I Give You A Favor, When Do You Return Me A Favor? – From A Social Exchange Perspective

Wei Xia, Department of Management and Organization
Foster School of Business, University of Washington

Research Question:

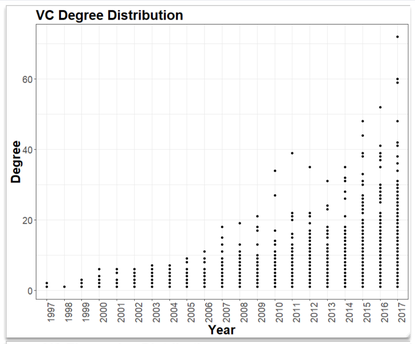
- When is inter-organizational reciprocity particularly strong and when does it break down?

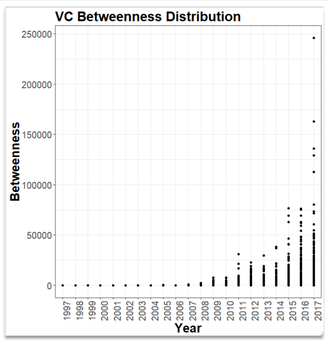
The motivation to study:

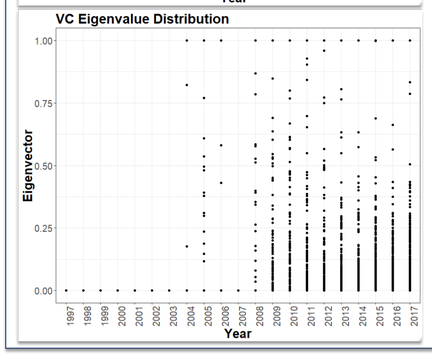
- As the core social exchange norm, reciprocity is an important mechanism to form strong ties, stabilizing both interpersonal and inter-firm relationship, as well as sustaining and enduring dyadic ties;
- Studying factors strengthening or weakening firms' social obligations to reciprocate helps us form a comprehensive idea of the boundary conditions of social exchange mechanism.

Research gap:

- Many network studied repeated ties, but the reciprocal tie, a special form of repeated tie, is rarely studied.
- VC literature mainly focuses on the tie formation (syndication) but neglects the processes how those ties persist (how syndications prolong);
- Due to the two-way and evolving nature of reciprocal tie, tie direction should be taken into account to study the notion of reciprocity.





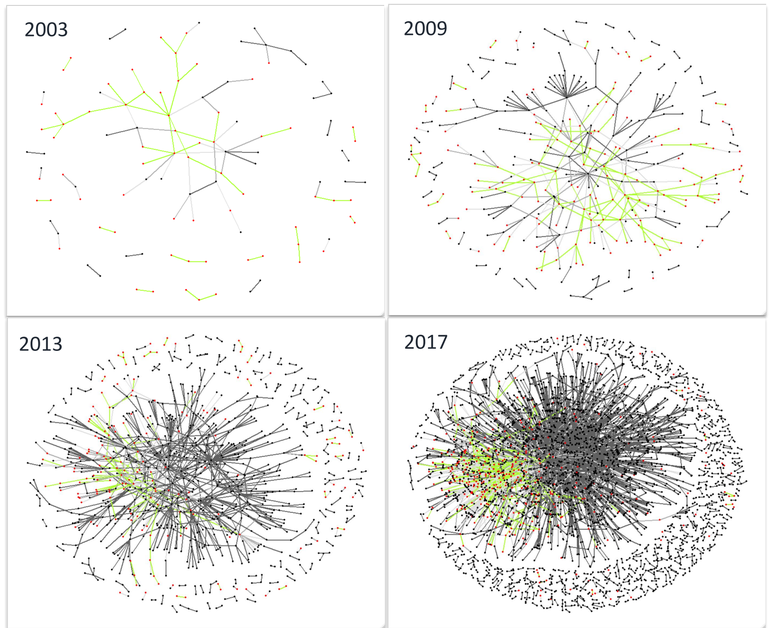


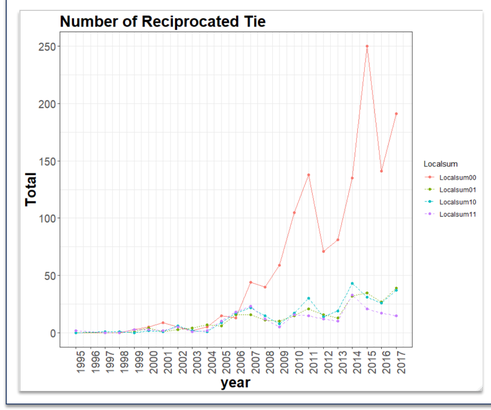
- VC industry is an ideal context to study reciprocal ties and its boundary conditions
- A VC network consists of past and current syndicate ties that are clearly directional, channeling and directing flows of information from one VC to another within a social structure.

Data:

- The dataset includes all the Chinese and foreign VCs actively investing in China from 1991 to 2017 (spanning the whole VC history in China);
- DV: the likelihood that firm B reciprocates firm A's inviting within 5 years;
- IV1: Firm A sends a tie to firm B at year 1;
- Moderator: The national/ethnic composition of the dyad.

The Evolvement of VC Network in China





- For instance, 3,819 ties were formed from 2013 to 2017;
- Out of them, 282 ties were reciprocated, including 191 ties formed by two local VC firms, and 15 ties formed by two foreign VC firms.

Model Selection:

- BTEGRM (Bootstrapped Temporal ERGM) considers the dynamic effect when predicting the conditional probability of an edge between two nodes.
- Based on ERGM:

$$\pi_{ij}(\theta) = P\left(N_{ij} = 1 \middle| N_{-ij}, \theta\right) = logit^{-1}\left(\sum_{r=1}^{R} \theta_r \delta_r^{(ij)}(N)\right)$$

- BTERGM uses the bootstrapped pseudolikelihood inference method by adding a temporal index to π:

$$arg\ max_{\theta} \sum_{t=K+1}^{T} \sum_{\langle ij \rangle} \ln\left[\left(\pi_{ij}^{t}(\theta)\right)^{N_{ij}^{t}} \left(1 - \pi_{ij}^{t}(\theta)\right)^{1-N_{ij}^{t}}\right]$$

Results:

	Model 1	Model 2	Model 3
Reciprocated tie	3.60*	2.98*	1.03*
	[2.96; 3.74]	[2.62; 3.09]	[0.61; 1.47]
Edges	-7.45*	-7.84*	-46.87*
	[-7.71; -6.70]	[-8.12; -7.21]	[-47.29; -44.70]
istar2		0.13*	0.10*
		[0.11; 0.14]	[0.05; 0.11]
ostar2		0.10*	0.11*
		[0.09; 0.15]	[0.10; 0.14]
nodecov.Local01			20.32*
			[19.36; 20.43]
edgecov.Local_0_0			70.10*
			[67.04; 70.40]
edgecov.Local_0_1			49.33*
			[47.27; 49.45]
edgecov.Local_1_0			49.64*
			[47.56; 49.83]
Num. obs.	26,660,800	26,660,800	26,660,800

* 0 outside the 95% confidence interval

Bootstrapped Temporal ERGM

Main findings:

- The results demonstrate when firm A invited firm B in one or more deals before, firm B is more likely to reciprocate A's favor by inviting A to participate B's another deal.
- Two Chinese firms are more likely to reciprocate than Western firms in general, because Chinese "Renqing" culture emphasizes mutual obligations and long-term relationship.

References:

- Leifeld, P., Cranmer, S. J., & Desmarais, B. A. (2018). Temporal exponential random graph models with btergm: Estimation and bootstrap confidence intervals. Journal of Statistical Software, 83(6).
- Robins, G., Pattison, P., Kalish, Y., & Lusher, D. (2007). An introduction to exponential random graph (p*) models for social networks. Social networks, 29(2), 173-191.