Determinants of Chicken Market Participation Decisions by Smallholder Farmers in West Gojam Zone, Ethiopia: A Gender Perspective

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Abstract

Ethiopia is a country where village chicken plays a dominant role in total chicken production. Chicken production as part of livestock production could be one alternative in generating income for rural households. Although some researchers studied chicken in Ethiopia, they asses and examine merely the production practices of chicken like adoption, feeding and variety. This indicates that there is huge knowledge gap regarding the determinants of chicken Market Participation Decisions by Smallholder farmers in Ethiopia. Thus, this study identified determinant factors affecting chicken market participation decisions by smallholder farmers in Mecha and Bahir Dar Zuria districts, Ethiopia. The data used in this study were collected from 154 male and 46 female headed households who *were selected via multistage sampling technique from four kebeles of the district. The data were analyzed using t-test, chi-square. Probit and Heckman two-stage selection were estimated to identify the determinants of chicken marketing participation-decision in Female-Headed Households (FHH) and Male-Headed Households (MHH). The probit model results indicate that distance from the nearest market, number of chicken owned, breed type and getting extension service influenced FHH farmers' decision to participate in marketing significantly. Experience of chicken production, market information, use of credit, and income from non-farm activity influenced MHHs' decision to participate in marketing. Therefore, in order to realize the country's long-term vision of food security and achieve agricultural and rural development, all the determinants of participation-decision and value of chicken sales should be considered by policy makers as a new insight for intervention measures.*

Keywords: Female-headed households, Gender, Heckeman, Market participation, Probit regression

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1. Introduction

Village poultry are used as a tool in promoting gender equality and women's development (Gueye, 2000). The role of gender not only in production but also in consumption and marketing is important to effectively increase benefits from poultry keeping for poor female-headed households (Guèye, 2003).

In sub- Saharan Africa, 85 percent of all households keep chicken (Guèye, 1998). In developing countries, many rural households keep chicken in their farmyard (Akililu, 2007). Ethiopia is representative of countries where village chicken plays a dominant role in total chicken production. The sector represents an important part of the national economy in general and the rural economy in particular.

Ethiopia has the largest livestock population in Africa. Livestock production, as one component of agriculture, covers 40% of the agricultural output playing an important role in the Ethiopian economy as it contributes 13-16% of the total GDP. The Livestock Master Plan (LMP) forecasts the poultry sub-sector to help close the total national meat production-consumption gap and achieve the increase of the share of chicken meat consumption to total meat consumption from the current 5% to 30% by 2030 (Shapiro *et al*, 2015). Chicken and cattle account for the largest proportion each with an estimated 50,000 million heads of animals (CSA,2014). In Amhara region, the total chicken population were accounted for 28.5% (CSA. 2011). In spite of the existing enormous livestock resource and great potential for increased livestock production, productivity is disproportionally lower. The contribution of this sector in the agricultural economy of the country in general and the region in particular remains lower. Chicken production as part of livestock production could be one alternative income generating mechanism for rural households. Even though some researchers studied chicken in Ethiopia they primarily focused on the production practices of chicken such as adoption, feeding and variety (Moges and Dessie, 2010; Melese and Melkamu, 2014; Awol, 2010; Dawit, 2010). As a result, there huge knowledge gap regarding the determinants of chicken market participation decisions by smallholder farmers in Ethiopia. In addition, determinants of chicken market participation decisions in the region and in the country are hardly studied form a gender perspective.

Identifying such determinants helps policy makers to embark on appropriate interventions aimed at improving chicken productivity in the whole system. This enhances the production and marketing of chicken as a means of reducing poverty and improving their livelihood. It provides direction for policy makers to make women more effective in their economic contribution. Therefore, assessment and promotion of chicken marketing in the region and assessment and expansion of improved package with appropriate extension method is required to alleviate the food shortage problem in the region and to exploit the huge potential of chicken in the study areas and other regions. The objective of this study is, therefore, to identify the determinants of chicken market participation decisions by male and female headed Smallholder farmers.

2. Methods

This study was under taken in *Mecha and Bahir Dar Zuria* districts located in *West Gojam Zone*, Amhara National Regional State of Ethiopia (Map1). *Mecha district* is located at $11^0$5000'N latitude and $37^0$000'E longitude. *Merawi* is the capital of the district and is found at 535 km from *Addis Ababa* and 30 km from the regional capital. The climate of Mecha

district is Weyina Dega. *Bahir Dar Zuria* is located at $11^{0}6000$'N latitude and $37^{0}3833$'E longitude. *Bahir Dar* is the capital of the *district* as well as the region and is found at 565 km away from *Addis Ababa*. The climate of Bahir dar Zuria District is Weyina Dega.

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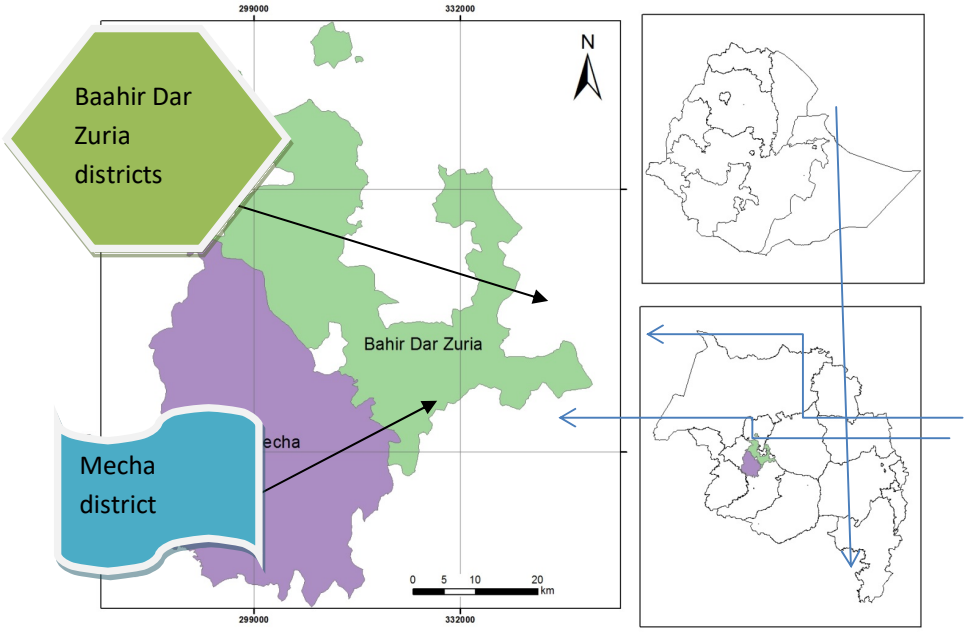
Map 1: Map of the Study Areas



Source: GIS Data, 2017

Sampling Design

A multi–stage random sampling procedure was employed to draw the sample kebeles and farm households. The first stage was the purposive selection of west Gojam zone of Amhara National Regional State. Out of the 13 districts in the zone, the study was conducted in two purposively selected districts, namely Mecha and Bahir Dar Zuria District. These districts were selected because of the following reasons.

1. The area has a great potential to produce chicken due to its location-good climate and proximity to Bahir Dar city.
2. As per the researcher's information, no study has been conducted in the districts especially regarding of chicken market participation decision of smallholder farmers from a gender perspective.
3. A pilot demonstration area of LIVES (Livestock Value Chain for Ethiopian Smallholders), whichsponsored this research project.
4. Improved agricultural inputs utilization as well as wide demonstration practices on agricultural inputs applications and utilizations in general and chicken technologies in particular.

The second stage of the sampling procedure involved stratifying the kebeles as near and far from the town. The distance between each kebele and the main town was taken and the average distance of all the kebeles was calculated. That is, a kebeles loclated a km below the average distance (Mecha 27 km and Bahir Dar Zuria 22 km were considered as a near kebele,

and kebeles above the average were considered as a far kebele. This is because, the near and the far kebeles may or may not equally access market and input for chicken production. As the third stage of the sampling procedure, a total of four kebeles (1 near and 1 far away from towns in each district) were selected randomly from near and far kebeles. In this study, sample size was determined by taking different factors like research cost, time, human resource, availability of transport facility, and other physical infrastructure accessibilities. By taking these factors into account, it was fixed to cover four kebeles out of 42 kebeles of Mecha and 32 Kebeles of Bahir Dar Zuria Districts, respectively.

As the fourth stage of the sampling procedure, farmers in the selected kebeles were stratified as male-headed and female- headed households. Finally, the number of respondents for male-headed households (MHH) was determined by using probability proportional to size sampling procedure. The same procedure was followed for selecting samples of female- headed households (FHH). Finally, respondents from each selected kebeles were identified using probability proportional to size random sampling technique, to get a total sample size of 200 households in both districts (154 MHH and 46 FHH).

Out of the total 1050 FHH and 5951 MHH farmers, 46 FHH and 154 MHH representative farmers were selected using simple random sampling methods (Table 1).

Table 1. Number of respondents in each of the selected rural *kebeles*

Name of district	Name of Kebeles	Number of household heads(Sex of respondents)			No of Respondents Selected		TNR	Percentage of Sample respondents (in %)
		MHH	FHH	Total	MHH	FHH		
Bahir Dar Zuriya Akaki	*Kinbaba*	886	106	992	25	3	28	14
	Robit	1814	209	2023	52	6	58	29
	Ambo Mesk	1444	963	2407	42	28	70	35
	Dagi	1263	315	1579	36	9	45	22
	Total	5951	1050	7001	154	46	200	100

NB: "FHH" refers to female-headed households, "MHH" refers to male-headed households and "TNR" refers to total No of respondent

Methods of Data Analysis

Data analysis employed descriptive statistics (such as percentage and mean comparison), t-test, chi-square, probit and Heckman two-stage selection, to identify the determinants of chicken marketing participation-decision.

To analyze the determinants of marketing participation-decision and value of chicken, the specifications of the empirical models used to identify these determinants follow the sample selection models widely used by different scholars (Abay,2007; Alene,2008 ;Almaz,2015; Astewel, 2010 ; Bellemare and Barrett. 2006; Berhanu and Hoekstra. 2007 ; Berhanu, 2012; Bienabe, 2004; Gotez,1992; Heckman, 1976; Heltberg Tarp, 2002; Holloway and Ehui,2002; Holloway,2004; IFAD, 2003; Irini and Aysen, 2005; Key,etal, 2000.; Lapar,2003; Makhura, 2001; Omiti, 2009; Reardon, and Timmer, 2005; Rehima, 2006; Rios *et al.,* 2008; Siziba ,2010; Woldemichael, 2008; World Bank, 2001; and Zelalem, 2008). In selectivity models, there is a sequential two-stage decision-making process. In the first-stage, farmers make a distinct decision whether or not to participate in chicken marketing.

In the second-stage, farmers conditional on their decision in chicken marketing, make a decision on the level of participation in terms of value (birr) of chickens and eggs supplied to the market by family members of the sample respondents in 2016. Table 2 presents the summary of the symbol, definition and hypothesized sign of variables.

Table 2. Symbol, definition and hypothesized sign of variables by producers

Definition	Symbol	Type of Variable	Hypothesized Sign
Market participation decision: Respondents who participate in chicken or egg market = 1, and =0, otherwise in the year 2016.	MKTPAR	Dummy	Dependent
Value of quantity supplied: which represents the value (birr) of chickens and eggs supplied to the market by family members of the sample respondents in the year 2016 .	VSPLD	Continuous	Dependent
Respondents age (Years)	AGEHH	Continuous	(+)
Education level of household head (1= illiterate, 2=literate)	EDUCA	Dummy	(+)
Total livestock unit except chicken	TLU	Continuous	(-)
Number of Chicken owned	CKOW	Continuous	(+)
Land hold of household(Hectare)	LANDH	Continuous	(-)
Distance of residence from development center	DISDC	Continuous	(-)
Distance of residence from all weather road	DISWR	Continuous	(-)
Access to credit (1=, if yes; 0=, otherwise)	CREDT	Dummy	(+)
Member of cooperatives (1= if yes; 0= Otherwise)	MCOOP	Dummy	(+)
Year of poultry production	EXPRE	Continuous	(+)
Income from both off and non-farm activities (in Birr)	INCFAR	Continuous	(+)
Distance of the respondents' house from input and output market (km),	DSTNT	Continuous	(-)
Breed type(1= Indigenous, 2= Hybrid, 3= Exotic)	BRDTY	Discreet	(+)
Access to Extension Service (1=, if yes; 0=, otherwise)	EXTEN	Dummy	(+)
Participating in training (1= if yes; 0= otherwise)	TRAIN	Dummy	(+)
Access to Market information (1=, if yes; 0=, otherwise)	INFM	Dummy	(+)

3. Results and Discussions

Summary of t--test Results of Respondents

Of the total of 200 farmers interviewed, 78.9% were male-headed, while the rest, 23%, were female-headed households. Male-headed households were also large in number in the study areas. This figure was consistent with the secondary data obtained from the district BOARD (BoARD, 2016) which indicated that male-headed constitute about 77% of the total population of the districts.

As indicated in Table 3, there are significant differences between FHH and MHH households both in experience of chicken production and age of respondents at 1% of probability level. The average land holding of male-headed households was 1.1 hectare (ha), which is significantly ($P < 0.01$) greater than that of female-headed households, 0.9 ha (Table 3). In general, FHH in sub-Ethiopia tend to cultivate smaller plots of land than that of MHH (Almaz *et al*, 2015; and Azanaw and Assamnew, 2017). This indicated that there was opportunity for FHH to participate increasingly in chicken marketing. The average heads of chicken owned by female and male headed respondent were 7.75 and 10.46, respectively. As the t-test shows the mean difference is statistically significant (t=2.104, p=0.05). This implies that female-headed households had large number of chicken than men which implies that the larger in the number of chicken heard female headed households possessing the more likely decided in favour of participating in chicken marketing (Table 3). Evidences from the t-test indicated that, FHHs had younger age, less chicken production experience and lived relatively far away from the development centre than their MHH counterparts. All these factors enabled MHH to reduce chicken production constraints (Table 3).

Table3**.** Summary of t-test Results of Sampled Respondents

Variables	Male (N=154)	Female (N=46)	All cases (N=200)	t-value
Age of respondents	38.13	32.72	36.88	-3.295***
Distance of residence from marketing center	53.27	51.74	52.92	-0.256
Distance of residence from development center	30.69	38.91	32.59	2.07**
Distance of residence from all weather road	24.21	24.28	24.23	0.016
Year of chicken production	15.36	10.59	14.26	-2.639***
Total crop land	1.0862	0.8685	1.0361	-1.978**
Number of Chicken owned	7.75	10.46	8.37	2.104**
Total livestock unit except chicken	3.8684	3.7252	3.8355	-0.35
Total on/off farm income	6545.58	7319.13	6723.50	0.537
total birr fron sale of chicken and egg	717.4286	1090.196	803.1650	1.546

Source: survey data, 2016. ***&**, denote 1% and 5% level of significance, respectively.

Summary of Chi-Square Test Results of Respondents

From the total interviewed in the study areas, more than three-fourth of the respondents (77 %) were male-headed. The summary results of the descriptive analysis for the households' socio-economic characteristics for 200 sample respondents showed that, 120(60%) and 80(40%) were participants and non-participants from the selected districts, respectively. The result indicated that out of the total respondents about 77 percent were male-headed and 23 percent were female head households. The result also indicated that 78.3 percent of female-head households responded that they had participation in chicken marketing while only 54.5 percent of male-headed participated in it. Test of variable shows that there was statistically

significant differences between categories with respect to poultry market participation decision at 1% significant level.

The analysis of field data confirms that there is statistical difference between the two groups in getting extension service at 5% probability level. This implies that more MHH got more extension advisory service than FHH ($\chi 2=5.91^{**}$) did.

Among the three chicken breed types, indigenous chickens are dominant (82.0%). The findings of this study concur with the study conducted in Ethiopia by Tadelle *et al.,* 2003 and in Addis, 2014. In addition, the majority of respondents (76.1% of FHH and 83.8% MHH) had indigenous chickens.

As presented in Table 4, 18% of the respondents have used credit services. Among female headed households and male-headed households, 19.6% and 17.5% respondents used credit service, respectively. The educational status indicates that about 47.8% and 50.6% of the FHH and MHH were illiterate, respectively. However, no statistical differences were noticed between FHH and MHH market participants with respect to the variables discussed above.

Table 4. Summary of chi-square test results for producer actors in vegetable value chain

Lists of Variables		**FHH (N=46)**	**MHH (N=154)**	**All cases (N=200)**	**χ^2-value**
MARKETPART	No	21.7	45.5	40	8.3***
	Yes	78.3	54.5	60	
CREDT	No	80.4%	82.5%	82.0%	0.01
	Yes	19.6%	17.5%	18.0%	
MARKINF	No	30.4%	36.4%	35.0%	0.55
	Yes	69.6%	63.6%	65.0%	
ADVISERY	No	50.0%	30.5%	35.0%	5.91**
	Yes	50.0%	69.5%	65.0%	
TRANING	No	89.1%	86.4%	87.0%	0.24
	Yes	10.9%	13.6%	13.0%	
Member of cooperatives	No	37.0%	33.8%	34.5%	o.16
	Yes	63.0%	66.2%	65.5%	
EDUCA	Illiterate	47.8%	50.6%	50.0%	0.11
	Literate	52.2%	49.4%	50.0%	
Chicken production	Indigenous,	76.1%	83.8%	82.0%	1.59
	Hybrid	19.6%	12.3%	14.0%	

system	Exotic	4.3%	3.9%	4.0%

Source: survey data, 2016. ***&**, represent 1% and 5% level of significance, respectively.

Econometric Analysis Results

The econometric regression analysis was intended to examine the determinants of the probabilities of households' in chicken market participation-decision and the level of participation in chickens and eggs supplied to the market. The analysis was also undertaken separately for female and male headed households.

Results of first-stage probit model estimation

The analysis of probit model for female and male headed households was done separately. The first-stage probit model estimation was used to determine the probabilities of households to participate in chicken marketing.

The analysis of the first-stage probit model estimating the determinants of likelihoods of households to participate in chicken marketing is shown in Table 5. The probit maximum likelihood method was employed to estimate the participation-decision in chicken marketing. The Table also displays the values of marginal effects. The model was highly significant with a Chi-square value of 113.62, 89.81 and 76.80 in pooled data set, MHH and FHH, respectively. This confirms that collectively the explanatory variables entered into the probit model regression explain the variations in the farmers' probability to participate in chicken marketing. The log likelihood ratio test is used to compute the total pool significance of the explanatory variables in explaining the variations in FHH and MHH farmers' likelihood to participate in marketing. The log likelihood ratio analysis of the null hypothesis showed that all coefficients are jointly zero. The first stage probit model explains 70%, 67% and 66% of the variations in the likelihood of participation in pool data set, MHH and FHH, respectively. It predicts about 95% of the cases correctly.

Due to lack of variability, market information, landholding and income from non-farm activities in female-headed households, they were excluded from the regression. Seventeen potential variables proposed to affect chicken marketing participation were entered into the model. The result indicated that seven and ten variables in the case of MHH and FHH were found significant, respectively.

Table 5. First-stage probit estimation of participation to produce onion and/or tomato

Explanatory Variable	**Pooled (N=200)**		**MHH (N=154)**		**FHH (N=46)**	
	Coefficient	**Marginal effect**	**Coefficient**	**Marginal effect**	**Coefficient**	**Marginal effect**
AGEHH	0.02(0.2)	0.01	0.03(0.02)	0.01	2.68(0.12)***	0.32
SEX	-1.10(0.27)***	-0.34	------	------	------	-----
EDUCA	0.17(0.24)	0.06	0.18(0.25)	0.07	3.14(0.79)***	0.02

DSTNT	0.01(0.00)	0.00	0.01(0.00)	0.00	-0.09(0.10)	0.52
DISDC	-0.01(0.01)	0.00	-0.01(0.01)	-0.01	-0.70(0.19)***	0.38
DISWR	0.01(0.01)	0.00	0.01(0.01)	0.01	-0.67(0.13)***	0.24
EXPRE	-0.01 (0.71)	0.00	0.03(0.02)*	-0.01	0.12(0.14)	0.10
MCOOP	0.81 (0.30) ***	0.30	0.58(0.34)*	0.23	12.48(1.80)***	0.6
LANDH	-0.19 (0.30)	-0.07	-0.12(0.33)	-0.05	-----	-----
CKOW	0.01(0.02)	0.00	0.01(0.02)	0.00	0.56(0.13)***	0. 10
TLU	-0.22(0.06)***	-0.08	0.21(0.07)***	0.08	-5.24(0.37)***	0.3
BRDTY	0.42(0.25)*	0.16	-0.16(0.26)	-0.06	37.57(2.32)***	0.13
TRAIN	1.58(0.34) ***	-0.56	1.98(0.40)***	-0.60	76.8(11.71)***	0.1
EXTEN	0.31(0.29) ***	0.12	0.21(0.31)	0.08	39.9(10.26)***	0.5
INFM	1.13(0.26)***	0.42	1.03(0.29)***	0.39	-----	----
CREDT	0.90(0.37) **	0.28	0.73(0.41)*	0.26	0.43(0.30)	0.2
INCFAR	0.11(0.1)**	0.001	0.01(0.04)***	0.01	----	-------
_cons	-1.84(0.80) **	-	-2.69(0.85)***	-	38.52(0.33)	-----
LR $chi^2(17)$ = 113.62***			LR $chi^2(16)$= 89.81***		LR $chi^2(16)$= 76.80***	
Log likelihood = -86.27			Log likelihood= -71.03		Log likelihood=--41.14	

Source: survey data, 2016. ***, ** & * represents 1%, 5% and 10% level of significance, respectively. Figures in parenthesis are Standard Errors.

As predicted, female-headed households were found to have more probability to participate in chicken market compared to male-headed households. Marginal effect analysis indicated that, being a female-headed household increases the probability of chicken market participation by 34% compare to being a male-headed household. This result is consistent with the study conducted by Tadelle, *et al.,* 2003 which indicated male-headed household is expected to affect market participation decision, value of poultry sales and access to poultry service negatively. However, the result from the present study contradicts the findings of Gebregziabher, 2010 and Abeykoon *et al.*, 2013 that the probability to participate in poultry market decrease with female household headship.

As hypothesized aprior, membership in cooperative is positively associated with FHH and MHH farmers' likelihood to participate in chicken marketing. This indicates that membership in cooperative increases FHH and MHH farmers' probability of participating in marketing by 23% and 10%, respectively. Also, as expected, number of livestock except chicken is statistically significant and negatively associated with FHH and MHH farmers' likelihood to participate in marketing. This indicates that as the numbers of livestock increases by TLU, FHH's and MHH's likelihood to participate in marketing decreases by 30% and 8%, respectively.

In line with prior expectation, participating in chicken training by MHH and FHH is positively associated with farmers' likelihood to participate in marketing. The probability of

participating in the market increases by 60% and 10% for MHH and FHH participating in chicken value chain training, respectively. As hypothesized, age of FHH household's influenced the farmers' decision to participate in marketing positively. This indicates that as a female-headed household's age increases by a year, the probability of that household to participate in marketing increases by 32%. Educational level of the FHH was found significantly associated with the hypothesized sign. As FHH becomes literate, the probability to participate will increase by 2%.

As hypothesized, distance from the nearest market, distance from the weather road, number of chicken owned, breed type, and getting extension service influenced FHH farmers' decision to participate in marketing significantly. This implies that the probability of participating in marketing increases by 38% and 24% as distance from the nearest market and distance from the weather road decreases by a km. As the number of chicken owned by FHH increased, probability to participate in marketing is increased by 10% confirming the hypothesis.

The model result also indicated that frequency in extension contact influences FHH's smallholder chicken market participation decision positively and significantly at 1% probability level. The marginal effect result showed that the probability to participate in chicken marketing increases by 50 percent for an additional extension contact. This result is supported by findings of Kassa and Kibreab, 2017; Tilahun, 2013; and Awol, 2010.

Type of chicken breed owned is positively and significantly associated with FHH smallholder households' chicken market participation decision at 1% probability level. The marginal effect result shows that the probability to participate in chicken marketing increases by 13 percent for one more use of chicken breed. This finding is consistent with the finding of Abeykoon *et al.,* 2013 and Kassa and Kibreab, 2017.

As hypothesized, experience of chicken production, market information, use of credit, and income from non-farm activity influenced MHHs' decision to participate in marketing significantly. The probability of marketing participation in MHHs increases by 10%, 39%, 26%, and 1% as household experience increases by a year, income increased by one birr, had market information, and use of credit, respectively.

Results of second-stage Heckman selection estimation

The results of second-stage Heckman selection estimation for producers' value of chicken sales are given in Table 6. Each decision has been computed by applying a selection model which included the inverse of Mill's Ratio estimated from the first stage of the decision by FHH and MHH on the value of chicken sales. With the help of the log likelihood ratio test, the overall joint goodness of fit for the Heckman selection model parameter estimates is computed. The results of the null hypothesis for the log likelihood ratio test confirmed that all coefficients are jointly zero. The overall goodness of getting a fitting result for the Heckman selection model is statistically significant at less than 1% probability level for the pooled data set and 5% for FHH and MHH. This indicates that, collectively, the explanatory variables regressed in the selection model regression explaining the value of chicken sales.

The results of second-stage Heckman selection estimation revealed that number of chicken owned by a household are positively associated and statistically significant with MHH value of chicken sale. This implies that holding other explanatory variables constant; as number of chicken owned by the household increases by one chicken, value chicken sales increases by

90.41 birr. As hypothesised, total livestock holding is negatively associated (statistically significant) with the level/value of participation. Other independent variables kept constant, MHH's additional livestock holding results in 385.37 birr decrease in the volume of chicken sales.

In FHH, breed type is positively associated with the value of chicken sales. This implies that holding other explanatory variables constant, utilization of hybrid type results in 390.29 birr increase in the sale of chicken. As expected, distance from the development centre is negatively associated and statistically significant with FHH value of chicken sales. By keeping other independent variables constant, increasing distance from the development centre results in 23.08 birr decrease in value of chicken sales.

As predicted, the results indicated that educational level, experience, and income from non-farm activity played a significant role in value of chicken sales positively and statically significant with FHH value of chicken sales. The results showed that the value of chicken sale increased by 3832.95, 513.84, and 1970.99 birr as FHH farmers being literate, experience increase by one year and one birr increase in non-farm income being other variables held constant.

Confirming the hypothesis, age of the households, distance from the nearest market, membership in cooperatives, land holding and participation in training influenced value of chicken sales in both MHH and FHH farmers significantly. The value of chicken sales decreases by 14.28 and 1812.57 birr as distance away from the nearest market goes up by one kilometre and land holding increases by one hectare, respectively.

As household age increases by a year, being membership in cooperative, and participating in training, value of chicken sales in MHH increases by 118.17, 2329.64 and 5239.57 birr, respectively. Similarly, other independent variables kept constant, the value of chicken sales in FHH increases by 147.84, 5539.42 and 13473.48 birr, as age of the household heads increases by a year, being membership in cooperative, and participating in training, respectively.

Table6. Results of second-stage Heckman selection estimation of determinants of level of participation in value of chicken sales

Explanatory Variable	Pooled (N=200)		MHH (N=154)		FHH (N=46)	
	Coefficient	**Z-ratio**	**Coefficient**	**Z-ratio**	**Coefficient**	**Z-ratio**
AGEHH	68.90	2.78***	118.17	2.20**	147.84	2.05**
SEX	-687.19	-1.50	------	----	----	-----
EDUCA	78.64	0.26	-517.71	1.03	3832.95	0.19***
DSTNT	1.42	0.28	-14.28	-1.71*	-27.55	-0.38***
DISDC	2.56	0.25	-2.94	-0.13	-23.08	-0.47**
DISWR	-2.75	-0.28	-7.20	-0.25	-26.61	-0.36
EXPRE	91.90	4.43***	41.52	0.94	513.84	0.08***
MCOOP	1125.57	1.77*	2329.64	2.88***	5539.42	0.26***
LANDH	-1342.23	-2.93***	-1812.57	-1.96**	-6707.62	-0.13***
CKOW	115.72	5.05***	90.41	2.92***	30.15	0.1
TLU	166.51	1.37	-385.37	-1.83*	-472.88	0.12
BRDTY	893.35	2.74***	-559.48	-0.90	3090.29	0.01***
TRAIN	1751.55	1.90*	-5239.57	-2.71***	13473.48	0.01***
EXTEN	1057.54	3.66***	991.71	1.22	1838.86	0.05***
INFM	-560.58	-0.96	827.79	0.66	1970.99	0.23**
CREDT	-473.39	-0.89	439.13	0.63	-395.39	-0.03
INCFAR	-0.01	-0.53	0.04	0.72	0.16	0.03***
_cons	-2838.72	-1.52	-9749.09	-2.22**	6368.50	0.13***
Censored observations= 80			Censored obs =70		Censored observations=10	
Uncensored observations =120 Wald $chi^2(17)$ =106.61***			Uncensored obs =84		uncensored observations = 36	
Rho = 1 and			Waldchi^2(16)=57.15**		Wald chi^2(16)=414.07***	
Sigma=1439.98			Rho = 1		Rho = -1 and	
			Sigma =4422.28		Sigma= 555.85	

Source: survey data, 2016. ***, ** & * represents 1%, 5% and 10% level of significance, respectively.

Conclusion and Policy Recommendations

The result of the study confirmed that the majority (78.3%) of female-headed household's are participating in chicken marketing than their male counter parts. To support the marketing participation performance of FHH and bring benefits to the entire community, special interventions should focus on FHH. This suggests that improved women participation in production and marketing, might increase the impact of policy interventions that intended to improve market access. Age of the farmers is a factor that influences participation-decision. This suggests that the likelihood of participation in chicken marketing increases as the age of farmers increases. Therefore, it is imperative to conduct periodic experience-sharing among young and old age participants. Membership in cooperatives and getting training is directly related with marketing participation produced by MHH and FHH.

The Ethiopian government in its Growth and Transformation Plans (GTP1 and GTP2) has introduced different measures (legislative, political and socio-economic) to empower women, but, in reaclity they are still disadvantaged. This accentuates the need for continuous follow up and supervision. The government needs to show its committment to women empowerment by giving attention to chicken marketing, via underpinning institutions like cooperatives and unions since cooperatives are not actively involving in chicken and marketing.

Generally, the findings of the study lend support to the advocacy for policies that encourage investment in public infrastructure, extension services, training and sharing experiences. Farmers' production as well as marketing through greater opportunities for education and training would have positive result to increase participation-decision and value chicken sales. In order to realize the country's long-term vision of food security and achieve agricultural and rural development, all the determinants of participation-decision and value of chicken sales that were analyzed above should be considered by policy makers as a springboard for designing intervention measures. Besides, to address the existing gap in terms of women's lack of access to market information, there is an urgent need for specialized programs and intensive training efforts targeting them..

Conflicts of Interest

The authors declare that there is no conflict interest regarding the publication of this paper.

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