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Consumer Choice of Locally Grown Produce in the Southeastern States

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Background

- The decrease of small farms slow down in the two decade
- More farms use direct-to-consumer sales (17% between 02-07, 5.5% between 07-12)
 - Traditional farmers market (1755 in 1996, 8476 in 2015)
 - CSA (2 in 1980s, 4,500 in 2012)
- The value of locally grown foods reached \$12 billion in 2014 (NASS 2015 local food marketing survey)

Reasons for LGP ?

- Products of high quality (fresh, nutritious, tasty)
- Contributor to farmers income, particularly small ones
- Driver of local economy and the rural community
- Enhance the food supply chain (food safety and defense)
- Generator of environmental benefits (low GHS, less chemical inputs, high organic materials return)

Literature

- There was a large body of literature on consumer behavior of purchasing LPG.
- Theoretical framework
 - Attitude-Behavior-Context (ABC) theory
 - Value-Belief-Norm (VBN) theory . Values directly determine beliefs (NEP, AC, AR), which affects norms (norm-activation theory), and norms determine behaviors
 - Alphabet Theory (Guagnano, 1995; Zepeda and Deal 2009), combining the VBN and the ABC and integrating knowledge (K), information seeking (IS), habit (H), and demographics (D) to understand consumer choices.
- Methodology
 - Qualitative analysis based on in-depth interviews and focus group discussions
 - Quantitative analysis based on survey data with the analytical tool set include conjoint analyses, choice experiments, auctions, and contingent valuation, hurdle models etc.

Objectives

- Understanding consumer behavior in the LGP marketplaces
- Measure the impact of major factors of interest
- Identify target markets for Locally grown products, particularly, the loyal consumer groups
- Support small local farmers in forming effective marketing practices

Data

A sample of 1147 participants related to the purchase of LGP. Among 69 question raised, purchase frequency and other information related were collected.

- Demographic characteristics (age, gender, marital status, household structure. ethnic group, education attainment)
- Social, and economics status (geographic location, dietary types, income, budget of produce purchase)
- Preferences (safety, healthy, taste, convenience, organic products)
- Perception on LGP (environmental economic impacts)

Statistics

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
var1f	Ever purchase local food	1143	0.85	0.36	0.00	1.00
var2f	Count of purchase	1086	1.74	1.79	0.00	8.00
var3f	Custmer perception of local	1137	2.37	1.21	1.00	5.00
var4af	Ranking of pesticide-free	995	3.42	1.30	1.00	5.00
var4bf	Ranking of locally grown	1046	3.60	1.10	1.00	5.00
var4cf	Ranking of being organic	982	2.80	1.21	1.00	5.00
var4df	Ranking of family farm	992	3.22	1.19	1.00	5.00
var4ef	Ranking of Gerogia Grown	1052	3.64	1.13	1.00	5.00
var5af	most important reason	1010	2.29	1.75	1.00	7.00
var5bf	2nd importnat reason	983	2.90	1.74	1.00	7.00
var5cf	3rd important reason	970	3.83	1.84	1.00	7.00
var6af	PW-pay for pesticide free	1035	3.06	1.54	0.00	6.00
var6bf	PW-pay for organic	1021	2.90	1.55	0.00	6.00
var6cf	PW-pay for family grown	1033	3.28	1.48	0.00	6.00
var6df	PW-pay for local grown	1027	3.20	1.45	0.00	6.00
var6ef	PW-pay for Georgia grown	1026	3.16	1.50	0.00	6.00
var7af	TW-pay for pesticide free	1037	3.04	1.58	0.00	6.00
var7bf	TW-pay for organic	1020	2.83	1.56	0.00	6.00
var7cf	TW-pay for family grown	1042	3.24	1.51	0.00	6.00
var7df	TW-pay for local grown	1030	3.17	1.49	0.00	6.00

Statistics (cont.)

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
var7ef	TW-pay for Georgia grown	1017	3.15	1.52	0.00	6.00
var8af	PeW-pay for organic	945	2.73	1.63	0.00	6.00
var8bf	PeW-pay for family grown	968	3.11	1.60	0.00	6.00
var8cf	PeW-pay for local grown	956	3.14	1.57	0.00	6.00
var8df	PeW-pay for Georgia grown	954	3.12	1.60	0.00	6.00
var10af	Importance of price	1073	2.97	0.90	1.00	4.00
var10bf	Importance of freshness	1074	3.59	0.65	1.00	4.00
var10cf	Importance of safety	1059	3.60	0.69	1.00	4.00
var10df	Importance of natural	1057	3.36	0.80	1.00	4.00
var10ef	Importance of local	1048	2.72	0.96	1.00	4.00
var10ff	Importance of Georgia	1052	2.76	0.89	1.00	4.00
var10gf	Importance of Taste	1047	2.72	0.95	1.00	4.00
var10hf	Importance of readiness	1046	3.41	0.79	1.00	4.00
var10if	importance of package	1045	2.86	0.93	1.00	4.00
var11af	F-Market price higher	1092	2.79	1.12	1.00	5.00
var11bf	F-market less safe	1083	3.30	0.97	1.00	5.00
var11cf	Fruit and vege more favorable	1083	3.83	1.08	1.00	5.00
var11df	Food become safer	1081	3.60	1.16	1.00	5.00
var11ef	Fresh food less rikier	1068	4.03	1.00	1.00	5.00
var11gf	Pesticide pose threat	1077	3.93	1.06	1.00	5.00
var12f	Vegetairan or not	1097	0.06	0.23	0.00	1.00

Statistics (cont.)

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
var13f	Growing produce or not	1099	0.48	0.50	0.00	1.00
var14f	Primary shopper	1095	0.75	0.43	0.00	1.00
var15af	family number <5	119	1.21	0.58	0.00	4.00
var15bf	family number 5-9	117	1.11	0.47	0.00	3.00
var15cf	family number 10-14	167	1.19	0.49	0.00	3.00
var15df	family number 15-18	174	1.20	0.54	0.00	5.00
var15ef	family number 19-24	261	1.33	0.67	0.00	5.00
var15ff	family number 25-34	212	1.42	0.62	0.00	5.00
var15gf	family number 35-44	219	1.40	0.53	0.00	2.00
var15hf	Family number 45-54	326	1.44	0.54	0.00	3.00
var15if	Family number 55-59	169	1.38	0.63	0.00	5.00
var15jf	Family number 60-64	101	1.22	0.58	0.00	4.00
var15kf	Family number >65	123	1.37	0.56	0.00	2.00
var16f	Spending on grocery	1025	100.30	70.40	0.00	250.00
var17f	Spending on produce	1039	30.83	32.01	0.00	130.00
var18f	Spending on nuts	1028	4.83	8.67	0.00	100.00
var19f	Community Type	1093	2.55	1.18	1.00	5.00
var21f	Interviwee age	1028	43.59	14.67	18.00	84.00
var22f	Level Education	1084	3.74	1.48	0.00	6.00
var23f	Marital Status	1087	2.03	0.95	1.00	5.00
var24f	Gender	1085	0.31	0.46	0.00	1.00
var25f	Ethnility	1081	4.56	2.22	1.00	6.00
var26f	Household income	1018	5.42	1.98	1.00	8.00

Methods

Tobit Model

- Zeroes of dependent variable are treated as corner solutions
- The impact of covariate is the same (set, direction, and quantity)

Cragg Model

- Two hurdles need to be passed before a purchase decision is made
- The determinants for each could be different

Count Hurdle Models

- Zero Inflated Poisson Model (ZIP)
- Zero Inflated Negative Binomial Model (ZINB)
- Double hurdle models (hurdle with Negative binomial, hurdle with Poisson)

Hurdle Poisson Model

First Hurdle

$$\Pr(Y = y) = \begin{cases} \pi, & y = 0 \\ 1 - \pi, & y = 1, 2, 3 \dots \end{cases}$$

Second Hurdle

$$\Pr(Y = y | Y > 0) = \begin{cases} \frac{\lambda^y}{(e^\lambda - 1)y!}, & y = 1, 2, 3, \dots \\ 0, & \text{otherwise} \end{cases}$$

Likelihood Function

$$\ln L(\pi_i, \lambda_i, y_i) = \begin{cases} \ln \pi_i & y = 0 \\ \ln \left\{ (1 - \pi_i) \frac{\lambda_i^{y_i}}{(e^{\lambda_i} - 1)y_i!} \right\} & y = 1, 2, 3, \dots \end{cases}$$

Model Selection

	Hurdle TNB	Hurdle TP	ZIP	ZINB	Nbin	Poisson
2LL	1782	1915.4	1904.5	1883.8	1926.2	1951.2
AIC	1884	2015.4	2006.5	1987.8	2002.2	2025.2
AICC	1893.1	2024.1	2016	1997.7	2007.3	2030.1
BIC	2111	2238	2231.6	2217.3	2170.4	2189
Pearson	687.9	1094.3	775.4	626.5	636.5	804.8

1st Hurdle

		Estimate	Standard Error	Z-Value	P
Intercept		1.890	0.863	4.798	0.029**
Var10b	Freshness	0.399	0.221	3.252	0.071*
Var10g	Georgia lab	0.211	0.131	2.586	0.108
Var10h	Taste	0.206	0.160	1.669	0.196
Var17	Produce C	-0.005	0.003	-1.988	0.159
Var23	Married	0.698	0.331	4.456	0.035**
Var23	Widowed	0.915	0.860	1.132	0.287
Var23	Divorced	1.007	0.503	4.008	0.045**
Var24	Widowed	-0.047	0.024	-1.958	0.05 **

2nd Hurdle

	Estimate	Standard Error	z Value	P
Intercept	-2.176	0.832	-2.610	0.009
var4c Organic label	0.140	0.047	3.010	0.003***
var5a Fresh	0.639	0.562	1.140	0.155
var5a Taste	0.680	0.570	1.190	0.233
var5a Nutrition	0.624	0.590	1.060	0.290
var5a local economy	0.000	.	.	.
var10b Fresh	0.041	0.105	0.390	0.097 *
var10d Healthy	0.296	0.078	3.800	0.000***
var10h Taste	0.197	0.080	2.460	0.014 **
var12 Not vegetarian	-0.430	0.179	-2.400	0.016 **
var12 Vegetarian	0.000	.	.	.
var16 Grocery exp.	0.001	0.001	1.340	0.180
var17 Produce exp.	0.005	0.002	2.610	0.009***
var21 Age	0.017	0.004	4.360	0.001***

2nd Hurdle (cont.)

		Estimate	Standard Erro	z Value	P
var23	Others	0.429	0.340	1.260	0.207
var23	Married	0.461	0.319	1.440	0.149
var23	Not married	0.000	.	.	.
var25	African	-0.511	0.350	-1.460	0.144
var25	Asian	-0.927	0.971	-0.950	0.340
var25	White	0.000	.	.	.
var26	\$15-25	-1.266	0.234	-5.410	0.007***
var26	\$40-74	0.541	0.161	3.360	0.001***
var26	\$75-100	0.566	0.172	3.290	0.005***
var26	\$24-35	0	.	.	.

Results

The hurdle model is the combination of the participation and purchase times decision. The two decisions were obviously driven by different forces in different direction and magnitude.

Participation hurdle. As high as 85% of consumers have willingness to buy LGPs. The group consisted of participants with very different perception, attitude, demographics and social characteristics. The limited factors were retained to explain the decision of the first hurdle.

- LGPs are the favorite of those buyers who value freshness and taste high in their diets.
- Marital status also matter. Those married consumers are most likely to purchase LGPs than single and divorced participant.
- Gender played a role. It is more likely that female consumers opted for LGPs.
- Other factors of interest, such as attitude toward organic farming, pro for community development, gender, income , ethnic groups were not retained in the model for insignificance in statistics.

Results (cont.)

Purchase decision. The result is much more informative. Factors identified with significant impact include organic label, dietary style, healthy, budget etc.

- Consumers with preference for organics tend to purchase more LGP
- Healthy conscious consumers purchase less frequently. This contradicted the previous findings, could be partially explained the ramification of adverse hygiene in farmers market.
- Consumers of vegetarian are opted to make more frequent purchase of LGP.
- Higher expenditure on produce is linked to more frequent visits to local markets.
- Income matters. Higher income accompanied more purchase.
- Ethnic groups, family structure, gender, and education turn out to be insignificant.

Discussion

- The data used in this study came from a survey with stated attitudes and actions. They were not equivalent to revealed purchase. Though the model fitted passed the serious screening process, the results interpretation or extrapolation should be by way of caution.
- Deviations from multiple ex ante expectations were identified in the results (reflected in impacts of attitude, perception, gender, knowledge, income environmental concerns etc.), which may call for introducing more value and belief variables in the investigation.
- Actual barriers are substantial in local marketplaces, including inconsistent supply, lack of standard products, limited market accessibility, and poor infrastructure. Consumer perceptions on these element could be the barriers that influence their purchases.

Discussion (cont.)

- Spontaneous purchase will remain. Consumers are willing to buy, but it was far short of a regular behavior. It was not clear whether there exist a stable market segment for LGP. At least we did not identify strong support from our data set . The impulse buying plus readily available of substitutes make it less realistic to expect a high ceiling growth of LGP in the food market.

Thanks

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