Do Members Commit to Their Cooperatives? An Econometric Analysis of Members’ Commitment in Ethiopia

Solomon Bizuayehu Wassie1,2, Hitoshi Kusakari1* and Masahiro Sumimoto3

Members’ commitment has a pivotal role in the effectiveness and continuity of cooperatives. Hence, using the double-hurdle and logit models, this study examines factors driving the commitment of members. The results show that education and social network have a positive and significant effect on the second and third level commitment of members. Moreover, positive perception about cooperatives increases the likelihood of member’s participation in decision making. On the contrary, members with access to regular market and located closer to the market tend to have a lower second-level commitment than otherwise. Based on the results of the study, implications are forwarded.

Key words: commitment, cooperatives, Ethiopia

1. Introduction

Agricultural cooperatives help smallholder farmers to overcome market failures, enhance economies of scale, reinforce bargaining power, and reduce transaction costs (Markelova et al., 2009; Paulus, 2012). Recognizing such roles of cooperatives, the Ethiopian government pushes producers to organize through direct and indirect influences. For instance, farmers access fertilizer mainly through cooperatives. However, membership does not necessarily lead to active participation and investment in the cooperatives (Tadesse and Kassie, 2017). For a cooperative to succeed, members should commit to supplying their cooperative with raw-products, capital, and managerial inputs (Fulton and Adamowicz, 1993; Fulton, 1999; Österberg and Nilsson, 2009). The commitment of members is so crucial for cooperatives because it leads to efficient operation, effective decision making, and low transaction costs1 (Österberg and Nilsson, 2009).

Generally, there are three levels of commitment in the cooperative literature. While the first level of commitment is to be or not to be a member, the second-level commitment concerns how deep to commit – i.e., how much business to do with the cooperative. The third-level commitment regards to members participation in decision making through attending meetings, voting at member meetings, and becoming an elected representative (Staatz, 1987).

Despite the growing consensus on the importance of members’ commitment, there is a strong perception that members’ commitment to their cooperatives is declining (Tadesse and Kassie, 2017). In fact, low participation in decision making (i.e., low commitment) is also among the significant challenges facing Ethiopian cooperatives (Getnet and Tsegaye, 2012). Moreover, a preliminary analysis for the present study shows that only 40% of members supply less than 40% their marketed surplus to the cooperatives, and the remaining 60% sell all their marketed surplus outside of the cooperatives.

It is thus necessary to explore why some cooperatives appear to have more committed members than others or even why some members of a cooperative are more committed than others? Presumably, the decision to commit more or less to their cooperative is taken comparing the benefits and costs of alternative market outlets. However, not all benefits and costs are measurable and available (Masten et al., 1991). Therefore, the decision on how much to commit can be derived from observed characteristics than the unobserved costs and benefits (Pascucci et al., 2012). This study is, therefore, motivated to investigate the household and community level factors driving the commitment of members to their cooperatives.

Admittedly, there are empirical studies on the first level of commitment in Ethiopia (Nugusse et al., 2013; Wassie et al., 1) Refer Österberg and Nilsson (2009) and Bijnum and Verhees (2011) for details.
However, studies on the second and third levels of commitment are scarce. Therefore, using double-hurdle and logit models, this study examines factors affecting the second and third levels of commitment among members of the cooperatives in Ethiopia. This paper has two main contributions to the existing literature. First, the study explicitly investigates drivers of members’ commitment by type, meaning the second and third levels of commitment. Second, the study employs the double-hurdle model, which is a multivariate approach that relaxes the assumption of the conventional Tobit model\(^2\). Above all, it suggests ways for improving members’ commitment and hence the performance of agricultural cooperatives.

The organization of the paper is structured as follows. The next section describes the data and estimation strategy. Section three briefly presents and discusses the findings of the study. And section four concludes.

2. Methodology

1) The data

The paper used the 2016 wheat growers’ survey data collected by the International Food Policy Research Institution (IFPRI). The survey comprises both household and community level data collected from four major wheat producing areas in Ethiopia – East Gojjam, North Shewa, Arsi, and Bale zones. The survey covered a total of 11 woredas and 121 kebeles\(^3\) in these zones. The sample households were selected using two-stage stratified sampling. The main interest of the current paper is to examine the determinants of commitment among members of the cooperatives. Therefore, the results of this study are based on 853 members of the cooperatives.

2) Estimation strategy

The decisions of whether to commit (sell through the cooperatives) or not and how much to commit are made simultaneously. Therefore, the double-hurdle model is a suitable estimation approach to investigate the determinants of the second-level commitment of members. Specification of the model is adopted from García (2013).

Suppose a member makes the commitment decision in two steps. First, s/he decides whether to commit to the cooperative or not – i.e., the participation decision. Then, s/he will choose the optimal level of commitment – i.e., the percentage of marketed surplus to be supplied for the cooperative – (which may also be 0) given his or her circumstance. And this is called quantity decision. If \( y_i \) represents the observed share of marketed surplus sold through the cooperatives, the double-hurdle model can be specified as:

\[
y_i = \begin{cases} 
(x_i \beta + \epsilon_i) & \text{if } \min(x_i \beta + \epsilon_i, z_i' \gamma + u_i) > 0 \\
0 & \text{otherwise}
\end{cases}
\]

where \( x_i \) refers to explanatory variables in the quantity decision, \( z_i \) refers to covariates included in the participation model, \( \beta \) and \( \gamma \) are vectors of parameters to be estimated, \( \epsilon_i \) and \( u_i \) are error terms in the participation and quantity equations respectively, \( \delta \) is the variance of \( \epsilon_i \), \( \delta_{z} \) is covariance of \( \epsilon_i \) and \( u_i \), and the model restricts variance of \( u_i \) equal to 1 so that the model will be identified.

Another question posited in the introduction section refers to the factors that explain variation in the third-level commitment of members. The dependent variable that indexes the third-level commitment takes a value of 1 if the member participates in decision making (directly or indirectly) and 0 otherwise. Presumably, a member decides to participate in decision making if the expected benefit from participation is higher than the associated cost of membership. However, not all benefits and costs are either observable or measurable or both. Hence, following Green (2008), we model the expected net benefit using unobserved variable \( y_i^* \). More formally, the logit model to analyze determinants of the third-level commitment of members can be specified as:

\[
y_i^* = x_i' \alpha + \mu_i \text{ with } y_i = \begin{cases} 
1 & \text{if } y_i^* > 0 \\
0 & \text{otherwise}
\end{cases}
\]

where \( y_i^* \) is an observed value of third-level commitment, \( x_i \) refers to explanatory variables, \( \alpha \) index vector of parameters to be estimated, and \( \mu_i \) is an error term.

3. Result and Discussion

1) Descriptive analysis

Table 1 summarizes the outcome and explanatory variables employed in this study. According to Pascucci et al. (2012), members are categorized as strong members if they sell some or all of their marketed surplus through the cooperatives.
cooperatives, and soft members otherwise. Accordingly, the results show that 40% (340) of them are strong members, while the remaining 60% (513) are soft members who sell their marketed surplus outside the cooperatives. The result also reveals that, on average, only 12% of the total marketed surplus is supplied for the cooperatives and hence are less committed in reference to the second-level commitment. Likewise, considerable share (45%) of cooperative members do not involve in decision making. The relatively higher third level commitment can be because members may have interest also to participate in decisions other than output aggregation, e.g., input supply.

2) Econometric analysis

(1) Drivers of the second-level commitment

Before embarking on the main findings of the study, it is necessary to highlight the overall performance of the model. As shown in Table 2, the Wald test for the null hypothesis $H_0$: all the parameters are not different from zero is rejected at 1% significant level. Moreover, the Wald test for the null hypothesis $H_0$: correlation coefficient ($\rho$) = 0 (Chi$^2$(1) = 8.01, $p = 0.005$) is rejected at 1% significance level, implying that there is a correlation between unobservable factors related to both decisions of whether to commit or not and how much to commit. The significance of the correlation coefficient ($\rho$) therefore indicates that there is efficiency gain attained by estimating the two equations simultaneously using a double-hurdle model (Humphreys, 2013).

The participation equation reported on the 1st panel of Table 2 refers to the decision to commit or not. The quantity equation (panel 2) presents the effect of the covariates on how much to commit. Finally, the 3rd panel of Table 2 reports the net effect on average. Overall, the study assumes that

### Table 1. Definition and summary of variables

| Variables                          | Variable definition                                                                 | Mean   | SDs $^1$ |
|------------------------------------|-------------------------------------------------------------------------------------|--------|---------|
| 2nd level of commitment            | The share of wheat marketed surplus sold through cooperatives (%)                    | 12.11  | 6.55    |
| Membership category$^2$            | = 1 strong member and $= 0$ soft members                                            | 0.40   |   |
| 3rd level of commitment            | Member participates in decisions making ($= 1$ yes and $= 0$ otherwise)             | 0.55   |   |
| $H_1$: Household characteristics   |                                                                                     |        |         |
| Education                          | The education level of household head (years)                                       | 2.83   | 3.62    |
| Age                                | The age of the household head (years)                                               | 46.44  | 12.91   |
| Social network                     | The family is a member of local social institutions ($= 1$ yes and $= 0$ otherwise)  | 0.75   |   |
| $H_2$: Location and market structure |                                                                                   |        |         |
| Road distance                      | Distance to the nearest main road (km)                                              | 8.98   | 15.8    |
| Distance to district               | Distance to the district (km)                                                       | 14.03  | 9.99    |
| Market distance                    | Distance to the nearest local market (km)                                            | 4.71   | 4.43    |
| Regular market                     | There is a regular market in the kebele ($= 1$ yes and $= 0$ otherwise)              | 0.32   |   |
| Alternative market outlets         | The number of buyers willing to buy from you ($= 1$ if one buyer)                    |        |         |
| 2 to 5 buyers                      | $= 2$ if 2-5 buyers                                                                  | 0.57   |   |
| 6 to 10 buyers                     | $= 3$ if 6-10 buyers                                                                  | 0.13   |   |
| > 10 buyers                        | $= 4$ if more than 10 buyers                                                         | 0.12   |   |
| $H_3$: Farm size and specialization |                                                                                   |        |         |
| Farm size                          | Total agricultural land the household owns (hectares)                                | 2.17   | 1.30    |
| Specialization                     | The population of the kebele producing wheat (%)                                    | 75.05  | 26.67   |
| $H_4$: Cooperative related factors |                                                                                   |        |         |
| Member’s perception                | The farmer believes that cooperatives are beneficial ($= 1$ yes and $= 0$ otherwise) | 0.78   |   |
| Other cooperative services         | Member gets other services from cooperative, e.g., buying seed ($= 1$ yes and $= 0$ otherwise) | 0.72   |   |

Notes: 1) SD refers to standard deviations.
2) 340 members sell at least some of their marketable surplus to the cooperatives.

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household characteristics (H1), location and market structure (H2), farm size and specialization (H3) and cooperative-related factors (H4) have a significant effect on members’ commitment (Table 1). Though not reported for brevity, joint test results show that these factors are jointly different from zero.

In what follows, we discuss the effect of individual covariates, which have a significant impact on the second-level commitment of cooperative members. We find that educated members of the cooperative are more likely to commit to their cooperative than otherwise. Intuitively, educated members could better understand the expected net benefits from output aggregation and hence tend to commit more than less educated members of the cooperatives. Similarly, members of the cooperative with a strong social network are more likely to be committed than their counterparts. This result is in line with a previous study on Dutch animal farmers (Bijman and Verhees, 2011).

The other group of variables that affect members’ commitment refers to geographic isolation – i.e., distance to the main road and the district. Our results show that, for strong members, the more they are isolated, the higher will be their level of commitment. Nonetheless, geographic isolation affects members’ probability to commit to their cooperative negatively and significantly. Here it is worth to note that a variable may have different effects on the participation and quantity equations, implying that using a double-hurdle model is more appropriate. The question is, therefore, which effect, if any, dominates? In this regard, we have reported the average marginal effects of variables in the third panel of Table 2. The results prevailed that the negative and positive effects of geographic isolation on the probability to commit and extent of commitment, respectively, offsets implying that, on average, geographic isolation has no detectable impact on the second-level commitment of members.

Our results also show that, on average, members located closer to the market will have a higher level of commitment.

| Table 2. Determinants of the second and third levels of commitment |
|---------------------------------------------------------|
| **Variable** | **Second-level commitment** | **Third-level commitment** |
| | Participation equation | Quantity equation | Marginal effect | Participation equation | Quantity equation |
| | Coeff. (Std. Err) | Coeff. (Std. Err) | dy/dx (Std. Err) | Coeff. (Std. Err) |
| Education | 0.094 (0.044)** | -0.100 (1.095) | 0.56 (0.28)** | 0.140 (0.03)** |
| Age | -0.001 (0.012) | -0.070 (0.293) | -0.02 (0.08) | 0.014 (0.006)** |
| Social network | 0.422 (0.246)* | 2.64 (1.45)* | 0.445 (0.17)** | 0.001 (0.001)*** |
| Road distance | -0.076 (0.031)** | 1.462 (0.516)** | -0.07 (0.12) | -0.022 (0.011)** |
| Distance to district | -0.074 (0.020)*** | 2.309 (0.667)*** | 0.18 (0.12) | 0.041 (0.041) |
| Market distance | -0.098(0.060) | -3.966 (1.562)*** | -1.71 (0.43)*** | 0.001 (0.001)*** |
| Regular market | -3.299 (1.093)*** | 40.83 (23.84)* | -9.22 (5.20)* | -0.159 (0.354) |
| Alternative market outlets (= 1 buyer) | | | | |
| 2 to 5 buyers | 0.277 (0.479) | 2.958 (12.790) | 2.37 (2.53) | 0.064 (0.070) |
| 6 to 10 buyers | 0.785 (0.634) | -1.466 (15.840) | 4.35 (3.83) | 0.091 (0.221) |
| > 10 buyers | 0.587 (0.588) | 6.673 (16.040) | 5.60 (4.11) | 0.545 (0.294)* |
| Farm size | -0.253 (0.117)** | 2.586 (3.258) | -0.86 (0.81) | 0.001 (0.001)*** |
| Specialization | -0.006 (0.006) | 0.376 (0.185)** | 0.06 (0.04) | 0.545 (0.294)* |
| Member’s perception | 0.110 (0.461) | 13.950 (14.00) | 4.57 (3.18) | 0.091 (0.221) |
| Other cooperative services | 0.236 (0.348) | 7.058 (10.710) | 3.44 (2.46) | 0.545 (0.294)* |
| Constant | 4.781 (1.733)*** | -88.88 (30.73)*** | -1.350 (0.530)*** |
| Wald test: all parameters = 0 | 91.63*** | 38.31*** |
| $\rho$ | -0.646 (0.194)*** |

Notes: 1) Estimated marginal effects are average marginal effect; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

2) $\rho$ is the correlation coefficient between unobservable factors of two equations.
The probable reason for this can be because the facilitation role of market access – i.e., triggering the cooperatives to be more competitive to keep its members committed – outweighs its substitution effect. Furthermore, members who have access to regular markets are less likely to commit to their cooperatives. However, once they commit, they tend to be more committed than those members who commit to the cooperatives but have no access to regular markets. Overall, the results suggest that members of the cooperatives who have granted regular market access are less committed than otherwise.

As shown in Table 2, farm size has a negative and significant effect on members' likelihood to commit. This result can be either because large farmers can sell their output directly to the market by themselves or due to portfolio problem which emerges when small landholders influence the cooperative to choose less risky decision with lower returns to investment as an optimal choice (Cook, 1995) or both. This result is in line with (Mensah et al., 2012) but contrary to others (Fulton and Adamowicz, 1993; Österberg and Nilsson, 2009) who find an insignificant relationship. Specialization in wheat production is another variable with a positive and significant effect on the degree of commitment among strong members of the cooperatives, as expected – i.e., specialization may give members the privilege to reap higher benefit from output aggregation (economies of scale).

(2) Drivers of the third-level commitment

The last panel of Table 2 presents determinants of the third-level commitment of cooperative members. We find that educated members of the cooperatives are more committed than less educated members, as expected. Intuitively, it is perceived that educated members are better in terms of making a rational decision and hence have a responsibility to participate in decision making. Our results also show that older members of the cooperatives are more committed than young members with respect to second-level commitment. The positive effect of age on members’ commitment could be associated with higher belongingness of older members. This result is in line with (Österberg and Nilsson, 2009).

Member’s social network has a positive and significant effect on the third-level commitment of members. The result implies that members’ participation in local institutions reinforces their active involvement in decision making regarding their cooperatives. Previous studies have also found similar results (Mekonen Habtamu, 2014; Trechter et al., 2002). The results also show that members of the cooperatives with positive perception about cooperatives are more likely to involve in decision making than their counterparts. On the other hand, distance to the district was found to have a negative and significant effect on members’ commitment. The likely reason for this could be because members of the cooperative living closer to the district will be more frequently supervised by district-level cooperative officers, and hence learn more about their potential role in the cooperatives (Mojo et al., 2017).

4. Conclusions

Establishment of cooperatives has generally been seen as a response to market failure. However, market failure is only a necessary condition for establishing cooperatives. For a cooperative to succeed, members should be committed (Fulton, 1999). But all members of the cooperatives are not equally committed. Therefore, it is interesting to identify the factors that explain the variation in commitment among members of the cooperatives. In this study, we further differentiate members’ commitment as the second and third levels of commitment. Thus, using the double-hurdle and logit models, this study analyzes household and community level factors affecting second and third levels of commitment, respectively.

In a nutshell, the second-level commitment of members is determined by household characteristics, location and market structure, farm size, and specialization. Briefly, the econometric results show that educated members and members with strong social networks are more committed to their cooperatives with respect to second-level commitment. Our result also revealed that, for those who commit, geographic isolation has a positive and significant effect on the second-level commitment. Furthermore, we find that small landholders and members living in kebeles which specializes in wheat production are more committed in terms of the second-level commitment of members than otherwise.

Our result also shows that the third-level commitment of members is derived by household characteristics, local market structure, and cooperative-related factors. Specifically, education level and age of members have a positive and significant effect on participation decision. Likewise, the social network has a positive and significant impact on the third-level commitment of members. The result also shows that while the distance to the nearby local market affects participation in decision making negatively,
members’ perception about cooperatives has a positive and significant effect.

As a concluding remark, we acknowledge that the results of this study cannot be generalized at the country level. However, this study contributes to the scarce literature on the commitment of cooperative members in Ethiopia. Furthermore, the findings of this study have important implications. First of all, it is crucial to recognize and enhance the deficient second and third levels of commitment apparent in the current study. Intuitively, this can be done by rewarding members’ commitment and discouraging free rider problem. In this regard, our results suggest that cooperatives should promote the participation of educated, older, and farmers with strong social networks, who tend to commit more.

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