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Beginning Farmer and Rancher Operations: Characteristics Associated With Business Survival

Katherine Lacy, Nigel Key, Allison Bauman, Becca B. R. Jablonski, and Joleen Hadrich

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Abstract

Information from the 2022 Census of Agriculture is used to describe the characteristics of farms and ranches with beginning farmers and ranchers (BFRs), producers having no more than 10 years of farming experience. The report presents data for farms where all producers are BFRs; at least one, but not all producers are BFRs (multigenerational); and those operations with no BFRs. For each type of operation, the report compares the characteristics of business operations that survived from 2012 to 2022 to those that did not. The analysis identifies which farm and producer characteristics were correlated with farm business survival over this 10-year period. Results suggest that land tenure arrangements, the use of differentiated markets, crop insurance, and government payments are important correlates with business survival for farms operated by beginning farmers and ranchers.

Keywords: beginning farmer, beginning rancher, farm business survival, land tenure

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Key Points

- Operations where all producers are beginning farmers and ranchers (BFRs) are unique from multigenerational operations or operations where no producers are beginning their farming careers.
- Farms with beginning farmers and ranchers tend to be smaller in scale than operations with no beginning producers. They are also more likely to rent all the land they operate, sell products through local food market channels, have fewer farm assets, have less farm debt and therefore few interest expenses, and receive fewer Government payments.
- Farms with beginning farmers and ranchers have survival rates lower than similar farms with no BFRs. Operations with only BFRs had 10-year survival rates that were 2–3 percentage points lower than similarly sized operations that had BFRs and more experienced farmers, depending on the size of the operation.
- This research compared characteristics of operations that survived from 2012 to 2022 with operations that did not. Results indicate that a higher survival rate for farms operated by BFRs was associated with participation in differentiated product markets (organic, local foods, value added, agritourism), use of crop insurance, greater involvement in available Government agricultural programs, and renting as opposed to purchasing farmland.
- Several USDA agencies have programs that work to meet the distinct needs of BFRs through targeted loan programs, financial assistance, crop insurance benefits, grants, or advance payments for incorporating conservation practices.

Why Does This Matter?

Beginning farmers and ranchers, those with no more than 10 years of farming experience, are likely to play an important role in the future of U.S. agriculture as current farmers continue to get older. In 2022, more than 1 million BFRs operated in the United States, farming 196 million acres with a combined $122 billion in agricultural sales. BFRs are typically younger than their more established counterparts and, on average, have less net worth for securing farm loans. They also tend to operate smaller farms, which may place them at a disadvantage in relation to larger, established operations due to economies of scale. This report uses data from the 2022 Census of Agriculture to compare farm and producer characteristics of operations on which all producers were BFRs; multigenerational operations where some, but not all, producers were BFRs; and operations where

no producers were BFRs. It also examines different characteristics of beginning farms such as finances, market outlets (organic production, local foods, agritourism), and producer characteristics. Data from the 2012 and 2017 Censuses of Agriculture were also used to identify key farm and producer characteristics associated with surviving in business from 2012 to 2022.

A Few More Details

USDA Programs

Several USDA programs direct resources toward meeting the distinct needs of beginning farmers and ranchers, including Farm Service Agency targeted loan programs and priority financial assistance for BFRs from Rural Development. The Risk Management Agency offers benefits to BFRs who buy crop insurance, and the Natural Resources Conservation Service's Environmental Quality Incentives Program provides advance payments to BFRs to adopt conservation practices. The National Institute for Food and Agriculture administers grants through its Beginning Farmer and Rancher Development Program to entities that provide training, education, outreach, and technical assistance to BFRs. While beginning farmers and ranchers are the focus of these USDA resources, limited information exists about the characteristics of the farms they operate. BFRs may have different needs or constraints depending on whether they farm alongside more experienced producers. Information about which factors are correlated with farm business survival could inform the design and function of programs and policies that provide resources for BFRs.

Beginning Farmer and Rancher Operations: Characteristics Associated With Business Survival

Introduction

Beginning farmers and ranchers (BFRs), usually defined as those with no more than 10 years of farming experience, are an important segment of the U.S. farm population. In 2022, more than 1 million new and beginning producers farmed 196 million acres and contributed $122 billion in agricultural sales (USDA, National Agricultural Statistics Service (NASS), 2024).

Beginning farmers face distinct challenges in growing and maintaining their operations. They are typically younger than their more established counterparts and, on average, have less net worth for securing farm business loans. BFRs also tend to operate smaller farms, which may place them at a disadvantage relative to larger, established operations due to economies of scale. Because they have less farming experience, some new farmers may lack the skills required to efficiently manage and operate their farm businesses. BFRs are likely to play an important role in the future of U.S. agriculture as current farmers retire. The average age of all U.S. farm producers reported in the Census increased from 56.3 years in 2012 to 57.5 in 2017 and 58.1 in 2022, with farmers 65 years and over making up 38 percent of all reported farm producers in 2022 (USDA, NASS, 2024).

Reflecting the importance of BFRs to the United States, several U.S. Department of Agriculture (USDA) programs direct resources toward meeting the distinct needs of BFRs (USDA, 2021). For example, the Farm Service Agency (FSA) provides targeted loan programs to help beginning farmers acquire land and capital. These loan programs include the Direct Farm Ownership, Direct Down Payment, Microloans, Direct Operating, Direct Emergency, and Farm Storage Facility Loan programs. Rural Development also makes loans and grants available under the USDA Business and Industry Loan and Value-Added Producer Grants programs. To facilitate access to land, the FSA administers the Transition Incentives Program, which provides retired or retiring landowners with additional payments for expiring Conservation Reserve Program contracts if they agree to sell or rent their land to a producer as defined in 7 CFR 1410.64 (USDA, FSA, 2019). The USDA, Environmental Quality Incentive Program gives BFRs the option of receiving advance payments to help defray the cost of select conservation practices. The USDA, Risk Management Agency offers benefits to BFRs who buy crop insurance, including exemptions from paying certain administrative fees, a higher premium subsidy, and less stringent yield and production history requirements. The USDA, National Institute of Food and Agriculture administers the Beginning Farmer and Rancher Development Program that funds entities that provide training, education, outreach, and technical assistance to BFRs.

Across many of these USDA programs, qualifications for individuals and entities that qualify as a BFR vary. Most include a requirement that an individual or entity has operated a farm or ranch for 10 years or less, and that the individual materially and substantially participates in the operation. However, discrepancies exist as to whether it is only the individual applying who must be a BFR or if the entity must be entirely operated by BFRs.

This report used Census of Agriculture data to describe BFRs and the farms they operated in 2022, comparing them to more established producers. Statistics include information on farm characteristics (size, location, farmland tenure, commodity specialization), financial characteristics (farm assets, debt), use of market differentiation strategies (organic production, local foods, value added, agritourism), and producer demographic characteristics. Understanding how farms operated by new producers differ from those operated by more experienced producers may help in the design of policies and programs for beginning farmers and ranchers.

Using data from the 2012 and 2022 Census of Agriculture, the authors compared the characteristics of beginning operations that survived in business from 2012 to 2022 to those that did not. The study focused on understanding differences across beginning and established operations in areas where current USDA support may be available, including land tenure, differentiated markets, crop insurance, and Government payments. In addition to identifying factors that might be correlated with farm business success, these results could be useful for identifying beginning farmers who have relatively low levels of business success and might be considered in greater need of assistance, or more likely to benefit from program interventions.

The analyses separately considered two types of beginning operations: those on which all producers were BFRs and those multigenerational BFR operations—that is, some but not all producers were BFRs (Thilmany et al., 2022). The first group likely included some farms where all producers were first-generation farmers, whereas the second group likely included many multigenerational operations where BFRs started farming on their family's operation.

Key Determinants of Farm Business Survival

Past studies sought to identify factors associated with farm business survival. Because of their relevance to the design of agricultural programs, this study focused on four key determinants of farm business survival: land tenure arrangements, the use of differentiated markets, the use of crop insurance, and the receipt of Government farm program payments.

Land Tenure

In 2020, the American Farmland Trust estimated that 40 percent of America's agricultural land will be in transition within the next 15 years because of the aging and retirement of the U.S. farm population (Freedgood et al., 2020). Approximately 39 percent of U.S. farmland in the contiguous 48 States is rented, with smaller family farms more likely to be full owners of the land they operate (Ahearn & Newton, 2009; Dodson & Ahrendsen, 2016; Bigelow et al., 2016; Callahan & Hellerstein, 2022). Land is a primary input to farming, and land tenure affects many decisions made on the farm (Bigelow et al., 2016). Several USDA programs, including those administered by FSA and the Natural Resources Conservation Service (NRCS), provide technical and financial assistance to beginning farmers to help them acquire farmland and develop and maintain economic viability.

To date, little research explores the relationship between land ownership and BFR farm survival. Is ownership necessary for a BFR's farm business growth and survival? Or is it financially less risky for farms to expand operations using land rental markets? Given that BFRs face many financial challenges relative to more established operations (Key & Lyons, 2019), understanding the relationship between farmland ownership and survival may be useful information to help optimize program impacts.

Market Differentiation

Compared to established operations, BFRs are more likely to participate in differentiated markets including producing organic or value added products, or selling through local food markets or agritourism arrangements. Newer operations that are too small to take advantage of economies of scale, and thus have higher production costs, may use differentiated markets to earn a premium over traditional commodity markets or to retain a greater share of the retail dollar, even if participating in such markets is relatively labor intensive (Jablonski et al., 2017).

The U.S. Congress and USDA have worked to increase the number of beginning farmers who sell through local food markets directly to consumers by using programs that promote the formation and expansion of local food infrastructure (e.g., food hubs, farmers markets). For example, the 2018 Farm Bill combined the Farmers' Market and Local Food Promotion Program and the Value-Added Agricultural Product Market Development Grants into the Local Agriculture Market Program, reserving 10 percent of grant funding for beginning farmers (Congressional Research Service, 2019). In addition, multiple USDA programs assist beginning farmers and ranchers in adopting organic production systems (Carlson et al., 2023).

Research found that participation in differentiated markets can influence farm profits and business performance. For example, direct marketing was associated with higher survival rates, but also with slower growth among beginning farms and ranches (Low et al., 2015; Key, 2024). Jablonski et al. (2022b) reported that local food market channels can be viable marketing opportunities for beginning operations, with sales through intermediated market channels (e.g., direct-to-retail, direct-to-institution) performing better than operations with only direct-to-consumer sales (e.g., farmers market, farm stand, community supported agriculture). Research found that the effect of local food markets on profitability depends on the market channels used, such as direct versus intermediated (Bauman et al., 2018, 2019). Further, case study evidence indicated that financial performance varies significantly within direct and intermediated channels. For example, sales through farmers markets have different financial effects than sales through roadside stands (Jablonski et al., 2019). While not specifically focused on beginning operations, Schilling et al. (2014) found that agritourism increased profits for farms with less than $250,000 in annual sales, but it had no significant effect on operations with $250,000 or more in annual sales. The report authors were not aware of studies directly examining the role of organic production in the success of beginning operations.

Crop Insurance

Access to crop insurance allows producers to mitigate some risks inherent in farming and ranching. Previous research found that crop insurance had a positive and significant effect on farm survival (Kim et al., 2020). To help support beginning farmers and ranchers, the USDA, Risk Management Agency (RMA) provides crop insurance benefits to these producers, including an exemption from paying some administrative fees, an additional 10 percentage points of premium subsidy, use of the previous producer's history if land was transferred, and an increase in the substitute Yield Adjustment (USDA, RMA, 2020).

Government Farm Programs

Several USDA programs include specific set asides or higher payment rates for beginning farmers. However, Key and Lyons (2019) found that among farms with at least $10,000 in production value, only 33 percent of farms with all beginning producers received program payments, compared to 41 percent of those with more experienced producers. Several studies that did not focus on beginning operations

have shown that participation in Government programs had significant and positive effects on farm business survival (Key & Roberts, 2006, 2007). More recent research suggested that this association was also strong for beginning farms, and Government payments are correlated with farm business survival and growth (Key, 2022a).

Data and Methods

This study used data from the Census of Agriculture, which is administered every 5 years by the U.S. Department of Agriculture, National Agricultural Statistics Service (NASS). The Census aims to include all U.S. farms and ranches and the people who operate them. It collects data on land use and ownership, producer characteristics, production practices, farm income, and expenditures. The Census of Agriculture defines a farm as a place from which $1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the Census year.[1]

The way the Census collects information about producer characteristics has changed over time. In the 2012 Census, data were collected for one principal operator per farm and up to two other operators.[2] Starting in 2017, the Census expanded the questionnaire to include up to four producers who were involved in the decisions for the operation (USDA, NASS, 2017).[3] Starting in 2022, USDA, NASS no longer reports data based on a principal producer or senior producer. The authors reported most demographic data based on operations in which at least one producer identified with the characteristic (e.g., age, sex, military service, off-farm employment, and race/ethnicity). Additional tables in the appendix are broken out based on all producers with the characteristic, one or more but not all, and none. To explore the factors associated with farm business survival, a panel dataset using 2012 and 2022 Census of Agriculture microdata was created. The dataset was used to track beginning farms in 2012 to see if they responded to the Census (and were therefore in business) in 2022.[4] Linking farms over time is useful for observing which types of farms are more likely to survive, and this approach has been used widely to track changes in farms across Census years (Key & Roberts 2006, 2007; Katchova & Ahearn 2016, 2017; Nadolnyak et al., 2019; Key, 2022a, 2022b).

Defining Beginning Farmers and Beginning Farms

The Consolidated Farm and Rural Development Act and the 2018 Farm Bill defined beginning farmers and ranchers as persons who have not operated a farm or ranch or who have operated a farm or

[1] This expansive definition of a farm includes operations with no production in the Census year. In 2022, around 22 percent of operations with all beginning producers reported no sales, compared to around 20 percent of established operations (farms with no sales may have participated in a land retirement program or experienced a crop failure).

[2] In 2012, the Census referred to a person who operates a farm, either doing the work or making day-to-day decisions on the farm, as an operator. Starting in 2017, operator was replaced with producer.

[3] An implication of the changes in the Census form is to increase the number of producers for whom data are collected, which likely increased the number of BFRs and farms with BFRs. This change should not significantly influence the outcomes of the analysis in this report since this report does not compare the number of BFRs or farms with BFRs over time.

[4] This approach to measuring business survival may underestimate the true rate of survival to some extent. Even though farmers are legally obliged to complete the Census questionnaire, some do not. Consequently, some producers may have filled out the Census in 2012 and not in a subsequent year, despite continuing to farm. Such operations would be incorrectly classified as not surviving. However, it is unlikely that the probability of responding is strongly correlated with other farm characteristics that affect farm survival.

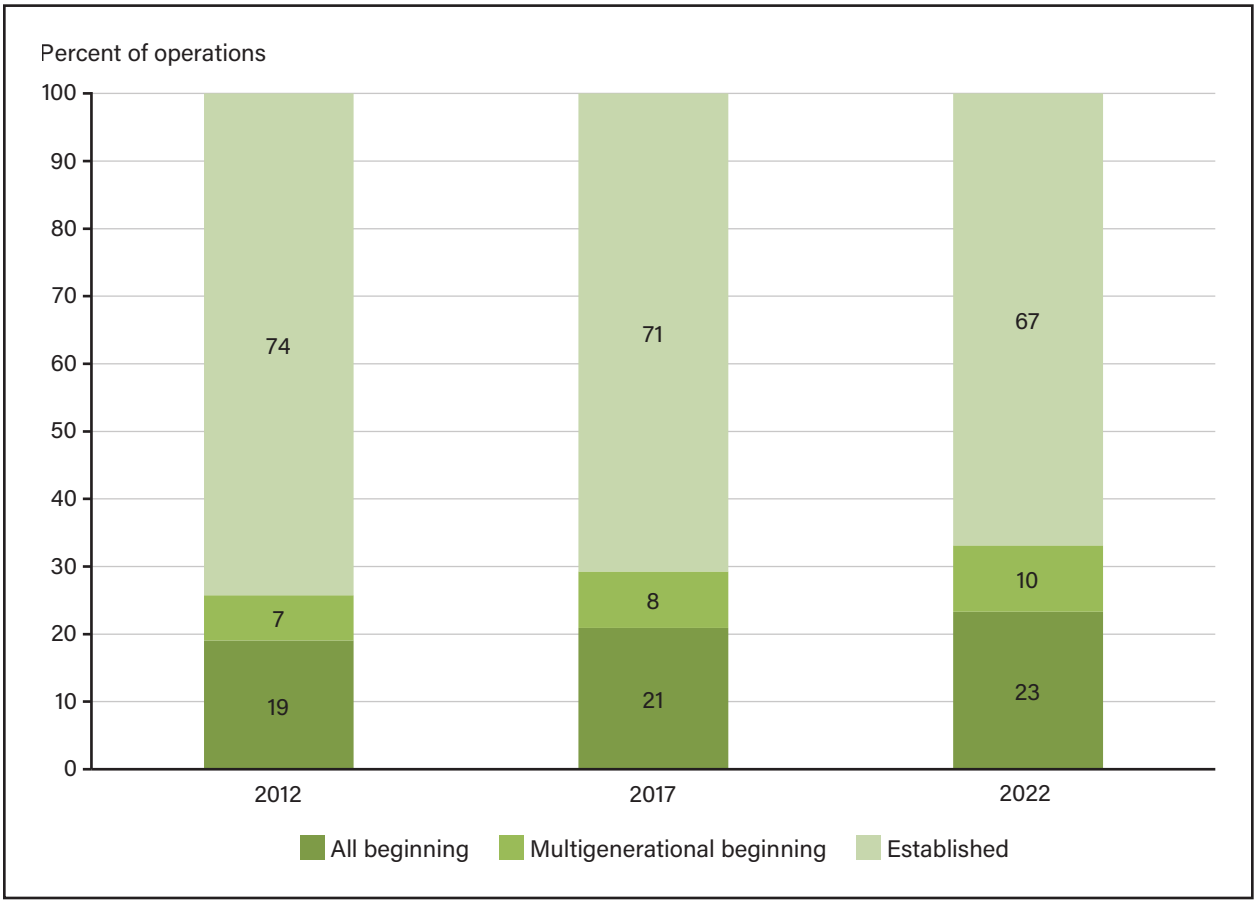
ranch for not more than 10 years and meet other USDA criteria (7 U.S.C. §2279). For most programs, the USDA uses this definition, but specific program requirements vary. To be eligible for NRCS beginning farm programs, for example, all producers must be beginning farmers (USDA, NRCS, 2023). To be eligible for a guaranteed FSA loan as a beginning farmer, an applicant must be substantially involved in the farm operation and have 10 or fewer years of farming experience (USDA, FSA, 2023). RMA provides crop insurance benefits for a beginning farmer or rancher, defined as an individual who has not actively operated and managed a farm or ranch anywhere, with an insurable interest in any crop or livestock, for more than 5 crop years (10 years for Whole-Farm Revenue Protection) (USDA, RMA, 2020).

For descriptive statistical purposes, NASS used different definitions of a beginning farmer and the farms they operated before and after 2017. Before 2017, NASS Census publications defined a beginning farmer as having no more than 10 years of experience on the farm they were operating. A beginning farm was defined as one in which the principal operator was a beginning farmer (USDA, NASS, 2014). Since 2017, NASS has defined a beginning farmer as a producer with no more than 10 years of farming experience on any operation, which is consistent with the definition used for program eligibility. NASS has described two types of beginning farms in its publications: Those in which all producers are beginning farmers and those in which the principal producer is a beginning farmer (USDA, NASS, 2019). USDA, ERS reports have used the more recent NASS definition of a beginning farmer, defining a beginning farm as one on which all producers are beginning farmers (Key & Lyons, 2019; Ahearn & Newton, 2009). For this report, we defined a beginning producer as one with no more than 10 years of farming experience on any operation.

This study considered two mutually exclusive categories of beginning farms: all beginning, where all producers identified as beginning farmers; and multigenerational beginning, where at least one, but not all, of the producers identified as beginning. The all beginning group likely includes a larger share of farms where all producers are first-generation farmers. The multigenerational beginning group likely includes a larger share of farms with younger producers working on the family farm. Thilmany et al. (2021) found significant differences between these beginning farmer subtypes, with multigenerational beginning farms being much more like established operations than all beginning farms.

Figure 1 shows the proportion of operations that are all beginning, multigenerational beginning, and established operations in 2012, 2017, and 2022. All beginning operations accounted for 19 percent of all operations in 2012, 21 percent in 2017, and 23 percent in 2022. Multigenerational beginning operations accounted for the smallest share (7–10 percent) of operations.

Figure 1
Percent of U.S. operations in each year by farm operator experience, 2012–2022



All beginning = all producers having no more than 10 years of experience on any farm or ranch. Multigenerational beginning = one or more but not all producers having no more than 10 years of experience on any farm or ranch. Established = all producers having more than 10 years of experience on any farm or ranch.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2012, 2017, and 2022.

Defining Other Variables

Using USDA, NASS definitions, farms are classified into seven primary commodity categories.[5] A primary commodity accounts for 50 percent or more of an operation's total value of production. For diversified operations, where no one commodity makes up 50 percent or more of the total value of production, NASS uses an algorithm to assign the operation a primary commodity.[6] In most cases, diversified crop operations are classified as "other crop," and diversified livestock operations are classified as "other animal."

[5] Primary commodity is broken into seven categories: field crops (grains, oilseeds, dry beans, dry peas, tobacco, cotton); fruit and vegetables (vegetables, melons, potatoes, sweet potatoes, fruit, tree nuts, and berries); other crops (nursery, greenhouse, floriculture, sod, cut Christmas trees, short rotation woody crops, grass seed, hay and grass silage, hops, maple syrup, mint, peanuts, sugarcane, sugar beets, etc.); livestock (hogs, pigs, cattle, calves); dairy; poultry (broilers, chickens, turkeys, ducks, eggs, geese, hatchlings, pheasants, poultry products, etc.); and other animals (aquaculture, bees, honey, rabbits, fur-bearing animals, semen, manure, other animal specialties, etc.).

[6] The first step assesses whether crops or livestock/poultry is 50 percent or more of total value of production. For those diversified operations where crops account for half or more of total value of production, with a combination of grains, sugar beets, peanut sales, etc., the operation is classified as "other crops." For those diversified operations where livestock/poultry is 50 percent or more total value of production but has a combination of cattle, sheep/goats, and chickens, the operation is classified as "other animal." If crop and livestock proportions are 50/50, a random number generator routine in the editing system determines whether an operation is a crop or livestock operation.

The operating profit margin (OPM), a measure of profitability, is net farm income (also known as gross cash farm income (GCFI)) minus total expenditures plus interest expense, divided by GCFI.[7] Government agricultural program payments come from participation in the Conservation Reserve Program, Wetlands Reserve Program, Farmable Wetlands Program, or Conservation Reserve Enhancement Program. They also include commodity program payments such as the Agriculture Risk Coverage and Price Loss Coverage programs but exclude Federal crop insurance payments. The importance of Government payments to a farm business was measured using the "Government payment share." This is defined as total agricultural program payments divided by the sum of sales plus total Government payments. GCFI is broken into four categories: GCFI less than $75,000, $75,000–$349,999, $350,000–$999,999, and $1 million or more (Bauman et al., 2019; Jablonski et al., 2021; Jablonski et al., 2022). Acres operated are classified as 1–9, 10–49, 50–179, 180–499, 500–999, 1,000–1,999, and 2,000 or more (Sommer et al., 1995), with further disaggregation in the smallest acre categories.

Operations are classified as differentiated if they reported sales in one or more of the following categories: agritourism or recreational services (e.g., farm tours, hayrides, hunting, fishing), value-added sales (e.g., jam, wine, cheese, meat, floral arrangements, cider), organic production (i.e., produce organic products according to the USDA, National Organic Program or have acres transitioning to National Organic Program production), or local food sales. Local food sales include direct-to-consumer (e.g., farmers markets, on-farm stores or farm stands, roadside stands or stores, u-pick, community supported agriculture, online marketplaces) and intermediated (e.g., supermarkets, supercenters, restaurants, caterers, independently owned grocery stores, food cooperatives, K–12 schools, colleges or universities, hospitals, workplace cafeterias, prisons, foodbanks).

Characteristics are presented for any producer having a particular characteristic, including categories for sex (female), age (younger than 35 years and 65 years or older), military service (veteran), race/ethnicity (Hispanic of any race, American Indian/Alaska Native, Native Hawaiian/Other Pacific Islander, Asian, Black), and whether at least one producer spent most of their work time working off the farm, as opposed to on the farm.[8]

Descriptive Statistics From the 2022 Census of Agriculture

Different measures of farm size—gross cash farm income and acreage—were used to compare the beginning and established operations in 2022 (figures 2, 3). With either measure, all beginning operations tended to be smaller than multigenerational beginning and established operations, which had a similar size distribution.[9] For example, 86 percent of all beginning operations were in the lowest farm income category (GCFI < $75,000), compared to 67 and 72 percent for multigenerational beginning and established operations, respectively (figure 2). Similarly, about 58 percent of all beginning operations

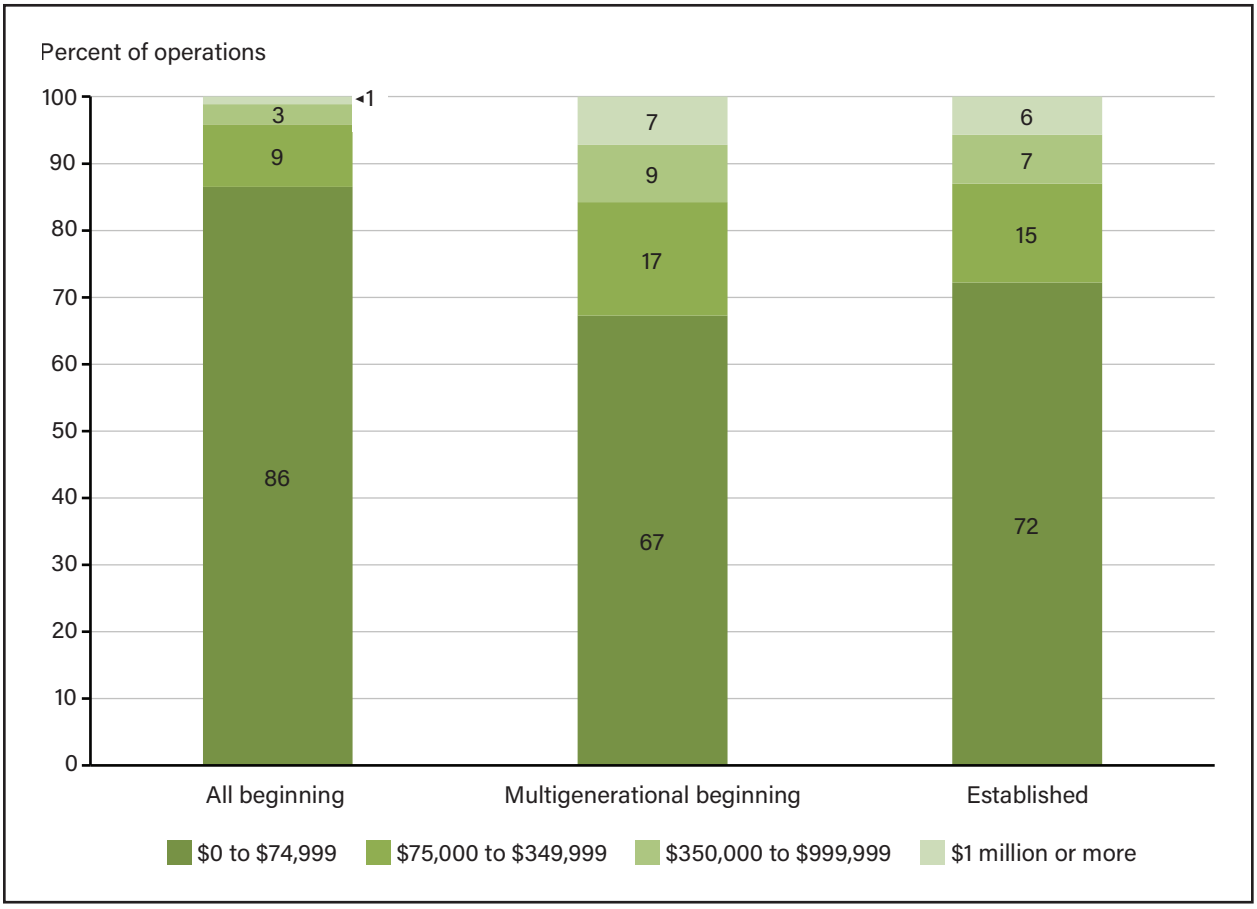
[7] USDA, NASS defines gross cash farm income as total sales plus total dollars received for delivering under contract, plus total government payments, plus income from other agricultural related sources, minus the landlord's share of total sales.

[8] Additional data are presented in table A.2 for the proportion of operations where all, one or more but not all, and no producers are young, senior, female, veteran, or work primarily off-farm.

[9] Changes in farm size from 2012 to 2022 are similar across beginning and established operations with some small differences. The percent of all beginning operations with gross cash farm income (GCFI) of $1 million or more remained the same over time, whereas the percent of multigenerational beginning and established operations increased. The percent of small scale (GCFI less than $75,000) all beginning operations remained the same over time whereas the percent of small-scale multigenerational beginning and established operations decreased.

had less than 50 acres, compared to 36 and 38 percent for multigenerational beginning and established operations, respectively (figure 3).[10]

Figure 2
Percent of U.S. operations in each gross cash farm income category, 2022

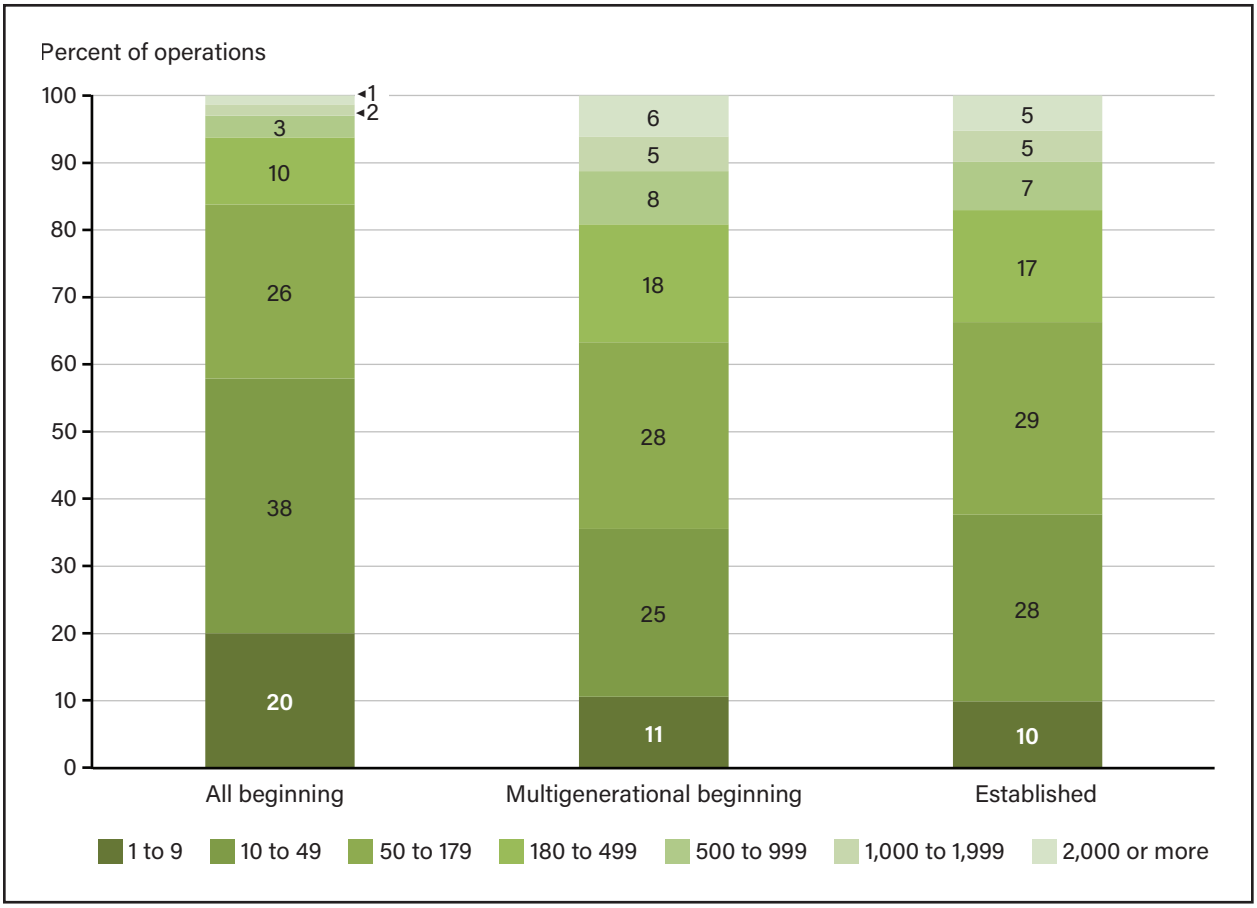


All beginning (N = 443,426) = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning (N = 186,690) = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established (N = 1,270,371) = all producers having more than 10 years of experience on any farm or ranch.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2022.

[10] Statistical tests of the differences in the proportions of all beginning and established operations and multigenerational beginning and established operations are given in the appendix.

Figure 3
Percent of U.S. operations in each farm acreage category, 2022



All beginning (N = 443,426) = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning (N = 186,690) = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established (N = 1,270,371) = all producers having more than 10 years of experience on any farm or ranch.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2022.

For all farm types, land tenure arrangements are correlated with the scale of production (table 1).[11] On larger farms, it was more common for all the land to be rented (full tenant) or a portion of the land to be rented (part owner) than it was on smaller operations. For example, only 6.7 percent of the smallest farms (GCFI less than $75,000) with all beginning producers rented all their land, compared to 21.9 percent of the largest farms (GCFI at least $1 million) with all beginning producers.

Comparing across farm types within the same farm income category, all beginning operations were the most likely to rent all the land operated (full tenants), followed by multigenerational beginning and established operations. This pattern might be explained by all beginning farms being more likely to be operated by first-generation farmers without access to inherited farmland. Because beginning farmers have less production history than their more established counterparts, it is more difficult for lenders to assess their credit worthiness (Ahrendsen & Dodson, 2022). Farmers without access to loans may need to rely more on rented land.

When comparing the proportion of all beginning to established operations within each farm size and land tenure category, statistically significant differences exist across all groupings. When comparing multigenerational beginning to established, statistically significant differences exist across all groupings apart from full-owner operations with GCFI of $75,000 to $349,999.

[11] Group summation by income group does not add to 100 percent due to rounding.

Table 1

Share of U.S. operations by land tenure and gross cash farm income, 2022

	All beginning			Multigenerational beginning			Established		
Farm income	Full owner	Part owner	Full tenant	Full owner	Part owner	Full tenant	Full owner	Part owner	Full tenant
$0–$74,999	0.834***	0.099***	0.067***	0.778***	0.160***	0.063***	0.829	0.131	0.040
$75,000–$349,999	0.518***	0.289***	0.192***	0.552	0.345***	0.103***	0.558	0.380	0.062
$350,000–$999,999	0.330***	0.439***	0.231***	0.336***	0.550***	0.115***	0.300	0.624	0.075
$1 million or more	0.263***	0.518***	0.219***	0.218***	0.642***	0.140***	0.198	0.710	0.092

All beginning (N = 443,426) = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning (N = 186,690) = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established (N = 1,270,031) = all producers having more than 10 years of experience on any farm or ranch.

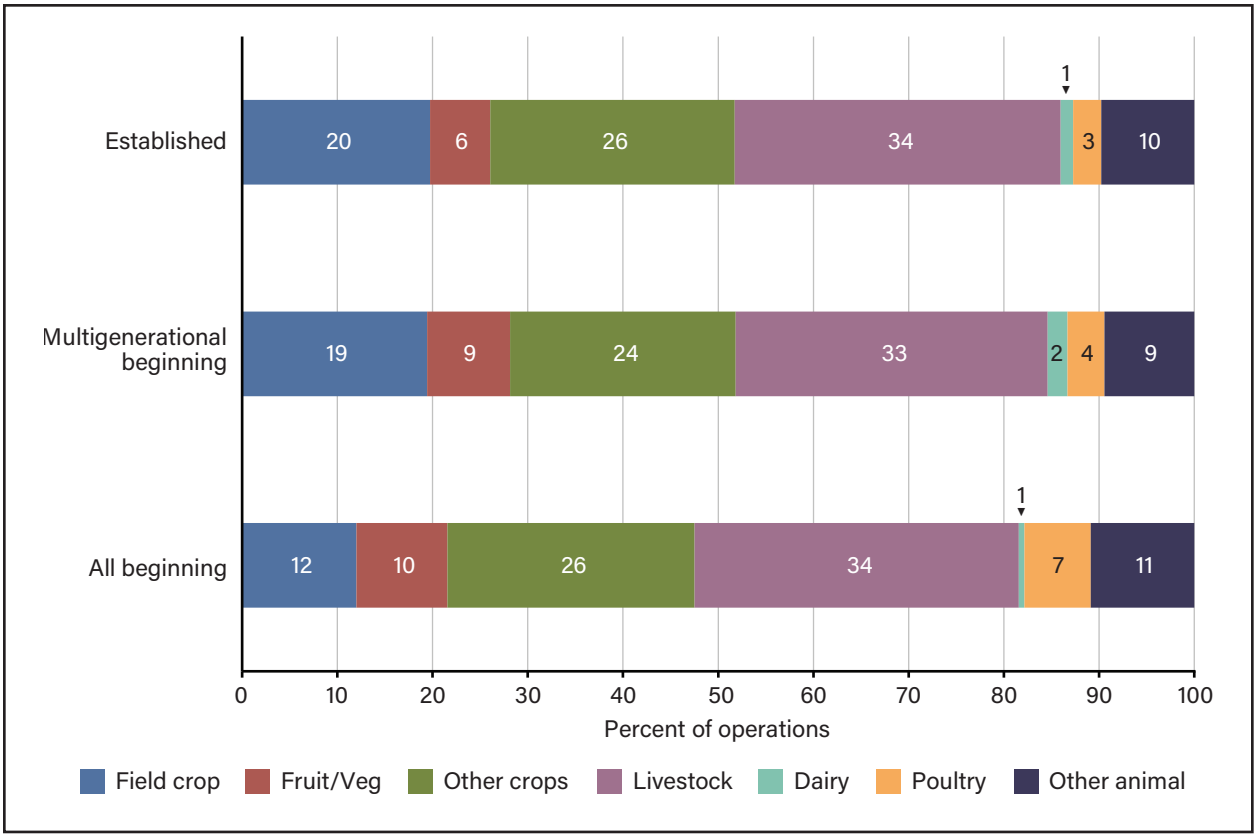
Note: Full owners own all the land they operate, part owners own a portion of the land they operate while renting a portion, and full tenant operations rent all the acres they operate. Asterisks indicate statistically significant differences to established operations within each combination of income and land category, p-value<0.01***, <0.05**, <0.1*.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2022.

While beginning and established farms had a similar mix of primary commodities, some differences existed (figure 4).[12] All beginning operations were slightly more likely to be primarily fruit or vegetable producers than multigenerational beginning and established operations (10 percent versus 9 and 6 percent, respectively). By contrast, all beginning farms were less likely to produce field crops than the other two farm types (12 percent for all beginning versus 19 and 20 percent for multigenerational beginning and established, respectively). Different land requirements for various types of crops may explain part of these differences. Field crops are generally grown on relatively large acreages, whereas fruits and vegetables can be cultivated on relatively little land. (See appendix for a discussion and maps of differences in the proportion of beginning farmers across States.)

[12] Totals do not add up to 100 percent within groups due to rounding.

Figure 4
Percent of U.S. farms by primary commodity category, 2022



All beginning (N = 443,426) = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning (N = 186,690) = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established (N = 1,270,371) = all producers having more than 10 years of experience on any farm or ranch; veg = vegetables.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2022.

Financial Characteristics

Farm assets include land, buildings, equipment, and machinery. Given a level of sales, a relatively high level of assets implies a greater need for financing from either savings or credit. Within the same farm size category, all beginning operations had on average fewer total assets than multigenerational beginning and established operations (table 2). It is possible that all beginning farms have less access to financial resources to purchase farm assets, making them more likely to choose relatively labor-intensive commodities and production technologies (Key, 2022b). Differences between multigenerational beginning operations and established operations were smaller, but statistically different across all size categories except for $75,000 to $349,999, where multigenerational beginning operations with at least $350,000 had fewer assets than established operations and small scale (GCFI less than $75,000) multigenerational operations had more.

The interest paid on real estate and nonreal estate debt provides a measure of the total debt held by operations. All beginning operations had the smallest share of operations with interest payments (around 30 percent) compared to closer to 35 percent and 40 percent for established and multigenerational beginning, respectively. Multigenerational beginning farms had the highest real estate and

nonreal estate interest expenses combined among the three types of farms in the farm size categories. Compared to established operations with older producers, the multigenerational beginning operations may plan to continue in business longer. This could explain why they might be more likely to expand and invest in their operations by taking on more debt. It is not clear why multigenerational beginning farms would have higher interest payments than all beginning farms of a similar scale.

The debt-to-asset ratio, which is proportional to the interest expense-to-assets ratio, is a measure of a farm business's leverage and is used by lenders as an indicator of bankruptcy risk. It gauges a business's ability to cover its financial liabilities through the sale of assets. Farms with a high debt-to-asset ratio are generally more highly leveraged and have less ability to cover potential financial liabilities through the sale of assets, leading to a greater risk of default. Total debt is not reported in the Census, only interest expense, so the authors used the interest expense-to-asset ratio as a proxy for debt-to-assets. Within each farm size category except the largest, interest expense-to-asset ratio was highest for all beginning operations, followed by multigenerational beginning and established. Kaufman (2013) found that compared to established farmers, young and beginning farmers reported higher debt-to-equity ratios, with nonreal estate debt the primary contributor to the difference. Similarly, Key and Lyons (2019) reported that all beginning operations that carry debt were more leveraged than established operations, with a debt-to-asset ratio of 29 percent compared to 18 percent.

In all farm size categories except for small scale (GCFI less than $75,000) multigenerational beginning operations, both types of beginning farms received fewer Government payments than established operations, and all beginning operations received fewer payments than both multigenerational beginning and established operations. These results are consistent with those of Key and Lyons (2019), who found that all beginning operations were less likely to receive Government payments than established operations (although for beginning operations that received payments, the payments represented a greater share of farm income than for established farms). All beginning farms might have lower payments partly because they are much less likely to specialize in field crops than any beginning or established farms (figure 4).

For all farm types, operating profit margin increases with scale. Established operations had a higher operating profit margin compared to all beginning in all farm sizes and compared to multigenerational beginning operations with GCFI $75,000 to $349,999 and $1 million or more. The higher profit margin may reflect the greater managerial or farming skills of the more experienced producers on established operations.

Table 2

Financial characteristics of U.S. operations by gross cash farm income category, 2022

	$0 to $74,999 (N = 1,426,582)			$75,000 to $349,999 (N = 261,222)			$350,000 to $999,999 (N = 122,263)			$1 million or more (N = 90,420)		
	All beginning	Multigenerational beginning	Established	All beginning	Multigenerational beginning	Established	All beginning	Multigenerational beginning	Established	All beginning	Multigenerational beginning	Established
Total assets	596,265***	831,352***	725,498	1,884,142***	2,511,929	2,489,615	4,381,837***	5,573,961***	5,888,954	12,176,220***	14,871,005***	15,521,930
	(4,064)	(7,996)	(2,621)	(26,597)	(36,360)	(12,916)	(76,119)	(80,915)	(28,936)	(324,956)	(233,727)	(86,244)
Interest expense	1,571***	1,657***	1,241	5,751***	5,916***	5,222	12,926***	15,118***	14,009	31,328***	50,388	50,915
(real estate)	(15.5)	(30.5)	(10.00)	(103)	(138)	(49.1)	(352)	(388)	(139)	(4,096)	(2,865)	(1,057)
Interest expense	321***	402***	289	1,947***	1,847***	1,604	5,508*	5,289	5,135	22,364***	27,177	26,089
(non-real estate)	(3.47)	(7.15)	(2.34)	(38.6)	(49.1)	(17.4)	(184)	(191)	(68.4)	(1,386)	(1,055)	(389)
Total	1,892***	2.059***	1,531	7,698***	7,764***	6,826	18,434	20,407***	19,143	53,692***	77,565	77,004
interest expense	(16.2)	(32.0)	(10.5)	(114)	(151)	(53.7)	(409)	(444)	(159)	(4,436)	(3,143)	(1,160)
Interest-to-	0.005***	0.004***	0.003	0.007***	0.005***	0.005	0.008***	0.006***	0.005	0.010	0.010	0.009
asset ratio	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)
Government	775***	1,113	1,098	6,092***	7,327***	8,150	16,261***	19,580***	22,254	40,433***	43,860***	49,807
payments	(8.84)	(17.6)	(5.77)	(121)	(161)	(57.1)	(481)	(510)	(182)	(1,652)	(1,196)	(441)
Operating profit	-15.0***	-10.9	-10.6	-0.138***	-0.038***	-0.006	-0.091***	0.137	0.142	0.245***	0.275**	0.293
margin	(1.22)	(1.80)	(0.596)	(0.010)	(0.013)	(0.005)	(0.013)	(0.013)	(0.005)	(0.013)	(0.009)	(0.003)

All beginning (N = 443,426) = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning (N = 186,690) = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established (N = 1,270,371) = all producers having more than 10 years of experience on any farm or ranch.

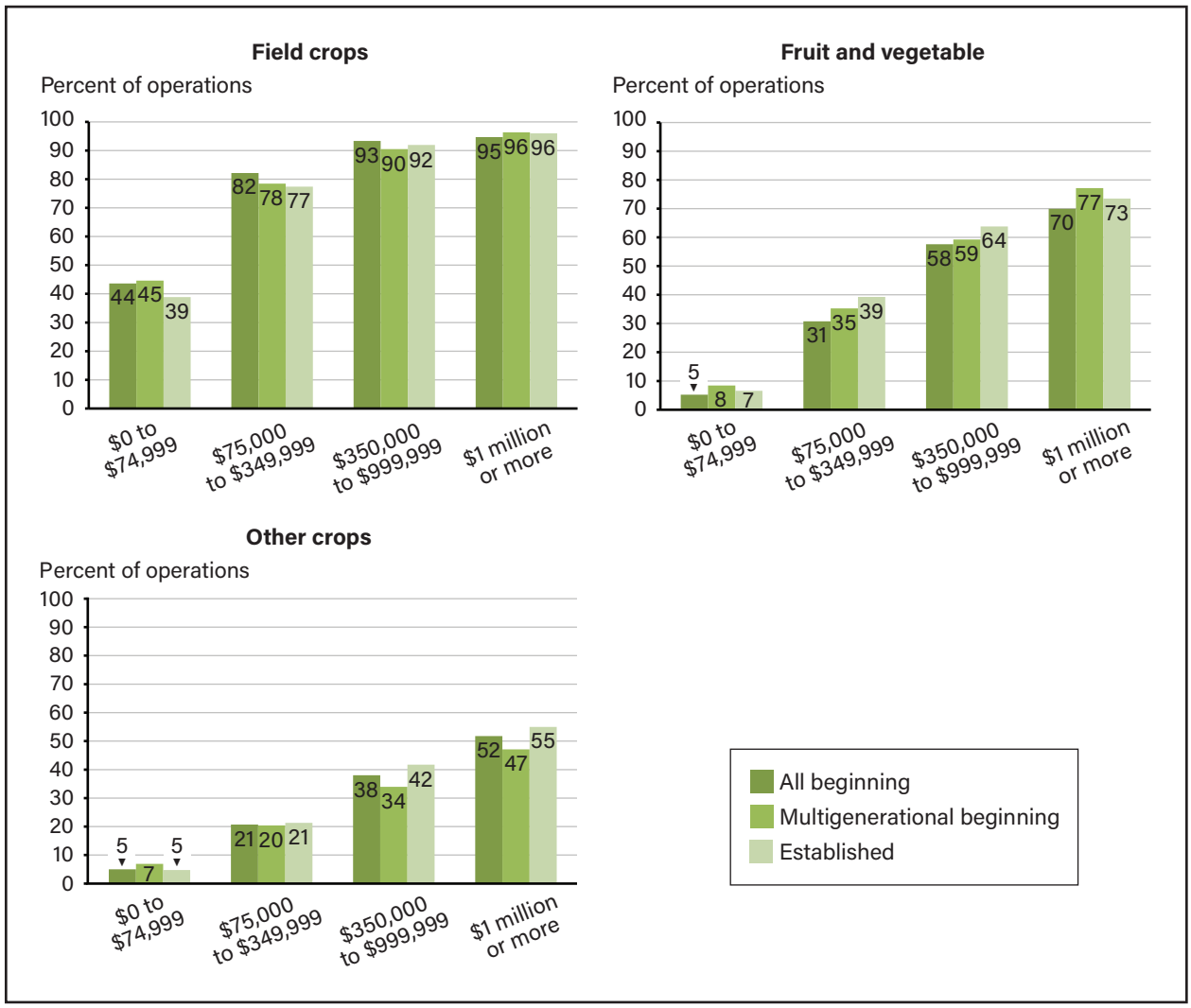
Note: Numbers not in parentheses are the means; numbers in parentheses are the standard errors. Asterisks indicate statistically significant differences to established operations within each gross farm cash income category, p-value<0.01***, <0.05**, <0.1*.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2022.

To compare insurance usage across similar farms, the proportion of crop producers[13] with Federal crop insurance are presented by farm size (GCFI) and commodity specialization categories (figure 5). The decision to purchase crop insurance appears to be more strongly correlated with farm size and commodity specialization than with an operation's BFR status. Field crop producers (N = 340,053) had the highest rate of crop insurance use, followed by fruit and vegetable producers. Among field crop farmers, rates of crop insurance uptake by all beginning and multigenerational beginning operations were similar to, or even higher than, the rates for established operations across all farm size categories. By contrast, all beginning fruit and vegetable operations (N = 139,136) had a lower proportion of producers with crop insurance compared to multigenerational beginning and established operations across all farm size categories. The similar pattern of crop insurance uptake among field crop farmers regardless of BFR status may reflect the requirement by many lenders of having crop insurance in order to secure an operating loan (DeLay et al., 2023).

Figure 5

Percent of U.S. operations with crop insurance by gross cash farm income and commodity specialization, 2022



All beginning (N = 443,426)= all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning N = 186,690) = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established (N = 1,270,371) = all producers having more than 10 years of experience on any farm or ranch.

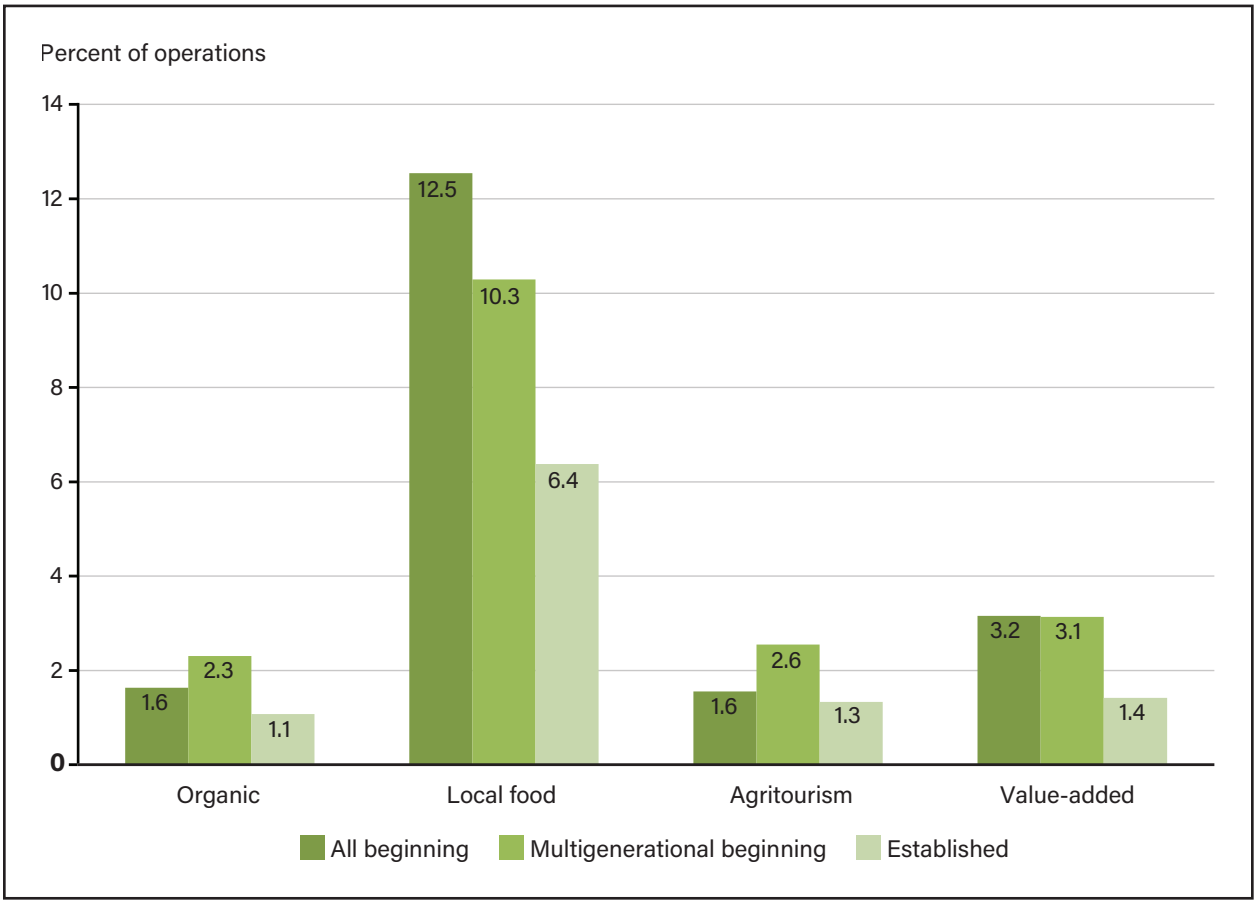
Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2022.

[13] Livestock and dairy operations were excluded as the focus of this section is on Federal crop insurance.

Differentiated Sales

Operations with differentiated sales are those with sales in local food marketing channels (including direct-to-consumer and intermediated), sales of value-added products, certified organic or transitioning to certified organic acres, or income from agritourism and recreational services. Less than 4 percent of farms in any category had organic sales, agritourism income, or value-added sales (figure 6). Further, while statistically significant, no substantial differences existed across beginning farmer status for these types of differentiated markets. Participation in local foods markets was more common: 13 percent of all beginning operations and 10 percent of multigenerational beginning operations sold in local food markets—substantially higher than the 6 percent of established operations.

Figure 6
Percent of U.S. operations with differentiated sales by beginning status, 2022

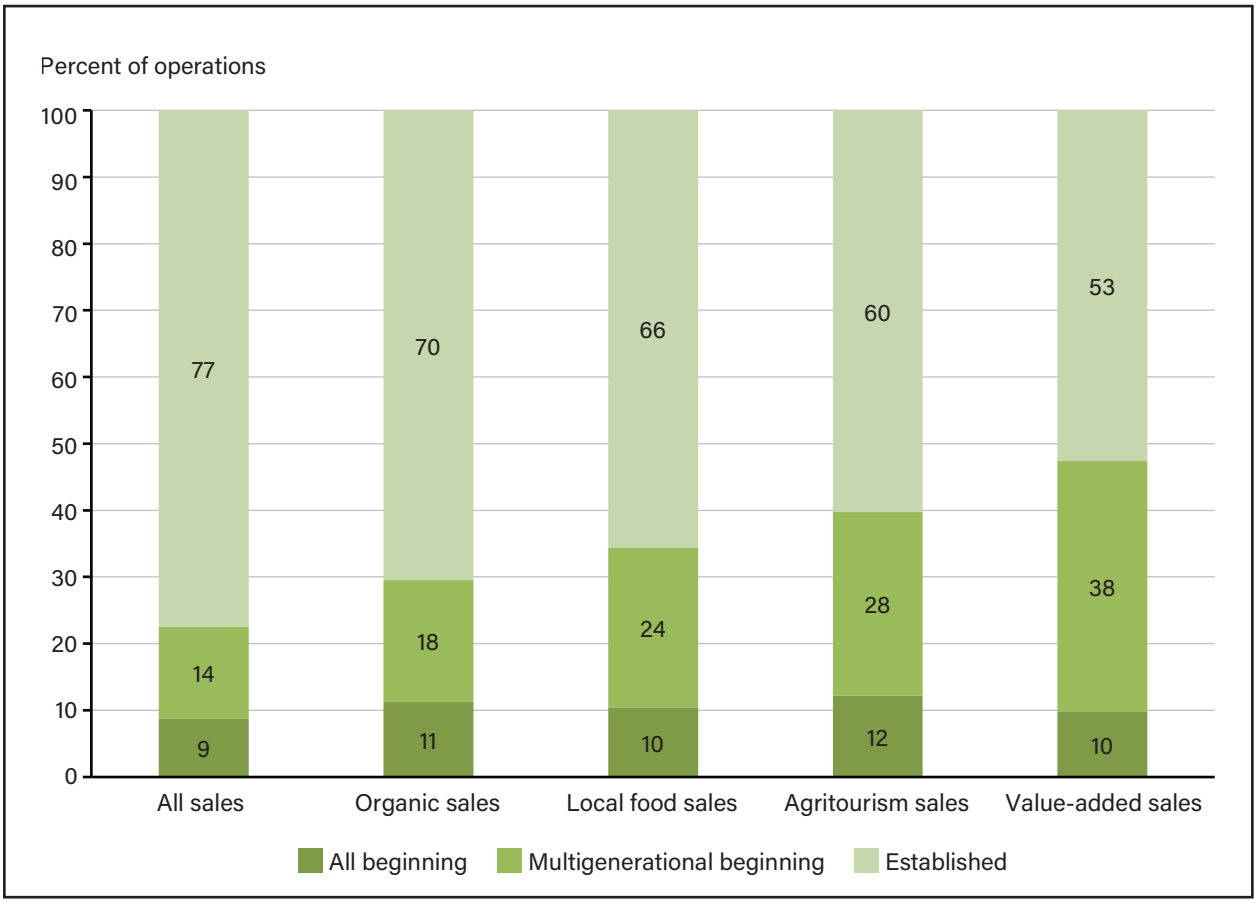


All beginning (N = 443,426) = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning (N = 186,690) = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established (N = 1,270,371) = all producers having more than 10 years of experience on any farm or ranch.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2022.

Although only a small portion of BFRs had differentiated sales, they accounted for a relatively large share of total differentiated sales (figure 7). All beginning operations made up only 9 percent of all sales, but they accounted for 11 percent of organic sales, 10 percent of local food sales, 12 percent of agritourism income, and 10 percent of value-added sales. Multigenerational beginning operations made up 14 percent of all sales, but they accounted for 18 percent of organic sales, 24 percent of local food sales, 28 percent of agritourism income, and 38 percent of value-added sales.

Figure 7
Percent of all and differentiated sales in the U.S. by beginning status, 2022



All beginning (N = 443,426) = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning (N = 186,690) =one or more but not all producers having no more than 10 years of experience on any farm or ranch; established (N = 1,270,371) = all producers having more than 10 years of experience on any farm or ranch.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2022.

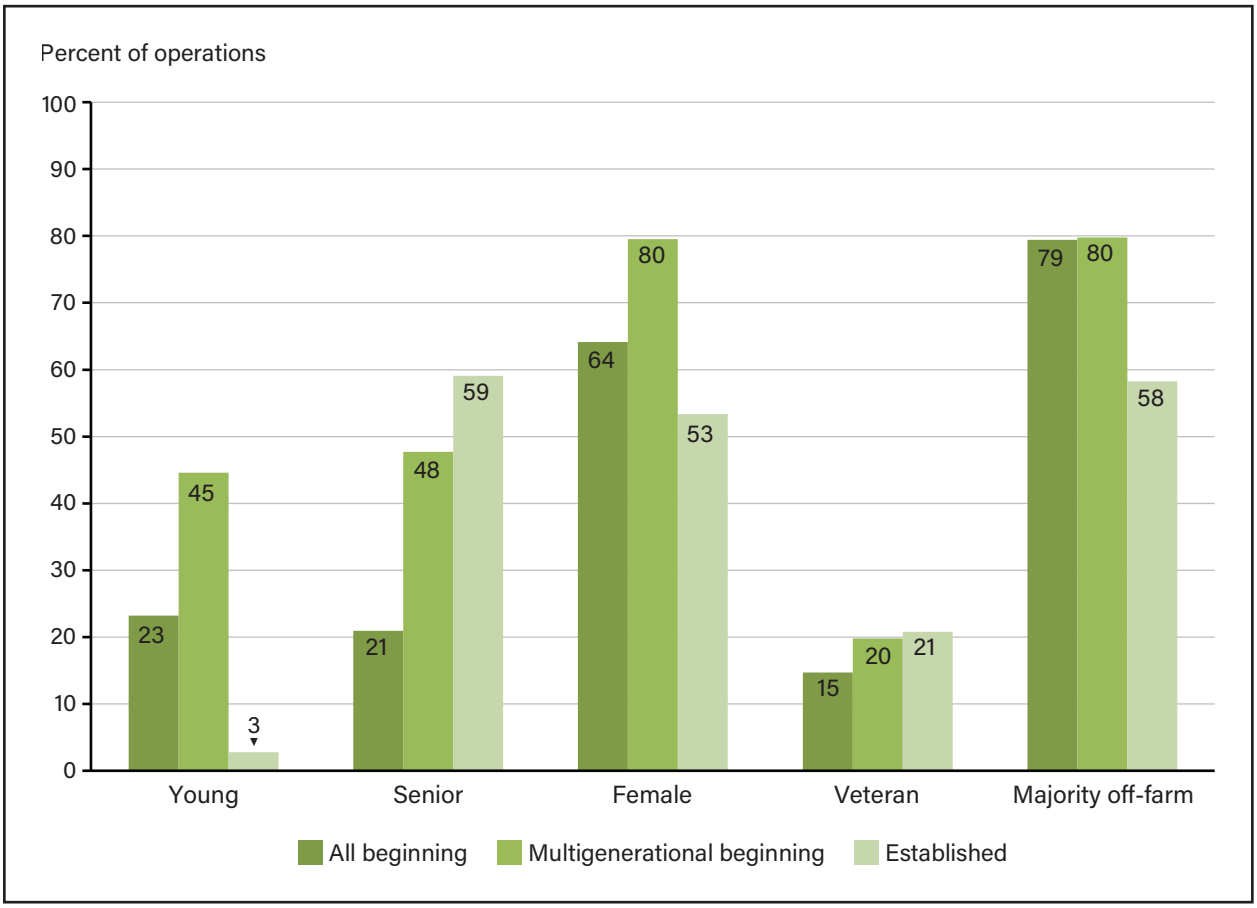
Producer Characteristics

Producer characteristics varied by farm type (figures 8, 9) and similar patterns were observed when comparing operations where all producers, one or more but not all, and no producers had each characteristic (table A.2).[14] All beginning and multigenerational beginning operations were more likely to have a producer that was young (under 35 years), female, or worked majority off-farm compared to established operations, and less likely to have a producer that was a senior (65 years or over) or a veteran. Multigenerational beginning operations had the highest proportion of operations with a young producer (figure 8). Multigenerational beginning operations also had the highest proportion of operations with a female producer (80 percent) followed by all beginning (64 percent) and established (53 percent). Both all beginning and multigenerational beginning operations had a similar proportion of operations where at least one producer worked primarily off-farm (79 and 80 percent, respec-

[14] Interesting differences appeared when comparing operations where all producers were young, female, or worked off-farm, where there were higher proportions of all beginning operations than multigenerational beginning operations, the opposite pattern than when comparing operations where at least one producer was young, female, or worked off-farm (see table A.2 for more details).

tively), significantly higher than the 58 percent of established operations. This might be because the producers of all beginning farms were younger and less likely to be of retirement age and that all beginning farms are smaller and, on average, generate less farm income. Established operations had the highest proportion of operations with a producer that was a veteran (21 percent) followed by multigenerational beginning and all beginning (20 and 15 percent, respectively).

Figure 8
Percent of U.S. operations with each characteristic, 2022



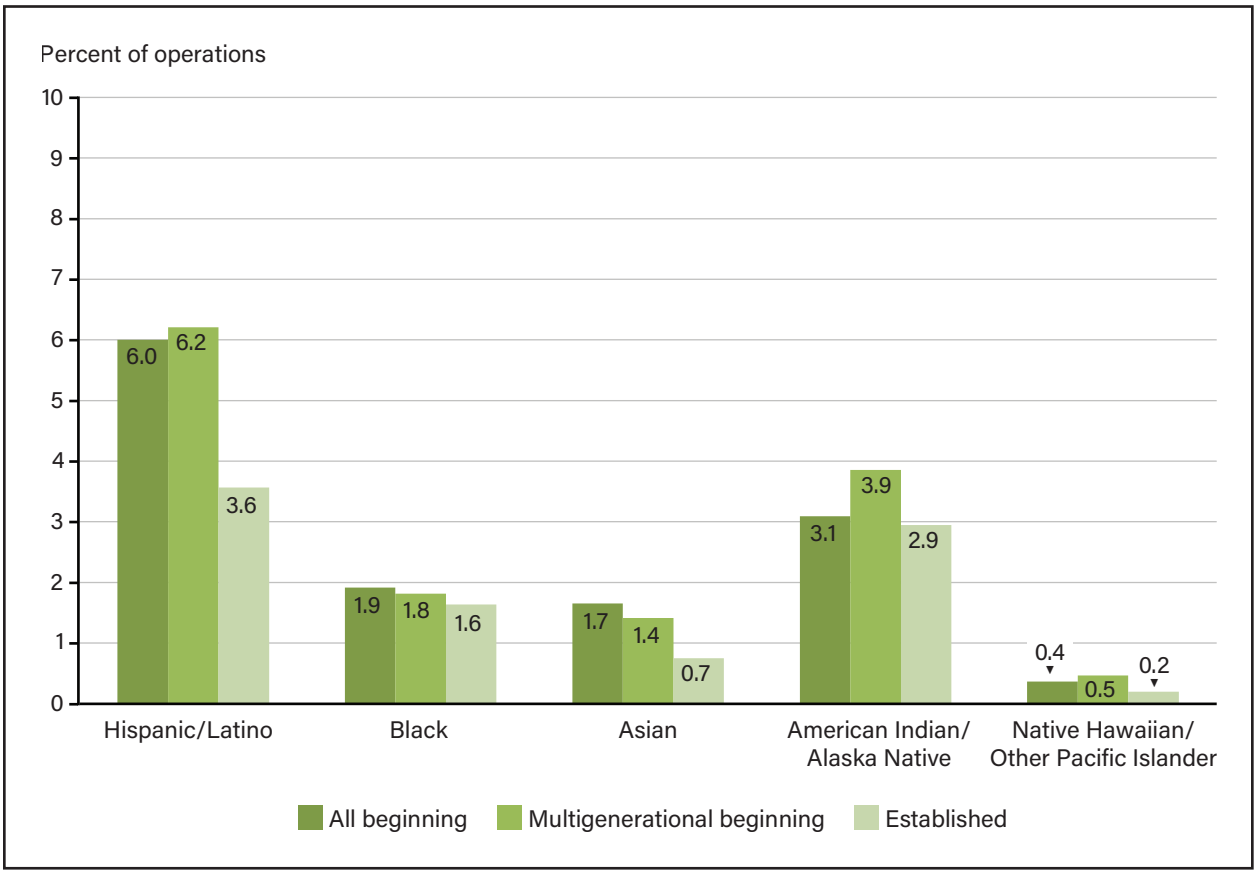
Young = any producer younger than 35 years old; Senior = any producer age 65 years or older; Veteran = any producer has served or is serving in the military; majority off-farm = any producer spent more than 50 percent of their work time on work other than farming or ranching; All beginning (N = 443,426) = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning (N = 186,690) = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established (N = 1,270,371) = all producers having more than 10 years of experience on any farm or ranch.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2022.

Most producers (85 percent of all beginning, 64 percent of multigenerational beginning, and 88 percent of established operations) were White only and non-Hispanic. Figure 9 shows the proportion of operations with at least one producer that identifies with the race/ethnicity of Hispanic/Latino, Black, Asian, American Indian/Alaska Native, Native Hawaiian/Other Pacific Islander. Operations are categorized by one or more producers identifying as each race/ethnicity (e.g., Hispanic is an operation with a Hispanic producer of any race, Black is an operation with a Black producer including Black producers who identify as another race or Hispanic ethnicity). Race/ethnic categories are nonexclusive, and operations were counted for all races/ethnicities selected for each producer. A producer that selects multiple races was counted for all races selected.

Operations with a Hispanic or Latino producer represented the second largest share of operations. There was a significantly higher share of beginning operations with a Hispanic producer: 6.2 and 6.0 percent for multigenerational beginning and all beginning, respectively, compared to 3.6 percent for established operations. The proportion of operations with a Black producer was similar across BFR status, but higher among all beginning and multigenerational beginning (1.9 and 1.8 percent, respectively) compared to established operations (1.6 percent). Beginning operations were at least twice as likely to have an Asian producer than established operations: 1.7 percent of all beginning operations, 1.4 percent of multigenerational beginning operations, compared to 0.7 percent of established operations. Multigenerational operations had the highest proportion of operations with an American Indian or Alaska Native producer, 3.9 percent compared to 3.1 percent of all beginning operations and 2.9 percent of established operations. Operations with a Native Hawaiian and Other Pacific Islander producer made up the smallest share, ranging from 0.2 percent of established operations to 0.4 and 0.5 percent of all beginning and multigenerational beginning operations, respectively.

Figure 9
Percent of U.S. operations for each race/ethnicity by farm type, 2022



All beginning (N = 443,426) = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning (N = 186,690) = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established (N = 1,270,371) = all producers having more than 10 years of experience on any farm or ranch.

Note: Operations are categorized by one of more producers identifying as each race/ethnicity (e.g. Hispanic is an operation with a Hispanic producer of any race, Black is an operation with a Black producer including Black producers who identify as another race or Hispanic ethnicity). Race/ethnic categories are nonexclusive, and operations will be counted for all races/ethnicities selected for each producer. Due to very small proportions, the y-axis is truncated at 10 percent.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2022.

Farm Business Survival

Remaining in business is a minimum threshold for farm business success. Past research using farm-level panel data provided insight into some key determinants of farm business survival. Using Census data, Key and Roberts (2006, 2007) found that Government payments were positively associated with the likelihood of farm survival, and that the magnitude of this association was generally greater for larger farms. Nadolnyak et al. (2019) used farm-level panel data from the Census to examine how weather variability, along with other economic and demographic factors, affected beginning farm exits. The authors of the 2019 study found that profitability and off-farm employment did not affect beginning farm exit rates, but farm size (sales) lowered the probability of exit. The study also found that weather effects on exits from farming were mostly attributable to droughts.

Key (2022a) used farm-level panel data from the Census to examine farm business survival and growth for beginning farms. The findings suggested that efforts to increase farm productivity, farmer participation in direct-to-consumer marketing, and the share of farmers who received agricultural program payments could improve outcomes for beginning farms. In a related study, Key (2022b) found that farmers who were credit constrained (i.e., unlikely to be offered new loans because of their low repayment capacity) took on less new debt and had lower rates of survival and growth than unconstrained farmers. Access to credit was found to be relatively more important for the growth of beginning farms with principal operators younger than age 40.

Unlike past studies that explored the relationship between farm characteristics and farm business survival rates, this report considered two types of beginning farms separately: all beginning and multigenerational beginning. The authors focused on operations that responded to the Census in 2012 to determine which characteristics were associated with farm survival for five and ten years as indicated by the farm responding to the Census in 2017 and 2022.[15] A beginning producer is defined as having no more than 10 years of experience on any farm or ranch.

Farm Survival Rates

The farm business survival rate is defined as the number of farms that remained in business for a certain length of time relative to the total number farms that were in business in the initial period. Over 5-year periods (2012–17 and 2017–22), farm business survival rates ranged from about 47 to 57 percent, depending on the farm type (figure 10). The survival rates were lower over 10 years (2012–2022), ranging from about 35–40 percent. Across farm types, all beginning operations had the lowest 10-year survival rates, whereas multigenerational beginning operations had similar, though slightly lower 5-year survival rates and the same 10-year survival rates than established operations. Deller and Conroy (2017) found that just over 60 percent of nonfarm businesses that started in 2007 survived for at least 5 years. This discrepancy may partly be explained by how farm business survival is defined using Census data.

[15] Principal operator farmers and ranchers that were beginning farmers in 2012 were tracked and followed until 2022, not including farms that entered farming during the sample time frame. The NASS-defined "principal operator ID" was used to track principal operators over time. In some cases, the principal operator ID may have been incorrectly assigned, making it not possible to track the same farm from 2012 to 2022; or a farm or ranch may have operated in all time periods without filling out the Census in one of the years. These challenges likely only affect a small number of observations, and the linked-farm approach has been used widely to track changes across Census years (Key &Roberts, 2006, 2007; Katchova & Ahearn, 2016, 2017; Nadolnyak, 2019; Key, 2022a, 2022b).

Figure 10
Percent of U.S. operations that survived from 2012 to 2022, by farm type

All beginning = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established = all producers having more than 10 years of experience on any farm or ranch.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2012, 2017 and 2022.

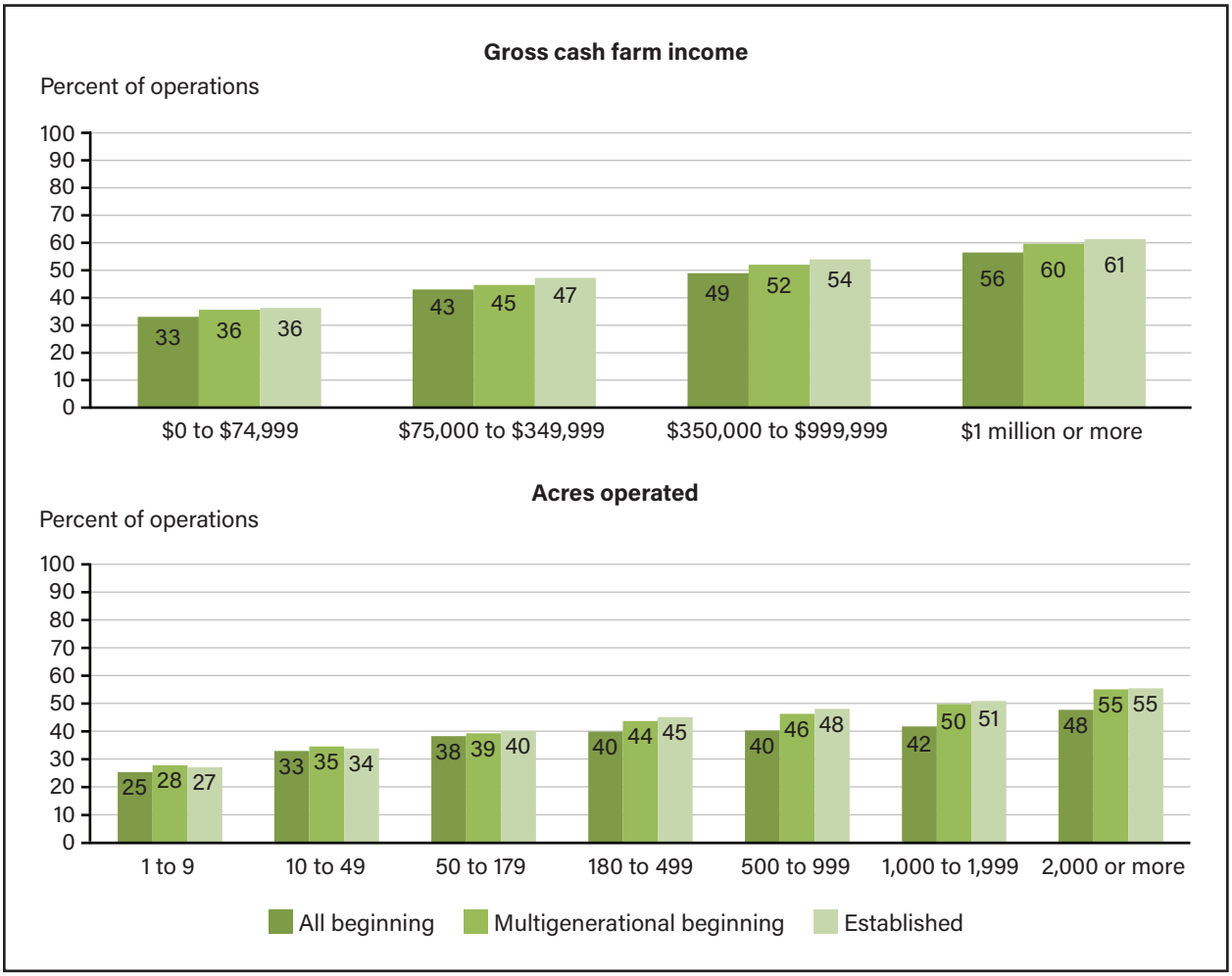
Farm Size

The likelihood of a farm surviving in business for 10 years generally increased with farm size (both gross cash farm income and acres operated), a consistent pattern across farm types (figure 11). Larger farms may have a higher survival rate because they are more profitable or because the producers have higher household income and wealth, which makes them more resilient to economic shocks (Whitt et al., 2019).

For all farm size categories, all beginning operations had the lowest survival rates. The difference in survival rates between all beginning operations and the other farm types was more pronounced for larger scale operations. Multigenerational beginning operations had slightly lower survival rates than established operations across all gross cash farm income categories (figure 11, left panel), but different patterns emerged when evaluating survival rates across acres operated categories (figure 11, right panel). Compared to established operations, multigenerational beginning operations with 10–49 acres had slightly higher survival rates and operations with 50-999 acres had slightly lower survival rates. Differences in the smallest and two largest acres operated categories were not statistically significant.

Figure 11

Percent of U.S. operations that survived from 2012–2022, by farm type and farm size (gross cash farm income and acres operated)



All beginning (N = 401,579) = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning (N = 141,905) = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established (N = 1,565,819) = all producers having more than 10 years of experience on any farm or ranch.

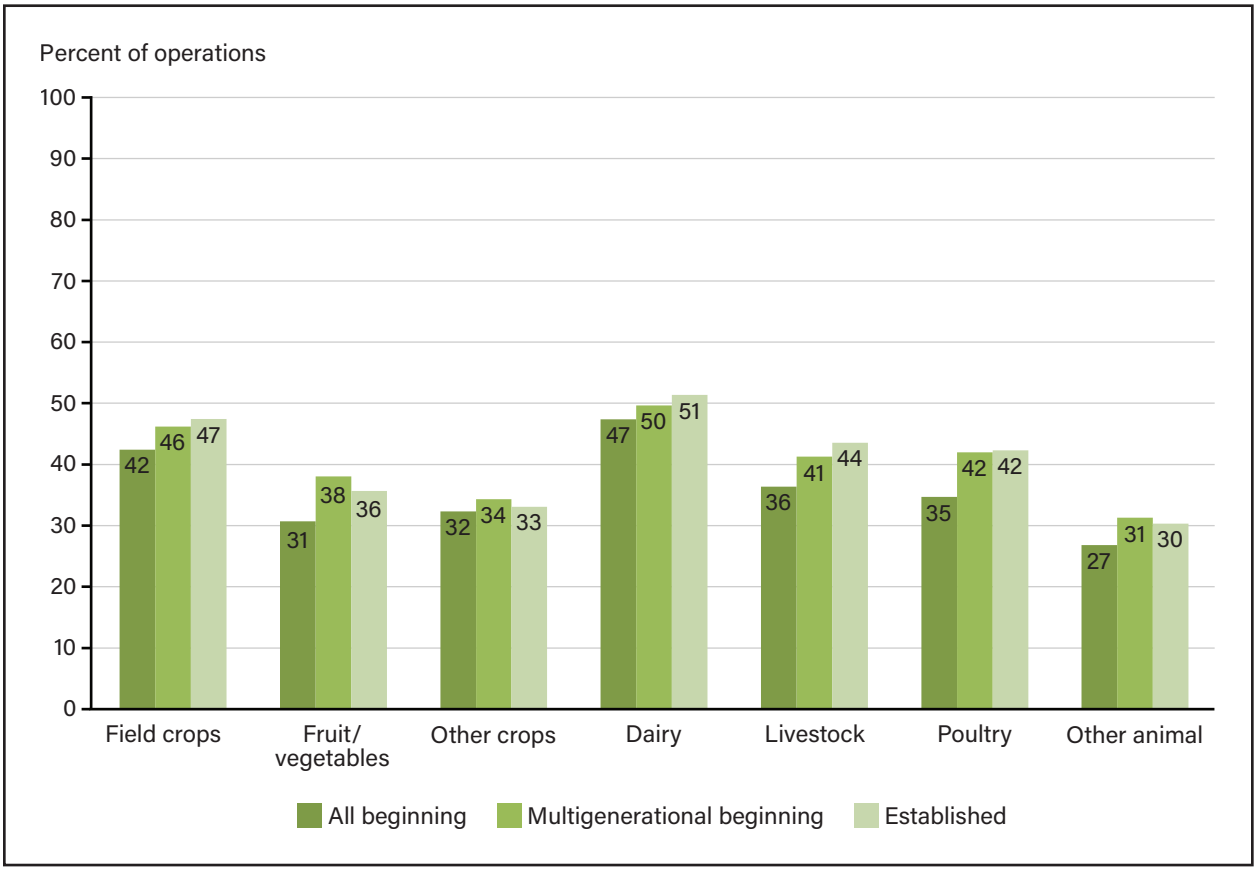
Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2012 and 2022.

Primary Commodity

Survival rates were correlated with the farm's primary commodity specialization. Farms specializing in field crops and dairies had the highest survival rates, while those specializing in other animals had the lowest (figure 12). The survival rate pattern across farm types for different farm size categories also held across commodity categories. That is, all beginning operations had the lowest survival rates, while multigenerational beginning operations had similar rates to established operations.

Figure 12

Percent of U.S. operations that survived from 2012–2022, by farm type and primary commodity



All beginning (N = 401,579) = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning (N = 141,905) = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established (N = 1,565,819) = all producers having more than 10 years of experience on any farm or ranch.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2012 and 2022.

Off-farm Work

Whether or not an operation had a producer who spent most of their time working off-farm could have affected the survival of the operation (table 3).[16] For small scale operations (GCFI less than $350,000), having at least one producer working majority off-farm was associated with higher survival rates across all BFR types, except for all beginning operations with GCFI $75,000 to $349,999. This was likely driven by the fact that small scale operations tend to rely more on off-farm income than larger farms, with smaller operations deriving more than half of total household income from off-farm sources in 2019 (Litkowski et al., 2021). But as GCFI increases to at least $350,000, all beginning operations where all producers spend the majority of their time working on-farm had survival rates 5 to 7 percentage points higher than the same scale operation with a producer that worked majority off-farm. For established and multigenerational operations, this difference occurred only for operations with GCFI of $1 million or more and ranged from 1 to 3 percentage points.

[16] Classification is based on a producer's response to the question: "At which occupation did the operator spend the majority (50 percent or more) of his/her work time in 2012?"

The difference in survival rates between operations with at least one producer working mostly off-farm versus all producers working mostly on-farm was the largest for all beginning operations, followed by multigenerational beginning and established operations. This suggests that working on-farm rather than off-farm had a bigger positive effect on survival for beginning farms, perhaps because more direct producer involvement is required for success when the business is being established.

Table 3
Percent of U.S. operations that survived from 2012–2022, by where producers spent most of the time working

	$0 to $74,999 (N = 1,635,984)		$75,000 to $349,999 (N = 280,016)		$350,000 to $999,999 (N = 125,478)		$1 million or more (N = 67,816)	
	Majority on-farm	Majority off-farm	Majority on-farm	Majority off-farm	Majority on-farm	Majority off-farm	Majority on-farm	Majority off-farm
All beginning	0.301***	0.340	0.430	0.430	0.503***	0.453	0.582***	0.506
Multigenerational beginning	0.329***	0.362	0.431***	0.457	0.525	0.513	0.606***	0.572
Established	0.337***	0.376	0.463***	0.491	0.541	0.536	0.616***	0.596

All beginning = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established = all producers having more than 10 years of experience on any farm or ranch. Majority on-farm = no producers spent 50 percent of their work time on work other than farming or ranching. Majority off-farm = at least one producer spent more than 50 percent of their work time on work other than farming or ranching.

Note: N represents the number of operations in each category in 2012. Asterisks indicated statistically significant difference between majority on-farm survival rates compared to majority off-farm survival rates within farm type and size category at p-value<0.01***, <0.05**, <0.1*.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture. 2012 and 2022.

Location

The effect of farm or ranch location on survival rates for beginning farmers can be compared by showing average 10-year survival rates at the State-level for all beginning, multigenerational beginning, and established operations, respectively (figure 13) (county-level maps are available in appendix figures A.2, A.3, and A.4). For all farm types, similar patterns were found in survival rates across regions. Operations located in the Midwest generally had the highest survival rates and operations located in the Southwest and Southeast had the lowest. For all beginning operations, State-level survival rates ranged from 26 percent (Arizona) to 53 percent (Alaska); multigenerational beginning State-level survival rates ranged from 31 percent (Florida) to 61 percent (Alaska); and established State-level survival rates ranged from 28 percent (Arizona) to 54 percent (Alaska).

Figure 13

Map of the survival rate of beginning and established U.S. farm operations by State, 2012–2022

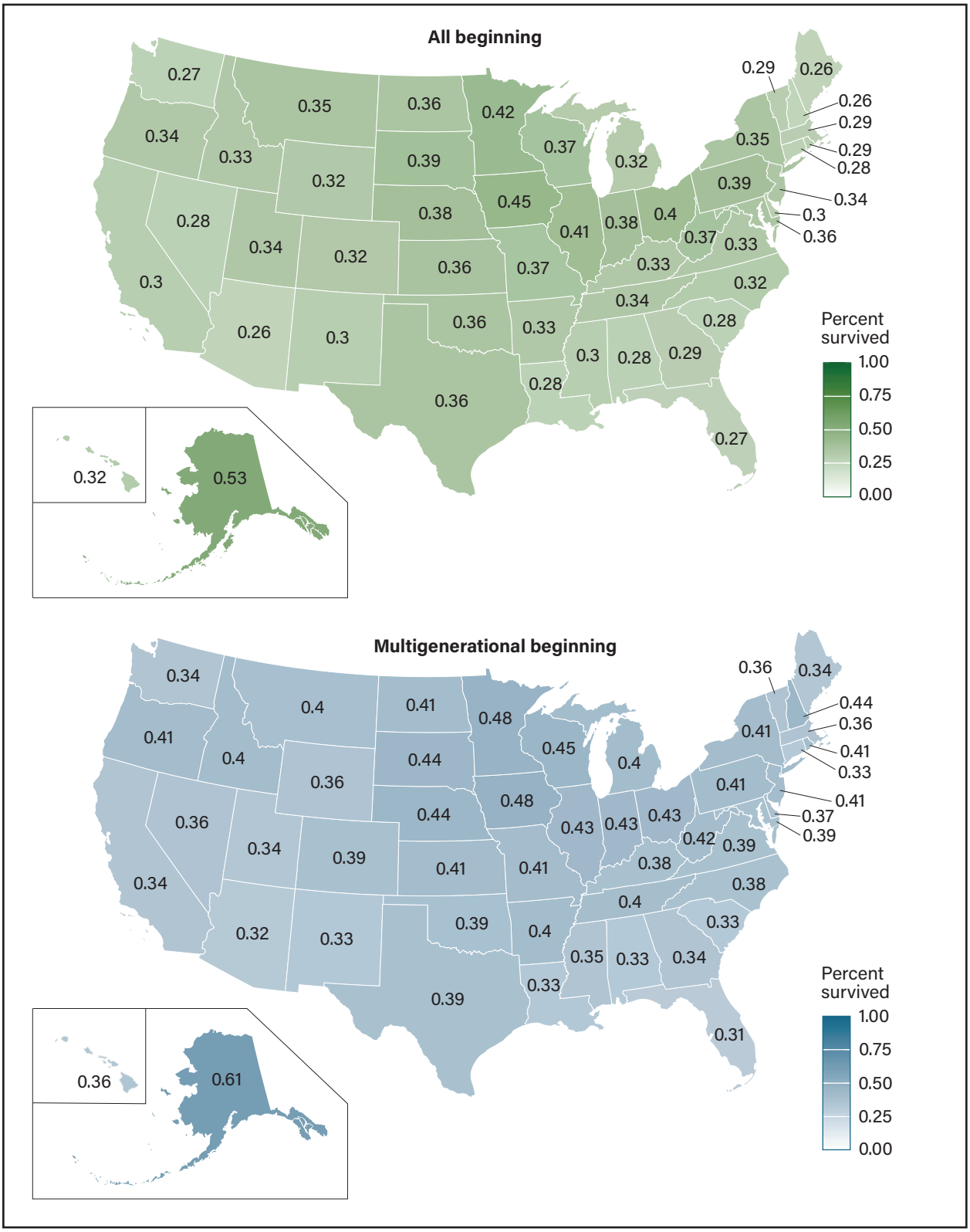
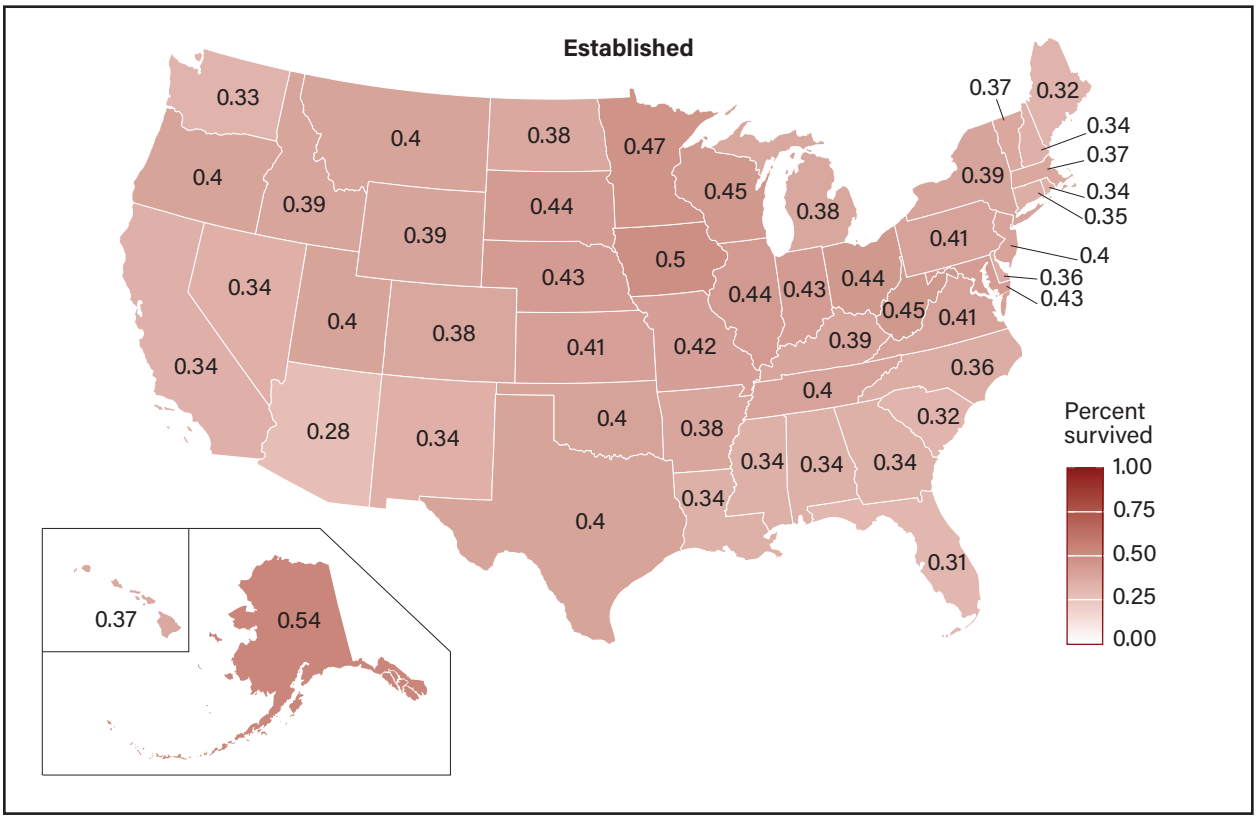


Figure 13 (cont.)

Map of the survival rate of beginning and established U.S. farm operations by State, 2012–2022



All beginning (N = 401,579) = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning (N = 141,905) = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established (N = 1,565,819) = all producers having more than 10 years of experience on any farm or ranch.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2012 and 2022.

Land Tenure

Across all farm sizes and types, operations that owned some but not all of the land they operate (part owners) had higher survival rates than full owners and full renters (table 4). When compared to full owner operations of the same size, survival rates of part owners ranged from 8 to 10 percentage points higher for all beginning operations, 8 to 13 percentage points higher for multigenerational beginning operations, and 10 to 14 percentage points higher for established operations.

When comparing survival rates for operations that owned all the land they operate (full owners) and those that rented all the land they operate (full tenants), differences were smaller and significant only for some scales of production. For the smallest farm size, all beginning and established full tenant operations had 2 percentage points lower survival rates compared to full owner operations. As scale increased to GCFI $75,000 to $999,999, full tenant operations generally had higher survival rates than full owner operations of the same size. Survival rates for full tenant all beginning operations were 3 to 7 percentage points higher when compared to full owner operations, and survival rates for full tenant established operations were 2 to 4 percentage points higher. For multigenerational beginning operations, the only statistically significant difference was for operations with GCFI $75,000 to $349,999, where full tenant operations had survival rates 3 percentage points higher when compared to full owner operations. For the largest operations, there were no statistically significant differences in survival rates when comparing full tenant and full owner operations.

Table 4

Percent of U.S. farm operations that survived from 2012–2022 by land tenure and gross cash farm income

	All beginning			Multigenerational beginning			Established		
	Full owner	Part owner	Full tenant	Full owner	Part owner	Full tenant	Full owner	Part owner	Full tenant
$0–$74,999	0.321	0.408***	0.304***	0.334	0.448***	0.325	0.340	0.479***	0.318***
$75,000–$349,999	0.397	0.473***	0.427***	0.400	0.497***	0.426**	0.420	0.523***	0.439***
$350,000–$999,999	0.423	0.520***	0.489***	0.470	0.547***	0.471	0.454	0.569***	0.497***
$1 million or more	0.537	0.615***	0.510	0.508	0.639***	0.537	0.541	0.643***	0.555

All beginning (N = 401,579) = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning (N = 141,905) = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established (N = 1,565,819) = all producers having more than 10 years of experience on any farm or ranch.

Note: Full owners own all the land they operate, part owners own a portion of the land they operate and rent a portion, and full tenant operations rent all of the acres they operate. N represents the number of operations in each category in 2012. Asterisks indicate statistically significant differences when comparing survival rates within farm type and income category to full owner, p-value<0.01***, <0.05**, <0.1*.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2012 and 2022.

Market Differentiation

For established operations of all farm size categories, operations with differentiated market sales (sales in local food markets, value-added product sales, organic product sales, or income from agri-tourism or recreational services) had higher average survival rates than those without differentiated sales (table 5*).* These differences were largest for the smaller operations. Similarly, multigenerational beginning operations, except for operations with GCFI $1 million or more, that had differentiated sales had higher survival rates than those that did not, ranging from 4 to 6 percentage points higher. Small scale all beginning operations (GCFI less than $350,000) had survival rates 3 percentage points higher if they had differentiated sales than if they did not, but there were no statistically significant differences for larger operations.

Table 5

Survival rates for U.S. farm operations with and without differentiated sales by farm income, 2012–2022

	All beginning		Multigenerational beginning		Established	
	No differentiated sales	Differentiated sales	No differentiated sales	Differentiated sales	No differentiated sales	Differentiated sales
$0–$74,999	0.326	0.358***	0.346	0.410***	0.352	0.447***
$75,000–$349,999	0.426	0.457***	0.437	0.496***	0.466	0.528***
$350,000–$999,999	0.490	0.484	0.515	0.555**	0.537	0.587***
$1 million or more	0.566	0.553	0.596	0.601	0.612	0.635***

All beginning (N = 401,579) = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning (N = 141,905) = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established (N = 1,565,819) =

all producers having more than 10 years of experience on any farm or ranch.

Note: Operations with differentiated sales are those with sales in local food marketing channels (including direct-to-consumer and intermediated), sales of value-added products, sales of organically produced commodities, or income from agritourism and recreational services. Asterisks indicate statistically significant differences to operations with no differentiated sales within each income category at p-value <0.01***, < 0.05**, < 0.1*.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2012 and 2022.

Crop Insurance

Across all crop commodity specialization categories,[17] farms with crop insurance had higher survival rates than those without crop insurance (table 6). The difference in survival rates between operations with and without crop insurance was largest for established operations, followed by multigenerational beginning and all beginning operations.

For some commodity specializations, having crop insurance was associated with an increase in the likelihood of surviving. For field crop producers, having crop insurance was associated with 8 percentage points higher survival rates for all beginning, and 10 for both multigenerational beginning and established operations. For fruit and vegetable producers, crop insurance was associated with 8, 9, and 11 percentage points higher survival rates for all beginning, multigenerational beginning, and established operations, respectively. For farms with other crops as their primary commodity, all beginning operations had a 2 percentage points higher survival rate if they had Federal crop insurance, while the survival rate was 8 percentage points higher for both multigenerational beginning and established operations.

Table 6
Survival rates for U.S. crop farms with and without Federal crop insurance by primary commodity specialization, 2012–2022

	All beginning		Multigenerational beginning		Established	
	Without Federal crop insurance	With Federal crop insurance	Without Federal crop insurance	With Federal crop insurance	Without Federal crop insurance	With Federal crop insurance
Field crop	0.377	0.461***	0.395	0.495***	0.408	0.512***
Fruit/vegetables	0.300	0.380***	0.362	0.448***	0.336	0.449***
Other crops	0.322	0.341**	0.337	0.415***	0.326	0.409***

All beginning (N = 401,579) = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning (N = 141,905) = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established (N = 1,565,819) = all producers having more than 10 years of experience on any farm or ranch.

Note: Primary commodities include field crops (grains, oilseeds, dry beans, dry peas, tobacco, cotton); fruit and vegetables (vegetables, melons, potatoes, sweet potatoes, fruit, tree nuts, and berries); and other crops (nursery, greenhouse, floriculture, sod, cut Christmas trees, short rotation woody crops, grass seed, hay and grass silage, hops, maple syrup, mint, peanuts, sugarcane, sugar beets, etc.). Asterisks indicate statistically significant differences to operations with no crop insurance within each category at p-value <0.01***, < 0.05**, < 0.1*.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2012 and 2022.

[17] Livestock and dairy operations were excluded as the focus of this section is on Federal crop insurance.

Government Payments

Government payments include all funding from Federal agricultural programs except those related to crop or livestock insurance or credit. Across all farm sizes and farm types, except multigenerational beginning operations with GCFI of $75,000 to $349,999, statistically significant higher survival rates were found for operations that received Government payments compared to those that did not (table 7). For the smallest and largest operations, the difference in survival rates between recipients and nonrecipients was largest for beginning operations. For very small-scale operations, those with GCFI of less than $75,000, all beginning operations that received Government payments were 6 percentage points more likely to survive than those without payments, compared to 4 and 3 percentage points for multigenerational beginning and established operations, respectively. For the largest farms, those with GCFI of $1 million or more, the largest difference in survival rates was for multigenerational beginning operations. Multigenerational beginning operations that received Government payments were 12 percentage points more likely to survive than operations that did not receive Government payments, compared to 5 and 8 percentage points for all beginning and established operations, respectively. Small scale operations, those with GCFI between $75,000 and $349,999, that received Government payments were 3 to 5 percentage points more likely to survive than those that did not. For operations with GCFI between $350,000 and $999,999, survival rates were 2 to 7 percentage points higher for operations that received Government payments.

All beginning operations received fewer Government payments within each gross cash farm income category compared to multigenerational beginning and established operations (table 2). Given the positive association between receiving Government payments and survival rates, this discrepancy could be a factor in the overall lower survival rates for all beginning operations.

Table 7
Survival rates for U.S. operations that did and did not receive Government payments by farm income, 2012–2022

	All beginning		Multigenerational beginning		Established	
	No Government payments	Government payments	No Government payments	Government payments	No Government payments	Government payments
$0–$74,999	0.318	0.375***	0.347	0.385***	0.353	0.385***
$75,000–$349,999	0.411	0.444***	0.439	0.452	0.436	0.488***
$350,000–$999,999	0.457	0.502***	0.504	0.525*	0.480	0.553***
$1 million or more	0.533	0.586***	0.512	0.628***	0.554	0.632***

All beginning (N = 401,579) = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning (N = 141,905) =as one or more but not all producers having no more than 10 years of experience on any farm or ranch; established (N = 1,565,819) = all producers having more than 10 years of experience on any farm or ranch.

Note: Asterisks indicate statistically significant differences when comparing operations that receive Government program payments to operations that do not receive Government program payments within each income category at p-value <0.01***, < 0.05**, < 0.1*.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2012 and 2022.

In addition to comparing survival rates for operations based on receipt of Government payments, survival rates based on the share of Government payments in farm sales were also compared. Following Key (2022a), the Government payments share is defined as the ratio of Government payments to Government payments plus total GCFI. This ratio ranges from 0 to 1, with 0 meaning no

use of Government payments and 1 meaning all GCFI is derived from payments. The report authors defined four categories of the Government payment share: none (no Government payments), low (0 < payments share < 0.5), high (0.5 payment share <1), and very high (payment share = 1).

Across farm types and sizes, survival rates were generally highest for operations with a low or high Government payment share and lower for operations receiving no Government payments or those with a very high share (table 8). Farms in the very high payment share category had no gross income from commodity sales. This category includes farms that had land enrolled in set-aside programs, such as the Conservation Reserve Program (CRP), as well as farms that had crop failures resulting in no production in the Census year. Both types of farms could be expected to have lower survival rates for different reasons. Operations in set-aside programs such as the CRP may include more older producers who were more likely to retire within 10 years (the period of analysis). Crop failures could create financial stress for the farm, and thus be associated with an increased likelihood of farm business exit.

Table 8
Survival rates of U.S. farm operations by Government payments share, 2012–2022

	All beginning				Multigenerational beginning				Established			
	None	Low	High	Very high	None	Low	High	Very high	None	Low	High	Very high
$0–$74,999	0.318	0.405***	0.381***	0.303***	0.347	0.411***	0.373**	0.283***	0.353	0.424***	0.362***	0.280***
$75,000–$349,999	0.411	0.445***	0.353	0.469	0.439	0.453	0.336*	0.346	0.436	0.489***	0.440	0.330**
$350,000–$999,999	0.457	0.502**	(D)	(D)	0.504	0.526*	(D)	(D)	0.480	0.553***	(D)	(D)
$1 million or more	0.533	0.586*	(D)	(D)	0.512	0.628***	(D)	(D)	0.554	0.632***	(D)	(D)

All beginning (N = 401,579) = all producers having no more than 10 years of experience on any farm or ranch; any beginning (N = 141,905) = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established (N = 1,565,819) = all producers having more than 10 years of experience on any farm or ranch.

Note: Government payments share is payments divided by payments plus sales. Government payment share categories are: None: no Government payments; Low: payment share >0 and <0.5; High: payment share ≥0.5 and <1; Very high: payment share is one. (D) represents a statistic with a very small sample size that did not meet the disclosure rules set forth by the USDA, National Agricultural Statistics Service. Asterisks indicate statistically significant differences to operations with no Government program payments within each income category at p-value <0.01***, < 0.05**, < 0.1*.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2012 and 2022.

Research Caveats

Given the many factors associated with farm survival, a correlation between survival and a single factor might provide an incomplete or misleading picture. For example, the data showed that larger farms are more likely to survive than smaller farms and that farms with crop insurance are more likely to survive than farms without crop insurance. However, since producers of larger farms are more likely to have crop insurance, it is not clear from the summary statistics whether, or by how much, each factor affects farm survival.

To identify the effect of individual factors on survival, the authors conducted a simple probit regression on farm survival (1 if survived, 0 otherwise), with the factors discussed above as explanatory variables (plus demographic characteristics of the producers). While probit regressions do not prove causation, they illustrate the effect of each variable individually, holding the other factors constant. The estimated marginal effects from the probit regressions confirm the correlations shown in the descriptive statistics in the previous section. The probit results are discussed in the appendix and shown in table A.3.

Conclusion

Using data from the USDA, National Agricultural Statistics Service, Census of Agriculture, this report provided a statistical overview of the characteristics of beginning U.S. farmers and the farms they operated in 2022. To help identify factors associated with farm business success, the report compared the characteristics of farms that survived in business from 2012 to 2022 by farm size (using gross cash farm income categories) and beginning farm status.

The study distinguishes between two types of farms with beginning farmers and ranchers (BFRs): those on which one or more, but not all, producers were BFRs (multigenerational beginning) and those on which all producers were BFRs. Results indicate that these two types of beginning farms differ in important ways, likely reflecting underlying differences in farm household structure and the ownership and transfer of farm assets.

In general, the data show that farms where at least one but not all producers are BFRs more closely resemble operations with no BFRs than farms having only BFRs. For example, compared to the two types of farms that include at least some experienced producers, operations with only BFRs tend to be smaller. Comparing within size categories, operations with only BFRs are more likely to rent all the land they operate, participate in differentiated market channels, and have fewer assets and Government payment receipts.

These data also show important differences in the rates of farm survival between farm types. Both types of farms with BFRs have survival rates that are lower than similar operations with no BFRs. However, operations with only BFRs have 10-year survival rates that are 2 to 3 percentage points lower than similarly sized operations that have BFRs and more experienced operators, depending on the size of the operation.

The observed differences between operations with only BFRs and those that also have experienced producers suggest important underlying differences in the organization and structure of these farms and farm households. On many multigenerational family farms, beginning producers would likely have access to family farmland and equipment, and they could learn farm production and manage-

ment skills from more experienced relatives. By contrast, farms with only BFRs are more likely to have producers who have less experience and who inherited fewer farm assets. Our results showed that these farms tend to be smaller and have fewer assets. These characteristics suggest farms with only BFRs are more vulnerable to financial shocks, as reflected in their lower survival rates.

The findings suggest that different types of operations have different needs, for example, in the areas of credit assistance and technical training. BFRs may face greater challenges in securing credit because they tend to be younger and less likely to have established sales and cash flow records or sufficient collateral to secure loans. The study found that farms with only BFRs borrowed less (had lower interest expenses) than similarly sized farms with BFRs and more experienced operators.

The USDA, Farm Service Agency (FSA) addresses beginning farmers' unmet needs for credit by providing loans directly to producers and facilitating federally guaranteed loans made through commercial lenders. However, a substantial share of beginning farmers may not meet FSA's loan eligibility criteria, which requires that applicants be unable to obtain credit through commercial lenders despite having a good credit history and a feasible business plan. Dodson and Ahrendsen (2016) estimated that less than half of all beginning farms were likely eligible for FSA credit programs at the end of 2014. In addition, FSA loans that target beginning farmers are often capped. Tulman et al. (2016) found that beginning operations received the largest share of all FSA microloans, which target small scale and beginning farmers and those involved in direct marketing. However, these microloans were capped at $50,000 for a farm ownership loan and $50,000 for an operating loan in 2023, so they may not meet the financing needs of some operations. Additional research could improve understanding of the unmet financial needs of beginning farmers and improve the design of programs targeting them.

This study identified several farm and producer characteristics associated with farm business survival. The results indicate that farmers who depend more on Government payments tend to have higher rates of farm business survival. This finding is consistent with other research that found that agricultural program payments are associated with an increase in the likelihood and duration of farm business survival of crop farms (Key & Roberts, 2006, 2007) and farms operated by BFRs (Key, 2022a).

The results suggest that Government payments may play a role in improving BFR outcomes and hence business survival. Higher Government payments raise net returns, which could reduce the likelihood of financial insolvency and allow farms to remain in business longer. Higher payments could also make agriculture more profitable relative to alternative occupations, which could reduce the incentive to quit farming, especially if off-farm occupations are in different locations or require a significant degree of specialization. Commodity program payments provide cash, some degree of insurance (due to links with commodity prices), and sometimes a means to leverage greater resources from lending institutions, all of which may lower farmers' capital costs. By lowering capital costs, Government payments may allow beginning farmers who are more likely to face borrowing constraints to more easily adopt new technologies and expand in scale, become more profitable and, consequently, remain in business longer.

Results also show that farms with differentiated market sales (organic, local foods, value-added, and agrotourism) are more likely to survive for at least 10 years compared to similar farms without these sales. Some differentiated markets require relatively labor-intensive practices (Jablonski et al., 2021). Consequently, producing for differentiated markets may require less capital and land to attain a certain level of farm sales, given price premiums and a higher share of the food dollar retained by operations participating in these markets (Low et al., 2015). This may reduce the need for debt, which would lessen the farm's risk of default. Using differentiated markets may also provide beginning farmers with a more predictable source of income. For example, farmers who participate in local food markets or agritourism likely derive a greater portion of their farm income from the time they spend

interacting with and providing services to customers. This source of income may remain relatively stable even when input and commodity prices vary (Key, 2024).

While the empirical literature on the connection between local food market participation and farm performance is mixed, recent research suggests that the use of local food markets—and direct-to-consumer sales in particular—are associated with success for beginning farms (Key, 2024). This implies that beginning farms could benefit from policies that promote local food markets. The USDA has worked to increase the number of beginning farmers who sell directly to consumers using programs that promote the formation and expansion of local food sales. For example, the 2018 Farm Bill combined the Farmers' Market and Local Food Promotion Program and the Value-Added Agricultural Product Market Development Grants into the Local Agriculture Market Program. It reserved 10 percent of its grant funding for beginning farmers (CRS, 2019).

The study found that across almost all commodity specialization categories, crop farms with Federal crop insurance had a higher survival rate than those without crop insurance. Since crop insurance is a risk management tool, it could promote business survival by helping farmers cope with production shocks. Crop insurance may help farmers obtain credit and is sometimes required to get an operating loan (DeLay et al., 2023). The data showed that among farms that produced fruits and vegetables, crop insurance uptake rates were lower for those operated by only BFRs. This suggests it might be possible to increase insurance uptake by BFRs through enhanced targeting and outreach by the Risk Management Agency, particularly to BFRs that produce specialty crops (Jablonski et al., 2022a, 2022c).

Results also indicate that land tenure arrangements are associated with farm business survival. Farms that rented some of their land had higher rates of survival than those that either owned or rented all their land. Beginning farmers face several challenges to increasing their access to land, including access to credit and lack of available land to rent or buy (Callahan & Hellerstein, 2022). To facilitate access to land, the FSA administers the Transition Incentives Program, which provides retired or retiring landowners with additional payments for expiring Conservation Reserve Program contracts if they agree to sell or rent their land to a producer as defined in 7 CFR 1410.64 (USDA, FSA, 2019).

References

Ahearn, M. C. (2011). Potential challenges for beginning farmers and ranchers. *Choices*, *26*(2).

Ahearn, M., & Newton, D. (2009). *Beginning farmers and ranchers* (Report No. EIB-53). U.S. Department of Agriculture, Economic Research Service.

Bauman, A., Thilmany McFadden, D., & Jablonski, B. B. R. (2019). Evaluating scale and technical efficiency among farms and ranches with a local market orientation. *Renewable Agriculture and Food Systems.*

Bauman, A., Thilmany McFadden, D., & Jablonski, B. B. R. (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.

Bigelow, D., Borchers, A., & Hubbs, T. (2016). *U.S. farmland ownership, tenure, and transfer* (Report No. EIB-161). U.S. Department of Agriculture, Economic Research Service.

Callahan, S., & Hellerstein, D. (2022, December). *Access to farmland by beginning and socially disadvantaged farmers: Issues and opportunities* (Report No. AP-096). U.S. Department of Agriculture, Economic Research Service.

Carlson, A., Greene, C., Skorbiansky, S. R., Hitaj, C., Ha, K., Cavigelli, M., Ferrier, P., & McBride, W. (2023). *U.S. organic production, markets, consumers, and policy, 2000–21* (Report No. ERR-315). U.S. Department of Agriculture, Economic Research Service.

Congressional Research Service. (2019). 2018 Farm Bill primer: Beginning farmers and ranchers. *In Focus*, (IF11227).

DeLay, N. D., Brewer, B., Featherstone, A., & Boussios, D. (2023). The impact of crop insurance on farm financial outcomes. *Applied Economic Perspectives and Policy, 45*(10), 579–601.

Deller, S. C., & Conroy T. (2017). Business survival rates across the urban–rural divide. *Community Development, 48*(1), 67–85.

Dodson, C. B., & Ahrendsen, B. L. (2016), Beginning farmer credit and the Farm Service Agency's role. *Choices.* Available online.

Farm Credit. (2020). *Farm Credit's commitment to young, beginning and small farmers grew in 2019.* Available online.

Francis, D. V., Chelwa, G., Hamilton, D., Mitchell, T. W., Rosenberg, N. A., & Stucki, B. W. (2023). The contemporary relevance of historic black land loss. *American Bar Association*, *48*(2).

Freedgood, J., Hunger, M., Dempsey, J., & Sorensen, A. (2020). *Farms under threat: The state of the States.* American Farmland Trust.

Jablonski, B. B. R., Key, N., Hadrich, J., Bauman, A., Campbell, S., Thilmany, D., & Sullins, M. (2022a). Opportunities to support beginning farmers and ranchers in the 2023 Farm Bill. *Applied Economics Perspectives and Policy, 41*, 1177–1194.

Jablonski, B. B. R., Hadrich, J., Bauman, A., Sullins, M., & Thilmany, D. (2022b). The profitability implications of sales through local food market channels for beginning farmers and ranchers. *Agricultural Finance Review, 82*(3), 559–576.

Jablonski, B. B. R., Hadrich, J., & Bauman, A. (2022c). The role of Federal crop insurance for farms and ranches that sell through local food markets. *Agricultural Finance Review, 82*(1), 113–132.

Jablonski, B. B. R., Bauman, A., & Thilmany, D. (2021). Local food market orientation and labor intensity. *Applied Economic Perspectives and Policy, 43*(3), 916–934.

Jablonski, B. B. R., Sullins, M., & McFadden, D. T. (2019). Community supported agriculture marketing performance: Results from pilot market channel assessments in Colorado. *Sustainability, 11*, 2950.

Jablonski, B. B. R., McFadden, D. T., Sullins, M., & Curtis, K. (2017). Determinants of effective beginning farmer programming: implications for emerging USDA programs. *Journal of Agricultural and Resource Economics, 42*(3), 427–438.

Katchova, A., & Ahearn, M. (2016). Dynamics of farmland ownership and leasing: Implications for young and beginning farmers. *Applied Economic Perspectives and Policy, 38*(2), 334–350.

Katchova, A., & Ahearn, M. (2017). Farm entry and exit from U.S. agriculture. *Agricultural Finance Review, 77*(1), 50–63.

Kauffman, N. S. (2013). Credit markets and land ownership for young and beginning farmers. *Choices, 28*(2), 1–5.

Key, N. (2022a). The determinants of beginning farm success. *Journal of Agricultural and Applied Economics, 54*(2), 199–223.

Key, N. (2022b). Credit constraints and the survival and growth of beginning farms. *Agricultural Finance Review, 82*(3), 448463

Key, N. (2024). Direct to Consumer Marketing and the Survival and Growth of Beginning Farms. *Journal of Agricultural and Resource Economics, 49*(1), 81–101.

Key, N., & Lyons, G. (2019). *An overview of beginning farms and farmers* (Report No. EB-29). U.S. Department of Agriculture, Economic Research Service.

Key, N., & Roberts, M. J. (2007). Do government payments influence farm size and survival? *Journal of Agricultural and Resource Economics, 32*(2), 330–348.

Key, N., & Roberts, M. J. (2006). Government payments and farm business survival. *American Journal of Agricultural Economics, 88*(2), 382–392.

Kim, Y., Yu, J., & Pendell, D. L. (2020). Effects of crop insurance on farm disinvestment and exit decisions. *European Review of Agricultural Economics, 47*(1), 324–347.

Litkowski, C., Giri, A. K., Subedi, D., Whitt, C., Todd, J. E. (2021, September 7). Off-farm income a major component of total income for most farm households in 2019. *Amber Waves*, U.S. Department of Agriculture, Economic Research Service.

Low, S. A., Adalja, A., Beaulieu, E., Key, N., Martinez, S., Melton, A., Perez, A., Ralston, K., Stewart, H., Suttles, S., Vogel, S., & Jablonski, B. B. R. (2015). *Trends in U.S. local and regional food systems* (Report No. AP-67). U.S. Department of Agriculture, Economic Research Service.

MacDonald, J. M., Korb, P., & Hoppe, R. A. (2013). *Farm size and the organization of U.S. crop farming* (Report No. ERR-152). U.S. Department of Agriculture, Economic Research Service.

Nadolnyak, D., Hartarska, V., & Griffin, B. (2019). The impacts of economic, demographic, and weather factors on the exit of beginning farmers in the United States. *Sustainability, 11*, 4280.

O'Donoghue, E. J., Roberts, M. J., & Key, N. (2009). Did the Federal Crop Insurance Reform Act alter farm enterprise diversification? *Journal of Agricultural Economics, 60*(1), 80–104.

Schilling, B. J., Attavanich, W., & Jin., Y. 2014. Does agritourism enhance farm profitability? *Journal of Agricultural and Resource Economics, 39*(1), 69–87.

Sommer, J. E., Hoppe, R. A., Green, R .C., & Korb, P. J. (1995). *Structural and financial characteristics of U.S. farms, 1995: 20th annual Family Farm Report to Congress* (Report No. AIB-746). U.S. Department of Agriculture, Economic Research Service.

Thilmany, D., Bauman A., Hadrich, J., Jablonski, B. B. R., & Sullins, M. (2021). Unique financing strategies among beginning farmers and ranchers: Differences among multi-generational and beginning operations. *Agricultural Finance Review, 82*(2).

Tulman, S., Higgins, N., Williams, R., Gerling, M., Dodson, C., & McWilliams, B. (2016). *USDA microloans for farmers: Participation patterns and effects of outreach* (Report No. ERR-222). U.S. Department of Agriculture, Economic Research Service.

U.S. Department of Agriculture. (2019). *2017 census of agriculture data now available* (Press release No. 0051.19).

U.S. Department of Agriculture. (2021). *New farmers fact sheet*.

U.S. Department of Agriculture, Farm Service Agency. (2019). *Conservation Reserve Program—transition incentives program fact sheet*.

U.S. Department of Agriculture, Farm Service Agency. (2023). *Beginning farmers' and ranchers' loans.*

U.S. Department of Agriculture, National Agricultural Statistics Service. (2012). *2012 Census of Agriculture appendix B*.

U.S. Department of Agriculture, National Agricultural Statistics Service. (2014). *2012 Census of Agriculture highlights, beginning farmers, characteristics of farmers by years on current farm*.

U.S. Department of Agriculture National Agricultural Statistics Service. (2016). *2017 Census of Agriculture, 2017 report forms, instructions, guide, general* (Form No. 17-A100).

U.S. Department of Agriculture, National Agricultural Statistics Service. (2017). *2017 Census of Agriculture appendix B*.

U.S. Department of Agriculture, National Agricultural Statistics Service. (2020). *2017 Census of Agriculture highlights, new and beginning producers* (Report No. ACH17-23).

U.S. Department of Agriculture, National Agricultural Statistics Service (2024). *2022 Census of Agriculture, United States Summary and State Data, Volume 1, Geographic Area Series, Part 51* (Report No. AC-22-A-51).

U.S. Department of Agriculture, Natural Resources Conservation Service. (2023). *New and beginning farmer and rancher: National fact sheets, beginning farmers and rancher benefits for crop insurance.*

U.S. Department of Agriculture, Risk Management Agency. (2020). *Beginning farmer and rancher benefits for crop insurance: Fact sheet.*

Whitt, C., Low, S. A., & Van Sandt, A. (2019, November 4). Agritourism allows farms to diversify and has potential benefits for rural communities. *Amber Waves*, U.S. Department of Agriculture, Economic Research Service.

Appendix

T-tests For All Figures Comparing All Beginning and Any Beginning to Established

Table A.1A

Percent of U.S. operations in each gross cash farm income category, 2022

Gross cash farm income	All beginning (N = 443,426)	Multigenerational beginning (N = 186,690)	Established (N = 1,270,371)
$0–$74,999	0.865***	0.672***	0.722
$75,000–$349,999	0.094***	0.170***	0.148
$350,000–$999,999	0.030***	0.086***	0.073
$1 million or more	0.011***	0.072***	0.057

All beginning = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established = all producers having more than 10 years of experience on any farm or ranch.

Note: The t-test is a statistical test of the null hypothesis that the means of established farms and either all beginning, or multigenerational beginning farms are equal (within each farm size category). Asterisks indicate the probability that the observed difference in means was due to chance if the null hypothesis were true: p-value <0.01***, < 0.05**, < 0.1*.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2022.

Table A.1B

Percent of U.S. operations in each farm acreage category, 2022

Acres	All beginning (N = 443,426)	Multigenerational beginning (N = 186,690)	Established (N = 1,270,371)
1–9	0.200***	0.106***	0.099
10–49	0.379***	0.249***	0.277
50–179	0.259***	0.277***	0.286
180–499	0.099***	0.175***	0.167
500–999	0.032***	0.079***	0.072
1,000–1,999	0.017***	0.052***	0.047
2,000 or more	0.013***	0.061***	0.052

All beginning = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established = all producers having more than 10 years of experience on any farm or ranch.

Note: The t-test is a statistical test of the null hypothesis that the means of established farms and either all beginning, or multigenerational beginning farms are equal (within each farm size category). Asterisks indicate the probability that the observed difference in means was due to chance if the null hypothesis were true: p-value <0.01***, < 0.05**, < 0.1*.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2022.

Table A.1C

Percent of U.S. farms by primary commodity category, 2022

	All beginning (N = 443,426)	Multigenerational beginning (N = 186,690)	Established (N = 1,270,371)
Field crop	0.120***	0.194**	0.197
Fruit/vegetables	0.095***	0.087***	0.063
Other crops	0.260***	0.237***	0.257
Livestock	0.341	0.328***	0.342
Dairy	0.006***	0.021***	0.013
Poultry	0.070***	0.039***	0.029
Other animal	0.109***	0.094***	0.098

All beginning = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established = all producers having more than 10 years of experience on any farm or ranch.

Note: The t-test is a statistical test of the null hypothesis that the means of established farms and either all beginning, or multigenerational beginning farms are equal (within each commodity category). Asterisks indicate the probability that the observed difference in means was due to chance if the null hypothesis were true: p-value <0.01***, < 0.05**, < 0.1*.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2022.

Table A.1D

Percent of U.S. operations with crop insurance by farm income and commodity specialization, 2022

	$0–$74,999 (N = 1,426,582)			$75,000–$349,999 (N = 261,222)			$350,000–$999,999 (N = 122,263)			$1 million or more (N = 90,420)		
	All beginning	Multigen-erational beginning	Established	All beginning	Multigen-erational beginning	Established	All beginning	Multigen-erational beginning	Established	All beginning	Multigen-erational beginning	Established
Field crops	0.436***	0.446***	0.389	0.822***	0.785**	0.774	0.933***	0.905***	0.919	0.947***	0.963	0.960
Fruit/ vegetables	0.052***	0.084***	0.066	0.308***	0.353***	0.392	0.576***	0.592***	0.638	0.700	0.771***	0.735
Other crops	0.050**	0.069***	0.048	0.207	0.204	0.213	0.380**	0.340***	0.417	0.518	0.471***	0.550

All beginning = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established = all producers having more than 10 years of experience on any farm or ranch.

Note: The t-test is a statistical test of the null hypothesis that the means of established farms and either all beginning, or multigenerational beginning farms are equal (within each commodity category). Asterisks indicate the probability that the observed difference in means was due to chance if the null hypothesis were true: p-value <0.01***, < 0.05**, < 0.1*.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2022.

Table A.1E

Percent of U.S. operations with differentiated sales by beginning status, 2022

	All beginning (N = 443,426)	Multigenerational beginning (N = 186,690)	Established (N = 1,270,371)
Organic sales	0.016***	0.023***	0.011
Local food sales	0.125***	0.103***	0.064
Agritourism	0.016***	0.026***	0.013
Value-added sales	0.032***	0.031***	0.014

All beginning = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established = all producers having more than 10 years of experience on any farm or ranch.

Note: The t-test is a statistical test of the null hypothesis that the means of established farms and either all beginning, or multigenerational beginning farms are equal (within each differentiated sales category). Asterisks indicate the probability that the observed difference in means was due to chance if the null hypothesis were true: p-value <0.01***, < 0.05**, < 0.1*.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2022.

Table A.1F

Percent of U.S. operations with each characteristic, 2022

	All beginning (N = 443,426)	Multigenerational beginning (N = 186,690)	Established (N = 1,270,371)
Young	0.232***	0.446***	0.028
Senior	0.209***	0.477***	0.591
Female	0.641***	0.795***	0.534
Veteran	0.147***	0.198***	0.208
Majority off-farm	0.794***	0.797***	0.582

All beginning = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established = all producers having more than 10 years of experience on any farm or ranch.

Note: Young (age <35), Senior (age ≥65), Veteran (have served or is serving in the military), majority off-farm (1 if at least one operator spent more than 50 percent of their worktime on work other than farming or ranching, 0 otherwise). The t-test is a statistical test of the null hypothesis that the means of established farms and either all beginning, or multigenerational beginning farms are equal (within each producer category). Asterisks indicate the probability that the observed difference in means was due to chance if the null hypothesis were true: p-value <0.01***, < 0.05**, < 0.1*.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2022.

Table A.1G

Percent of U.S. operations for each race/ethnicity by farm type, 2022

	All beginning (N = 443,426)	Multigenerational beginning (N = 186,690)	Established (N = 1,270,371)
Black	0.019***	0.018***	0.016
Hispanic	0.060***	0.062***	0.036
Asian	0.017***	0.014***	0.007
Native Hawaiian	0.004***	0.005***	0.002
American Indian	0.031***	0.039***	0.029
White only, non-Hispanic	0.848***	0.644***	0.888

All beginning = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established = all producers having more than 10 years of experience on any farm or ranch.

Note: The t-test is a statistical test of the null hypothesis that the means of established farms and either all beginning, or multigenerational beginning farms are equal (within each demographic category). Asterisks indicate the probability that the observed difference in means was due to chance if the null hypothesis were true: p-value <0.01***, < 0.05**, < 0.1*.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2022.

Table A.1H

Percent of U.S. operations that survived from 2012–2022, by beginning farmer and rancher status

	All beginning	Multigenerational beginning	Established
2012–2017	0.488***	0.556***	0.571
2017–2022	0.466***	0.518***	0.543
2012–2022	0.345***	0.396***	0.399

All beginning = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established = all producers having more than 10 years of experience on any farm or ranch.

Note: The t-test is a statistical test of the null hypothesis that the means of established farms and either all beginning, or multigenerational beginning farms are equal (within each period). Asterisks indicate the probability that the observed difference in means was due to chance if the null hypothesis were true: p-value <0.01***, < 0.05**, < 0.1*.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2012, 2017, and 2022.

Table A.1I

Percent of U.S. operations that survived from 2012–2022, by farm type (2012) and scale (gross cash farm income and acres in 2012)

	All beginning (N = 401,579)	Multigenerational beginning (N = 141,905)	Established (N = 1,565,819)
Gross cash farm income			
$0–$74,999	0.331***	0.357***	0.363
$75,000–$349,999	0.430***	0.447***	0.473
$350,000–$999,999	0.490***	0.520***	0.540
$1 million or more	0.565***	0.597***	0.613
Acres operated			
1–9	0.253***	0.277	0.271
10–49	0.329***	0.345**	0.338
50–179	0.382***	0.393**	0.401
180–499	0.398***	0.437***	0.450
500–999	0.403***	0.463***	0.481
1,000–1,999	0.418***	0.498	0.509
2,000 or more	0.477***	0.551	0.554

All beginning = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established = all producers having more than 10 years of experience on any farm or ranch.

Note: The t-test is a statistical test of the null hypothesis that the means of established farms and either all beginning, or multigenerational beginning farms are equal (within each farm size category). Asterisks indicate the probability that the observed difference in means was due to chance if the null hypothesis were true: p-value <0.01***, < 0.05**, < 0.1*.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2012 and 2022.

Table A.1J

Percent of U.S. operations that survived from 2012–2022, by farm type (2012) and primary commodity (2012)

	All beginning (N = 401,579)	Multigenerational beginning (N = 141,905)	Established (N = 1,565,819)
Field crop	0.424***	0.462***	0.474
Fruit/vegetables	0.307***	0.380***	0.357
Other crops	0.323***	0.343***	0.331
Livestock	0.364***	0.413***	0.436
Poultry	0.347***	0.420	0.423
Other animal	0.268***	0.313*	0.304
Dairy	0.474***	0.497**	0.514

All beginning = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established = all producers having more than 10 years of experience on any farm or ranch.

Note: The t-test is a statistical test of the null hypothesis that the means of established farms and either all beginning, or multigenerational beginning farms are equal (within each commodity category). Asterisks indicate the probability that the observed difference in means was due to chance if the null hypothesis were true: p-value <0.01***, < 0.05**, < 0.1*.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2012 and 2022.

Geographic Distribution of the Share of Farms by Beginning Status

Figure A.1

All beginning, any beginning, and established as a percent of total U.S. producers in each State, 2022

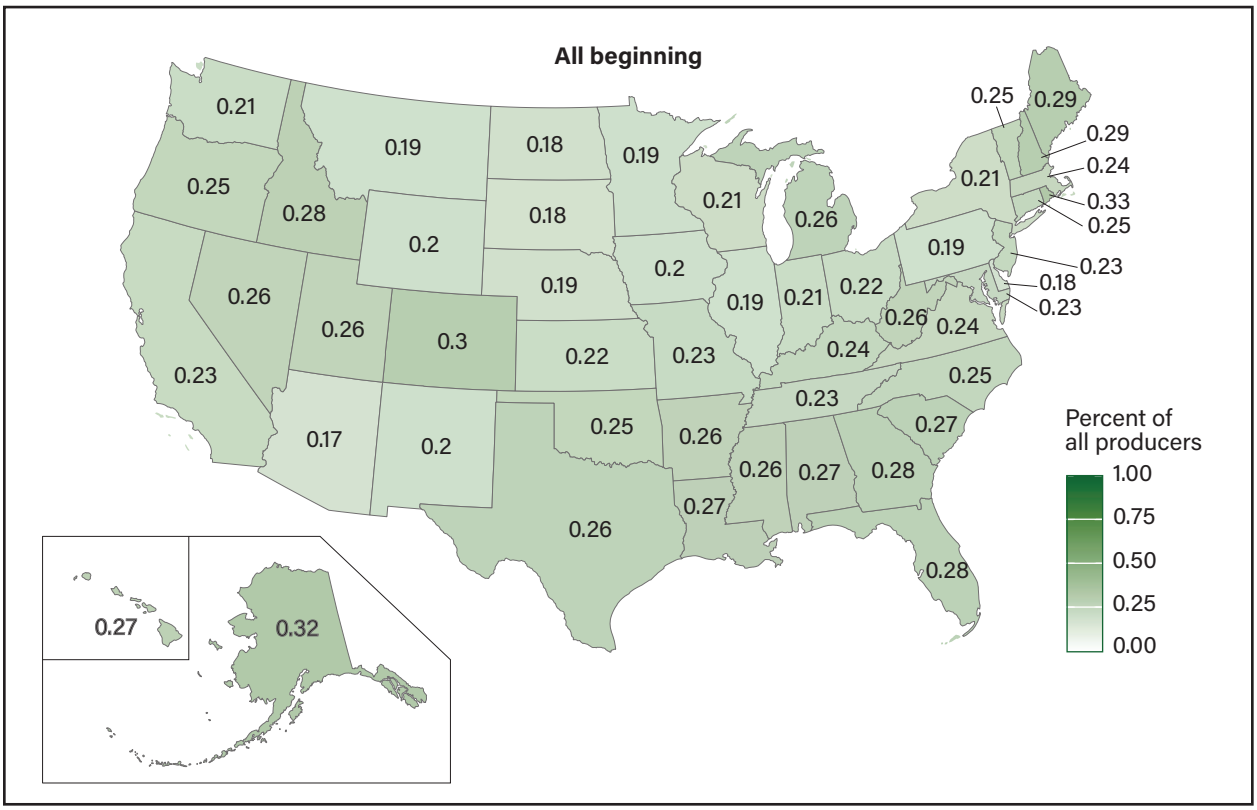
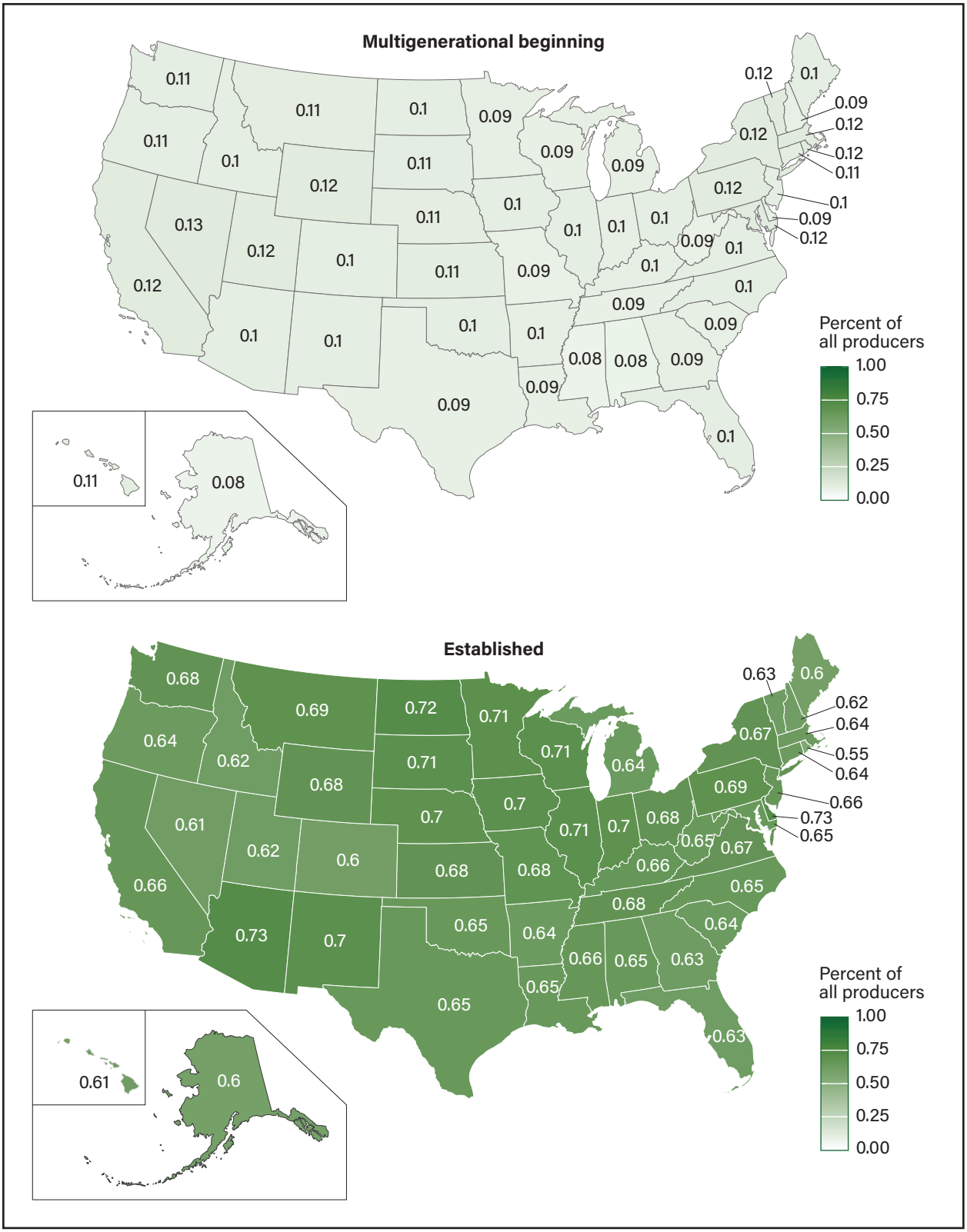


Figure A.1 (cont.)

All beginning, any beginning, and established as a percent of total U.S. producers in each State, 2022



All beginning (N = 443,426) = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning (N = 186,690) = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established (N = 1,270,371) = all producers having more than 10 years of experience on any farm or ranch. Note: All beginning operations as a proportion of total operations in a State ranged from 17–33 percent, multigenerational beginning from 8–13 percent, and established from 55–73 percent.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2022.

To illustrate the geographical distribution of farms, figure A.1 shows the percent all farms in a State that were all beginning, multigenerational beginning, and established operations. The percent of all beginning operations ranged from 17 percent in Arizona to 33 percent in Rhode Island. States with the lowest percent of all beginning operations were generally located in the Midwest. The percent of multigenerational beginning operations had much smaller variability, ranging from 8 percent in Mississippi, Alaska, and Alabama to 13 percent in Nevada. The highest share of established operations generally was in the Midwest. The percent of established operations in a State ranged from 54 percent in Rhode Island to 73 percent in Delaware. County-level maps are available in figures A.2, A.3, and A.4.

Producer Characteristics

Table A.2

Average proportion of U.S. operations with producers for each producer characteristic, 2022

	All beginning (N = 443,426)	**Multigenerational beginning** (N = 186,690)	**Established** (N = 1,270,371)
All young	0.137***	0.027***	0.009
Any young	0.096***	0.418***	0.019
Not young	0.768***	0.554***	0.972
All senior	0.130***	0.061***	0.449
Any senior	0.079***	0.416***	0.141
Not senior	0.791***	0.523***	0.409
All female	0.089***	0.021***	0.078
Any female	0.552***	0.774***	0.455
Not female	0.359***	0.205***	0.466
All veteran	0.051***	0.006***	0.089
Any veteran	0.097***	0.192***	0.119
Not veteran	0.853***	0.802***	0.792
All off-farm	0.641***	0.375***	0.422
Any off-farm	0.153***	0.423***	0.160
Not off-farm	0.206***	0.203***	0.418

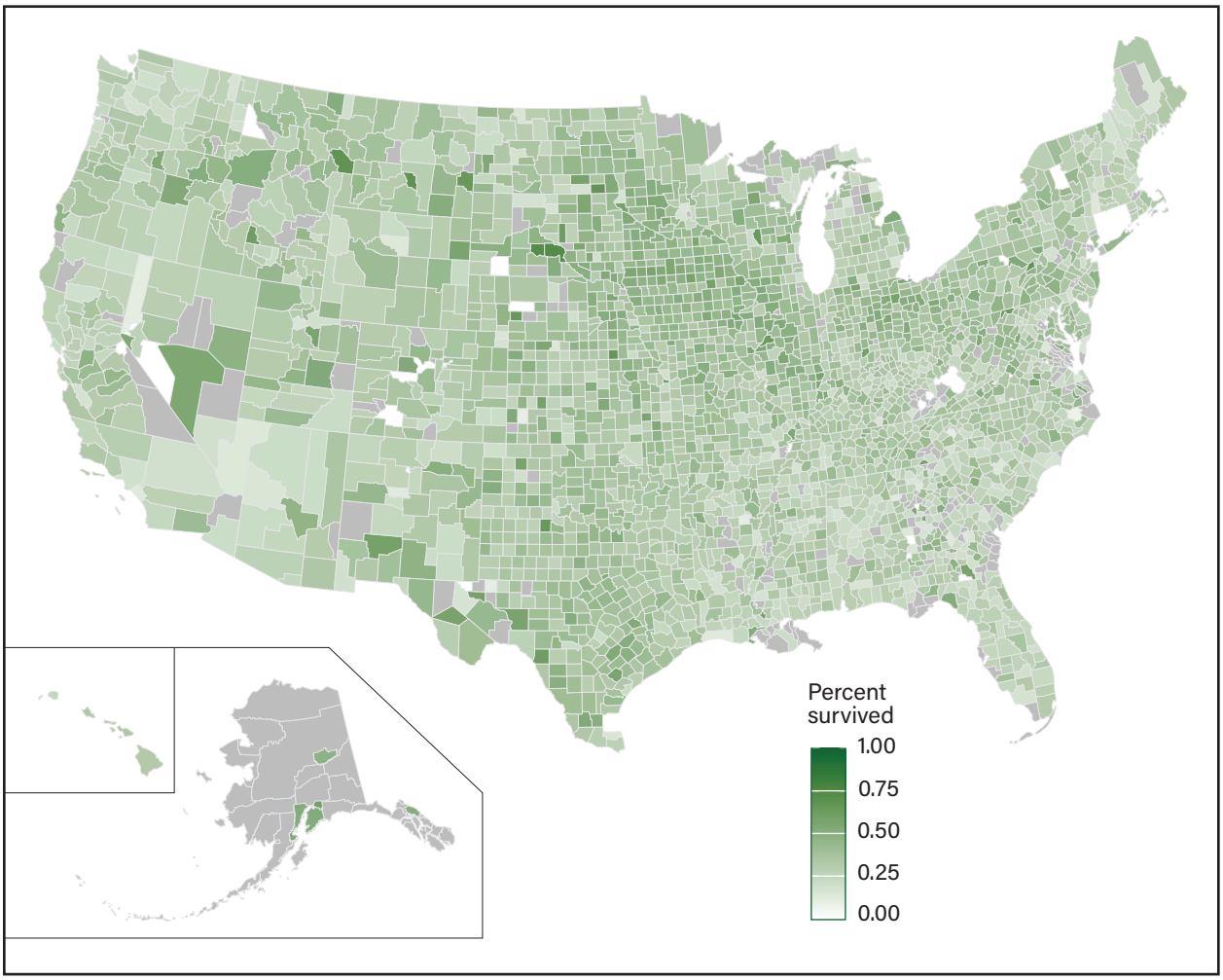
All young = all producers are age < 35; any young = one ore more but not all are age < 35; not young = no producers are age < 35; all senior = all producers are 65 or older; any senior = one or more but not all producers are 65 or older; not senior = no producers are 65 or older; all female = all producers are female; any female = one or more but not all producers are female; not female = no producers are female; all veteran = all producers have served or are serving in the military; any veteran = one or more but not all producers have served or are serving in the military; not veteran = no producers have served or are serving in the military; all off-farm = all producers spent more than 50 percent of their work time on work other than farming or ranching; any off-farm = one or more but not all producers spent more than 50 percent of their work time on work other than farming or ranching; not off-farm = no producers spent more than 50 percent of their work time on work other than farming or ranching. The t-test is a statistical test of the null hypothesis that the means of established farms and either all beginning, or multigenerational beginning farms are equal (within each category). Asterisks indicate the probability that the observed difference in means was due to chance if the null hypothesis were true: p-value <0.01***, < 0.05**, < 0.1*.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2022.

County-level Survival Rates

Figure A.2

Map of the survival rate from 2012–2022 of all beginning U.S. operations by county

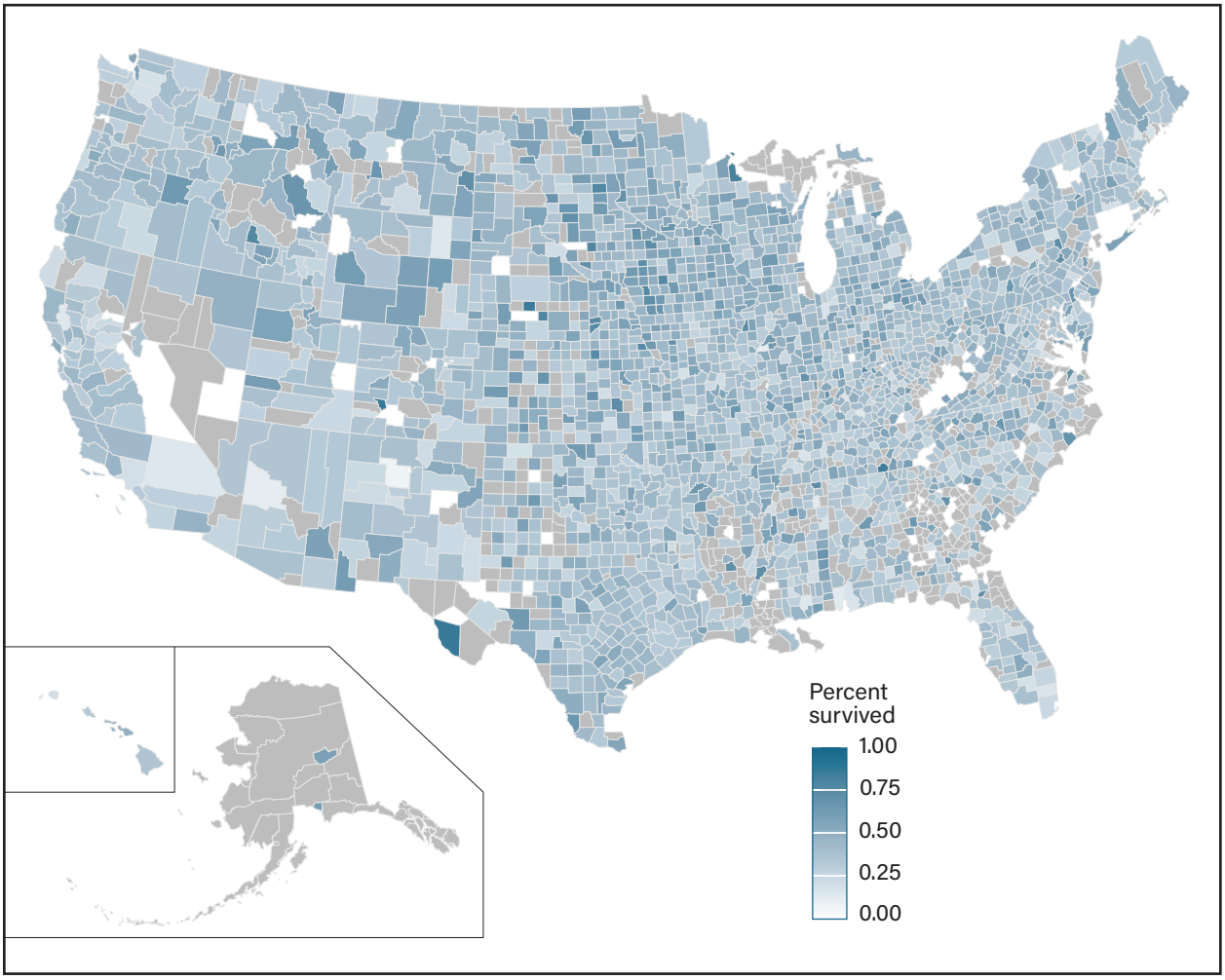


All beginning (N = 401,579) = all producers having no more than 10 years of experience on any farm or ranch.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2012 and 2022.

Figure A.3

Map of the survival rate from 2012–2022 of multigenerational beginning U. S. operations by county

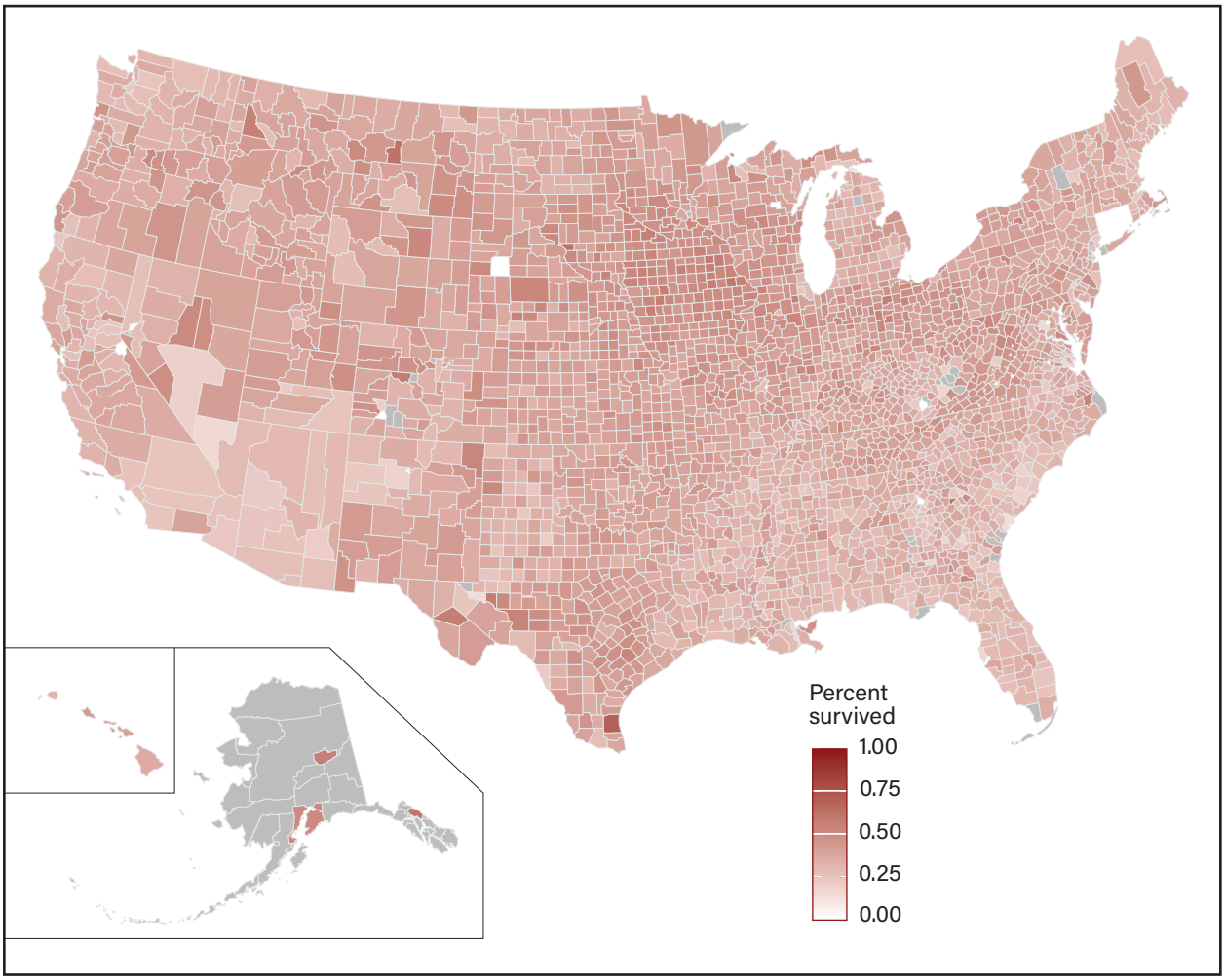


Multigenerational beginning (N = 141,905) = one or more but not all producers having no more than 10 years of experience on any farm or ranch.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2012 and 2022.

Figure A.4

Map of the survival rate from 2012–2022 of established U. S. operations by county



Established (N = 1,565,819) = all producers having more than 10 years of experience on any farm or ranch.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2012 and 2022.

Probit Results of Survival Rates by Beginning Status

Table A.3

Probit regression of survival rates of U.S. farms and ranches from 2012–2022 by beginning status (2012)

	All beginning	Multigenerational beginning	Established
GCFI $1 million or more[1]	0.201***	0.196***	0.180***
	(0.009)	(0.007)	(0.002)
GCFI $350,000–$999,999[1]	0.107***	0.111***	0.094***
	(0.006)	(0.006)	(0.002)
GCFI $75,000–$349,999[1]	0.062***	0.063***	0.061***
	(0.003)	(0.004)	(0.001)
Full owner (0/1)[2]	-0.059***	-0.079***	-0.090***
	(0.002)	(0.003)	(0.001)
Full tenant (0/1)[2]	-0.086***	-0.093***	-0.111***
	(0.003)	(0.005)	(0.002)
At least one producer works majority off-farm (0/1)	0.020***	0.015***	0.018***
	(0.002)	(0.003)	(0.001)
Differentiated sales (0/1)	0.039***	0.048***	0.069***
	(0.002)	(0.004)	(0.001)
Federal crop insurance (0/1)	0.028***	0.019***	0.026***
	(0.003)	(0.004)	(0.001)
Government payment share	0.019***	0.010	-0.003*
	(0.003)	(0.007)	(0.002)
All producers are White only, non-Hispanic	0.001	0.015***	0.013***
	(0.003)	(0.004)	(0.002)
At least one producer is 65 or older	-0.081***	-0.110***	-0.136***
	(0.002)	(0.003)	(0.001)
At least one producer is less than 35	-0.003	0.017***	-0.026***
	(0.002)	(0.003)	(0.002)
Dairy[3]	0.028***	-0.015**	-0.004
	(0.007)	(0.008)	(0.003)
Fruit/Vegetables[3]	-0.036***	0.015**	-0.009***
	(0.004)	(0.007)	(0.002)
Livestock[3]	0.005	0.041***	0.061***
	(0.003)	(0.005)	(0.001)
Other animal[3]	-0.077***	-0.037***	-0.051***
	(0.004)	(0.006)	(0.002)
Other crops[3]	-0.031***	-0.010***	-0.020***
	(0.003)	(0.005)	(0.001)
Poultry[3]	-0.018***	0.033***	0.024***
	(0.005)	(0.008)	(0.003)
State fixed effects	YES	YES	YES
Observations	235,907	91,785	1,054,407

GCFI = gross cash farm income; all beginning = all producers having no more than 10 years of experience on any farm or ranch; multigenerational beginning = one or more but not all producers having no more than 10 years of experience on any farm or ranch; established = all producers having more than 10 years of experience on any farm or ranch.

Note: Statistics: Average marginal effect (standard error). Asterisks indicate confidence that coefficient is statistically different from zero: p<0.05**p<0.01***p<0.001. Reference category: 1 GCFI<$75,000, 2 Part owner, 3 Field crop.

Source: USDA, Economic Research Service based on USDA, National Agricultural Statistics Service, Census of Agriculture, 2012 and 2022

Table A.3 shows the results of the probit regression with farm business survival (1/0) as the outcome.[18] Consistent with the summary statistics, the results indicate that the scale of the operation is strongly positively associated with likelihood of farm survival. Compared to farms with gross farm cash income (GCFI) less than $75,000 (the missing category in the regression), being in a larger farm income category is associated with a higher probability of survival. For example, all else equal, for all beginning farms, being in the $75,000 to $349,999 GCFI category increases the farms' likelihood of surviving over 10 years by 6 percentage points, relative to similar farms with GCFI less than $75,000. The positive correlation between scale and survival probability is maintained across farm types.

The probit results are also consistent with the tenure relationships that were illustrated in table 4. All else being equal and across all farm types, being a full owner or a full tenant is associated with a lower probability of survival compared to a partial owner, with full tenants having the lowest predicted probability of survival. All beginning operations have a 6 percentage points lower chance of survival if they are full owners and 9 percentage points lower if they are full tenants compared to partial owners. For multigenerational beginning and established operations, full owners have an 8 and 9 percentage points lower chance of survival compared to partial owners, and full tenants have a 9 and 11 percentage points lower chance of survival to partial owners, respectively. All else equal, there was a positive correlation between off-farm work by at least one producer and farm business survival , albeit with a small effect. Operations where at least one producer worked majority off-farm had around a 2 percentage point lower chance of survival across farm types. This is slightly different from what was found in table 3, where small scale operations had higher survival rates when a producer worked majority off-farm, but the opposite was true for larger operations.

Probit results also confirm the relationships shown in table 5. Having differentiated sales is associated with higher probability of survival, with the greatest effect on survival being for established operations, followed by multigenerational beginning and all beginning. All else being equal, established operations with differentiated sales have a 7 percentage points higher chance of survival compared to operations without differentiated sales. Multigenerational beginning and all beginning operations with differentiated sales have a 5 and 4 percentage points higher chance of survival, respectively.

All else being equal, Federal crop insurance participation is positively correlated with farm survival across all farm types, also confirming the conclusions from table 6. Operations that participate in Federal crop insurance have a 2 to 3 percentage points higher likelihood of survival compared to operations without Federal crop insurance, across farm types. For all beginning operations, a greater share of Government payments in farm sales was positively associated with higher survival rates, confirming results from table 8, but was insignificant for multigenerational beginning operations and negative (albeit very small) for established operations.

Multigenerational beginning and established operations where all producers are White only, non-Hispanic were slightly more likely to survive (1 to 2 percentage points) than operations with a Hispanic, Black, Asian, Native Hawaiian/Other Pacific Islander, or American Indian/Alaska Native operations. Differences were not significant for all beginning operations. Similar to the effects of scale, having a producer 65 or over is associated with a large impact on farm survival. Established operations with a producer 65 or over 70 have a 14 percentage points lower likelihood of survival than operations with all producers under 65, followed by multigenerational beginning (11 percentage points lower) and all beginning (8 percentage points lower). Operations with a producer under 35 are associated with higher survival rates for multigenerational beginning operations, lower survival rates for established operations, and insignificant effects for all beginning operations.

[18] The authors also ran the same model without State fixed effects and results did not significantly change.

Multigenerational operations with a younger producer had 2 percentage points higher survival rates compared to similar operations where all producers are over 35 and established operations with a producer under 35 had survival rates 3 percentage points lower than similar operations with all producers over 35. For established operations, compared to specializing in field crops (the excluded category in the regression) specializing in any commodity except livestock and poultry lowers the likelihood that a farm survives, holding all else constant.[19] For all beginning operations, specializing in any commodity other than dairy lowered the likelihood that a farm survives, with insignificant effects for livestock producers. This is slightly different from the statistics in figure 12, where dairy operations had survival rates similar to field crop operations. This might be explained by the fact that the summary statistics in figure 12 do not control for farm size. Specializing in "other animal" is associated with the greatest reduction in the survival rate, compared to the other commodity specializations.

[19] With a categorical explanatory variable (like commodity specialization) one of the categories must be excluded in the regression. In this regression, the authors excluded field crops, so all the coefficients can be interpreted as the percentage point change in the survival rate relative to farms specializing in field crops.