Retirement income and savings behavior in farm households

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Abstract

Farmers face unique challenges and opportunities in saving for and maintaining income during retirement relative to other Americans. Farm households have higher income than the average American household but may decide to invest in their farm rather than save for retirement. We use information from the Agricultural Resource Management Survey, the Survey of Consumer Finances, and the Current Population Survey to answer three questions pertaining to the retirement preparedness of farm households. First, what is the composition of income and assets for farm households? Second, how do retirement income and assets for farm households compare to those of all U.S. households and nonfarm self-employed households? Third, do retirement income and assets vary across subpopulations of retirement-age farmers? Our results suggest that, on average, older farm households received smaller shares of their income from retirement sources and had smaller retirement assets than older U.S. households. However, farm households had higher levels of total income and assets with most assets being concentrated in the farm operation. Farm assets may be relatively illiquid compared to retirement assets making it more difficult to rely on them for income during retirement. Among older farm households, those with low-sales farm businesses and Hispanic and non-White operators may be particularly unprepared for retirement relative to other farm households. Our results have implications for farm household well-being as operators' average age rises. They highlight the similar and distinct challenges farmers face in saving for and maintaining income in retirement relative to other workers.

Keywords Farm household retirement planning · Retirement income · Retirement savings

Introduction

Farmers have unique challenges and opportunities in saving for and maintaining income during retirement relative to the broader population. Farm households have higher income than the average American household suggesting a greater ability to save for retirement (Mishra et al. 2005). On the other hand, farm income is variable, and farmers may use current income to finance capital needs for their farm business rather than save for retirement. Additionally, farmers are generally self-employed and must set up their own retirement plans, which requires more financial planning and sophistication than contributing to an employer plan. Finally, farmers who own their land may have the ability to

finance their retirement through leasing their land or selling this valuable asset.

The rapid aging of farm operators highlights the increasing relevance of retirement and succession decisions for farm households and businesses in the coming years. In 2021, over 45% of farm principal operators were 65 years of age or older, and the average age of principal operators increased by 2.4 years between 2018 and 2021.[1] Many older farm households have not developed detailed succession plans but wish to keep the farm operation within the family for estate tax or personal reasons (Mishra et al. 2010). The fact that a portion of their wealth is tied into the farm operation creates a unique challenge for farmers relative to other households whose sources of wealth may be more liquid and accessible for living expenses such as standard retirement investment accounts.

This paper seeks to answer three questions to enhance our understanding of retirement preparedness of farm

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1   Authors' calculations using ARMS data.

households. First, what is the composition of income and assets for farm households? Second, how do retirement income and assets for farm households compare to those for all U.S. households and nonfarm self-employed households? Third, within the population of retirement-age farmers, is there heterogeneity in retirement income and assets across characteristics of the farm operation and operator? We use information from the 2018–2022 annual Agricultural Resource Management Survey (ARMS) to document income, assets, and net worth of farm households, focusing on resources designated for retirement, and to categorize farm households by operator demographics (e.g. race/ethnicity, sex, etc.) and characteristics of the operation (e.g. size, primary occupation, etc.). To compare farm households to other self-employed households and all U.S. households, we use income information from the Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC) from the U.S. Census Bureau and wealth information from the Survey of Consumer Finances (SCF) from the Board of Governors. Our work supplements a small body of existing evidence on farm households' retirement savings and income, updating decades old results and expanding findings to all U.S. farmers.

We find that farm households of all ages held most of their assets in the farm. Similar shares of farm households had savings in retirement accounts relative to all U.S. households and nonfarm self-employed households. Among those who saved for retirement, the average value of retirement assets for farm households was similar to that for U.S. households but smaller than that of nonfarm self-employed households. Older farm households, however, had lower retirement assets than both U.S. households and nonfarm self-employed households of similar ages. In contrast, our results show that farm households had higher levels of retirement income than both nonfarm self-employed and all households. Retirement income made up a smaller share of total household income among older farm households compared to older U.S. households, but a larger share compared to nonfarm self-employed households.

Among farm households with a principal operator who is 65 years of age or older, we find that Non-Hispanic White operators were less reliant on retirement income, were more likely to have retirement savings, and had higher levels of retirement assets compared to Hispanic operators and operators of a race other than White. Similar racial and ethnic disparities were also found across the general population of households 65 and older, with non-Hispanic White households having higher levels of retirement income and assets than other groups. Farm households with a female principal operator were more reliant on retirement income compared to households with a male principal operator even though their retirement income levels were lower. Farm households

with a female principal operator were also less likely to have a retirement account.

Older farm households who received less than half of their income from farm sources were, on average taking farm losses and received most of their income from off-farm and retirement sources. As expected, these households had higher retirement savings rates and levels than farm households who received most of their income from the farm. Households with retirement and low-sales farm operations were more reliant on retirement income than other farm typologies. Households operating low sales farms in particular stand out as being particularly unprepared for retirement as they were less likely to have retirement accounts and had low levels of retirement assets, total income, and total assets.

This work highlights the ways in which farmers face both similar and distinct challenges in saving for and maintaining income in retirement relative to other workers informing policies aimed at supporting farmers' overall economic well-being throughout the life cycle. Our results have important implications for farm household well-being. During their working years, farmers face tradeoffs between investments in their farm business, current household consumption, and saving for retirement. In their retirement years, farmers' ability to maintain their lifestyle and plan for farm succession may be helped or hindered by the resources they have saved for retirement.

Background and existing literature

Farmers' status as business owners may affect their desire and ability to retire relative to other U.S. workers. Previous research finds that farmers work longer than wage and salary employees (Thelin and Holmberg 2010) and that only 20 to 30% plan on ever fully retiring (Lobley et al. 2010).

Existing studies of farmers find that most farmers plan to transfer their farm operations to a family member perhaps due to strong financial and personal incentives to keep the farm in the family. These include a reduction in taxes due to step-up in basis at death for capital gains, the potential to resource share in retirement, the ability to transfer valuable human capital over time to a successor, and a desire to bequest wealth and a lifestyle to a younger generation (Hachfeld et al. 2009, Lobley et al. 2010; Mishra et al. 2010). However, most farmers have not created a succession plan (Mishra and El-Ostra 2010, Lobley et al. 2010), which could result in less-than-optimal savings and investment strategies for both retirement and the farm operation (Inwood and Sharp 2012).

While farm households tend to have larger assets relative to nonfarm households (Mishra et al. 2005), their assets

may be relatively illiquid because they are concentrated in farm assets. Consistent with their desire to transfer the farm to the next generation, Lobley et al. (2010) find that farmers anticipated social security, private retirement plans, and other investments being important sources of retirement income, with farm income and sales of assets being less important. Farmers who plan to retire in the next 5 years only plan to transfer 23% of their land (Bigelow et al. 2016), and sale of farm assets was the least reported planned source of retirement income in a survey of Iowa farmers (Maule et al. 2020). Mishra and El-Osta (2010) find that farmers with sources of passive income are less likely to say they are planning a family transfer, which could indicate that they are planning for a retirement where they do not share income with a family member who owns and operates the farm.

Our study compares farm households' levels and types of wealth and income to the U.S. population to assess older farm households' retirement security. There is relatively little recent quantitative work on retirement income and savings from the farm household perspective. Our study is most similar to Mishra et al. (2005) who use ARMS data, Internal Revenue Service (IRS) data, and SCF data from 1999 to 2003 to examine income sources and assets of farm and nonfarm households. They find that farm operators collecting social security are less reliant on it than the average social security recipient in part because farmers have a variety of income sources including both farm and off-farm income. Farmers who are retired from farming made up 13% of farms in 2022, but received 25% of Conservation Reserve Program payments suggesting this program may be providing an income stream to retired farmers (Whitt et al. 2023). Mishra et al. (2005) show that around 40% of farm households have assets in retirement accounts compared to 60% of U.S. households. Farm households have higher levels of total assets than the average U.S. household, but they have a much larger share of their assets in business equity and much lower shares in their principal residence and investments.

We examine differences in retirement income and assets across farm households based on sex and race/ethnicity of the principal operator, reliance on off-farm income, and farm typology because previous work shows that farm households are diverse in their reliance on farm income and their levels of wealth and income. A voluminous literature has focused on gender differences in farm operations (see, for example, Ball 2020 and Sachs 2023 for a discussion). Relative to farm households led by men, female farm households have higher net worth and are more likely to expect to leave a bequest (Worthy et al. 2020). Additionally, female operators are more likely to exit farming than male operators but less likely to disinvest, although the differences were small

(Griffin et al. 2019). We examine racial and ethnic differences among farm households motivated by more general research on retirement savings and preparedness showing disparities in retirement savings by race and ethnicity (GAO 2023).

Off-farm work is common among U.S. farm households. Previous work has shown it plays an important role in supporting the farm business (Yee et al. 2004; Lien et al. 2010; Sabasi et al. 2019), although it may also pull labor resources away from the farming operation. There are many motivations for spouses and operators to work off the farm including access to fringe benefits including retirement plans (Huffman and Lange 1989; D'Antoni et al. 2014; Inwood 2017). Our article examines differences between households that are more and less reliant on farming income directly and through the ERS farm typology. We also analyze farmers' self-reported reasons for working off-farm including access to retirement accounts.

Our paper complements existing work by providing detailed information on income sources and wealth for farm households that inform the financial side of retirement readiness and succession decisions. It adds to the broader literature about the varied considerations for farmers as they plan their exit from farming and retirement.

Data and descriptive statistics

This study uses results from three surveys to obtain data on the assets, income, and demographics of U.S. farm households and the broader population of U.S. households. Farm household income and assets data comes from Phase III of ARMS. To compare farm households to all U.S. households and nonfarm self-employed households, we use income information from the CPS ASEC and asset information from the SCF, which are representative surveys at the national level. We adjusted all dollar values for inflation using the Bureau of Labor Statistics's personal consumption expenditure (PCE) price index and report results in 2022 dollars. Income and asset variables across the three surveys are detailed in Table 1.

Agricultural resource management survey

ARMS is an annual survey conducted in three phases by the USDA's Economic Research Service (ERS) and National Agricultural Statistical Service (NASS) that covers the 48 contiguous United States and includes farm operations where at least 1,000 value of agricultural production requirement.

The survey uses a stratified sample design to ensure coverage across different sized operations, commodities, and

Table 1 Data description for selected variables

Variable	Description
Agricultural resource management survey (ARMS)	
Farm assets	Crops, livestock, dwellings and other farm structures, land rented to others, machinery, and vehicles owned by the operation. The principal operator's household value of farm assets is equal to the share of ownership multiplied by the farm operation level assets.
Retirement assets	Individual retirement account (IRA), Keogh, 401k, and other retirement accounts[a]
Nonfarm assets excluding retirement	Total value nonfarm assets owned by operator household including operator dwellings not owned by the operation, real estate and other personal homes, businesses not part of this farm, and vehicles
Farm income	Annual income from the surveyed farm operation, renting out farmland, and any other farm business not selected for the survey
Retirement income	Sum of income from private pensions, private disability payments and public sources including social security, military, and other public retirement, veteran's benefits, unemployment and other public assistance earned annually by operator household
Nonfarm income excluding retirement	Off-farm wages or salaries, off-farm business income, proceeds from capital asset sales, COVID-19 economic impact payments (applicable years), off-farm interest income, and off-farm dividend income earned annually by operator household
Survey of Consumer Finances (SCF)	
Total assets (ASSET)	Total value of assets held by household
Retirement assets (RETQLIQ)	Total value held by household in IRAs, Keoghs, thrift-type accounts, and future and current account-type pensions
Current Population Survey (CPS)	
Total income	Total household income calculated as sum of total personal income across household members.
Retirement income	Income from social security and pensions earned annually by the household

[a]An IRA is a tax-advantaged investment account that is used to save for retirement. A Keogh is an employer-funded, tax-deferred retirement account for self-employed individuals or unincorporated businesses. A 401k is an employer-provided, tax advantaged retirement investment account

regions, and NASS generates weights to account for the sampling design. The survey results undergo processing and data cleaning by both NASS and ERS, and we use the processed records for this analysis.[2]

We pooled ARMS surveys from 2018 to 2022 to estimate income, assets, and net worth for farm households.[3] Throughout the analysis, we generally aggregated reported annual income and assets variables from the ARMS Phase III section titled "Principal Producer Household-Income, Asses & Debt" to three main sources: farming; retirement; and nonfarm excluding retirement, the details of which are included in Table 1. Retirement income is not strictly retirement income because it includes things like unemployment insurance payments and veterans' benefits, but we believe a large portion of it is social security payments based on how much average values increase for older farmers. Importantly this category of income does not include any government payments to farmers for farm operations as those are considered farm income. We also note that our measure of retirement income for farm households does not include

distributions from private retirement accounts, which would be reflected in ARMS data as a reduction in assets and are not asked about in the income section. ARMS also does not ask about annuities or interest received from retirement accounts. While the measurement of retirement income in ARMS is not as complete or precise as other surveys, ARMS is the only survey with household-level information on farm households who make up a small share of the U.S. population and are difficult to study using publicly available datasets.

We used ARMS data to categorize farm households by sex of the principal operator, age cohort of the principal operator, race and ethnicity of the principal operator, the ERS farm typology classification, and reliance on farming income. We designated ARMS farm households as male or female depending on the sex of the principal operator as reported in ARMS and into age cohorts based on the age class of the principal operator reported in ARMS. We use the following age cohorts: 19–34, 35–44, 45–54, 55–64, 65–69, and 70 or older.

We assigned farm households to one of three race/ethnicity categories based on the race/ethnicity of the principal operator. Hispanic households are those in which the principal operator is of Spanish origin. Non-Hispanic White households are those in which the principal operator identifies as White only and is not of Spanish origin. Non-Hispanic non-White households are those in which the

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principal operator does not belong to the former two categories and identifies as Black/African American, American Indian or Alaska Native, or Hawaiian/Pacific Islander.

We constructed the five farm typologies developed by Hoppe and MacDonald (2013)– retirement farms, off-farm occupation farms, farm occupation farms with low sales, farm occupation farms with moderate sales, and commercial farms (midsize, large, and very large family farms). Retirement farms are those in which the principal operator reported their primary occupation as retired and with less than 350,000. Low and moderate sales farms are those in which the principal operator reported farming as their primary occupation and with GCFI less than 150,000 to 350,000.[4] We measured reliance on off-farm income by identifying farm households for whom off-farm income comprises over half of annual total income.

The ERS typology categories reflect both the scale of farming operation and the reliance on off-farm employment for the principal operator, which we expect to influence retirement income and savings behavior. Larger farming operations may have more income to invest in retirement, but also may have greater assets within the farm to support retirement. Off-farm wage and salary employment may make it more likely that the farm household has an employer retirement account and employer contributions leading to higher retirement account balances for a given level of income.

One limitation of the ARMS data is that it does not include retired individuals who used to be farmers but are no longer in the farming business as they are outside of the sampling frame for ARMS. In 2022, roughly 13% of farms were considered retired farms where the operator states that they are retired (Whitt et al. 2023), but they still farm on a small scale that meets the requirement to be included in ARMS. We leave it to future researchers to study fully retired farm households who are not engaged in any agricultural production but may lease their land to other operators or derive income from conservation programs.

Current population survey

CPS ASEC is a nationally representative annual survey of over 75,000 households jointly administered by the U.S. Census Bureau and U.S. Bureau of Labor Statistics (BLS). It asks respondents and their household members detailed questions on income, employment, family structure, and demographics. The survey includes additional questions on retirement income for respondents 58 years or older. CPS redesigned these retirement income questions in 2019, so

we construct a pooled dataset containing ASEC observations from 2019 to 2023 to study retirement income. Data were downloaded from IPUMS (Flood et al. 2023).

We aggregated individual income data to the household level to construct household-level measures of income by source, and we use the survey's household weights in our analysis. We generated several household classifications designed to closely match ARMS, based on the characteristics of the primary respondents. We characterized the age of the household based on the age of the primary respondent. We characterized households as nonfarm self-employed if they reported that the primary respondent is self-employed or the primary respondent has nonfarm business income.

The ASEC includes detailed measures of retirement income sources. For comparison with ARMS data, we constructed retirement income as the total household income from social security and pensions. While this measure is the closest measure we can create, the main difference between the two data sources is that ARMS includes other public sources of income like unemployment insurance, disability payments, and veterans' benefits because they are included in sources of public income. We note that this definition excludes other sources of income recorded in the CPS ASEC that would be considered retirement income such as distributions from retirement accounts, annuities, and interest from retirement accounts. For that reason, we likely underestimate total retirement income, but the CPS measure should be more comparable to the ARMS retirement income measure.

Survey of consumer finances

The SCF is conducted every three years by NORC at the University of Chicago and sponsored by the Federal Reserve Board in cooperation with the Department of the Treasury. It collects detailed information about the finances of U.S. families, including their assets, debts, income, and demographic characteristics and is the only fully representative source of information on the broad financial circumstances of U.S. households. The main unit of analysis in the SCF is the "primary economic unit" (PEU), not the household. A PEU is defined as an economically dominant individual or couple and all the people dependent on that individual or couple. For the purposes of our analysis, we compare SCF PEU estimate to household estimates from ARMS and use the terms household and PEU interchangeably.

The most recent survey, referred to as the 2022 SFC, includes data from 2021 and sampled at most 7,000 randomly selected families.[5] The SCF includes a weight variable for data analysis, and the sum of the weights for each

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[4] We do not include nonfamily farms in commercial farms because household level information is not calculated for these farms in ARMS.

[5] The publicly available data used for our analysis is scaled to 2022 dollars.

Table 2 Descriptive statistics on income and assets

	Median	Mean	Standard Deviation
Panel A: ARMS Farm Households			
Income			
Farm	-$852	$27,835	$268,321
Nonfarm excluding retirement	$61,657	$99,495	$376,533
Retirement	$20,180	$22,487	$64,251
Total	$91,553	$140,263	$446,724
Assets			
Farm	$612,410	$1,366,272	$3,680,870
Nonfarm excluding retirement	$212,500	$581,143	$1,553,696
Retirement	$25,223	$221,390	$624,372
Total	$1,379,976	$2,168,805	$4,210,080
Panel B: CPS Data U.S. Households			
Retirement income	$0	$9,207	$19,090
Total	$69,633	$99,450	$117,104
Panel C: SCF Data U.S. Households			
Retirement Assets	$4,000	$181,547	611,619
Total Assets	$331,500	$1,186,321	8,182,253

Note: Data are from 2018 to 2022 ARMS survey, CPS ASEC 2019 through 2023, and the 2022 SCF. See Data section for a detailed description of income and asset category construction

Table 3 Descriptive statistics by farm operation and operator characteristics

	Share of operations	Average acres	Average GCFI (2022$)
Farm typology			
Retirement	0.12	157	23,537
Off-farm Occ	0.41	141	23,380
Low Sales	0.34	219	29,696
Moderate Sales	0.05	967	255,473
Commercial	0.09	2,139	1,550,243
Race and Ethnicity			
Non-Hispanic White	0.93	389	171,250
Hispanic	0.03	248	141,068
Non-Hispanic non-White	0.04	247	83,526
Sex			
Male	0.86	409	184,545
Female	0.14	188	53,800
Reliance on Off-farm Income			
<50% off-farm income	0.14	1,253	866,515
>50% off-farm income	0.86	213	46,856
All		388	171,343

Note: Data are from 2018 to 2022 ARMS survey. See Data section for a detailed description of different categories of farms. GCFI stands for gross cash farm income, which is annual income before expenses and includes cash receipts, farm-related income, and Government farm program payments

year is equal to the number of U.S. households that year. We use weighted 2022 SCF data reported in 2022 dollars to estimate the mean and median values and incidence of assets for all PEUs and the subset of PEUs for which the reference person is self-employed (OCCAT1 = 2) but reports zero farm business value (FARMBUS = 0). We define the latter as nonfarm self-employed households. We focus our analysis primarily on SCF's retirement asset variable, RETQLIQ, as defined in Table 1.

We categorized households based on race/ethnicity and age using the RACE and AGE variables. Age cohorts and race categories match those used for farm households. Non-Hispanic White households are those for which RACE equals 1, Hispanic households are those for which RACE equals 3, and non-Hispanic non-White households are those for which RACE equals 2 (Black/African American) or 5 (other).

Descriptive statistics

In this section, we provide descriptive statistics on our measures of income and assets for the farm household and U.S. household populations (Table 2). We also provide background information on the different subgroups that we analyze in our results section to provide context for those results (Table 3).

Methods

Our study assesses retirement preparedness of farm households three ways. The first is to examine the composition of income and assets for farm households. The second is to compare income and assets of farm households to U.S. households with a focus on retirement aged households. The third is to provide information on differences across older farm households in their reliance on income and asset sources and their readiness for retirement. To do so, we used our three data sources to estimate the following values for various subsets of the U.S. population: (i) average household compositions of income/assets across all income/asset sources, (ii) average and median value of assets in retirement accounts, (iii) average and median value of annual household retirement income, (iv) average household share of assets in retirement accounts, (v) average household share of annual income derived from retirement income, (vi) share of population with assets in retirement accounts, and (vii) the average and median value of assets in retirement accounts for the subpopulation of respondents with non-zero retirement assets, heretofore referred to as conditional retirement assets.

Our analysis first estimates the average composition of income and assets for farm households overall and then by age cohort. Ideally, we would follow households over time to study assets and income over the life cycle, but our data sources are cross-sectional, so we use a cohort analysis to shed light on differences by age. We then compare retirement income and assets of farm households to those of U.S. households and nonfarm self-employed households of similar ages. This is because farm operators are older than the average American so average comparisons across these populations may not accurately reflect retirement preparedness relative to other household types. 40% of primary farm operators are 65 years or older, compared to only 27% of primary respondents across all U.S. households and 26% across nonfarm self-employed households. Comparing similar aged households yields a more direct comparison of income and asset levels. Finally, we estimate differences in retirement income and assets across older farm households by race and ethnicity, sex, farm type, and reliance on farming income.

Estimating assets and income for farm households

We used 2018–2022 ARMS data for all farm household asset and income estimates. We adjusted all dollar values for 2018 through 2021 ARMS data to 2022 levels using the BLS PCE price index. To construct population estimates from ARMS, we applied the probability sample weight provided by NASS.

We estimated average and median value of assets in retirement accounts (ii) and average and median value of annual household retirement income (iii) for farm households. To estimate household shares of assets and income (i, iv, v), we first computed the share of total income or assets from each source for each household and then averaged those shares across households. For each farm household, the share of retirement assets, for example, is equal to retirement assets divided by the sum of farm and non-farm assets owned by the operator household. To calculate the household-level share of income, we bounded the ratio of each income source to total income between −1 and 1 and restricted our sample to households with positive total household income. This restriction affected around 5% of our original ARMS sample. We then computed the average share of income/assets by source for farm households by averaging the household-level shares.

Not all households have assets in retirement accounts, so estimates of the mean and median value of retirement assets for the full sample population underestimate retirement asset values for households with positive retirement savings. To address this, we generated an indicator variable equal to 1 for farm households with non-zero retirement

assets to estimate the share of households in each population saving for retirement (vi). We restricted the population to only those with retirement savings to estimate average and median conditional retirement assets (vii).

We examined differences across older farm households in their readiness for retirement by restricting our sample to those 65 and older and comparing estimates of average retirement income/assets (ii and iii), average household share of annual income derived from retirement income (v), the share of farm households with assets in retirement accounts (vi), and average conditional retirement assets (vii) by race and ethnicity, sex, farm type, and reliance on farming income. For these differences, we use a simple t-test to test for differences between groups as explained in more detail in the results section. We compute standard errors for these tests using the recommended jackknife re-sampling process based on 30 provided replicate weights in the ARMS data (Dubman 2000).

Estimating retirement assets for U.S. households and nonfarm self-employed households

We used data from the 2022 SCF survey for all estimates of assets for U.S. households and nonfarm self-employed households. We used the SDA analysis tool to estimate population means, medians, standard errors and weighted sample sizes for total assets, retirement assets, the share of the sample population with positive retirement savings, and conditional retirement assets.[6] Specifically, we used the SDA Comparison of Means Program with our variables of interest as the dependent variables and WGT sample weights.

Estimating retirement income for U.S. households and nonfarm self-employed households

Following the methodology we used to examine retirement income in ARMS data, we constructed total income and retirement income at the household level in the CPS-ASEC. Total income is equal to the sum of total personal income (INCTOT) across household members and retirement income is the sum of pension income (INCPENS) and social security income (INCSS) across all household members.[7] At the individual household level we computed the share of total household income that comes from retirement sources and bounded that share between 0 and 1. We report the average share of retirement income across households

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[6] SDA is a product of the Computer-assisted Survey Methods Program (CSM) at the University of California, Berkeley and can be found at https://sda.berkeley.edu/sdaweb/analysis/?dataset=scfcomb2022.

[7] Please see the IPUMS CPS website for documentation of income variables https://cps.ipums.org/cps/.

in our results where we focus on subsets by age cohort of the primary respondent. We also report averages of total income and retirement income levels for all households and nonfarm self-employed households. Finally, we report retirement income shares and levels for subsets of the population by sex and race/ethnicity for comparison with older farm households. All results were weighted using household weights (ASECWTH) and all dollar values were converted to 2022 levels.

Results and discussion

Composition of farm household income and assets

In this section, we briefly provide detail on the average composition of income and assets of farm households in aggregate using ARMS data, but our primary focus is on retirement income and assets by age cohort.

On average, the largest sources of income for farm households were off-farm wages and salaries and, to a lesser extent, public sources such as social security (Fig. 1, Panel A). [8] Together these two sources comprised nearly 65% of annual income for the average farm household, whereas income from the farm business and other farming income from farm rentals or other farms combined for just 5% of average annual farm household income. This reflects the fact that many households reported losses in annual farm income.[9]

Farm households held wealth in a variety of farm and nonfarm assets, both of which could serve as a source of retirement income alongside recurring income streams like pensions and social security. Whereas farm households derived a small share of annual income from the farm business, farm households held most of their assets in the farm (56% on average), as shown in Fig. 1, Panel B. Outside of the farm, retirement accounts made up the largest average share of total household assets, with retirement accounts making up 11% of farm households' total assets. This was followed by operator dwellings not owned by the operation at 7% and financial assets held in non-retirement accounts at 6%. The former does not capture the full share of the operator's dwelling in the household's asset portfolio, though, as some operator dwellings are owned by the farm operation and are classified as farm assets.

Retirement income comprised a small share of total income for farm households with young principal operators but made up the majority of income for farm households with a principal operator over the age of 70 (Fig. 2, Panel A).[10] All but the oldest age cohort relied on non-retirement, nonfarm income for the majority of their annual income. The share of total income derived from non-retirement sources of off-farm income peaked at 80% for the 45 to 54 cohort and decreased for subsequent age cohorts until reaching 41% for farm households with a principal operator at or above 70 years of age. The average household received a relatively small share of their income from farming, peaking at 14% for farm households with a principal operator under 35 and declining across subsequent age cohorts. Finally, total farm household income exhibited an inverted U-shaped relationship with the principal operators' age, peaking for the 45 to 54 cohort.

Total household assets increased with the age of principal operator, but the share of assets in retirement accounts remained relatively stable for farm households with principal operators 35 and older. This suggests that these cohorts invested in farm, retirement, and nonfarm retirement assets proportionally. In contrast, the households in the youngest age cohorts had assets more heavily concentrated on the farm and held substantially less money in retirement and non-retirement accounts than their older counterparts. The share of assets in retirement accounts were similar for operators between ages 35 and 69 but decreased in the highest age cohort consistent with some draw down of retirement assets among principal operators at or above 70 years of age. The average level of farm assets, however, was highest for households with principal operators at or above 70 years of age, indicating farm operators on average are not liquidating significant portions of their farm assets to fund their retirement years.

Farm and nonfarm retirement income and assets

The average value of retirement assets for farm households (181,547) but fell short of the average nonfarm self-employed household ($281,046). However, average retirement assets varied greatly by age for all three groups (Fig. 3). Farm households headed by operators under 45 had higher levels of average retirement assets than both U.S. households and nonfarm self-employed households of a similar age. Beyond age 45, nonfarm self-employed

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[8] Note that public sources of farm income such as government payments to farmers are included in the farm business income and not in public sources of off-farm income.

[9] An important context for farm income and self-employment income more generically is that net farm income does not fully reflect other benefits accruing to the household, which helps explain why business owners who make losses continue operating their businesses. See Prager et al. (2018) for discussion and evidence.

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[10] Our measure of retirement income from ARMS is not the ideal measure as social security income is placed in the same category as other public sources including unemployment insurance, veterans' benefits, and disability, which likely explains why young farm households are receiving non-trivial shares of income from what we label retirement sources.
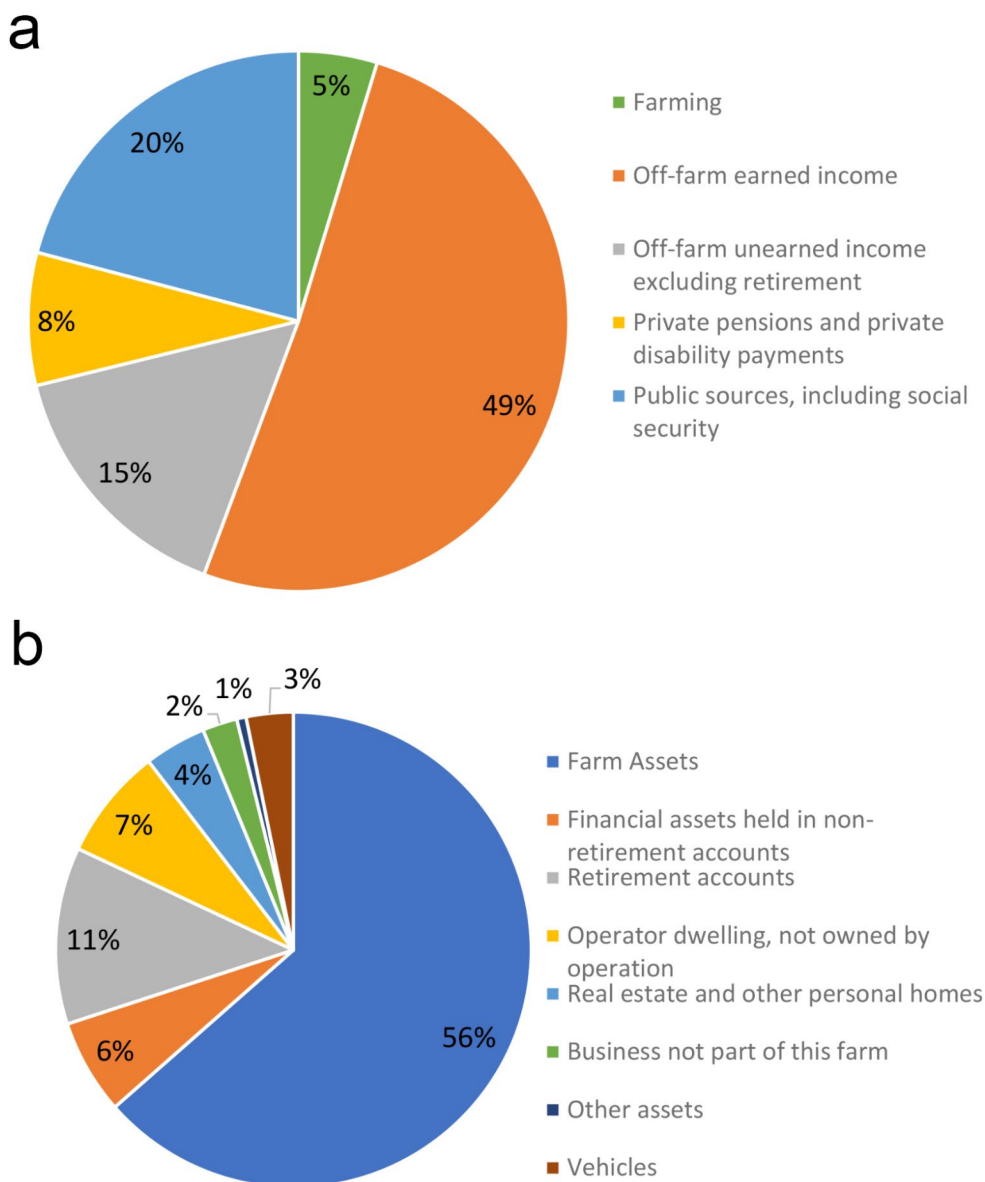
Fig. 1 Average share of farm household income and assets - all households. Panel **A**: Income, Panel **B**: Assets

Note: Authors' calculations from 2018 to 2022 USDA ARMS data. Observations are weighted using survey weights. Panel A includes only households with non-negative total household income. Plotted values are the average share across households that each income source represents where shares are trimmed at -1 and 1. Income from farming represents household level income from the main sampled farm business including wages paid to the principal operator's household and income from other farming businesses or renting out land. Off-farm earned income includes all wages and salaries for the household from working off of the farm and any other business income from non-farms. Off-farm unearned income includes sales of capital assets, interest and dividends, and other income, which includes income from all other sources including COVID-19 EIP payments during 2020 and 2021. Income from public sources includes Social Security, military, and other public retirement, veteran's benefits, public disability, unemployment, or other public assistance. Panel B values are the household shares of total assets by source averaged across all ARMS households. Farm assets, as defined by ARMS, include but are not limited to crops, livestock, dwellings and other farm structures, land rented to others, machinery, and vehicles owned by the operation. The principal operator's household value of farm assets is equal to the share of ownership multiplied by the farm operation level assets. Information on nonfarm assets is only collected for the principal operator's household. Retirement assets include money held in IRA, Keogh, 401k, and other retirement accounts

Fig. 2 Average share of income and assets of farm households by age cohort. Panel **A**: Income, Panel **B**: Assets

Note: Authors' calculations from 2018 to 2022 USDA ARMS data and observations are weighted using survey weights. Panel A only includes households with non-negative total household income. Plotted values are the average share across households that each income source represents where shares are trimmed at -1 and 1. Age is based on the age of the principal operator for the farming operation sampled in ARMS. Income from farming represents household level income from the main sampled farm business including wages paid to the principal operator's household and income from other farming businesses or renting out land. Off-farm income less retirement includes off-farm income from nonfarm businesses, wage and salary income, interest and dividends and other income sources. Retirement income includes private pensions and disability payments and income from public sources including Social Security, military, and other public retirement, veteran's benefits, public disability, unemployment, or other public assistance. In Panel B, farm assets include but are not limited to crops, livestock, dwellings and other farm structures, land rented to others, machinery, and vehicles owned by the operation. The principal operator's household value of farm assets is equal to the share of ownership multiplied by the farm operation level assets. Information on nonfarm assets is only collected for the principal operator's household. Nonfarm assets are comprised of financial assets held in non-retirement accounts; IRA, Keogh, 401k, and other retirement; operator dwellings not owned by the operation; real estate and other personal homes; businesses not part of the farm; the household's share of vehicles; and other assets not owned by the operation
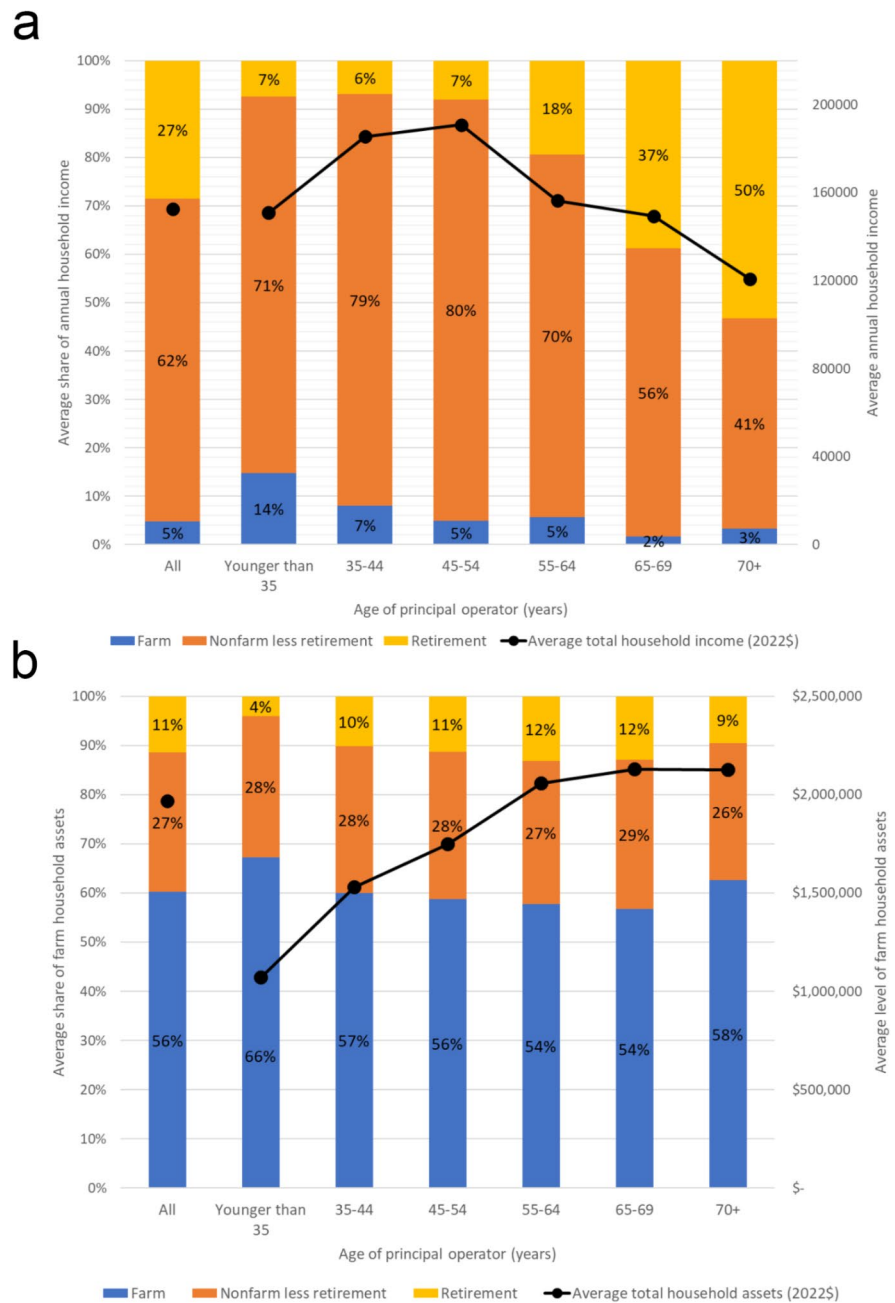
households had the highest levels of average retirement assets. Across all three groups, average retirement assets peaked between the ages of 65 to 69.

A greater share of farm households had assets in retirement accounts (61%) compared to all U.S. households (54%) and nonfarm self-employed households (52%). These findings contrast with those of Mishra et al. (2005) who found that only 40% of farm households had retirement savings in 1999 and that they were less likely to have retirement savings compared to U.S. households in general.

Among households who saved for retirement, similar patterns persisted. Average conditional retirement assets

increased by age until peaking for those 65 through 69 for all household types. Farm households headed by those under 45 had slightly higher average conditional retirement savings than U.S. households of the same age, but nonfarm self-employed households had the highest levels of average conditional retirement assets in aggregate and within each age cohort. Farm households between the ages of 65 to 69 had roughly three quarters the average conditional retirement assets of U.S. households (639,701).

Although farm households had lower levels of average retirement assets compared to similar aged households more generally, they have greater overall asset levels as shown

Fig. 3 Retirement assets by age cohort. Panel **A**: Average retirement assets, Panel **B**: Average conditional retirement assets Note: Farm household values derived from pooled 2018–2022 ARMS. Estimates for all households and nonfarm self-employed households derived from 2022 Survey of Consumer Finances Extract Data. Average conditional retirement assets are equal to average retirement assets conditional on households reporting a positive retirement balance
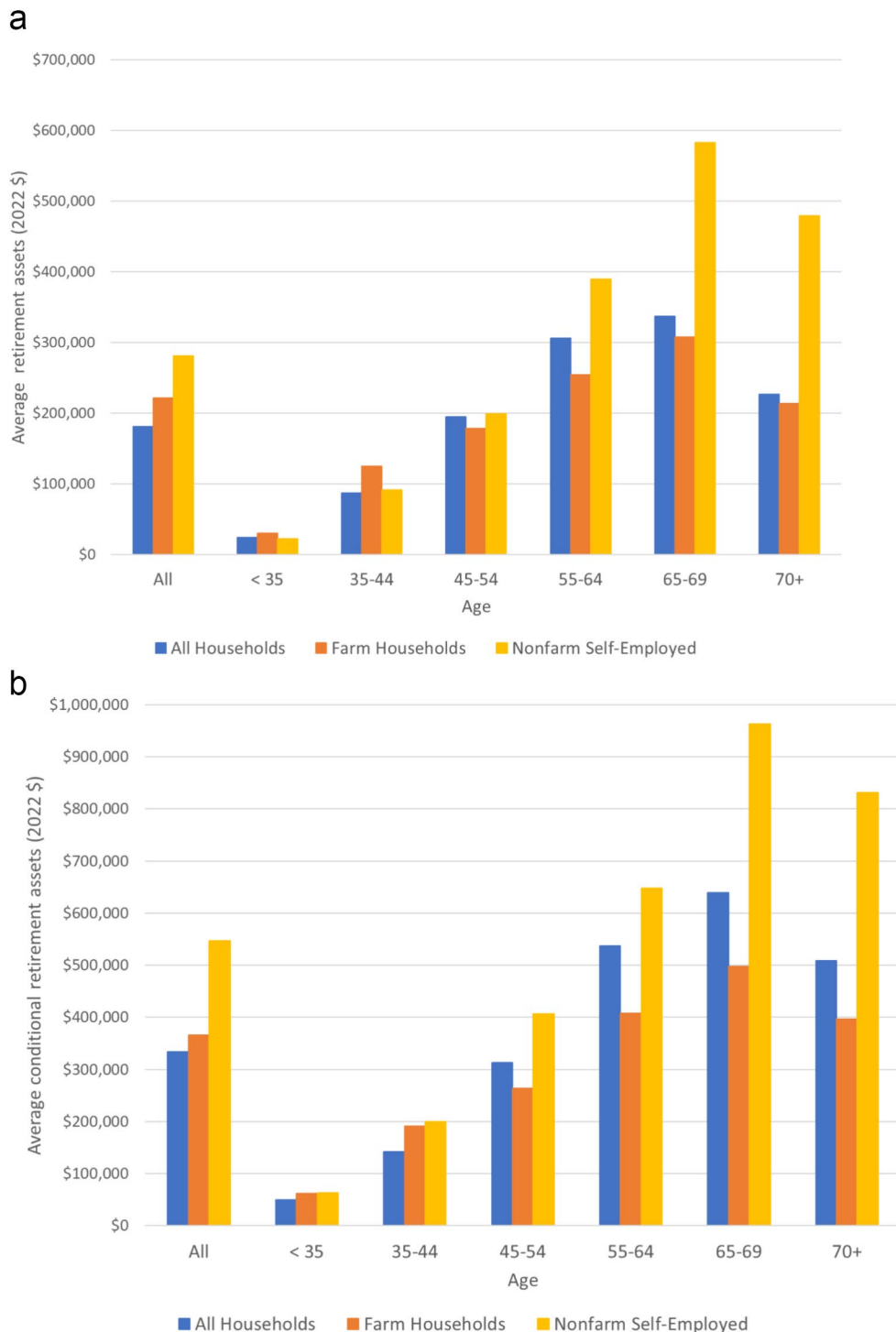
in Table 4. Farm households on average held roughly 90% more assets than the average U.S. household but 36% fewer assets than the average nonfarm self-employed household. The median farm household, however, held more assets than both median U.S. and nonfarm self-employed households suggesting a highly skewed distribution of wealth among the nonfarm self-employed population. Median total assets for all U.S. and nonfarm self-employed households

were 527,580, respectively, compared to $1.4 million for median farm households. Across all household types, total assets increased alongside the age of cohorts until peaking for the 65–69 age cohort.

Tax policies like step-up in basis play a significant role in incentivizing farmers to retain their capital assets in retirement and in preserving intergenerational farming operations. Stepped-up basis allows heirs of a deceased individual

Table 4 Household assets by age cohort

	Farm households		All households		Nonfarm self-employed	
Age	Mean	Median	Mean	Median	Mean	Median
< 35	$1,221,241	$722,660	$287,961	$68,600	$802,336	$85,300
35–44	$1,783,610	$1,124,056	$725,802	$306,300	$1,769,224	$330,470
5–54	$2,056,601	$1,270,836	$1,161,170	$427,100	$2,797,822	$480,900
55–64	$2,328,482	$1,476,970	$1,696,492	$473,500	$4,760,137	$1,183,000
65–69	$2,457,049	$1,569,889	$1,933,189	$454,800	$5,650,803	$1,198,400
70+	$2,396,864	$1,411,165	$1,716,392	$418,501	$5,544,071	$1,024,600
ALL	$2,249,819	$1,379,976	$1,186,334	$331,500	$3,491,367	$527,580

Note: Farm household values derived from pooled 2018–2021 ARMS. Estimates for all households and nonfarm self-employed households derived from 2022 Survey of Consumer Finances Extract Data

Table 5 Retirement income of farm households, U.S. households, and nonfarm self-employed households

	Average total income (2022$)			Average retirement income (2022$)			Average share of total income		
Age	Farm	Nonfarm self-employed	All	Farm	Nonfarm self-employed	All	Farm	Nonfarm self-employed	All
55–64	156,435	150,663	108,696	16,093	6,001	9,696	18%	6%	18%
65–69	149,422	152,543	90,968	29,650	20,256	27,151	37%	21%	47%
70+	120,862	151,797	69,206	39,189	35,681	33,175	50%	34%	65%

Note: CPS ASEC sample households are categorized based on the age of the primary respondent and the self-employment status of the primary respondent. Total income represents total household income for all family members while retirement income includes total household income from social security and pensions. ARMS households are similarly defined by principal operator age. Total income is total household income across all sources and household members. The definitions of retirement income differ in that ARMS includes public income sources that may not be retirement income (e.g. unemployment insurance and veterans' benefits)

to inherit assets at their current market value, effectively eliminating the capital gains tax liability on the appreciation that occurred during the prior owner's life. This creates a powerful economic incentive for farmers to hold onto rather than liquidate their assets, as they can pass them down without inflicting a large tax burden onto their heirs. As a result, farmers are more likely to continue their agricultural operations into retirement.

Farm households had higher levels of retirement income than both U.S. households and nonfarm self-employed households, but retirement income made up a smaller share of total income for farm households than for similar aged U.S. households in general (Table 5). Compared to nonfarm self-employed households though, farm households received a much larger share of their income from retirement sources. Both farm households and nonfarm self-employed households had higher levels of total household income than U.S. households overall. The patterns in reliance on retirement income and income levels may reflect differences in employment activity across household types. Many older U.S. households are likely retired with little to no earned income. Nonfarm self-employed households are more likely to be working, while older farm households are a mixture of retired and non-retired farmers.

Heterogeneity by operator and operation characteristics across older farm households

In this section, we explore differences across older farm households in farm income and assets by farm type, race, ethnicity, and sex of the principal operator, and the dependency of the household on farm income. One difficulty in studying farm households is that they are diverse in their farming operations and their household characteristics. Continuing our focus on households with a principal operator 65 years or older, we use ARMS data to examine variation in retirement income and assets by characteristics of the operator and operation.

As shown in Table 6, Non-Hispanic White farm households were more likely to have retirement savings and had higher levels of retirement assets than either Hispanic households or non-Hispanic non-White farm households. Farm households with non-Hispanic White principal operators had more than double the level of retirement savings than their counterparts with Hispanic and non-Hispanic non-White principal operators. 66% of farm households with a non-Hispanic White principal operator reported a positive retirement balance, compared to only 44% and 42% with Hispanic and non-Hispanic non-White operators, respectively. Lower savings rates, however, do not fully account for the lower retirement balances for non-White farm households. Among those who saved for retirement, large disparities in retirement savings persist, with non-White farm households reporting at least $100,000 less in

Table 6 Retirement income and assets by operator and operation characteristics, age 65+

	Average retirement income (2022$)	Retire-ment income share	Average assets in retirement accounts (2022$)	Share with assets in retirement accounts	Average con-ditional retire-ment assets (2022$)
Race/Ethnicity					
Non-Hispanic White	37,682	45%	258,391	58%	445,131
Hispanic	32,756*	47%	103,340*	42%*	247,501*
Non-Hispanic Non-White	35,673	54%*	93,996*	36%*	262,515*
Sex					
Male	38,492	45%	257,029	58%	441,416
Female	31,681*	49%*	198,015*	48%*	414,034
Reliance on off-farm income					
<50% off-farm income	20,050	13%	163,160	49%	332,675
>50% off-farm income	40,083*	51%*	266,223*	60%*	444,010*
Farm Typology					
Retirement	37,340*	51%*	198,346*	55%*	361,687
Off-farm Occ	34,749*	33%*	358,909	62%	581,180*
Low Sales	41,630*	58%*	206,982*	54%*	385,945
Moderate Sales	28,714*	24%*	184,599*	59%*	315,252*
Commercial	25,481	12%	288,106	63%	457,165

Note: Table shows average share of income across households with a principal operation 65 years of age or older in each category from 2018 to 2022 ARMS data. Income from retirement represents household level income from private pensions and disability payments and income from public sources including Social Security, military, and other public retirement, veteran's benefits, public disability, unemployment, or other public assistance. Average conditional retirement assets are equal to average retirement assets conditional on households reporting a positive retirement balance. Statistical significance is denoted using a 95% confidence interval. Significance of quantities is tested against Non-Hispanic White households for race and ethnicity, male principal operators for female, <50% off-farm income for reliance on off-farm income, and commercial farms for farm typology

conditional retirement savings compared to non-Hispanic White farm households.

Non-Hispanic non-White farm households were more reliant on retirement income than the other two groups with social security and pensions making up 54% of their income on average. Since this group had the lowest share with retirement savings and the lowest level of savings, they may be particularly financially vulnerable during their retirement years.

Such racial and ethnic disparities are not unique to farm households. Across all 65 and older U.S. households, those with a non-Hispanic White primary respondent had mean retirement savings of 42,861 and 572,657, 371,289 for non-Hispanic White, Hispanic, and non-Hispanic non-White households respectively. Median conditional retirement assets, however, were much more similar across the groups at 154,000, and 20,000 per year compared to 33,650 for non-Hispanic White households.

On average, older farm households with a female principal operator had lower levels of retirement income, were more reliant on that retirement income, and were less likely to have retirement savings compared to households of male principal operators. These differences may be explained, in part, by the scale of operation where male principal operator farms had twice the average acreage and over three times

the average gross cash farm income relative to female principal operator farms. We see similar patterns among older U.S. households, where female-led households had slightly lower average retirement income and were a bit more reliant on this income. Among farm households, there was no statistically significant difference in conditional retirement savings, between operations with male and female principal operators, despite male-led operations having far higher levels of unconditional retirement savings. Unlike farm households, U.S. households 65 and older with a male primary respondent reported mean retirement assets of over three times than that of those with a female primary respondent (97,486). Further, average conditional retirement assets for older male-led households were 309,091 for female-led households. Female-led households were also less likely to have retirement savings at 32% compared to male-led households at 55%.

Off-farm employment plays a major role in supporting the average farm household and is also likely important in determining retirement preparedness (Whitt and Todd 2020). Wage and salary employment off the farm may provide access to employer sponsored 401k accounts and employer matching. Workers also pay into social security on these earnings as they do on net farm earnings. While net farm earnings may often be negative resulting in little

to no social security entitlements, off-farm wage and salary income is positive and at low levels of income social security is a progressive system.

Indeed, we find that many farm households said that retirement considerations are an important reason they work off farm. In 2018 and 2019, ARMS asked respondents who worked a wage and salary position off the farm to check all the reasons why they sought off-farm employment. Among farm households where at least one spouse worked in a wage and salary position, roughly 90% said they worked off-farm for a source of reliable income, 81% said it was because it was more lucrative than farm work, 73% said it was at least in part for health insurance, and 72% said it was for retirement benefits. These results suggest that off-farm wage-and-salary employment provides an important complement to self-employment income from farm operations.

As expected, older farm households with the majority of income coming from the farm received around half as much income from retirement sources and it made up a much smaller percent of their income compared to households receiving over half of their income from off-farm sources. Farm households that derived more than 50% of their total income from off-farm sources had higher levels and rates of retirement savings compared to farm households that generated most of their income on the farm.

Older households operating commercial farms had the lowest levels of retirement income and that income only made up 12% of their total income. Retirement and low sales farms households had the highest retirement income levels, and both were heavily reliant on retirement income. Off-farm occupation farm operators had significantly higher savings rates and conditional retirement balances. This was likely due to greater access to employer-sponsored retirement accounts and matching programs for households in these two groups. Conversely, retirement, low sales and moderate-sales farm operators had lower retirement balances relative to commercial-farm and off-farm occupation households.

Conclusion

Farm households exhibit unique characteristics compared to the general population that may affect preparation for retirement such as income volatility, limited access to employer-sponsored retirement savings plans, a high concentration of assets in the farm business, and tax policies that incentivize the preservation of farms through intergenerational transfer. Our study finds that farm households are less reliant on retirement income in their older years compared to older households in the general population, but more reliant than nonfarm self-employed households. A greater share of farm

households maintained savings in retirement accounts relative to U.S. households overall and nonfarm self-employed households. Older farm households, however, may be relatively less prepared for retirement as they had lower levels of retirement savings relative to similar aged U.S. households. Although farm households' overall asset levels were higher than other U.S. households, their wealth is concentrated in the farm operation. Farm assets may be relatively illiquid, and previous work suggests that farmers may be reluctant to draw on them for retirement support.

There is important heterogeneity across farm households by producer demographics and farm operation characteristics. Non-Hispanic non-White operators were more reliant on retirement income sources but had lower levels of retirement assets to draw from in retirement. Farm households that derived more than half their income from off farm sources had higher retirement savings rates and levels likely due to their access to private employers' retirement benefits. Operators of low sales farm businesses stand out as households that may be particularly unprepared for retirement as they were less likely to have retirement accounts and have low levels of retirement assets, total income, and total assets.

Future work could examine the well-being of the truly retired no longer producing farm households who live on rental payments from land, retirement sources alone, income sharing with a successor, or other sources of income. Longitudinal data may offer additional opportunities to identify and study the well-being of fully retired farm households who would not be covered in the ARMS survey. These households may look different from the "retired" farm households in ARMS who are still producing at a small scale. Examining income and wealth during the post-production years would provide a more complete perspective of farm households' retirement experiences across the life cycle.

Declarations

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