Community Level Factors Affecting Participation Rate in Agricultural Cooperatives in Ethiopia

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Using a recent community-level data from Ethiopia, this study employed a Tobit model and investigates factors affecting participation rate in agricultural cooperatives. The average participation rate was calculated to be 50.3\%, with a wide variation amongst communities. Our result confirms that access to paved road, average landholding of a household and information access have a significant effect on community-level participation rate in agricultural cooperatives. Based on the results of the study, policy implications are forwarded.

Key words: cooperatives, Ethiopia, participation rate

1. Introduction

Agriculture is a cornerstone of the Ethiopian economy. The sector accounts for 50\% of GDP, 85\% of export, and more than 80\% of employment in the labor force (Deloitte, 2016). Currently, the country is implementing the second growth and transformation plan (2015-2020) which aims at increasing the productivity and competitiveness of the agricultural sector. On the other hand, the Ethiopian agriculture is dominated by subsistence farmers who are vulnerable and with a need to produce part of their own food requirements. Hence, without institutions that facilitate the input and output market, smallholder farmers cannot afford to switch to commercialization (Tefera et al., 2016). Recognizing such a role of agricultural institutions, recently, the government showed a renewed interest in promoting the cooperative sector development (Getnet and Tsegaye, 2012).

Empirical researches done using microdata in Ethiopia showed that cooperatives improve farmers’ income, production efficiency, and technology adoption (Getnet and Tsegaye, 2012; Abebaw and Haile, 2013; Abate et al., 2014). Yet the participation rate was limited to nearly 19\% in Abate et al. (2014) and 34.4\% in the case of Abebaw and Haile (2013). Our preliminary analysis also shows that the participation rate in the sample kebeles\textsuperscript{1} is 50.3\% (Table 1). Generally, the overall low participation rate could be partly explained by a misconception due to the poor performance of agricultural cooperatives in the former regimes (Bernard et al., 2008). However, there is also a substantial difference in participation rate amongst kebeles. Hence, it is interesting to understand why participation rate is low, despite the benefit from participation (this is briefly explained in section 3).

Prior researchers in Ethiopia (e.g. Bernard et al., 2008; Abebaw and Haile, 2013; Nugusse et al., 2013; Abate et al., 2014; Tefera et al., 2016) have examined determinants and/or the impact of participation in agricultural cooperatives. However, we have not come across any study which has examined community-level participation rate in agricultural cooperatives. Furthermore, the federal cooperative commission is working with a goal to establish a cooperative in each kebele of the country. Hence, understanding why the participation rate varies across kebeles will give an insight regarding which kebeles should be given priority in the process of establishing new cooperatives and what needs to be done to increase the participation rate in the existing cooperatives in Ethiopia. This study was, therefore, motivated to examine the factors affecting community level participation rate in Ethiopia.

In a nutshell, our result shows that the average participation rate in agricultural cooperatives is 50.3\%. Moreover, we find that community-level participation rate is relatively higher in kebeles with access to paved road and information.

2. Methodology

This section of the paper describes the data and explains estimation strategy used in this study.

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1) Kebele is the smallest administration unit in Ethiopia.
1) Data source

The study used community-level data of the 2016 Ethiopian wheat growers survey. The data was collected from 11 woredas (districts) in the two biggest regions (in terms of population) of the country (Amhara and Oromia) by the International Food Policy Research Institute (IFPRI). The survey has comprehensive data (on infrastructure and market access, cooperatives, rural finance, production and post-harvest, transportation, and information source) from a total of 121 kebeles.

2) Estimation strategy

The dependent variable in this study is kebele level participation rate in agricultural cooperatives (the percentage of members out of the total population in the kebele). Following Green (2008: p.872), a Tobit model to analyze the participation rate in agricultural cooperatives can be specified as follows. Suppose the latent regression model is:

\[ Y^* = \beta_i X_i + \gamma D_i + v_i \]

where \( Y^* \) represents the latent participation rate which is either observed or not; \( X \) refers to community level explanatory variables; \( D \) is woreda fixed effect; \( k \) indexes kebele; \( j \) indexes explanatory variables; \( i \) indexes the woreda; \( \beta \) and \( \gamma \) are parameters to be estimated, and \( v \) is a continuous random variable with mean 0 and variance \( \sigma^2 \).

As the dependent variable (participation rate) is measured in percentage, we have a lower censor limit of 0 and upper censor limit of 100. Accordingly, the Tobit model can be expressed as:

\[ Y_k = \begin{cases} 
Y^*_k & \text{if } 0 < Y^*_k < 100 \\
0 & \text{if } Y^*_k \leq 0 \\
100 & \text{if } Y^*_k \geq 100 
\end{cases} \]

where \( Y \) is observed variable and others are as defined above.

In fact, some of the explanatory variables (e.g. transport service, extension service, and information access) may be endogenous due to omitted variables, but since there are no good instruments to treat endogeneity, we use them as they are.

3. Result and Discussion

1) Descriptive analysis

Table 1 presents definition and summary of the variables. The result shows that the average participation rate of households in the sampled kebeles is 50.3%, and the high standard deviation (31.85) indicates that there is a wide range in the participation rate amongst kebeles. Specifically, the distribution of participation rate ranges from nearly 1 to 100% implying that all households in the kebele are members of the cooperatives in the latter case. Given cooperatives’ wide range of services (e.g. output aggregation, supply of agricultural inputs and consumption goods) and lack of other options to get similar services in some kebeles, full participation rate is possible in such kind of kebeles.

It is intuitive that availability of cooperatives increases the likelihood of participation in agricultural cooperatives and hence participation rate. Indeed, the majority (90%) of the sampled kebeles do have cooperatives but households in the kebeles without cooperatives also tend to be members of the nearby cooperatives – i.e. there are cooperatives that serve multiple kebeles.

Our analysis indicates that 73% and 11% of sampled kebeles do have access to paved and asphalt road respectively. On average, sampled kebeles are located about 14 kilometers away from the district capital. The result also shows that, on average, there is one truck based in the kebele to provide transportation service.

Extension service and information access are other important covariates hypothesized to affect the participation rate in agricultural cooperatives. In Ethiopia, development agents are the grassroots of the agricultural extension. Our result indicates that, on average, there are about 3 development agents per kebele. The proportion of households who own a radio is considered as a proxy variable for community-level access to information. Accordingly, on average, 56% of households in the kebele do have access to information.

Furthermore, the study accounted for average landholding per household in the kebele, hypothesized a priori to have a positive and significant impact on the participation rate. The average landholding of a household in the kebeles was calculated to be 1.69 hectares. In fact, evidence shows that landholding has a nonlinear relationship with the probability to participate in agricultural cooperatives (Bernard et al., 2008). Hence, we have also considered the square of average landholding of a household in the kebele.

2) Econometric analysis

Using a total of eight covariates, this study investigates factors affecting community-level participation rate in agricultural cooperatives. The study used woreda/district level fixed effect to control for unobserved heterogeneity.
Table 1. Definition and summary of variables

| Variables              | Variable definition                                                                 | Mean  | SDs  |
|------------------------|--------------------------------------------------------------------------------------|-------|------|
| Participation rate     | Households in the kebele who are members of cooperatives (%)                        | 50.33 | 31.85|
| Paved road             | The kebele has access to paved road (1 = yes and 0 otherwise)                       | 0.73  | -    |
| Asphalt road           | The kebele has access to asphalt road (1 = yes and 0 otherwise)                     | 0.11  | -    |
| Distance from the district | Kebele to woreda (district) measured in kilometers                                  | 14.43 | 15.73|
| Transport service      | The number of trucks based in the kebele                                            | 1.31  | 2.07 |
| Extension service      | The number of Development Agents (DAs) in the kebele                                | 3.58  | 1.21 |
| Information access     | Households in the kebele who own a radio (%)                                       | 56.39 | 25.67|
| Landholding            | Average landholding of a household in the kebele (hectares)                        | 1.69  | 0.95 |
| Landholding square     | Square of average landholding of a household in the kebele (hectares)              | 3.75  | 4.77 |

Note: 1) SDs refers to standard deviations; the number of observation is 121 for all variables.

Table 2 presents results of Tobit regression, showing that kebeles without access to paved road do have higher participation rate than otherwise. This can be mainly because the transaction cost of getting marketing services will be higher without access to road. In fact, collective action pays off more when such transaction costs are high, provided that they can be overcome by cooperatives (Markelova et al., 2009). Abebaw and Haile (2013) also revealed that likelihood of participation in agricultural cooperatives increases with distance.

We also find that access to information has a positive and significant effect on kebele level participation rate in agricultural cooperatives. Access to information could help to change farmers’ misconception about cooperatives, mainly due to its poor performance in the previous era of cooperatives (Bernard et al., 2008). Prior researchers also found similar results (Nugusse et al., 2013).

Furthermore, our result shows that average landholding of a household has a positive and significant effect on the community-level participation rate. The lower participation rate of small landowners may be because they have limited marketable surplus and input demand. However, contrary to our result, others (Bernard et al., 2008; Fischer and Qaim, 2012; Abate et al., 2014) found a nonlinear (inverted U shape) relation between landholding and participation in agricultural cooperatives.

4. Conclusions

Agricultural cooperatives support smallholder farmers’ livelihood by providing input, credit, and output aggregation services, among others. Given such roles of cooperatives, this research attempted to examine the factors affecting community-level participation rate in agricultural cooperatives. Our result shows that community-level variables included in the model to explain the variation in participation rate amongst kebeles were significant with the expected sign. Specifically, access to paved road, access to information, and average landholding of a household were found to have a positive and significant effect on the community-level participation rate in Ethiopia.

Explaining policy implication of the results need due care though. For example, establishing new cooperatives in kebeles without access to paved road will increase the participation rate than otherwise. Moreover, increasing the access to information will also improve the participation rate in agricultural cooperatives, supporting the governments’ plan....
to increase the coverage of cooperative services. However, we acknowledged that this study does not account for the potential endogeneity of some explanatory variables (e.g., transport service, extension service, and information access).

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