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A Profile of Tennessee Farmstead Milk Consumers

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Abstract

An online survey of 817 Tennessee consumers identified those more likely to be familiar with and purchase bottled milk produced and processed at the same farm (i.e., farmstead milk [FSM]). Three logistic regression models were analyzed for variables, including heard of, previously purchased, and future interest in purchasing FSM. Few variables impacted each model, with only respondents' age and local food purchase frequency impacting all models. Findings suggested that some consumer demographics may impact knowledge and purchase likelihood of FSM, but they changed based on region. Producers may benefit from specialized marketing strategies targeting younger, married individuals with children who are local-oriented consumers.

Keywords: farmstead, milk, consumer preference

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Introduction

Tennessee (TN) has 18 farmstead dairy (FSD) operations with growth potential. However, little is known about the consumer of dairy products produced and processed at the same farm, or farmstead dairy products. A key success factor for these operations is a better understanding of their target market; without this understanding, these enterprises are unlikely to succeed. A target market is a group of homogenous customers who can be reached with tailored marketing strategies. Consumer preference studies are used to determine traits consumers deem desirable in food products and marketing and to determine what leads to consumers purchasing various food products. These studies are often surveys conducted in person, over the phone, by mail, or online.

This study aimed to provide TN FSD with marketing and product data of TN residents who consumed dairy products by determining how demographics impact a consumer's likelihood of hearing about and purchasing local farmstead milk (FSM). Demographics have not been seen as a reliable way of predicting a potential consumer when evaluating FSM due to the variation among respondents. In other products and industries, demographics have impacted consumer preferences and tastes (Patterson et al., 1999; Brown, 2003; Keeling Bond, Thilmany, and Bond, 2009; Khachatryan et al., 2018), which implies they may have an impact on FSM purchasing behavior.

Background

Outside sources may sway consumer preferences toward a product. A 2020 study of Tennessee milk consumers found that 65% trusted doctors to learn about milk, followed by other family members (23%) and community educators (20%) (Eckelkamp et al., 2021). However, while 46% did consult doctors to receive information on milk, 43% sought information from online articles, 27% went to registered dieticians/nutritionists, and 4% sought out industry peer-reviewed journals (Eckelkamp et al., 2021). This study showed a discrepancy between where consumers place their trust and where consumers seek information about milk. If consumers receive information from misinformed sources, their willingness to purchase a farmstead milk product might be hindered.

Several surveys focused on consumers' perceptions of and their willingness to pay for local products in the 1990s (Adelaja, Brumfield, and Lininger, 1990; Gallons et al., 1997; Patterson et al., 1999) and 2000s (Brown, 2003; Maynard, Burdine, and Meyer, 2003; Keeling Bond, Thilmany, and Bond, 2009).

One possible driving factor for these surges of interest could have been the early 1990s and 2000s recessions and the Great Recession of 2007. An interest in local agricultural products re-emerged in 2018 and remained a hot topic due to the COVID-19 pandemic and the resulting COVID-19 recession (de Paulo Farias and dos Santos Gomes, 2020; Google, 2021). The pandemic severely impacted processing plants, partly due to the close quarters that many food processing workers experienced (Waltenburg et al., 2020). Infections of COVID-19 linked to these plants, of both employees and their associates, equated to 6% to 8% of all U.S. cases as of July 21, 2020 (Taylor, Boulos, and Almond, 2020). The high number of COVID-19 cases led to temporary shutdowns of processing facilities, impacting meat availability for consumers. There was an increase in Google

searches for "farmers market," "butcher," "pick your own," and "farm fresh" around the time food chain issues as a result of COVID-19 were becoming prominent. The most notable spike for the terms "farmers market," "pick your own," and "farm fresh" occurred between March and May of 2020 (Google, 2021). This spike coincided with COVID-19 reaching the United States, and stay-at-home orders were issued (Moreland et al., 2020). The term "butchers" had a smaller spike around this time, with the most significant spike around November and December 2020. The term "farmers market" increased between July and September, coinciding with the previous 5 years' trend in search history (Google, 2021).

These trends showed that consumers sought localized products and sources for those products and persisted through the pandemic, benefiting programs like "Pick TN," which advertises local producers-processors in Tennessee who sell meat, dairy, fresh produce, and other crops. The COVID-19 pandemic, followed by other global wars and catastrophes, allowed consumers to witness the global food system's fragility, which led to an elevated and sustained interest in local and farmstead agricultural products. To take full advantage of the increased interest in locally sourced food items, FSDs need a clearer understanding of who their current consumers are and what demographics they should target to maximize profit.

This study aimed to identify customer attributes that impact Tennessee FSM customer awareness and purchasing behaviors. Based on a review of the available literature, we hypothesized that some potential consumer attributes may impact whether a respondent has heard of, purchased, or is interested in purchasing FSM in the future. A complete list of hypotheses can be seen in Table 1. Results showed that younger, married individuals with a farm background and children in the home who lived in East or Middle TN and frequently purchased local foods were likely to be aware of and intend to purchase products produced on the same farm that milk was produced. These results, along with others, can inform future marketing strategies of FSM businesses.

Table 1. Expected Impacts of Variables on Consumers' Familiarity with and Purchase Likelihood of Farmstead Milk Based on the Current Literature

Variable	Heard of FSM	Sources	Purchase likelihood of FSM	Sources
TN region	+		+	
Age	·	Patterson et al., 1999	·	Patterson et al., 1999 Zepeda and Li, 2006 DeLong et al., 2020
Current local purchase habits	+		+	
Farm background	+	Brown, 2003	+	Brown, 2003
Area of residence	+	Brown, 2003 Keeling Bond, Thilmany, and Bond, 2009	+	Brown, 2003 Keeling Bond, Thilmany, and Bond, 2009
Children	·	Patterson et al., 1999	+	Patterson et al., 1999 Best and Wolfe, 2009 Ortez et al., 2020
College education	+	Patterson et al., 1999	·	Patterson et al., 1999 Brown, 2003 DeLong et al., 2020
Male	·	Patterson et al., 1999	·	Patterson et al., 1999 Zepeda and Li, 2006 DeLong et al., 2020
Weekly food budget	+	Zepeda and Li, 2006 Best and Wolfe, 2009	·	Zepeda and Li, 2006 Best and Wolfe, 2009
Weekly dairy expenditure	+	Regmi et al., 2020	+	Regmi et al., 2020
Household size	?		+	Zepeda and Li, 2006 Khachatryan et al., 2018
Income	·	Patterson et al., 1999	·	Patterson et al., 1999 Keeling Bond, Thilmany, and Bond, 2009 DeLong et al., 2020
Married	?		+	Keeling Bond, Thilmany, and Bond, 2009

Note: + indicates positive association; - indicates negative association; · indicates no association; ? indicates uncertain effects

Material and Methods

An online survey was used to evaluate the research hypotheses. This analysis was based on a subset of questions from a more extensive study that included a choice set experiment and survey instrument, which categorized Tennessee consumer desires, created an ideal consumer profile, and determined willingness to pay based on specific fluid milk attributes (for more details on the experimental design, see Jensen et al., 2021). The survey was distributed through QualtricsXM (Provo, UT) from March 2021 to May 2021. It targeted 840 respondents who were TN residents, 18 years of age or older, and the primary food shopper of a household that consumed milk or dairy products.

The survey required a sample representative of the TN population, so a stipulation of similar percentage breakdowns per region (East, Middle, West) was given to QualtricsXM. The survey remained open for another two weeks to obtain a similar percentage to the West TN population density and concluded in May 2021.

The survey consisted of 90 questions about participants' familiarity with locally produced and processed milk, prior and future purchases, purchase likelihood both on and off-farm, desires when participating in a dairy farm visit, perceptions of local milk products, general demographics, purchase behaviors, and likelihood of purchasing milk with various attributes. Because some survey questions asked respondents how much they thought they would spend on FSM, we reiterated that spending the chosen amount would mean less money to spend elsewhere to remind respondents of their household budget constraints and reduce hypothetical bias. Multiple choice and open-ended questions captured age, gender, children, marital status, education, income, and farm background. Likert scale questions (1 = a great deal, …, 5 = not at all; 1 = extremely important, …, 5 = not important at all; 1 = strongly agree, … 7 = strongly disagree) were used to determine respondents' purchase behaviors and perceptions of local dairy products.

Each respondent was asked three questions on which study's models were built: "Have you heard of milk that is both produced, processed, and packaged on a Tennessee dairy farm (Tennessee farmstead milk)?" "Have you purchased fluid milk that was produced, processed, and packaged on a Tennessee farm (Tennessee farmstead milk)?" and "In the future, would you be interested in purchasing milk that is produced, processed, and packaged on a Tennessee dairy farm (Tennessee farmstead milk)? (Keep in mind the farmstead milk could be purchased at a variety of retail outlets including directly from the farm)." The University of Tennessee Institutional Review Board reviewed the survey for appropriate human subject protocols and approved it under UTK IRB-21-06261-XM; a copy of the survey is available upon request from the corresponding author.

Survey Respondent Demographics

The survey had 817 usable responses with distributions similar to the state population distribution by region (East: 36.7% sample vs. 36.5% population; Middle: 42% vs. 41.2%; West: 21.3% vs. 22.3%, respectively [U.S. Census Bureau, 2022]), thus resulting in a representative sample of Tennessee's population by distribution.

Approximately 62% of the respondents were female, and 38% were male (Table 4). This makeup was expected because research asserts that females are the primary food shoppers in most households (Schafer and Schafer, 1989; DeLong et al., 2020), which was a criterion for participating in the survey. Respondents were 49 ± 17 years old (see Table 5), slightly higher than the state mean of 39 years old (U.S. Census Bureau, 2022), which was expected because the survey only considers individuals 18 and older.

More of our respondents had a bachelor's degree or higher than the state mean (40% for the sample and 29% for the state, respectively [see Table 4]). A contributing factor could be that the age range was 18 years or older, and the state's education age range only considered those 25 years old and younger, which may help explain why the sample's educational attainment was 11% higher than the state mean (U.S. Census Bureau, 2022). Within the respondent group, 83% were white; 23% had children less than 12 years old in the house; and approximately 26% had a farm background. The average household size was 2.7 ± 1.5 people; 53% of respondents were married; and 25% lived in rural areas.

Table 2. Comparison of Survey Respondent Demographics to the Distribution of Tennessee Residents in 2021

Demographic	Percentage	State Estimate 18+[1]	State Percent 18+[1]
Region			
East (n = 300)	36.72%	1,959,391	36.54%
Central (n = 343)	41.98%	2,209,503	41.21%
West (n = 174)	21.30%	1,193,164	22.25%
College education (n = 326)	39.90%		28.70%
Female (n = 504)	61.99%	3,500,059	51.30%
Male (n = 309)	38.01%	3,329,115	48.70%
Children (n = 190)	23.26%		
Farm background (n = 212)	25.95%		
Race–Caucasian (n = 680)	83.23%	5,272,910	77.20%
Race–Other (n = 137)	16.77%		22.80%
Married (n = 430)	52.63%	2,740,130	49.20%

Note: [1] Numbers retrieved from U.S. Census Bureau (2022) population estimates.

Table 3. Comparison of Survey Respondent Demographics to the Mean Tennessee Population in 2021

Demographic	Number of Respondents	Mean ± Standard Deviation[1]	State Mean[1]
Age (year)	817	49.02 ± 16.52	39 ± 0.2
Weekly dairy expenditure ($ per week)	805	10.62 ± 9.51	
Weekly food budget ($ per week)	801	124.82 ± 90.12	
Household number (#)	816	2.70 ± 1.47	2.51 ± 0.01
Income ($ per year)	765	59,228.76 ± 41,030.49	78,035 ± 785

Note: [1] Numbers retrieved from U.S. Census Bureau (2022) population estimates.

Respondents made an annual income of $59,229 ± 41,030. Finally, respondents spent $10.62 ± 9.51 on dairy products per week and had a weekly food budget of $124.82 ± 90.12, meaning they spent 8.5 ± 10.6% of their weekly food budget on dairy products.[1] Results are comparable to national spending on dairy products, which was $10.44 per trip in 2022 (Progressive Grocer, 2022).

There were 366 respondents indicated they had heard of FSM in the past (44.80%), while 451 indicated they had not heard or were unsure if they had heard of it. When asked if they had purchased FSM that "was produced, processed, and packaged on a Tennessee farm (Tennessee farmstead milk)," 267 (32.68% of total respondents and 72.95% of respondents who had heard of FSM) responded "yes" they had purchased either on the farm, at another location, or both. Finally, when asked if they would be interested in purchasing FSM in the future, 781 (95.59%) respondents said "maybe," "probably yes," or "definitely yes."

Demographic Impact Analyses

Analyses were done in Stata 16.1 (StataCorp LLC, College Station, TX). Respondent demographics were described using tabulate and summarize commands. Logit models (using the *logit* commands in Stata) were used to determine the variables associated with respondents that 1) had heard of local farmstead milk (FSM1), 2) had previously purchased local farmstead milk (**FSM2**), and 3) had an interest in purchasing local farmstead milk in the future (**FSM3**). Each model used the same respondents, and respondents were excluded from the model if they did not have answers to questions corresponding to each variable (61 excluded; n = 756). Each model's dependent variable was analyzed for correlation using the *corr* command. Have heard of (FSM1) had a strong correlation to have purchased (r = 0.773) and a weak correlation to interested in purchasing FSM in the future (FSM3; r = -0.011). Have purchased (FSM2) had a weak correlation to interested in purchasing FSM in the future (FSM3; r = 0.073). *Margins dydx(*)*, *estat classification*, and *estat summarize* commands were used to analyze the results further. Collinearities and confounding effects were checked with *regression* commands and *estat VIF*

[1] Respondent descriptors can be compared to Tennessee's census data in Tables 4 and 5.

commands. The model was further validated using a multivariate probit analysis (*mvprobit* command); results of this analysis are located in Table 9.

Table 2. Multivariate probit analysis of the impacts of Tennessee consumer demographics on whether or not they had heard of farmstead milk prior to the study, purchased farmstead milk in the past, and their interest in purchasing farmstead milk in the future

	FSM1: Have heard of farmstead milk		**FSM2: Have purchased farmstead milk in the past**		**FSM3: Interested in purchasing farmstead milk in the future**	
Variable Name[1]	**Estimated Coefficient**	**Standard Error**	**Estimated Coefficient**	**Standard Error**	**Estimated Coefficient**	**Standard Error**
West Tennessee	-0.498***	0.138	-0.373***	0.144	-0.049	0.250
Middle Tennessee	-0.173	0.111	-0.204*	0.108	-0.113	0.210
Age (yr)	-0.017***	0.003	-0.020***	0.003	-0.010	0.006
Current local purchase habits	0.357***	0.054	0.404***	0.056	0.241	0.105
Farm background	0.297**	0.118	0.501***	0.115	0.391	0.265
Rural location	0.001	0.121	-0.061	0.121	0.335	0.254
Children < 12 yr	0.280**	0.142	0.258*	0.138	0.264	0.306
College education (≥ bachelor's)	0.204*	0.115	0.235**	0.115	0.105	0.216
Male	0.123	0.104	0.264**	0.103	-0.143	0.187
Weekly food budget ($/wk)	0.001	0.001	0.001	0.001	0.003	0.002
Weekly dairy expenditure ($/wk)	0.001	0.006	0.007	0.006	-0.003	0.011
Household (count)	-0.010	0.043	-0.025	0.043	-0.155	0.078
Income ($/yr)	7.98e-07	1.56e-06	-7.84e-08	1.56e-06	-3.31e-06	2.96e-06
Married	0.112	0.114	0.287**	0.113	0.646	0.226
…						
N = 756						
Wald chi2(42) = 225.89						
Log likelihood ratio = -735.50829						
Prob > chi2 = 0.0000						

Notes: * indicates $P < 0.10$, ** indicates $P < 0.05$, and *** indicates $P < 0.01$

[1]reference Table 2 for full list of variables, variable definitions, and the explanation of base variables (ex. East TN)

Model 1 (FSM1) and model 2 (FSM2) had the same independent variables, while model 3 (FSM3) included all independent variables seen in both prior models and two additional independent variables: have heard of and have purchased.

$$FSM_1 = \beta_0 + \beta_1 TNregion + \beta_2 age + \beta_3 local + \beta_4 farm + \beta_5 rural + \beta_6 children + \beta_7 college + \beta_8 gender + \beta_9 weekly\ food\ budget + \beta_{10} weekly\ dairy\ expenditure + \beta_{11} household\ number + \beta_{12} income + \beta_{13} married \quad (1)$$

$$FSM_2 = \beta_0 + \beta_1 TNregion + \beta_2 age + \beta_3 local + \beta_4 farm + \beta_5 rural + \beta_6 children + \beta_7 college + \beta_8 gender + \beta_9 weekly\ food\ budget + \beta_{10} weekly\ dairy\ expenditure + \beta_{11} household\ number + \beta_{12} income + \beta_{13} married \quad (2)$$

$$FSM_3 = \beta_0 + \beta_1 TNregion + \beta_2 age + \beta_3 local + \beta_4 farm + \beta_5 rural + \beta_6 children + \beta_7 college + \beta_8 gender + \beta_9 weekly\ food\ budget + \beta_{10} weekly\ dairy\ expenditure + \beta_{11} household\ number + \beta_{12} income + \beta_{13} married + \beta_{14} have\ purchased + \beta_{15} have\ heard\ of \quad (3)$$

Sample sociodemographic descriptors are defined and described in Table 2. Briefly, respondents were grouped by education level (college-educated: yes or no), family status (children: yes or no), annual household income level ($5,000 to $150,000), and farm background (yes or no). Respondents' age was reported in years. Annual household income level was asked in categories (options were in increments of $10,000 except for $100,000 to $149,000 and $150,000 or more) to control for and minimize "prefer not to answer" selections as disclosure of annual household income may be considered a sensitive topic.

A local index, called "local," was created to determine the respondent's willingness to purchase local foods based on a series of four Likert-scale questions (1 = not at all, …, 5 = a great deal) about local food purchase desires and actions. The following questions were used to generate the local variable because the series of local statement questions were highly correlated (Cronbach's alpha: 0.8496; see Table 3 for a complete list of pairwise correlations between variables): "I purchase local foods on a regular basis" (2.79 ± 1.11), "I shop at local farmers markets on a regular basis" (3.50 ± 1.20), "I am willing to pay price premiums for local foods" (3.07 ± 1.16), and "I choose my grocer on whether they offer local foods" (3.49 ± 1.32). Responses for each question were averaged together to create our local variable, and the higher the number, the more inclined respondents were to purchase local foods (1 = not at all likely to purchase local foods, …, 5 = purchase local foods a great deal).

Table 5. Lists of Variables with Coding Used in Logit Models for Familiarity with and Purchase Likelihood of Farmstead Milk

Variable Name	Coding
TN region (location)	1 = East Tennessee[2]
	2 = Central Tennessee
	3 = West Tennessee
Age	Years
Current local purchase habits (local)	1 = not at all
	2 = a little
	3 = a moderate amount
	4 = a lot
	5 = a great deal
Farm background (farm)	0 = otherwise[2]
	1 = yes
Area of residence (rural)	0 = otherwise[2]
	1 = rural
Children < 12 yr	0 = no/no answer[2]
	1 = children < 12 years
College education (college)	0 = no/no answer[2]
	1 = Bachelor's or Higher
Gender (male)	0 = otherwise[2]
	1 = yes
Weekly food budget (WFB)	$ per week
Weekly dairy expenditure (WDE)	$ per week
Household	Total
Income	$ per year
Marital Status (married)	0 = otherwise[2]
	1 = married
Have heard of farmstead milk[1]	0 = otherwise[2]
	1 = yes
Have purchased farmstead milk in the past[1]	0 = otherwise[2]
	1 = yes
Interested in purchasing farmstead milk in the future	0 = otherwise[2]
	1 = yes

Notes: [1] indicates these variables were not used in only the third model (FSM3; interested in purchasing farmstead milk in the future); [2] indicates the omitted variable level that was the base category for the corresponding variables for each model.

Table 6. Pairwise Correlations between Four Statements Housed within the Local Variable

Variable	"I purchase local foods on a regular basis"	"I purchase local foods on a regular basis"	"I am willing to pay price premiums for local foods"	"I choose my grocer on whether they offer local food"
"I purchase local foods on a regular basis"	1.000	0.623[1]	0.551[1]	0.578[1]
"I purchase local foods on a regular basis"	0.623[1]	1.000	0.599[1]	0.587
"I am willing to pay price premiums for local foods"	0.551[1]	0.599[1]	1.000	0.592[1]
"I choose my grocer on whether they offer local food"	0.578[1]	0.587[1]	0.592[1]	1.000

Note: [1]Pairwise correlation was significant at $P < 0.05$.

Results and Discussion

Farmstead Milk Budget

Respondents who purchased FSM in the past purchased it an average of 30 times per year (n = 817, or 2.5 times per month) and indicated they purchased 6.6 L at each purchase (n = 741; those who selected "prefer not to answer" were not included). When asked how much respondents would spend on FSM per purchase, they indicated they would spend $1.41/L (n = 735; those who selected "prefer not to answer" were not included). Using these numbers, we concluded that TN consumers would be willing to spend $178.00 ± $190.94 annually on FSM. Given that respondents spent $552.24 ± 494.52 on dairy products, TN consumers would spend approximately 32% of their yearly dairy products budget on FSM.

Demographic Impacts across Familiarity with and Purchase Likelihood of Farmstead Milk

The impacts of the variables on each dependent variable can be viewed in Tables 6, 7, and 8. Only two variables were significant in all three models; the first was age. As respondents aged one year, the probability of hearing of FSM decreased by 0.54% ($P < 0.001$, see Table 6). As age increased by one year, respondents were 0.55% less likely to have purchased FSM ($P < 0.01$, see Table 7), and 0.09% less likely to be interested in purchasing FSM in the future ($P < 0.10$, see Table 8). Our results confirmed research by Keeling Bond, Thilmany, and Bond (2009) that found older, single consumers were less likely to purchase local products than younger, married respondents ($P < 0.05$). Another study of in-state produced ornamental plants found that older individuals were less likely to purchase in-state grown plants ($P < 0.01$) (Khachatryan et al., 2018). However, results from this study differed from Best and Wolfe (2009), who found that consumers between 25 and 64 years of age had a higher purchase likelihood of local products. Despite our findings and prior discussed literature, most literature reports that age does not impact consumers' knowledge of, purchase likelihood for, and willingness to pay for local produce and dairy products (Patterson et al., 1999; Zepeda and Li, 2006; DeLong et al., 2020).

Table 7. Logistic Regression That Determined the Impact of Tennessee Consumer Demographics on Whether or Not They Had Heard of Farmstead Milk Prior to the Study

Variable Name[1]	Estimated Coefficient	Standard Error	Marginal Effect	Standard Error
West Tennessee	-0.822***	0.228	-0.164***	0.044
Middle Tennessee	-0.273	0.184	-0.055	0.037
Age (yr)	-0.027***	0.006	-0.005***	0.001
Current local purchase habits	0.575***	0.090	0.115***	0.016
Farm background	0.504***	0.194	0.101***	0.038
Rural location	-0.021	0.200	-0.004	0.040
Children < 12 yr	0.460*	0.243	0.092*	0.048
College education (≥ bachelor's)	0.312*	0.190	0.062*	0.038
Male	0.180	0.173	0.036	0.034
Weekly food budget ($/wk)	0.001	0.001	2.64e-04	2.28e-04
Weekly dairy expenditure ($/wk)	0.002	0.010	3.60e-04	0.002
Household (count)	0.010	0.073	0.002	0.015
Income ($/yr)	7.96e-07	2.57e-06	1.59e-07	5.14e-07
Married	0.175	0.188	0.035	0.037
…				
N = 756				
LRchi2(14) = 158.55				
Log likelihood ratio = -442.032				
Pseudo R2 = 0.152				
Correctly classified 67.72%				

Notes: * indicates $P < 0.10$, ** indicates $P < 0.05$, and *** indicates $P < 0.01$

[1]Reference Table 2 for full list of variables, variable definitions, and the explanation of base variables (e.g., East TN)

A possible reason for the decreased awareness and purchase behaviors of FSM as a person ages could be that most FSD enterprises advertise their products through digital media, including, but not limited to, social media channels, farm websites, or online listings (Zaring, 2022). Research shows older individuals use social media less (Hruska and Maresova, 2020). This finding supports the idea that the older the individual, the less likely they are to encounter advertisements for FSM and the operations producing FSM. Further, there may be a confounding effect of digital media advertising not targeting older individuals, which could account for the decreased awareness of and purchase behaviors of FSM. More research should be conducted to assess the impact of social media on advertising on an individual's likelihood to be aware of and purchase FSM products; results could further inform marketing tactics of these operations and increase FSM sales.

The second and final variable to impact all three models was current local purchase habits. As respondents' frequency of purchasing local products increased (1 = not at all willing to purchase,

…, 5 = willing to purchase a great deal), respondents were 11.51% more likely to have heard of ($P < 0.01$; Table 6), 11.56% more likely to have purchased ($P < 0.01$; Table 7), and 1.84% more likely to be interested in purchasing FSM in the future ($P < 0.05$; Table 8). These results were expected because purchasing local foods often requires visiting websites such as PickTN (https://www.picktnproducts.org/) or farmers markets, which expose patrons to different FSM products. The findings suggest that targeting markets that currently purchase local agricultural products may lead to a higher success rate for FSM operations.

Table 8. Logistic Regression That Determined the Impact of Tennessee Consumer Demographics on Whether or Not They Had Purchased Farmstead Milk in the Past

Variable Name[1]	Estimated Coefficient	Standard Error	Marginal Effect	Standard Error
West Tennessee	-0.676***	0.253	-0.112***	0.041
Middle Tennessee	-0.361*	0.201	-0.060*	0.033
Age (yr)	-0.033***	0.006	-0.005***	0.001
Current local purchase habits	0.701***	0.098	0.116***	0.014
Farm background	0.845***	0.207	0.140***	0.033
Rural location	0.008	0.223	0.001	0.037
Children < 12 yr	0.481*	0.254	0.079*	0.041
College education (≥ bachelor's)	0.326	0.208	0.054	0.034
Male	0.419**	0.187	0.069**	0.030
Weekly food budget ($/wk)	0.001	0.001	1.78e-04	1.95e-04
Weekly dairy expenditure ($/wk)	0.013	0.010	0.002	0.002
Household (count)	-0.034	0.078	-0.006	0.013
Income ($/yr)	1.75e-07	2.78e-06	2.89e-08	4.58e-07
Married	0.442**	0.208	0.073**	0.034
…				
N = 756				
LRchi2(14) = 209.59				
Log likelihood ratio = -379.14				
Pseudo R2 = 0.217				
Correctly classified 77.12%				

Notes: * indicates $P < 0.10$, ** indicates $P < 0.05$, and *** indicates $P < 0.01$

[1]Reference Table 2 for full list of variables, variable definitions, and the explanation of base variables (ex., East TN)

Table 9. Logistic Regression That Determined the Impact of Tennessee Consumer Demographics on Whether or Not They Had Interest in Purchasing Farmstead Milk in the Future

Variable Name[1]	Estimated Coefficient	Standard Error	Marginal Effect	Standard Error
West Tennessee	-0.158	0.567	-0.006	0.021
Middle Tennessee	-0.292	0.451	-0.011	0.017
Age (yr)	-0.025*	0.013	-0.001*	4.90e-04
Current local purchase habits	0.504**	0.241	0.018**	0.009
Farm background	0.707	0.572	0.026	0.021
Rural location	0.660	0.536	0.024	0.020
Children < 12 yr	0.515	0.671	0.019	0.025
College education (≥ bachelor's)	0.340	0.466	0.012	0.017
Male	-0.367	0.400	-0.013	0.015
Weekly food budget ($/wk)	0.008*	0.004	2.79e-04*	1.51e-04
Weekly dairy expenditure ($/wk)	-0.009	0.024	-3.43e-04	8.94e-04
Household (count)	-0.306*	0.164	-0.112*	0.006
Income ($/yr)	-7.42e-06	6.33e-06	-2.71e-07	2.33e-07
Married	1.308***	0.494	0.048***	0.020
Have purchased	1.184*	0.611	0.043*	0.023
Have heard of	-1.129**	0.465	-0.041**	0.018
…				
N = 756				
LRchi2(16) = 37.85				
Log likelihood ratio = -110.45				
Pseudo R2 = 0.146				
Correctly classified 95.90%				

Notes: * indicates $P < 0.10$, ** indicates $P < 0.05$, and *** indicates $P < 0.01$

[1]Reference Table 2 for full list of variables, variable definitions, and the explanation of base variables (ex., East TN)

Four variables were significant in two of the three FSM models; the first was farm background. Respondents with a farm background were 10.09% more likely to have heard of FSM ($P < 0.01$; Table 6) and 13.95% more likely to have purchased FSM in the past ($P < 0.01$; Table 7). However, a farm background did not significantly impact future interest in purchasing FSM (see Table 8). Prior literature varies on how farm background impacts consumers' familiarity with and purchase likelihood of local products. A survey of southeast Missouri residents reported that those with a farm background who lived in rural locations were more likely to search out locally grown foods and pay a higher premium for local foods versus conventional food products (Brown, 2003). Similar research found that TN consumers were more willing to pay for local dairy products labeled with a "Made with Tennessee Milk" logo but were not likely to pay a higher price for the logo (Regmi et al., 2020). Converse to our second model (past purchases), but like our third model

(interest in purchasing FSM in the future), DeLong et al. (2020) reported that a farm background did not influence a consumer's decision to purchase milk with a "Tennessee Milk" logo.

Possible reasons for why respondents were more likely to have heard of FSM and purchased it in the past if they had a farm background might be because they understand the work local farmers have devoted to their products and want to support those farms local to them, or possibly even those operations and individuals they know. However, those with a farm background were no more or less likely to be interested in purchasing FSM in the future than those without a farm background. Thus, consumers without farm backgrounds could have similar motives of supporting farms close to their community than those with farm backgrounds. More studies should be done to understand the motivations behind consumer purchase intentions of local dairy products to understand how one's background and experiences could impact them.

Marital status was another variable that impacted two of the three FSM models. Married respondents were no more likely than unmarried respondents to have heard of FSM (see Table 6), but they were 7.29% more likely to have purchased FSM in the past ($P < 0.05$; Table 7) and 4.78% more likely to be interested in purchasing FSM in the future than unmarried individuals ($P < 0.01$; Table 8). Little research has explored how marital status impacts FSM or local food purchasing habits, but what research exists differs from our results. Keeling Bond, Thilmany, and Bond (2009) found that younger and single individuals were less likely to purchase locally grown produce than older married individuals. Another study determined that unmarried customers had a higher willingness to pay for locally produced and processed steaks (Maynard, Burdine, and Meyer, 2003). Possible reasons for these differences might be attributed to the fact that our study focused on dairy products, while these studies focused on locally produced meats and produce. Differences could also be attributed to the fact that the previous studies were conducted more than 12 years before this study.

Another significant variable in two of the three models was the presence of children in the home. If children under 12 years of age were present in the house, respondents were 9.20% more likely to have heard of FSM ($P < 0.10$; Table 6) and 7.93% more likely to have purchased FSM in the past ($P < 0.10$; Table 7). However, the presence of children did not alter an individual's likelihood of purchasing FSM in the future (see Table 8). This result was consistent with studies conducted by Regmi et al. (2020) and Khanal, Lopez, and Azzam (2020), who found that the presence of children did not impact purchase intentions of local dairy products. On the other hand, Best and Wolfe (2009) and Patterson et al. (1999) found a greater likelihood of purchasing local products when children were present in the home. Additionally, research stated that households with children under 19 years of age had an overall higher willingness to pay for locally produced and processed meats (Maynard, Burdine, and Meyer, 2003) and would pay \$0.038/L premium for milk advertised with added health properties and \$0.429/kg premium for butter with the same advertisements (Maynard and Franklin, 2003).

These results suggest that while households with children may not be more likely than households without children to purchase FSM in the future, they were more likely to have heard of and purchased FSM in the past, but that local products, such as milk, sold to households with children

may command a higher price. This finding suggests that households with children are more often marketing targets than households without, and that operations should consider marketing channels carefully to ensure they are reaching a wide range of individuals, including those without children present in the household. More research should be done to understand where households with children are becoming familiar with FSM and other local products, as this information can be used to discover untapped marketing channels and refine targeted marketing tactics further.

During data collection, respondents were enlisted from West, Middle, and East TN. The West TN and Middle TN regions were independently compared to East TN in each model to determine how region impacted whether respondents had heard of, purchased FSM in the past, or intended to purchase FSM in the future. West TN was the final variable to impact two of the three models, while Middle TN impacted only one model. West TN was 16.44% less likely to have heard of FSM ($P < 0.01$; Table 6) and 11.16% less likely to have purchased FSM ($P < 0.01$; Table 7) than those in East TN. Individuals in Middle TN were 5.96% less likely to have purchased FSM in the future ($P < 0.10$; Table 7) when compared to those in East TN. These results show that individuals in East and Middle TN were both equally and most likely to have heard of FSM, but those in Middle TN were most likely to have purchased FSM in the past. However, individuals in each region were equally likely to be interested in purchasing FSM in the future.

In 2022, 54% of dairy operations in TN were located in East TN, 38% were in Middle TN, and 8% were in West TN (J. Strasser, Tennessee Department of Agriculture, Nashville, TN, personal communication). As of 2021, 56% of the current and prospective FSD enterprises were in East TN, 38% were in Middle TN, and 6% were in West TN (Zaring, 2022). Additionally, approximately 37% of the TN population lives in East TN, 42% in Middle TN, and 22% in West TN (U.S. Census Bureau, 2022). Understandably, East and Middle TN respondents are most likely to have heard of FSM, as most FSD and TN residents are in these regions. Despite Middle TN having a smaller concentration of FSD than East TN, the majority of these operations are located near densely populated areas within Middle TN, unlike those in East TN, which are far enough away from densely populated areas that the advertising and sale of products is more difficult. This factor contributes to why those from Middle TN were most likely to have purchased FSM in the past and why those in West TN were least likely. Interestingly, all regions' respondents were equally likely to be interested in purchasing FSM in the future. This information can help to inform marketing analyses for dairies considering opening a FSD operation in West TN.

In addition to the Middle TN region, six other variables impacted a single model. The first was college education. Respondents with a bachelor's degree or higher were 6.24% more likely to have heard of FSM ($P < 0.10$; Table 6), but college education did not impact past or future purchase intentions. Similar to this study's findings, an Arizona study found that respondents who had a bachelor's degree or higher were more likely to be aware of the local promotional program known as "Arizona Grown" (Patterson et al., 1999). Other research reported that college education did not impact purchase likelihood or willingness to pay for local produce and dairy products (Brown, 2003; Khachatryan et al., 2015; DeLong et al., 2020).

As household size increased by 1, respondents were 1.12% less likely to be interested in purchasing FSM ($P < 0.10$; Table 8). Of the literature reviewed, only one study found similar results. Khanal, Lopez, and Azzam (2020) found that respondents were 0.4% less likely to prefer local milk as household size increased by 1. Farmstead milk is a specialty product that can command a higher price than conventional milk bought in a grocery store or supermarket. It may be less feasible to purchase a higher-priced specialty product, especially when it is a household staple, as household size increases.

Contrary to this study's findings, other studies have found a positive relationship between household size and the purchase likelihood of local produce and locally produced ornamental plants (Zepeda and Li, 2006; Khachatryan et al., 2015). Finally, a study found that household size did not impact a respondent's purchase likelihood for locally produced milk labeled with a state promotional label (DeLong et al., 2020). The DeLong et al. (2020) study and this study were administered to a similar population (TN milk consumers) using the same platform. However, DeLong et al. (2020) focused on the purchase intention of locally produced milk with a state promotional logo attached and did not consider FSM as our study did. Thus, this subject matter distinction is large enough to justify the difference in results.

Our study revealed that males were 6.92% more likely to have purchased FSM ($P < 0.05$; Table 7) than females. This result was notable because the primary household food shopper has been consistently identified as female (Schafer and Schafer, 1989; DeLong et al., 2020). However, these results are consistent with Best and Wolfe (2009), who state that males had a higher purchase likelihood for locally produced dairy products. This finding indicated a narrower pool of consumers than initially anticipated, and further studies may be warranted to understand why men were more likely to purchase FSM than women. One likely reason males have purchased more in TN FSM might be due to promotional milk campaigns, such as the "Fuel up to play 60" campaign, between the Dairy Alliance and the Tennessee Titans professional football team promoting whole chocolate milk as a pre- and post-workout recovery drink. Such advertising campaigns targeted to men could have impacted respondents' purchase likelihood because of the exposure to whole milk campaigns as a health and fitness component.

However, men were no more likely to have heard of or be interested in purchasing FSM in the future than females (see Tables 6 and 8). Another study found that females were likely to pay more for local products (Brown, 2003), while Regmi et al. (2020) and DeLong et al. (2020) found that gender did not impact whether TN consumers would be more likely to purchase or pay more for milk products with a "Made with Tennessee Milk" logo and milk with a "Tennessee Milk" logo, respectively. Further, an Iranian study found that females were more likely to purchase full-fat yogurt and cream cheese than males (Ahmadi Kaliji et al., 2019). However, males were more likely to purchase butter (Ahmadi Kaliji et al., 2019). Future work could examine drivers of preference differences for FSM by gender.

The variables "have purchased FSM in the past" and "have heard of FSM" were included in the "interested in purchasing" model. Those who had purchased FSM in the past were 4.33% more likely to be interested in purchasing in the future ($P < 0.10$; Table 8), indicating that those who

have purchased before have had good experiences and would be willing to purchase again. Additionally, FSM is not a novel product, so there is less hesitation than there could be for a new purchaser who wants to avoid different products. Respondents who had heard of FSM were 4.13% less likely to be interested in purchasing it in the future ($P < 0.05$; Table 8), possibly because, as discussed earlier, they are comfortable with the milk they usually purchase and thus are less inclined to purchase something novel to them. Another possible reason could be that respondents who had heard of FSM may not have been informed sufficiently; the information they were given was not enough to entice them; or they were not satisfied with the information provided and possibly did not trust FSM products. They may have been unwilling to pay a price premium for FSM, or they did not know where to purchase FSM.

Respondents were 0.03% more likely to be interested in purchasing FSM as their weekly food budget increased ($P < 0.10$; Table 8), possibly because of the greater amount that could be spent on specialty food products, such as FSM. However, weekly food budget had no significant effects on whether a respondent had previously heard of or purchased FSM. The impact weekly food budget has on intent to purchase FSM is significant but minute, suggesting that those with a larger food budget are more likely to be interested in purchasing; however, respondents with a lower weekly food budget should not be excluded as potential FSM consumers.

Another financial variable considered in each model was weekly dairy expenditure, which did not significantly impact a respondent's awareness or purchase decisions of FSM. This result differed from many other published research. A prior "Tennessee Milk" logo study found that as consumers spent more on milk per month, the more likely they were to purchase milk with a TN milk logo and that as their weekly budget for milk increased by $10, consumers were 7% more likely to purchase logoed milk (DeLong et al., 2020). Another TN survey found that spending more on dairy products improved the likelihood of consumers purchasing locally produced and processed milk (Regmi et al., 2020). This study found that TN consumers with higher weekly dairy expenditures were willing to pay $0.115 premiums for milk products labeled with a "Made with Tennessee Milk" logo. Results of this study may differ from other studies because they did not ask about a weekly food budget in addition to weekly dairy budget. Weekly dairy expenditure may not have been relevant because the impact was seen with weekly food budget. Perhaps respondents place more weight on an overall food budget than a budget grouped by food types.

Like weekly dairy expenditure, income did not impact awareness or purchase decisions of FSM. Studies by Patterson et al. (1999), Brown (2003), and DeLong et al. (2020) reported that income had no significant impacts on awareness of or purchase likelihood for local produce and dairy products. Regmi et al. (2020) reported that annual income did not impact consumers' willingness to pay for dairy products labeled with a "Made with Tennessee Milk" logo.

However, a study of local produce in the southeast United States found that consumers with an annual income greater than $30,000 were more likely to purchase local produce (Best and Wolfe, 2009), while another survey found that consumers with an annual income of greater than $66,000 were 1.5% more likely to purchase local fluid milk than non-local milk (Khanal, Lopez, and Azzam, 2020). Other studies of local foods, local ornamental plants, and local dairy products found that

the higher their annual income, the less likely consumers were to purchase these products (Zepeda and Li, 2006; Khachatryan et al., 2015; Ahmadi Kaliji et al., 2019). Brown (2003) found that household income greater than $50,000 equated to a higher willingness to pay for local produce.

The differing result could be partly due to the location and time of the study or similar to weekly food budget and weekly dairy expenditures, many studies only factored in one financial variable. Specifically, studies by DeLong et al. (2020) and Regmi et al. (2020) factored in both weekly dairy expenditure and income, and the effect of financials may have been captured with weekly dairy expenditure rather than income. In contrast, other studies such as Khachatryan et al. (2015) and Brown (2003) factored the financial impact of income alone and found a significant effect on willingness to pay.

Finally, the respondent's area of residence (rural versus urban) had no significant impact on whether or not they had heard of, had purchased, or would be likely to purchase FSM in the future (see Tables 6–8). Findings from our study confirm prior research in TN, which found that area of residence did not impact whether a person would purchase "Made with Tennessee Milk" dairy products (Regmi et al., 2020). However, our research counters other studies from different locations. One found that consumers in rural locations were less likely to prefer "Arizona Grown" local produce (Patterson et al., 1999), while another study of local produce found urban consumers were less likely to purchase locally produced items (Keeling Bond, Thilmany, and Bond, 2009). Regional differences in preference and perceptions of these programs may account for some discrepancies.

Closing Remarks

This study provided insight into what type of consumer an FSD business could target with the greatest likelihood of purchasing FSM products. Younger, married individuals with a farm background and children present in the home who lived in East or Middle TN and frequently purchased local foods were more likely to have heard of or purchased FSM. Results show that while a narrower group of people have purchased FSM before, the type of person who could be interested in purchasing FSM varies greatly.

One limitation of this study was that the survey was representative of a snapshot in time, specifically during COVID-19. As consumers and markets constantly evolve, some results would likely change if this study were conducted today. While these results are specific to a particular time in TN, they can and should still be used to guide marketing strategies for FSD operators across the state. Additional research, such as marketing analyses, should be done on the target marketing area to provide a complete and up-to-date view of the consumers within the market area. This is especially true for rural areas and those with limited computer access, as this survey was administered online and did not include those without internet access, which could exclude 18% of the population (National Center for Education Statistics, 2019).

This survey targeted TN consumers and only analyzed FSM. More studies should be done for other farmstead dairy products, such as cheese and ice cream, and should be expanded to surrounding

states to determine why customers choose certain products. Understanding these concepts could aid extension personnel in providing FSD with likely customers, increase visits and sales, and create targeted marketing materials.

While these results should not be used alone, they can be used in addition to supplementary research to guide marketing strategies for other farmstead agricultural industries and FSD across the United States. This study revealed that a person's background, former experiences, lifestyle, and demographics may influence their purchase intentions. Further studies should be conducted to understand why these factors affect purchase intentions. Understanding these influences can further inform business owners and their marketing strategies. Using this information, FSD owners and managers can alter where they market their products and to whom they market. For example, older individuals are less likely to have heard of, purchased, or be interested in purchasing FSM. If researchers can understand why older individuals are less likely to purchase, solutions can be created to encourage those individuals to purchase. Businesses can tailor their marketing tactics, possibly by providing more print advertisements or targeting older demographics with online ads.

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