Paper/Poster Title	Geographic vs. social distance – Neighborhood effects and agricultural commercialization in South India

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Abstract	*200 words max*

Peers play an important role in the decision-making process of smallholders regarding their management systems, as several studies have shown. We explore these peer effects on the decision of 591 farmers to commercialize agricultural production in the rural-urban interface of Bangalore in South India. We first develop a theoretical model formulizing smallholder decision-making regarding location, peer effects, and opportunity costs for other income sources. Afterwards, we test the derived hypotheses by estimating a probit model including neighborhood effects (SLX) constructed based on geographic as well as social distance (i.e., caste and age) among famers. We, thus, extend standard approaches using spatial weight matrices that rely exclusively on geographic distance. Our results support that the consideration of the social structure in communities (especially caste in our context) is important when modeling knowledge transfer among smallholders. Relying only on geographic distance likely oversimplifies the actual information pathways. This is also crucial when thinking about policies relying on the diffusion of knowledge.

Keywords	Agricultural commercialization, Smallholder decision-making, Spatial spillovers, Social networks, India
JEL Code	O13, Q1, R2 see: www.aeaweb.org/jel/guide/jel.php?class=Q)

Introduction	*100 – 250 words*

Agricultural commercialization and the integration of smallholders into agrifood value chains is a key aspect of policies in many low- and middle-income countries to foster economic growth and food security. Understanding the factors affecting smallholders' decisions to change and commercialize their management systems has therefore been an important question in the literature on agricultural development. One influence that has been identified in several studies is the effect of peers on smallholder decision-making. Acquiring information from neighbors, the wish for social conformity, or competition might all factor in smallholders' management decisions.

Studies investigating these effects generally fall in one of two groups. The first group applies complex sampling designs following social ties in communities to identify social networks. The other group relies on randomized observational data and uses spatial weights to model spillovers among farmers. We argue that there is a disconnect between these two strands of literature as the first group highlights the importance of social characteristics (e.g., status, ethnicity, etc.), while the second

group relies on spatial proximity alone when modeling smallholder interactions. We aim to bridge this gap by incorporating the idea of social distance in the definition of spatial weights for the analysis of observational data on agricultural commercialization. We also investigate how social weights perform in comparison to traditional geographical weights. Beyond the methodological exercise of this study, our results are also relevant for policies as they provide a clearer picture of the actual pathways of smallholder interaction and effects on agricultural transition.

Methodology	*100 – 250 words*

We start our analysis with a theoretical model of smallholder decision-making regarding agricultural commercialization. In this model, we pay special attention to location effects (e.g., market access), neighborhood effects (e.g., information, competition), and opportunity costs (e.g. off-farm employment as an alternative income source).

For our empirical analysis, we use the data of 591 farm households in the rural-urban interface of Bangalore and apply a probit model to investigate the effects of neighbor characteristics (SLX; farm size, off-farm employment, irrigation) on farmers' decisions to sell crops in the market. The neighborhood of each smallholder is constructed using weight matrices. We test several matrix specifications based on social proximity specific to the Indian context (i.e., caste and age hierarchies) as well as geographic distance. For all matrix specifications, we furthermore test interaction radii between 1 to 8 kilometers (in 1 km steps). Next to the neighborhood, we also include standard control variables and regional effects in our model, the latter being particularly important for identification.

Results	*100 – 250 words*

We find that irrigation on neighboring farms significantly increases smallholders' likelihood to sell crops in the market. Coefficients for neighboring farm size and off-farm employment remain insignificant. If irrigation is assumed to indicate an intensified management system, the influence of neighbors in our study area appears to be largely linked to information exchange and competition.

This pattern of neighborhood effects is picked up by all neighborhood specifications (weight matrices) independent of a definition based on social or geographic distance. Note, however, that the neighborhood specifications are uncorrelated and when included in the same model, the full effect of neighboring irrigation is picked up by the neighborhood defined based on caste. Thus, a weight matrix based on social distance seems to outperform a standard spatial weight matrix in capturing spillover effects on agricultural commercialization.

In addition, we find a nonlinear effect of farm size (own farm) on the likelihood of farmers selling crops. Thus, farm size is generally associated with an increased likelihood to commercialize agricultural management except for the largest farms in the sample. The estimations further suggest that extension supports agricultural commercialization, whereas more experienced farmers are less likely to sell their crops in the market.

Discussion and Conclusion	*100 – 250 words*

On the basis of the results of our research, we can conclude that the social structure of the neighborhood of smallholders is important in the transfer of information that leads to agricultural commercialization. Although a traditional spatial weight matrix picks up spillovers as well, our empirical analysis suggests that there is a hierarchy (in our context based on caste) in the influence of neighbors' farm characteristics. This means smallholders' decisions to sell crops are more likely to be influenced by neighbors of the same caste or higher castes (although less important) than neighbors with a lower caste.

This also has an important policy implication, especially regarding programs relying on knowledge transfer among farmers. Whereas results based on a traditional spatial weight matrix might suggest that eventually all farmers in the proximity of a trained farmer will receive certain information, our results emphasize that such approaches need to factor in the social structure of communities as well.