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Demeke, Leykun and Haji, Jemma

Adama Science and Technology University, Haramaya University

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[1]Leykun Birhanu Demeke and [2]Jemma Haji

[1]Department of Economics, School of Business and Economics, Adama Science and Technology University; Address: E-mail: bleykun@gmail.com, Tel: +251911307177, P.O. Box: 1888, Adama, Ethiopia

[2]Associate Professor of Agricultural Economics, School of Agricultural Economics and Agribusiness, Haramaya University; Address: E-mail: jemmahaji@gmail.com Tel: +251911780518, Dire Dawa, Ethiopia

Abstract

It is evident that for a developing country, agriculture forms the basis for every economic activity. It plays an active role in determining the economic, social, and political system of a society of a developing world. The title of the study is Econometric Analysis of Factors Affecting Market participation of Smallholder Farming in Central Ethiopia. The main objective of this study was to identify and examine the demographic and socioeconomic factors determining market participation of smallholder farmers. The findings from the multinomial logistic regression analysis revealed what factors influence the probability of being commercial farmers. Accordingly, age, being male, urea application, labor expenditure, and land size cultivated had positive sign and significantly affect the probability of being commercial farmer. Nevertheless, use of improved seed, number of oxen owned, and water harvesting had unexpected negative sign, but they are statistically insignificant. Finally, there is still the potential of integrating non-participant farm households with the market if better support services in the form of technical advice and capacity building training to use technology and intensify production are provided. Moreover; if additional funds for agricultural research activities dealing with high-yield seed varieties are allocated and if investments in irrigation projects are made, it is possible to better integrate smallholder farmers to the market.

Key word: Degree of market participation, Commercialization, Adaa District, and Multinomial logistic regression analysis

1. INTRODUCTION

It is evident that for a developing country, agriculture forms the basis for every economic activity. It plays an active role in determining the economic, social, and political system of a society of a developing world. In other words, it is the source of food supply for domestic consumption and for marketable items. It is also major employer for larger proportion of the population to make a living out of it. Since agriculture has significant contribution to the overall economy its share in terms of foreign exchange earnings has continued to be disproportionately higher than other sectors' exportable items. It is also a major source of input for manufacturing industries particularly for food processing, textile and leather sub-sectors.

Ethiopian economy, which is based on agriculture, accounts for 41% of GDP and 85% of total employment and 90% of the total foreign exchange earnings. The sector contributes for about 70% of the raw material supply for local industries and is the major supplier of food for consumers in the country. Coffee has been a major export crop. (CSA, 2009) Even though Ethiopian economy is based on agriculture sector, it is suffered from poor cultivation practices and frequent drought. But recent joint efforts by the Government of Ethiopia and donors have strengthened Ethiopia's agricultural resilience, contributing to a reduction in the number of Ethiopians threatened with starvation. The five year Growth and Transformation Plan that Ethiopia unveiled in October 2010 presents a government led effort to achieve the country's ambitious development goals. Despite GDP growth has remained high, per capita income is among the lowest in the world.

The agricultural sector is predominantly subsistence where the major part of farm production is used for household consumption rather than for market. Smallholder peasant farms cultivate close to 95% of the total cropped land and produce more than 90% of the total agricultural output. Smallholders represent the vast majority of Ethiopian farmers about 37% of the farming households in the country cultivate less than 0.5 hectares and about 87% cultivate less than 2 hectares. Only 12.8% of the farmers own more than 2 hectares of land and 0.9% own more than 5 hectares. (CSA, 2009)

Ethiopia has adopted commercialization of smallholder agriculture as a strategy for its economic transformation. The agricultural services of extension, credit, and input supply are expanding significantly to support commercial transformation, although the dominant player in these services still remains to be the public sector. The expansion of the agricultural services had

significant impact on the intensity of input use, agricultural productivity, and market participation of Ethiopian smallholders.

Commercialization occurs both on the input and output sides. It is characterized by increased marketed surplus, purchase of modern inputs and product choice based on profit maximization, substitution of non-traded inputs for purchased ones, specialization of production and creation of input and output markets. In light of this commercialization can be measured by the ratio of the value of agricultural sale to the total value of agricultural production (output side) or it can be approximated by the ratio of value of inputs purchased to the total value of agricultural products (input side) (Balint, 2004).

The status of smallholder commercialization in Ethiopia as a whole, the average crop output and crop input market participation are 25% and 20%, respectively in 2009, indicating moderate market participation. The average value of annual crop produced per household is Birr[4] 3874, of which Birr 1468 worth of produce is sold. The average input value used for annual crop production is also Birr 2604, of which about Birr 520 is purchased input. These results indicate that the average return to land per household is about Birr 977. At a glance this demonstrates that Ethiopia is found at the first phase of commercialization. But there are significant variations within the country (Gebremedhin et al., 2009).

Therefore, this study assessed factors affecting market participation of smallholder farmers' in Adaa District of East Shoa Zone of Oromia Region. Specifically the study identified the demographic and socioeconomic factors affecting the level of market participation of smallholder farmers

2.1 Theoretical Review

2.1.1 Definition of commercialization

In most literature, a farm household is assumed to be commercialized if it is producing a significant amount of cash commodities, allocating a proportion of its resources to marketable commodities, or selling a considerable proportion of its agricultural outputs (Immink and Alarcon 1993; Strasberg et al. 1999). However, the meaning of commercialization goes beyond supplying surplus products to markets (von Braun et al. 1994; Pingali 1997). According to these authors, it has to consider both the input and

output sides of production, and the decision-making behavior of farm households in production and marketing simultaneously. Moreover, commercialization is not restricted only to cash crops as traditional food crops are also frequently marketed to a considerable extent (von Braun et al. 1994; Gabre-Madhin et al. 2007).

The commonly accepted concept of commercialization is, therefore, that commercialized households are targeting markets in their production decisions, rather than being related simply to the amount of product they would likely sell due to surplus production (Pingali and Rosegrant 1995). In other words, production decisions of commercialized farmers are based on market signals and comparative advantages, whereas those of subsistence farmers are based on production feasibility and subsistence requirements, and selling only whatever surplus product is left after household consumption requirements are met.

The commercialization of agriculture refers to the production of agricultural products to meet specific demands with the sale of fresh or processed product to consumers or to manufacturers in the case of raw material for industries. Agricultural marketing also includes the supply, to farmers, of inputs for production (Abbott, 1987).

According to the above definition commercialization occurs both on the input and output sides. It is characterized by increased marketed surplus, purchase of modern inputs and product choice based on profit maximization, substitution of non-traded inputs for purchased ones, specialization of production and creation of input and output markets. In light of this commercialization can be measured by the ratio of the value of agricultural sale to the total value of agricultural production (output side) or it can be approximated by the ratio of value of inputs purchased to the total value of agricultural products (input side) (Balint, 2004).

2.1.2 Instruments of commercialization

The major instrument of commercializing agricultural products is market which is classified into three; grain, commercial crop and livestock markets in most developing countries (World Bank, 1990).

1. Grain markets: commercializing grain needs special attention due to the fact that grain (wheat, maize, teff etc) is a staple crop in most sub-Sahara African countries, so its market availability and price matters to the population both individually and collectively. Secondly, grain is produced seasonally but consumed daily. Thus it is a great concern and subject to market intervention. Grain is bulky, non-perishable and traded in large volumes. It has a low unit cost but segregation with respect to quality is important in marketing. Grain is produced by large number of small-scale farmers, each producing a small part of the total quantity sold. Most farmers are price takers since they have weak bargaining power.

2. Commercial crop markets: this includes markets for two types of crops; perishables (fruits, vegetables, flowers, milk, egg etc) and cash crops (beverage, fibers, coffee, cotton etc). Unlike in grain trading which becomes ready for final sale with only on-farm processing, commercial crop trading requires relatively large scale processing. The structure of such markets favors the emergence of integrated production with the disappearance of small-scale producers. The demand for most commercial crops is a derived demand, i.e. it is derived from input demand of processing industries. And relative to food crops, the demand for commercial crops is elastic.

3. Livestock market: it includes markets for mainly sheep and cattle. In most cases the farmer can control volume, timing and location of sale. In most African countries there are formal livestock centers like slaughter houses in addition to the small farmers who breed animals.

As the 3 types of commercial activities of agriculture expand, the developmental process shifts the technology from traditional to modern. Purchased input use increases which in turn puts pressure for development of input markets. In addition, as the technology modernizes output of farmers increase which in turn implies an even faster growth in the amount of agricultural products traded.

2.1.3 Rationale for commercialization

The transformation of peasant agriculture from a subsistence economy to a more commercialized system based on well developed markets is critical in promoting

economic growth and poverty reduction based on the following different theoretical arguments (Abbott, 1987 and Mosher, 1966).

1. **Specialization argument:** commercializing encourages specialization of farmers which raises their productivity, expands trade and raises their standard of living. This is in line with Adam Smith's Theory of division of labor in which any marketing (trade) encourages specialization. According to A. Smith the larger the market size (i.e. the higher the degree of commercialization) the greater will be the extent of specialization. Specialization brings productivity growth and as a result leads to higher economic growth. In the agricultural sector marketing agricultural products leads to productivity growth of the sector.
2. **Induced demand argument:** commercialization based on well developed markets provides incentive for farmers to grow and produce for sale. This increases farmers' cash income so that farmers form a growing market for domestic industry and thus consumption of the peasant will develop. The improved income is also used to purchase modern inputs, farm implements and other on-farm investments. The improved income through market arrangements that give the farmer a fair share of the consumer's price will provide farmers the incentive to increase production, raise their living standards and save for future investment. The farmer will sell enough products to pay tax, rent, debt (if any), buy necessities that he cannot produce and get services like health and education. Therefore, " The market system is not only effective in inducing increased streams of output, the product market also represents an effective device for the transfer of gains of productivity growth to other sectors of the economy." (Hayami and Ruttan, 1971)
3. **Efficient resource utilization:** markets contribute to development by providing a way to allocate resources ensuring highest value production and maximum consumer satisfaction. Access to markets can be a way to make use of underused resources. For instance, until farmers in East and West Africa were given the chance to grow commercial crops (through construction of railway and opening oversea market), they concentrated on subsistence food production and traditional activities that did not fully employ available land and labor. So incentives to increase commercialization of agricultural products have the effect of utilizing

available resources efficiently (Abbott, 1987). This is particularly true for large scale productions.

4. **Extraction of fund for industrial development:** agricultural growth can provide surplus to industrial investment only if there are market channels to transfer the agricultural surplus. Marketing agricultural surplus allows the creation of capital for investment outside agriculture. This is the basis of the extraction of agricultural surplus thesis. Kuznet (1964), an instrumentalist in his view of the value of agriculture, assessed the market contribution of agriculture in two ways: i) purchasing some inputs from other sectors and ii) selling some of its product to other sectors. Marketing strengthens these backward and forward linkages of agriculture.
5. **Addressing food insecurity:** one of the major roles of agriculture is to ensure sufficient amount of domestic food production and food security at the household level and also to decrease dependence on external food sources. But with the absence of appropriate markets farmers' output can't reach the increasing urban population.

In general, since agricultural marketing serves as a link between production and consumption it contributes to growth of the national economy. However in most developing economies particularly sub-Saharan Africa (SSA) the marketing systems are not well developed.

3. METHODOLOGY

3.1 Data

The study used a dataset commonly called the Ethiopian Rural Household Survey (ERHS) is a unique longitudinal household data set covering households in a number of villages in rural Ethiopia. The survey was conducted in collaboration with Economics Department, Addis Ababa University (Economics/AAU) and the Centre for the Study of African Economies (CSAE), University of Oxford. Data collection started in 1989, when a team visited 6 farming villages in Central and Southern Ethiopia. In 1989, IFPRI conducted a survey in seven Peasant Associations located in the regions Amhara, Oromiya, and the Southern Ethiopian People's

Association (SNNPR). Civil conflict prevented survey work from being undertaken in Tigray. Under extremely difficult field conditions, household data were collected in order to study the response of households to food crises. The study collected consumption, asset, and income data on about 450 households. In 1994, the survey was expanded to cover 15 villages across the country. An additional round was conducted in late 1994, with further rounds in 1995, 1997, 1999, 2004, and 2009. In addition, nine new villages were selected giving a sample of 1477 households. The nine additional communities were selected to account for the diversity in the farming systems in the country, including the grain-plough areas of the Northern and Central highlands, the enset-growing areas and the sorghum-hoe areas. Topics addressed in the survey include household characteristics, agriculture and livestock information, food consumption, health, women's activities, as well as community level data on electricity and water, sewage and toilet facilities, health services, education, NGO activity, migration, wages, and production and marketing.

The study used the sixth and seventh (2004 & 2009) round was used. Moreover, the study focused on the Central Ethiopia, East Shoa Zone of Oromia Region. Specifically the survey was in Adaa district which include four villages.

3.2 Empirical Model and Econometric Estimation Techniques

To assess factors affecting market participation of smallholder farming, the researcher used a model of crop output market participation index (MP) which is modeled as a function of household and household head characteristics (HH); access to markets and transport infrastructure (AMTI); access to institutional services (extension (EXT), credit (CRD)); and access and ownership of factors of production (AOFP)

$$MP_i = f(HH, AMTI, EXT, CRD, AOFP, U_{MPi}) \quad \text{.....1}$$

Where: u_{MPi} is an error term assumed to be independently and identically distributed with zero mean and constant variance.

Following von Braun et al. (1994), we can compute household crop output market participation in annual crops as the proportion of the value of crop sales to total value of crop production, which we refer to in this paper as crop-output market participation (MP) index, computed as follows:

$$MP_i = \frac{\sum \overline{P_k} S_{ik}}{\sum \overline{P_k} Q_{ik}} \quad \text{..... (2)}$$

Where: S_{ik} is quantity of output k sold by household i evaluated at an average community level price (P_k), Q_{ik} is total quantity of output k produced by household i.

Given the nature of market participation level (MP_i) 1.Subsistence farmers (proportion of value sold is less than 25%) 2. Transition farmers (proportion of value sold is between 25% and 50%) 3. Commercial farmers (proportion of value sold is above 50%) The estimation was based on multinomial logit (MNL) model which enable us to treat the three scenarios of market participation. This method can be used to analyze the impact of various explanatory variables on the probability of being in one or another category (outcome). The advantage of the MNL is that it permits the analysis of decisions across more than two categories, allowing the determination of choice probabilities for different categories (Wooldridge, 2002).

Multinomial logistic regression is used to predict categorical placement in or the probability of category membership on a dependent variable based on multiple independent variables. The independent variables can be either dichotomous (i.e., binary) or continuous (i.e., interval or ratio in scale). Multinomial logistic regression is a simple extension of binary logistic regression that allows for more than two categories of the dependent or outcome variable. Like binary logistic regression, multinomial logistic regression uses maximum likelihood estimation to evaluate the probability of categorical membership. Multinomial logistic regression does necessitate careful consideration of the sample size and examination for outlying cases. Like other data analysis procedures, initial data analysis should be thorough and include careful univariate, bivariate, and multivariate assessment. Specifically, multicollinearity should be evaluated with simple correlations among the independent variables. Also, multivariate diagnostics (i.e. standard multiple regression) can be used to assess for multivariate outliers and for the exclusion of outliers or influential cases. Sample size guidelines for multinomial logistic regression indicate a minimum of 10 cases per independent variable (Wooldridge, 2002).

Multinomial logistic regression is often considered an attractive analysis because; it does not assume normality, linearity, or homoscedasticity. A more powerful alternative to multinomial logistic regression is discriminant function analysis which requires these assumptions are met. Indeed, multinomial logistic regression is used more frequently than discriminant function

analysis because the analysis does not have such assumptions. Multinomial logistic regression does have assumptions, such as the assumption of independence among the dependent variable choices. This assumption states that the choice of or membership in one category is not related to the choice or membership of another category (i.e., the dependent variable). The assumption of independence can be tested with the Hausman-McFadden test. Furthermore, multinomial logistic regression also assumes non-perfect separation. If the groups of the outcome variable are perfectly separated by the predictor(s), then unrealistic coefficients will be estimated and effect sizes will be greatly exaggerated. (Wooldridge, 2002)

Variable selection or model specification methods for multinomial logistic regression are similar to those used with standard multiple regression; for example, sequential or nested logistic regression analysis. These methods are used when one dependent variable is used as criteria for placement or choice on subsequent dependent variables (i.e., a decision or flow-chart)(Wooldridge, 2002).

To describe the MNL model, let y denote a random variable taking on the values {1, 2...J} for J , a positive integer, and let x denote a set of conditioning variables. In this case, y denotes commercial class or categories of farmers and x contains household attributes like age, education, asset ownership, and so forth. The question is how, ceteris paribus, changes in the elements of x affect the response probabilities P(y = j / X), j =1, 2 ...J. Since the probabilities must sum to unity, P(y = j / x) is determined once we know the probabilities for j = 2...J.

Let x be a 1× K vector with first element unity. The MNL model has response probabilities:

$$P(Y = j / X) = \frac{\exp(X\beta_j)}{\left[1 + \sum_{K=1}^{J} \exp(X\beta_K)\right]} \quad \textbf{j=1 ...J..... (3)}$$

Where β_j is Kx1, j=1…J. Because the response probabilities must sum to unity,

$$P(y = 0 / X) = \frac{1}{\left[1 + \sum_{K=1}^{J} \exp(X\beta_K)\right]} \quad \textbf{..... (4)}$$

When J=1, β_1 is the Kx1 vector of unknown parameters, and we get the binary logit model.
For this study, the outcome or response probabilities are three:

1. Subsistence farmers (proportion of value sold is less than 25%)
2. Transition farmers (proportion of value sold is between 25% and 50%)
3. Commercial farmers (proportion of value sold is above 50%)

Unbiased and consistent parameter estimates of the MNL model in equation (1) require the assumption of independence of irrelevant alternatives (IIA) to hold. More specifically, the IIA assumption requires that the probability of being in one category by a given household needs to be independent from the probability of being in another commercial class (that is, Pj/Pk is independent of the remaining probabilities). The premise of the IIA assumption is the independent and homoscedastic disturbance terms of the basic model in equation (1).

The parameter estimates of the MNL model provide only the direction of the effect of the independent variables on the dependent (response) variable, but estimates do not represent either the actual magnitude of change nor probabilities. The magnitudes of the coefficients of MNL model are difficult to interpret. Thus, either we compute partial effects, as in equation (5), or compute differences in probabilities. These results are easily obtained by comparing fitted probabilities after multinomial logit estimation. The fitted probabilities can be used for prediction purposes: for each observation i, the outcome with the highest estimated probability is the predicted outcome. This can be used to obtain a percent correctly predicted, by category if desired. (Wooldridge, 2002) Therefore, differentiating equation (1) with respect to the explanatory variables provides partial effects of the explanatory variables given as:

$$\frac{\alpha P(y=j/X)}{\alpha X_K} = P(y=j/X)\left\{\beta_{jK} - \frac{\left[\sum_{K=1}^{J}\beta_{hK}\exp(X\beta_K)\right]}{g(X,\beta)}\right\} \quad \textbf{..... (5)}$$

Where β_{hk} is the kth element of β_h and

$$g(X,\beta) = 1 + \sum_{h=1}^{J}\exp(X\beta_h) \quad \textbf{..... (6)}$$

The marginal effects or marginal probabilities are functions of the probability itself and measure the expected change in probability of a particular category with respect to a unit change in an independent variable from the mean (Wooldridge, 2002). Using this procedure the factors that differentiate the commercialization level of the households are discussed and explained.

For MNL regression measure of fit of the model stata's output concerning overall model fit is sufficient. Both the model chi-square (i.e. the LR test for the current model compared to the null model) and the McFadden's Pseudo R-square are included in the standard output.

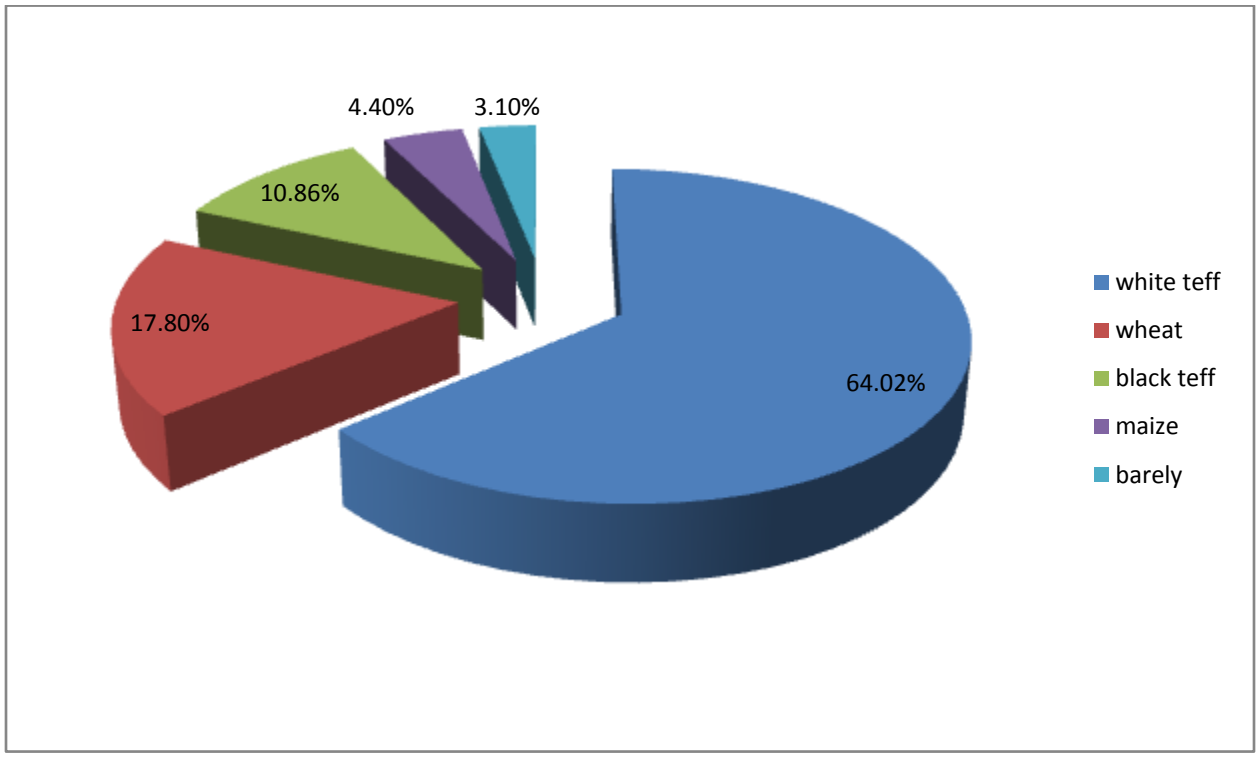
In order to show the relationship and capture the hidden characteristics of the data mainly econometric analysis was applied. The cross-sectional data taken from 83 households was run using multinomial logit (MNL) model on stata 11 software packages. Previous studies on market participation have typically adopted a two-step analytical approach involving the unobservable decision to participate and the observed degree or intensity of participation in the markets.

4. RESULT AND DISCUSSION

4.1 Crop Production, Sales, and Degree of Market participation

The pie chart depicted that teff had taken the lion's share of the total cereal crop production in the entire sample villages of the Adaa Wereda. Wheat took the second place in terms of volume of production while barley had taken the last place.

Figure 1: Volume of Food Crop Production



Source: own computation from ERHS survey, 2009

As can be seen from the pie chart on Fig. 4.5, white teff account for the largest percentage (64.02%) of the total sales volume earned by the typical household head followed by wheat sells volume (17.8%), black teff 3rd with 10.86%, maize (4.4%) and finally barely 3.1%.

Table 1: Statistical Summary of crop value produced and sold (in Birr)

Variable	Obs	Mean	Std. Dev.	Min	Max
Total food crop produced	74	16404.34	14124.35	325	86250
Total food crop sold	74	4618.89	8779.72	0	66600
Market participation of food crop	74	0.2241	0.21	0	1
Degree of food crop Market Participation	74	22.41	19.12	0	100

Source: own computation from ERHS survey, 2009

The statistical summary given in table 4.9 shows that a typical household head produced food crops valued approximately birr2 16404 ranging from birr 325 to 86250. From sells dimension, a typical household head, on average, sold food crops worth birr 4618 ranging from selling nothing to birr 66600. The degree of market participation (which is defined as the ratio of the gross value of all crop sales to the gross value of all crop production times hundred) for the typical household head is computed to be 22.4% ; the most commercialized household head sold about 100% of the gross value of its total cash crop production. The level of market participation in the study areas is lower than the national average which ranges from 33-36% (EEA 2004 cited in Samuel and Sharp 2007:65). This indicates that the level of market participation in the study areas is very low even in comparison to the national average, which is in itself considered to be low.

4.2 Econometric Analysis of Factors Affecting Degree of Market Participation

The likelihood ratio statistics as indicated by chi2 statistics are highly significant (P <0.0000), suggesting the model has a strong explanatory power. We tested whether the assumption of IIA holds in our model using the Hausman tests. The result consistently indicates that the assumption is not violated and hence application of multinomial logit model is appropriate. The Pseudo R2 is 0.4169, indicating the specification fits the data well the variables included in the model explain 42% of the variation in the degree of market participation of farmers. The maximum likelihood estimate for the multinomial logistic regression for the probability of being commercial, transition farmer and subsistence farmer as base outcome is presented in Table 4.11. The result of the MNL regression showed that most of the variables tested for the probability to be commercial farmer had expected sign. However, only age, being male, urea

application, labor expenditure, and land size cultivated had positive sign and significantly affect the probability of being commercial farmer. Nevertheless, use of improved seed, number of oxen owned, and water harvesting had unexpected negative sign, but they are statistically insignificant. For the probability of being transition farmer; age, urea application, land size cultivated, and hired labor had expected positive sign and significantly affect the probability of being transition farmer. However; use of improved seed, and being male had unexpected negative and statistically significant effect on the probability of being transition farmer. Nevertheless, DAP application, use of improved seed, labor expenditure, seed expenditure, and water harvesting had unexpected negative sign, but they have statistically insignificant effect on the probability of being transition farmer.

Table 2: Marginal effects of the explanatory variables on the probability of different market participation

Variables	Subsistence Farmer			Transition Farmer			Commercial Farmer		
	Margenal Effect	Std. Err.	P>Z	Margenal Effect	Std. Err.	P>Z	Margenal Effect	Std. Err.	P>Z
AGE	-0.020	0.006	0.002***	0.018	0.006	0.003***	0.002	0.001	0.238
Education	-0.004	0.046	0.933	0.002	0.046	0.963	0.002	0.007	0.811
Household size	-0.035	0.045	0.446	0.033	0.046	0.472	0.002	0.003	0.637
Sex	0.385	0.187	0.04**	-0.410	0.186	0.027**	0.025	-0.036	0.096*
Oxen owned	0.007	0.080	0.936	0.012	0.081	0.883	-0.018	0.018	0.295
DAP Fertilizer	0.002	0.002	0.435	-0.002	0.002	0.425	0.000	0.000	0.648
UREA Fertilizer	-0.014	0.004	0.000***	0.014	0.004	0.000***	0.010	0.009	0.108*
Seed	0.023	0.009	0.008***	-0.022	0.008	0.01***	-0.021	0.002	0.567
Seed expense	0.001	0.001	0.388	-0.001	0.001	0.289	0.006	0.000	0.561
Labor expense	0.000	0.000	0.200	0.000	0.000	0.165	0.037	0.027	0.031**
Water Harvesting	-0.226	0.227	0.319	0.266	0.223	0.233	-0.040	0.048	0.401
Hired labor	-0.081	0.041	0.051*	0.083	0.042	0.048**	-0.002	0.005	0.631
Land size	-0.101	0.259	0.022**	0.133	0.573	0.018**	0.095	0.123	0.044**
Extension visit	-0.034	0.083	-0.410	0.001	0.001	0.550	-0.016	0.020	-0.790
Credit use	0.049	0.051	0.960	0.004	0.006	0.660	0.017	0.023	0.730

The parameter estimates of the MNL model provide only the direction of the effect of the independent variables on the dependent variable: estimates do not represent actual magnitude of change or probabilities. Thus, the marginal effects from the MNL, which measure the expected change in probability of a particular category with respect to a unit change in an independent variable, are reported and discussed. In all cases the estimated coefficients should be compared with the base category. Table 4.12 presents the marginal effects along with the levels of statistical significance.

Household characteristics like being male headed household decreases the probability of being subsistence farmer and have positive effect on being transition and commercial farmers. On the other hand, an increase in age by one year significantly decrease the probability of being subsistence farmer where as it has positive effect on being transition farmer. The result is consistent with other previous research. A study conducted by Cunningham et al. (2008) showed that men are likely to sell more grain early in the season when prices are still high, while women prefer to store more output for household self-sufficiency. Cunningham et al. (2008) also showed that experience on farm work proxy to age of farm household head has positive significant effect on the level of market participation. In contrary to Cunningham et al. (2008), Mahelet (2oo7) shows that age of the head negatively and significantly affects the degree of market participation. This could arise from the fact that older heads have limited access to market information; whereas younger heads could sell a relatively large portion of their product through a better access to price information. In addition there is a tendency of younger heads to have relatively a higher educational level in terms of highest completed grade than older heads.

Urea usage has positive effect on the probability of being transition farmer and decrease the probability of being subsistence farmer. A unit increase in urea application of a household decreases the probability of being subsistence farmer by 1.3 percent but increase the probability of being transition and commercial farmer by 1.4 and 1 percent respectively. Thus, fertilizer use indicate the integration into the input market, thus from the way it is defined, it is expected that the fertilizer use variable is positively related to market participation.

Quantity of improved seed applied decrease the probability of being transition farmer but has positive effect on being subsistence. The data shows a unit increases in quantity of improved seed applied decreases the probability of being transition farmer by about 2.2 percent while it tends to increase the probability of subsistence farmers by almost the same percent. The result deviated from many previous researches. Thus it is in support of the argument that improved

seed applied in the absence of sufficient complementary inputs tend to decrease the welfare of the household.

Regarding labor expenditure only has a significant positive effect on being commercial farmer. Moreover quantity of hired labor decreases the probability of being subsistence farmer but has a significant positive effect on being transition farmer. A unit increase in hired labor of a household decreases the probability of subsistence class by 8% but increase the probability of being transition farmer by 8.3 percent. This result is in line with Mahelet (2oo7), Erik (2002), and Alene et al. (2008). Hired labor has a positive significant impact on the degree of market participation where as household labor is not significant. The explanation could be that although the available household labor positively influences the degree of market participation, commercial farms rely on hired labor and not just family resources.

Land size cultivated significantly decreases the probability of being subsistence farmer but it has a positive significant outcome on being transition and commercial farmer. As the table indicates as Land size cultivated increases by one unit, the probability to be subsistence farmer decreases by 13 percent while the probability to be commercial and transition increases by 9 and 10 percent respectively. Using different model Balint (2003) and Mahelet (2oo7) showed that land size has a significant positive impact on the degree of market participation. The cultivated land size positively influences the share of sale from total production and it has a highly significant positive sign. Households with larger land size are relatively better off because it allows the household to have a surplus production above subsistence needs and enable them to sell products for market. Thus, access to land can be enhanced by improving the functioning of the land lease market.

5. CONCLUSIONS AND POLICY IMPLICATION

5.1 Conclusions

Market participation of smallholder farming is getting priority in the developing world in general and Ethiopia in particular. The five year Growth and Transformation Plan that Ethiopia unveiled in October 2010 has adopted market participation of smallholder agriculture as a strategy for its economic transformation. This prioritization of smallholder farming has been reflected in the policy agenda of many developing countries. In Ethiopia, smallholder farmers cultivate

approximate to 95% of the total cropped land and produce more than 90% of the total agricultural output. Given the agricultural led industrialization strategy for development and the dominance of smallholder agriculture in Ethiopia, it becomes imperative that smallholder farmers be transformed from the subsistence based production to market oriented production system. However, the degree of agricultural market participation is at its infant stage in Ethiopia which is given by the national average of 33 to 36% in 2009.

This study assessed factors affecting the degree of market participation of smallholder farmers in East Shoa Zone of Oromia Region, Ethiopia based on data obtained from ERHS 2009. Market participation of farmers was justified on the basis of poverty reduction arguments in which farmers should be able to plan, transport, store, and sell their products in the market participation process. In Ethiopia empirical works show that production of peasant farmers could be increased through land and input use. But market participation has been low due to weak rural infrastructures, uncompetitive markets, and low technological input usage.

The households in the study area are characterized by a high productivity but with low degree of market participation. The average share sold was found to be 22.4% of total food crop productions. Households' production is high even with low degree of input use and technology as compared with other areas but the degree of market participation is very low even as compared with national average 33to 36%. This is a vivid indicator of the low level of market participation in the study area despite the unique advantage of their proximity to the largest city in the region, Debrezeit. In absolute terms, the average household sold crops amounting to birr 5605 per annum. Out of the total respondents, the majority (90%) participated in the output market while the rest (10%) did not participate at all.

The findings in this study showed that majority of the households covered in this study are mainly dependent on agriculture for their livelihoods. Most of them are engaged in mixed farming; and most of these produce exclusively food crops for own consumption. This indicates that the majority of the households are subsistence-oriented. The findings from the multinomial logistic regression analysis revealed what factors influence the probability of being commercial farmers. Accordingly, age, being male, urea application, labor expenditure, and land size cultivated had positive sign and significantly affect the probability of being commercial farmer. Nevertheless, use of improved seed, number of oxen owned, and water harvesting had unexpected negative sign, but they are statistically insignificant.

5.2 Policy Implications

The findings discussed above provide the following policy implications:

• Existing government direction to transform smallholders from subsistence-oriented to market-oriented production system is proving to have an encouraging result. However, a lot needs to be done to enhance the level of market participation since the majority of smallholders are not well integrated with the market yet.

• There is still the potential of integrating non-participant farm households with the market. If better support services in the form of technical advice and capacity building training to use inputs like fertilizer and technology intensify production, this brings better market participation. Empirical results indicating the importance of Urea application, land size, and labor as a determinant factor for market participation justifies such an intervention.

• Better credit services for households with marginal land holding could create a viable condition to exit from subsistence oriented farming and join the newly emerging rural non-farm entrepreneurship while at the same time allowing others to lend in additional land. The empirical results indicating the importance of land size as a determinant factor for market participation justifies such an intervention.

• To improve the market participation across farmers there is a need to focus on improving and facilitating the female head market participation. Training and information provision on market increase the productivity of farmers especially less commercialized female farmers. The empirical results indicating being male as a determinant factor for market participation justifies such an intervention.

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Acronyms

CSA Central Statistical Agency

CSAE Center for Study African Economy

DOMP Degree of Market participation

EEA Ethiopian Economics Association

ERHS Ethiopia Rural Household Survey

HH Household

IFPRI International Food Policy Research Institute

IIA Independence of Irrelevant Alternatives

MNL Multinomial logit

MoFED Ministry of Finance and Economic Development

PSN productivity safety net

SSA Sub-Saharan Africa

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