

Opportunities to support beginning farmers and ranchers in the 2023 Farm Bill

Becca B. R. Jablonski¹ | Nigel Key² | Joleen Hadrich³ |
Allie Bauman¹ | Sarah Campbell⁴ | Dawn Thilmany¹ |
Martha Sullins¹

¹Department of Agricultural and Resource Economics, Colorado State University, Fort Collins, Colorado, USA

²Economic Research Service, U.S. Department of Agriculture, Washington, District of Columbia, USA

³Department of Applied Economics, University of Minnesota, St. Paul, Minnesota, USA

⁴Beginning Farmer and Rancher Program, U.S. Department of Agriculture, Washington, District of Columbia, USA

Correspondence

Becca B.R. Jablonski, Department of Agricultural and Resource Economics, Colorado State University, B325 Clark, Fort Collins, CO 80512, USA.
Email: becca.jablonski@colostate.edu

Abstract

Beginning farmers and ranchers represent an important segment of U.S. agriculture, yet they face financial challenges relative to more established operations. This article provides an overview of emerging research on the financial performance of beginning farm and ranch operations, with a lens toward implications for the 2023 Farm Bill. First, we use U.S. Department of Agriculture (USDA) Agricultural Resource Management Survey data to explore descriptive statistics relative to beginning farm and ranch usage of: local food markets, Federal crop insurance, and financing mechanisms. Subsequently, we leverage a farm-level panel dataset from the USDA Census of Agriculture and regression analysis to examine the relationship between key financial metrics and beginning farmer success. Results show: (a) beginning farm performance over time is associated with both increases in scale and productivity, as well as participation in agricultural programs, (b) access to credit is important, and

This material is based upon research supported in part by the U.S. Department of Agriculture (USDA) National Institute of Food and Agriculture, and the USDA Economic Research Service. The authors have no financial interest or benefit from the direct application of this research. The funders played no role in the decision to submit the paper for presentation. The findings and conclusions in this presentation are those of the authors and should not be construed to represent any official USDA or U.S. Government determination or policy.

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2022 The Authors. *Applied Economic Perspectives and Policy* published by Wiley Periodicals LLC on behalf of Agricultural & Applied Economics Association.

Funding information

Economic Research Service; National Institute of Food and Agriculture; U.S. Department of Agriculture

Editor in charge: Daniel Petrolia and Joshua Maples

that being credit constrained lowers the probability of survival, growth, and success for beginning operations, and (c) beginning operations are significantly less likely to use Federal crop insurance compared to established operations across all scales.

KEYWORDS

beginning farmer, credit, direct market, Farm Bill, insurance, local food

JEL CLASSIFICATION

Q12, Q18

There is significant interest from policymakers in leveraging programs and initiatives within the U.S. Farm Bill to support beginning farmers and ranchers. This is because beginning operations represent an important agricultural segment: there are more than 900,000 new and beginning producers that farm 193 million acres and contribute \$88 billion in agricultural sales (USDA NASS, 2020). The fact that over 40% of farmland is expected to change hands in the next two decades implies that ensuring the viability of new and beginning operations is key to the future of U.S. agriculture (Freedgood et al., 2020). Yet, on average, beginning farmers face financial challenges relative to more established operations. The average beginning farm household has approximately one-half the net worth of an average established operation. And, they report earning less farm income and have higher relative debt (Key & Lyons, 2019).

Though beginning farmers and ranchers are eligible for all programs administered by the U.S. Department of Agriculture (USDA), recent Farm Bills, including the 2018 Farm Bill, provided targeted support specifically addressing the needs of new and beginning producers (CRS, 2019, see figure 1). To increase understanding of the determinants of financial performance of beginning operations, the 2018 Farm Bill established a national beginning farmers and rancher coordinator, who, among other responsibilities, was charged with facilitating research on the profitability of new operations (CRS, 2019) (Figure 1).

This paper provides an overview of emerging research on the financial performance of U.S. beginning and new farm and ranch operations,¹ leveraging restricted access national datasets. Here, we first use U.S. Department of Agriculture (USDA) Agricultural Resource Management Survey (ARMS) data to explore descriptive statistics related to beginning farm and ranch usage of: local food markets, Federal crop insurance, and financing mechanisms. Subsequently, we leverage a farm-level panel dataset from the USDA Census of Agriculture and regression analysis to examine the relationship between key financial metrics and beginning farmer success. Results provide important insight into opportunities that could be addressed as part of the 2023 Farm Bill to enhance the economic viability and survivability of new and beginning farmers and ranchers.

PREVIOUS RESEARCH

Though previous research on the financial performance of beginning farmers and ranchers is limited, what does exist finds that their performance is heterogenous—in many ways even more

2018 Farm Bill Provisions Supporting BFRs

- **Farming Opportunities Training and Outreach** (§12301). Combines and expands the existing Beginning Farmer and Rancher Development Grant Program and the Outreach and Assistance to Socially Disadvantaged Farmers and Ranchers. Authorizes competitive grants to support training, education, outreach, and technical assistance. Provides annual mandatory funding of \$30 million (FY2019), rising to \$50 million (FY2023), and authorizes \$50 million in annual appropriations.
- **Local Agriculture Market Program** (§10102). Combines and expands the existing Farmers' Market and Local Food Promotion Program and the Value-Added Agricultural Product Market Development Grants. Provides \$50 million annually in mandatory funds and reserves 10% of grant funding for BFRs and other historically underserved producers.
- **Underserved Producers** (§11108). Establishes a definition of *underserved producer*. Provides additional assistance to certain underserved groups in obtaining federal crop insurance.
- **Tree Assistance Program** (§1501). Increases cost sharing to 75% for BFRs and other producers.
- **USDA Conservation Programs** (Title II). Provides preferences for BFRs and other historically underserved producers under some programs (§2204, §2403, §2501, §2706).
- **BFR Individual Development Accounts Pilot Program** (§5301). Reauthorizes appropriations for the program, which, to date, has never been funded or implemented.
- **Farm Credit Programs** (Title V). Provides additional support for, and requires additional reporting regarding, BFRs and historically underserved producers to gain access to credit (§5104, §5306, §5413, §5316).
- **State Agricultural Mediation Programs** (§5402). Expands state agricultural grants to support mediation services related to credit counseling and other issues requiring mediation.
- **Competitive, Special, and Facilities Research Grant Act** (§7504). Requires USDA priority research areas to consider barriers to entry for underserved farmers and ranchers.
- **Reports on Land Access and Farmland Ownership Data Collection** (§12607). Requires USDA to submit a public report within a year of enactment on barriers that prevent BFRs from acquiring or accessing farmland.
- **BFR Coordination** (§12304)—Establishes a national BFR coordinator to provide outreach and technical assistance to help BFRs participate in USDA farm programs.

FIGURE 1 2018 Farm Bill provisions supporting beginning farmers and ranchers. Source: Congressional Research Service. 2019. <https://crsreports.congress.gov/product/pdf/IF/IF11227#:~:text=The%202018%20farm%20bill%20requires,BFR%20coordinator%20for%20each%20state>

so than established operations (Ahearn, 2011; Dodson & Ahrendsen, 2016; Katchova and Ahearn 2016; Williamson, 2017). Further, on average, beginning farmers have characteristics that may be impediments to consistent profitability—e.g., smaller scale, less farm income, higher relative debt-to-asset ratios, and less wealth (Key & Lyons, 2019). In this section, we provide a brief overview of previous literature on beginning operations specific to participation in local food markets, participation in Federal crop insurance programs, access to credit, and business success.

Local food markets

Support for local food markets has increased, in part to expand market access for beginning farm operations, in recent Farm Bills. Specifically, the 2018 Farm Bill made funding for the Local Agriculture Market Program (LAMP) permanent and not subject to annual budget appropriations for the first time (NSAC, 2019). Accompanying this growing Federal support is an emerging literature that investigates farm performance impacts associated with local food markets (e.g., Bauman et al., 2018, 2019; Park, 2015; Park et al., 2014; Uematsu & Mishra, 2011). However, only three articles assess the relationship between participation in local food markets and beginning farmer status. Understanding the relationship between financial performance of sales through local food markets and status is important as many beginning operations are leveraging these markets. According to the 2012 census, 22% of beginning operations sold through local food markets (a directly comparable tabulation has not been released from 2017). As beginning operations are smaller than more established operations (Key & Lyons, 2019), on average, leveraging these value-added markets with low barriers to entry may be important (Angelo et al., 2016). Bauman et al. (2018) demonstrates that even at the smallest scale (\$1000–\$74,999 in gross cash farm income), almost half of the operations selling through local food markets are profitable.

Compared to beginning operations that did not use local food markets, Low et al. (2015) find that direct sales are associated with higher business survival rates across all sales classes, but slower growth rates compared to beginning farms not using local food markets for all but the smallest sales category. Ahearn et al. (2018) found that for operations using local food markets, being a beginning farmer was negatively related to short-term performance measured in terms of gross cash farm income, but positively related to the long-term performance measured as rate of return on assets. Jablonski et al. (2022) find that though local food channels can be viable marketing opportunities for beginning operations, but that similar to Ahearn et al. (2018), there are differences when using short- and long-term financial performance indicators of profitability.

Federal crop insurance

Previous research has demonstrated that the lack of a federally subsidized crop insurance product protecting revenues can be a limitation for some producers interested in accessing value-added markets, including organic production expansion (Belasco & Schahczenski, 2020). Accordingly, as part of the 2018 Farm Bill, Congress directed the USDA to investigate usage of Federal crop insurance by underserved producers, including those selling through local food markets and/or who are beginning farmers or ranchers (U.S. Senate, n.d.).

We could not identify any literature that studies the relationship between Federal crop insurance participation and beginning operations. However, Jablonski et al. (2022) examine the role of Federal crop insurance for farms and ranches that sell through local food markets and find that there is little variation in Federal crop insurance premium expenditures across local food market channels. Rather, their results show that scale is the primary predictor of Federal crop insurance participation and insurance premium expenditures.

Financing strategies

Agriculture requires large sunk cost capital investments, which necessitates farmer's ability to access credit or debt through various financing options. Beginning operations may be more challenged to secure access to credit as they are less likely to have established sales and cash flow records, or collateral to secure loans (Ahearn, 2011). Further, they are more likely to use differentiated marketing strategies (such as local food markets) than established operations (USDA NASS, 2014). Risk management can be more straightforward for operations accessing conventional markets because insurance products target conventional market revenues. However, fewer government programs are available to manage risk for local food markets (Jablonski et al., 2022) that may include organic and value-added revenue streams.

The most common traditional source of financing is debt, an arrangement giving the borrowing party permission to access money under the condition that it is to be paid back later, usually with interest to the lender (Thilmany et al., 2022). Beyond the traditional sources of debt (including savings and loan associations, commercial banks, Farmer mac, the Farm Credit System, and credit unions), the USDA's Farm Service Agency (FSA) has been found to be an important source of credit for beginning farmers through a combination of loans made directly to producers and through Federal guarantees of loans made through commercial lenders and the Farm Credit System (Dodson & Ahrendsen, 2016).

Not all farms with a beginning farmer, however, meet FSA loan eligibility criteria. Qualified applicants for FSA loans must: have the requisite skills or knowledge to manage a farm operation, supply the majority of the labor through the applicant or family member, and be unable to obtain credit through a commercial lender despite having a good credit history and a feasible business plan. Based on these criteria, Dodson and Ahrendsen (2016) found that 176,000 farms, or less than half of all beginning farms, were likely eligible for FSA credit programs at the end of 2014. Tulman et al. (2016) examined usage of the USDA's microloan program, which was designed, in part, to better serve the needs of beginning farmers and ranchers. They found that beginning operations received the largest share of these loans, however these microloans were capped at \$35,000 prior to November 2014, and \$50,000 after that, so may not fill all the financing needs of these operations. Accordingly, exploring the role of financing strategies for beginning farmers is important in order to understand if there are beginning operations without access to credit or access to sufficient credit, an issue that could have important implications for the Farm Bill.

Business success

Past studies of business success not specific to beginning farmers and ranchers have used panel data to explain variation in farm business survival or farm size growth rates (Diwisch et al., 2009; Key & Roberts, 2006, 2007; Kimhi & Bollman, 1999; Storm et al., 2015; Weiss, 1999). Using Census of Agriculture data, Katchova and Ahearn (2016) found that farms operated by older beginning farmers tend to be smaller and do not tend to grow as much over time. Their results show that it is mostly young farmers, as opposed to all beginning farmers, who rapidly expand their farm operations after entering agriculture. Williamson (2017) also explored how differences in the initial ages of farmers affects farm finances and assets. His results indicate farmers who are under 45 years old saw a much larger increase in production,

assets and liabilities than older farmers. More recently, Nadolnyak et al. (2019) used farm-level panel data from the Census of Agriculture to examine how weather variability, along with other economic and demographic factors, affect beginning farm exits. The authors found that profitability and off-farm employment does not affect beginning farm exit rates, but farm size (sales) lowered the probability of exit.

This study contributes to the literature by examining the determinants of beginning farm success, where a farm is considered successful if it remains in business without declining in size (value of real estate assets) over a 5-year period. Because this definition of success requires that a farm business both survive and grow, it likely provides a more relevant measure of business success than either the survival rate or growth rate alone. This definition also allows for an interpretation of the net effect on success of factors that have opposing effects on farm survival and farm expansion.

DATA AND METHODS

Throughout this research we use two national datasets from the USDA National Agricultural Statistics Service (NASS), both in their restricted access form. The annual ARMS is the primary source of information on the economic well-being of America's farms and ranches. Here, we use ARMS data to explore descriptive statistics related to beginning farm and ranch usage of local food markets, Federal crop insurance, and financing mechanisms. Subsequently, we leverage a farm-level panel dataset from the USDA Census of Agriculture and regression analysis to examine the relationship between key farm characteristics and access to credit and beginning farmer success. The Census of Agriculture is conducted every 5 years and provides a complete count of U.S. farms and ranches.

Agricultural resource management survey

The USDA ARMS is a nationally representative survey of farms and ranches in the 48 contiguous states, targeting about 30,000 farms each year. We use 2013–2016 Phase III data, collected at the whole farm level, which includes 17,427 observations in 2013, 29,733 in 2014, 19,623 in 2015, and 18,545 in 2016. Data are pooled across years. ARMS is a multiphase, multiframe, stratified, probability-weighted sampling design.

We treat the use of ARMS sampling weights differently across different statistics. For the descriptive statistics on local food markets we use ARMS sampling weights, however we do not use them for the descriptive statistics on either federal crop insurance or financing strategies. ARMS expansion weights are not based on the population level characteristics of operations that participate in local food markets, and therefore weighting the sample will distort the results by forcing them to align with the average farmer-respondent (Bauman et al., 2018, 2019). For these unweighted data, following USDA ARMS disclosure rules, we conducted dominance testing on all data and dropped any statistic for which any one observation made up 45% or more of the total subsample. Statistics on federal crop insurance and financing strategies are calculated using ARMS sampling weights that account for the probability of selection within a given year. While jackknife estimation is recommended for estimating standard errors, Katchova (2015) states that when sub-setting the data in small samples, jackknife estimation using replicate weights to estimate standard error may become unreliable and totals from the

sub-sample may not expand to population values. Because we subset our data in this paper, we use standard methods to calculate standard errors.

Following the USDA's definition of a farm we exclude observations with gross cash farm income (GCFI) less than \$1000 (Hoppe and MacDonald, 2016) and nonfamily farms. To define beginning operations, we follow Key and Lyons (2019) and define them as 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 across beginning and established farmers and ranchers. GCFI is total cash revenue generated through sales of commodities on the operation, whereas rate of return on assets (RROA) is calculated as net farm income less an estimate of unpaid labor and management and before interest payments, divided by the value of farm assets.

For the local food market analysis, we follow Low et al. (2015), Low and Vogel (2011), and Jablonski et al. (2020), and interpret farms that did not report local food sales as having zero local food sales 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 results in a sample of 3908 producers reporting positive local food sales.² Following Bauman et al. (2019) and Jablonski et al. (2020) the local food subsample is further divided by market channels: farmers market, other direct (on-farm stores, u-pick, road-side stand, CSA), retail (restaurants, grocery stores), distributor/institution (food hub, internet aggregator, school, hospital, other business providing dining services) and by scale levels of \$1000–\$74,999, \$75,000–\$349,999, \$350,000–\$1 M, and over \$1 M.

To understand participation in Federal crop insurance by beginning operations compared to established operations, we use the ARMS Phase III question: “[o]f the insurance for the farm business (dollars) how much was for Federal crop insurance.” We treat this variable as binary (positive expenditures on Federal crop insurance vs. no expenditures).

For the research focused on sources of credit, our analysis is centered on Section K: Farm Debt, where respondents are asked to list up to five loans (including lines of credit) held by the operation on December 31st. Loan details utilized in this analysis include lender type, balance owed on December 31st, and the primary purpose of the loan. We group the 18 lender types in Section K into seven lender groups and classify each group as either traditional or non-traditional financing (Table 1).

Census of agriculture

Farm-level data from the USDA Censuses of Agriculture are used to estimate how farm and farm operator characteristics and access to credit affect the probability of farm business success. A farm is defined as successful if it remains in business and does not decrease in size (measured using the inflation-adjusted value of farm real estate assets) over a five-year period. Census data are used to identify factors that contribute to farm business success. The farm-level data used in this study are compiled from the 2007, 2012, and 2017 Agricultural Censuses administered by the USDA's National Agricultural Statistics Service (NASS). The Census of Agriculture aims to collect information from all agricultural operations that produce, or would normally produce and sell, at least \$1000 of agricultural products per year.³ Farm principal operators are matched across consecutive Censuses and the two 5-year panels are pooled. To focus on beginning farms, the sample is limited to farms on which the principal operator reported 10 or fewer years of farming experience in the initial period.

TABLE 1 Lending source groupings

Lender group	Lender classifications
Traditional commercial lending	Savings and loan association Commercial bank Farmer mac Credit union
Farm credit	Farm credit systems
Farm service agency	USDA Farm Service Agency (FSA)
Federal/state financing	Small business administration (SBA) State and county government lending agencies
Input suppliers	Implement dealer financing corporations Input suppliers Co-ops and other merchants Contractor
Personal relationship finance	Life insurance Individuals for whom any land in this operation was bought under a mortgage or deed of trust Individuals for whom any land in this operation was bought under a land purchase contract
Credit cards	Credit cards

Note: Lender classifications taken from the U.S. Department of Agriculture Agricultural Resource Management Survey Phase III Farm Debt section. Other lender, a response shared by less than 1% of the sample, was not included in this typology.

To understand business success, we focus on three variables: credit constraints, the receipt of farm program payments, and farm productivity. Farms are classified as credit constrained if they have an interest expense ratio (IER) among the top 5% of all beginning farms. The IER is defined as the farm's total interest expenses on all loans divided by value of farm production (FFSC, 2017, p III-24). The IER is one measure often used by agricultural lenders to assess the creditworthiness of prospective borrowers (FFSC 2017). Borrowers with low creditworthiness ratings are more likely to face financial constraints—that is, a limitation on the quantity of new debt that they can borrow. To allow for the possibility that farmers with no initial debt are fundamentally different from those with debt, the regression models also include an indicator of whether the farmer had any interest expenses in the first period.

The importance of government payments to the farm is measured using an intensity index defined as the value of government agriculture payments divided by the sum of the value of payments plus the total value of production.⁴ Farm productivity is measured as the ratio of output (value of production) to real estate assets.⁵ If net returns are proportional to the value of production, then this productivity ratio will be proportional to the return on assets.⁶

Control variables expected to explain variation in farm size growth and farm business survival include characteristics of the operation and operator observed in the initial period. These include a measure of farm size (the value of farm real estate assets), land tenancy, farm organizational arrangement (family farm, partnership, other), commodity

specialization (five crop types and five livestock types); region (nine USDA-ERS Farm Resource Regions⁷); and a direct-to-consumer sales indicator. Principal operator characteristics hypothesized to affect farm business success include age, race and ethnicity (Hispanic/non-Hispanic). Also included in the regression models are an indicator of whether farming is the operator's main occupation, the self-reported share of household income that comes from farming, and a measure of local economic conditions (the percentage point change in the Bureau of Labor Statistics county unemployment rate in the Census years).

The Agricultural Census data are organized into pooled 2-year panels, in which a farm observed period t may or may not be observed again period $t + 1$. The following regression models are estimated for all operations observed in period t :

$$Y_{it+1} = a + X'_{it}\beta + \varepsilon_i, \quad (1)$$

where Y_{it+1} are outcome variables that depends on conditions observed in period $t + 1$ and X_{it} are control variables observed in the initial period t . The outcome variables include: (a) an indicator for whether a farm survived in business between t and $t + 1$; (b) the log difference in farm size between periods, and (c) an indicator of business success (defined as remaining in business with non-negative business growth between t and $t + 1$). Probit regressions are estimated for the survival and success outcomes for all farms observed in period t . An OLS regression is estimated for the growth (log difference) outcome only for farms that responded to the Census in consecutive periods.

RESULTS

In this section, first we provide the results from the ARMS descriptive analysis, divided by local food markets, Federal crop insurance, and financing strategies. Subsequently, we present the regression results highlighting implication for beginning farmer and rancher business success based on the farm-level panel data from the Census of Agriculture data.

Local food markets

Figure 2 provides the average RROA by scale and market channel for beginning and established operations. Across all four market channels we find that average RROA is positive once operations exceed \$350,000 in gross cash farm income (the threshold to exceed the USDA ERS' definition of a small farm). Established farms outperform beginning operations across all market channels and scales, except: (a) mid-scale operations that sell to farmers markets, (b) all scales $>$ \$75,000 in gross cash farm income selling to other direct markets, and (c) small scale (\$75,000–\$349,000) and large scale ($>$ \$1 M) operations selling to distributors and institutions.

Overall, we see that performance generally improves with scale, and that the top performers are large scale operations (both established and beginning) that sell to distributors and institutions. Interestingly, we see that mid-scale beginning operations selling to direct markets—both farmers markets and other direct markets—are performing well on-average, with RROA exceeding 10%.

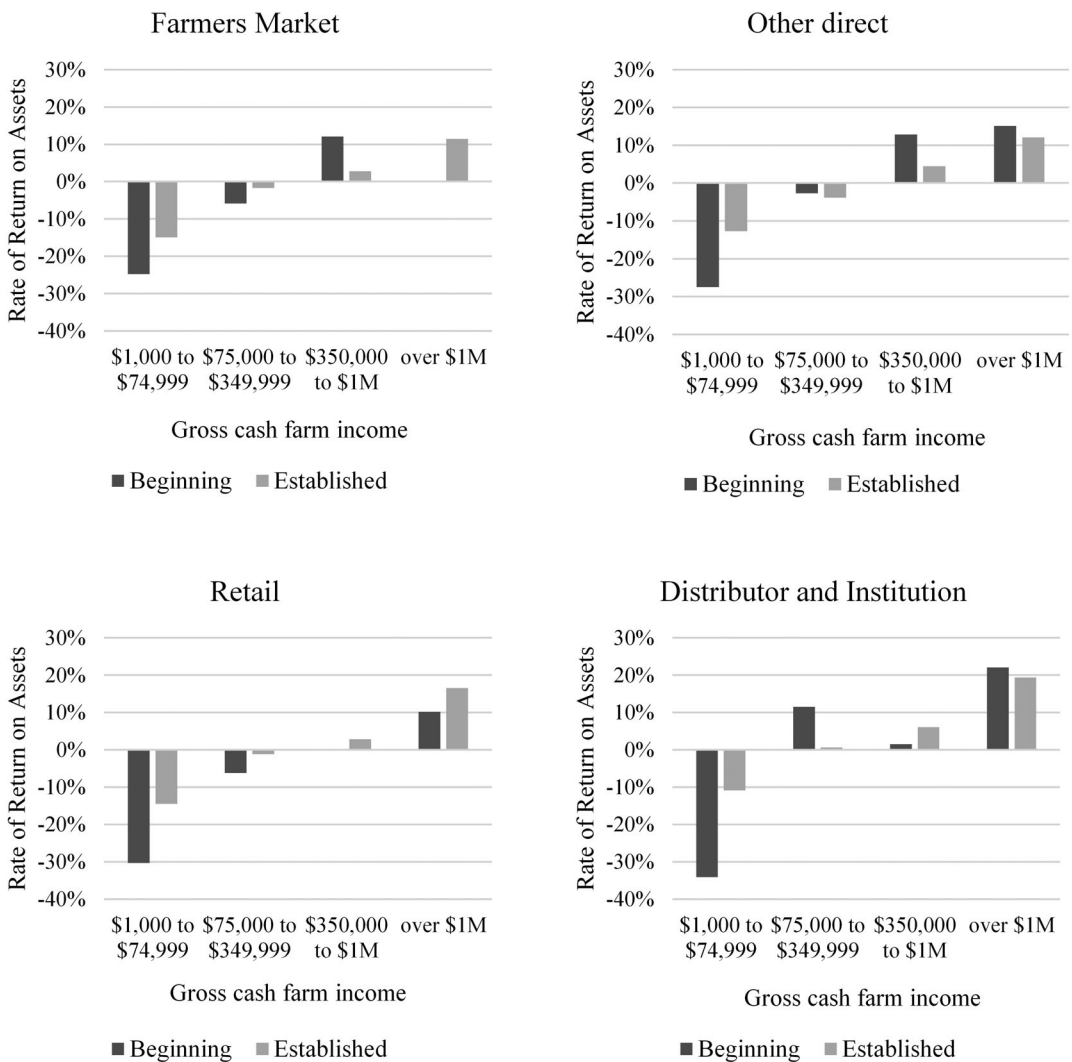


FIGURE 2 Average rate of return on assets (RROA) for beginning and established producers by scale (defined as gross cash farm income) and local food market channel. Source: USDA, National Agricultural Statistics Service and Economic Research Service, 2013–2016. Agricultural Resource Management Survey

Federal crop insurance

We divide our sample by beginning and established operations, by scale, and by those with and without positive expenditure on Federal crop insurance (Figure 3). We find as operations get larger, they are more likely to have positive expenditure on Federal crop insurance, regardless of if they are an established or beginning operation. However, we also find that established operations have a significantly different and positive Federal crop insurance expenditure compared to beginning operations (significant differences are found at the 10% level for GCFI \$1000–\$74,999, at the 5% level for GCFI \$75,000–\$349,000, and at the 1% level for both GCFI \$350,000–1 M and GCFI > \$1 M).

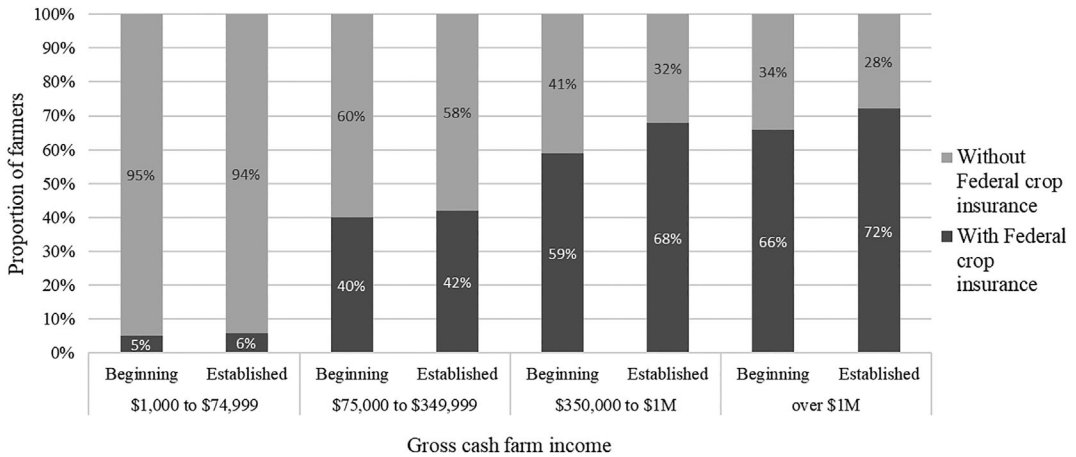


FIGURE 3 Proportion of U.S. beginning and established producers with and without crop insurance, by scale. Source: USDA, National Agricultural Statistics Service and Economic Research Service, 2013–2016. Agricultural Resource Management Survey

Financing strategies

Thirty-six percent of all operations report using debt to finance their operation, giving us an average weighted yearly sample of 601,153. Of beginning operations, 39% utilize debt (average weighted yearly sample of 108,032), compared to 35% of established operations (average weighted yearly sample of 493,121). Of our total sample of producers that utilize debt, 18% are beginning operations and 82% are established operations.

When we divide our sample into beginning and established operations and the source of credit funds (see Figure 4), we find that for both beginning and established operations, just over one-half of the balance owed is to traditional commercial lending (52% for both groups). Though we find that the next commonly used source of credit for both beginning and established operations is the Farm Credit System, established operations have a larger portion of balance owed (30%) relative to beginning operations (21%). We find that the beginning operation outstanding debt to FSA is relatively larger compared to established operations (10% and 4% of outstanding debt, respectively). The remaining balance is mostly to input suppliers (7% for beginning operations, 8% for established operations), personal relationship finance (8% for beginning operations and 6% for established operations), and a very small amount to Federal/state financing (1% for both beginning and established operations).

Regression results: business success

Columns 1 and 3 in Table 2 show the estimated marginal effects at the means from a probit model of farm survival and success, respectively.⁸ Column 2 shows the estimated coefficients from a linear regression model of the farm size growth rate (log difference of farm assets). The results indicate that for beginning farms, being credit constrained lowers the probability of survival by 11.3% points, lowers the growth rate by 10.2 points, and reduces the success rate by

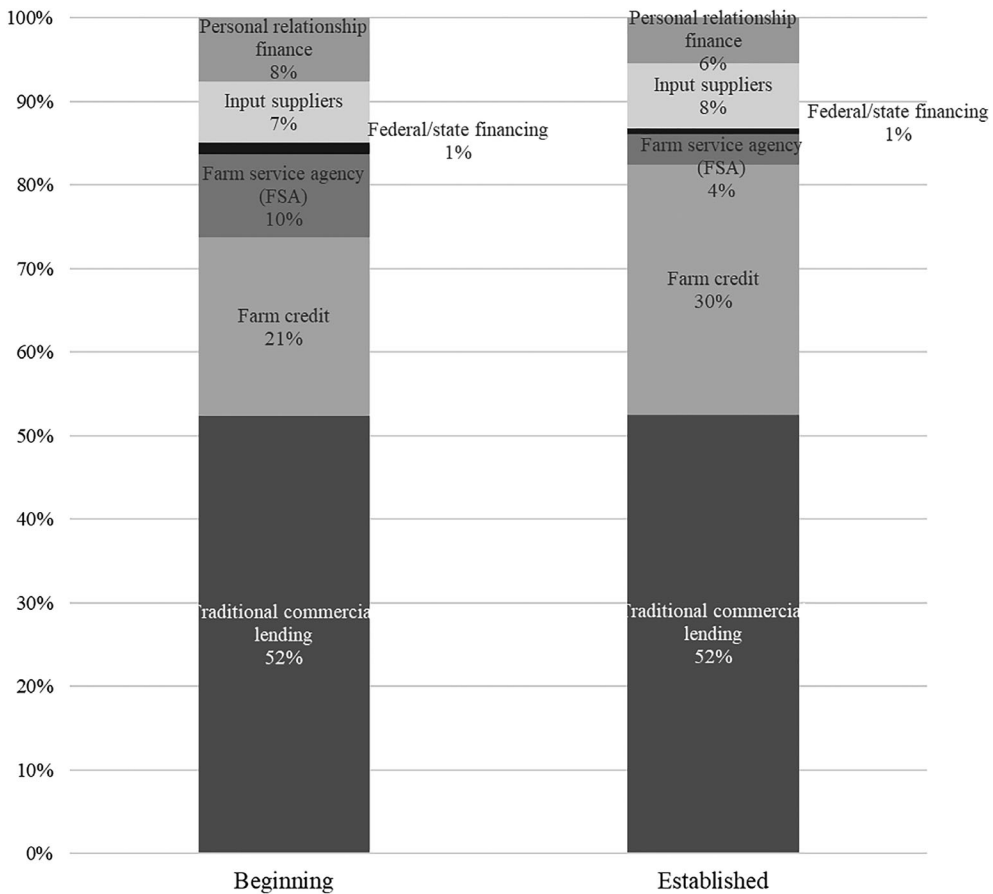


FIGURE 4 Balance owed as a percentage of total balance owed (aggregated for all producers), comparing beginning and established farmers. Source: USDA, National Agricultural Statistics Service and Economic Research Service, 2013–2016. Agricultural Resource Management Survey

17.5 points. Without access to credit, farmers may be less able to cope with farm or off-farm income variation and less able to adopt more efficient production technologies or expand production.

The results also indicate that beginning farms that are more dependent on government agricultural payments tend to have better business outcomes. Increasing the “payment intensity” (agricultural payments as a share of gross revenues) increases beginning farm survival, growth and success rates. Increasing the payment intensity share by 10% points is associated with a 2.9% point increase in the likelihood of success. These findings are consistent with earlier research that found that payments were associated with an increase in the likelihood and duration of farm business survival of crop farms (Key & Roberts, 2006, 2007). Program payments provide a revenue stream that increases the returns to farming and makes farming less risky and more profitable. This, in turn, likely increases farmers’ incentive to remain in farming and increases farmers’ ability and incentive to expand production.

The estimates indicate that farm productivity (value of production relative to assets) was positively and significantly correlated with survival, growth and success. The results imply that increasing the average farms’ productivity value by one standard deviation would raise the success rate by

TABLE 2 Marginal effects on five-year survival probability, growth rate, and success rate

	Survival probability	Growth rate (Log diff. assets)	Success probability
Credit constrained	-0.113 (0.008)**	-0.102 (0.009)**	-0.175 (0.009)**
No debt	-0.209 (0.004)**	-0.108 (0.004)**	-0.217 (0.004)**
Log assets (\$)	0.100 (0.001)**	-0.446 (0.002)**	-0.111 (0.001)**
Does not rent land	0.111 (0.006)**	-0.087 (0.007)**	0.010 (0.006)
Rents out land	0.170 (0.006)**	0.076 (0.007)**	0.106 (0.007)**
Agric. payment intensity (index)	0.258 (0.016)**	0.270 (0.017)**	0.291 (0.017)**
Productivity (TVP/assets)	0.057 (0.003)**	0.208 (0.003)**	0.040 (0.003)**
Had direct-to-consumer sales	0.184 (0.005)**	-0.065 (0.006)**	0.066 (0.006)**
Family farm	0.121 (0.005)**	-0.191 (0.006)**	-0.003 (0.005)
Operator age: 30–39	0.056 (0.006)**	-0.130 (0.007)**	-0.386 (0.011)**
Operator age: 40–49	0.107 (0.006)**	-0.211 (0.007)**	-0.144 (0.009)**
Operator age: 50–59	0.148 (0.006)**	-0.239 (0.007)**	-0.328 (0.011)**
Operator age: 60–69	0.145 (0.007)**	-0.294 (0.008)**	-0.195 (0.006)**
Operator age: 70+	-0.066 (0.009)**	-0.324 (0.011)**	-0.302 (0.010)**
Primary occupation farming	0.001 (0.004)	0.107 (0.004)**	-0.114 (0.011)**
Shr. of HH income from farm	0.141 (0.007)**	0.295 (0.008)**	-0.117 (0.005)**
Female	-0.217 (0.005)**	-0.100 (0.006)**	-0.430 (0.009)**
Initial year: 2012	0.045 (0.003)**	0.128 (0.004)**	-0.270 (0.009)**

(Continues)

TABLE 2 (Continued)

	Survival probability	Growth rate (Log diff. assets)	Success probability
County emp. change (pctg. pts.)	0.0001 (0.0001)	0.0026 (0.0002)**	-0.020 (0.006)*
Operator race/ethnicity	Yes	Yes	Yes
Commodity specialization	Yes	Yes	Yes
USDA-ERS region	Yes	Yes	Yes
Constant	-1.408 (0.021)**	6.454 (0.024)**	1.088 (0.022)**
<i>N</i>	644,899	324,290	644,899

Note: * $p < 0.01$; ** $p < 0.001$. All variables are dichotomous indicators (1/0) unless otherwise noted. “Yes” means the set of indicator variables are included in the model. Results for these variables are not shown due to space limitations.

Source: USDA-NASS Census of Agriculture, 2007, 2012, 2017.

3.5% points. Higher productivity is likely associated with greater farm profitability and access to capital, which enables farmers to both remain in business and expand the scale of production.

The results indicate that operations with female principal operators had significantly lower business survival, growth and success rates compared to similar farms with male principal operators. These rates were also lower for beginning farms with principal operators who were Hispanic or of any race other than “white” (Key, 2022a).

Commodity specialization was also an important determinant of farm performance. Holding all other characteristics constant, farms that produce “grains, oilseeds, dry beans, or dry peas” had the highest probability of success (Key, 2022b). While there could be numerous factors, including differences in pest, climate and market conditions that cause variation in farm performance across commodity groups, it is plausible that insurance availability plays a role. The category with the highest success probability is comprised of commodities with historically higher Federal crop insurance programs participation rates. Crop insurance may reduce the risk of default and bankruptcy and result in higher survival rates. Greater crop insurance coverage might also enhance farmers’ access to credit with which to expand production (Ifft et al., 2015).

POLICY IMPLICATIONS

Collectively our results highlight three important findings that have implications for the 2023 Farm Bill discussions. First, results from our ARMS and Census analysis demonstrate that improved beginning farm performance is associated with both increases in scale and productivity, as well as participation in agricultural programs (indicated by the share of program payments in gross revenue). Our ARMS analysis finds a positive relationship between RROA and increases in scale, and our Census analysis demonstrates that farm productivity and agricultural payments are associated with beginning farm survival, growth, and success. Efforts to help beginning operations increase the scale of their operation, raise their productivity, and increase awareness of agricultural programs might include enhanced training, education, outreach, and technical assistance programs and expanded or refined credit programs that could facilitate adoption of more efficient or innovative technologies. Additionally, program

payment and participation rates of beginning farmers might be raised through more active and targeted outreach by USDA program agencies. Specifically, programming might target beginning operations with female principal operators, or farms with principal operators who are Hispanic or of any race other than “white” as these operations were found to have lower rates of farm business survival, growth and success compared to otherwise similar operations. The findings also highlight the need for additional research to better understand why farms operated by socially disadvantaged farmers have worse outcomes, even after controlling for farm and operator characteristics.

Second, the Census analysis results affirm that access to credit is an important determinant of business performance, and that being credit constrained lowers the probability of survival, growth, and success for beginning operations. Further, the ARMS analysis shows that beginning operations overall use Farm Credit and FSA more than established operations. Yet, it is unclear if FSA is a “better” financing option in some way (for example, more favorable terms), if farm credit is less favorable, or there is some other qualitative explanation for these differences. Additional exploration is recommended as there could be important insights here that could reduce credit constraints for beginning operations.

Regardless, the Census finding that credit constraints impede the growth and survival of beginning farms supports a rationale for targeted loan programs designed to help beginning farmers acquire land and equipment. Policies to reduce credit constraints could include less strict collateral or less strict income requirements for loans. These types of policies could allow young farmers who have not acquired large amounts of saving to grow more rapidly, and thereby presumably attain higher levels of farm income and profits. Some USDA loan programs offer low down payment requirements and less strict income verification, farming experience, and yield history requirements for qualified beginning farmers. The connection observed between credit constraints and farm success suggests that expanding these types of USDA efforts to promote credit access could lead to higher success rates for beginning farmers.

Finally, our ARMS analysis demonstrates that as operations get larger, they are more likely to have positive expenditure on Federal crop insurance, regardless of if they are an established or beginning operation. In addition, the Census analysis found that producers specializing in crops which traditionally have had higher rates of crop insurance coverage had higher rates of business success. However, beginning operations are significantly less likely to use Federal crop insurance compared to established operations across all scales, and are more likely to produce commodities that have had lower rates of insurance coverage. It might be possible to increase insurance uptake by beginning farmers through enhanced targeting and outreach by the USDA Risk Management Agency (RMA). Increasing RMA outreach and programmatic support toward specialty crops, including fruits and vegetables, might also increase adoption rates by beginning farmers who are more likely to specialize in these crops.

ACKNOWLEDGMENTS

This material is based upon research supported in part by the U.S. Department of Agriculture (USDA) National Institute of Food and Agriculture, and the USDA Economic Research Service. The authors have no financial interest or benefit from the direct application of this research. The funders played no role in the decision to submit the paper for presentation. The findings and conclusions in this presentation are those of the authors and should not be construed to represent any official USDA or U.S. Government determination or policy.

ENDNOTES

- ¹ Beginning and new farm and ranch operations are interchangeably referred to as beginning and new farms, ranches, enterprises, operations and producers, but all follow the USDA definition, “those who have operated a farm or ranch for 10 years or less either as a sole operator or with others who have operated a farm or ranch for 10 years or less.”
- ² To mitigate potential bias from outliers, we winsorize financial variables (Hastings et al., 1947), where extreme values are replaced by less extreme ones. For all variables with outliers that can only take positive values, we winsorize observations at the 99th percentile. The winsorizing vector is:

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

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

- ³ More information about the Agricultural Census can be found at <https://www.nass.usda.gov/AgCensus/index.php>.
- ⁴ Government agricultural payments include all federal, state, and local government agricultural program payments received in the initial year of the panel (2007 or 2012). Depending on the year, these payments include: direct, counter cyclical, and ACRE (Average Crop Revenue Election) payments; the amount received from loan deficiency payments (LDPs), marketing loan gains, and net value of commodity certificates; other payments (disaster, market loss), NAP (non-insured assistance program), and EQIP (Environmental Quality Incentives Program); and amount received for participation in the Conservation Reserve Program (CRP), Wetlands Reserve Program (WRP), Farmable Wetlands Program (FWP), or Conservation Reserve Enhancement Program (CREP).
- ⁵ Even though farm real estate represents about 80% of total farm assets, it would be preferable to include the value of machinery along with farm real estate in the denominator of the productivity measure. However, the census does not permit us to accurately value machinery that was rented and only used part time on the farm. The census questionnaire asks for the value of the machinery and equipment regardless of the amount of time it was used on the farm and regardless of ownership. Hence, a farmer who rented a combine for 1 day would report the same value as a farmer who rented the combine for the entire season.
- ⁶ The Census of Agriculture was not designed to measure farm production costs, and net returns cannot be accurately measured with the information collected.
- ⁷ See <https://www.ers.usda.gov/publications/pub-details/?pubid=42299> for a description of the ERS Farm Resource Regions.
- ⁸ For the dichotomous independent variables, the marginal effect at the mean shows how the probability of survival, growth or success changes as the independent variable changes from 0 to 1, holding all other variables at their mean values.

REFERENCES

- Ahearn, Mary C. (2011). “Potential Challenges for Beginning Farmers and Ranchers,” Choices <https://www.choicesmagazine.org/choices-magazine/theme-articles/innovations-to-support-beginning-farmers-and-ranchers/potential-challenges-for-beginning-farmers-and-ranchers>.
- Ahearn, M. C., K. Liang, and S. Goetz. 2018. “Farm Business Financial Performance in Local Foods Value Chains.” *Agricultural Finance Review* 78(4): 470–88. <https://doi.org/10.1108/AFR-08-2017-0071>
- Angelo, B. E., B. B. R. Jablonski, and D. Thilmany. 2016. “Measuring What Matters.” *British Food Journal* 118(5): 1146–62.
- Bauman, A., D. Thilmany, and B. B. R. Jablonski. 2019. “Evaluating Scale and Technical Efficiency among Farms and Ranches with a Local Market Orientation.” *Renewable Agriculture and Food Systems* 34(3): 198–206.

- Bauman, A., D. Thilmany, and B. B. R. Jablonski. 2018. "The Financial Performance Implications of Differential Marketing Strategies: Exploring Farms that Pursue Local Markets as a Core Competitive Advantage." *Agricultural and Resource Economics Review* 47(3): 477–504.
- Belasco, E., and J. Schahczenski. 2020. "Is Organic Farming Risky? An Evaluation of WFRP in Organic and Conventional Production Systems." *Agricultural and Resource Economics Review* 50(1): 63–75.
- Congressional Research Service. 2019. "2018 Farm Bill Primer: Beginning Farmers and Ranchers." In Focus. <https://crsreports.congress.gov/product/pdf/IF/IF11227#:~:text=The%202018%20farm%20bill%20requires,BFR%20coordinator%20for%20each%20state>.
- Diwisch, S., P. Voithofer, and C. R. Weiss. 2009. "Succession and Firm Growth: Results from a Non-parametric Matching Approach." *Small Business Economics* 32: 45–56.
- Dodson, Charles B., and Ahrendsen, Bruce L.. 2016. "Beginning Farmer Credit and the Farm Service Agency's Role." *Choices*. <https://www.choicesmagazine.org/choices-magazine/submitted-articles/beginning-farm-credit-and-the-farm-service-agencys-role>.
- Farm Financial Standards Council (FFSC). 2017. "Financial Guidelines for Agriculture." <https://ffsc.org/2017/01/2017-financial-guidelines-available/>.
- Freedgood, J., M. Hunger, J. Dempsey, and A. Sorensen. 2020. *Farms under threat: The state of the states*. Washington, DC: American Farmland Trust.
- Hastings, C., Jr., F. Mosteller, J. W. Tukey, and C. P. Winsor. 1947. "Low Moments for Small Samples: A Comparative Study of Order Statistics." *The Annals of Mathematical Statistics* 18(3): 413–26.
- Hoppe, R. A., and J. M. MacDonald. 2016. "EIB-164." In *America's Diverse Family Farms, 2016 Edition*. Washington, D.C.: U.S. Department of Agriculture Economic Research Service. <https://www.ers.usda.gov/publications/pub-details/?pubid=81401>.
- Ifft, J. E., T. Kuethe, and M. Morehart. 2015. "Does Federal Crop Insurance Lead to Higher Farm Debt Use? Evidence from the Agricultural Resource Management Survey (ARMS)." *Agricultural Finance Review* 75: 349–67.
- Jablonski, B. B. R., A. G. Bauman, and D. Thilmany McFadden. 2020. "Local Food Market Orientation and Labor Intensity." *Applied Economic Perspectives and Policy* 43(3): 916–34.
- Jablonski, B. B. R., J. Hadrich, A. Bauman, M. Sullins, and D. Thilmany. 2022. "The Profitability Implications of Sales through Local Food Markets for Beginning Farmers and Ranchers." *Agricultural Finance Review*.
- Jablonski, B. B. R., J. Hadrich, and A. Bauman. 2022. "The Role of Federal Crop Insurance for Farms and Ranches that Sell through Local Food Markets." *Agricultural Finance Review* 82(1): 113–32.
- Katchova, A. 2015. *Agricultural Resource Management Survey (ARMS) Data User Guide*. Washington, DC: U.S. Department of Agriculture, Economic Research Service.
- Katchova, A. L., and M. C. Ahearn. 2016. "Dynamics of Farmland Ownership and Leasing: Implications for Young and Beginning Farmers." *Applied Economic Perspectives and Policy* 38(2): 334–50.
- Key, N. 2022a. "Credit Constraints and the Survival and Growth of Beginning Farms." *Agricultural Finance Review*. <https://doi.org/10.1108/AFR-04-2021-0050>
- Key, N. 2022b. "The Determinants of Beginning Farm Success." *Journal of Agricultural and Applied Economics*.
- Key, Nigel, and Lyons, Greg. 2019. "An Overview of Beginning Farms and Farmers." U.S. Department of Agriculture Economic Research Service Economic Brief Number 29. <https://www.ers.usda.gov/webdocs/publications/95010/eb-29.pdf?v=9561.9>.
- Key, N., and M. J. Roberts. 2007. "Do Government Payments Influence Farm Size and Survival?" *Journal of Agricultural and Resource Economics* 32(2): 330–48.
- Key, N., and M. J. Roberts. 2006. "Government Payments and Farm Business Survival." *American Journal of Agricultural Economics* 88(2): 382–92.
- Kimhi, A., and R. Bollman. 1999. "Family Farm Dynamics in Canada and Israel: The Case of Farm Exits." *Agricultural Economics* 21(1): 69–79.
- Low, S. A., and S. Vogel. 2011. *Direct and intermediated marketing of local foods in the United States*. Washington, DC: U.S. Department of Agriculture, Economic Research Service Economic Research Report No. 128.
- Low, Sarah A., Adalja, Aaron, Beaulieu, Elizabeth, Key, Nigel, Martinez, Stephen, Melton, Alex, Perez, Agnes, Ralston, Katherine, Stewart, Hayden, Suttles, Shellye, Vogel, Shellye, and Jablonski, Becca B.R.. 2015, "Trends in U.S. Local and Regional Food Systems, U.S. Department of Agriculture", Economic Research

- Service. Administrative Publication Number 067. https://www.ers.usda.gov/webdocs/publications/42805/51173_ap068.pdf?v=42083.
- Nadolnyak, D., V. Hartarska, and B. Griffin. 2019. "The Impacts of Economic, Demographic, and Weather Factors on the Exit of Beginning Farmers in the United States." *Sustainability* 11(16): 4280.
- National Sustainable Agriculture Coalition (NSAC). (2019). "A Closer Look at the 2018 Farm Bill: Local Agriculture Market Program." NSAC's Blog. <https://sustainableagriculture.net/blog/2018-farm-bill-local-agriculture-market-program/>.
- Park, T. 2015. "Direct Marketing and the Structure of Farm Sales: An Unconditional Quantile Regression Approach." *Journal of Agricultural and Resource Economics* 40(2): 266–84.
- Park, T., A. K. Mishra, and S. J. Wozniak. 2014. "Do Farm Operations Benefit from Direct to Consumer Marketing Strategies." *Agricultural Economics* 45: 213–24.
- Storm, H., K. Mittenzwei, and T. Heckelei. 2015. "Direct Payments, Spatial Competition, and Farm Survival in Norway." *American Journal of Agricultural Economics* 97(4): 1192–205.
- Thilmany, D. T., A. Bauman, J. Hadrich, B. B. R. Jablonski, and M. Sullins. 2022. "Unique Financing Strategies Among Beginning Farmers Focused on Direct and Local Markets." *Agricultural Finance Review* 82(2): 285–309.
- Uematsu, H., and A. Mishra. 2011. "Use of Direct Marketing Strategies by Farmers and their Impact on Farm Business Income." *Agricultural and Resource Economics Review* 40(2): 1–19.
- U.S. Department of Agriculture, National Agricultural Statistics Service (USDA NASS). (2014). "Highlights: Beginning Farmers – Characteristics of Farmers by Years on Current Farm. ACH12-5." https://www.nass.usda.gov/Publications/Highlights/2014/Beginning_Farmers/index.php.
- U.S. Department of Agriculture, National Agricultural Statistics Service (USDA NASS). (2020). "Highlights: New and Beginning Farmers", ACH17-23. <https://www.nass.usda.gov/Publications/Highlights/2020/census-beginning%20farmers.pdf>.
- U.S. Department of Agriculture, National Agricultural Statistics Service (USDA NASS) (2007, 2012, 2017). "Census of Agriculture." <https://www.nass.usda.gov/AgCensus/>.
- U.S. Senate Committee on Agriculture, Nutrition, and Forestry (U.S. Senate). (n.d.). 2018 Farm Bill. <https://www.agriculture.senate.gov/2018-farm-bill>.
- Tulman, Sarah, Higgins, Nathaniel, Williams, Robert, Gerling, Michael, Dodson, Charles, and McWilliams, Bruce (2016). "USDA Microloans for Farmers: Participation Patterns and Effects of Outreach", U.S. Department of Agriculture, Economic Research Service. Economic Research Report No. 222. https://www.nass.usda.gov/Education_and_Outreach/Reports,_Presentations_and_Conferences/reports/ers-222.pdf.
- Weiss, C. R. 1999. "Farm Growth and Survival: Econometric Evidence for Individual Farms in Upper Austria." *American Journal of Agricultural Economics* 81(1): 103–16.
- Williamson, J. M. 2017. "Following Beginning Farm Income and Wealth over Time: A Cohort Analysis Using ARMS." *Agricultural Finance Review* 77(1): 22–36.

How to cite this article: Jablonski, Becca B. R., Nigel Key, Joleen Hadrich, Allie Bauman, Sarah Campbell, Dawn Thilmany, and Martha Sullins. 2022. "Opportunities to support beginning farmers and ranchers in the 2023 Farm Bill." *Applied Economic Perspectives and Policy* 1–18. <https://doi.org/10.1002/aep.13256>