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Income Volatility and Social Security: Understanding Farm Losses and Their Implications

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Abstract

Farm and ranch operators in the United States are an economically vulnerable group. Unlike other categories of self-employed individuals, farmers have more discretion over whether to pay self-employment taxes due to the "farm optional method" (FOM). The FOM allows farmers who have negative or very small profits to opt-in and pay self-employment taxes when they typically would have little to no self-employment tax liability. By opting to use the FOM, farmers can accrue quarters of covered work that contributes towards eligibility for Old Age, Survivors, and Disability Insurance (OASDI). This research longitudinally links two decades of USDA Agricultural Census Data on the share of farms in a county that incur losses and the share of farm owners in a county working off-farm. I find that the average share of farms in a county that incur losses is between 50 and 55 percent. In addition, the average share of farm owners in a county who report working at least one day off-farm is between 53 and 64 percent. The estimated upper and lower bounds on the share of farms in each county in each survey wave that may have been eligible to use FOM when filing their taxes show that although the bounds are relatively stable over time, there are significant geographical differences in these bounds. This information is valuable for those doing outreach to help farmers plan for retirement and to make sure farmers are eligible to claim SSDI benefits if they are injured and unable to work.

Keywords: Social Security, Farm Optional Method, Retirement Security
JEL Classification: Q14, I30, H55

1 Introduction/Literature Review

Farm income is much more volatile than most nonfarm income due to the fact that it is directly tied to yields and prices, which in and of themselves are highly volatile. In a study of farm income volatility, Key, Prager, and Burns (Key, Prager, and Burns 2017) found the median income change between periods for farms in their sample was $100,925. When compared to findings using data from the Current Population Survey for nonfarm households, Hertz (Hertz 2006) found that the median absolute change in household income between 2003 and 2004 was $11,345. For this reason, agricultural supports from the federal government have been in place for many years to try to help shelter farmers from these fluctuations. For example, the 2014 Farm Act changed the priority of agricultural supports toward programs designed to reduce income risk (Key, Prager, and Burns 2017). However, supports are not perfect and have not been able to completely protect farmers from large swings in prices and yields. This volatility in income makes financial planning a difficult task as farmers weigh how much they should save during good years to help protect them in bad years, how much they should invest back into the farm, and if and how much they should save for retirement. This study focuses on the link between income volatility and retirement planning.

For individuals working in nonfarm employment (and who are not self-employed), there are typically more savings options for retirement (employer pension plans, 401k matching, etc.). However, these options are not frequently available for individuals whose sole income is from their farm. According to the Social Security Administration, in 2014 about 84 percent of individuals age 65 and older were receiving income from Social Security, followed by about 62 percent having asset income, and about 44 percent having retirement benefits from places other than Social Security (Social Security Administration, 2016). When looking at farm owners specifically, Maule, Zhang, and Baker (Maule, Zhang, and Baker 2020) found about 58 percent of farmers in Iowa indicated Social Security as a source of retirement income, 52 percent said income from the farm, and less than 30 percent indicated income from a private retirement plan as a source.

This smaller fraction of farmers using Social Security to finance retirement may be a direct function of the volatility of farm income. Due to Social Security eligibility rules and the calculations used to determine payment amounts, some farmers may not be eligible and others

who are eligible may only get small payments. This research aims to expand knowledge in this area by studying the share of farmers who were eligible for the Farm Optional Method (FOM) when filing their self-employment taxes. This method, discussed in detail in the next section, allows farmers who typically would not have a tax liability to pay taxes to accrue credits to be eligible for Social Security. However, it is not well understood how many farmers know about this option and how widely used it is.

In addition to the challenges farmers face when it comes to income and retirement planning, they also face job-specific challenges. First, farmers have been found to delay their retirement more than those in nonfarm occupations. Thelin and Holmberg (Thelin and Holmberg 2010, 42) found that among those 65 and older, 64 percent of farmers were still working as compared to only 6 percent of those in nonfarm occupations. In the data used for this analysis, the average age of farmers in the United States increased from 54 years in 1997 to 57.5 years in 2017.

Farmers are not only aging but are facing more mental health challenges. A systematic review of 167 studies that looked at the mental health of farmers determined that the four most common influences on the mental health of farmers were: pesticide exposure, financial difficulties, climate variabilities, and poor physical health/past injuries (Yazd, Wheeler, and Zuo 2019). Of these 167 studies, 45 were conducted in the United States, with the most common stressor being finances. A study of farmers and ranchers covering the years 1992 to 2010 found that farmers had a suicide rate almost three times higher than the national average (Ringgenberg, Peek-Asa, Donham, and Ramirez 2017, 246). As noted earlier, in the five waves of the Agricultural census studied here, about half of all farms reported incurring a loss in the previous year. This is coupled with the fact that over half of all farmers interviewed for these census waves reported working at least one day off-farm. These factors are likely contributing to the high suicide rate. Beyond the stress of income and potentially working a second job, more senior farmers may struggle with the emotions surrounding retirement planning and what that means for the future of their farm. As Kirkpatrick (Kirkpatrick 2013, 3) stated:

> "Too many farmers allow their inability or unwillingness to recognize, analyze, and discuss the emotional aspects of retirement and succession to perpetually stall their planning. Farm operations that would be considered financially sound, well-managed businesses can slowly collapse and fail because the older generation is unable or unwilling to face the contradicting

desires of seeing the next generation succeed yet retain the independence and self-identity farming provides.

On top of the mental challenges farmers face, they also face physical challenges. In their research, Miller and Aherin (Miller and Aherin 2018) found that about 19 percent of farmers had a disability at some point between 2008 and 2016. According to a literature review conducted by Deboy et al. (Deboy et al. 2008), "Depending on the source quoted, agricultural workers sustain from 4 to 16 non-fatal injuries per 100 annually." For these reasons, it is even more important that farmers accrue quarters of earnings history for SSDI as they are disproportionately likely to acquire a work-limiting mental or physical disability.

In this paper, I longitudinally linked data from two decades of the United States Department of Agriculture (USDA) Agricultural Census to form a new dataset. Using this dataset, I found that across the waves of the Census the mean share of farms in a county that incurred losses was between 50 percent and 55 percent. In addition, I found that the mean share of farm owners in a county working at least one day off-farm ranged from between 53 percent and 64 percent. When that threshold was increased to working at least 200 days off-farm, the range was between 38 percent and 41 percent. In this paper, I aimed to answer the question "What share of farms could be eligible to use FOM when preparing their taxes?". I created upper and lower bounds for each survey wave using linked data on the share of farms in a county that incurred losses and the share of farmers who reported working off-farm. I then presented descriptive results on these upper and lower bounds over time and across counties. This descriptive work lays a foundation for future work in the area aimed at helping farmers prepare for retirement, specifically when it comes to eligibility for OASDI.

2 Institutional Background

When the Social Security Act of 1935 was passed it excluded agricultural and domestic workers, and they were not included until the Social Security Amendments of 1954 (DeWitt 2010; Reinsel and Ellickson 1966). The reasons given were that farms were widely dispersed in rural areas at the time and it was seen as infeasible to collect taxes from farms for this purpose. One justification given was that individuals would be able to obtain coverage by getting a second job in a covered occupation, a trend that is still common today.

In order to claim Social Security retirement benefits today, an individual must earn at least 40 Social Security credits. To be eligible for SSDI benefits, individuals must meet the requirements of a recent work test and a duration work test which varies depending upon the age at which the disability starts. For example, if an individual is 32 years old at the onset of their disability, they generally need to have earned at least 20 credits in the 10 years immediately before their disability began (Social Security Administration 2022). Individuals can earn up to four credits per year based on total wages and self-employment income. These credits are earned based on income, not on the number of weeks out of the year individual works. The income threshold to earn credits changes each year, but in 2022 one credit was earned for every $1,510 in covered years, meaning an individual needed $6,040 in covered earnings to accrue the maximum four credits for the year. For those working in nonfarm industries, these may seem like low and easily obtainable thresholds. However, many farms have years where they have negative income (they incur a loss) or a very small positive income, meaning the farm owners would not accrue credits if they did not have another job outside of their farm. For this reason, many farm owners get a second job working off-farm in order to accrue the credits they need to be eligible for OASDI, in addition to earning extra income for their household.

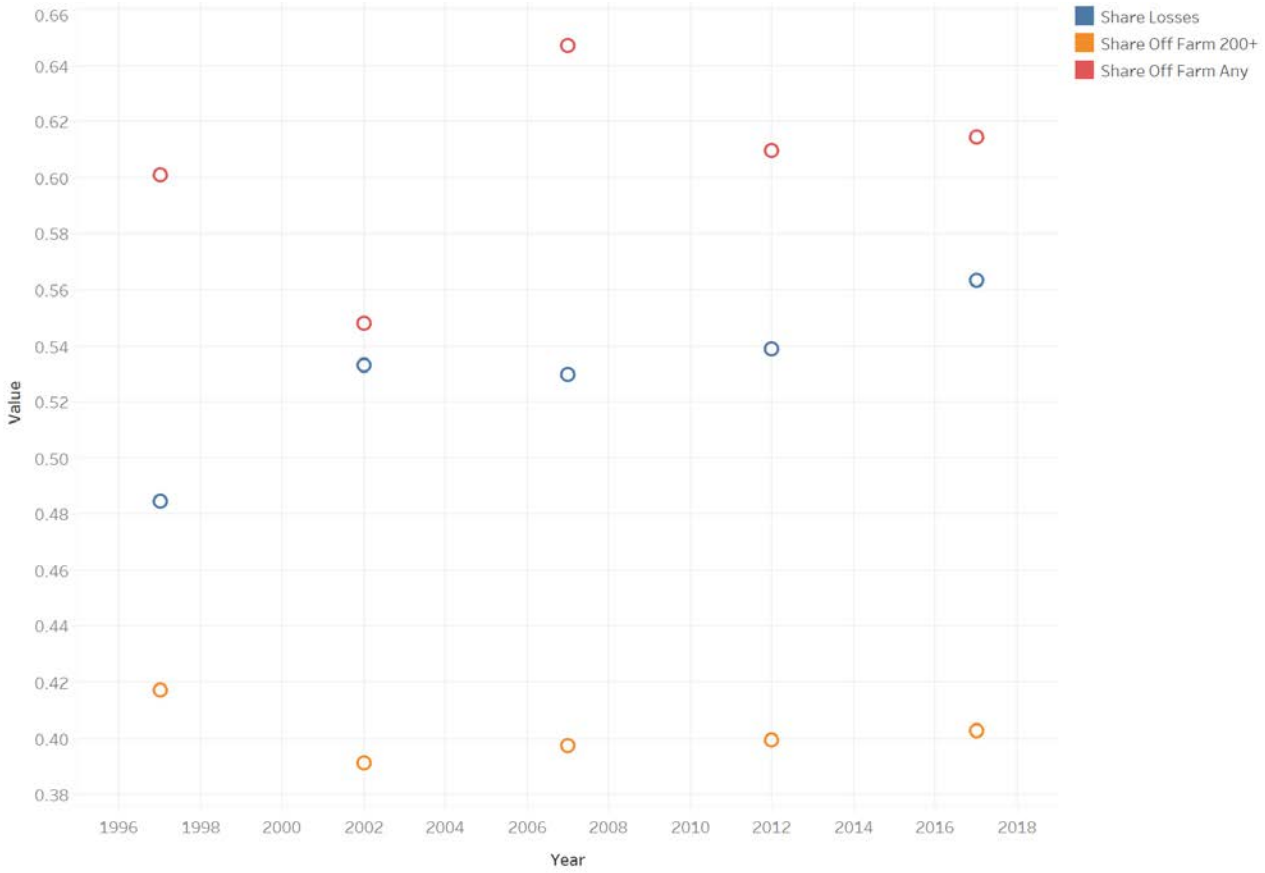
With this in mind, farmers have the option to use the Farm Optional Method (FOM) when preparing their self-employment taxes. When using this method, farmers who typically would have no or little self-employment tax liability may opt to pay a self-employment tax in order to accrue credits for that year (Internal Revenue Service 2022). For example, in 2021, if a farm had a gross farm income of $8,820 or less or profits less than $6,367, they were eligible to use the FOM. When using this method, farmers use the smaller of either two-thirds of their gross income or the lower limit for earning four quarters of coverage. They are then subject to self-employment taxes (FICA and Medicare) on this income. As discussed previously, farmers have a higher rate of physical disability than those in nonfarm occupations, and if they want to claim SSDI benefits at the onset of the disability they must pass the recent work test and duration of work test to be able to get these benefits. These two factors together bolster the importance of farmers' awareness of the FOM when preparing taxes, specifically if they are not earning coverage from a second job.

3 Data & Methods

3.1 Data

The data for this study came from the USDA Agricultural Census from the 1997, 2002, 2007, 2012, and 2017 waves[1]. This data was collected by the USDA at the individual farm level and then aggregated and made available at the county level. For my analysis, I longitudinally linked data at the county level on the average age of farmers, number of farms with gains, number of farms with losses, and information on whether the farm operator also worked off-farm, and if so, for how many days in that year. I excluded data from Hawaii and Alaska due to limited data observations, resulting in observations for 3,070 counties. In addition, it is important to note that the USDA only asked questions related to net cash returns for a subset of farms in each county.

Figure 1. US Level Summary Statistics



[1] This research uses the NASS API but is not endorsed or certified by NASS.

Figure 1 shows key summary statistics on the share of farms incurring losses and the share of farmers working off-farm at the national level for each wave of the Agricultural Census analyzed in this paper. The first important observation is that in all waves over half of farmers reported working at least one day off-farm. This share appears to fluctuate over time but has been over the 60 percent threshold since the 2007 census. In addition, in all waves over 35 percent of farmers reported working at least 200 days off-farm. There is much less variability in this share and it has stayed close to 40 percent in the last three census waves. Lastly, when looking at the share of farms incurring losses, a general upward trend appears, with over 55 percent of farms reporting that they incurred a loss in the 2017 census. However, these national-level statistics may mask important heterogeneity at the regional or county level. For this reason, both spatial and temporal variation was used when presenting estimates in the following section.

3.2 Methods

Using the newly created dataset, I attempted to bound the share of farms in each wave of the census by county that could have used FOM. As discussed above, the questions on net cash were only fielded to a subset of farms in each county. To perform this analysis, I used the share of farms incurring a loss and the share of farmers who reported working off-farm. For this to produce reliable bounds, it was assumed that the random sample of farms was truly random and there was not a response bias correlated with farm income.

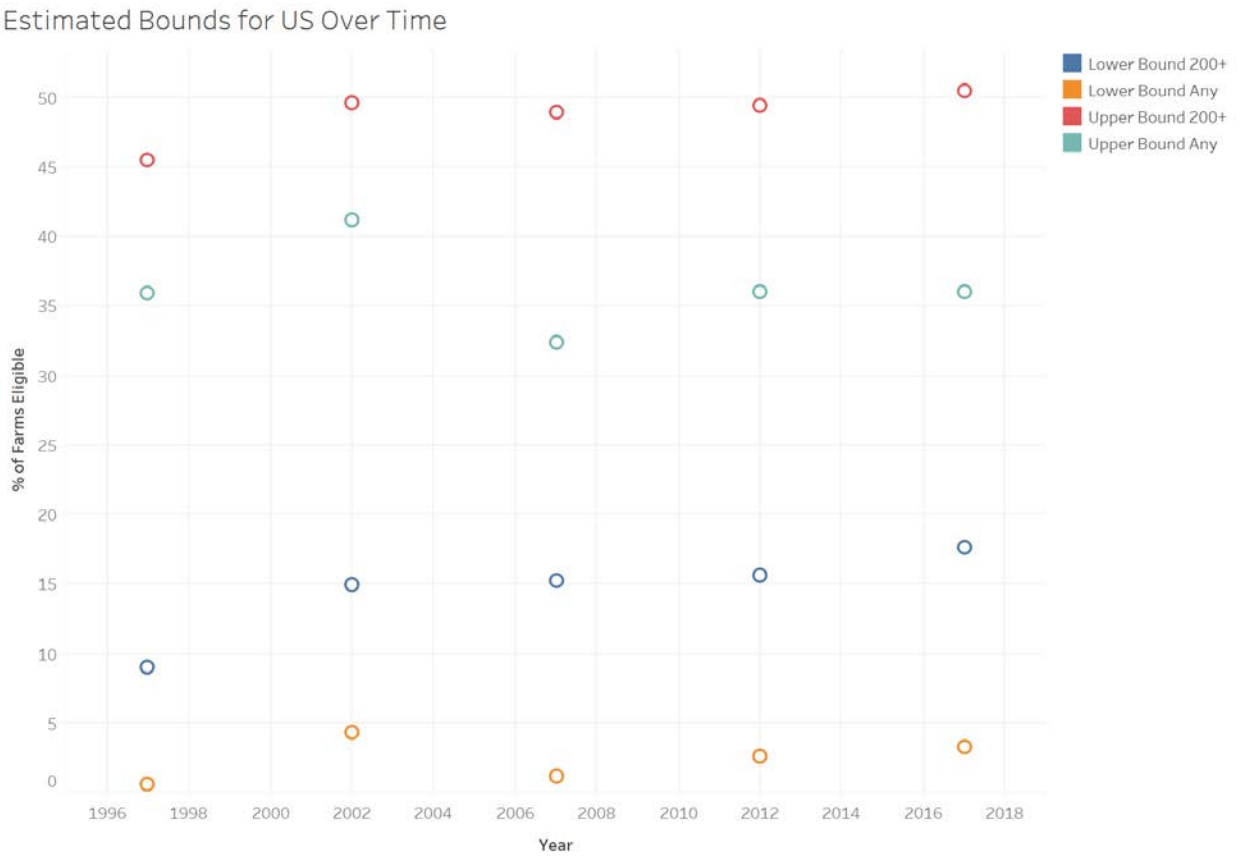
The bounding exercise performed was based on the following thought experiment- what share of farms would be eligible to use the FOM based on different assumptions on how losses are correlated with working off-farm. Both losses and working off-farm needed to be considered instead of simply looking at the share of farms with losses. This is because many farmers did work a second job off-farm in order to supplement their income, accrue credits needed for eligibility in OASDI, and get health insurance and other benefits. First, to create an estimate of the lower bound on the share of farms that could have been eligible to use FOM, I based the estimate on whether all of the farmers who reported having worked off-farm were also those who incurred a loss; if this number was negative it was replaced with zero. Next, I created an upper bound estimate based on whether all of the farmers who reported working off-farm had net gains. If the share of farmers who worked off-farm was greater than the share of farms with net gains, I first subtracted off the share of farms with gains and then subtracted the remaining share from

the share of farms with losses. I then repeated the creation of both the lower and upper bounds using a second threshold available in the data which measured if the individual worked 200 or more days off-farm in the previous year. Once the bounds were created, I used linear regression with state and year fixed effects to look at how the average age of farmers in a county was related to those estimated bounds.

4 Results

I began my analysis by looking at trends over time in the estimated bounds at the country level. Figure 2 shows the estimated upper and lower bounds for the entire United States using both thresholds for days worked off-farm. The bounds were fairly stable over time, with less than 5 percent of all farms estimated to be eligible to use the FOM when using the most conservative lower bound, and over 45 percent of farms estimated to be eligible when using the upper bound and requiring 200+ days worked off-farm. These estimates were a useful starting point for getting a sense of how many farms may have been eligible to use the FOM, however, they do not give insight into if there were any spatial patterns in these estimates.

Figure 2.



The summary statistics presented in Figure 2 are valuable when gauging the impact at a macro level, but to fully understand where additional outreach on FOM may be valuable, a more granular approach is needed. When looking at the state level, I was able to compute the share of farms in each state, in each wave, that were estimated to have been eligible to use the FOM. I was then able to rank the states from the highest estimated share with a given bound to the lowest estimated share with a given bound. Regardless of which bound was used, Iowa was consistently among the states with the lowest share of farms estimated to be eligible to use the FOM. Tables 1a. and 1b. show the list of states that were among those with the five lowest shares for each of the four bounds, ordered by how frequently they were among the five lowest across the five waves of the Census.

Table 1a. List of States with Smallest Lower Bounds Ordered by Frequency Across Waves

Lower Bound Any	Lower Bound 200+
Iowa	Iowa
North Dakota	Illinois, North Dakota
Kansas, Nebraska	South Dakota
Delaware, Minnesota, Illinois	Kentucky, Minnesota, Illinois, Nebraska
Missouri, Wyoming, Vermont, South Dakota	Indiana, Kansas

Table 1b. List of States with Smallest Upper Bounds Ordered by Frequency Across Waves

Upper Bound Any	Upper Bound 200+
Iowa	Iowa, South Dakota, Illinois
North Dakota	North Dakota
Minnesota, South Dakota	Nebraska
Nebraska, Illinois	Minnesota
Tennessee, Kentucky, Colorado, Kansas, Utah, Rhode Island	Kentucky

Conversely, when looking at the states that are most frequently among the top five states with the largest share of farms estimated to be eligible for the FOM, Arizona was the most frequent across all four estimates. Tables 2a. and 2b. show the list of states that were among those with the five largest shares for each of the four bounds, ordered by how frequently they were among the five largest across the five waves of the Census.

Table 2a. List of States with Largest Lower Bounds Ordered by Frequency Across Waves

Lower Bound Any	Lower Bound 200+
Arizona, Florida	Arizona
New Hampshire, New Mexico	New Hampshire
Georgia, Nevada, Texas, Washington	New Mexico
Maryland, North Dakota, Maine, South Carolina	Nevada, Oregon, South Carolina, Texas, Florida

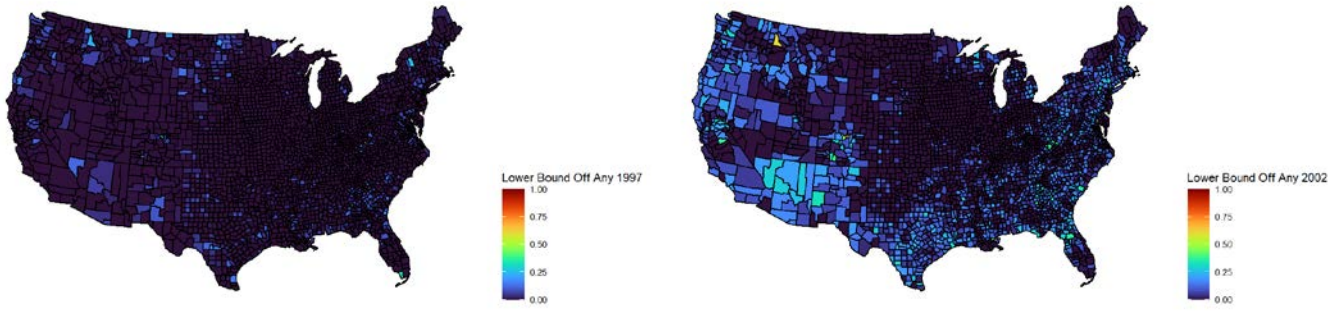
	North Dakota, Maine, Montana

Table 2b. List of States with Largest Upper Bounds Ordered by Frequency Across Waves

Upper Bound Any	Upper Bound 200+
New York	Arizona, New Mexico
Arizona	New Hampshire, Oregon
Wisconsin	Connecticut, New Jersey, Florida
Florida, Georgia, Michigan, Pennsylvania	Maine, Massachusetts, Nevada
Wyoming, Connecticut, California, North Dakota, Massachusetts	

These state-level rankings capture both the spatial and temporal variation seen in the estimates of the bounds. However, they may miss important county-level variation. Figures 3 and 4 below show heat maps of the lower bounds using any days off-farm and at least 200 days off-farm, respectively, plotted at the county-census wave level. A pattern appears to emerge. There was a clear section in the center of the country where the lower bound was always zero or close to zero. Whereas counties in the Southwest and West frequently had a larger lower bound. This corresponded to what was seen when looking at the states that frequently had the highest and lowest shares shown previously.

Figure 3: Lower Bound- Any Days Worked Off-Farm



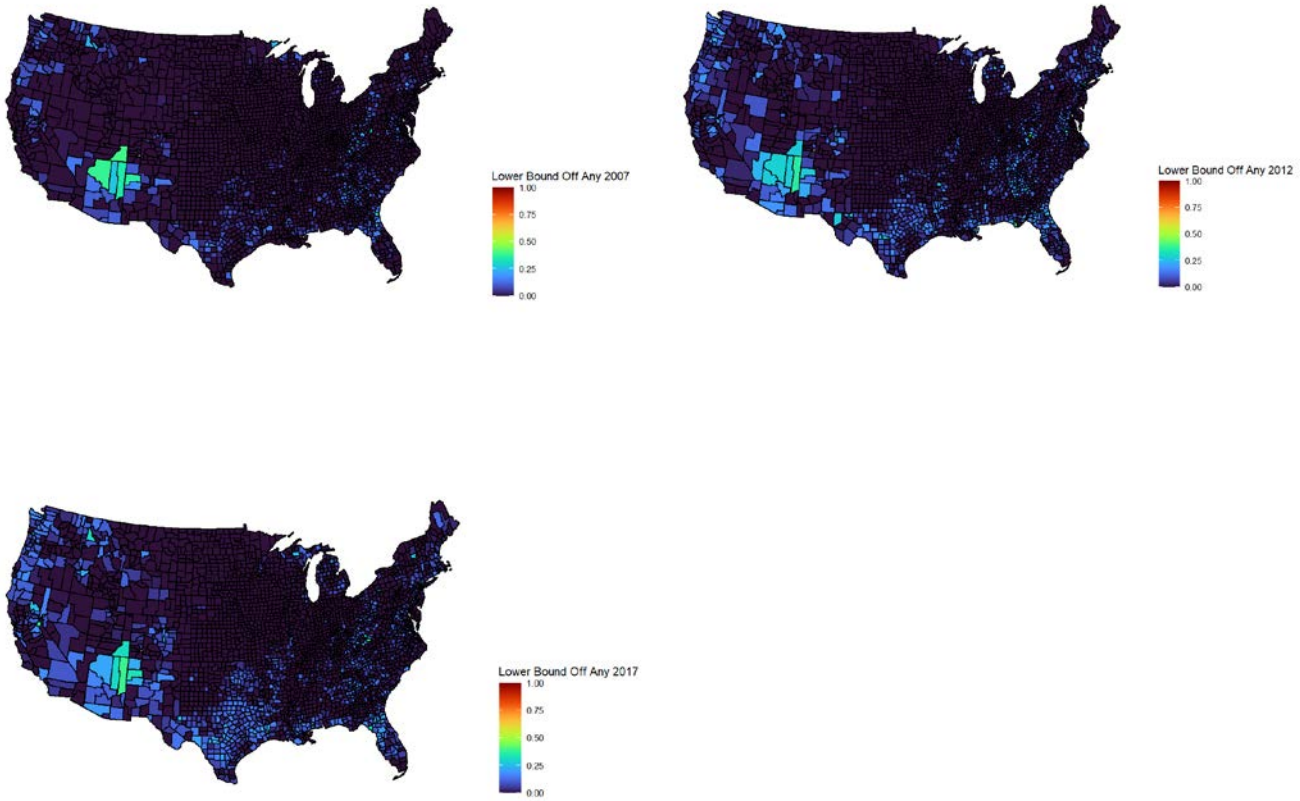
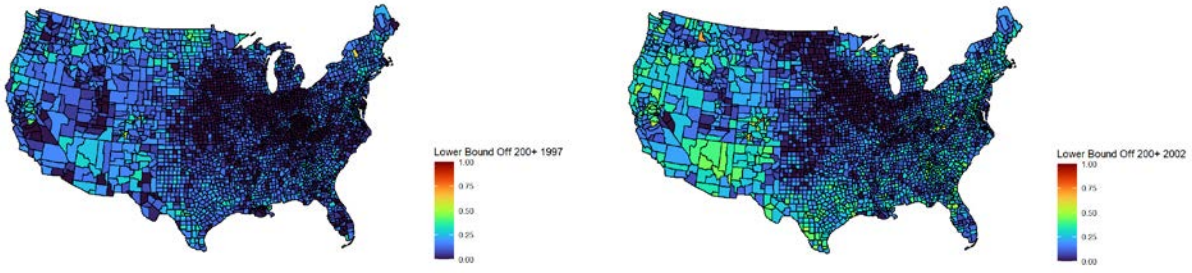
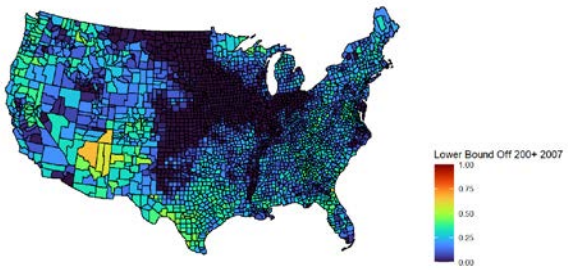
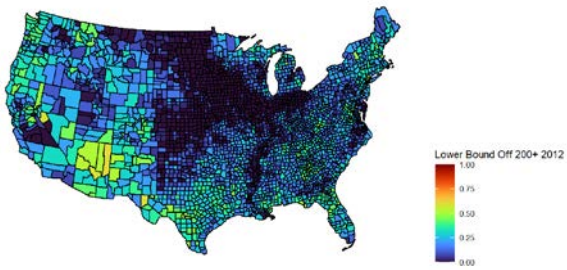
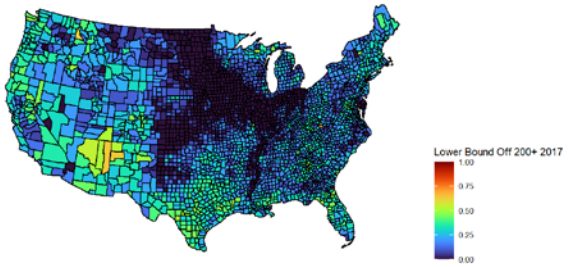


Figure 4. Lower Bound- 200+ Days Worked Off-Farm









Looking at the county-census wave heat maps shown in Figures 5 and 6, we can again see patterns emerge, specifically across regions. Again, counties in the center of the country were more likely across all time periods to have a much smaller share of farms that were estimated to have been able to use the FOM. Whereas counties in the southwest, and to a lesser extent the west and east coasts, were more likely to have a larger share of farms estimated to be able to use FOM. Again, these trends were consistent with those found when looking at the state-level trends analyzed earlier.

Figure 5. Upper Bound-Any Days Worked Off-Farm

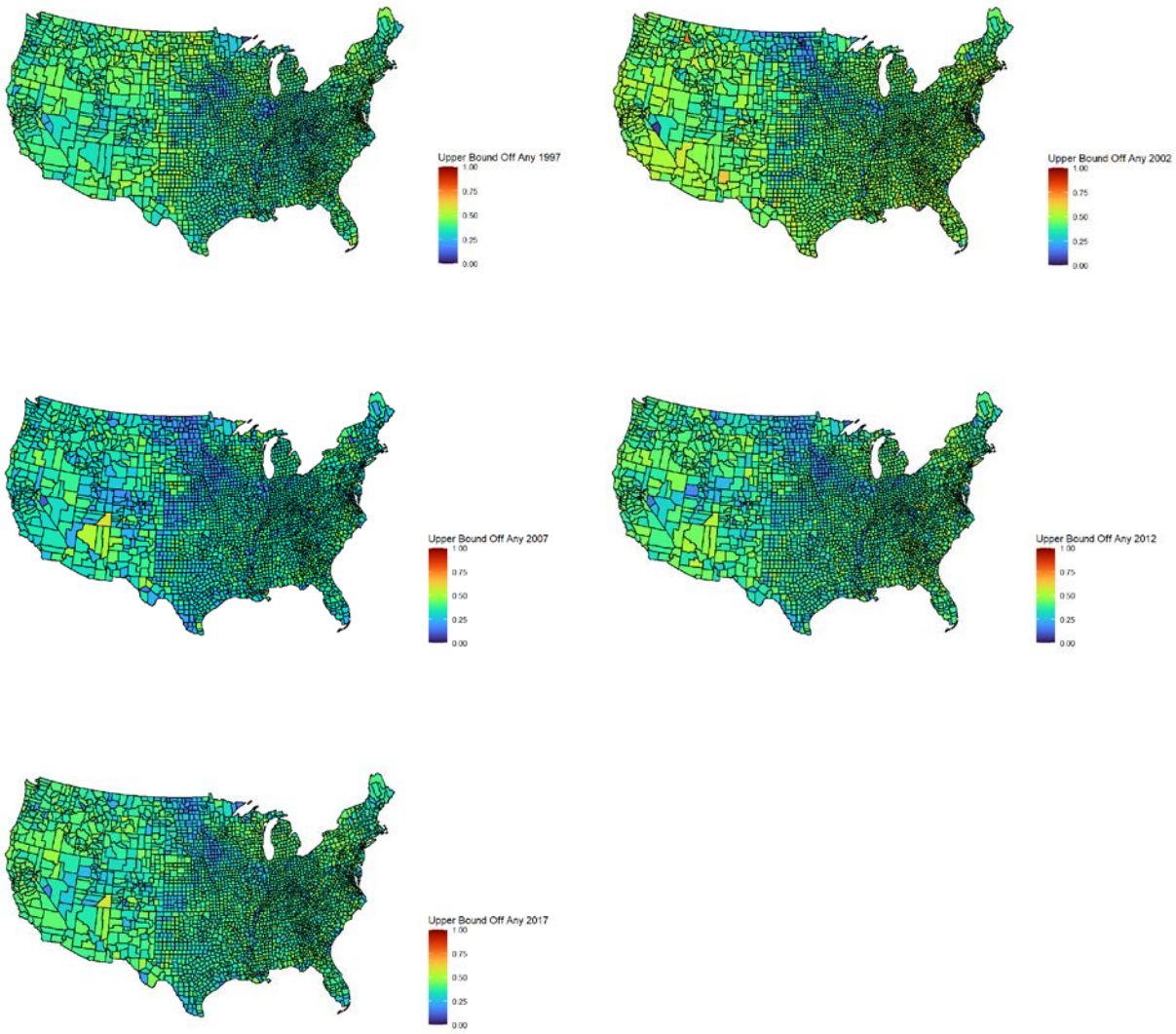
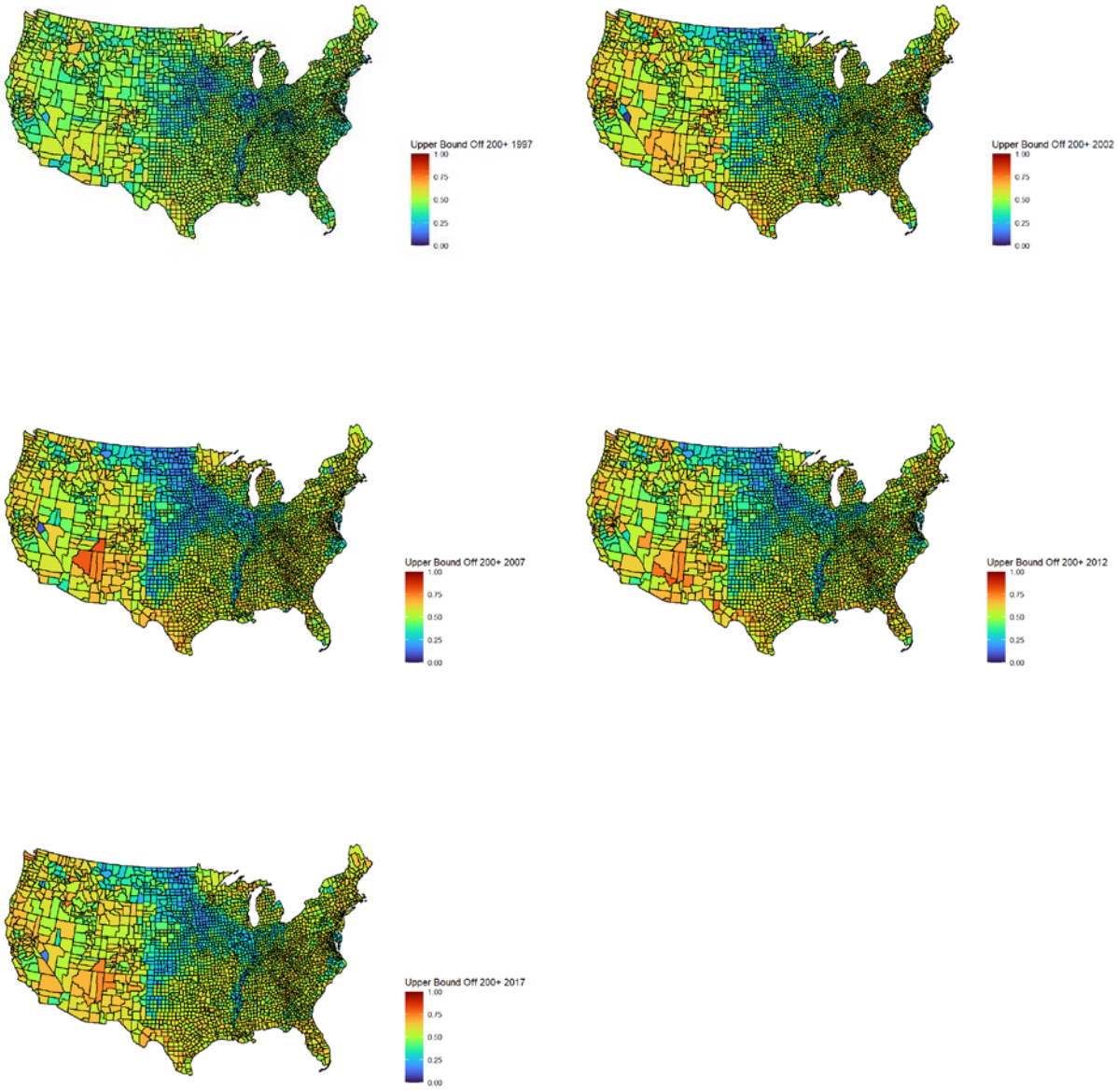


Figure 6. Upper Bound-200+ Days Worked Off-Farm



Lastly, I looked at how the average age of farmers in a county was related to the estimated bounds. Table 3 presents the results of these regressions[2]. In all cases, an increase in the age of farmers in a county was estimated to increase the percentage of farms eligible to use

[2] Only coefficient estimates for average age are shown. Full results showing estimated state and year fixed effects are available upon request.

the FOM. The point estimates indicated that a one-year increase in the average age of farmers would be expected to increase the share of farms estimated to be eligible by between 0.4 and 0.7 percentage points.

Table 3.

	Lower Bound Any (1)	Lower Bound 200+ (2)	Upper Bound Any (3)	Upper Bound 200+ (4)
Average Age	0.004***	0.005***	0.007***	0.006***
	(0.0002)	(0.001)	(0.0003)	(0.001)
Observations	14,867	14,867	14,867	14,867
R^2	0.222	0.677	0.327	0.431
Adjusted R^2	0.219	0.676	0.325	0.429
Residual Std. Error (df = 14814)	0.046	0.113	0.060	0.114
F Statistic (df = 52; 14814)	81.148***	597.859***	138.406***	216.203***
Note:	*p<0.1; **p<0.05; ***p<0.01			

5 Discussion

The distinct geographic patterns found are important to note when thinking about outreach efforts to inform farm owners they are eligible for OASDI benefits. In addition, looking at county-level estimates may be important if states or extension groups want to target outreach within their state. For example, in the list of states that were among those with the smallest shares estimated to be eligible shown in Tables 1a. and 1b., Illinois showed up in all four tables. However, within the state, there was still substantial variation. One example is Lake County, Illinois, where for the most recent wave the most conservative estimated lower bound was almost

12 percent and the least conservative upper bound was almost 65 percent. This highlights the importance of being able to target outreach to specific counties that may benefit most from it.

6 Conclusion

This research has started the creation of a longitudinally linked panel dataset linking multiple years of county-level USDA Agricultural Census Data. In this paper, the dataset was used to estimate the upper and lower bounds of the share of farms that may have been eligible to use the FOM when filing their self-employment taxes. The share of farms estimated to be eligible at the US level across census waves was relatively consistent for all four estimated bounds. However, when looking at the state and county levels, there were distinct patterns that emerged. It's possible to use these patterns to determine which states, or counties within a state, may have the largest share of farms that could be eligible to use the FOM, and target outreach to ensure that individuals have accrued enough credits for both OASI and SSDI to those areas.

In addition, this research highlighted that since 1997, over 50 percent of farmers have been working a second job off-farm in addition to working on their farms. Again, using spatial patterns found here, outreach might be more targeted in areas where working a second job is more frequent. By doing targeted outreach on this topic, educators may be able to inform individuals of options such as the FOM if the individuals are only working a second job to ensure they are eligible for OASI and/or SSDI.

Lastly, this research found information about the stresses faced by farmers in the United States and how the challenges differ not only over time but also across the country. Coupling this research with that on farmer mental health may be beneficial for policymakers when thinking about the incentives for farmers to work more than one job. Future work in this area is important as the farming industry continues to age and face new challenges.

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