The determinants of market outlet choice of smallholder Vegetable and Fruit producers in Ethiopia

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ABSTRACT

Market outlet choice is an important farm household-specific decision made by smallholder households to secure high returns. However, the choice among the market alternatives is not mutually exclusive as producers could sell at more than one market outlet and the random error terms of the market outlets may be correlated. Hence, a multivariate probit model was adopted to examine the determinants of market outlet choices. The results of the study showed that the distance from the main roads influenced the decision of the producers in all market outlets. The effect was positive and significant for producers choosing main markets and roadsides as the market outlet of their vegetable and fruits products sale. However, in the case of the local market, the likelihood of choosing this market outlet decreases as the distance from the main road increases. Livestock holding influenced the local market positively and the main market negatively and significantly. Gender influenced the choice of main market outlets negatively. Access to extension service was obtained positively and significantly influencing the decision to choose the main market outlet. Cooperative membership influenced the decision of producers to choose the main market negatively and significantly. Finally, the study recommended important policy measures needed to help producers choose the appropriate market outlets.

Keywords: *Market outlet choice, Vegetable, Fruits, Multivariate probit model, Ethiopia.*

INTRODUCTION

Subsistence agricultural production system is the sources of livelihood for a majority of smallholder farmers in developing countries. However, limited access to improved agricultural technologies and practices, inadequate infrastructure, limited access to inputs and finance and non-competitive markets of subsistence smallholder agricultural production system in the developing countries have limited production of marketable surplus (Arias et al., 2013). In this regard, increasing the extent of commercialization among semi-subsistence, low-input, low-productivity smallholder farmers is seen as playing a crucial role in poverty alleviation (Olwande & Smale, 2014). This could be because market access gives players the opportunity to specialize according to comparative advantages of ownership and therefore enjoy the trade earnings(Otekunrin et al., 2019). This showed that subsistence agricultural production cannot improve rural food security and welfare substantially without improving smallholders' access to markets(Otekunrin et al., 2019). Hence, facilitating the expansion of market participation by smallholder farmers can be critical in helping households transition out of food poverty (Barrett, 2008).

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In Ethiopia, the production and marketing of fresh fruits and vegetables, which is a high value and labour-intensive cash crop, can contribute significantly to the well-being of the producers. They have significant importance for domestic consumption, export markets and industrial processing(Sisay, 2018). However, farm households' market participation is limited by factors such as high transaction costs (Arias et al., 2013), limited asset endowments, and limited access to public goods and services (Barrett, 2008). Furthermore, production and marketing of these crops were constrained with marketing problems such as low bargaining power arising from lack of alternative market outlets, low price for the produce specially during the harvesting season, poor infrastructure, poor handling and storage facilities and lack of marketing information (Sisay, 2018). In this regard, farmers with access to adequate assets and infrastructure and faced with appropriate incentives would engage actively in markets, while those who lack one or more of those three essential ingredients largely do not (Barrett, 2008). Hence, commercialization of the smallholders must be built on the establishment of an efficient and well-functioning market and the corresponding infrastructure keeping the transaction costs low and minimizing risk particularly for the poor living in the rural areas with low productivity and weak infrastructure (Otekunrin et al., 2019).

In this case, smallholders' decision to choose an appropriate market outlet is an important farm household-specific decision. However, the smallholders' decision to sell their produce in a different market outlet is made by evaluating the return in expected utility of each market outlet. In addition, accessibility of market outlets also plays an important role in influencing producers' decision to choose and participate in alternative market outlets (Usman et al., 2017). However, the choice among the market alternatives is not mutually exclusive, as producers could sell at more than one market outlet at the same time and the random error terms of the market outlets may be correlated (Arinloye et al., 2015). Hence, there could be a correlation among different market outlets. The model simultaneously capturing the influence of explanatory variable on each set of market outlets and allowing for the potential correlation among unobserved disturbances as well as the relationship between the choices of different market outlets (Arinloye et al., 2015) is an appropriate model. However, most of the previous studies on vegetables and fruits focused on the examination of the determinants of market outlet choices without considering the potential correlation among unobserved disturbances as well as the relationship between the choices of different market outlets(Abera, 2016; Emana et al., 2015; Hailu & Fana, 2017). Hence, the current study will contribute to the empirical works by adopting the empirical strategy designed to correct this bias. This will have a variety of significance for policy measures aimed at improving the food security and welfare of the smallholder farmers in the country.

The rest of the paper is organized into three sections. The next section describes the estimation problems, data and the description of the variables. The third section presents and discusses the empirical results of the study. Finally, the conclusion and the implication of the results are presented.

METHODOLOGY OF THE STUDY

Description of the sampling procedures and data

The study used data from the Ethiopian Socioeconomic Survey (ESS), a nationally representative cross-sectional survey of rural households of Ethiopia in 2018/19. The data was collected under the Living Standards Measurement Study-Integrated Surveys on Agriculture Initiative (LSMS-ISA) in collaboration with the Central Statistical Authority (CSA). In the collection of these data, a two-stage probability sampling technique was used. As the study is interested in the rural farmers in Ethiopia, by excluding the capital and the provincial capital cities and deleting some missing observations, the analysis here is based on a sample of 605 households. The survey questionnaire collected information on basic demographics; education; food and non-food expenditure; household nonfarm income-generating activities; food security and shocks; safety nets; assets; credit; and other sources of household income. The community questionnaire gathered information on access to infrastructure; community organizations. The post-planting and post-harvest agriculture questionnaires

focused on farming activities and solicited information on land ownership and use; crop harvest and utilization. The livestock questionnaire collected information on animal holdings and sales of livestock.

Method of data analysis

Following the literature on the determinants of market outlets, the producer's market outlet choice can be modelled using a Random Utility Model (RUM). RUM is an indirect utility function where an individual with specific characteristics associate an average utility level with each alternative market outlet choice in a choice set. In this way, the producer's decision to sell in a given market is derived from the maximization of utility expected from these markets (Arinloye et al., 2015). However, conditional to socio-economic, institutional, production and market-related factors, producers to maximize their utility (i.e. profit) are more likely to choose two or more market outlets simultaneously (Arinloye et al., 2015; Fikiru et al., 2017). In this case, the choice decision of market outlet by the producers can be modelled in two different ways.

The first is the multinomial probit model whereby the underlying assumption is the independence of alternatives in which error terms of the choice equations are mutually exclusive (Greene, 2012). Hence, the multinomial probit model is appropriate in the case an individual can choose only one alternative from the set of mutually exclusive alternatives. However, the choice among the market alternatives are not mutually exclusive as producers could sell at more than one market outlet at the same time and the random error terms of the market outlets may be correlated (Arinloye et al., 2015). Hence, the model which allows for the possible correlation of choice among different market outlets is appropriate to examine the determinants of market outlet choices. In this regard, multivariate probit model simultaneously capturing the influence of explanatory variable on each set of market outlets and allowing for the potential correlation among unobserved disturbances as well as the relationship between the choices of different market outlets (Arinloye et al., 2015) is an appropriate model.

Therefore, a multivariate probit model was adopted in this study to determine the set of explanatory variables on each of the different market outlet choices (Greene, 2012). The model was specified using the RUM. In this case, producers make the choice of an appropriate market by comparing the expected utility of market outlets. The market outlet with the highest possible expected utility will be selected by producers. The expected utility difference can stated as follows:

$$U_j\left[= \pi_{ij}^{A} - \pi_{ij}^{0}\right] = X_a^A \beta_a + \varepsilon^A$$

Where U_j represents the expected utility difference between the utility derived from market i selected by farmer j (π_ij^A) and the utility of market i if not selected (π_ij^0). Influenced by socio-economic and farming characteristics, producers will choose market outlets from which they expected higher utility than otherwise. Then, equation 1 can be modeled as:

$$Y_{ij}^{A} = \begin{cases} 1 \; if \; \left[\pi_{ij}^{A} - \pi_{ij}^{0}\right] \geq 0 \; \leftrightarrow X_a^A \beta_a \geq -\varepsilon^A \\ 0 \; if \; \left[\pi_{ij}^{A} - \pi_{ij}^{0}\right] < 0 \; \leftrightarrow X_a^A \beta_a < -\varepsilon^A \end{cases}$$

Where: Y_ij^A is a dummy variable which represents the market selection i by producer j. The selection equation can be re written as:

$$Y_{ij}^{A} = \begin{cases} 1 \; if \; Y_{ij}^{A} = X_{ij}^{A}\alpha_{ij} + \varepsilon^A \geq 0 \; \leftrightarrow X_{ij}^{A}\alpha_{ij} \geq -\varepsilon^A \\ 0 \; if \; Y_{ij}^{A} = X_{ij}^{A}\alpha_{ij} + \varepsilon^A < 0 \; \leftrightarrow X_{ij}^{A}\alpha_{ij} < -\varepsilon^A \end{cases}$$

Where Y_ij^A and X_ij^A represent the dependent and vectors of explanatory variables of the selection equation. A are the vectors of estimators and error terms, respectively. The error terms are assumed to have a normal distribution.

DEFINITION OF VARIABLES AND WORKING HYPOTHESIS

Dependent variable

In the current study, the market outlet choices were considered as the dependent variable of the multivariate probit model. The available set of market outlets includes roadsides, the local market and main market. The producers depending on their farming and socio-economic characteristics will choose an appropriate market outlets maximizing their expected utilities (i.e. profit).

Independent variables and hypothesis of the study

As there are various factors affecting producers' choice of market outlet, selecting appropriate market outlet to deliver farm products is not an easy task (Emana et al., 2015). In this regard, important variables of interest were selected based on the theoretical and the empirical studies conducted to identify determinants of market outlet choices. Demographic characteristics of the producers including, family size (Hailu & Fana, 2017; Tura & Hamo, 2018), age (Dessie et al., 2018; Nxumalo, et al., 2019), marital status (Nxumalo et al., 2019), gender (Nxumalo et al., 2019) and educational level (Dessie et al., 2018; Nxumalo et al., 2019) of the household head were hypothesized influencing the choices of market outlet in one or another way. Socio-economic characteristics of the producers were also expected to influence the decision of producers' market outlet choices. These include total livestock size owned, access to credit and off-farm income opportunities for the producers (Dessie et al., 2018; Hailu & Fana, 2017; Nxumalo et al., 2019). Access of producers to the extension services as a proxy for marketing information and the physical distance of producers from the main road and market (Arinloye et al., 2015) were also included in the model as the important determinants of market outlet choice. Membership of producers to cooperative was also included in the model to capture the various roles that these farmers organization could play in the selection decision of market outlets. These organization by increasing producers bargaining power could ultimately increase the profits that can accrue to producers rather than intermediaries and buyers (Zhang et al., 2014). The selected determinants and the expected hypothesis of the study were presented in Table 1.

Table 1. Summary of variables and their expected sign in the multivariate probit model

Variables	Variable types	Roadsides and Friends	Local Market	Main Market
Gender (= 1 if males)	Dummy	-	-	+
Age	Continuous	+	+	-
Marital status (=1 married)	Dummy	-	-	+
Education level	Continuous	-	+	+
Household size	Continuous	+	+	+/-
Extension access (= 1 if it has access)	Dummy	-	+	+
Credit access ((= 1 if it has access)	Dummy	-	-	+
Livestock ownership (TLU)	Continuous	-	+	+/-
Nonfarm ((= 1 if it has access)	Dummy	-	-	+
Mobile phone ownership	Dummy	-	+	+
Distance roads (in Kilometers)	Continuous	-	-	-
Distance major town (in Kilometers)	Continuous	-	-	-
Distance administration town (in Kilometers)	Continuous	-	-	-
Cooperative membership (= 1 if he/she is a member)	Dummy	-	-	-

Source: Authors computation

RESULTS AND DISCUSSION

Descriptive statistics

According to results summarized in Table 2, most of the smallholder farmers choose to supply their vegetables and fruits to main market outlets. Producers choosing to sell their products at the roads sides (5 percent) are

relatively lower than those producers choosing the local (36 percent) and main market outlets (59percent). The results of descriptive statistics for each market outlet were also presented in Table 3. According to the results in Table 3, most of the surveyed households were headed by male households. It was accounted for about 77, 89 and 85 percent of households choosing the roadsides, the local market and main market outlets, respectively. The average age of the surveyed household head was 46 years old. The result of the marital status indicated that most of the households selecting each market outlet were married households. Relatively, the highest educational level in years was achieved by households selecting the local market outlets. In this case, though households with the highest educational level were expected to choose the main markets, maybe due to the aggregate effect of other farming and households characteristics, they are selecting the local markets to sell their produce. The perishability nature of vegetables and fruits may also matter in the choice of the market that is easily accessible. The average household size was 5 persons per household for both the households selecting the local and main market outlets. In this case, the existence of the highest labor could play an important role in the marketing of agricultural products by making available the labor force required.

Extension contact was an important variable included in this study to capture its role of supplying the necessary marketing information, which in turn would improve households' access to the market. In this regard, 42 percent of households choosing the main market outlet had an access to extension services. According to the descriptive results presented in Table 2, relatively access to extension was higher for the households choosing the main market outlets than the other two market outlets. The choice of market outlets was also expected to be affected by the asset base of the households. In this regard, ownership of livestock is an important asset in the rural area. The ownership of livestock could also affect the selection of market outlet by providing transport for the produce of the households. But, the average livestock owned was low accounting for about 3.31in tropical livestock units (TLU). Hence, in the rural areas where households are characterized by a low asset base, access to credit is expected to increase the access of households to market. However, according to results presented in Table 3, only 8 percent of the households had access to credit services. This could negatively affect a household's decision to choose an appropriate market outlet.

Mobile phone ownership was the other important variable included in the current study as a proxy for the household's access to marketing information. About 34 percent of the households selling their products in the local and main market had owned a mobile phone. Access to market and choice of the market outlet was also expected to be affected by the distance of the household's location from both the main market and main road. The average distance from the main road of households selling their products on the roadsides was 35 kilometres. But this was 18 and 27 kilometres for households selling in the local and main market, respectively. Added to this, the average distance to the major town was also higher for households selling their product on the roadsides. The constraints of a household to access the main market could be improved by increasing households' access to different rural institutions like cooperatives. In this case, cooperatives by providing marketing information to members or selling on the behalf of the members can improve the gain of market participation for smallholder households. However, cooperative membership was also low accounting for about 10 percent of surveyed households.

Table 2. The main buyers/outlets and households choice

The main buyers/outlets	Number of market outlet users	Percentage of users (%)
Roadsides and friends	31	5.1
Local Market	218	36.1
Main Market	355	58.78
Total	604	100

Source: Authors computation from Ethiopian socio-economic sample survey (2018/2019)

Table 3. Descriptive statistics

Variables	Roadsides and Friends		Local Market		Main Market		Total	
	Mean	Std. Err.	Mean	Std. Err.	Mean	Std. Err.	Mean	Std. Err.
Gender (= 1 if males)	0.77	0.43	0.89	0.32	0.85	0.36	0.86	0.35
Age	44.45	16.09	45.78	14.29	46.18	14.89	45.92	14.71
Marital status (=1 married)	0.74	0.44	0.85	0.36	0.81	0.39	0.82	0.38
Education level	1.6	3.35	2.20	5.16	1.71	4.56	1.88	4.73
Household size	4.52	2.25	5.13	2.03	4.99	2.20	5.02	2.15
Extension access (= 1 if it has access)	0.36	0.49	0.41	0.49	0.44	0.50	0.42	0.49
Credit access ((= 1 if it has access)	0.10	0.30	0.10	0.30	0.08	0.27	0.08	0.28
Livestock ownership (TLU)	2.09	4.09	3.91	3.26	3.06	3.19	3.31	3.29
Nonfarm ((= 1 if it has access)	0.10	0.30	0.06	0.24	0.05	0.22	0.061	0.23
Mobile phone ownership	0.48	0.51	0.34	0.47	0.34	0.51	0.34	0.50
Distance roads (in Kilometres)	34.48	34.30	17.78	21.02	27.38	26.86	24.19	25.7
Distance major town (in Kilometres)	22.55	17.15	15.47	15.90	19.87	17.93	18.40	17.28
Distance administration town (in Kilometres)	41.39	55.00	50.69	46.07	53.740	55.79	52.07	52.67
Cooperative membership (= 1 if he/she is a member)	0.19	0.40	0.12	0.32	0.09	0.28	0.10	0.30

Note: Source: Authors computation from Ethiopian socio-economic sample survey (2018/2019)

Determinants of Market Outlet Choices

Table 4 summarizes the model results of different demographic, socio-economic and institutional factors affecting the decision of the producers to choose an appropriate market outlet for their product. The overall significance of these factors was examined by using the Wald-chi-square statistics. The significance of the model's test result (significant at 1 percent) indicated that the explanatory power of the factors included in the model is significant.

The likelihood ratio test was used to test the null hypothesis that the market outlet choices are independent. The result of tests for the independence of market outlet choices (p21=p23=p31) was obtained significant at a 1 percent significance level. This suggests that the decision of the producers to choose market outlets is interdependent with each other. Consequently, the model estimation ignoring this interdependency will result in biased estimates. Multivariate probit model taking into account this interdependence was used to determine factors affecting market outlet choices (Table 4.)

Results presented in Table 4 also indicated the degree of correlation between each pair of market outlet choices. This was demonstrated by the individual rho values. Accordingly, the correlation between the choices of local market and roadsides (p21) is positive and significant, implying that producers selling their vegetables and fruits at the local market are more likely to participate in the roadside's sale. However, the correlation between the choice of main market and roadside (p31) is negative and significant suggesting that producers selling their vegetables and fruits in the main market are less likely to participate in the roadsides. Similarly, the correlation between the choice of the main market and the local market (p23) is negative implying that producers selling their vegetables and fruits in the main market are less likely to participate in the local market.

The results presented in Table 4 also summarize the likelihoods of selling in each market outlet choice. The likelihood of selling vegetables and fruits to the roadsides and friends was 20 percent which was low relative to the likelihood of selling in the local (36 percent) and main market (57 percent). This was good evidence that

smallholder farmers would prefer formal markets relative to informal market outlets. However, the likelihood of selecting all markets simultaneously was 0.01 percent suggesting that producers were less unlikely to choose all market outlets at the same time. This could be because accessing all markets simultaneously may be unaffordable. However, the joint probability of not choosing all markets outlets was only 8 percent implying that smallholder farmers were more unlikely to fail.

Table 4. Results of Multivariate Probit Model

Variables	Main Market		Local Market		Roadsides and Friends	
	Coef.	(Std. Err.)	Coef.	(Std. Err.)	Coef.	(Std. Err.)
Gender	-0.368*	0.202	0.303	0.221	-0.576	0.436
Age	0.005	0.004	-0.004	0.004	0.006	0.011
Marital status	-0.052	0.059	0.012	0.065	0.075	0.126
Education level	-0.009	0.010	0.016	0.01	-0.036	0.037
Household size	0.012	0.025	-0.015	0.028	-0.095	0.077
Extension access	0.250**	0.107	-0.149	0.114	0.341	0.288
Credit access	-0.069	0.199	0.064	0.206	-0.594	0.711
Livestock owned (TLU)	-0.035**	0.016	0.051***	0.018	-0.002	0.055
Access to non-farm income	0.057	0.221	0.011	0.233	0.154	0.594
Mobile phone ownership	0.048	0.102	-0.111	0.119	0.406	0.289
Distance roads	0.009***	0.002	-0.010***	0.003	0.012**	0.005
Distance major town	-0.001	0.001	0.002	0.001	-0.003	0.004
Distance to administration town	0.006	0.004	-0.009**	0.004	0.006	0.010
Cooperative	-0.409**	0.170	0.242	0.177	0.121	0.524
Constant	0.117	0.355	-0.222	0.383	-2.356***	0.870
Predicted probability	0.57		0.36		0. 20	
Joint probability (Success)	0.00126					
Joint probability (Failure)	0.0830					
p21	0.327 ***(0.091)					
p31	-0.463***(0.083)					
p32	-0.962***(0.009)					
Likelihood chi2(3)	502.532***					
Number of observation	599					
Wald chi2(42)	95.25***					
Log-likelihood	-553.23036***					

Note: ***, ** and * indicate the level of significance at 1, 5 and 10 percent respectively. Values in the parenthesis represent the standard deviation.
Source: Authors' computation from Ethiopian socio-economic sample survey (2018/2019)

Table 4 also presents the results of the determinants of market outlet choices. According to the results presented in Table 4, the distance from the main roads influenced significantly the decision of the producers in all market outlets. The effect was positive and significant for producers choosing main markets and roadsides. This indicated that as the distance of the household's residence from the main road increases, the likelihood of selling the produce at the roadsides increases. The producers prefer selling at the roadssides to minimize the transportation cost associated with the distance. Similarly, in the case of the main market, though the distance from main roads increases, the producers still prefer selling products in the market. This suggests that, though the distance from the main market increases producers still prefer supplying their products to the main due to the remunerative price they expected in the main market. However, in the case of the local market, the likelihood of choosing this market outlet decreases as the distance from the main road increases. Added to this, the distance to the market affected the decision of household to choose local markets significantly and negatively. A similar result was also obtained by Mgale & Yunxian (2020) which suggested that distance from market can be a barrier for farmers to access better markets. Hence, constructing and improving roads to reduce transportation cost should be an important policy consideration to enable the producers' access to an appropriate market outlet for their products.

Livestock holding influenced local market positively and main market negatively and significantly. This indicated that as herd size owned by producers increases, farmers prefer local market to main market. This could be because an increment in the herd size requires more labor making the local market more accessible. Though the correlation between the choice of market outlets was not considered in the study by Hailu & Fana (2017), the results of their findings confirmed the negative effect of the size of livestock holdings on the choice of better market outlets for major vegetables. The results of the model in Table 4 also indicated that gender influenced the choice of main market outlets negatively. This implies that females prefer selling their vegetables and fruits in the market than their male counterparts. This has an important policy implication in that increasing the participation of females in the main market could decrease the income inequality between males and females. Hence, the promotion of vegetable and fruits production and marketing in the main market will have a significant implication for the gender dimension problems.

As expected, the influence of the variable access to extension service was obtained positively and significantly influencing the decision to choose the main market outlet. This implied that increasing producers' access to extension services increases the likelihood of the producers choosing the main market outlet as their appropriate market outlet. This could be because extension services can provide the required technical assistance and marketing information and can link producers to markets (Rehima et al., 2013) which in turn increases the likelihood of producers choosing the main market outlet. In addition, these services could also help producers to improve their productivity and to produce a marketable surplus. Furthermore, inadequate access to extension is among the hindrance to participation in the market (Ndoro et al., 2014). The results of other studies have also confirmed the importance of access to extension in enabling households' decisions in choosing an appropriate market outlet (Usman et al., 2017).

Cooperative membership influenced the decision of producers to choose the main market negatively and significantly. In this case, the main market may not benefit producers who are cooperative members; because the producers cooperative could help producers generate higher incomes just like main market outlets(Zhang et al., 2014). Farmers would also have the advantage of bulking hence gaining economies of scale through farmers production and marketing organization rather than individually (Mgale & Yunxian, 2020). In this regard, the cooperative has the potential of lowering costs and facilitating the processing and marketing of agricultural commodities for individual producers (Zhang et al., 2014). In addition, market-oriented producers cooperatives can also assist their members to purchase inputs, equipment and to meet the quality standard. Furthermore, organized producers have higher bargaining power than individuals and are better to negotiate with other more powerful market players to ultimately increase the profits that accrue to producers (Zhang et al., 2014). Similar results were also obtained by other researchers (Mgale & Yunxian, 2020; Usman et al., 2017) in which they suggested strengthening collective action through a well-organized farmers group.

CONCLUSION

In Ethiopia, the production and marketing of fresh fruits and vegetables can contribute significantly to the well-being of the producers. However, production and marketing of these crops were constrained by different marketing problems. In this case, smallholders' decision to choose an appropriate market outlet is an important farm household-specific decision. However, the smallholders' decision to sell their products in a different market outlet is made by evaluating the expected return of each market outlet, whereby the choice among the market alternatives is not mutually exclusive as producers could sell at more than one market outlet. Hence, there could be a correlation among different market outlets. Hence, the model which allows for the possible correlation of choice among different market outlets is appropriate to examine the determinants of market outlet choices. In this regards, a multivariate probit model was adopted to examine the determinants of market outlet choices. The results of the study indicated that the decision of the producers to choose appropriate market outlets for their product is determined by different demographic, socio-economic, and institutional factors. Accordingly, the distance from the main roads influenced the decision of the producers in all market outlets. Though the direction of the effect varies between different market outlets, it was obtained as an

important determinant influencing the decision of households choosing an appropriate market outlet. Hence, the policy measures emphasizing the role of the market should improve access to roads to reduce transportation costs of the smallholder producers.

Livestock holding was also obtained affecting the choice decision significantly. In this case, livestock holding by supplying transport helps the smallholder households' access to the market. As a result, improving the asset base of the household should emphasize helping households build their asset bases in the form of livestock. But, this should be market-oriented which otherwise would have a negative effect on the households effort to access the market. The other important variable with policy implication is the gender of the households. The result indicated that the gender of the household affected the choice of main market outlets negatively. This implied that policy measures aimed at decreasing food insecurity and poverty through the production and marketing of vegetables and fruits should include the gender dimensions.

Access to extension service was obtained positively and significantly influencing the decision to choose the main market outlet. Households who have access to extension services selected the main market outlet to sell their products. This implied that the extension agents should be capacitated to enable the smallholders to access the appropriate market. The other important policy variable is cooperative membership. This could be because cooperative as an important rural farmer's organization has the potential to lower costs and facilitate the processing and marketing of agricultural commodities for individual producers. In this case, they can increase the bargaining power of the individual producer, thereby increasing the gain accruing to the individual producers. Hence, rural organizations should be established and strengthened to enable producers to choose an appropriate market outlet which in turn could help reduction of the problems of food insecurity and poverty in the rural areas.

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