Municipality-level characteristics of local food exchanges

An economic analysis using maximum-likelihood methods for count data

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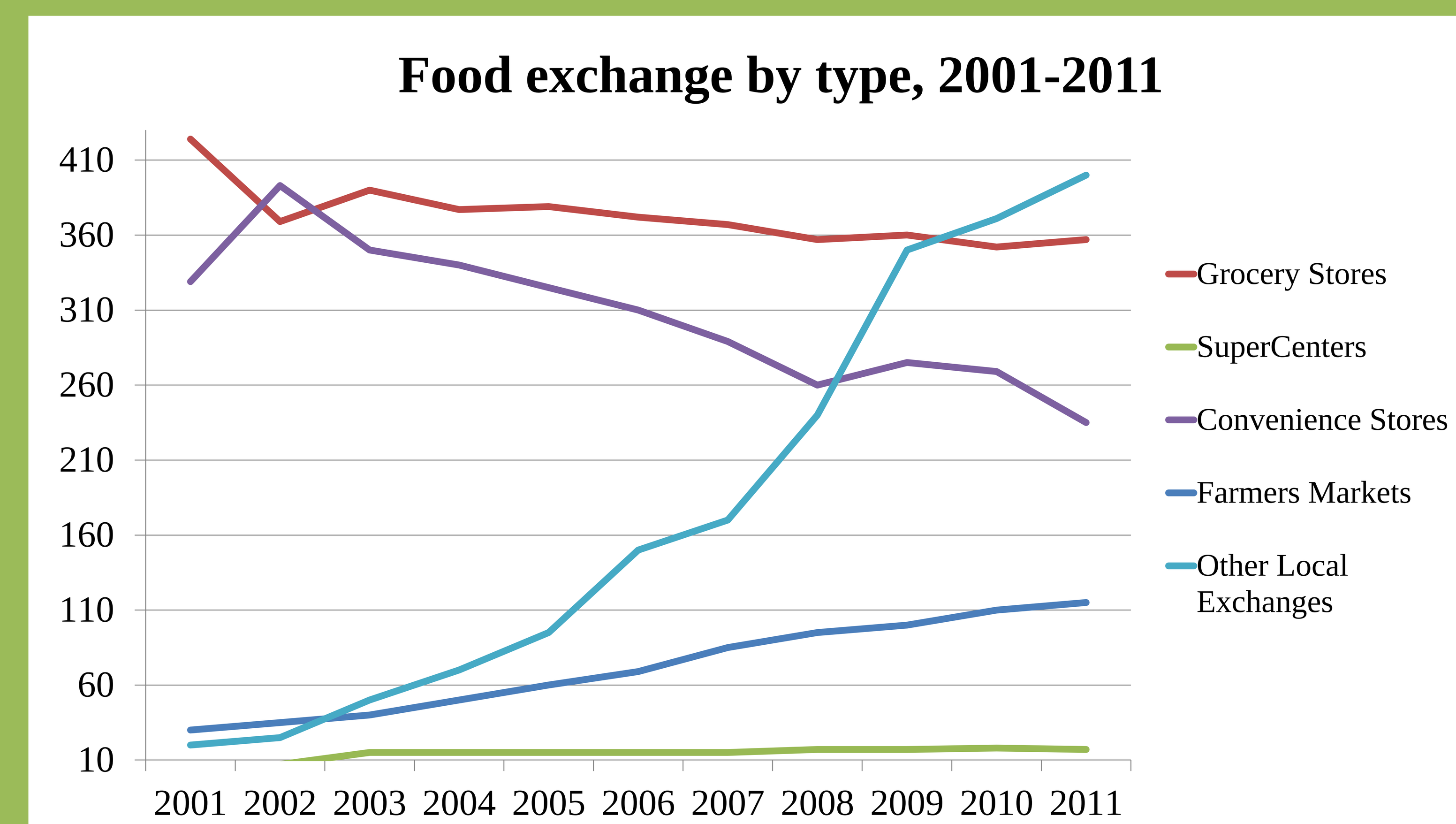
Introduction

Local food systems rebuild ecological, cultural and economic links between food producers and consumers. These systems arise out of dissatisfaction with the conventional food system, which is built on vertical integration and industrialization strategies that break these links. Over the past decade, Maine has seen a rise in the number of local food exchanges and a decline in the number of conventional exchanges, reflecting growing concern about food sovereignty, consumer and producer rights and about the economic health of the state's many rural communities.

The goal of this research is to better understand where and under what circumstances these local food systems arise and are sustained.



What are the municipality level socio-economic characteristics underlying the rise of local food exchanges in Maine?

Discussion

Initial results show that cities and towns with a well-educated population and a vibrant retail sector, including grocery stores, will have the highest counts of local food exchanges. Voter participation beyond the municipality level and seasonal housing counts have a negative effect, indicating that local food exchanges are not driven by non-residents or by state-level policy; rather they arise because engaged and informed citizens are actively addressing the economic, ecological and social externalities of the conventional system.

Contrary to the literature, income does not appear to be a significant indicator of local food activity. The sharp rise in cooperative local exchanges, such as community gardens and farm-to-school initiatives, further indicates that local food activity is motivated by social justice concerns.

In a broader context, this research indicates that Maine citizens are aware of the link between their economic well-being and control over their food sources, and that they are willing to take collective action to protect traditional agricultural systems in their communities.

Econometric Model:

$$Y = \alpha + \beta_1 \text{Porg} + \beta_2 \text{AV} + \beta_3 \text{HiEd} + \beta_4 \text{Inc} + \beta_5 \text{gcap} + \beta_6 \text{PF} + \beta_7 \text{Ssnl} + \varepsilon$$

Independent:		Dependent:
		sum of:
political organization	(Porg)	CSAs
active voting, %	(AV)	co-ops
higher education, %	(HiEd)	buying clubs
med. Hh income	(Inc)	farmers markets
per capita food retailers	(gcap)	community gardens
pull factor	(PF)	farm-to-school initiatives
seasonal housing	(Ssnl)	food sovereignty ordinances
N = 514		**per municipality**

Variables:

Porg: political organization of each municipality: city, town, unorganized territory, plantation.
AV: active voters as % of 18+ population
HiEd: % of 25+ population w/ at least a B.A./ B.S.
Inc: Median total household income
Gcap: per capita grocery stores, supercenters or convenience stores, based on county population
PF: pull factor; a per capita measure of consumer spending to measure economic vibrancy by municipality
Ssnl: count of seasonal housing stock
Y: count of local food exchanges

Initial Results:

Dependent Variable: LOCAL
Method: ML - Poisson Count
Included observations: 514
Cov. matrix computed using second derivatives

Variable	Coef.	Std. Error	Prob.
C	-2.5579	0.4547	0.0000
PORG1	2.3430	0.4200	0.0000
INC	0.0044	0.0043	0.3093
PF	0.2727	0.0355	0.0000
GCAP	0.1554	0.0101	0.0000
AV	-1.1257	0.2710	0.0000
HIED	3.5154	0.4763	0.0000
SSNLH	-0.0003	0.0001	0.0169
SER	1.630		

The Poisson regression model for count data with population parameter λ_i assumes that the expected mean and variance of outcomes are the same:

$E(Y|X) = Var(Y|X) = \lambda = e^{x'_i\beta}$ The log linear model used: $\log(\lambda \mid X_{1\to i}) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots\ldots \beta_i X_i + \varepsilon_i$

Possibility of over dispersion: A LaGrange multiplier test will determine whether a negative binomial model would be a better fit:

$E(Y \mid X) = \lambda$ and $Var(Y \mid X) = \lambda + (\lambda^2/r)$

Both models estimated by maximum likelihood.

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