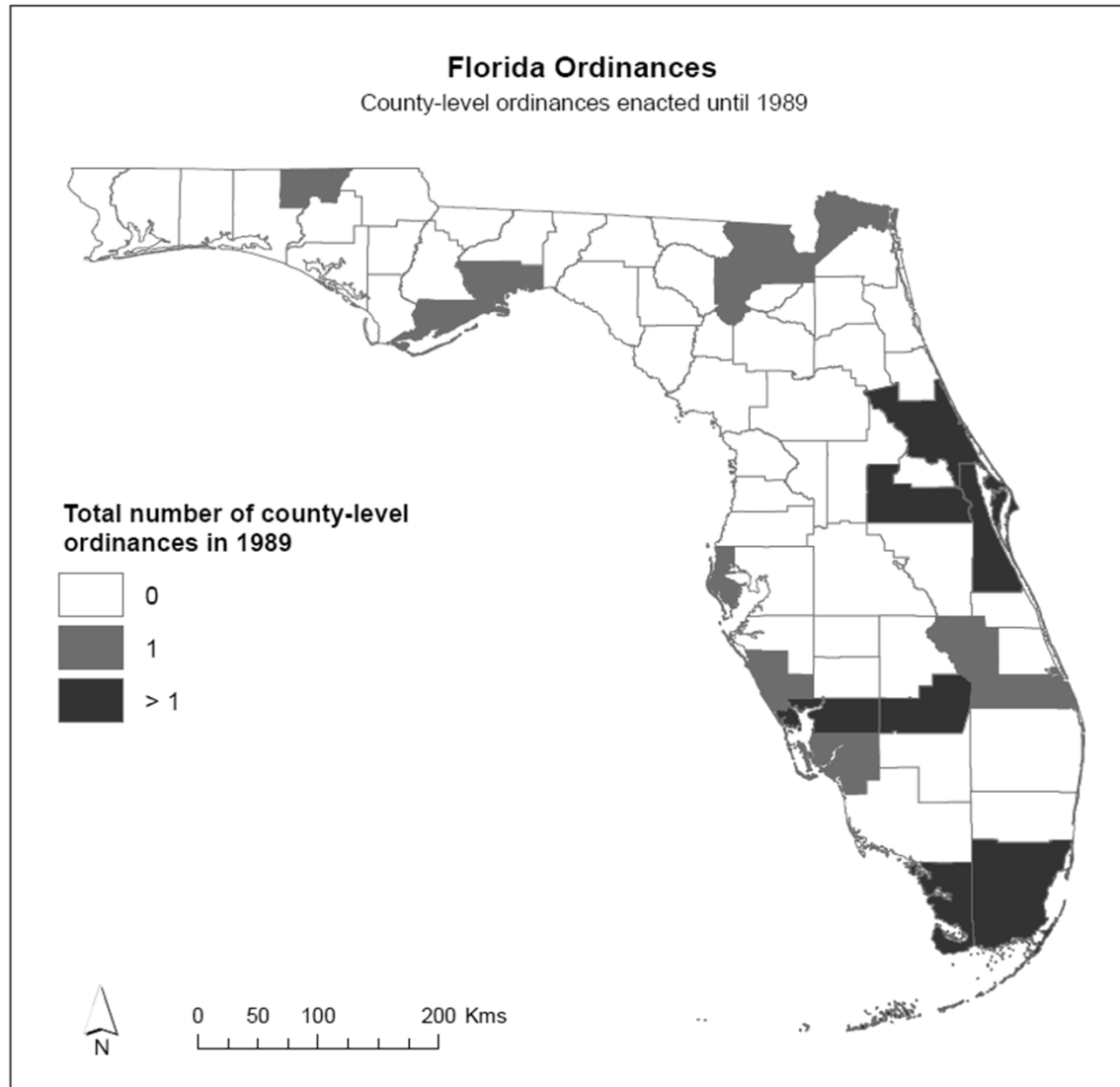
Effects
(county level)



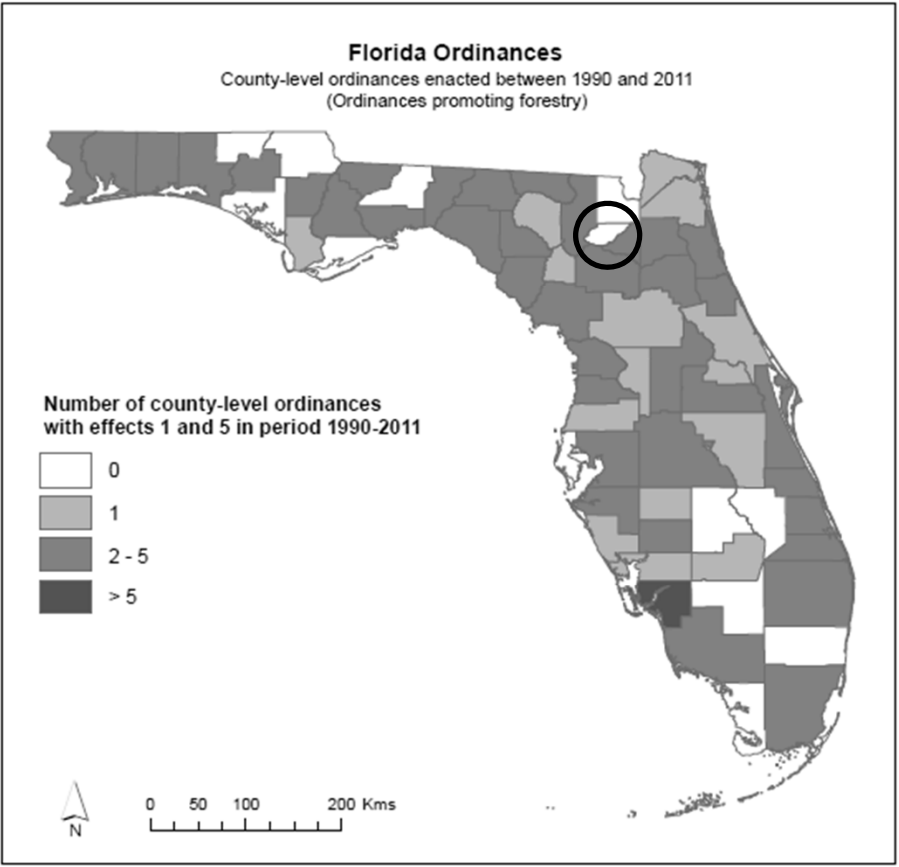
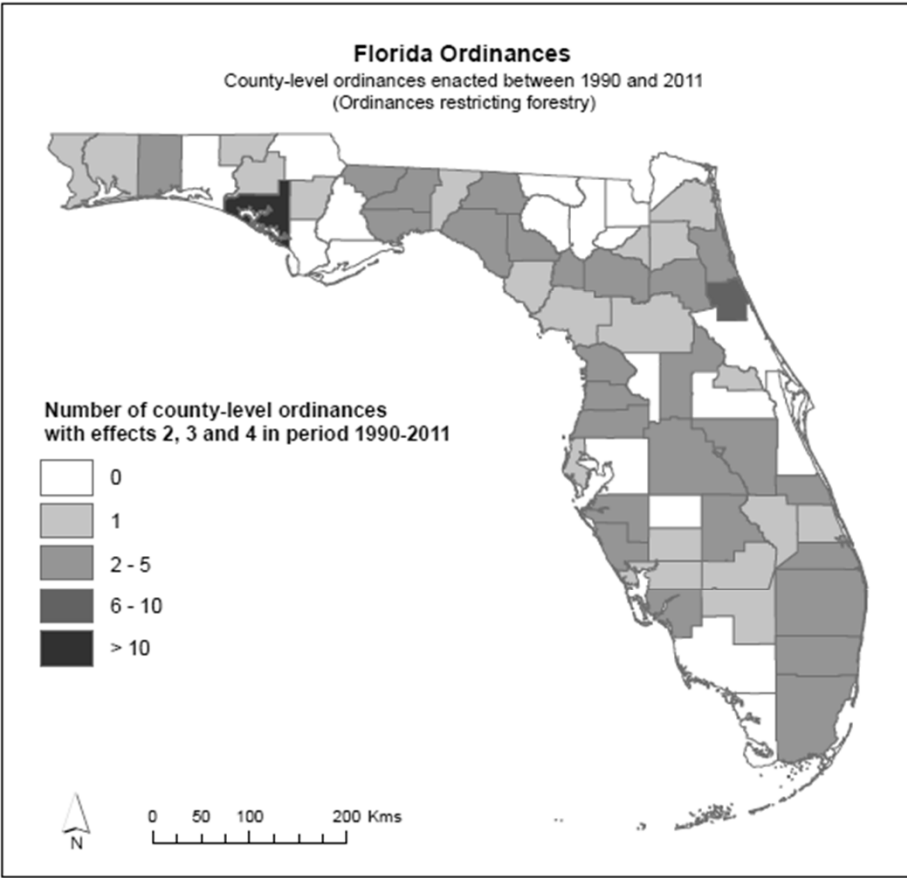
Effects
(sub-county level)



County Ordinances in Florida



County Ordinances in Florida



Timber harvest

Time Fixed Effects

Regressors	Parameters (t-ratios)					
	Saw		Veneer		Pulp	
Constant	3591.870*** (10.678)	3713.144*** (12.207)	746.170*** (9.198)	714.412*** (9.475)	5941.466*** (10.445)	6073.295*** (11.746)
County Area	-0.453*** (-4.400)	-0.410*** (-4.203)	-0.094*** (-3.777)	-0.085*** (-3.518)	-0.708*** (-4.070)	-0.634*** (-3.824)
Is Coastal (dummy)	279.910 (0.916)	476.599 (1.602)	-190.103** (-2.581)	-191.103*** (-2.592)	445.177 (0.862)	748.799 (1.481)
Promotes Forestry (county-level)	18.029 (0.149)		0.297 (0.010)		-48.512 (-0.237)	
Restricts Forestry (county-level)	-187.015 (-1.375)		34.759 (1.059)		-312.948 (-1.360)	
Promotes Forestry (all levels)		124.250* (1.879)		42.527*** (2.594)		164.491 (1.463)
Restricts Forestry (all levels)		-390.468*** (-5.034)		-27.272 (-1.418)		-612.918*** (-4.649)
Akaike IC	6239.131	6215.179	5286.227	5280.655	6591.167	6570.613
Bayesian IC	6273.459	6249.506	5320.555	5314.982	6625.494	6604.940
Hannan-Quinn IC	6252.817	6228.864	5299.913	5294.340	6604.852	6584.298
R-squared	0.071	0.136	0.083	0.098	0.074	0.129
RMSE	2643.738	2550.894	637.596	632.315	4471.034	4335.956
n	335	335	335	335	335	335

Notes: Dataset: 67 units, 5 time periods (1995, 1997, 1999, 2003, 2005).

Within estimator: time fixed effects.

Determinants of ordinances

Theoretical frameworks from political science

- Interest groups (large jurisdictions)
 - More likely to hold sway with at-large elections
- Median voter (small jurisdictions)
 - Fischel's "homevoter"
- Bureaucratic (regulations and agency budgets as complements)
- Diffusion (from neighboring localities) or state level influences
- Political market: supply (institutional features of local governments) and demand (organizations and interests of community)

Determinants

Empirical analysis

- Restrictive land use favored
 - in homogeneous white communities with high per capita income and educational attainment
 - where population growth has been rapid

Anecdotal evidence

- Regulation of timber harvest favored
 - where population and/or government not familiar with forestry
 - by “affluent exurbanites” who prioritize forest amenities

Florida Data on Determinants

- Employment in wood products sector
 - Proportion of jobs in pulp & paper, primary wood products
- County government
 - District vs. at large elections, charter county
 - Size, number of municipalities
- Diffusion
 - Ordinances adopted in neighboring counties pre 1990, WMD
- Environmental preferences
 - Environmental license plates, solar homes, referendum votes (limit marine fishing in '94; 3 x Everglades in '96)
- Familiarity with forests and production forestry
 - Percent born in-state, education

Florida Data on Determinants

- ‘Homevoters’
 - Income, education, race, party affiliation
 - Population density and growth
 - Agricultural just to use value ratio
 - Growth in avg. single family property value
 - Road density/access
 - Housing in wildland-urban interface
 - Conservation areas

Descriptive statistics for ordinances passed 1990 - 2011

	Restrict	Promote
County:		
Mean	1.54	1.75
St Dev	1.76	1.28
% Zero	30%	19%
Max	11	6
All local:		
Mean	2.87	3.15
St Dev	2.84	2.79
% Zero	18%	12%
Max	12	17

All local ordinances restricting forestry

Poisson model	Coeff.	P-value
One	1.1115	0.260
% Employment in secondary wood products	8.0818	0.150
County land area	0.0776	0.230
At-large districts (dummy)	-0.5570	0.007
Pro-environmental vote ('94)	0.1599	0.104
% land in conservation units	-1.0405	0.060
% born in state	-0.7115	0.422
% white	-1.8032	0.035
ratio just:use value ag land '90	0.1402	0.000
km of roads	0.0002	0.301
number of municipalities	0.0740	0.012
number of neighbors	0.0479	0.303
McFadden pseudo-r-squared = 29%		

County ordinances restricting forestry

Poisson model	Coeff.	P-value
One	3.139	0.032
% employment in secondary wood products	12.117	0.074
County land area	0.201	0.022
At-large districts (dummy)	-0.348	0.241
Pro-environmental vote ('94)	-0.167	0.195
% land in conservation units	-1.654	0.031
% born in state	-2.686	0.018
% tertiary educ	1.574	0.329
% white	-2.628	0.038
Ratio just: use value ag land '90	0.156	0.000
# interstate exits	-0.013	0.171
# restrictive ordinances in neighboring counties pre-1990	-0.608	0.139
McFadden pseudo-r-squared = 19.5%		

Ordinances restricting forestry

- Employment in wood products sector ?
- County government ✓
 - Size, # municipalities, at large elections
- Diffusion ?
 - Perhaps at county level
- Environmental preferences ?
 - Referendum votes
- Familiarity ?
 - Perhaps proportion from out-of-state
- 'Homevoters' ✓
 - Real estate development pressures (ag just: use value ratio)
 - Race (more racially diverse)
 - Not income, home value, homes in WUI, educ, party affiliation
- Conservation areas ✓

Ordinances promoting forestry

- Low explanatory power, and little consistent support for any of the proposed theories
- Ordinances idiosyncratic and plausibly exogenous?
 - Glaser and Ward (2009) found only historical housing density predicted minimum lot size
 - Sims and Schuetz (2009) found only education and commuter connections predicted wetland protection
 - Floyd et al. (1996) found most significant predictor of ordinances regulating timber harvest was whether local officials had experienced controversies over timber management

Interpretation

- Local ordinances may have
 - positive impact on veneer (and sawn lumber)
 - negative correlation with production of sawn lumber, pulp & paper

Next steps

- Unbundle ordinances to identify determinants and effects
- Outcome measures: wildfire, forest area
- Delphi survey
 - forestry professionals (industry, NIPF service providers)
 - Gov't (officials from NR agencies, local planners)
 - More accurate characterization of ordinances
 - Whether and why municipal ordinances have effects

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Suggestions?

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APPENDIX

Descriptive statistics

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% Zero	18%	12%
Max	12	17

Ordinances restricting forestry

Poisson Model	Coefficient	P-value
One	1.082	0.275
% Employment secondary wood products	9.260	0.092
Area of county	0.093	0.134
At large districts	-0.588	0.004
# municipalities	0.070	0.016
Ratio of pro- to anti-environmental vote in '94	0.168	0.084
Percent land in conservation units	-1.120	0.040
Percent born in state	-0.481	0.577
Percent white	-1.693	0.045
Ratio of just to use value of ag land in '90	0.145	0.000
Roads in county	0.0002	0.175

- Determinants of ordinances restricting:
 - Real estate development pressure
 - County government
 - Immigration into state, race (?)
- Determinants of ordinances promoting:
 - Not much!