3 (b)

**Model Description**

The researchers developed a diffusion model to capture the diffusion process of participation in a microfinance program at household level.

The structure of the diffusion model can be explained as follows:

1. A set of initial leaders (injection points) are informed of the microfinance program. These leaders are generally pre-school teachers, shop keepers and saving self-help group leaders.
2. Leaders get to decide if they wish to participate
3. In each period households that have been informed pass the information independently to each of their neighbors with probability (q) that varies depending on a household participation status. (Participant qP or non-participant qN)
4. Newly informed households decide whether to take part depending on their characteristics and previous participation decisions of their neighbors who passed the information to that household.

The model repeats the same procedures and terminates after certain periods of information passing.

Information Model :  =α + Xi’β

Information with endorsement Model: =α + Xi’β + λFit

People who are informed but not eligible or have no intention to participate can still pass the information around and the effect of those non-participants is examined in the study. The baseline model is the simple information model which incorporates only information transmission. Another more enriched model, information model with endorsement effect, incorporates peer influence. The model accounts for the endorsement effect by allowing households’ decisions to participate to depend on what their neighbors have done.

**Model Estimation**

Two diffusion models are estimated in the study: a baseline information model and an information model with endorsement effect which incorporates peer influence. The models are estimated structurally with the use of Method of Simulated Moments (MSM).

The key moments considered in the models are:

1. The share of leaders who participate in the microfinance program
2. The share of households who participate with no participating neighbors/who participate that are in the neighborhood of a participating leader/who participate that are in the neighborhood of a non-participating leader
3. Covariance of fraction of households participating in the program with the share of their neighbors that participate or with the share of their second-degree neighbors that participate.

The information diffusion process is simulated with the use of various selected parameters. The parameters chosen aim to best match the key moments predicted by the model with actual moments observed in the village. Model estimation is carried out in three steps. For each set of moments, estimate β first through logistic regression using the participating decisions amongst the informed leaders. Parameters λ, qN and qp are then estimated by searching through the entire set of parameters and run the simulation 75 times. Moments are calculated at each simulation before averaging out over 75 runs and select parameters that minimize a criterion function consisting the difference between moments observed in the data and those predicted by the model for each village. Lastly the standard errors are estimated with the simple Bayesian block-bootstrap algorithm.

Several robustness checks are performed on the modelling results such as re-estimating the model with a different set of moments and a different participating variable.

The modelling results suggest that information effects are far more significant than peer influence. Individual’s decision to participate is not significantly affected by peer influence and hence no additional endorsement effects beyond information passing. Participants in the microfinance program are approximately five times more likely to pass the information to their friends than nonparticipants, however non-participants still play substantial role in the way information transmitted. The model replicates well the actual observed pattern of information transmission in these villages. There is no significant correlation between network characteristics and the eventual participation of the program.

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Fit: a fraction whose denominator is the no. of i’s neighbors who informed i about the microfinance program and the numerator is the no. of those who participated in the program

λ: change in the log - odds ratio of household i participating because of a change in the fraction of neighbors who informed i that decided to participate

β: a vector of coefficients that describe how the log-odds ratio of participation varies with characteristics Xi

Xi: is a vector of individual characteristics and F is the fraction of informed neighbors who participate.

qN: Probability of informing a given neighbor from a non-participant

qP : Probability of informing a given neighbor from a participant