Learning and Synergy in Social Networks: Productivity Impacts of Informal Labor Sharing Arrangements

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Introduction

In labor sharing arrangements, a household head invites members of other households in his network to help him with specific agricultural activities. Other households respond to such requests not based on wages but in expectation that the household will reciprocate the labor supply when they make a similar request later.

Objectives

We investigate to what extent involvement in labor sharing arrangements affects productivity above and beyond the direct impact of the additional labor to production. If ordinary interactions with other farmers can boost productivity through the influence and leadership of some farmers, that has implications for the design of production-increasing policies. Alternatively, if observation and interaction is not enough, but rather training and educational opportunities are necessary, then developing countries need to alter policies such as model farmer programs and instead focus more on policies such as farmer training centers.

Learning Versus Synergy

We hypothesize that labor sharing affects agricultural productivity through its synergy and learning effects. The synergy effect refers to productivity gains that come from working together such as speed gains and being less bored by tedious agricultural activities or working harder while observed by the labor sharing partners. The learning effect is the skills learned and information obtained from the labor sharing partners that the household can put into use to improve its productivity even when when a labor party is not present. We identified the two effects by segmenting the farmers based on their history of labor sharing participation and comparing technical efficiency among them.

Labor Sharing Participation			
Farmer Type	Season		
	Current	Previous	Future
Ia	No	No	No
Ib	No	No	Yes
II	Yes	Yes	
III	No	Yes	
IV	Yes	No	

Efficiency	Effect of Labor Sharing
III > Ib	Learning
II > III = Ib	Synergy but not learning
II = III > Ib	Learning but not synergy
II = III = Ib	Neither learning nor synergy
II > III > Ib	Both learning and synergy

Empirical Model

- Distance function of grains production to accommodate multi-output production
- A generalized quadratic Box-Cox model to represent the distance function
- Homogeneity and symmetry restrictions are imposed
- Estimated technical efficiency, efficiency change, technical change, and productivity change for each farmer
- Inefficiency explaining factors including the labor sharing types are included in the model to be estimated in one step with the distance function
- The model is estimated using heteroscedasticity and autocorrelation consistent iterated GMM

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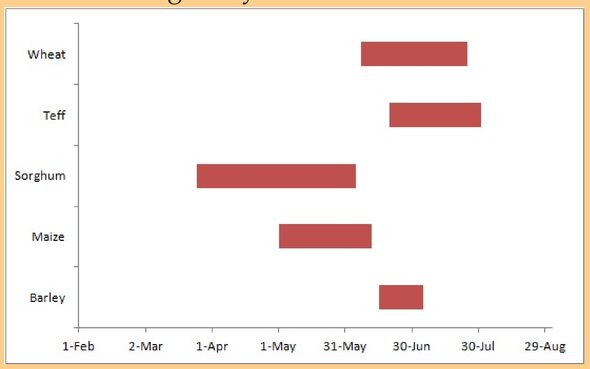
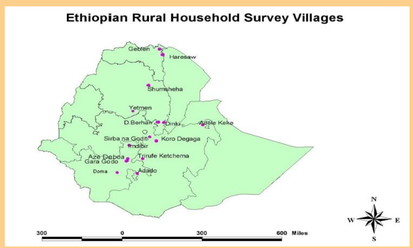
Instruments

RHS endogenous outputs are instrumented by the performance of rain using the country's crop calendar to ensure exogeneity of the instruments



Data

A panel data set covering households in 15 villages of rural Ethiopia with seven rounds between 1989 and 2009.



Results

- Labor sharing does not lead to learning as the productivity gains observed in years with labor sharing disappear in following years if the farmers do not continue to employ labor sharing
- Labor sharing improves farmers' efficiency, but does so through its synergy effect rather than learning
- The synergy effect amounts to an approximate 20 percent gain in output in 2004
- Why no learning effects:
  - Lack of heterogeneity among labor sharing partners
  - The LS partners are related in a number of other ways
- Access to the public extension system, participating in off-farm income generating activities, and having access to irrigation are found to improve efficiency of production

Conclusion

- The results do not encourage policies based on passive learning
- Ordinary interaction and observation is not enough.
- Rather, training and eduction activities such as extension and off-farm works are required to produce learning & associated productivity gains

References

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