The Resource Curse and U.S. Timber Harvest in Western Counties

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Relationship between timber harvest and economic outcomes

- U.S . Forest Service is interested in this relationship (Direct Response Coefficient)
- USFS tasked with providing economic impact reports
- Do high-timber harvest volume counties exhibit decreased economic performance?

Why is it important?

- Timber harvest volume variable is unique
- Economic performance variables are welfare indicators
- Policy can address any welfare gaps

Background/Theory

- Resource Curse Hypothesis (Sachs and Warner, 1995)
- Different mechanisms in which the resource curse occurs
- Transition channels (Papyrakis and Gerlagh, 2004)
- Assumption that education and investment are most important in U.S.

Data

Table 1: Descriptive Statistics

Variable	Mean	Std. Dev	Min	Max
Timber Harvest Volume (MBF-Scribner)	48,542	89,307	0	731,301
Total Real Per Employee Wage (In thousands of $'s)	49	15	27	197
Employment (In thousands)	90	350	0	4,510
Education Rate	0.25	0.09	0.08	0.61
Population over 65 (In thousands)	30	103	0	1,416
Manufacturing Employment ratio	0.07	0.05	0.00	0.31
Accommodations Employment ratio	0.10	0.05	0.00	0.50
Population (In thousands)	216	806	0	10,124

All statistics are calculated from all counties in sample

Methods

Models	Pros	Cons
Least Squares Dummy Variable (LSDV)	State Fixed effects State Dummy variables	No control for unobservable heterogeneous variables (county)
Fixed-Effects (FE)	Controls for unobservable heterogeneous variables, within county fixed-effects	Less variance
Random-Effects (RE)	Allows for between and within county variation (also a con)	Assumes no correlation between independent and unobs. heterogeneities

Methods

- Fixed-Effects Model

- Driscoll-Kraay Standard Errors

$$EP_{i,t} = \beta_1 TH_{i,t} + \beta_j X_{i,t,j} + \lambda_t + u_{i,t}$$

Per Employee Wage Results

Table 2: Per Employee Wage Results

	Ln Real Per Employee Wages		
	LSDV	FE	RE
ln_timber_harvest	0.099***	0.001	0.002*
	(0.038)	(0.001)	(0.001)
education_percent	-0.874	0.673***	0.600***
	(2.037)	(0.185)	(0.188)
ln_retirement_population	-2.061***	0.037	0.034
	(0.404)	(0.076)	(0.081)
manufacturing_employment_ratio	-2.629*	-0.049	0.083
	(1.501)	(0.069)	(0.096)
accommodations_employment_ratio	3.725**	-0.313*	-0.365**
	(1.450)	(0.174)	(0.167)
time_trend	0.140***	0.015***	0.011***
	(0.010)	(0.003)	(0.002)
N	2,020	2,020	2,020
R^2	0.989	0.588	0.514
Adjusted R^2	0.989	0.541	0.512
Residual Std. Error	1.119 (df = 2009)		
F Statistic	16,843.530*** (df = 11; 2009)	369.758*** (df = 7; 1811)	17,048.520***
Notes:	Discoll-Kraay standard errors reported in columns 2 and 3. Clustered Standard Errors reported in column 1.		
	Hausman Test: chi2(7) = 175.34, p = 0		

Employment Results

Table 3: Employement Results

	Ln Employment		
	LSDV	FE	RE
ln_timber_harvest	-0.031***	0.001	-0.00001
	(0.005)	(0.001)	(0.001)
education_percent	1.093***	0.198*	0.252**
	(0.194)	(0.114)	(0.122)
ln_retirement_population	0.259***	0.135**	0.136**
	(0.063)	(0.063)	(0.067)
manufacturing_employment_ratio	0.677*	0.369***	0.394***
	(0.373)	(0.086)	(0.085)
accommodations_employment_ratio	-0.663	0.386***	0.352***
	(0.501)	(0.145)	(0.127)
time_trend	-0.022***	-0.002*	-0.003
	(0.006)	(0.001)	(0.002)
N	2,020	2,020	2,020
R^2	0.999	0.313	0.782
Adjusted R^2	0.999	0.234	0.781
Residual Std. Error	0.340 (df = 2009)		
F Statistic	143,993.300*** (df = 11; 2009)	117.972*** (df = 7; 1811)	152,152.900***

Notes: Discoll-Kraay standard errors reported in columns 2 and 3. Clustered Standard Errors reported in column 1.
Hausman Test: chi2(7) = 175.34, p = 0

Rural Employment Results

Table 4: Rural Employment results

	Ln Employment		
	LSDV	FE	RE
ln_timber_harvest	-0.026***	-0.019*	-0.026***
	(0.005)	(0.011)	(0.010)
education_percent	0.412	0.523	0.412
	(0.390)	(0.338)	(0.332)
ln_retirement_population	0.068	-0.071	0.068
	(0.111)	(0.121)	(0.102)
manufacturing_employment_ratio	0.647**	0.210	0.647
	(0.318)	(0.562)	(0.617)
accommodations_employment_ratio	0.683	0.494	0.683
	(0.533)	(0.496)	(0.506)
time_trend	-0.012**		-0.012***
	(0.006)		(0.004)
N	1,254	1,254	1,254
R^2	0.998	0.917	0.913
Adjusted R^2	0.998	0.916	0.912
Residual Std. Error	0.342 (df = 1243)		
F Statistic	64,877.370*** (df = 11; 1243)	1,366.641*** (df = 10; 1234)	713,651.100***

Notes: Discoll-Kraay standard errors reported in columns 2 and 3. Clustered Standard Errors reported in column 1.
Hausman Test: chi2(7) = 175.34, p = 0

Discussion

- Little evidence of the resource curse
- Investment not available at the county level
- County level unit of observation is small
- No ownership variable (i.e. public vs. private)
- Would we really see the resource curse evident from timber?

Directions and Extensions

- Conduct using larger units of observation
- Compare regions where harvesting practices are different
- Exclude California

Thank you!

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https://www.bber.umt.edu/FIR/default.asp

Citations

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