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How do farmers compose their portfolio of local food marketing channels?

Iryna Demko, Postdoctoral Researcher in Agribusiness, Department of Agricultural, Environmental, and Development Economics, The Ohio State University

Zoë Plakias, Assistant Professor, Department of Agricultural, Environmental, and Development Economics, The Ohio State University

Ani Katchova, Associate Professor and Farm Income Enhancement Chair, Department of Agricultural, Environmental, and Development Economics, The Ohio State University

Correspondence may be sent to: Iryna Demko, demko.29@osu.edu

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Abstract:

We analyze farmers' choices of local food marketing channels using the 2015 Local Food Marketing Practices Survey. This novel data set distinguishes among four different marketing channels (direct-to-consumer, direct-to-retailer, direct-to-institution, and other direct-to-intermediate) and 14 sub-channels. We examine how farmers utilize different types of direct marketing channels using binary logit models for each of the four channels, multinomial logit models for the five most frequent combinations of marketing channels, and Tobit models to examine factors affecting the value of farmers' direct sales using each channel. We find that most direct farms use one direct marketing channel. Farms in metro counties usually have more diversified options for their direct marketing portfolios relative to rural counties. Small farms (those with an annual gross value of total sales less than \$250,000) may find it harder to sell directly to retailers than large farms. Also, farms in rural counties and beginning farmers may have higher barriers to enter direct-to-institution marketing channel than farms located in metro and metro-adjacent counties and experienced farmers. At the same time, sales directly to intermediates such as food hubs are particularly important in U.S. rural counties and for small and medium farms.

Keywords: Local Food Marketing Practices Survey, direct marketing, direct-to-consumer marketing, direct-to-retailer marketing, direct-to-institution marketing, direct-to-intermediate marketing

1. Introduction

Between the 1992 and 2012 Censuses of Agriculture, the number of farms marketing directly to consumers increased from 86,432 to 144,530 farms and the average direct sales per farm nearly doubled. Direct sales include both fresh foods and processed or value added food and drink products such as bottled milk, cheese, meat, jam, cider, wine, etc. In 2015, food sales directly to consumers, retailers, institutions and intermediates accounted for \$8.7 billion nationwide and constitute more than 2% of total farm sales (NASS, 2016a). Interest in supporting local food systems is also rising among policymakers. For example, the 2014 Farm Bill included \$501.5 million more in federal and state programs to support and promote local and regional food systems than the previous bill in 2008 (Low et al. 2015).

Markets for local food products have developed to include supermarkets, schools, restaurants, and on-line marketplaces. In the 2015 Local Food Market Practice Survey, an add-on to the U.S. Census of Agriculture, the local food sector was represented by four marketing channels composed of 14 sub-channels. In direct-to-consumer (DTC) marketing channels, producers engage consumers in face-to-face market transactions via on-farm stores, farmers' markets, off-farm stores or stands, community supported agriculture operations (CSAs), and virtually via online marketplaces. Marketing channels other than farmer-to-consumer transactions in the local food supply chain are classified as: (i) direct-to-retailer (DTR), including farmers selling to restaurants, caterers, food cooperatives, supermarkets and supercenters; (ii) direct-to-institution (DTI), including sales to schools, colleges and universities, and hospitals; and (iii) direct-to-intermediate (DTInter), covering sales to distributors and food hubs which market locally-branded products.

The objective of this study is to understand how farmers diversify their portfolio of local food marketing channels and in what ways, using information on the current structure of the U.S. local food sector from the 2015 Local Food Market Practices Survey. Direct marketing enables food growers to receive a greater percentage of the consumer food dollar than they would if they marketed through a traditional intermediary.¹ Canning et al. (2016) estimated that the farm share of the food dollar is approximately 14% in the U.S. and 17% in Canada, while the post-farm component of market value (the marketing bill) accounts for the rest of consumers' food

¹ Food dollar represents the portion of the consumers' food expenditures received by farmers.

expenditure. Participation in the shorter supply chains also leads to overall reductions in the marketing bill share devoted to energy and transportation costs (Diamond et al., 2014).² Marketing directly to a retailer, an institution or an intermediary using a contract secures production purchases and provides price stability (Hu, 2012; Barrowclough et al., 2015).

Comparing the relative performance of wholesale and direct marketing channels, LeRoux et al. (2010) concluded that a combination of different marketing channels is needed to maximize farm financial performance. Farmers can diversify their marketing portfolios in many different ways. Starr et al. (2003) showed that farmers already doing direct marketing also had a desire for a farmers' cooperative to do large-scale buying and distribution. Payne (2002) and Thilmany and Watson (2004) showed that 69% of U.S. farmers selling at farmers' markets also had retail and wholesale markets to which they were selling higher volumes of products at lower margins. Similarly, Lawson et al. (2008) found that only 12% of farmers in their New Zealand study relied on one distribution outlet. Most farmers used a combination of two or three marketing channels to distribute their products. These channels included the internet, the major supermarket chains, restaurants, and catering outlets. Uva (2002), Park et al. (2014), Bauman et al. (2016) found that farmers with diversified portfolios of local marketing channels also generated more income.

Mostly due to the lack of requisite data, few studies have examined farmers selling to broadly defined intermediated marketing channels. Using data from the Agricultural Resource Management Survey (ARMS) survey, Low and Vogel (2011) estimated that in 2008 the value of local food marketed through channels other than direct-to-consumer channels accounted for 50-66% of the value of all local food sales. The 2015 Local Food Marketing Practices Survey confirms their estimates: local food sales directly to institutions, retailers and intermediates accounted for 66% of local food sales nationwide (NASSa, 2016). Relative to direct-to-consumer, direct sales to intermediates involve less producer-customer interaction and may be more suitable for farmers who prefer farming to marketing. Farmers may expose consumers to local food in a more convenient way while being more cost-effective, taking into account that farmers need to participate in farmers' markets by withdrawing their time from farming.

² The average supermarket product in the U.S. is handled 33 times on its way to the shelf (Kahn and McAlister, 1997) and has traveled an average of 1,500 miles (Kingsolver et al., 2007).

The 2015 Local Food Marketing Practices Survey is a novel data set which provides benchmark statistics on local food marketing practices and sales. We contribute to the literature by examining how farmers diversify their portfolio of local food marketing channels using new data on the current structure of the U.S. local food sector.

We consider each farmer's combination of marketing channel choices, which we will call their marketing channel portfolio. First, we develop hypotheses about the factors related to farmers' use of each of the four individual marketing channels and test these hypotheses using logit and Tobit regressions. Second, we consider the factors related to farmers' use of certain the five most frequent combinations of marketing channels using multinomial logit regressions.

We find that most direct farms use one direct marketing channel. Farms in metro counties usually have more diversified options for their direct marketing portfolios relative to rural counties. Small farms (those with an annual gross value of total sales less than \$250,000) may find it harder to sell directly to retailers than large farms. Also, farms in rural counties and beginning farmers may have higher barriers to enter DTI marketing channel than located farms in metro and metro-adjacent counties and experienced farmers. At the same time, sales directly to intermediates such as food hubs are particularly important in U.S. rural counties and for small and medium farms.

II. Hypotheses

Prior literature leads us to hypothesize about farmers' use of each of the four individual marketing channels. Larger farm operations may have an incentive to save on marketing costs by selling to buyers who can absorb a large proportion of their production, such as retailers and institutions. Larger farms may find maintaining a constant supply of local goods easier than smaller farms can (Monson et al., 2008). We hypothesize that: (1) small and medium farms will be more likely to participate in DTC marketing than large farms; (2) small and medium farms will be less likely to participate in DTR and DTI marketing channels than large farms; (3) small and medium farms will be more likely to participate in DTInter than large farms.

Proximity to population centers of large cities has been shown to be a key determinant of successful DTC marketing (Gale, 1997; Govindasamy et al. 1999; Morgan and Alipoe, 2001; Brown et al.

2006; Detre et al. 2011). We hypothesize that the farms located in metro and metro-adjacent counties will be more likely to participate in DTC and DTR sales than farms located in rural areas because of their proximity to potential markets. Because schools, colleges and hospitals are not necessarily located in the areas with higher population density, we hypothesize that farms in metro counties will be equally likely to participate in the DTI channel relative to farms in rural counties. We hypothesize that farms in metro counties will also be less likely than rural farms to participate in the DTInter channel, as this channel tends to support small farmers and ranchers in accessing retail, food service and institutional markets (Rimal et al. 2016). For farms located in rural metro-adjacent counties, we hypothesize more active participation in the DTInter channel relative to farms in rural counties. Also, farms in metro-adjacent counties will be equally likely to participate in DTI channel relative to rural farms.

Timmons and Wang (2010), Cheng et al. (2011) and Ahearn and Stern (2013) focused on significant regional variation in direct food sales across the U.S. Demko et al. (2017) showed that farms located in the Atlantic, West and Midwest production regions are more likely to have high values of direct sales compared to farms in the South. Farms in the Plains have less DTC sales than farms in the South, which is explained by the lower population density (Timmons and Wang, 2010; Ahearn and Stern, 2013) and relatively less developed local food system infrastructure. We hypothesize that farms in the Atlantic, West, and Midwest regions will be more likely to participate in DTC, DTR, DTI, and DTInter channels than those in the South; and farms in the Plains will be less likely to participate than those in the South.

Prior studies showed the importance of DTC marketing to produce growers (those producing fruit, vegetables, or nuts) (Morgan and Alipoe, 2001; Uva, 2002; Monson et al., 2008; LeRoux et al., 2010). We hypothesize that produce farms will be more likely to participate in DTC sales than livestock and crop farms. We also hypothesize that produce farms will be more likely to participate in DTR, DTI and DTinter channels than other farms.

DTC channel includes types of sub-channels (from on-farm stores to an online marketplace) which require different land investments. For example, in 2015, on-farm stores require more land (\$1.3 billion or 44% of direct sales, also representing 31% of farm operations) than other sub-channel types (NASSa, 2016). Sales online accounted for 6% of direct sales and 6% of farms. We hypothesize that farmers who own more of their operated acres as opposed to leasing will be more

likely to participate in DTC sales. Land ownership will also stimulate farms' participation in the DTR, DTI, and DTInter marketing channels.

A beginning farmer may be more interested in trying various DTC marketing sub-channels and more likely to participate in DTC sales (Park et al., 2014). Rimal et al. (2016) found that more than 60% of producers use food hubs to broaden their market, which the beginning farmer may seek the most. Thus, we hypothesize that beginning farmers will also be more likely to participate in the DTInter channel. At the same time, they may find it difficult to enter DTR and DTI markets and are expected to be less likely to participate in DTR and DTI channels.

If a farm operator is older she is expected to know more about direct marketing and DTC channel in particular along with regulations needed to enter DTR and DTI markets. DTInter is a new marketing channel and we hypothesize that older farm operators will be less likely to participate in it.

A farm with a principal operator whose primary occupation is farming (i.e., who spends at least 50% of her time farming) is more likely to participate in DTC, DTR, DTI, DTInter channel than a farm with a principal operator whose primary occupation is not farming. Farmers whose primary occupation is farming have more time available to work on the farm and to market directly to consumers (Ahearn and Stern, 2013). Similar arguments apply to DTR, DTI and DTInter channels.

Farmers who have more experience in direct sales may find it easier to meet the quality expectations of DTI and DTR marketing channels. Thus, we expect that farmers are more likely to participate in DTR and DTI sales as their experience increases. More experienced farmers are also hypothesized to have higher DTC sales as this channel is the most mature among the local food marketing channels. Finally, we expect that more experienced farmers are less likely to participate in the DTInter channel as they are more likely to have already established distribution channels and food hubs is a relatively new channel.

III. Data and Empirical Model

The data used in this analysis come from the 2015 Local Food Marketing Practices Survey. The survey was administered via mail, phone, web, e-mail and in-person data collection modes in all

50 states in the spring of 2016. Surveys were sent to 24,907 farms, and the response rate was 57.5%.³ The weighted sample size, which accounts for nonresponse, coverage and misclassification, is 167,009.

The survey includes questions about sales and locations to four direct marketing channels (direct-to-consumer, direct-to-retail, direct-to-institution and direct-to-intermediate) and 14 total sub-channels within these channels. The survey also asked about sales of raw and value-added product to all sub-channels, as well as about locations and collective action related to these sub-channels. Finally, the survey asked about a variety of on-farm practices potentially related to direct marketing and some basic farm and operator characteristics.

First, we test our hypotheses about the relationships between the factors related to farmers' use of each of the four individual marketing channel using logit regressions. We also use Tobit regressions with the same variables to examine how these factors affect the value of farmers' direct sales in each of the four main marketing channels. In addition, we consider factors related to farmers' use of the five most frequent combinations of marketing channels using multinomial logit regressions.

We compare small- and medium-sized local farms' participation in direct marketing channels relative to large farms. The small farms' total gross value of sales ranges from \$1 to \$249,999. Medium farms are defined as those with \$250,000-\$999,999 total sales. Small farms represent 92.04% of all local food farms, medium farms account for 6.42% and large account for the remaining 1.54% (Table 1). In 2012, operations with direct food sales of \$500,000 or more accounted for 2% of all direct marketing operations but received 45% of direct marketing income (NASSb, 2016).

We control for a farm's location with respect to metropolitan areas using the 2013 Rural-Urban Continuum Codes (RUCC). Among those farms in the sample, 53.25% of farms were located in metro counties, 31.71% were located in rural metro-adjacent counties and 15.04% were located in the rural areas. We employ the ERS/NASS classification to define five production regions:

³Another 19,365 possible operations (based on publically available information) from the Multi-Agency Collaboration Environment (MACE) list were surveyed for coverage adjustment purposes only. Further information about the sampling, stratification and coverage adjustment methodology can be found in USDA (2017)

Atlantic, Midwest, Plains, West, and South (used as a base category).⁴ California accounted for \$2.9 billion in all local food sales or 33% of the U.S. total (NASSb, 2016). The Southeast and Northeast had the most farms participating in direct sales of food (Figure 1).

Figure 2 shows that in 2012, produce farms represented 25% of all DTC farms and 45% of DTC sales. Livestock farms accounted for 57% of all DTC farms and 35% of DTC sales. Produce farms outnumbered other farms in the percentage of sales to broadly defined intermediated marketing channels (Low et al., 2015)⁵.

We define the share of land that is owned to be the share of owned land, less any land leased to others, out of the farmer's total area of land in production. In 2015, farmers in the sample owned an average 83.01% of the land on which they produced and rented the rest from others (Table 1).

Table 1 also shows that 74.49% of direct farms had internet access in 2015. Also, 17.96% of farms hosted websites for their farms. Of these, 84% of the websites promoted the farm's history, 82% were used to promote the farm's production; and 29% offered a platform for selling agricultural goods (NASSa, 2016).

A beginning farm has a primary operator with 10 or fewer years of farming experience. The data show that 23% of farmers in the Local Food Marketing Practices Survey were beginning farmers, but only 9% were under 35 years old (NASSb, 2016). In 2015, 52% of farmers had more than 10 years of experience marketing via the DTC marketing channel and 46% of farmers had more than ten years of experience marketing via the DTR channel (NASSa, 2016). In addition, 41% of farm operators in the survey indicated their primary occupation was farming. Of local food farm primary operators, 38% were women—a higher proportion of women than among all farms, according to data from the 2012 Census of Agriculture (NASSb).

Farms' record-keeping is evaluated on a scale of 1 to 5 for maintaining a balance sheet, an income statement, a cash flow budget or projection, a written business plan and a separate marketing plan.

⁴ Atlantic region is comprised of CT, DE, KY, ME, MD, MA, NH, NJ, NY, NC, PA, RI, TN, VT, VA, WV; Midwest - IL, IN, IA, MI, MN, MO, OH, WI; Plains - KS, NE, ND, OK, SD, TX; and West - AZ, CA, CO, ID, MT, NV, NM, OR, UT, WA, WY.

⁵ Currently we do not have comparable statistics on produce and livestock farms, but we hope to include these statistics in future iterations of the paper.

Third party certification is defined as obtaining one or more of the following: (1) USDA Certified Organic; (2) pasture-based management (grass fed, free range, pasture raised); (3) animal care-based management (cage free, raised without antibiotics, animal welfare approved, certified humane); (4) Naturally Grown Certified, other USDA labels/quality verification; and (5) other third party certified or verified practices excluding food safety certification. In 2015, 21.35% of the farms had at least one of these certifications. Also, 13.93% of the farms participated in one of the USDA farm programs.

IV. Results

Factors affecting participation and sales by channel

First, we consider the results of the logit and Tobit regressions (Tables 3 and 4). For the both, we report the average marginal effects (AMEs). In the case of the logit regressions, the AME is the average change in the probability of participating in each of the four channels given a one-unit change in the value of the regressor. In the case of the Tobit regressions, the AME is the average change in sales to each marketing channel, conditional on participating in that marketing channel, given a one-unit change in sale. The results from the logit model estimations (reported in Table 3) show that small farms are significantly less likely to participate in the DTR channel than large farms. Small and medium farms are also significantly more likely to participate in DTInter channels relative to large farms. Furthermore, as shown in Table 4, small and medium farms have significantly lower sales to the DTC, DTR and DTI marketing channels relative to large farms.

As expected, farms in metro counties are significantly less likely to participate in the DTInter marketing channel than farms in rural counties. However, we do not find evidence that metro-adjacent farms are more likely to sell to intermediated channels than rural farms, as we had predicted. In the Tobit regressions (Table 4), we also find that farms located in metro and metro-adjacent counties sell significantly more through DTI channel than farms located in rural counties.

Farmers who own more of the land they produce on have significantly higher DTInter sales (Table 4). Unexpectedly, we see a significant negative impact of share of land that is owned on participation in DTI (Table 3) and volume of DTI sales (Table 4). Farmers who own more of their land also have lower DTR sales.

Being a crop farm is a very strong predictor of participation in the DTI channel (Table 3) and higher sales in the DTC and DTI channels (Table 4). At the same time, crop farms have lower sales through the DTInter channel than livestock farms.

The Tobit estimation results show that beginning farmers have higher DTC sales than more experienced farmers. We also confirm that beginning farmers are significantly less likely to participate in the DTI channel and have a lower volume of DTI sales. Interestingly, we find that beginning farmers are significantly more likely to participate in the DTR channel and have significantly higher DTR sales relative to more experienced farmers.

Farmers who are older are significantly less likely to participate in DTInter and DTI sales (Table 3). They also have significantly lower DTInter sales for each additional year of the age (Table 4). Unexpectedly, every additional year of experience in direct sales adds to a farmer's DTInter sales.

Table 4 confirms that a farmer whose primary occupation is farming has higher DTC sales than those with other primary occupations. Those farmers whose primary occupation is farming are also more likely to participate in the DTR channel (Table 3) and have a higher volume of DTR sales (Table 4).

The results in shown in Table 3 confirm our hypothesis that farms in the Atlantic, Midwest and West regions are more likely to participate in DTR and DTI sales than farms in the South. In Table 4, we see that farms in the Atlantic production region also have higher DTR and DTI sales relative to farms in the South. In addition, farms in the Plains are significantly less likely to participate in the DTR channel (Table 3).

In addition, we find that farms in the Midwest and Plains will be significantly more likely to participate in DTC sales than farms in the South. We also find that farms in the Atlantic, Midwest and West have significantly higher DTC sales than farms in the South.

We do not find evidence for our hypothesis that farms in the Atlantic, Midwest, Plains and West regions are more likely to participate in DTInter channels than the farms in the South (Table 3). Unexpectedly, farms in the Atlantic and Midwest regions have significantly lower DTInter sales than farms in the South.

Factors affecting choice of marketing channel portfolio

Next, we consider each farmer's combination of marketing channel choices, which we will call their marketing channel portfolio. Using the 2015 Local Food Marketing Practices Survey, we find that 80.5% of farms sell through one direct marketing channel and 19.5% choose more than one channel. These four channels include: (1) direct-to-consumer, (2) direct-to-retailer, (3) direct-to-institution, (4) and other direct-to-intermediate. These results are different from Uematsu and Mishra (2011), where 59% of farms use single direct marketing channel and 41% diversify using the 2008 Agricultural Resource Management Survey (ARMS). ARMS is a national survey collecting financial information for about 30,000 farms each year. ARMS also recorded data on direct marketing in 1997, 2002, 2005 (for direct sales over the Internet only), and from 2007 to 2015. In 2008, marketing channels included seven options: (1) roadside stand or on-farm facility (excluding on-farm store); (2) on-farm store; (3) farmers' market; (4) Community Supported Agricultural (CSA) buying club; (5) regional distributor; (6) State branding program; (7) direct sales to local grocery stores, restaurants, or other retailers.

We further analyze the top five most common marketing channel portfolios; all other marketing channel portfolios are pulled into an "other" category. Just over 95% of farmers use one of these five most common portfolios of marketing channels. We use a multinomial logit regression with the same factors employed in our analysis of farmer's choices by channel to analyze factors affect the likelihood of choosing each marketing channel portfolio. The marginal effects reported in Table 5 are the average marginal effect—or the average change in the probability of a farmer choosing each of the five most common portfolios, or some other portfolio, given a one-unit change in each of the regressors.

We find that relative to large farms (those with an annual gross value of total sales more than \$1 million), small farms (those with an annual gross value of total sales less than \$250,000) are significantly more likely to choose to market via the DTC channel only and significantly less likely to choose portfolios that include DTR, as well as other portfolios. Interestingly, we find that medium farmers (those with an annual gross value of total sales of at least \$250,000 and less than \$1 million) are significantly less likely to market to portfolios consisting of only DTC or DTR channels, as well as other portfolios, but significantly more likely to market through the DTInter channel only.

Relative to rural counties, farms in metro counties are significantly more likely to choose other portfolios, perhaps reflecting the diversity of marketing options and thus marketing portfolios available to farmers in urban areas with the highest concentration of consumers. Being a metro-adjacent area relative to a rural area does not significantly affect the choice of any of the top five portfolios or other portfolios.

As stated earlier, the crop farm variable is not intuitive because most livestock products were not considered in defining this variable. In addition, there is minimal variation in this variable. However, we see that a farm that is a crop farm is significantly more likely to choose the DTC channel only and significantly less likely to choose the DTInter channel only.

In terms of regional differences, we find that relative to being in the South, being in the Atlantic or Midwest regions makes a farm significantly more likely to choose the DTC marketing channel only, as well as other portfolios. In addition, farms in the Atlantic, Midwest and West are significantly less likely to participate in the DTInter marketing channel only than farms in the South. These results suggest important differences in direct consumer access in these regions. Farms in the Atlantic region are also significantly more likely to choose to portfolio consisting of DTC and DTR channels relative to farms in the South. We see no effect of being located in the Plains relative to the South on the choice of portfolios.

V. Conclusions and Implications

Local foods are linked to many USDA priorities—these priorities include enhancing the rural economy, the environment, food access and nutrition, and strengthening agricultural producers and markets. The 2014 Farm Bill increased support to intermediated marketing channels (Low et al., 2015). The purchases of local foods by schools present opportunities for farmers as approximately 30.7 million students participate annually in the National School Lunch Program (USDA Food and Nutrition Service, 2017). Retailers have been increasing their direct purchases from farmers. For example, in the U.S., at least 9% of produce sold in Wal-Mart, the world’s largest grocer, is sourced from local farmers (Clifford, 2010; Wal-Mart, 2017)⁶. In 2016, Sustainable Agriculture and Food System Funders counted at least \$165 million of grants for food and farm issues,

⁶ Wal-Mart defines local produce as that grown and sold in the same state (Clifford, 2010).

including the development of local and regional food infrastructure (Environmental Grantmakers Association, 2016).

Although significant public and philanthropic funds are being directed to support local food systems, relatively little is known about farmers participating in these systems. With this work, we are among the first to use the new Local Food Marketing Practices Survey to better understand farmers' direct marketing strategies. Furthermore, we contribute to the previous literature by providing insight on the full portfolio of farmers' choices rather than focusing solely on one direct marketing channel.

We find that most direct farms use one direct marketing channel. Farms in metro counties usually have more diversified options for their direct marketing portfolios relative to rural counties. We also find that sales directly to intermediates such as food hubs are particularly important in U.S. rural counties and for small and medium farms.

Farms located in metro and metro-adjacent counties sell significantly more through DTI channel than farms located in rural counties. Also, beginning farmers are significantly less likely to participate in the DTI channel and have a lower volume of DTI sales. Farmers' sales to institutions are of particular interest as the number of farm-to-school programs rises across the U.S. Farm-to-school programs connect schools and local farms with the goals of increasing children's consumption of local and healthy foods, providing health and nutrition education, and supporting small and medium-sized local and regional farmers (Joshi et al., 2008). Evaluations suggest that farm income generated through the school food services market amounts to between 2% and 5% of total farm sales (Feenstra and Ohmart, 2012). We find that farms in rural counties and beginning farmers may have higher barriers to enter DTI channel than located farms in metro and metro-adjacent counties and experienced farmers.

Small farms (those with an annual gross value of total sales less than \$250,000) are significantly more likely to choose to market via the DTC channel only and are less likely to participate in the DTR channel than large farms. Retailers may be able to increase their profits by providing food differentiated as local to consumers (Gupta and Jablonski, 2016; Richards et al, 2017) but small farms may find it harder to enter these potentially lucrative markets.

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Table 1: Local Food Farm Characteristics in 2015

Commodity	Number of Farms	Share in Total
Small Farms (\$1-249,999 in total gross value of sales)	153,709	92.04%
Medium Farms (\$250,000-999,999)	10,728	6.42%
Large Farms (\$1,000,000 and more)	2,572	1.54%
Metro Counties	88,926	53.25%
Metro-Adjacent Counties	52,961	31.71%
Remote Rural Counties	25,122	15.04%
Share of Owned Acres	132,663	83.01%
Internet Access	120,289	74.49%
Web-Site for the Farm	28,977	17.96%
Third-Party Certifications, at least one	33,178	21.35%
USDA Programs Participant, at least one	21,771	13.93%

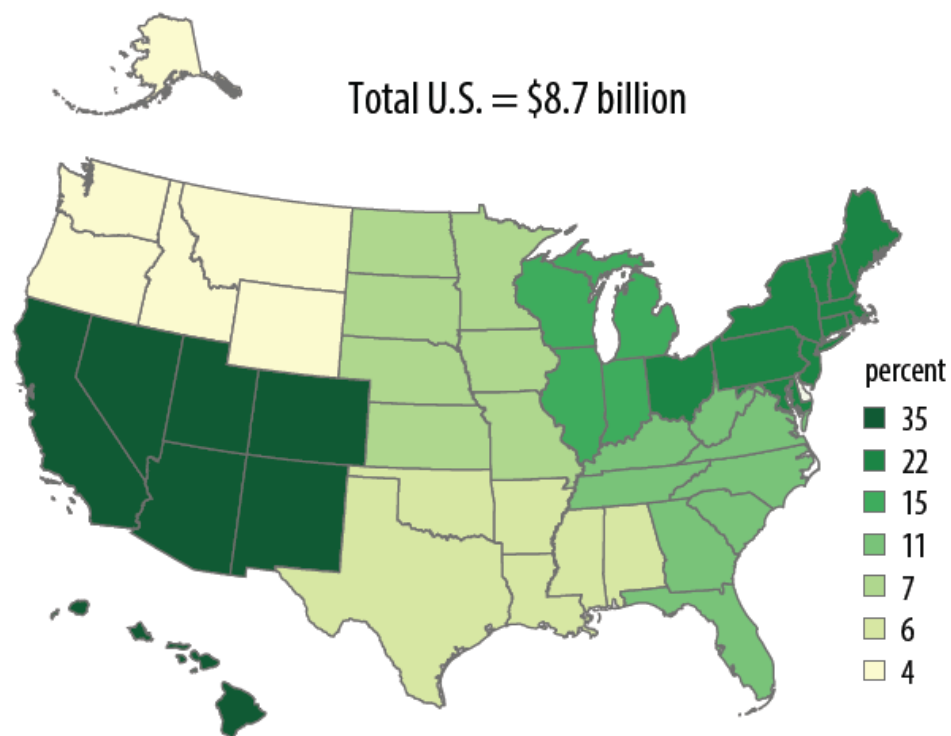
Note: Table 1 includes statistics for the variables released by NASS

Table 2: Food Commodities and Their Share in the Total Number of Local Farm Operations (n = 167,009)

Commodity	Number of Farms	Share in Total
Beef	52,766	32%
Fruits and Nuts	46,130	28%
Vegetables	46,029	28%
Poultry and Poultry Products	32,332	19%
Lamb, Goats and Products	15,078	9%
Other Crops	14,805	9%
Specialty Animal Products	12,295	7%
Pork	9,692	6%
Dairy Products	8,750	5%
Greenhouse and Food Grown Under Protection	8,058	5%
Grains	7,923	5%
Aquaculture	2,258	1%

Source: NASS (2016a) and authors' calculations.

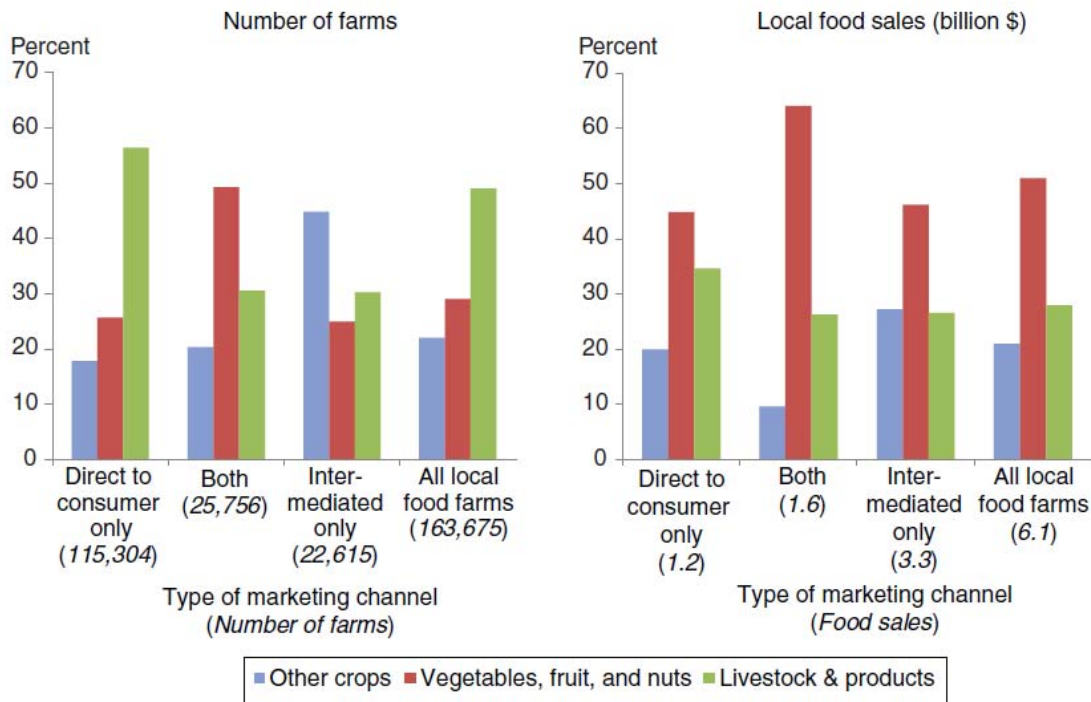
Figure 1: Direct Sales of Local Food by Farms: Regional Share in 2015



Source: NASS (2016b)

Note: The 5 regions that we used in our analysis do not match what was used in the 2015 Local Foods Marketing Practices Survey. The survey was broken into 7 regions, with 30 states (within those regions) to be published.

Figure 2: Local Food Farm Numbers and Sales by Marketing Channel Use and Farm Type



Note: The share of farms by marketing channel use and farm production type are based on 2012 Census benchmark counts; the shares of total value of local food sales by marketing channel use and farm production type are synthetic estimates. Source: USDA, ERS/NASS, ARMS data, 2008-2011; USDA, NASS, 2012 Census of Agriculture.

Source: Low et al. (2015)

Table 3: Binary Logit Models of Farms Participation in Local Food Marketing Channels

	<i>Average Marginal Effect (standard error)</i>			
	<i>Pr(DTC = 1)</i>	<i>Pr(DTR = 1)</i>	<i>Pr(DTI = 1)</i>	<i>Pr(DTInter = 1)</i>
Small Farms	0.046 (0.030)	-0.234 (0.082)***	-0.150 (0.122)	0.148 (0.043)***
Medium Farms	-0.005 (0.036)	0.058 (0.117)	-0.183 (0.142)	0.224 (0.057)***
Metro Counties	-0.004 (0.035)	-0.080 (0.070)	-0.059 (0.113)	-0.057 (0.033)*
Metro-Adjacent Counties	0.037 (0.038)	-0.063 (0.077)	-0.005 (0.135)	-0.078 (0.038)**
Owned Share of Land	-0.027 (0.029)	-0.097 (0.066)	-0.234 (0.127)*	-0.022 (0.034)
Crop Farm	0.033 (0.037)	-0.238 (0.148)	0.582 (0.262)**	-0.069 (0.061)
Beginning Farmer	0.034 (0.025)	0.203 (0.059)***	-0.277 (0.109)**	-0.018 (0.034)
Age	0.0004 (0.0009)	0.001 (0.002)	-0.008 (0.004)**	-0.003 (0.001)**
Farming Occupation	-0.030 (0.025)	0.082 (0.043)*	-0.098 (0.090)	0.031 (0.025)
Atlantic	0.042 (0.031)	0.109 (0.060)*	0.416 (0.124)***	-0.052 (0.040)
Midwest	0.073 (0.041)*	0.133 (0.069)*	0.406 (0.124)***	0.002 (0.042)
Plains	0.107 (0.052)**	-0.273 (0.087)***	0.111 (0.170)	0.074 (0.045)
West	0.020 (0.033)	0.136 (0.074)*	0.260 (0.143)*	0.041 (0.039)
Direct Sales Experience	0.0008 (0.0001)	0.0003 (0.002)	-0.003 (0.002)	0.0005 (0.001)
Weighted Number of Farms	112,667	30,158	7,038	57,757
Pseudo R²	0.04	0.10	0.16	0.06

Notes: (i) * p<0.10, ** p<0.05, *** p<0.01; (ii) Dependent Variable, e.g., Pr(DTC)=1 is a whether or not a farm has sales through this particular DTC marketing channel

Table 4: Tobit Models of Sales in Local Food Marketing Channels

	<i>Average Marginal Effect (standard error)</i>			
	<i>DTC</i>	<i>DTR</i>	<i>DTI</i>	<i>DTInter</i>
	-247,365.1	-1,296,727	-16,928.9	-339,812.6
Small Farms	(42,203.7)***	(354,933.5)***	(6,004.2)***	(120,909.3)***
Medium Farms	-184,834.5	-1,070,936	-11,691.0	-79,466.9
	(47,552.6)***	(334,576.4)***	(5,887.6)**	(107,042.8)
Metro Counties	1,566.4 (8,744.3)	80,732.3 (80,315.8)	6,742.9 (3,518.2)*	12,988.7 (29,786.8)
Metro-Adjacent Counties	-7,461.5 (9,084.2)	399,05.82 (81,562.7)	5,563.1 (3,266.5)*	-9,941.5 (32,074.3)
Owned Share of Land	-10,318.2	-211,168.7	-9,984.9	59,945.4
	(8,802.2)	(104,550.3)**	(3,419.8)**	(34,281.3)*
Crop Farm	105,608.4	128,572	23,093.8	-224,578.1
	(29,666.6)***	(161,275.9)	(9,164.6)**	(68,202.8)***
Beginning Farmer	13,700.1	208,182.2	-6,633.8	-39,595.2
	(6,886.4)**	(74,059.0)***	(2,820.9)**	(27,245.1)
Age	-13.0 (242.3)	1,175.6 (2,010.3)	-15.2 (65.1)	-2,108.8 (1,079.5)*
Farming Occupation	12,064.3	227,652.3	-1,816.6	-3,202.8
	(4,753.8)**	(76,176.7)***	(2,900.2)	(20,244.9)
Atlantic	47,670.3	227,128.4	13,858.5	-128,875.2
	(8,886.4)***	(97,211.6)**	(3,932.0)***	(44,080.0)***
Midwest	27,832.1 (9,311.2)***	112,700.8 (97,022.7)	14,401.8 (4,267.9)***	-73,854.1 (37,963.1)*
	-1,955.4	-150,996.8	2,876.2	1,339.9
Plains	(12,419.2)	(111,267.8)	(4,900.2)	(30,839.3)
	17,215.2	134,428.6	6,701.4	-33,814.7
West	(10,397.0)*	(103,437.5)	(4,239.1)	(31,090.7)
Direct Sales Experience	262.8 (188.5)	515.3 (1,643.5)	-120.8 (85.3)	1,507.3 (664.4)**
Number of Represented				
Farms	155,745	155,701	155,745	155,680
Pseudo R²	0.04	0.01	0.02	0.01

Notes: (i) * p<0.10, ** p<0.05, *** p<0.01; (ii) Dependent Variable, e.g., Pr(*DTC*)=1 is a decision to sell through DTC marketing channel

Table 5: Factors Affecting Farmers' Participation in Top Five Most Common Marketing Channel Combinations

<i>Average Marginal Effect (standard error)</i>						
	DTC Only	DTC and DTR	DTInter Only	DTC and DTInter	DTR Only	Others
Small Farm	0.210 (0.079)***	-0.107 (0.022)***	-0.017 (0.089)	0.028 (0.027)	-0.048 (0.018)***	-0.066 (0.013)***
Medium Farm	-0.159 (0.091)*	-0.052 (0.033)	0.220 (0.106)**	0.067 (0.048)	-0.049 (0.022)**	-0.027 (0.012)**
Metro County	-0.026 (0.055)	-0.006 (0.022)	0.006 (0.056)	-0.021 (0.028)	0.020 (0.015)	0.026 (0.015)*
Metro-Adjacent County	0.019 (0.058)	-0.002 (0.022)	0.011 (0.059)	-0.051 (0.031)	0.010 (0.018)	0.013 (0.011)
Owned Share of Land	-0.008 (0.057)	-0.024 (0.018)	0.061 (0.061)	0.025 (0.027)	-0.024 (0.019)	-0.030 (0.010)***
Crop Farm	0.551 (0.136)***	-0.021 (0.037)	-0.535 (0.120)***	0.039 (0.057)	-0.030 (0.020)	-0.004 (0.022)
Atlantic	0.219 (0.058)***	0.071 (0.018)***	-0.327 (0.059)***	0.006 (0.031)	-0.002 (0.017)	0.032 (0.012)**
Midwest	0.141 (0.061)**	0.027 (0.019)	-0.163 (0.058)***	-0.032 (0.036)	-0.003 (0.023)	0.030 (0.018)*
Plains	0.050 (0.077)	-0.019 (0.023)	0.039 (0.066)	-0.037 (0.048)	-0.022 (0.023)	-0.011 (0.016)
West	0.089 (0.064)	0.007 (0.022)	-0.102 (0.059)*	-0.005 (0.038)	0.012 (0.020)	-0.001 (0.013)
Farming Occupation	-0.021 (0.039)	0.056 (0.014)***	-0.043 (0.039)	-0.005 (0.019)	0.015 (0.013)	-0.002 (0.011)
Beginning Farmer	0.012 (0.047)	0.073 (0.018)***	-0.026 (0.047)	-0.043 (0.027)	-0.003 (0.010)	-0.013 (0.013)
Direct Sales	-0.002	0.000	0.002	0.001	-0.000	-0.000
Experience	(0.001)*	(0.000)	(0.001)*	(0.000)*	(0.000)	(0.000)
Age	0.003 (0.002)	-0.000 (0.000)	-0.001 (0.002)	-0.002 (0.001)***	0.001 (0.000)	-0.000 (0.000)
Weighted Number of Farms						
155,745						

Note: * p<0.10, ** p<0.05, *** p<0.01