

The profitability implications of sales through local food markets for beginning farmers and ranchers

Beginning farms and local food markets

Becca B.R. Jablonski

Department Agricultural and Resource Economics, Colorado State University, Fort Collins, Colorado, USA

Joleen Hadrich

College of Food Agricultural and Natural Resource Sciences, University of Minnesota, Saint Paul, Minnesota, USA

Allison Bauman and Martha Sullins

Colorado State University Extension, Fort Collins, Colorado, USA, and

Dawn Thilmany

Department Agricultural and Resource Economics, Colorado State University, Fort Collins, Colorado, USA

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Abstract

Purpose – The Agriculture Improvement Act of 2018 directed the US Secretary of Agriculture to report on the profitability and viability of beginning farmers and ranchers. Many beginning operations use local food markets as they provide more control, or a premium over commodity prices, and beginning operations cannot yet take advantage of economies of scale and subsequently have higher costs of production. Little research assesses the relationship between beginning farmer profitability and sales through local food markets. In this paper, the profitability implications of sales through local food markets for beginning farmers and ranchers are explored.

Design/methodology/approach – The authors utilize 2013–2016 USDA agricultural resource management survey data to assess the financial performance of US beginning farmers and ranchers who generate sales through local food markets.

Findings – The results point to four important takeaways to support beginning operations. (1) Local food channels can be viable marketing opportunities for beginning operations. (2) There are differences when using short- and long-term financial performance indicators, which may indicate that there is benefit to promoting lean management strategies to support beginning operations. (3) Beginning operations with intermediated local food sales, on average, perform better than those operations with direct-to-consumer sales. (4) Diversification across local food market channel types does not appear to be an indicator of improved financial performance.

Originality/value – This article is the first to focus on the relationship beginning local food sales and beginning farmer financial performance. It incorporates short-term and long-term measures of financial performance and differentiates sales by four local food market type classifications: direct-to-consumer sales at farmers markets, other direct-to-consumer sales, direct-to-retail sales and direct-to-regional distributor or institution sales.

Keywords Local food, Direct sales, Beginning farmer, Farm Bill

Paper type Research paper

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Introduction

The share of newly entering US farmers declined significantly between 1982 and 2007 (Ahearn, 2013). As a result, Federal policymakers put increased emphasis on enhancing the financial viability of beginning farmers and ranchers (defined in the 2017 census of agriculture as any producer who has farmed for 10 years or less). Specifically, the Agriculture Improvement Act of 2018 (2018 Farm Bill) provided \$435 million in mandatory funding to the Farming Opportunities Training and Outreach program, created a national beginning farmer coordinator position at the US Department of Agriculture (USDA), and designated coordinators in each state to better support outreach efforts (NSAC, 2018). Furthermore, the 2018 Farm Bill required the US Secretary of Agriculture to “develop surveys and distribute comprehensive reporting of trends in farmland ownership, tenure, transition, barriers to entry, profitability, and viability of beginning farmers and ranchers” (USDA ERS, 2019a). Although the share of beginning producers stabilized from 2007 to 2017 at 27% of all operations (USDA NASS, 2007, 2020), recent reports highlight that challenges continue for these operations; beginning farmers often report earning less farm income and have higher relative debt compared to established farms (Key and Lyons, 2019).

The 2018 Farm Bill also made significant investments in support for local and regional supply chains and markets, including ensuring permanent, mandatory funding for the Farmers Market and Local Food Promotion Program and the Value-Added Producers Grant Program (NSAC, 2019). As part of these efforts, priority points are awarded to applications from or inclusive of beginning operations. The linking of local food markets and beginning producers stems from the idea that beginning operations may need to access differentiated markets that provide a premium over commodity prices, as they cannot yet take advantage of economies of scale and, subsequently, have higher costs of production (Jablonski *et al.*, 2017). Previous research has demonstrated that financially viable farm businesses often require control of substantial assets, which poses a major obstacle to potential for beginning operations (Ahearn and Newton, 2009). Many local food markets have low barriers to entry, and there is well-documented evidence that consumers are willing to pay a premium for products sold through these markets (Low *et al.*, 2015).

In 2012, 22% of beginning farmers reported sales through direct markets (USDA NASS, 2014) [1]. And, the limited available research presents mixed results of beginning farmers' participation in these channels. Key (2016) and Low *et al.* (2015) show that beginning farmers who marketed food through direct channels had a greater likelihood of reporting positive sales in 2007 and 2012, and higher business survival rates when compared to beginning producers who only used traditional channels. However, direct marketing was also associated with slower total sales growth (Low *et al.*, 2015). Ahearn *et al.* (2018) found that being a beginning farmer had a positive impact on the farm's rate of return on assets (ROA), which is a long-term performance measure, and a negative impact on gross cash farm income (GCFI), a short-term performance measure.

This research uses 2013–2016 USDA agricultural resource management survey (ARMS) data to assess the financial performance of US beginning farmers and ranchers who generate sales through local food markets. It measures this relationship using short-term and long-term measures of financial performance following Ahearn *et al.* (2018). Furthermore, we differentiate sales by four local food market type classifications: direct-to-consumer sales at farmers markets, other direct-to-consumer sales, direct-to-retail sales and direct-to-regional distributor or institution sales. Given findings of previous research indicating that farm performance varies across type of local food market (e.g. Bauman *et al.*, 2018, 2019; Park *et al.*, 2014), understanding differential impacts by type of local food market, particularly when considering the unique context of beginning farmers, is important. Results have timely implications for federal policy, as discussions on the 2023 Farm Bill, including refining opportunities to support beginning farmers and ranchers, are underway.

Conceptual model

Agricultural producers' overall goal is to maximize their profit subject to a set of constraints imposed on their farm or ranch. However, the level of profit differs by farm characteristics, in particular if a farmer is a beginning or non-beginning operation as well as the marketing channel they chose to sell their product.

Based on a producer's assets, their comparative advantage will vary. In thinking about market channel selection specifically, a classification scheme of local food business models by [Angelo *et al.* \(2016\)](#) provides a useful illustration. As a producer's sales volume increases, they can achieve greater economies of scale, and have lower costs of production. This enables them to sell successfully through commodity markets. For producers, such as beginning operations, that are unable to achieve economies of scale, finding opportunities to differentiate their products and achieve a higher value per unit of sales may be important. For the smallest scale operations, finding markets with low barriers of entry, where they can keep the entire value of the food retail dollar is likely key. Direct-to-consumer channels such as farmers markets and community supported agriculture (CSA) arrangements require very little up front capital investment ([Jablonski *et al.*, 2017, 2019](#)). As producers scale up, and gain more experience, they may be able to trade some portion of the value per unit of sales in order to increase their sales volume. In this case, intermediated local food markets such as sales to restaurants, institutions or specialty retail may provide good marketing opportunities.

There are many ways to measure financial performance. In the short-term, producers are likely more concerned with increasing gross revenue to ensure immediate cash flow, especially to cover potential loan obligations and meet cash expenses. In the long-term, producers focus on the return or profit generated by the assets on their operation. Accordingly, there are important reasons why we may see differences across financial performance measures for beginning and non-beginning operations, including these varying priorities and the producers' strategies to achieve different measures of success.

Literature review

Literature on beginning farmer and rancher performance

Beginning farmers and ranchers is a broad group of producers with no more than 10 years of farming or ranching experience ([Key and Lyons, 2019](#)). Research demonstrates the heterogeneity of performance within beginning operations. For example, [Katchova and Ahearn \(2015\)](#) and [Williamson \(2017\)](#) found that young beginning farmers, as opposed to all beginning farmers, are more likely to rapidly expand their farm operations (as defined by increasing GCFI and variable expenses).

[Mishra *et al.* \(2009\)](#) explored factors affecting financial performance of new and beginning farmers and found these operators were twice as likely to be tenants and had average net farm income (NFI) 5.5 times less than experienced operators, higher interest payments and farm assets about half the size of more established farm operators. Additionally, they found that beginning operations that involved tenants, compared to full owners, had higher ROA and that beginning operations involved in processing agricultural products, or value-added activities, were more likely to have higher ROA.

Most recently, [Key and Lyons \(2019\)](#) used 2013 to 2017 USDA ARMS data to describe the structural and economic characteristics of beginning operations. They found that, compared to more established operations, beginning farms operate at a smaller scale, earn less farm income and have higher relative-debt-to-asset ratios, while reporting more off-farm work and less wealth. [Katchova and Dinterman \(2018\)](#) used ARMS data to assess the performance of beginning farmers during the agricultural downturn (2013–2015) and found that beginning farmers were at greater risk of short-term financial stress, measured by liquidity, but they

were actually better positioned than non-beginning farmers with respect to their repayment capacity.

Literature on performance of farms selling through local food markets

There is also a growing literature that investigates farm performance impacts associated with sales through local food markets, and there is consensus that farms with sales through local food markets are, on average, smaller. [Park \(2015\)](#) uses 2008–2010 ARMS data to estimate the impact of participating in direct marketing on the entire distribution of farm sales. He finds that the impacts of direct marketing are uniformly negative, but that relative decline in sales decreases as gross farm sales (scale) increases. [Low et al. \(2015\)](#) found that operations using local food markets did not grow as quickly as those that used only commodity-oriented markets. Despite this, [Bauman et al. \(2018\)](#) find initial evidence that participation in local food markets supports financial viability (break-even returns) for some share of farms across all sales classes.

Other literature presents useful information about operator characteristics and local food market channel decisions that might impact performance of sales through local food markets. [Bauman et al. \(2019\)](#) estimate the relationship between local food marketing strategy and farm financial efficiency. Their results suggest that scale, followed by production enterprise specialty, land ownership and management of expenses, most significantly influence producer financial efficiency for those operations selling through local food markets.

[Uematsu and Misha \(2011\)](#) identified factors affecting the intensity of adoption of direct marketing strategies on GCFI using 2008 USDA ARMS data. They found that the intensity of adoption of direct marketing strategies was not related to GCFI. However, adoption of individual direct marketing strategies showed some significant effects on GCFI. Marketing through roadside stores and farmers markets had a negative and significant effect on GCFI, whereas sales through farm stores had a positive and significant effect on GCFI for all in the 0.90 quantiles.

[Park et al. \(2014\)](#) used 2008 USDA ARMS data to consider the relationship between sales through direct markets and financial performance. They find that farmers using direct-to-consumer-only outlets (e.g. farmers markets, roadside stands) report sales that are significantly lower than those derived from other direct marketing strategies, such as using intermediated only (e.g. direct to retail, farm to school) or both direct-to-consumer and intermediated sales channels. These findings have also been corroborated in more recent research (e.g. [Bauman et al., 2018, 2019](#)). [Park et al. \(2014\)](#) further investigated the role that management and marketing skills play in the decision to sell through direct markets. They found that management skills were a significant factor in explaining the choice to engage in intermediated marketing, and their indicator of marketing skills was significant in explaining the gross value of farm sales.

Literature on beginning farms and local food markets

Two articles highlight the relationship between participation in local food markets and beginning farmer status. [Low et al. \(2015\)](#) find that among beginning operations, local food sales were associated with slower sales growth compared to beginning operations that did not use these channels (17.9% growth between 2007 and 2012, compared to 25.6 for those without local food sales). They also argue that differences in sales growth rates may be due to the additional labor requirements of local food sales, substantiated by [Jablonski et al. \(2021\)](#). However, consistent with their findings of the overall farm population, beginning operations with local food sales were more likely to survive from 2007 to 2012.

[Ahearn et al. \(2018\)](#) used 2009–2012 USDA ARMS data and a two-stage Heckman approach to first understand the decision to participate in direct markets and, second, to

estimate the financial performance of farms and ranches that sell through local food markets. They used two measures of financial performance to reflect short-term performance (GCFI) and long-term performance (ROA), finding that the factors affecting farm financial performance varied significantly across these two measures. For example, being a beginning farmer was negatively related to short-term performance of GCFI but positively related to the long-term performance measure of ROA.

This research builds on the work of [Ahearn *et al.* \(2018\)](#) in using GCFI and ROA to evaluate how short- and long-term measures of financial performance differ across four local food market type classifications: direct-to-consumer sales at farmers markets, other direct-to-consumer sales, direct-to-retail sales and direct-to-regional distributor or institution sales. Given findings of previous research indicating that farm performance varies across type of local food market (e.g. [Bauman *et al.*, 2018, 2019](#); [Park *et al.*, 2014](#)), understanding differential impacts of participation in different types of local food markets on the financial performance of beginning farmers may be important.

Data and methods

To examine the differences between local food market classifications and short- and long-term financial performance measures, we use the 2013–2016 USDA Agricultural Resource Management Survey (ARMS) data.

The ARMS is USDA's primary source of information on the financial condition of US farm businesses. It is a nationally representative survey that targets 30,000 farms annually in the 48 contiguous states [2] and utilizes a complex survey design (i.e. complex stratified, multiple-frame and probability-weighted). ARMS is conducted in three phases. We use Phase III data, which are collected at the whole-farm level and focus on farm income and expenditures, farm financial arrangements and other characteristics of the farm business and farm household ([Katchova, 2015](#)).

Since 2008, ARMS has included questions about farm sales through local food channels and provided a sufficiently large sample of producers participating in these markets ([Low and Vogel, 2011](#)). Although the ARMS is congressionally mandated to focus on the core agricultural states [3], beginning in 2013, its design was changed to increase sample coverage among very small farms and somewhat expand its geographic representation. Hence, [Low *et al.* \(2015\)](#) predicted that as of 2013, the survey would have reduced variation regarding farmer participation in local and regional food systems [4].

Starting in 2013 (and through 2016), the Phase III USDA ARMS includes more detailed questions about local food channels. ARMS participants were asked to report if they produced, raised or grew commodities for human consumption that were sold directly to (1) individual consumers, (2) retail outlets or (3) institutions. Subsequently, they were asked to provide the monetary amounts received from selling (1) directly to consumers at farmers markets; (2) directly to consumers through on-farm stores, u-picks, roadside stands or CSAs; (3) to local retail outlets, such as restaurants or grocery stores; (4) to regional distributors, such as food hubs; or (5) to local institutional outlets, such as schools or hospitals ([USDA ERS, 2019b](#)). Accordingly, we use data from 2013–2016 [5].

Due to the small sample size of farmers and ranchers participating in local food marketing channels, we pool data across years. Following the USDA's definition of a farm, we drop all observations with GCFI of less than \$1,000 ([Hoppe, 2014](#)), and we exclude all nonfamily farms.

ARMS is a multiphase, multi-frame, stratified and probability-weighted sampling design. Sample weights are created in ARMS, so the sample of farms included in each year of the data expands to the US farm population and targets are met in terms of number of farms by state, harvested acres for major crops, total production by commodity, etc. ([Katchova, 2015](#)). Given the unique nature of the subsample of the population we

are evaluating in this paper (producers that participate in local food markets), ARMS expansion weights are not based on the population level characteristics of this group [6].

Following [Low *et al.* \(2015\)](#), [Low and Vogel \(2011\)](#) and [Jablonski *et al.* \(2021\)](#), we interpret farms that did not report local food sales as having zero local food sales [7] and define local food participants as those who reported positive sales through at least one local food marketing channel rather than those who simply replied affirmatively regarding the use of local food marketing channels. This gives us a sample of 3,908 producers reporting positive local food sales. We subdivide our sample of farms with local food sales by market channels: farmers market, other direct (on-farm stores, u-pick, road-side stand and CSA), retail (restaurants, grocery stores), distributor/institution (food hub, Internet aggregator, school, hospital and other business providing dining services) and by scale levels of \$1,000 to \$74,999, \$75,000 to \$349,999, \$350,000 to \$1M and over \$1M, following [Bauman *et al.* \(2019\)](#) and [Jablonski *et al.* \(2021\)](#). Based on results from [Bauman *et al.* \(2018, 2019\)](#) not specific to beginning operations, we expect larger scale operations, as well as those selling through intermediated markets (i.e. retail, distributor/institution) to be more profitable (as measured by net farm income).

To mitigate potential bias from outliers we winsorize financial variables ([Hastings *et al.*, 1947](#)), where extreme values are replaced by less extreme ones. In this approach, for variables with outliers that can take on any value, observations below the 1st percentile and above the 99th percentile are given the value at the 1st and 99th percentile, respectively. For all variables with outliers that can only take positive values, we winsorize observations at the 99th percentile. The winsorizing vector is:

$$g(x) = \begin{cases} -c & \text{for } x \leq -c \\ x & \text{for } |x| < c \\ c & \text{for } x \geq c \end{cases} \quad (1)$$

Where $g(x)$ is defined as the winsorizing vector, x is an observation and c is the value at the selected quantile.

To address our main research question, we compare financial and farm characteristics for beginning and non-beginning farmers and ranchers. We follow [Key and Lyons \(2019\)](#) and define beginning farmers as first-generation, beginning operations in which all operators have no more than 10 years of experience as a farm or ranch operator. We conduct unpaired t -tests (Welch's two-sample t -test) to compare differences in means of financial performance measures for beginning and non-beginning farmers and ranchers.

Financial performance is evaluated using revenue, profit and efficiency measures. First, we compare farm performance by studying the differences between the reported dollar estimates of GCFI and NFI by beginning farmer classification. GCFI includes all revenue sources generated due to farm activities while NFI subtracts all cash and non-cash operating and ownership expenses from GCFI ([Ahearn *et al.*, 2018](#)). Understanding that farm size and scale may impact a farms' ability to generate profit over time, each of these measures is also standardized by farm size, measured by acres operated.

Second to study farm sales characteristics and its impact on revenue generation we decompose GCFI by market channels: farmers markets, other direct sales, retail sales and distributor/institutional sales to determine the impact of each market on overall revenue accumulation. To further understand a farm's market diversification strategy, we create a market channel diversification index, such that,

$$\begin{aligned} \text{Market channel diversification index} = 1 - & \left(\text{farmers' market share of GCFI}^2 \right. \\ & + \text{other direct sales share of GCFI}^2 \\ & + \text{retail sales share of GCFI}^2 \\ & + \text{institutional sales share of GCFI}^2 \\ & \left. + \text{distributor sales share of GCFI}^2 \right) \quad (2) \end{aligned}$$

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The market channel diversification index, calculated similarly to a Herfindahl index, is bounded by 0 and 1, where an index of zero is a producer selling through one local food marketing channel (i.e. not diversified) and as the index value gets larger it indicates the producer is selling through more market channels (i.e. more diversified). For example, if a farmer sold through all four marketing channels, with each representing 25% of the farmer's GCFI, the index would be $(1 - (0.25^2 + 0.0.25^2 + 0.25^2 + 0.25^2)) = 0.75$.

Third, we compare the financial performance of beginning and not beginning farms across financial performance measures and market channels. This includes evaluating the nominal value of GCFI and NFI in addition to standardizing these measures by farm size, as measured with acres operated. While NFI provides an estimate of profit at a dollar value, in local foods research, the ROA measure is important as it includes the costs associated with unpaid labor and management. These unpaid measures have been found to be important in previous research, which demonstrates the additional labor requirements associated with these channels (Ahearn *et al.*, 2018; Jablonski *et al.*, 2021). Here, ROA is calculated as NFI less an estimate of unpaid labor and management and before interest payments, divided by the value of farm assets. We also evaluate labor efficiency by comparing labor expense as a percent of total variable expenses.

Finally, following USDA, Economic Research Service (ERS) and ARMS disclosure rules, we conducted dominance testing on all data and dropped any statistic for which any observation made up 45% or more of the total.

Results

Table 1 provides summary statistics for all variables used in this analysis. Approximately, 17% of our local food producers report being beginning operations. On average, local food operations report \$533,250 in GCFI (\$6,965 per acre), or \$55,486 (\$657 per acre) at the 50th percentile and \$311,775 (\$2,181 per acre) at the 75th percentile. Average NFI reported is \$114,296 (\$2,053 per acre). The average ROA is -7%, or -2.8% at the 50th percentile, and 1.8% at the 75th percentile. A total of 54% of local food operations report a positive labor expense.

Table 2 presents summary statistics for the percent of farmers and ranchers reporting positive sales or expenditures in reported categories. Other direct sales are the most commonly utilized local food channel (56%) followed by farmers' market sales (41%), retail sales (25%) and distributor/institution sales (16%). On average, operations reported one type of local food channel as dominant (representing >50% of total GCFI), which is reflected in a relatively low average market channel diversification index of 0.1. For operations with sales through other direct channels, these sales make up 79% of GCFI on average. For operations with farmers' market sales, those sales made up 75% of GCFI. Retail sales made up 56% of GCFI for those operations with retail sales. Lastly, distributor or institutional sales made up 66% of GCFI for those that primarily sold through those channels.

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Statistic	Mean	St. dev.	25th percentile	50th percentile	75th percentile
Gross cash farm income (GCFI), \$	533,250	1,566,293	11,183	55,486	311,775
Gross cash farm income per acre, \$/acre	6,965	47,169	205	657	2,181
Net farm income, \$	114,296	492,605	-6,143	9,095	62,473
Net farm income per acre, \$/acre	2,053	23,805	-86.431	100	680
Rate of return on assets (ROA), %	-7.002	32.432	-10.368	-2.818	1.873
Acres operated	410	944	22	88	316
Ratio of owned to operated acres, %	0.865	0.768	0.5	1	1
Total variable cost, \$	335,830	1,003,927	9,618	36,500	184,792
All operators beginning farmers (0/1)	0.167	0.373	0	0	0
Market channel diversification index	0.100	0.186	0	0	0.100

Note(s): $N = 3,908$

Market channel diversification index = $1 - (\text{farmers' market share of GCFI}^2 + \text{other direct sales share of GCFI}^2 + \text{retail sales share of GCFI}^2 + \text{institutional sales share of GCFI}^2 + \text{distributor sales share of GCFI}^2)$

Table 1.

Summary statistics for local food producers

Source(s): Agricultural Resource Management Survey (ARMS) 2013–2016. Outliers are winsorized at the 1st and/or 99th percentiles. No sampling weights are used due to unique aspects of this sample

Statistic	% reporting positive sales/expenditures	Mean	St. dev.	25th percentile	50th percentile	75th percentile
Labor expense as a % of total variable cost	54%	0.291	0.226	0.090	0.254	0.453
Farmers market sales share of GCFI	41%	0.755	0.342	0.500	1.000	1.000
Other direct sales share of GCFI	56%	0.791	0.326	0.604	1.000	1.000
Retail sales share of GCFI	25%	0.556	0.368	0.200	0.519	1.000
Distributor/institutional sales share of GCFI	16%	0.662	0.396	0.203	0.922	1.000

Table 2.

Summary statistics for local food producers reporting positive sales or expenditures in reported categories

Note(s): $N = 3,908$

Source(s): Agricultural Resource Management Survey (ARMS) 2013–2016. Outliers are winsorized at the 1st and/or 99th percentiles. No sampling weights are used due to unique aspects of this sample

In [Table 3](#), we present the summary statistics for local food producers by market channel, separating the results by beginning and non-beginning farmer operations. Non-beginning farm operations perform better than beginning farmers across all financial measures and market channels, with the exception of GCFI per acre and NFI per acre, where the differences are not significant except for retail sales where in both cases non-beginning farmers perform better.

On average, beginning farms selling through all markets had negative ROA. Similarly, non-beginning operations had negative average ROA for all channels except sales to distributors and institutions. However, ROA was less negative for non-beginning operations compared to beginning operations. For both beginning and non-beginning operations, farms with sales through distributors and institutions farmed the most acres (320 and 559, respectively).

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Variable	Farmers market, N = 1,592	Other direct, N = 2,190	Retail, N = 988	Distributor and institutional, N = 639
<i>Gross cash farm income, (\$)</i>				
Beginning farmer	96,443*** (202,622)	122,255*** (321,652)	202,993*** (470,899)	677,176*** (1,512,105)
Not beginning farmer	378,329 (1,027,125)	462,117 (1,326,727)	951,016 (2,146,338)	1,426,227 (2,719,314)
<i>Gross cash farm income per acre, (\$/acre)</i>				
Beginning farmer	5,046 (22,888)	4,731 (23,044)	7,219*** (22,784)	28,986 (114,462)
Not beginning farmer	6,892 (52,350)	4,051 (24,187)	15,179 (82,846)	10,549 (40,723)
<i>Net farm income, \$</i>				
Beginning farmer	17,776*** (84,039)	22,272*** (210,914)	25,351*** (293,434)	160,648** (645,185)
Not beginning farmer	77,585 (370,725)	94,039 (411,651)	207,507 (660,292)	321,804 (854,164)
<i>Net farm income per acre, \$/acre</i>				
Beginning farmer	995 (7,856)	786 (7,403)	1,198* (12,059)	10,780 (47,929)
Not beginning farmer	2,040 (26,686)	977 (11,797)	4,550 (44,817)	2,773 (14,518)
<i>Return on assets, %</i>				
Beginning farmer	-18.3*** (43.2)	-19.6*** (44.3)	-19.3*** (48.7)	-9.18** (53.7)
Not beginning farmer	-7.09 (29.4)	-5.66 (27.9)	-1.44 (31.0)	3.80 (33.3)
<i>Acres operated</i>				
Beginning farmer	122*** (327)	175*** (616)	195*** (636)	320** (979)
Not beginning farmer	417 (971)	424 (917)	468 (986)	559 (1,089)
<i>Labor expense as a percent of total variable expense</i>				
Beginning farmer	0.127** (0.212)	0.118*** (0.203)	0.200*** (0.249)	0.232** (0.255)
Not beginning farmer	0.158 (0.223)	0.152 (0.213)	0.257 (0.249)	0.295 (0.246)

(continued)

Table 3.
Summary statistics for local food producers by market channel

Variable	Farmers market, <i>N</i> = 1,592	Other direct, <i>N</i> = 2,190	Retail, <i>N</i> = 988	Distributor and institutional, <i>N</i> = 639
<i>Farmers market sales share of GCFI</i>				
Beginning farmer	0.744 (0.345)	0.092 (0.218)	0.169 (0.270)	0.102 (0.223)
Not beginning farmer	0.758 (0.342)	0.082 (0.203)	0.166 (0.277)	0.089 (0.215)
<i>Other direct sales share of GCFI</i>				
Beginning farmer	0.138 (0.262)	0.788 (0.327)	0.255** (0.317)	0.174 (0.311)
Not beginning farmer	0.118 (0.239)	0.792 (0.326)	0.201 (0.289)	0.125 (0.248)
<i>Retail sales share of GCFI</i>				
Beginning farmer	0.087 (0.198)	0.089 (0.210)	0.533 (0.372)	0.113 (0.242)
Not beginning farmer	0.088 (0.210)	0.085 (0.211)	0.561 (0.367)	0.115 (0.227)
<i>Distributor/Institutional sales share of GCFI</i>				
Beginning farmer	0.032 (0.139)	0.031 (0.144)	0.043** (0.143)	0.611 (0.421)
Not beginning farmer	0.036 (0.154)	0.041 (0.165)	0.073 (0.202)	0.671 (0.391)
<i>Market channel diversification index</i>				
Beginning farmer	0.174 (0.227)	0.144 (0.213)	0.291 (0.232)	0.196 (0.236)
Not beginning farmer	0.161 (0.220)	0.138 (0.210)	0.279 (0.225)	0.203 (0.230)

Note(s): Means are presented with standard deviation in parentheses, *N* = 3,908. Beginning farmer is defined as all operators on the farm/ranch having operated a farm or ranch for 10 years or less. Pairwise tests are conducted to compare means across beginning farmer type, **** statistical significance at the 1% level, ** at the 5% level and * at the 10% level

Market channel diversification index = $1 - (\text{farmers' market share of GCFI}^2 + \text{other direct sales share of GCFI}^2 + \text{retail sales share of GCFI}^2 + \text{institutional sales share of GCFI}^2 + \text{distributor sales share of GCFI}^2)$

Source(s): Agricultural Resource Management Survey (ARMS) 2013–2016. Outliers are winsorized at the 1st and/or 99th percentiles. No sampling weights are used due to unique aspects of this sample

Table 3.

For beginning farmers, on average, those with sales through distributors and institutions performed the best across all financial characteristics, including having the highest GCFI (\$677,176), GCFI per acre (\$28,986), NFI (\$160,648), NFI per acre (\$10,780) and least negative ROA (−9.18%) [8]. On average, beginning operations that reported some sales through intermediated markets (direct-to-retail or direct-to-distributor or institution sales) performed

better than those beginning operations that reported some direct-to-consumer sales (either through farmers markets or other direct channels). On average, beginning operations with intermediated sales had a higher GCFI, GCFI per acre, NFI and NFI per acre.

When looking at sales through each of the four market channels as a share of GCFI, we see almost no significant differences across beginning farmer status (the exceptions are for other direct sales share of GCFI for retail sales, and distributor/institutional sales share of GCFI for retail sales) (Table 3). For both beginning and non-beginning operations, those with sales through retailers had the highest market channel diversification index (0.29 and 0.28, respectively), implying relatively low market channel diversification across all samples. Across both beginning and non-beginning operations, for those with farmers markets sales, 75% of GCFI is from these markets; for the other direct sales category, 79% of GCFI is from these markets; for retail sales, 53–56% of GCFI is from these markets; and for distributor or institutional sales, 61–67% of sales are from these markets. This means that, similar to the results for the entire local food sample, both beginning and non-beginning operations heavily rely on their primary channel for the majority of their revenue.

Turning to expenses, beginning and non-beginning operations spend a significantly different share of their total variable expense on labor across all market channels, with non-beginning operations devoting larger shares to labor. Beginning operations had the lowest average labor expense as a percent of total variable expenses for other direct markets (12%), followed by farmers markets (13%), sales to retail (20%) and distributors and institutions (23%). Interestingly, this means that on average, the market with the highest labor expense as a percent of total variable expense (distributors and institutions) was also the top performing for GCFI and net income, implying investments in labor were well-utilized by those farms.

Finally, we divide the summary statistics for beginning and non-beginning operations by market channel and scale (GCFI). As we evaluate GCFI by scale and market channel, across all channels we see significant differences across very small and large scales (\$1,000 to \$74,999 and >\$1 million in GCFI) (Figure 1). For both these very small and large operations, non-beginning operations outperform beginning operations in all market channels. When we take a closer look at our long-term financial indicator, ROA (Figure 2), we find that it is only the smallest sales class (less than \$75,000 in GCFI) that non-beginning operations outperformed beginning operations across all market channels, with a less negative ROA. For every other sales class and market channel, there are no significant differences between beginning and non-beginning operations.

Perhaps, even more important than a comparison between beginning and non-beginning operations is recognizing, that local food markets offer a path to profitability, even at a small scale. Beginning operations in the \$75,000 to \$349,000 sales class with sales to distributors and institutions had an average ROA of over 10%. In addition, average ROA was more than 0 for all beginning farmer market channels starting at a GCFI scale of \$350,000. Similarly, average NFI is positive for beginning farmer operations across all market channels once they scale up to more than \$75,000 in GCFI sales (see Table 4).

Discussion and implications

This research used 2013–2016 USDA ARMS data to examine the relationship between financial measures and local food market channel selection for beginning farmers and ranchers. A particular contribution of this work was to differentiate four types of local food markets and use short- and long-term indicators of financial performance. Our results point to four potential implications for supporting beginning operations.

Local foods channels as viable market opportunities for beginning operations

First, we see clear evidence that, for beginning operations above \$75,000 in GCFI, local food markets allow them to be profitable (defined as positive NFI per acre or ROA) on average.



Figure 1. Gross cash farm income by market channel, comparing beginning and not beginning farmers

Note(s): Beginning farmer is defined as all operators on the farm/ranch having operated a farm or ranch for 10 years or less. Pairwise tests are conducted to compare means across beginning farmer type, *** represents statistical significance at the 1% level, ** at the 5% level and * at the 10% level

Source(s): Agricultural Resource Management Survey (ARMS) 2013-2016. Outliers are winsorized at the 99th percentile. No sampling weights are used due to unique aspects of this sample

Given that only 28% of all beginning farmers (not just those selling through local food markets) have positive ROA and 58% have positive NFI, differentiation through local food markets seems to be a promising strategy. However, we see that local marketing strategies are labor intensive (as illustrated by the increasing relative share of labor in expenses as farms grow in scale). And that on average, the market with the highest labor expense as a percent of total variable expense (distributors and institutions) was also the top performing for GCFI and NFI, implying investments in labor were well-utilized by those farms. If the returns are sufficient to pay wages that attract and retain skilled workers, this could be another competitive advantage for these farms, but given historic and continuing challenges in retaining farm workers due to seasonality, demanding work and perceptions of low earnings, this dependence on labor should be noted.

Short-term vs. long-term financial performance and lean management

Second, we found differences when using short-term and long-term financial performance indicators for beginning operations. We find that for very small and large-scale operations non-beginning operations outperform beginning operations when we consider our short-term financial measure, GCFI. When we consider our long-term financial measure, ROA, only at the very smallest sales class to non-beginning operations outperform beginning operations [9]. This may be due to the findings of Bauman *et al.* (2019), which show that the most efficient local food operations tend to operate with a lean model and are less likely to own assets until their scale allows them to be fully utilized. Given that non-beginning operations tend to be larger, they also have greater ability to spread out their fixed expenses.

Beginning farms and local food markets



Note(s): Beginning farmer is defined as all operators on the farm/ranch having operated a farm or ranch for 10 years or less. Pairwise tests are conducted to compare means across beginning farmer type, *** represents statistical significance at the 1% level, ** at the 5% level and * at the 10% level

Source(s): Agricultural Resource Management Survey (ARMS) 2013-2016. Outliers are winsorized at the 1st and 99th percentiles. No sampling weights are used due to unique aspects of this sample

Figure 2. Return on assets by market channel, comparing beginning and not beginning farmers

This finding also resonates with previous research and reports on beginning operations (e.g. [Ackoff et al., 2017](#)), which indicate that access to land is the top challenge for young operations, with student loan debt a close second. Accessing credit to make capital purchases may not be an option for many young and beginning operations whose members already have significant student loan debt. Thus, these operations may be forced to use (rather than strategically choose) lean management strategies, such as renting land instead of pursuing ownership and using more labor instead of equipment for field and packing operations.

One implication of this finding may be promoting lean management strategies to beginning operations and, for lenders, to understand that the types of capital they may seek are less likely to be secured with assets (and instead be focused on covering labor and payroll). Finding creative and innovative solutions to long-term lease arrangements or sharing equipment may be important for long-term viability and, perhaps, even more important than finding quick paths to land or equipment ownership.

Importance of intermediated channels

Third, similar to the findings of [Park et al. \(2014\)](#), we find that when we do not divide our sample by scale, beginning operations with intermediated sales—particularly those with sales through distributors and institutions, but also through retailers—performed better according to GCFI, GCFI per acre, NFI and NFI per acre metrics. Supporting beginning operations so they have better access to intermediated markets has potentially important implications for Farm Bill investments and programming. For example, putting set asides in programs such as the USDA Agricultural Marketing Services' Local Food Promotion Program (which funds

Table 4.
Summary statistics for local food producers by scale (GCFI) and market channel

Variable	Farmers market				Other direct				Retail				Distributor and Institutional			
	\$1,000 to \$74,999, N = 904	\$75,000 to \$349,999, N = 383	\$350,000 to \$74,999, N = 192	\$75,000 to \$349,999, N = 1,232	\$1,000 to \$74,999, N = 113	\$75,000 to \$349,999, N = 472	\$350,000 to \$74,999, N = 292	\$75,000 to \$349,999, N = 1,094	\$1,000 to \$74,999, N = 194	\$75,000 to \$349,999, N = 276	\$350,000 to \$74,999, N = 182	\$1,000 to \$74,999, N = 159	\$75,000 to \$349,999, N = 191	\$350,000 to \$74,999, N = 151	\$75,000 to \$349,999, N = 136	\$350,000 to \$74,999, N = 161
Gross cash farm income																
Beginning farmer	17,026*** (17,693)	163,613 (72,150)	556,730 (176,915)	1,211,874*** (180,833)	14,999*** (16,517)	162,717 (68,153)	535,042* (155,539)	1,486,896*** (812,325)	20,733*** (19,976)	148,390*** (63,164)	537,944* (151,412)	1,907,502*** (1,083,478)	24,910** (20,694)	187,197 (79,361)	511,146* (174,595)	3,232,010*** (2,333,675)
Not beg. farmer	21,183 (19,587)	176,821 (183,553)	587,670 (183,553)	2,974,386 (2,239,933)	21,898 (20,150)	178,615 (74,668)	589,234 (178,821)	3,222,225 (2,942,445)	26,927 (21,456)	178,363 (181,609)	604,725 (181,401)	4,160,342 (3,459,482)	32,134 (20,908)	186,396 (76,834)	606,997 (186,807)	4,631,830 (3,683,086)
Gross cash farm income per acre																
Beginning farmer	1,420 (2,233)	14,326 (42,961)	143,536 (42,961)	4,550** (617)	1,045 (1,863)	14,046 (45,932)	24,751** (51,195)	4,024** (2,680)	1,727 (2,745)	8,855 (23,327)	26,208 (49,016)	88,555 (9,603)	2,182 (1,658)	(D)	(D)	116,644 (249,766)
Not beg. farmer	1,200 (3,050)	5,354 (16,052)	10,248 (53,161)	43,127 (163,026)	983 (2,759)	4,341 (14,172)	4,418 (12,215)	18,779 (69,717)	1,861 (5,661)	9,603 (30,076)	11,137 (49,805)	51,400 (177,172)	1,658 (3,034)	5,221 (15,406)	13,266 (46,501)	21,919 (62,801)
Net farm income																
Beginning farmer	-1,834 (55,582)	34,844 (69,055)	1,765 (28,134)	1,051 (598)	-6,387*** (160,897)	31,731 (76,391)	104,698 (215,201)	-7,740 (56,503)	22,571 (82,841)	-4,662 (48,188)	61,266 (100,558)	(D)	(D)	801,742 (1,395,695)		
Not beg. farmer	956 (34,740)	34,962 (96,587)	101,898 (233,158)	15,087 (89,230)	3,505 (41,341)	29,900 (105,988)	100,152 (228,023)	704,082 (1,076,088)	-865 (37,804)	35,384 (96,613)	94,549 (248,844)	964,571 (1,251,434)	5,653 (69,609)	41,868 (84,597)	103,083 (232,852)	1,075,806 (1,381,085)
Net farm income per acre																
Beginning farmer	166 (2,896)	1,765 (4,717)	8,334 (28,134)	1,051 (598)	-1,611*** (2,374)	3,418 (13,786)	5,361 (17,079)	1,041* (3,018)	-223** (5,029)	(D)	(D)	(D)	-434 (4,318)	7,451 (19,690)	9,563 (32,425)	46,559 (104,655)
Not beg. farmer	401 (3,045)	1,322 (6,574)	1,916 (15,317)	15,087 (89,230)	369 (2,437)	3,399 (11,589)	5,389 (4,934)	5,389 (31,478)	550 (3,946)	1,534 (17,435)	1,143 (6,688)	19,932 (100,181)	409 (2,495)	1,451 (7,383)	3,480 (19,341)	5,724 (20,104)
Return on assets																
Beginning farmer	-24.82*** (43.53)	-5.90 (38.9)	12.1 (27.2)	11.5 (27.5)	-27.5*** (46.1)	-2.68 (19.5)	12.9 (31.4)	15.1 (30.0)	-30.3*** (50.8)	-6.20 (42.4)	0.201 (37.6)	10.2 (33.9)	-34.1*** (54.7)	11.5 (37.8)	22.1 (38.4)	51.0 (51.0)
Not beg. farmer	-14.9 (31.4)	-1.72 (19.9)	2.77 (26.7)	11.5 (27.5)	-12.7 (29.7)	-3.82 (20.9)	4.49 (21.5)	12.1 (27.9)	-14.5 (32.5)	-1.18 (23.9)	2.86 (25.0)	16.6 (33.9)	-10.9 (27.9)	6.04 (21.4)	19.4 (32.8)	40.0 (40.0)
Percent of operated acreage owned																
Beginning farmer	0.910* (0.700)	0.645*** (0.469)	0.390 (0.424)	0.908 (0.663)	0.621** (0.448)	0.313*** (0.381)	0.372* (0.596)	0.836*** (0.454)	0.559*** (0.877)	0.278*** (0.408)	0.552 (0.530)	0.944 (0.703)	0.944 (0.408)	0.782 (0.514)	0.506 (0.514)	0.468 (0.422)
Not beg. farmer	1.01 (0.768)	0.852 (0.883)	0.572 (0.387)	0.694 (0.901)	0.790 (0.717)	0.586 (0.614)	0.586 (0.484)	1.06 (0.654)	1.06 (0.975)	0.877 (0.911)	0.674 (0.472)	0.753 (0.857)	1.099 (1.057)	0.854 (0.748)	0.653 (0.657)	0.621 (0.667)
Labor expense as a percent total variable expense																
Beginning farmer	0.083 (0.185)	0.218 (0.233)	0.256 (0.233)	0.619*** (0.057)	0.067 (0.155)	0.193 (0.214)	0.345* (0.229)	0.456 (0.296)	0.134 (0.230)	0.229 (0.224)	0.346 (0.217)	0.513 (0.277)	0.137 (0.226)	0.221 (0.233)	0.275 (0.196)	0.472 (0.248)
Not beg. farmer	0.081 (0.169)	0.200 (0.232)	0.282 (0.247)	0.333 (0.239)	0.073 (0.156)	0.186 (0.227)	0.263 (0.219)	0.327 (0.231)	0.130 (0.214)	0.254 (0.249)	0.359 (0.236)	0.377 (0.212)	0.167 (0.226)	0.255 (0.251)	0.360 (0.246)	0.406 (0.187)

Notes (6): Means are presented with standard deviation in parentheses, N = 3,908. (D) represents nondisclosed data for any statistic for which any observation made up 45% or more of the total. Beginning farmer is defined as all operators on the farm (and/or hired) for 10 years or less. Otherwise means are calculated for non-beginning farmer type. * represents statistical significance at the 10% level, ** at the 5% level and *** at the 1% level. Source(s): Agricultural Resource Management Survey (ARMS) 2013–2016. Outliers are winsorized at the 1st and/or 99th percentiles. No sampling weights are used due to unique aspects of this sample.

projects that develop, coordinate, and expand local and regional food business enterprises that engage as intermediaries in indirect producer-to-consumer marketing) for marketing initiatives that target beginning operations may support new or expanded opportunities, including technical assistance and market development, for beginning operations to sell through intermediated markets.

Market channel diversification

Finally, although we cannot say anything about market channel diversification within market type (e.g. the number of farmers markets at which an operation participates), we see that for beginning operations across all market types, the market at which they sell product represents a significant percentage of their GCFI. This may point to policy recommendations promoted by [Schmit and Gomez \(2011\)](#) specific to farmers markets, in which more centralized markets are an important way to support farm performance. Beginning operations may find it more efficient to sell greater volumes through fewer outlets, but this runs counter to trends occurring in some places in the country, where a desire for every community to have its own market has fragmented the sales going to any one market.

Part of the explanation for the relative lack of market channel diversification may be due to specialized skills or certifications required by different types of local food markets. For example, [Low et al. \(2015\)](#) show that only a small percentage of farms selling through local food markets are certified organic. Those that choose to certify may do so as they sell through intermediated channels where they have less ability to communicate their production practices directly to consumers. Food retailers may also have specialized third party food safety audits that are not required through the producer rule of the food safety modernization act ([Minor et al., 2019](#)). These specific requirements are in line with the findings of [Park et al. \(2014\)](#) that management and marketing skills play in the decision to sell through intermediated channels. Accordingly, it makes sense that there may be returns to market channel specialization.

Conclusion

Based on our analysis, we find evidence that Congress and USDA's investment in local food markets to support beginning operations has merit. For beginning operations above \$75,000 in GCFI sales through local food markets appear to support pathways to profitable operations. That said the reliance of these operations on labor and less on ownership of assets may require lenders to think more creatively about collateral. Furthermore, given challenges with labor availability, there may need to be additional consideration given to the long-term viability of such labor-intensive operations. Finally, we see that there appear to be benefits associated with specialization with type of local food market, and particularly with sales through intermediated markets. Continued investments to beginning farmers in building managerial and marketing skills, as well as in adhering to the relatively hire food safety and other requirements of intermediated markets may be warranted.

Notes

1. Note that this tabulation has not been run for 2017 Census data.
2. While 30,000 farms are targeted each year, the actual number of respondents is lower and varies by year. We use data from 2013 to 2016 with total yearly unweighted sample sizes ranging from 17,427 (in 2013) to 19,623 (in 2015). We report sample sizes for each subset of producers in the tables reporting findings.
3. The core agricultural states are Arkansas, California, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Carolina, Texas, Washington and Wisconsin ([Katchova, 2015](#)).

4. Our pooled 2013–2016 ARMS data includes a sample of 652 beginning operations with sales through local food markets. We believe that this is an adequate sample to test our research question and to substantiate our conclusions. That being said, given that the ARMS is congressionally-mandated to focus in the core agricultural states, our results may be biased toward producers in states that have less local food sales. According to USDA NASS' 2015 Local Food Marketing Practice Survey, there are only four top 10 states in direct farm sales that are “core” agricultural states within the ARMS: California, Texas, Wisconsin, and Iowa.
5. More recent data are not used due to changes in data availability. Local food questions differ in 2017 due to it being a census year, and local food questions were temporarily removed from the survey in 2018.
6. Following [Bauman *et al.* \(2018\)](#) and [Bauman *et al.* \(2019\)](#), we determine that weighting the sample will distort the results by forcing it to align with the average farmer-respondent who is not representative of the population we are studying. Therefore, we do not weight our sample.
7. We changed missing values to zero.
8. Note that there is a lot of variability in the distributors and institutional sales category, even with winsorizing the top and bottom at 1%.
9. It is important to note that we are reporting averages in this analysis, so a farm may have a positive NFI or one that is close to zero and still report a negative ROA due to including the opportunity cost of labor and management.

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Corresponding author

Becca B.R. Jablonski can be contacted at: Becca.Jablonski@colostate.edu