



Texas Tech University

Per capita income and farmers' markets:

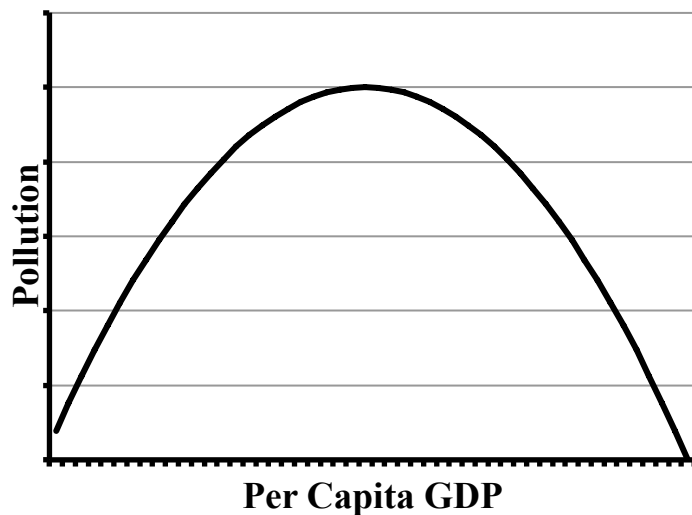
Searching for an environmental Kuznets curve for environmental attributes

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Source of image: peyri/flickr

The Environmental Kuznets Curve



Literature:

- Grossman & Krueger (1991, 1995)
- Theoretical Critiques
 - Arrow et al. (1995) and Stern et al. (1996)
- Econometric Critiques
 - Stern (2004)
 - heteroskedasticity, simultaneity, omitted variable bias

Motivation



- Problems with estimating environmental Kuznets curve (EKC) across countries
 - Evaluate at a regional level?
 - See, for example, Paudel & Poudel, Kahn (1998), Wang et al. (1998), and Soyatas et al. (2007).
- Can an EKC be found for *reductions* in environmental bads, or the purchase of environmental goods?
 - Ghalwash (2007) evaluates recreational services in Sweden and finds support for the EKC

Farmers Market Prevalence

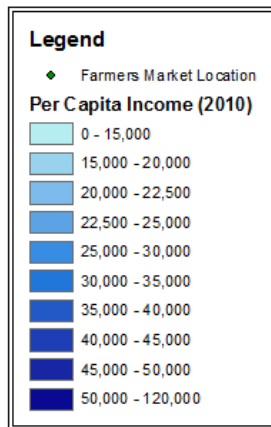
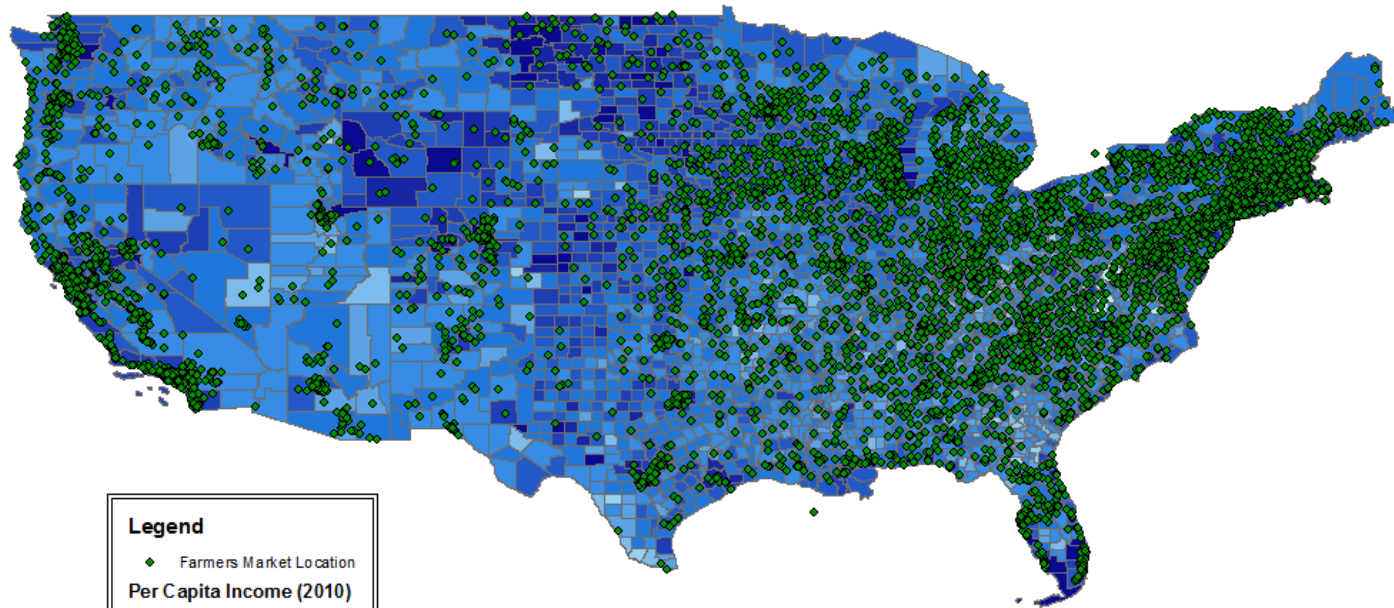


National Count of Farmers Market Directory Listings



Source: USDA-AMS-Marketing Services Division

Farmers Markets and County PCI



Data



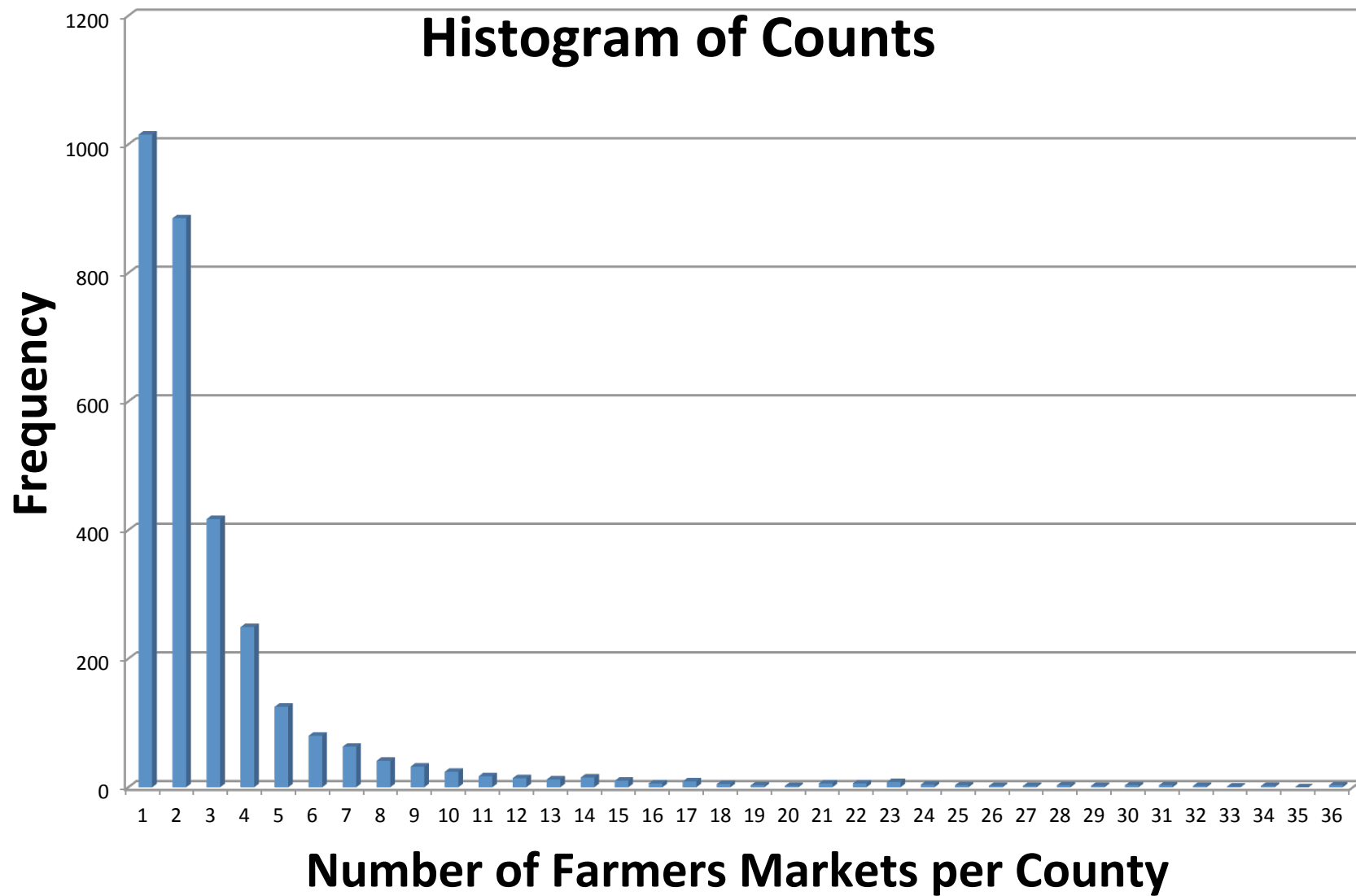
- farmers market data from USDA National Farmers Market Directory
- population and urban/urban cluster data from 2010 US Census
- per capita income (PCI) data from Bureau of Economic Analysis
- 2012 Presidential Election data from National Atlas of the United States



- Initial evaluation of the data revealed the hypothesized results:
- However, the first result is very small...



- The count data exhibits an excessive number of zero values.
 - $1015/3088$, or approximately 33%
- The distribution of counts is overdispersed



Estimation Results



Zero-Inflated Negative Binomial (ZINB) Results for Farmers Market Counts in US Counties

Negative Binomial Regression

Variable	Estimate	Robust SE	z	P> z	IRR
Per Capita Income (2010)	0.0000	0.0000	7.13	0.000	1.0000
Percent Urban	0.0217	0.0022	9.83	0.000	1.0220
Percent Vote Democrat (2012 Presidential Election)	0.0360	0.0028	12.65	0.000	1.0367
Population (2010)	0.0000	0.0000	4.64	0.000	1.0000
Constant	-2.1264	0.1469	-14.5	0.000	0.1193

Logistic Regression for Zero Inflation

Variable	Estimate	Robust SE	z	P> z	Odds Ratio
Per Capita Income (2010)	0.0000	0.0000	1.06	0.287	--
Percent Urban	-6.3445	3.6661	-1.73	0.084	0.0018
Percent Vote Democrat (2012 Presidential Election)	0.0130	0.0152	0.86	0.393	--
Population (2010)	0.0000	0.0000	1.19	0.234	--
Constant	-1.9190	0.6664	-2.88	0.004	0.1468

Note: LR Test Against ZIP: $\chi^2(01) = 3087.46$, $\Pr \geq \chi^2 = 0.0000$.

Vuong's test: $z = 5.036$, $\Pr > z = 0.0000$.

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Conclusions



- The current model specification suggests that the EKC isn't supported by the number of markets – county PCI relationship.
 - Income elasticity of demand for fresh fruits and vegetables impacting results?
 - Expenditures instead of counts
 - Households instead of aggregated to county level
- The larger the share of a county that is urban, the greater the number of farmers markets, even when controlling for county population.
- Voting patterns are correlated with the markets, suggesting that the “type” of average household in a county matters.

Future Directions



- Panel data
- EKC at the household level for environmentally attributed goods?
- Non-parametric approach to more accurately reflect income



Comments?