Have Broadband Expansion Policies ‘Flattened’ the Local Food Marketplace for Rural Farms?

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Introduction

- U.S. consumer interest in local foods has provided important market opportunity for farms near cities
- High-speed internet infrastructure expansion could help rural farms access consumers and adapt to consumer shopping patterns
- Research Question: Have policy efforts to expand internet access “flattened” the DTC marketplace?

Overview

- Use Local Food Marketing Practices Survey data to estimate probability of online marketplace adoption by DTC farmers
- For post-2009 DTC farmers :
  - Metropolitan: 6% less likely to use online marketplace
  - Non-metropolitan adjacent: 7% less likely to use online marketplace
  - Non-metropolitan non-adjacent: 6% more likely to use online marketplace

DTC Marketing Background

- U.S. DTC sales from farmers = $3 billion in 2015
  - On-farm stores, farmers markets, CSAs, roadside stands
  - Market sales predominately occur w/in 20 to 60 miles of farm
  - Online sales 6% of total
- U.S. DTC sales doubled between 1992 and 2012
  - Increasing incomes in cities (O'Hara and Low 2016)
  - Social interactions at marketplaces (Hunt 2007)
  - Economies of scale (Schmit and Gomez 2011)
- Uncertain future: online food shopping projected to increase

Internet and Agriculture

- Policy efforts intended to reduce disparities between urban and rural areas in high-speed internet access

- 2009 ARRA (“Stimulus”)
  - $7.2 billion for grants/loans available for broadband expansion
  - Funds obligated 2009 - 2014

- Farmer internet access: 57% in 2007 to 70% in 2012
  - Age / education contribute to internet use (Briggeman and Whitacre 2010)
  - Broadband expansion has improved non-metro farm performance (Kandilov et al. 2017)
  - Online marketing strategies by farmers not well-understood

Discrete Choice Model

- Binary dependent variable:
  - DTC farmers adopt an online marketplace

- Relevant independent variables:
  - Urban-rural classification
  - Began participating in DTC markets 2009 or later
  - Interactions of these terms

- Other controls:
  - Farmer characteristics (gender, age, age squared, race/ethnicity, internet usage for other business purposes)
  - County-level ratio of internet adoption by households
  - Census Bureau region

- 4,664 observations

Selected Weighted Descriptive Statistics of DTC Farmers

Variable	Mean	Std. Dev.
Online Marketplace	0.08	0.28
Hispanic	0.04	0.20
Non-Hispanic white	0.89	0.31
Use Internet to Access Resources	0.61	0.49
Ave. Age	57	12
Metropolitan County	0.54	0.50
Non-metro Adjacent County	0.31	0.46
Residential HSC / Total Households (County)	0.75	0.13
Begin Selling in DTC Markets 2009 or Later	0.35	0.48

Mean Characteristics of DTC Online Marketplace Farms

Variable	DTC Farm w/out Online Marketplace	DTC Farm with Online Marketplace
DTC Sales	$21,157	$79,928
DTC Commodity Sales	$13,356	$17,869
DTC Value Added Sales	$7,801	$62,059
On-Farm Stand Sales	$8,833	$38,231
Online Sales	N.A.	$18,287
Proportion Online Sales 'Local'	N.A.	0.72
Proportion Metro	0.55	0.49
Average Began 2009 or Later	0.35	0.43
Sell Vegetables Local	0.36	0.23

Regional Profile of Online Marketplace Farm

- DTC experience levels
  - Higher: Northeast and West
  - Lower: South and Midwest

- Metropolitan status and size
  - Metropolitan / larger: West
  - Non-metropolitan / smaller: South

- Commodities
  - Fruit: West
  - Poultry / lamb: South
  - Vegetables / beef: Midwest

Weighted Logit Regression Results (select variables)

Variable	Coefficient
Hispanic	1.65***
Non-Hispanic white	1.01**
Use Internet to Access Resources	1.95***
Ave. Age	0.14*
Square of Ave. Age	-0.0013**
Residential HSC / Total Households (County)	1.24*
Begin Selling in DTC Markets 2009 or Later	0.22
Northeast	0.48*
Midwest	-0.14
South	0.60*
Female	0.38
Metropolitan County	-0.48
Non-metro Adjacent County	-0.20

Weighted Logit Regression Results (select variables)

Variable	Coefficient	Coefficient
Hispanic	1.65***	1.65***
Non-Hispanic white	1.01**	1.04***
Use Internet to Access Resources	1.95***	1.96***
Ave. Age	0.14*	0.15**
Square of Ave. Age	-0.0013**	-0.0015**
Residential HSC / Total Households (County)	1.24*	1.32*
Begin Selling in DTC Markets 2009 or Later	**0.22**	**1.28****
Northeast	0.48*	0.45*
Midwest	-0.14	-0.15
South	0.60*	0.61*
Metro * Sell in 2009 or Later		**-1.14***
Non-metro Adj. * Sell in 2009 or Later		**-1.51***

Marginal Effects (select variables)

Variable	Marginal Effect
Hispanic	0.08***
Non-Hispanic white	0.05**
Use Internet to Access Resources	0.10***
Begin Selling in DTC Markets 2009 or Later	0.06**
Metro * Sell in 2009 or Later	-0.06*
Non-metro Adj. * Sell in 2009 or Later	-0.07*

Conclusions

- Newer, rural DTC farmers are more likely to develop online marketplace

- Online marketplaces are a part of the portfolio of DTC marketing channels, and appear most complementary with on-farm stands
  - Advertising strategies for online marketing not investigated

- Implications:
  - High-speed access policies appear to have “flattened” local food marketplace in a previously unexplored way
    - Both supply-side and demand-side impacts that could be disentangled in future research

  - Stereotypical profile of local food farmer may be changing as food e-commerce increases