AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Farm-Direct Food Sales in the Northeast Region: A County-Level Analysis

Mei-luan Cheng, Nelson Bills, and Wen-fei Uva

As articles on local foods appear frequently in the mass media, interest in local food markets has increased significantly around the United States. Growing consumer interest in fresh and local foods, sustainable agriculture, and local community development have fueled demand for purchasing directly from farms. Many small and medium farms have adopted direct marketing to consumers as an alternative to sustain business vitality, obtain higher prices, and maintain a competitive edge in the market. Local food markets typically involve small farmers, various products, and farm-direct marketing channels. Farm-direct sales are only one portion of local foods. However, due to the vague and inconsistent definitions of "local," farm-direct sales become the most visible aspect of a growing interest in local foods.

The USDA Agricultural Census provides farm-direct sales at the county level that include crops, livestock, poultry, or agricultural products that were sold directly to consumers for human consumption. Farm-direct food sales account for a small but fast-growing segment of U.S. agriculture, increasing by an inflation-adjusted 59 percent from 1997 to 2007 and reaching $1.2 billion in 2007 (Timmons and Wang 2010). Recent growth in direct-to-consumer marketing sales has come from large operations with annual sales higher than $50,000 and from beef, fruit, and vegetable farms (Martinez et al. 2010).

Assessing the future growth in local food requires an understanding of the factors that influence farm-direct food sales. There has been considerable research on the consumer characteristics and attitudes that influence farm-direct food sales, while previous research relative to farm characteristics is limited. Surveys are the basis of most studies of direct-marketing farms and farmers (Govindasamy, Hossain, and Adelaja.1999; Uva 2002; Hunt 2007). General research reviews for farm-direct marketing are provided by Brown (2002), Brown and Miller (2008), and Martinez et al. (2010). A few studies analyzed major factors associated with farm-direct food sales at the county level using USDA Agricultural Census data (Brown, Gandee, and D'Souza 2006; Timmons and Wang 2010). However, additional attention should be given to the types of participating farms and the full range of direct marketing channels (Lev and Gwin 2010). More research into the actual linkages between the variables and observed direct food sales based on regional differences is needed (Brown 2002; Timmons and Wang 2010).

This study uses 2007 USDA Census of Agriculture data and regression analysis to identify major factors associated with farm-direct food sales across counties in the Northeast region. The Northeast region includes Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island, New York, Pennsylvania, New Jersey, Delaware, and Maryland. The role of farm-direct food sales in the agricultural sector is most prominent in this region because all six New England states, New Jersey, and New York are among the top ten states in farm-direct food sales as a share of total agricultural sales (Diamond and Soto 2009). In addition, New York, Pennsylvania, and Massachusetts have appeared among the top ten States in terms of overall direct marketing sales over the three census years from 1997 to 2007. Our regression analysis examines significant variables of agricultural production, direct marketing options, and socio-economic characteristics that impact the level of farm-direct food sales in the Northeast region.

Data and Methodology

The Census definition of direct farmer-to-consumer sales does not separate out the value of agricul-

Cheng is Assistant Professor, Department of Applied Economics, National Chung Hsing University, Taiwan. Bills is Professor Emeritus, Charles H. Dyson School of Applied Economics and Management, Cornell University, Ithaca, NY. Uva is Agricultural Economic Development Specialist, Mid-Shore Regional Council, Easton, MD and the owner of Seaberry Farm, Federalsburg, MD.

tural products that pass through different marketing channels of farmers markets, roadside stands, pick-your-own sites, community-supported agriculture (CSA), etc. It excludes non-edible products such as craft items and flowers. Farm-direct food sales also exclude food purchased by retail stores, restaurants, co-ops, and institutions, and any processed food such as jellies, sausages, etc. Although the USDA direct sales data are likely a low estimate of actual farm-direct food sales in the U.S, no other data source provides better accuracy of direct food sales and greater insight into consumption of local foods (Timmons and Wang 2010).

This study analyzes farm-direct food sales per square mile as a dependant variable to estimate an ordinary least squares (OLS) linear model. Variables included in the regression model and data source are described in Table 1. The farm-direct food sales equation is $DFS_i = \beta X_i + \varepsilon_i$, where DFS_i is the natural logarithm of farm-direct food sales per square mile in county i and X_i is a vector of explanatory variables; ε_i is the random error component. Note that some data of the 2007 Census of Agriculture were suppressed to avoid disclosing information on individual farms. We excluded counties for which farm-direct sales were not reported. Therefore, our sample of the Northeast region includes 225 counties in 11 states. The explanatory variables include farm characteristics, direct marketing channels, and socioeconomic factors related to demand and supply at the county level.

Results and Discussion

Regression results of the Northeast model, along with summary statistics of variables in the model are presented in Table 2. We include average farm size and type of farming to analyze the impact of farm characteristics. Gale (1997) suggested that small farms and fruit and vegetable growers are more likely to sell directly to consumers. As expected, average farm size (FARMSIZE) was strongly and negatively related to farm-direct sales per square mile. A higher percentage of farms reporting vegetable sales (VEGGI) is significantly associated with higher farm-direct sales in a county, whereas fruit farming (FRUIT) is not a significant factor influencing the level of direct market sales in the

Table 1. Variable Definition and Data Source of the Farm-Direct Food Sales Model.

Variables	Definition	Data source
DFS	Natural log of farm direct food sale per square mile ($K/ square mile)	USDA-NASS (n.d.)
FARMSIZE	Natural log of average farm size (acres)	USDA-NASS (n.d.)
CATTLE	Cattle farm percentage /100	USDA-NASS (n.d.)
VEGGI	Vegetable farm percentage/100	USDA-NASS (n.d.)
FRUIT	Fruit farm percentage/100	USDA-NASS (n.d.)
FRMMKT	Number of farmers markets per 1,000 population in 2009	USDA-ERS (n.d.)
CSA	Ratio of farms marketing through community supported agriculture to total farms	USDA-NASS (n.d.)
SCHOOL	Counties with one or more farm-to-school programs in 2009 (Yes = 1, No = 0)	USDA-ERS (n.d.)
LAND	Land area proportion in farms (%)	USDA-NASS (n.d.)
INCOME	Natural log of median income in 2008 ($K)	U.S. Census Bureau (n.d.)
POP	Natural log of population in 2007	U.S. Census Bureau (n.d.)
MSA	Metropolitan Statistical Area (Yes = 1, No = 0)	U.S. Census Bureau (n.d.)

Table 2. Summary Statistics of Variables and Direct Food Sales Model Estimates.

	Descriptive statistics		OLS regression			
Variables	Mean	Std. deviation	Coeffi-cients	Std. error	p-value[1]	
DFS	0.855	1.164				
Farm characteristic						
FARMSIZE	4.837	0.522	–0.86	0.126	0.000	**
CATTLE	0.228	0.118	1.93	0.532	0.000	**
VEGGI	0.094	0.049	6.21	1.248	0.000	**
FRUIT	0.081	0.069	1.05	0.772	0.174	
Direct marketing options						
FRMMKT	0.044	0.042	3.13	1.388	0.025	*
CSA	0.013	0.013	11.89	4.399	0.007	**
SCHOOL	0.195	0.397	0.52	0.127	0.000	**
Socioeconomic factors						
LAND	23.644	15.958	0.04	0.004	0.000	**
INCOME	10.821	0.249	0.86	0.267	0.002	**
POP	4.669	1.123	0.26	0.064	0.000	**
MSA	0.562	0.497	0.16	0.126	0.218	
(Constant)			–7.93	3.029	0.009	**
			N = 225			
			Adjusted R^2 = 0.66;			

[1] * significant at 5 percent level; ** significant at 1 percent level.

Northeast. Although produce dominates all of the most visible farm-direct marketing channels, it is surprising that livestock farms constituted 58 percent of direct marketers in 2007 (Lev and Gwin 2010). Our results show that a higher percentage of farms reporting cattle and calf sales (CATTLE) in a county is significantly associated with higher farm-direct sales.

Farmers markets are the most important direct marketing channel, concentrated in densely populated areas of the Northeast, Midwest, and West Coast. The number of farmers markets grew to 5,274 in 2009, a 92 percent increase from 1998 (USDA-AMS 2009). The influence of farmers markets (FRMMKT), represented by the number of farmers markets in a county, was strongly positive and significant. The other two direct marketing options—CSA and farm-to-school (SCHOOL)—also show a positive and significant impact on farm-direct sales. Although farm-to-school programs do not directly contribute to the farm-direct sales figure, they may be an indicator of institutional and public support for local food systems.

On the production side, the percentage of farmland (LAND) is used to capture the general suitability of agriculture in a particular area. Farm-direct sales were positively related to this explanatory variable. On the consumer side, population (POP) and median household income (INCOME) are positively correlated with farm-direct sales.

Conclusion

The regression analysis show that nine variables—household income, population, average farm size, available farmland, vegetable production, beef production, number of farmers markets, CSA, and participation of the farm to school programs—together explain most of the variation in farm-direct food sales at the county level in the Northeast. These results imply potential marketing plans and policy construction for the future. Our findings may also serve as a baseline for future research that intends to understand the recent growth and trends of farm-direct food sales in the Northeast, using previous USDA Census of Agriculture data.

References

Brown, A. 2002. "Farmers' Market Research 1940–2000: An Inventory and Review." *American Journal of Alternative Agriculture* 17(4): 167–76.

Brown, C. and S. Miller. 2008. "The Impacts of Local Markets: A Review of Research on Farmers' Markets and Community Supported Agriculture (CSA)." *American Journal of Agricultural Economics* 90(5):1296–1302.

Brown, C., J. E. Gandee, and G. D'Souza. 2006. "West Virginia Farm Direct Marketing: a County Level Analysis." *Journal of Agricultural and Applied Economics* 38(3):575–584.

Diamond, A. and R. Soto. 2009. "Facts on Direct-to-Consumer Food Marketing." United States Department of Agriculture, Agricultural Marketing Service. May.

Gale, F. 1997. "Direct Farm Marketing as a Rural Development Tool." *Rural Development Perspectives* 12(2):19–25.

Govindasamy, R., F. Hossain, and A. Adelaja. 1999. "Income of Farmers Who Use Direct Marketing." *Agricultural and Resource Economics Review* 28(1):76–83.

Hunt, A. R. 2007. "Consumer Interactions and Influences on Farmers' Market Vendors." *Renewable Agriculture and Food Systems* 22:54–66.

Lev L., and L. Gwin. 2010. "Filling in the Gaps: Eight Things to Recognize about Farm-Direct Marketing." *Choices* 25(1).

Martinez, S., M. Hand, M. Da Pra, S. Pollack, K. Ralston, T. Smith, S. Vogel, S. Clark, L. Lohr, S. Low, and C. Newman. 2010. "Local Food Systems: Concepts, Impacts, and Issues." ERR 97. U.S. Department of Agriculture, Economic Research Service. May.

Timmons. D. and Q. Wang. 2010. "Direct Food Sales in the United States: Evidence from State and County-Level Data." *Journal of Sustainable Agriculture* 34(2):229–240.

U.S. Department of Agriculture, Agricultural Marketing Service. 2009. "Farmers' Market Growth: 1994–2009."

U.S. Department of Agriculture, Economic Research Service (USDA-ERS). No date. "The Food Environment Atlas." www.ers.usda.gov/foodatlas. Accessed November 2010.

U.S. Department of Agriculture, National Agricultural Statistics Service (USDA-NASS). No date. "2007 Census of Agriculture." http://www.agcensus.usda.gov. Accessed July 2010.

U.S. Census Bureau. No date. http://www.census.gov. Accessed July 2010.

Uva, W. L. 2002. "An Analysis of Vegetable Farms' Direct Marketing Activities in New York State." *Journal of Food Distribution Research* 33: 186–189.