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Trust in cohesive communities ☆

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Abstract

This paper studies which social networks maximize trust and welfare when agreements are implicitly enforced. We study a repeated trust game in which trading opportunities arise exogenously and a social network determines the information each player has. The main contribution of the paper is the characterization of optimal networks under alternative assumptions about how information flows across a network. When a defection is observed only by the victim's connections, cohesive networks are Pareto efficient as they allow players to coordinate their punishments to attain high equilibrium payoffs. In contrast, when a defection is observed by the victim's direct and indirect connections, barely connected networks maximize the number of players that can punish a defection and are therefore efficient.

JEL classification: C73; D82; D85; Z13

Keywords: Repeated games; Social networks; Cohesiveness

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1. Introduction

The use of informal mechanisms of misconduct deterrence has been widely recognized and documented by economists (Milgrom et al., 1990; Dixit, 2006; Greif, 2006), political scientists (Ostrom, 1990; Fearon and Laitin, 1996), sociologists (Coleman, 1990; Raub and Weesie, 1990; Burt, 2001; Rauch, 2001), and legal scholars (Bernstein, 1992). Crucial to their use is the way in which trading partners get informed about mischievous actions. Several authors have argued that the social structure is a key determinant of information flows and of the sustainability of trust-based transactions. For instance, Greif (1993) studies contract enforcement between medieval Maghribi traders, and argues that a close-knit community can quickly disseminate information about its members' behaviors. Thus members' incentives can be aligned by employing community-based sanctions that punish behaviors deemed opportunistic.[1]

This paper formally explores optimal network architectures in the context of a repeated trust game in which the social network determines information flows and feasible punishments. Our main contribution is the characterization of optimal networks under alternative assumptions about how information flows across a network. Cohesive networks are efficient when information flows are slow, whereas barely connected networks are efficient when information spreads quickly within a component.

Our baseline model is a repeated game played by N investors and one agent. At each round $t \geq 1$, one of the N investors is randomly and uniformly selected to play a trust game with the agent. In the trust game, the investor decides whether or not to participate. If he participates, he also picks an action or investment level, then the agent chooses whether to cooperate or to defect. If the agent does not participate, stage game payoffs are 0 and the game moves to next round. The equilibrium of the stage game is inefficient as the agent will defect after an investment is made and, anticipating this behavior, the investor will not participate. The agent's temptation to defect may be curtailed by the existence of community sanctions governed by a social network of investors G. Our model exhibits *network monitoring* since after the agent misbehaves when facing investor i, then i and all his direct connections in G become aware of that, but players who are not connected to i learn nothing about it. We focus on perfect Bayesian equilibria that sustain cooperation on the path of play.

Our results characterize optimal networks. Theorem 1 establishes the Pareto optimality of any social network of equally sized complete components (i.e., networks in which all players have the same number of connections and if a player is connected to two other players, then all three are connected). Precisely, if G^* has equally sized complete components and G is such that no investor has more connections than in G^*, there exists an equilibrium σ^* under network G^* yielding higher expected payoffs to each community member than any equilibrium σ under network G. When the number of links is scarce and the number of connections per player is

[1] Other cases abound. In the automobile industry, for example, firms usually outsource large amounts of work and suppliers are routinely called upon to make specific investments. Hold-up problems are overcome by the threat of future business losses. As McMillan (1995) documents, one of the keys to deter opportunistic behavior in vertical relationships is the existence of cohesive business associations, such as Japanese keiretsus or Korean chaebols, that facilitate information exchange about parties' previous performances. McMillan (1995) observes that "the institutionalization of links among firms that is provided by the keiretsu system arguably serve as ... an information-provision device." He also notes that "by providing a mechanism for keeping track of any opportunistic behavior ..., the keiretsu provides a disincentive to such behavior."