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Agricultural Diversification and Beekeeping: A Study of Rural Ethiopian Farmers

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Introduction

- Beekeeping offers a way to supplement income and diversify agricultural activities, with minimal investment.
- Market opportunities are abundant in Ethiopia, although pure honey is rarely consumed. Many Ethiopians do eat honey containing bee parts and brood, as well as *tej*, a honey wine. Ethiopia is also permitted by the European Commission to export honey to the European Union (Alemseged & Yildiz, 2008).
- Previous studies have found that beekeeping has the potential to increase income by 31 percent over other households in the same village (Yirga & Ftwi, 2010). This study expands on that work, by determining what characteristics differ between households which participate in apiculture activities and those that do not.



- More than 99 percent of apiculture production in Ethiopia is done following traditional methods (Bezabeh, 2005). A traditional hive is shown at left.
- Beehives are generally made of bark or bamboo, which have a minimal investment, with the former costing US\$0.25 each and the latter US\$0.50-US\$0.75 each.

Model and Data

- Using a random effects binomial probit model, we determine the characteristics which differ between households who participate in beekeeping activities and those which do not.
- We consider the choice to participate in apiculture as a discrete participation decision.
- We model a household's participation in beekeeping as a standard probit of the form:

$$\Pr(y_i = 1 | X_i) = \Phi(X_i' \beta_i)$$

y_i : whether or not a household participates in beekeeping activities
 X : matrix of independent variables, including household characteristics
 Φ : standard normal c.d.f.
 β : a vector of coefficients

- Using this standard form, we test the equation:

$$\Pr(BK = 1 | X) = \Phi(\beta_0 + \beta_1 R_{ijt} + \beta_2 G_{jt})$$

If $BK = 1$, then a household participated in beekeeping activities.
 If $BK = 0$, then a household did not participate in beekeeping activities
 R : household-level factors
 G : community-level variables

- Data come from the Ethiopian Rural Household Survey, a panel study (1898-2009) conducted in twelve villages, by the International Food Policy Research Institute.
- We use data from the center six rounds (1993-2004), which follows 1,293 households.
- The set includes consumption, asset, and income data, as well as household characteristics, agriculture, apiculture, and livestock information.

Hypothesis:

- Apiculture has the potential to improve lives of smallholder farmers in Ethiopia, through increasing income and expanding markets for new products.
- Those who are already participating in beekeeping activities tend to be more wealthier, with higher education
- than those who do not participate.

Summary Results:

- Evidence from the study sight shows farmers who practice apiculture, in addition to other agriculture activities, have greater income and wealth, than those who do not participate.
- Evidence indicates that beekeeping farmers have greater landholdings, on average, and greater crop diversification.

Results



Probit Model Results

Variable	Coeff.	Mean	Std. Dev.	Min	Max
Farm income, in birr	9.2**	0.637	0.637	0.001	0.957
Education, in years	23.1	0.647	0.219	0.001	0.936
Landholding, in hect.	3.9**	0.618	0.222	0.001	0.952
Crop diversification index	1.29*	0.663	0.243	0.001	0.957

Farmer Characteristic Results

- Farmers with greater levels of education are not more likely to participate in apiculture activities.
- Households that are female-headed generally do not keep bees. Further, they largely have low levels of crop diversification.

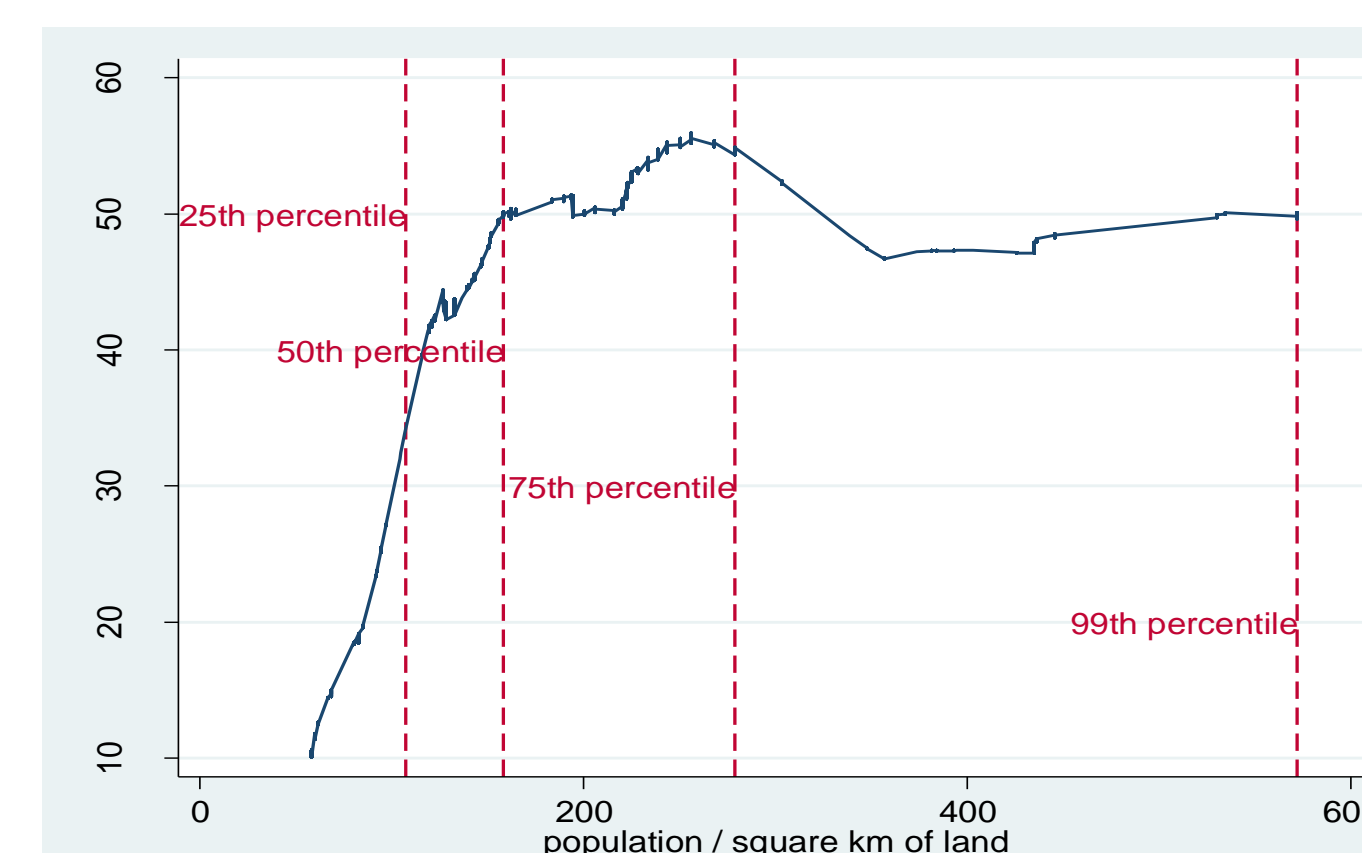
Household Characteristic Results

- Households with greater landholdings are more likely to participate in beekeeping activities. This may be a result of increased land on which to locate beehives, as well as a potentially higher value from having bees on a farm.
- Households which are already well crop diversified, in particular to cash crops, such as coffee and chat, are more likely to participate in beekeeping activities. This may be due to improved knowledge regarding multiple agriculture practices.

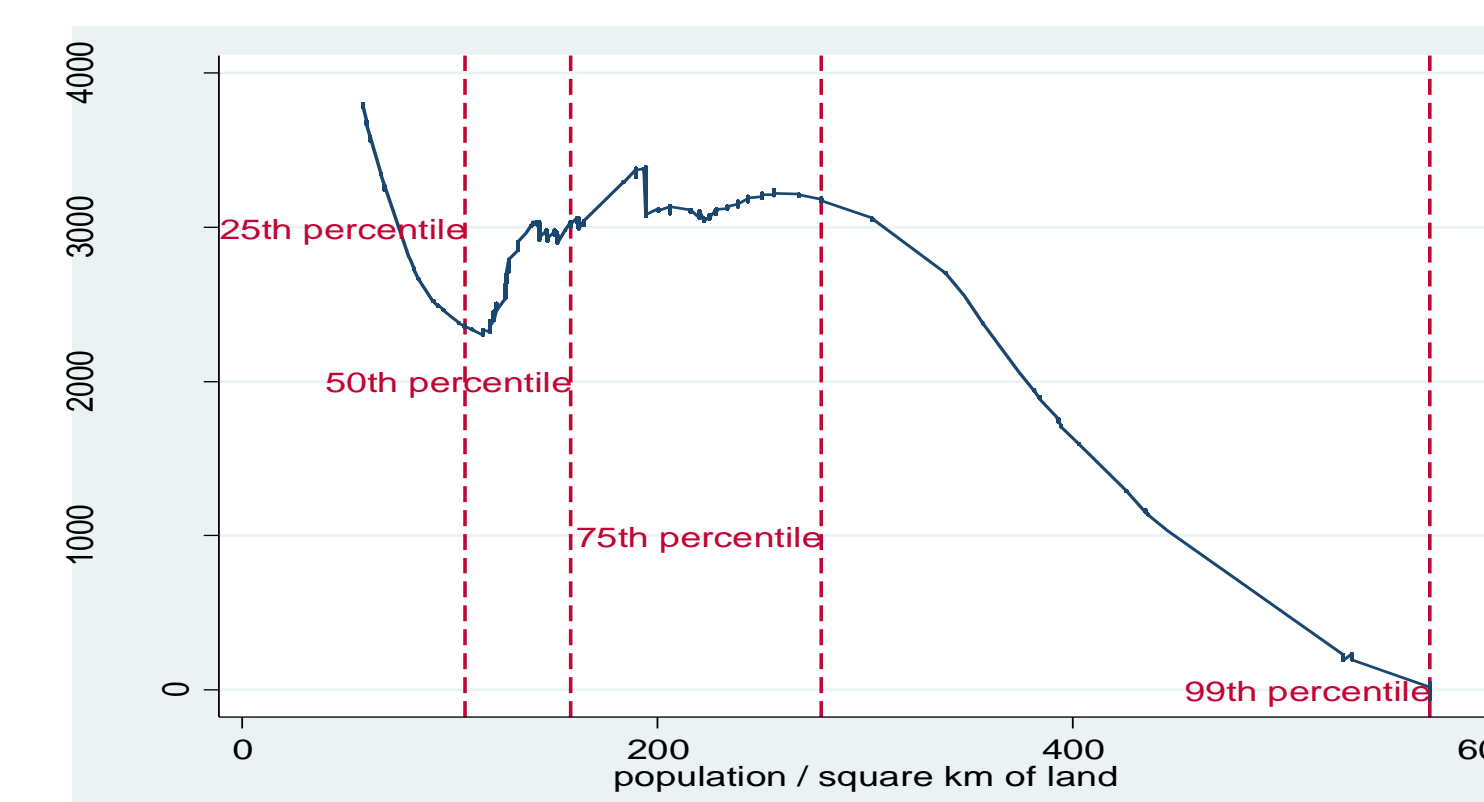
Income Results

- Beekeeping households are more likely to be wealthy. Although there is not a great deal of cost to participating in apiculture, it still seems that households who already have money are those who are likely to participate.
- Households who do practice beekeeping have greater farm and total household income. This makes sense are farmers have an additional source of income from honey. This does suggest as well that other crops do not suffer from adding beekeeping to an agricultural repertoire.
- These results suggest that it would be possible to analyze the effect of beekeeping on a household, through using wealth as a proxy for success in the trade. In future work, we intend to analyze these relationships.

Landholding per Adult



Farm Income per Adult



Conclusions

- Our results provide valuable insight regarding which farmers are most likely to already be participating in apiculture activities, as well as the benefits of doing so:
 - We find evidence that farmers who practice apiculture have incomes higher than those who do not.
 - This suggests that although an additional activity is being done on the farm, income does not decrease from failing to grow other crops instead.
 - Farmers who presently participate in beekeeping are generally wealthier, with higher landholdings, and greater diversification of cropping.
 - Crop diversification may signal a willingness to try new activities, a greater understanding of trade, or perhaps improved access to markets.
- It is unsurprising that farmers who participate in apiculture are generally more wealthy. It is also unsurprising that those who already participate in a variety of agriculture activities also practice beekeeping.
- It is surprising, however, that education plays no role in whether a farmer keeps bees or not.

References

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For Further Information

This poster is based on a working paper of the same title. The paper can be accessed by contacting:
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 An electronic version of this poster is available at:
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