

Intensity and Impact of Direct Marketing Strategies on Farm Income: Evidence from a National Survey

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Overview

This study is NOT about

- Consumers
- Specific regions
- Specific Direct Marketing Strategy (DMS)

This study is about

- Producers (Farmers)
- Contiguous United States
- Adoption intensity of various DMSs

Objectives

1. Assess the current situation of the use of DMSs by agricultural producers in the United States.
2. Identify factors affecting adoption intensity of DMS.

(Count Data Analysis)

3. Estimate the effect of DMS adoption intensity on gross farm income.

(Quantile Regression)

Data

- 2008 Version of Agricultural Resource Management Survey (ARMS) by USDA and NASS.
- It asks a series of questions about use of 7 DMSs:
 1. Roadside Stores
 2. On-farm Stores
 3. Farmer's Market
 4. Regional Distributors
 5. State Branding Programs
 6. Direct Sales to Local Grocery Stores/Restaurants
 7. Community Supported Agriculture (CSA).

Summary Statistics on DMS

Table: Summary of Direct Marketing Strategies (DMS), ARMS 2008

Total number of DMS Adopted				Individual DMS Frequency			
Count	Frequency	%	Cumulative %	DMS	Frequency	%	Cumulative %
0	4,379	92.09	92.09	Roadside store	160	25.32	25.32
1	219	4.61	96.70	Farm store	106	16.77	42.09
2	88	1.85	98.55	Farmer's market	118	18.67	60.76
3	49	1.03	99.58	Regional distributors	57	9.02	69.78
4	13	0.27	99.85	State branding programs	27	4.27	74.05
5	5	0.11	99.96	Direct sales to restaurants/grocery stores	152	24.05	98.10
6	1	0.02	99.98	CSA	12	1.90	100
7	1	0.02	100.00	Total	632	100	100
Total	4,755	100	100				

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Methodology

Our study consists of two stages

1. Zero-inflated negative binomial (ZINB) model on the number of DMSs adopted by a farm household.
(Obtain the predicted count of DMSs adopted.)

Number of DMSs Adopted

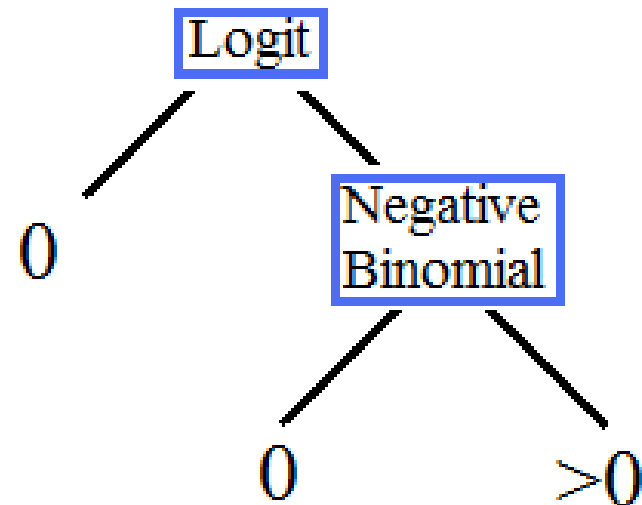


Table: First Stage Zero-Inflated Negative Binomial Model

Variable	Coefficient	Std. Err	inflate		
operator's education	0.115***	0.035	direct payment	-0.0000066	0.000015
spouse's education	-0.027	0.035	CRP	4.518***	1.430
farming experiences	-0.014***	0.004	high valued crops	-1.401	0.958
operator primary occupation	0.530***	0.143	other field crops	2.336	1.586
spouse primary occupation	0.274**	0.114	_cons	-2.574	1.856
acres	-0.0000058	0.000013	alpha	0.959	0.190
NRCS	0.391**	0.176	Inflation model = logit		
full tenant	-0.177	0.212	Log likelihood = -1312.162		
full owner	0.002	0.120	Vuong test of zinb vs. standard negative binomial		
dairy	0.638*	0.375	Z = 2.14 Pr>Z = 0.0161		
other field crops	2.299***	0.382			
high valued crops	3.332***	0.341			
livestock	0.708**	0.310			
processing facility in 50 miles	2.631***	0.211			
miles to city	-0.001	0.003			
direct payment	-0.000013**	0.0000052			
CRP payment	1.508***	0.435			
dummy for internet	0.200	0.156			
Atlantic	0.364**	0.151			
South	-0.461**	0.183			
Plains	-0.450**	0.213			
West	-0.634***	0.167			
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Second State Quantile Regression (QR)

- QR allows us to focus on the underlying socio-economic factors influencing extreme values in the conditional distributions of the dependent variable (Koenker and Basset, 1978).
- Minimizes the objective function as follows

$$Q(\beta_q) = \min_{\beta \in R^p} \left[\sum_{i \in \{i: y_i \geq x'_i \beta\}} q |y_i - x'_i \beta_q| + \sum_{i \in \{i: y_i < x'_i \beta\}} (1 - q) |y_i - x'_i \beta_q| \right]$$

$q \in (0,1)$

Table: Second Stage Quantile Regression

Dependent Variable= Log of Gross Farm Income

OLS	Variables	q10	q25	q50	q75	q90	Wald F
-0.033	zinb_hat	-0.126	-0.0064	0.021	-0.041	-0.043	0.81
-0.491***	roadside	-0.615***	-0.609***	-0.497***	-0.407***	-0.077	1.61
0.441***	farmstore	0.607***	0.4448	0.402***	0.192	0.016	1.36
-0.995***	market	-1.060***	-0.999***	-1.090***	-0.871***	-0.930***	0.36
0.417*	regdist	0.164	0.1600	0.400	0.510*	0.768***	0.55
0.002	stbrand	0.480	0.2907	-0.168	0.188	0.338	0.64
0.404***	directsales	0.415**	0.3413	0.232	0.399***	0.342*	0.29
-0.188	csa	0.167	-0.0650	-0.622	-0.575	-0.780*	0.62
16.639***	entropy	11.84***	15.32***	21.08***	35.68***	52.72***	12.83***
0.030***	op_educ	0.002	0.0167	0.042***	0.030***	0.034**	1.01
0.042***	exper	0.041***	0.0407***	0.037***	0.039***	0.036***	0.13
-0.001***	exper2	-0.001***	-0.001***	-0.001***	-0.001***	0.000***	0.17
0.028**	sp_educ	0.033	0.0198*	0.026***	0.036***	0.041***	0.29
1.508	opo	1.26***	1.25***	1.51***	1.59***	1.28***	8.63***
0.299	spo	0.438***	0.3563***	0.260***	0.137***	0.129***	3.24***
0.00009	acres	0.000***	0.0001***	0.000***	0.000***	0.000***	0.94
-3.24E-10***	acres2	-8.82E-10	-7.46E-10	-4.39E-10	-5.01E-10	-5.54E-10**	0.39
0.004***	dta	0.006	0.004	0.003	0.001	0.001	0
0.179***	interest	0.204***	0.202***	0.140***	0.099***	0.091***	8.26***

Table Continued: Second Stage Quantile Regression

OLS	Variables	q10	q25	q50	q75	q90	Wald F
0.180***	nrcs	0.199***	0.199	0.068	0.009	0.103	1.32
0.735***	ftenant	0.638***	0.897***	0.752***	0.697***	0.576***	2.34**
0.553***	powner	0.689***	0.631***	0.537***	0.459***	0.438***	1.96
0.507***	internet	0.338***	0.386***	0.501***	0.520***	0.488***	1.27
0.596***	dairy	0.448***	0.482***	0.645***	0.683***	0.688***	0.83
-0.867***	ofc	-1.353***	-1.041***	-0.896***	-0.371***	-0.073	25.61***
0.163*	hvc	-0.098	0.010	0.210*	0.508***	0.612***	4.73***
-0.971***	livestock	-1.337***	-1.182***	-0.991***	-0.710***	-0.414***	17.98***
-0.083	atlantic	-0.148	-0.156*	-0.156*	-0.004	0.053	1.73
-0.314***	south	-0.485	-0.350***	-0.381***	-0.159***	-0.103	3.08***
-0.106*	plains	-0.130	-0.154*	-0.182***	-0.156***	0.005	1.69
-0.033	west	-0.021	-0.075	-0.165***	-0.133*	-0.088	0.51
8.70***	_cons	7.96***	8.59***	8.83***	9.15***	9.57***	

Wald Test examines the null hypothesis that all quantile estimates are the same

Table: Summary of DMS estimates

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0.002	State branding Program	0.48	0.2907	-0.168	0.188	0.338
0.404***	Direct sales to local restaurants/grocery stores	0.415**	0.3413	0.232	0.399***	0.342*
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Possible Explanations

- No impact of DMS adoption intensity at any quantiles.
 - Labor requirement to adopt a new DMS may be a barrier.
- Negative impact of farmer's market participation at all quantiles.
 - Because of its popularity, farmers may face higher degree of competitions and little room for arbitrage in the farmer's market.

Challenges

- Relatively small number of observations on DMS adoption (only 8% of farms in sample implemented at least one DMS).
- Labor requirement for each DMS was not considered in this study.
- Alternate measures of “adoption intensity” of DMS may need to be used to see the robustness of the results.

Thank you very much!

Questions?

