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Do Socioeconomic Factors Matter in Acreage Owned and Acreage Farmed by Small Livestock Producers in Alabama?

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Abstract

Socioeconomic factors could affect acreage owned and acreage farmed by small producers. However, there is limited research on the issue in the Southeastern U.S., for example, Alabama. Thus, this study examined the impact of socioeconomic factors on acreage owned and acreage farmed by small livestock producers in Alabama. The data were collected from a convenience sample of producers from several counties in Alabama, and analyzed using descriptive statistics and ordinal logistic regression analysis. The results showed that a majority had farming experience of more than 30 years, but had livestock farming experience of less than 30 years. Also, a little over half owned over 60 acres of land, and a majority (58%) farmed over 60 acres. The ordinal logistic regression analyses showed that, of the socioeconomic factors, only age and education had statistically significant effects on acreage owned and acreage farmed. The findings suggest that socioeconomic factors, specifically, age and education, are important to farm size in the study area.

Keywords: socioeconomic factors, acreage owned, acreage farmed, small livestock producers, small producers

1. Introduction

Farm size has always been of interest to agricultural scholars and practitioners. The Smallholders in Transition Team, FAO (2017, p. 4) defined farm size as "the land operated by the household, intended as the land owned plus the agricultural land rented/borrowed/sharecropped in minus the agricultural land rented/lent/sharecropped out. Also, land left fallow is considered operated land." MacDonald, Korb, and Hoppe (2013, p. 1) also defined farm size as the crop acres operated by a farm, meaning "the cropland it owns, plus any that it rents, minus any rented to others." According to them, crop farm size in the U.S. has been increasing; however, at the same time, the number of very small farms has been increasing. They argued that the increase in farm size can be attributed to improvements in technology, changes in farm organization, and government policy. They, in addition, observed that the increase in farm size has been associated with specialization and the increase in production and marketing contracts.

What is more, the USDA National Agricultural Statistics Service [NASS] (2018) reported that, from 2010 to 2017, the total number of farms in the U.S. has been decreasing; the land in farms (acres) has been decreasing; yet, the average farm size acres has been increasing. From 2010 to 2017, the total number of farms decreased by 4.72%; the land in farms (acres) decreased by 0.62%, and the average farm size increased by 4.22%. Additionally, it reported that, in 2017, the number of farms with less than $10,000 in sales dominated the farm category; followed by the number of farms with sales between $10,000-99,999; $100,000-249,999; $250,000-499,999; $500,000-999,999, and $1,000,000 plus. This notwithstanding, those with the larger farm sizes had the higher sales.

Relatedly, the USDA Economic Research Service [ERS] (2018), measuring farm size by gross cash farm income (GCFI), reported three main categories of farm types or sizes and nine farm subtypes or sizes. These were as follows: (A) small family farms with GCFI less than $350,000, with five subtypes or sizes; (B) midsize family farms with GCFI from $350,000-999,999, with one subtype or size, and (C) large-scale farms with GCFI from $1,000,000 plus, with three subtypes or sizes. The nine subtypes or sizes are: (1) retirement farms; that is, small

farms whose owners indicate that, they are retired but still farm on a small scale; (2) off-farm occupation; that is, small farms whose owners indicate that, they have a primary job other than farming; (3) farming-occupation farms; that is, small farms whose owners indicate that, farming is their primary occupation; (4) low-sales farms; that is, farms with GCFI of less than $150,000; (5) moderate-sales farms; that is, farms with GCFI that ranged from $150,000-349,999; (6) mid-size family farms; that is, farms with about mid-range income as previously described, for main farm size (B); (7) large farms; that is, farms with GCFI that ranged from $1,000,000-4,999,999; (8) very large farms; that is, farms with GCFI of $5,000,000 plus, and (9) nonfamily farms; that is, farms where the principal manager and individuals associated with the manager are not majority owners of the farm. The subcategories reveal that the higher the sales, the larger the farm size.

The type of farm determines the type of producer. Usually, small producers operate small/smaller farms. The definition of who a small farmer is has also been intriguing to agricultural scholars and practitioners. However, there is no clear-cut definition of who a small producer is. According to the FAO (2015), usually, this is measured in terms of farm size; for instance, those with 2 hectares or 4.9 acres of farm size are characterized as small producers. Dixon, Tanyeri-Aburi, and Wattenbach (2004) defined a small producer as one with limited resource endowment, such as land, capital, or skill, compared to other similar producers. Hoppe and MacDonald (2001) also characterized U.S. small farms using farm size, production, financial returns, business structure, origin of household income, and government payments. Reddy, Huam, and Donald (1989) explained that small farms share some identical attributes, such as being concentrated in rural areas, having an average farm size of at most 50 acres, and being run by farmers who are usually above 54 years. Vorley, Fearne, and Ray (2016) argued that although most agricultural production comes from large family and nonfamily farms, small producers also contribute to agricultural production, despite heavily relying on off-farm income. They contribute to the food supply chain through their production and sale mostly through direct markets.

Acreage owned and acreage farmed are important in agricultural production. Both are related to farm size. If a producer or entity owns more acreage, it is likely that he/she/it will have a larger farm acreage than the average producer or entity. Acreage owned and acreage farmed may affect production. Further, acreage owned and acreage farmed may also be influenced by socioeconomic factors. In Alabama, for example, one group of farmers that this can affect is small livestock producers who specialize in local or regional production, particularly, those in South Central Alabama and adjoining counties, as many of them own beef cattle and meat goats. Acreage owned and acreage farmed by these farmers may be affected by socioeconomic factors; yet, insofar as the authors are aware, no known studies have been conducted to ascertain how socioeconomic factors affect acreage owned and acreage farmed by these farmers. Thus, the purpose of this study was to assess the impact of socioeconomic factors on acreage owned and farmed by small livestock producers in Alabama. The specific objectives were to (1) identify and describe socioeconomic and other factors, and (2) estimate the extent to which socioeconomic factors affect acreage owned and acreage farmed. The rest of the article covers the relevant literature, methodology, results and discussion, and conclusion.

2. Literature Review

Several researchers have examined the issue of farm size vis-à-vis other factors; however, none has examined it from the perspective of the influence of socioeconomic factors on farm size per se. A selection of these studies are briefly mentioned and discussed in chronological order in this section. For instance, Reddy, Huam, and Donald (1989) analyzed the problems confronting part-time and full-time small vegetable producers in Mississippi. They collected data from a random sample of small-scale vegetable producers using a survey questionnaire, and analyzed the data by descriptive statistics, including chi-square tests. Their results showed that over half of full-time producers cultivated less than 10 acres of vegetables, while over four-fifths of part-time producers cultivated less than 10 acres of vegetables. The average acreage in vegetables for full-time producers was 27; however, that for part-time producers was only 7 acres. The results also showed that there was a significant difference between full-time and part-time producers in relation to farm size. In other words, those with larger farm sizes (full-time farmers) produced more vegetables than those with smaller farm sizes (part-time farmers).

Further, Adutwum (1989) assessed credit use and agricultural productivity on Black limited-resource farms. They collected data through a survey and analyzed them using descriptive statistics and multiple regression analysis, based on the Cobb-Douglass Production Function, and marginal analysis. The author reported from the descriptive statistics that, respondents' average age was 52 years; length of schooling was 10 years; acreage owned was 88 acres, and acreage farmed was 111 acres. The author also reported the average gross farm income as $20,040; operating expense as $29,256; net farm income as $3,699, and off-farm income as $11,575. Based on the regression analysis, farm size and operating expenses had significant effects on output; size is a determinant

in production! Based on the marginal analysis, the optimal use of land was at 45 acres, a level far lower than the average for the producers. Thus, the author suggested appropriate technology associated with credit availability, other inputs, and technical assistance to help the producers achieve their potential.

Additionally, Jones, Batte, and Schnitkey (1989) examined the impact of economic and socioeconomic factors on the demand for information by commercial farmers. They used a mail survey to collect data from the farmers, and analyzed the data by descriptive statistics and binary logistic regression analysis. For the regression analysis, subscription to an information source was the dependent variable and the independent variables were age, education, years in farming, off-farm employment, farm size, and farm sales. They found that a little over one-third of respondents had a farm size of at least 600 acres; a majority (nearly three-fifths) had a farm size of 200-599 acres; however, a majority (nearly four-fifths) had farm sales of less than $200,000 but more than $40,000. They also found that farm size had a significant and positive effect on seeking the specialized information. In other words, information sources were of greater importance to larger farmers than smaller farmers; size matters!

Moreover, McCann, Sullivan, Erickson, and DeYoung (1997) analyzed environmental awareness regarding farming practices for a group of organic and conventional farmers. Data were obtained by interviews. The data were analyzed by descriptive statistics and by ordinary least squares multiple regression analysis. The dependent variable was willingness to practice sustainable agriculture and the independent variables were age, education, income, acreage owned, acreage leased, and years of farming. The results showed that, typically, organic producers had smaller-sized farms both in acreage owned and leased compared to conventional producers. The former, on average, owned 74-85 acres of land, and leased 65-171 acres of land, while the latter, on average, owned 198-229 acres of land and leased 482-670 acres of land. Further, acreage owned, acreage leased, and years of farming had significant and positive effects on willingness to practice sustainable agriculture.

Also, Kebede and Gan (1999) evaluated the economic potential of vegetable production for limited resource farmers in South Central Alabama. They also obtained data from a select group of farmers through interviews. They analyzed the data by descriptive statistics, enterprise budgets, and linear programming. The average farm size was 107 acres, with 13% of the total acreage allocated to vegetable production. Farmers who cultivated vegetables on larger acreages of land were able to increase farm income. In other words, income was positively related to farm size.

Furthermore, Tavernier and Tolomeo (2004) examined the influence of farm size on the practice of sustainable agriculture. They used a survey questionnaire to collect the data, and used descriptive statistics and binary logistic regression analysis to analyze the data. They defined farm size using sales as the main criterion: small-sized, less than $100,000 sales and large-sized, greater or equal to $100,000 sales. For the regression analysis, sustainable agriculture was the dependent variable, and education, tenure, sales, and age were the independent variables. Although they defined small-sized and large-sized in their study, they subdivided their sales categories, based on the 2001 Agricultural Food and Public Policy Reference Sales Categories, into: less than $10,000; $10,000-49,000; $50,000-99,999; $100,000-249,000; $250,000-499,999; $500,000-999,999, and $1,000,000 plus. They reported that most of the respondents were middle to older age; had some college education; owned most of the land that they farmed, and had sales less than $10,000. They also reported that farm size had a significant and positive effect on the practice of sustainable agriculture; specifically, for small farms with sales of less than $50,000 but greater than $10,000. Additionally, farm size had a significant and negative effect on the practice of sustainable agriculture, particularly, for a farm size with sales under $10,000, where operators did not own land.

Rios and Shively (2005) also analyzed farm size and nonparametric efficiency for small and large coffee farms in Vietnam. Data for the study were collected from a survey of farmers via in-person interviews. They analyzed their data using Data Envelopment Analysis, to assess technical and cost efficiency, and Tobit regression analysis. For the regression, the dependent variable was access to credit and the independent variables were village dummy, residency, non-agricultural assets, house material, farm size, education of household head, and farm ownership. Small farmers were defined as those who had less than or equal to 1.5 hectares (3.7 acres) of coffee, and large famers were defined as those who had more than 1.5 hectares (3.7 acres) of coffee. The results revealed that small farms had higher production costs, more operators with off-farm work, and more tenure compared to large farms. They also used more fertilization and family labor than large farms. Thus, small farms were less efficient than large farms. However, the increase in education associated with small farms caused a decrease in inefficiency. The reason, according to the authors, may be that higher education leads to more off-farm jobs, which in turn is related to less farm management; thus, reducing inefficiency.

In addition, Barbieri and Mshenga (2008) assessed the role of the firm and owner characteristics on the performance of agritourism farms. The authors collected data using a web-based survey of selected members of the North American Farmers' Direct Market Association. They analyzed the data by employing descriptive statistics and the generalized least squares regression analysis. The dependent variable was gross sales and the independent variables were farm characteristics (acreage farmed and number of years of farming) and owner characteristics (farming status, gender, age, race, education, and principal occupation). The descriptive statistics showed that over one-third of the respondents had an annual gross income of less than $50,000; a majority were males; were middle-older aged; had some college education; had farming as their primary occupation, and had average farm size of 226 acres. The regression results revealed that, of the farm characteristics, acreage farmed and years of farming had significant and positive effects on gross sales. Of the owner characteristics, farming status, gender, race, and education had significant and positive effects on gross sales; whereas, age had a significant and negative effect on gross sales.

Moreover, Tackie et al. (2011) examined the characteristics and perceptions of small and limited resource farmers on organic farming and products. They used a survey questionnaire to collect the data and analyzed them by descriptive statistics. Their findings showed that a majority of the respondents was small producers from rural areas; had some college education; reported an annual household income of less than $40,000, and were part-time farmers. Additionally, about two-fifths had a farm size of at most 10 acres. The producers had an overall mean farm size of 9 acres; organic producers had a mean farm size of 1.6 acres, and conventional producers had a mean farm size of 6 acres. The authors were of the opinion that research and Extension educators should provide technical assistance and appropriate technology in order to increase farm size.

Similarly, Tackie, Ngandu, Allen, Baharanyi, and Ojumu (2012) evaluated the characteristics and status of small and limited resource meat goat farmers in the Alabama Black Belt. In this case, as well, they obtained their data by using a survey questionnaire, and analyzed the data by descriptive statistics. They reported that a little over half of the respondents were part-time producers; a majority was middle aged or older; was males; had associate degrees or lower educational levels, and farmed less than 50 acres of land.

However, Hashmi et al. (2015) analyzed socioeconomic factors and their influences on scale efficiency of wheat farms. They obtained their data by using a survey, and analyzed the data by Data Envelopment Analysis (to assess scale efficiency) and multiple regression analysis. In the latter analysis, scale efficiency was the dependent variable and farm type, farm size, age, education, farmers' experience, and farming status were the independent variables. They reported that large farms were more efficient than small farms, and farms that owned machinery were more efficient than those that did not own machinery. They also reported that farm type and farm size had significant and positive effects on scale efficiency. Age, education, farmers' experience, and farming status did not have significant effects on scale efficiency.

Consequently, Tackie et al. (2018) assessed the characteristics and practices of selected Georgia small livestock producers examining economic and marketing issues. They collected data by a survey, and analyzed them by descriptive statistics. The results showed, among other things, that the respondents comprised more full-time than part-time producers; more female producers than male producers; more producers with at least some college education compared to other categories, and more producers with at least $40,000 as annual household income compared to other categories. The results also showed that a majority had farming experience of over 20 years; had livestock production experience of over 20 years; had small herd sizes of mostly beef cattle; owned over 40 acres of land (63%), and farmed over 50 acres of land (65%). They surmised that since they farmed more acreage than they owned, some may be renting or leasing additional acreage.

Correspondingly, Tackie, Adu-Gyamfi, Bartlett, McKenzie-Jakes, and Perry (2018) also assessed the characteristics and practices of selected Florida small livestock producers examining economic and marketing issues. Similarly, they used a survey technique to collect their data, and analyzed them by descriptive statistics. The findings revealed, among other things, that the producers comprised more part-time than full-time producers; more producers with at least some college education than otherwise, and more producers with at least $40,000 as annual household income than otherwise. The findings also revealed that a majority had less than 20 years farming experience; had less than 20 years livestock farming experience; had small herd sizes of mostly meat goats; owned more than 20 acres of land (61%), and farmed more than 30 acres of land (69%). In this case, also, the producers farmed more acreage than they owned. The authors again surmised that these producers may be renting or leasing additional acreage.

Finally, Sheng and Chancellor (2018) examined the relationship between farm size and productivity in the Australian grains industry. The data were obtained from the Australian Agricultural and Grazing Industries

Surveys, the Natural Resource Management surveys conducted by the Australian Bureau of Agricultural and Resource Economics and Sciences, and the drought index database. A multiple regression analysis was used with total factor productivity as the dependent variable and a set of farmer characteristics (age, education, off-farm income, and management practice) as independent variables. The descriptive statistics results indicated that, small farms make up the vast majority of farms (58%); however, they accounted for a relatively small proportion of output (30%). The results also showed that education had a significant and positive effect on farm size. Larger farm sizes had a significant and positive effect on farm productivity. Off-farm income, however, had a significant and negative effect on farm productivity, suggesting that the more income producers earned off-farm, the less likely they were to spend time on on-farm activities.

The literature discussed above, can be summarized in three main categories. First, farm size and efficiency (Reddy et al., 1989; Adutwum, 1989; Rios & Shively, 2005; Hashmi et al., 2015; Sheng & Chancellor, 2018). Second, farm size and type of farming (McCann et al., 1997; Tavernier & Tolomeo, 2004; Tackie et al., 2011; Tackie et al., 2012). Third, farm size and other factors [information, revenue, unique determinants] (Jones et al., 1989; Kebede & Gan, 1999; Barbiera & Mshenga, 2008; Tackie et al., 2018; Tackie et al., 2018)

3. Methodology

3.1 Data Collection

The study used a questionnaire, which comprised six parts, namely, farm characteristics, production, processing, economics, marketing, and demographic information. The questionnaire was submitted to the Institutional Review Board, Human Subjects Committee of the researchers' Institution for vetting and approval before being administered. It was administered to a convenience sample of small livestock producers. This method of sampling was used, because of a lack of a known sampling frame from which the subjects of interest could be drawn.

The data were obtained by interviewing small beef cattle and meat goat producers at several program sites in South Central Alabama on a plethora of issues affecting production in general. The producers were from 22 Alabama counties, 18 from South Central Alabama counties and 4 from non-South central Alabama counties. The counties are Autauga, Barbour, Bullock, Butler, Chilton, Dallas, Greene, Hale, Henry, Lowndes, Macon, Montgomery, Marengo, Perry, Pickens, Russell, Sumter, and Wilcox (South Central Alabama counties), Dekalb, Randolph, Talladega, and Tuscaloosa (Non-South Central Alabama counties). The data were collected from the summer of 2013 to the spring of 2014 by Extension agents in the various counties, as well as by other personnel and graduate students. The total sample size was 121. Not all the responses to questions on the questionnaire are reported in this study, because this is part of a larger study and other parts of the questionnaire are dealt with in other studies.

3.2 Data Analysis

The data were analyzed by using descriptive statistics and ordinal logistic regression analysis. The regression model used a modified version of the one used by Banterle and Cavaliere (2009), and is stated as follows:

$$C_j(X_i) = \ln [P(Y > j|X_i)/P(Y \leq j|X_i)] = \beta_1 X_{i1} + \ldots + \beta_{ik} X_{ik} - \tau_j + 1 \quad (1)$$

where, $C_j(X_i)$ is the cumulative odds of being at or below category j of an ordinal variable with K categories, $1 \leq j \leq K\text{-}1$; i is the number of participants/producers considered; j is the score for a category (of Y); k is the number of independent variables; Y is the dependent variable; X_{ij} represents the independent variables; β_i represents the coefficients, and τ represents the cut points between categories of the dependent variable.

Although the total sample was 121, for the ordinal logistic regression analysis, the number of observations used was 98, after eliminating "no responses" to some questions. Acreage farmed is assumed to be related to acreage owned, because ordinarily acreage farmed depends on acreage owned. Based on this, acreage farmed represents "actual farm size." Therefore, both indices have a relationship to farm size. Taking into consideration the preceding, two models were developed, and used. The estimation model for model 1 is stated as:

$$\ln(P\text{ACO} > j/P\text{ACO} \leq j) = \beta_1 \text{FST} + \beta_2 \text{GEN} + \beta_3 \text{RAE} + \beta_4 \text{AGE} + \beta_5 \text{EDU} + \beta_6 \text{HHI} - \tau + 1 \quad (2)$$

where, $\ln(P\text{ACO} > j/P\text{ACO} \leq j)$ is cumulative odds of being at or below an acreage owned (ACO) category; FST is farming status; GEN is gender; RAE is Race/ethnicity; AGE is Age; EDU is Education, and HHI is Household income.

In brief, the estimation model, 1, hypothesizes that acreage owned is influenced by farming status, gender, race/ethnicity, age, education, and household income. The overall null hypothesis is that all of the regression coefficients are equal to zero or the independent variables together do not affect acreage owned. The hypothesized

signs were as follows: farming status (+/-); gender (+/-); race/ethnicity (+/-); age (+); education (+), and household income (+). These imply that full-time producers will own more acreage; male producers will own more acreage; White producers will own more acreage; older producers will own more acreage; more educated producers will own more acreage; higher household income producers will own more acreage. The details of the variable names and descriptions used for model 1 are shown in Appendix Table A1.

An identical model, model 2, was set up for acreage farmed as follows:

$$\ln(P\text{ACF} > \text{j}/P\text{ACF} \leq \text{j}) = \beta_1\text{FST} + \beta_2\text{GEN} + \beta_3\text{RAE} + \beta_4\text{AGE} + \beta_5\text{EDU} + \beta_6\text{HHI} - \tau + 1 \quad (3)$$

where, $\ln(P\text{ACF} > \text{j}/P\text{ACF} \leq \text{j})$ is cumulative odds of being at or below an acreage farmed (ACF) category; FST is Farming status; GEN is Gender; RAE is Race/ethnicity; AGE is Age; EDU is Education, and HHI is Household income.

In sum, the estimation model, 2, hypothesizes that acreage farmed is influenced by farming status, gender, race/ethnicity, age, education, and household income. In this case, also, the overall null hypothesis is that all of the regression coefficients are equal to zero or the independent variables together do not affect acreage farmed. Again, the hypothesized signs were as follows: farming status (+/-); gender (+/-); race/ethnicity (+/-); age (+); education (+), and household income (+). Identical explanations for the expected signs hold for acreage farmed as for acreage owned. The details of the variable names and descriptions used for model 2 are also shown in Appendix Table A1. The ordinal logistic regression analysis was run for the models, using SPS 12.0© (MapInfo Corporation, Troy, NY). The criteria used to assess the model were the model chi-square, beta coefficients, and *p* values.

4. Results and Discussion

Tables 1 and 2 capture the descriptive results and Tables 3 and 4 show the regression results. Although Tables 1 and 2 captures the descriptive results, which may have been depicted in other studies related to the larger study, they are presented here for perspective and context. Table 1 reflects the socioeconomic characteristics of the respondents. A majority of the producers were part-time (69%); were males (83%); were Blacks (81%), and were in the age range of 45-64 years (51%); however, a sizeable proportion (39%) were in the 65 years or older age range. Additionally, nearly 50% had a two-year/technical degree or lower, and 31% had a college degree or some college education. What is more, 51% had an annual household income of $40,000 or less, and 39% had an annual household income of more than $40,000 but less than $60,000. The results agree with Tackie et al. (2018) for Florida who also reported more part-time producers than full-time producers, more producers in the 45-64 year range than other age ranges, and more producers with at most an associate's degree compared to other educational levels. They also agree with Tackie et al. (2018) for Georgia, in terms of gender, where there were more male producers than female producers. However, they are in opposition to Tackie et al. (2018) for Georgia, where more respondents earned more than $40,000 in annual household income than below $40,000.

Table 1. Socioeconomic characteristics of respondents (N = 121)

Variable	Frequency	Percent
Farming Status		
Full-time	36	29.8
Part-time	83	68.6
No Response	2	1.7
Gender		
Male	100	82.6
Female	17	
No Response	4	3.3
Race/Ethnicity		
Black	98	
White	19	
Other	1	
No Response	3	2.5
Age		
20-24 years	3	2.5
25-34 years	1	0.8
35-44 years	1	9.1
45-54 years	25	20.7

55-64 years	37	30.6
65 years or older	36	29.8
No Response	8	6.6
Educational Level		
High School Graduate or Below	41	33.9
Two-Year/Technical Degree	19	15.7
Some College	19	15.7
College Degree	19	15.7
Post-Graduate/Professional Degree	17	14
No Response	6	5
Annual Household Income		
$10,000 or less	1	0.8
$10,001-20,000	16	13.2
$20,001-30,000	22	18.2
$30,001-40,000	23	19
$40,001-50,000	14	11.6
$50,001-60,000	19	15.7
Over $60,000	14	11.6
No Response	12	9.9

Table 2 shows farm characteristics of the producers. Approximately 56% into livestock operations only, and 44% had mixed enterprises of livestock and crop production; 16% had farming experience of at most 15 years; 24% had farming 16-30 years, and 58% had farming experience of more than 30 years. Experience with livestock reflects a different trend; 36% had livestock farming experience of at most 15 years; 39% had livestock farming experience of 16-30 years, and 24% had livestock farming experience of more than 30 years. In sum, 40% had farming experience of at most 30 years, and 58% had farming experience of more than 30 years. Similarly, 75% had livestock farming experience of at most 30 years, and 24% had livestock farming experience of more than 30 years. The proportion of producers with livestock farming experience was less than the proportion of producers with farming experience of more than 30 years. It is likely that many of these producers started farming as crop farmers and later converted to livestock farming or added livestock farming to their enterprise mix.

Additionally, 71% focused on beef cattle production, primarily, Angus and mixed breeds (not shown in table), and 22% focused on meat goat production, primarily, Boer and Kiko mixed breeds (not shown in table). Having these breeds, is quite typical of Alabama producers. Also, the producers generally had small herd sizes, reflecting that 43% had a beef cattle herd size of 30 heads or less, and 32% had a beef cattle herd size of more than 30 heads. Furthermore, 16% of the producers had a meat goat herd size of 30 heads or less, and 12% had a meat goat herd size of more than 30 heads.

Considering acreage owned, 42% owned at most 30 acres, 27% owned 31-60 acres, and 50% owned over 60 acres of land. However, 16% farmed at most 30 acres; 24% farmed 31-60 acres, and 58% farmed over 60 acres of land. More producers were on the higher ends (greater than 50 acres) of acreage owned and acreage farmed, 61% and 69%, respectively, than on the lower ends. Acreage owned and acreage farmed reflected similar trends. Generally, producers who owned more acreage, farmed more acreage. Since those who farmed over 60 acres were more than those who owned over 60 acres, the most plausible explanation is that some of the producers may be renting or leasing land for production.

Table 2. Farm characteristics of the respondents (N = 121)

Variable	Frequency	Percent
Enterprises		
Livestock	68	56.2
Multiple	53	43.8
Farming Experience		
1-5 years	8	6.6
6-10 years	6	5
11-15 years	5	4.1
16-20 years	7	5.8

21-25 years	9	7.4
26-30 years	13	10.7
More than 30 years	70	57.9
No Response	3	2.5
Livestock Farming Experience		
1-5 years	18	
6-10 years	18	
11-15 years	8	6.6
16-20 years	8	6.6
21-25 years	17	14
26-30 years	22	18.2
More than 30 years	29	24
No Response	1	0.8
Animal Type		
Beef Cattle	86	71.1
Meat Goats	26	21.5
Both	8	6.6
No Response	1	0.8
Beef Cattle Herd Size		
10 or less	20	16.5
11-20	21	17.4
21-30	11	9.1
31-40	14	11.6
41-50	5	4.1
51-60	6	5
61-70	9	7.4
More than 70	5	4.1
No Response	5	4.1
Not Applicable	25	20.7
Meat Goat Herd Size		
10 or less	7	5.8
11-15	2	1.7
15-20	7	5.8
21-25	3	2.5
26-30	2	1.7
31-35	1	0.8
36-40	2	1.7
More than 40	9	7.4
No Response	1	0.8
Not Applicable	87	71.9
Total Acreage Owned		
10 acres or less	12	29.9
11-20 acres	8	6.6
21-30 acres	7	5.8
31-40	9	7.4
41-50 acres	1	9.1
51-60 acres	13	10.7
More than 60 acres	61	50.4
Total Acreage Farmed		
10 acres or less	8	6.6
11-20 acres	6	5
21-30 acres	5	4.1
31-40	7	5.8
41-50 acres	9	7.4
51-60 acres	13	10.7
More than 60 acres	70	57.9
No Response	3	2.5

Table 3 shows the estimates for model 1, socioeconomic factors and their effects on acreage owned by small producers. It reflects overall statistical significance of the model (p = 0.001), *i.e.*, at least one or all of the socioeconomic variables jointly explain the variation in the dependent variable (acreage owned, ACO), or at least one of the socioeconomic regression coefficients is not equal to zero. Age and education had statistically significant and positive effects on acreage owned, respectively, p = 0.014 and p = 0.002. The coefficient for age means that for one unit increase in age, the expected ordered log odds increases by 0.431 moving from one category to the next higher category of acreage owned, all things equal. Similarly, for education, it implies that for one unit increase in educational level, the expected ordered log odds increases by 0.565 moving from one category to the next higher category of acreage owned, all things equal. Identical explanations apply to the other variables in model 1. In sum, age and education contribute immensely to acreage owned. The higher the age and educational level, the larger the acreage owned.

Table 3. Estimates for socioeconomic factors and their effects on acreage owned

Variable	β	*P*
Farming status	0.441	0.367
Gender	0.366	0.512
Race/ethnicity	1.039	0.108
Age	0.431***	0.014
Education	0.565***	0.002
Household Income	-0.027	0.857
Chi-square	21.858***	
	(P = 0.001)	

Note. ***Significant at 1%.

The results here are not surprising. For instance, for age, it is expected that as people grow older, all things equal, they would be able to acquire more financial resources and be able to own more land. Similarly, for education, it is expected that as people get more education, all things equal, they would be able to acquire more financial resources and be able to own more land. The result on education agrees with Shen and Chancellor (2018), who reported that education had a positive and statistically significant effect on farm size. Farming status, gender, race/ethnicity, and annual household income were statistically insignificant. Despite this, they were in the order of the expected signs, positive, except household income, which was negative. This means that full-time producers, male producers, and White producers were more likely to own more acreage than part-time producers, female producers, and Black producers. The negative relationship between acreage owned and household income was unexpected. It is possible that higher income producers were investing their resources elsewhere rather than in owning more land since land is slower to move or sell than other assets.

Table 4 presents the estimates for model 2, socioeconomic factors and their effects on acreage farmed by small producers. It also reveals overall statistical significance of the model (p = 0.028), *i.e.*, at least one or all of the socioeconomic variables jointly explain the variation in the dependent variable (acreage farmed, ACF), or at least one of the socioeconomic regression coefficients is not equal to zero. Here also, age and education had statistically significant effects on acreage farmed, respectively, p = 0.005 and p = 0.035. Again, the coefficient for age means that for one unit increase in age, the expected ordered log odds increases by 0.491 moving from one category to the next higher category of acreage farmed, all things equal. Similarly, for education, it implies that for one unit increase in educational level, the expected ordered log odds increases by 0.369 moving from one category to the next higher category of acreage farmed, all things equal. Similar explanations apply to other variables in model 2. Consequently, it implies that in this case also, age and education contribute immensely to acreage farmed. The higher the age and educational level, the larger the acreage farmed.

Table 4. Estimates for socioeconomic factors and their influence on acreage farmed

Variable	β	*P*
Farming Status	0.497	0.306
Gender	0.218	0.691
Race/ethnicity	0.2	0.737
Age	0.491***	0.005
Education	0.369**	0.035
Household Income	0.017	0.907
Chi-square	14.139**	
	(*P* = 0.028)	

Note. ***Significant at 1%; **Significant at 5%.

The findings, once again, are not a surprise. Indeed, the argument made for acreage owned, holds for acreage farmed. That is, for age, it is expected that as people grow older, all things equal, they would be able to amass more financial resources, own more land, and farm more acreage. In the same vein, for education, it is expected that as people get more education, all things equal, they would be able to acquire more financial resources, own more land, and result in farming more acreage; acreage owned and acreage farmed are ordinarily linked. Again, this finding for education is in agreement with Shen and Chancellor (2018). They found that education had a positive and statistically significant effect on farm size. Farming status, gender, race/ethnicity, and annual household income were statistically insignificant. Once again, this notwithstanding, the expected signs, were in order, positive. This implies that full-time producers, male producers, White producers, and higher income producers were more likely to farm more acreage of land than part-time producers, female producers, Black producers, and lower income producers. In the case of the higher income producers, marrying this finding with the previous finding of a negative relationship between higher income and acreage owned, it could mean that they (higher income producers) preferred renting or leasing more acreage for production than simply owning more acreage.

5. Conclusion

The study assessed the impact of socioeconomic factors on acreage owned and acreage farmed. Specifically, it identified and described socioeconomic and other factors, and estimated the extent to which socioeconomic factors affected acreage owned and acreage farmed. The data were collected using a questionnaire, and were analyzed by descriptive statistics and ordinal logistic regression analysis. The results showed that, a majority of the producers were part-time farmers; were males; were middle-aged or older; had a two-year degree or lower, and had an annual household income of at most $40,000. Furthermore, a majority had farming experience of more than 30 years; had livestock faming experience of less than 30 years; had small livestock herd sizes; had acreage owned of more than 60 acres, and had acreage farmed of more than 60 acres (50 versus 58%). The ordinal logistic regression analyses showed that selected socioeconomic factors, namely, age and education, had statistically significant effects on acreage owned and acreage farmed. Though other factors, farming status, gender, race/ethnicity, and annual household income did not have statistically significant effects on acreage owned and acreage farmed, they had the expected signs; except annual household income, in the case of acreage owned, which had an unexpected sign. The findings suggest that, at least, age and education are important to farm size. It is plausible that other factors may also be important to farm size, though not vividly observed in this study. The main contribution of this study is the indication that socioeconomic factors matter in acreage owned and acreage farmed by small livestock producers, in particular, in the study area. This has laid the ground work for further studies. Future studies may entail, but not limited to, replicating this study, using a larger sample size, and/or covering a larger geographical area.

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Appendix A

Variable Definitions and Description of Data for the Various Models

Table A1. Variable definitions and description of data for the acreage owned model (N = 98)

Variable	Description	Mean	Standard Deviation
Farming status	1 = full-time 2 = part-time	1.70	0.46
Gender	1 = male 0 = female	0.83	0.37
Race/ethnicity	1 = Black 2 = White	1.21	0.48
Age	1 = 20-24 2 = 25-34 3 = 35-44 4 = 45-54 5 = 55-64 6 = 65 or above	4.81	1.22
Education	1 = high school or less 2 = two-year/technical 3 = some college 4 = college degree 5 = post-graduate/professional	2.54	1.47
Household income	1 = $10,000 or less 2 = $10,001-20,000 3 = $20,001-30,000 4 = $30,001-40,000 5 = $40,001-50,000 6 = $50,001-60,000 7 = more than $60,000	4.41	1.65
Acreage owned	1 = 10 or less acres 2 = 11-20 acres 3 = 21-30 acres 4 = 31-40 acres 5 = 41-50 acres 6 = 51-60 acres 7 = More than 60 acres	5.48	2.06
Acreage farmed	1 = 10 or less acres 2 = 11-20 acres 3 = 21-30 acres 4 = 31-40 acres 5 = 41-50 acres 6 = 51-60 acres 7 = More than 60 acres	5.65	1.95