

Do Injection points matter in the diffusion of microfinance?

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1. Background and Data

1.1 Background

How do the first individuals to received information in the social network influence the final outcome of behavior changes? To Answer this question, in this paper we analyzed the data collected by a team of researchers when they studied the diffusion of participation in a program of Bharatha Swamuki Samsthe (BSS), a microfinance institution, in 77 villages in India (Banerjee et al., 2012).

1.2 Data description

After cleaning and analyzing the original data using Python, we form the “cross_sectional_45_gw.csv” file which variables for the following regression process.

The “village” column shows the village number of the 45 villages. The “leader eigenvector centrality” column shows the average eigenvector centrality. The “leader degrees” column shows the average degree of leader. The “household” column shows the number of household. The “mf rate non-leader” column shows the microfinance program take up rate of non-leader. The “fraction of taking leaders” shows the fraction of leader who join the microfinance program. The “Eigenvector centrality taking leader” column shows the average eigenvector centrality of leaders who join the microfinance program.

2. Regression

We do the regression process in R, and the regression report is in Table 1. The dependent variable is “mf rate nonleader”,

Table 1: Leader/Injection points

	Dependent variable:			
	mf_rate_nonleader			
	(1)	(2)	(3)	(4)
leader_eigenvector_centrality	1.633508* (0.879904)		1.934080** (0.928331)	1.253756 (0.912957)
household	-0.000382 (0.000270)	-0.000704*** (0.000213)	-0.000270 (0.000292)	-0.000305 (0.000233)
leader_degrees		-0.001109 (0.003154)	-0.003239 (0.003198)	
fraction_of_taking_leaders				0.322836*** (0.081428)
Eigenvector_centrality_taking_leader				-0.175095 (0.421695)
Constant	0.150286 (0.114821)	0.362092*** (0.066447)	0.161911 (0.115356)	0.092423 (0.100250)
Observations	43	43	43	43
R2	0.293094	0.234552	0.311211	0.501802
Adjusted R2	0.257748	0.196280	0.258227	0.449360
Residual Std. Error	0.072410 (df = 40)	0.075349 (df = 40)	0.072387 (df = 39)	0.062367 (df = 38)
F Statistic	8.292286*** (df = 2; 40)	6.128492*** (df = 2; 40)	5.873711*** (df = 3; 39)	9.568729*** (df = 4; 38)

Note: *p<0.1; **p<0.05; ***p<0.01

We build 4 models with available data as the author in “The Diffusion of Microfinance” did, and the final results are very similar.

Result: According to table 1, the average eigenvector centrality of leader is significantly affecting the eventual non-leaders' take up rate in model (1) ~ (3). Though in model (4), the eigenvector centrality is not significant after adding fraction of taking leaders and eigenvector centrality of taking leader, the coefficient is still the same with that in Abhijit's paper, with the standard error being slightly different. In model (1), the coefficient shows that increase 1 unit of the eigenvector centrality of the leader, the taking up rate of the non-leader will increase by 1.64 percentage points. Fraction of taking leaders is significantly affecting the take up rate of non-leaders, as shown in model (4).

The average degree of leaders is not correlated with the take up rate of non-leaders in all four models. The average eigenvector centrality of taking leader is not significant in influencing the take up rate too. Household variable is significant when not adding other eigenvector centrality measurement, but it become not correlated with the dependent variables model (1), (3) and (4).

3. Conclusion

The average eigenvector centrality of leaders to be firstly informed in the village is a determinant in the final take up rate of the microfinance program. When the initial informed leaders' average eigenvector centrality is higher, the eventual non-leaders' take up rate of the program will be higher too.

The fraction of taking leader can also affect the final take up rate. This situation might be the consequence of "endorsement effect".

Other social network characteristics across villages are relatively insignificant determinants of the diffusion of microfinance program.

Reference:

Banerjee, Abhijit V. and Chandrasekhar, Arun G. and Duflo, Esther and Jackson, Matthew O., The Diffusion of Microfinance (January 2012). NBER Working Paper No. w17743. Available at SSRN: <https://ssrn.com/abstract=1985076>