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## **Participation in Agritourism and Off-farm Work: Do Small Farms Benefit?**

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## **Participation in Agritourism and Off-farm Work: Do Small Farms Benefit?**

Aditya R. Khanal, Ashok K. Mishra, and Krishna Koirala

### **Abstract**

Small farms face significant challenges using conventional crop production methods. They seek methods of generating alternative income both on- and off the farm. The literature considers these opportunities individually; however recent evidence shows that small farms engage in both activities simultaneously. This study considers agritourism and off-farm work alternatives as income diversification choices and analyzes factors influencing such choice decisions. Further, the study assesses the impact of agritourism, off-farm work, and both on farm and total household incomes. We utilized a large nation-wide farm survey data and selectivity based multinomial choice model. Our results suggest that education, age of the operator, financial conditions of the farm and location of the farm are important factors deriving alternative choice decisions for income diversifications. Our impact analysis suggests that small farms have higher household income if they chose a combination of both strategies rather than a single strategy.

Key words: Income diversification, multinomial logit, selectivity, agritourism, off-farm work, small farms

## **Participation in Agritourism and Off-farm Work: Do Small Farms Benefit?**

### **1. Introduction**

Most small sized agricultural farms face increasing pressure to find ways to increase profitability and the viability of their farming business. They seek additional sources of income aside from the traditional route of commodity production. At the household level, such challenges amount to smoothening income and consumption levels. Allocation of production assets and resources among different income-generating activities both on- and off-farm may help to mitigate income variability and increase total income at both farm and household levels.

In the United States, about ninety-one percent of all U.S. farms are classified as small—gross cash farm income<sup>1</sup> of less than \$250,000. These farms generate less than \$10,000 in income from farming and are mainly specialized in poultry, cow/calf operations, hay, and grain/soybean production. Almost one third of U.S. farm households embrace diversification strategies both on and off the farm, independent of commodity production (Vogel, 2012). A U.S. Department of Agriculture (USDA) report suggests that farm households engaged in such non-commodity entrepreneurial activities contributed almost 40 percent of the total value of U.S. agricultural production in 2007 (Vogel, 2012).

Scholars describe a relatively stagnant agricultural economy, with the exception of increasing commodity prices, in the past few decades in the U.S.; small and medium sized farms may not have received benefits from the increase in commodity prices, especially when compared to large farms (Galinato et al., 2010). For most small farms, the only way to stay in the

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<sup>1</sup> Gross cash farm income is the sum of the farm's cash and marketing contract revenues from the sale of livestock and crops. It includes all farm-related revenue, not just crop and livestock sales, and is based on annual sales, not the value of annual production.

business is to diversify and increase their incomes, either through new alternatives on the farm or from off-farm employment. Studies have discussed the role of agritourism for small farmers, suggesting it as a viable option for on-farm diversification. Capturing the recreational aspect of the farm, agritourism is becoming an important economic boost for many farmers (Galinato et al., 2010; Bagi and Reeder, 2012; Joo, Khanal, and Mishra, 2013). Agritourism is becoming an enticing option for many small farmers. For example, the New York Times (June 9, 2011) reports on how agritourism in California “Small U.S. farms find profit in tourism” has saved many small farms from financial bankruptcy. In a recent study, Joo, Khanal, and Mishra (2013) found that small farm business households engaged in agritourism earn 0.4% higher returns to assets and bring an additional \$16,000 to \$19,000 in total household income compared to non-participants. On the other hand, substantial studies related to off-farm work participation suggest that farm operator and spouses of small farms earn a significant portion (up to 90%) of their total income from off-farm sources (USDA, 2011). Such income has been largely responsible for reducing the income gap between farm and nonfarm households, maintaining food consumption and nutrition, and stimulating farm input usage (Mishra and Soudretto, 2002; El-Osta, Mishra, and Morehart, 2008). Off-farm income has also been a significant influence for on-farm diversification, especially for small-scale farms (Fernandez-Cornejo et al., 2007).

Moreover, adoption of income diversification strategies has been the subject of many studies (Abdulai and Crolerees, 2001; Salvioni et al., 2009; Bagi and Reeder 2012; Vogel 2012; Joo, Khanal, and Mishra, 2013). However, these studies mainly include— highlighting overview and importance, and identify factors influencing participation decisions of such activities on the farm (such as agritourism) and off the farm. However, these studies have failed to consider the effect of participation in both agritourism and off-farm work, simultaneously and to analyze their

impact on financial performance. It should be noted that previous studies lack in providing an in-depth understanding of such decisions on the economic and financial performance of small farms. To the best of our knowledge, none of the previous studies have analyzed these strategies and their combinations as set of alternative options in a choice framework for income diversification.

This study aims to fill this gap by investigating the impact of agritourism and off-farm work participation on farm financial returns and total household income of small farm households. Using farm-level data, we investigate factors associated with the choice of agritourism and off-farm work strategies. Next, we applied a selectivity-based approach for the multinomial logit model to assess the impact of choosing such strategies—participation in agritourism, off-farm work, or both strategies on the farm financial performance and economic well-being of small farm business households. Neglecting selectivity effects adversely affects the estimated coefficients on impact equations (Park, Mishra, and Wozniak, 2013). Trost and Lee (1984) included selectivity corrections on polychotomous choice decision models and found that earnings due to schooling would be underestimated had they not accounted for selectivity. We apply a selectivity approach for our choice based multinomial logit model introduced and described by Bourguignon, Fournier, and Gurgand (2007), commonly referred as BFG model. The BFG model is found to be more accurate in capturing selectivity effects coming from and across alternative choices<sup>2</sup>. The remaining part of the paper is organized as follows. The next section provides a literature review related to small farm business survival, income diversification strategies and impact estimations. Subsequent sections include discussion about the empirical model, data collection, and results. The final section provides some conclusions.

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<sup>2</sup> Recently, Park, Mishra, and Wozniak (2013) discussed the advantages of BFG model over previously used models in application of choice based models for direct marketing strategies.

## **2. Literature Review**

Small farms, which account for roughly 91 percent of all farms in the United States, contribute significantly to a diverse and pleasing rural landscape, local economics, the nation's food supply, and strengthen rural communities (Hoppe, MacDonald, and Korb, 2010; Mishra, El-Osta, and Steele, 1999). Small scale farms are the major producers of beef, grains/soybeans, poultry, hay, and minor providers of fruits, vegetables, and dairy products (Hoppe MacDonald, and Korb, 2010). These farms are unable to keep pace with the scientific technological advancements requiring high initial costs, and have uncertainty about the survival while following conventional commodity production routes. Instead, small farms diversify their farm income sources and rely on off-farm activities.

Family subsistence and risk aversion are the top most priorities for the survival of small farms in the United States. Small farms, having limited quantities of land, capital, limited managerial ability, and limited skilled labor. They are often unable to adopt improved technology, new managerial practices, intensive cultivation, and the use of more profitable enterprise combinations. Small farms are more susceptible to increasing input prices. The most critical problem facing small farm operators today is maintaining a sufficient level of income. Variability, risk, and the uncertainty associated with small-scale farm's income are the primary reason for the operating farmer to work off the farm. When farmers face difficulties to generate enough income from farming, they look for different alternatives to sustain themselves. They can opt for alternative crop farming, selling out part of their land, or look for other sources of income such as off-farm employment. Small farmers are becoming increasingly dependent on off-farm activities (Hoppe, MacDonald, and Korb, 2010). Hoppe, MacDonald, and Korb (2010)

highlighted that median household income for each small farm sales class is comparable with the median for all U.S. households, when taking into account their off-farm income. Involvement of farm households in nonfarm employment activities has shown significantly growth over the last 50 years.

Off-farm activities have become a critical component of farm family income and are regarded as an alternative source of income to small-scale farm operators (Goodwin and Mishra, 2004; Fernandez-Cornejo et al., 2007). Fernandez-Cornejo et al. (2007) concluded that off-farm income has an impact on on-farm diversification, especially for small-scale farm operators. Several studies have shown that off-farm income has largely been responsible for reducing the income gap between farm and nonfarm households, maintaining food consumption and nutrition, and stimulating farm input usage (El-Osta, Mishra, and Morehart, 2008).

Another alternative to sustain small-scale operators is the diversification of their activities and enterprises including agritourism, which is increasingly becoming an attractive option in some areas. University of California Cooperative extension and small farm program (UCCE, 2013) describes agritourism as wide range of activities involving outdoor recreation, educational experience, on-farm direct sales, and on-farm entertainment and hospitality services including harvest festivals, picking up berries, farm stays, cooking classes, wine testing. Agritourism is an attractive option especially for small-scale farm operators wishing to increase return and to diversify returns on their farm assets (Brown and Reeder, 2007).

Moreover, allowing farm products to sell directly to consumers, agritourism offers an opportunity to identify new customers, build a relationship, and expand their farming business. By doing so, small-scale farm operators are able to skip the middleman and reduce farm costs. Agritourism may also help to increase the local economic situation by drawing more visitors to



the area. Factors motivating or limiting agritourism participation are important in studies pertaining to survival and the diversification of small farm business. Brown and Reeder (2007) postulate that the farm operators with high net worth, farm workers working fewer hours off the farm during summer, operators with farms in greater distances from the city and locations in the county with abundance natural amenities are more likely to run a farm-based recreation business. However, the impact of agritourism on financial performance has been investigated by very few studies. A recent study by Joo, Khanal, and Mishra (2013) suggests that small farm business households engaged in agritourism earn 0.4% higher returns to assets and increase total household income by \$16,000 to \$19,000 compared to non-participants.

Although literature on the advantages of off-farm work for small farm households is well documented, studies related to agritourism and simultaneous income diversification choices have been overly anecdotal possessing limited applicability (Brown and Reeder, 2007). Most of the previous studies dealt with factors influencing participation decision in off-farm works, and agritourism separately. To the best of our knowledge, none of the previous studies have analyzed these strategies and their combination as a set of alternative options in a choice framework for income diversification. This study fills this gap by assessing factors determining these choice decisions and the impact of such diversification choice decisions on farm and household level incomes. This study contributes to the empirical literature of small farm business. Findings from this study are expected to benefit, in addition to small farms, farm business research centers, extension agents, policymakers, tourism industry, local governments.

### **3. Data**

This study uses 2008, 2009 and 2010 Agricultural Resource Management Survey (ARMS), a nation-wide survey conducted by Economic Research Service (ERS) and the

National Agricultural Statistics Service (NASS). ARMS provides information about the relationships between agricultural production, resources as well as characteristics and financial conditions of farm households, their income and expenses, and management strategies. Data are collected from senior farm operators, who make most of the day-to-day management decisions on the farm.

In this study, we considered small farm households, those generating less than \$250,000 in gross cash income from farming. We considered participation in agritourism if the household is engaged in agritourism related recreational activities and generated income from such activities. Similarly, we considered participation in off-farm work if the operator and/or spouse worked off the farm and generated off-farm income for the farm household.

Gross cash farm income and total household income are variables used as measures of financial performance in the second stage of the analysis. We have included farm and farmer characteristic variables, location, and farm financial condition as explanatory variables for diversification choices. Inclusion of these variables is consistent with previous studies considering participation decisions in agritourism and off-farm work. Table 1 describes summary statistics and definitions of the variables used in this study. The total sample of small farms, 9990 observations, represent the sample size used in multinomial logit regression. However, only 68 farmers participated solely in agritourism, 8,289 participated solely in off-farm work, and 269 farmers participated in both agritourism and off-farm diversification strategies (Table 1). Table 1 shows mean and standard deviations of each variable across each group of farmer participants—“agritourism participants only”, “off-farm work participants only”, and “both agritourism and off-farm work participants.” Farm business households that participate in “agritourism only” have the highest acreage of lands, the lowest total revenue from commodity production, are

having relatively older operator, the lowest debt-to-asset ratio (5%) and are mostly located in non-metro farming counties and plains. “Off-farm work only” participants have relatively larger household size, higher debt-to-asset ratio (around 10%), less land acreage, and are located mostly in metro counties. Participants in “both agritourism and off-farm work”, on the other hand, are characterized by those having higher levels of education, moderate level of debt-to-asset ratio (8.7%) and mostly recipients of government farm program payments.

Along with farm and operator characteristics, we have also controlled for location and regional differences. Distribution of small farm households by county classification is shown in figure 1, suggesting 33% of the small farm businesses are located in metro counties, while 14% are located in non-metro farming counties and most of the farm families located in the metro counties opt for off-farm work. Financial performance equations representing the impact of the diversification choices and regional differences were controlled by including regional classifications as defined by the Economic Research Service and United States Department of Agriculture (ERS, USDA), namely Atlantic, Midwest, Plains, West, and South. These regions are shown in Figure 2.

#### **4. Empirical method of choice of diversification and earnings in the chosen strategy**

The empirical approach is based on a discrete choice model where farm operator households undertake participation decisions in: a) agritourism only; b) off-farm work only; and c) both agritourism and off-farm work. In linking the effect of such discrete choice decisions (participation decisions) on continuous variables (financial performance variables such as gross cash farm income and total household income), a multinomial logit framework is widely used (McFadden, 1986). Methodologically, estimating the actual effect of participation decisions on the economic well-being of a farm household possesses significant challenges. In our case, we

did not select farm operator household participation in agritourism activities or off-farm work but they selected themselves. Thus, self-selection could be an issue leading to biased and inconsistent estimators, if one fails to account for. In our econometric framework, we have accounted for these issues.

The farmer's choice of diversification is based on utility maximization among  $M$  alternatives, where  $y_j^*$ , utility from choosing a particular income generating alternative depends on different features associated with operator and farm business. Let a farmer chooses from  $M$  ( $j = 1, \dots, M$ ) mutually exclusive alternatives. The utility derived from choosing a particular alternative depends on the set of exogenous variables representing farm and operator attributes, farm financial conditions, and farm location etc. and is represented as:

$$y_j^* = Z\gamma_j + \eta_j, \quad j = 1, \dots, M. \quad (1)$$

Equation (1) represents a commonly used latent variable approach. We observe only whether a diversification choice is chosen, i.e.,  $y_j = 1$  if strategy  $j$  is chosen and  $y_j = 0$ , otherwise. Given the choice of that particular strategy (for instance, strategy 1) the effect on income and earnings on farm or operator household level are represented as:

$$y_1 = X\beta_1 + u_1 \quad (2)$$

where  $X$  is a set of exogenous variables affecting income earned from the particular diversification strategy and  $\beta$  is a set of estimated parameters. We assume that the error term  $u_1$  satisfies  $E(u_1|X) = 0$  and  $Var(u_1|X) = \sigma^2$ . The estimation strategy accounts for correlation between two error terms  $\eta_j$  and  $u_1$ .

Following the BFG model, the  $M^{\text{th}}$  option (alternative) is observed only if  $y_m^* > \max(y_j^*)$ , where  $j \neq M$ . This condition is equivalent to  $Z\gamma_M > \epsilon_M$ , where  $\epsilon_M = \max(y_j^* - \eta_M), j \neq M$ .

$$(3)$$

where the  $\eta_j$  elements are independent and identically distributed, the cumulative distribution function is  $G(\eta) = \exp(-e^{-\eta})$  and the density function is  $g(\eta) = \exp(-\eta - e^{-\eta})$ , leading to multinomial logit model. Multinomial logit models are widely used in discrete choice models.

The probability that the  $M^{\text{th}}$  alternative is preferred is:

$$P_M = \frac{\exp(Z\gamma_M)}{\sum_j \exp(Z\gamma_j)} \quad (4)$$

Parameters of multinomial logit models are retained using a maximum likelihood method. For impact (effects of choice on incomes) estimations, we need some additional assumption under the BFG procedure. Following BFG, we assume that  $\eta_j^*$  have a standard normal distribution, where  $\Phi$  is standard normal cumulative distribution function such that:

$$\eta_j^* = \Phi^{-1}[G(\eta_j)] \quad (5)$$

Assume that there is linear relationship between  $u_1$  and  $\eta_j^*$  for every  $j$ . Then, we represent as follows:

$$E[u_1 | \eta_1, \dots, \dots, \eta_M] = \sigma \sum_{j=1, \dots, M} \rho_j^* \eta_j^* \quad (6)$$

where  $\rho_j$  represents correlation coefficient between  $u_1$  and  $\eta_j$  and  $\sigma$  is the standard deviation of the disturbance term from the income equation. For the multinomial logit model, BFG derived the conditional expectation of  $\eta_j^*$ . For the strategy one chosen ( $j = 1$ ), the outcome equation for income earned,  $y_1$  is represented as:

$$y_1 = X\beta_1 + \sigma \left[ \rho_1^* m(P_1) + \sum_{i=2, \dots, M} \rho_i^* m(P_i) \frac{P_i}{P_{j-1}} \right] + w_1 \quad (7)$$

Equation (7) represents the outcome equation for  $j=1$  and we can write outcomes for each alternatives in the similar manner.  $P_1$  represents the probability that the first alternative is chosen,  $m(P_1)$  is the conditional expectation of  $\eta_j^*$ , for  $j=1$  while  $m(P_j)$  represents the conditional

expectation of  $\eta_j^*$  and the term  $m(P_j) \frac{P_j}{P_j-1}$  represents expectation of  $\eta_j^*$  for all but one, *i.e.*, for  $j \neq 1$ ;  $w_1$  is a residual error term and is independent of the regressors. Each of these conditional expectations can be computed numerically. The general framework follows that the discrete choice model represented as multinomial logit equation in equation (4) is estimated by maximum likelihood method and then  $\hat{\gamma}$  are obtained. In the second stage, equation (7) is estimated for the chosen alternative one using the ordinary least squares methods. The BFG approach for dealing with selectivity has advantages over this because it not only shows the direction of the bias related to strategy but also which diversification strategy is the source of the bias by estimating a different selectivity term for each diversification strategy, unlike the Lee (1983) method that would estimate a single selectivity term combining the effects of all strategies together (Park, Mishra, and Wozniak, 2013). The choice of diversification strategies—agritourism, off-farm work, and both agritourism and off-farm work are estimated using the BFG method and the selectivity term is used in the financial performance equation.

## **5. Results and discussion**

### *5.1 Income diversification strategies and farm business incomes*

Figures 3 to 6 show the violin plots of gross cash farm income and total household incomes for various diversification strategies. Violin plots combine box plots and density traces in one diagram so that we can see the center, the spread, asymmetry, distribution of data—peaks and bumps in one place. Around 66% of the small farms participated in diversification strategies while 33% did not participate in any of the income diversification strategies. Mean gross farm income for small farms participating in any diversification strategy was \$57,211, which is higher than \$46,864 for those not involved. Mean total farm household income for those participating in diversification strategies was higher (\$79,315) than their counterpart (\$ 45,634). Violin plots in

Figures 3 and 5 suggest that larger number of very small farms (bottom quantiles indicating very small farms) participate in income diversification strategies than those in upper quantiles. There is a large standard deviation for participants and non-participants, suggesting volatility in participation. In Figure 4, notice that central dot for “agritourism” and “both” participants is more towards the right side on the plot, indicating that these groups generate higher farm income than “off-farm work only.” The mean comparison in Table 1 confirms these findings. However, the mean comparison regarding total farm household income suggests different results. As shown in Figure 4 and Table 1, total farm household income is highest (\$96,120) for “both agritourism and off-farm work” participants, followed by “off-farm work participants only” (\$79,043) and “agritourism participants only” (\$45,978).

Participation in “agritourism only” and “both” strategies have more spread in gross cash farm income. The total farm household income spread is highest for those involved in “both” strategies indicating that wider range of small farms have embraced this option. Overall the violin plots suggest that: a) both gross cash farm income and total household income are higher for the farm households with income diversification strategies; b) even within smaller farms, farm households with lower income are more likely to participate in diversification strategies than those with higher income. Figures suggested that the highest mass is for farms with less than \$100,000 in gross cash farm income and total household income.

## *5.2 Choice of income diversification strategies*

Table 2 reports parameter estimates of the choice of income diversification strategies used by small farmers. Notice that the base group of comparison is farmers with no diversification strategies. In this study, we have defined participation in agritourism, and participation in off-farm works as income diversification strategies. We have used multinomial

logit (MNL) regression in choice modeling which assumes independence of irrelevant alternatives (IIA). Imposition of IIA means that the choice between any categories of income diversification strategy, in our case “agritourism only”, “off-farm work only”, and “both agritourism and off-farm work”, are unaffected by availability of another option. After the MNL regression, we conducted a Hausman and McFadden (1984) test and concluded that IIA assumptions were not rejected.

Table 2 shows that operator’s age, educational attainments, location of the farm, and financial conditions derive income diversification choice decisions. A significantly positive effect of age and education of the operator for “agritourism only” choice suggests that relatively older and more educated operators are more likely to participate in agritourism. These findings are consistent with the previous agritourism studies. Relatively older and retired farmers may place a higher value on agricultural activities and derive higher utilities by engaging in farm related recreational business. A significantly positive coefficient of total production (proxy for farm size) may indicate that farms with higher land acreage are likely to opt for agritourism. A plausible explanation is that more space, i.e., land acreage may allow farmers to organize more recreational activities on the farm without loss of acreage allocated to production applications. Small farms located in metro counties are less likely to choose ‘agritourism only’ option. This finding is consistent with the fact that these farmers are more likely to have more opportunities for off-farm work. Land value per unit acre is also higher in metro counties and thus the farmer may not opt for ‘agritourism’ activities.

Consistent with theory, we find significantly a positive coefficient of household size and education in off-farm work choice. Larger family size and higher educational attainment of the farm operator brings greater opportunities for income generating activities from off-farm



employment. Educational attainment of the spouse, on the other hand is negatively associated with choosing ‘off-farm work only’ decision. Consistent with theory and literature, older operators are less likely to choose off-farm work choice. Other interesting results include significantly positive effects of government farm program payments, debt-to-asset ratio, and farm location in metro counties. For off-farm income diversification strategy, farmers with higher debt-to-asset ratios are more likely having solvency problems and chose to work off the farm to reduce debt. Operators of farms located in metro counties have greater off-farm employment opportunities, at least for short-term, and thus may choose to work off-farm as income diversification strategy.

Our results suggest that having a female operator and educational attainment are positively associated with choosing ‘both agritourism and off-farm work’ as income diversification strategy. Farms receiving government farm program payments are more likely to choose this balanced strategy. Farms located in metro areas are less likely to choose this option. Finally, farms located in non-metro farming counties are more likely to choose this balanced option of income diversification.

### *5.3 Impact of diversification strategies on farm business income*

Table 3 presents parameter estimates for the impact of the chosen income diversification option on gross cash farm income. We investigated factors affecting gross cash farm income conditional on operator’s choice of a particular income diversification option. The dependent variable is the logarithm of gross cash farm income and we estimated parameters using BFG model. First, notice that  $M(P_j)$ ,  $j = 1, \dots, 4$  are selectivity terms related to the alternative choices in the MNL model where four options produce four selectivity terms. The selectivity terms in ‘off-farm work only’ equation are all significant indicating the presence of sample selection

effects. The estimated coefficients would have been biased and inconsistent had we have not included these terms in our model. A negative selectivity coefficient of  $M(P_1)$  in ‘off-farm work only’ gross cash farm income indicates lower gross cash farm income for the farm relative to a randomly chosen farm. Thus, for a farmer that obtained earnings from the off-farm only choice, moving away from “off-farm only” to an ‘agritourism only’ choice leads to a significant negative impact on their gross cash farm income. On the other hand, a positive  $M(P_2)$  coefficient of 8.542 suggests that moving away from third option “agritouriam and off-farm work” indicates that a positive gross cash farm earning is associated with moving away from the “off-farm only” option to a more balanced “agritouriam and off-farm work” option.

Selectivity terms in the third equation are also significant. A significant -69.5 coefficient on  $M(P_3)$  in the ‘both’ option equation indicates that a higher gross cash farm income with this balanced option for the farm household relative to a randomly chosen farm household. The coefficient on land acres is positive and significant in the third equation suggesting that a one percent increase in land acreage results increase in a 0.25% increase in gross cash farm income for farmers choosing both ‘agritourism and off-farm’ as income diversification strategies.

#### *5.4 Impact of diversification strategies on total farm household income*

Additionally, we investigated the factors affecting total farm household income conditional of a farm household’s particular diversification choice. The results of each alternative choice are presented in Table 4. The dependent variable is the logarithm of total farm household income. Selectivity terms  $M(P_1)$  and  $M(P_2)$  are significantly negative in the ‘agritourism only’ option. The negative selectivity effect for farm households participating in ‘off-farm only’ in the model for ‘agritourism only’ is due to lower than expected total farm household income through ‘agritourism only’ due to the movement of farm households with

better unobserved characteristics away from ‘agritourism only’ and into using ‘off-farm only.’ Similar interpretations can be drawn for significantly positive coefficient of  $M(P_1)$  and significantly positive coefficient of  $M(P_3)$  in the second model (‘off-farm work only’ option). As depicted in the third model, total farm household income of farmers participating in both agritourism and off-farm work is affected by selectivity parameters. A significantly negative coefficient in the selectivity term due to ‘agritourism only’ indicates lower earnings for the farm households relative to randomly chosen farm household. This suggests that farmers with unobserved attributes that enhance household income in participating in ‘agritourism only’ have moved to alternative income diversification strategies. As implied by significantly positive  $M(P_3)$  and negative  $M(P_1)$ , it is plausible that these farmers (‘agritourism only’ participants) earn more in total household income by opting to ‘both agritourism and off-farm work.’ Additionally, elasticity of land acres suggested that a 1% increase in land acreage is associated with 0.06% increase in total household income for those choosing ‘both off-farm and agritourism’ option for income diversification.

## **6. Conclusions**

Rather than taking the traditional commodity production route, small farms are better off by diversifying their income through different on and off-farm diversification strategies. Small farms seek such alternatives. In this study, we investigated agritourism and off-farm work participation decisions as alternative choices for income diversification and analyzed the impact of a particular choice in gross cash farm income and total household income.

Our results suggest that both gross cash farm income and total household income are higher for participating farm households than their counterparts. Even within smaller farms, farm households with lower gross cash farm income are more likely to participate in diversification

strategies than those with relatively higher gross cash farm income. Results of discrete choice (multinomial logit) model suggest factors affecting choice of the particular alternative. With the potential of receiving higher financial returns, farms with relatively more acreage but receiving less revenues from commodity production and with relatively older operators are more likely to participate in the ‘agritourism only’ option. Farms with larger farm size, higher debt-to-asset ratio, educated operators, and farms located in metro counties are more likely to participate in the off-farm work option. Choosing a mixed strategy (both agritourism and off-farm work) on the other hand, is affected by age, the educational attainment of the operator, farm location, and government farm program payments. We found that small farms located in non-metro farming counties are more likely to choose this mixed option.

The selectivity coefficients in impact equations for each strategies indicated that BFG selectivity model is appropriate for the analysis of the impact of diversification choices. Total gross cash farm income obtained from ‘off-farm work’ and ‘both off-farm and agritourism’ are downward biased since farmers who are better suited for agritourism have moved toward this strategy. This clearly suggests that accurate evaluation of income due to certain choices must account for selectivity effects.

Overall, results from this study suggest that operator’s age, educational attainments, location of the farm, and financial conditions derive the choice decisions for agritourism, off-farm work, and both of these alternatives for income diversification. We considered three broad strategies of diversification in his study. More in-depth analysis with wider spectrum of alternatives may lead to further insight regarding farmer’s decision process and behavior. Though this prospect seems elegant, it demands more in-depth analysis because it requires an understanding of all real options available for a particular decision maker at given time. Provided

with such information or data availability, this could be an interesting extension in future studies. Nonetheless, our study provides a basic understanding on which to draw an interesting insight—based on the assets and resources on the farm, and farm and family requirements, as well as considering potential outside opportunities, small farms undertake rational decisions about income diversification strategies.

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Table 1: Variable definition and summary statistics, small farm business households

Variable Definitions	Agritourism participants only Mean (Std. Dev.)	Off-farm work participants only Mean (Std. Dev.)	Both agritourism and off-farm work Mean (Std. Dev.)
Gross farm income (in dollars)	70373.62 (59024.28)	56408.64 (69029.69)	78603.86 (69686.49)
Total household income (in dollars)	45978.46 (53528.93)	79042.92 (158662.70)	96119.90 (200018)
Female (dummy, =1 if household head is female)	0.088 (0.286)	0.096 (0.295)	0.141 (0.348)
Household size	2.118 (1.07)	2.754 (1.347)	2.524 (1.077)
Education of operator (years)	13.176 (1.900)	13.664 (1.833)	14.282 (1.806)
Education of spouse (years)	14.912 (2.641)	14.374 (2.176)	14.781 (2.044)
Age of the operator (years)	65.662 (13.44)	55.862 (12.399)	58.309 (12.173)
Acres (total land acreage)	1957.00 (4208.80)	421.918 (1567.411)	1914.033 (4489.67)
Total production (Value of farm productions, dollars)	53689.66 (60999.09)	129688.20 (352810.10)	107927.80 (639844.20)
High value crop farms (dummy, =1 if farm is high value crop producing farm, 0 otherwise)	0.015 (0.121)	0.101 (0.300)	0.074 (0.26)
Debt to asset ratio (total debt over total asset)	0.0525 (0.107)	0.097 (0.195)	0.087 (0.163)
Government payments (dummy, =1 if farm have received government payments)	0.4118 (0.496)	0.387 (0.487)	0.509 (0.501)
Metro county (dummy, =1 if farm is located in the county classified as metro)	0.162 (0.371)	0.331 (0.471)	0.253 (0.435)
Non-metro farming county (dummy, =1 if farm is located in non-metro farming county)	0.250 (0.436)	0.141 (0.348)	0.234 (0.424)
Atlantic (dummy,=1 if located in Atlantic region)	0.103 (0.306)	0.221 (0.415)	0.160 (0.367)
Midwest (dummy, if located in Midwest region)	0.088 (0.286)	0.214 (0.410)	0.086 (0.280)
Plains (dummy, =1 if located in Plains region)	0.441 (0.500)	0.180 (0.384)	0.349 (0.477)
West (dummy,=1 if located in West region)	0.191 (0.396)	0.200 (0.399)	0.267 (0.437)
South (dummy,=1 if located in Southern region)	0.176 (0.384)	0.186 (0.389)	0.149 (0.356)
Year 2008 (dummy,=1 if year is 2008)	0.221 (0.418)	0.284 (0.451)	0.297 (0.458)
Year 2009 (dummy, =1 if year is 2009)	0.426 (0.498)	0.339 (0.473)	0.360 (0.481)
Year 2010 (dummy, =1 if year is 2010)	0.353 (0.481)	0.377 (0.485)	0.342 (0.475)
Sample size	68	8289	269



Table 2: Parameter estimates for choice in income diversification strategies by small farm business households in the United States

Variable	Agritourism participation		Off-farm work participation		Both agritourism and off-farm work	
	Estimate	T-ratio	Estimate	T-ratio	Estimate	T-ratio
Constant	-19.97*	(-5.23)	3.003*	(5.14)	0.572*	(2.67)
Female	-0.260	(-0.53)	0.0629	(0.70)	0.572*	(2.67)
Household size	0.000675	(0.00)	0.0666*	(3.37)	0.000467	(0.01)
Education of operator	0.257*	(3.65)	0.402*	(28.03)	0.609*	(14.75)
Education of spouse	0.0933	(1.59)	-0.0384*	(-3.54)	-0.0287	(-0.84)
Age of the operator	1.922*	(2.51)	-1.862*	(-15.66)	-1.330*	(-4.14)
Log of total production	0.349*	(3.79)	0.0123	(0.85)	0.0988*	(2.23)
Debt to asset ratio	-0.330	(-0.29)	0.424*	(2.64)	0.301	(0.81)
Government Payment	-0.435	(-1.56)	0.177*	(3.33)	0.433*	(2.88)
Metro county	-0.871*	(-2.52)	0.144*	(2.79)	-0.274*	(-1.65)
Non-metro farming county	0.212	(0.66)	0.0904	(1.24)	0.516*	(2.99)
Year 2009	0.558*	(1.76)	-0.0152	(-0.26)	0.0110	(0.06)
Year 2010	-0.0366	(-0.10)	0.185*	(3.15)	0.164	(0.97)
Number of Observations	9990					

Note: Asterisk indicates asymptotic t-values with significance at  $\alpha=0.10$  or higher level

Table 3: Parameter estimates for income diversification strategies and its impact on financial performance of small farm business households in the United States, dependent variable= gross cash farm income (in logarithm)

Variable	Agritourism participants		Off-farm work participants		Both agritourism and off-farm work	
	Estimate	T-ratio	Estimate	T-ratio	Estimate	T-ratio
Constant	21.622	0.52	20.369*	42.97	10.497*	1.90
Log of age of the operator	-3.493	-0.31	1.737	7.53	1.229	0.75
Education of operator	0.178	0.07	-1.040*	-21.55	-0.414	-1.21
Education of spouse	-0.138	-0.43	-0.006	-0.58	0.051	0.78
High value crop farms	1.658	1.10	1.057*	18.40	1.009*	2.62
Log of total land acreage	0.482	0.72	0.280*	19.52	0.256*	3.22
Government payment	0.781	0.44	0.912*	17.06	0.015	0.05
Atlantic	3.665*	3.18	0.063	1.08	0.385	1.16
Midwest	1.717	0.74	0.099*	1.66	0.346	0.78
Plains	1.004	1.02	-0.213*	-3.30	0.252	0.69
West	1.873*	1.67	0.235*	3.87	0.768*	1.90
year 2009	-0.556	-0.31	-0.579*	-11.64	-0.642*	-2.31
year 2010	-0.200	-0.15	-0.221*	-4.65	-0.150	-0.52
M(P1, agritourism only)	-1.827	-0.55	-218.063*	-33.03	-69.500*	-2.39
M(P2, off-farm work only)	-1.244	-0.07	1.743*	5.16	2.326*	0.59
M(P3, agritourism & off-farm)	-10.853	-0.19	8.542*	6.56	1.401*	0.102
M(P4, none of these)	-4.479	-0.15	19.828*	22.88	10.965*	1.82

Note: Asterisk indicates asymptotic t-values with significance at  $\alpha=0.10$  or higher level

Table 4: Parameter estimates for income diversification strategies and its impact on financial performance of small farm business households in the United States, dependent variable= total household income (in logarithm)

Variable	Agritourism participants		Off-farm work participation		Off-farm work and agritourism	
	Estimates	T-ratio	Estimate	T-ratio	Estimate	T-ratio
Constant	-53.563	-1.22	10.859*	31.04	6.832*	1.71
Log of age of the operator	17.252*	1.76	0.572*	3.25	-0.048	-0.04
Education of operator	-3.782	-1.58	-0.072*	-1.93	-0.004	-0.04
Education of spouse	0.404	1.20	-0.002	-0.20	0.039	0.80
High value crop farms	-1.085	-0.64	0.067	1.61	0.403	1.45
Log of total land acreage	0.009	0.02	0.005	0.44	0.062	1.69*
Government payment	-1.101	-1.01	0.026	0.69	-0.065	-0.28
Atlantic	-0.880	-0.84	-0.114*	-2.58	0.037	0.14
Midwest	-1.373	-1.58	-0.165*	-3.74	-0.174	-0.53
Plains	0.319	0.41	0.074*	1.64	0.358	1.57
West	-0.681	-0.66	-0.179*	-4.15	-0.138	-0.57
year 2009	-0.009	-0.01	-0.082*	-2.29	-0.022	-0.11
year 2010	-1.373	-1.34	-0.019	-0.55	0.169	0.75
M(P1, agritourism only)	-5.842*	-1.93	-8.346*	-4.25	-27.055*	-2.40
M(P2, off-farm work only)	-81.498*	-2.09	0.031	0.11	-2.546	-0.95
M(P3, agritourism & off-farm)	76.925	0.91	1.513*	1.86	1.060*	1.78
M(P4, none of these)	-13.6744	-0.71	3.111*	4.48	2.1767	0.50

Note: Asterisk indicates asymptotic t-values with significance at  $\alpha= 0.10$  or higher level

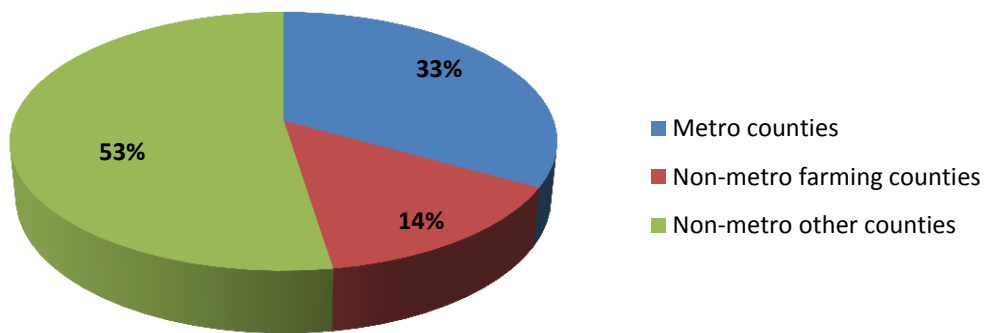


Figure 1: Small farm household locations based on county classifications; *Source:* Authors' computation based on ARMS survey data, 2008, 2009, and 2010.

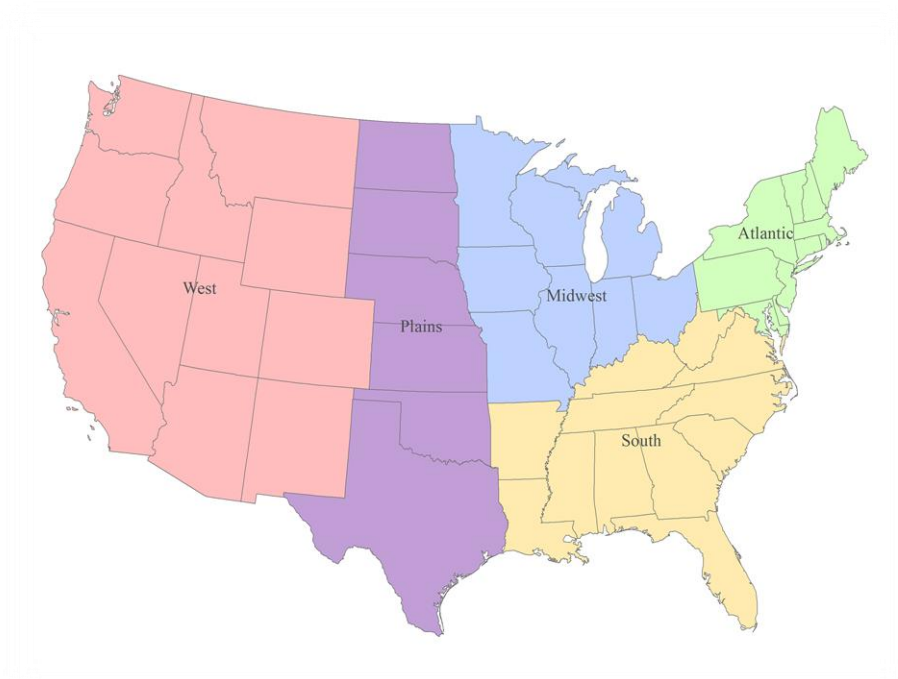
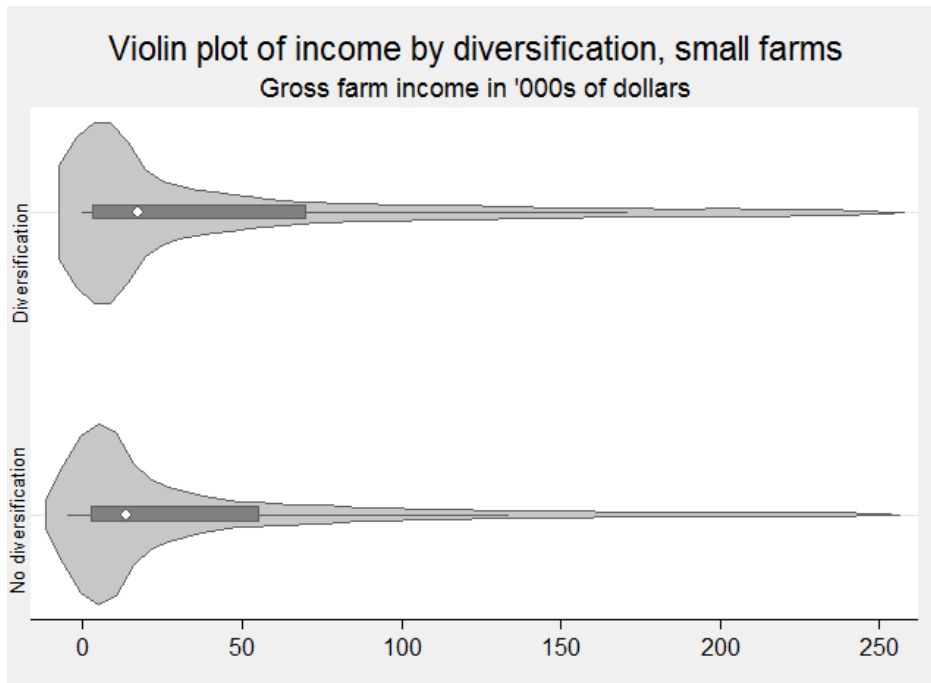
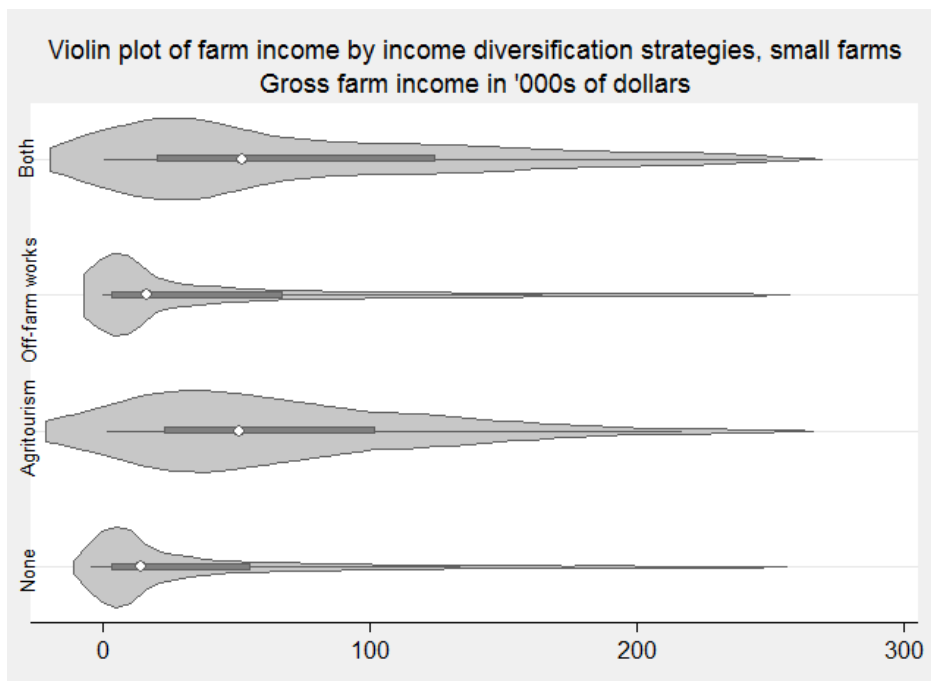


Figure 2: U.S. geographic regions

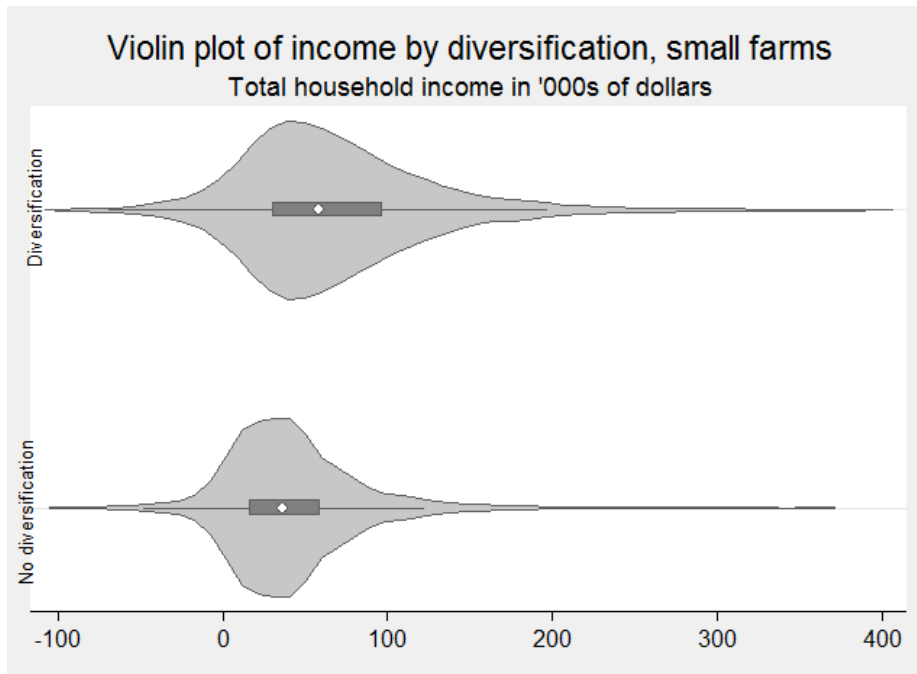
*Source:* Economic Research Service, U.S. Department of Agriculture <http://www.ers.usda.gov/data-products/chart-gallery>



Source: Calculations from 2008, 2009, and 2010 ARMS survey, ERS, USDA  
Figure 3: Participation in income diversification and gross farm income, small farms

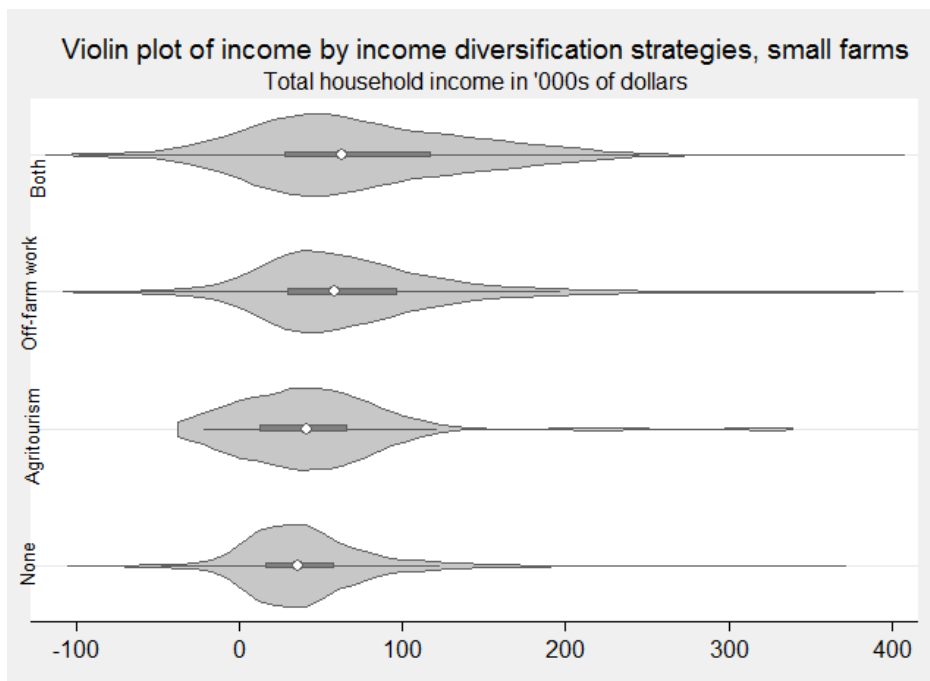


Source: Calculations from 2008, 2009, and 2010 ARMS survey, ERS, USDA  
Figure 4: Income diversification strategies and gross farm income, small farms



Source: Calculations from 2008, 2009, and 2010 ARMS survey, ERS, USDA

Figure 5: Participation in income diversification and total household income, small farm business households



Source: Calculations from 2008, 2009, and 2010 ARMS survey, ERS, USDA

Figure 6: Income diversification strategies and total household income, small farm business households