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Social network structure and government provision crowding-out on voluntary contributions

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ABSTRACT

We propose a general equilibrium model of voluntary contributions in which people have an individual-specific level for social approval. This heterogeneous setting has evolved from the different degree of social interaction of individuals in the exogenously given network. By extending the techniques developed by Ghiglino and Goyal (2010), we show that, given a network, individuals who face higher standards of social norms contribute more to the public good and are simultaneously less sensitive to government provision crowding-out in relative value. When comparing different networks, we show that government provision is more effective in networks with higher average connectivity because of a lesser crowding-out effect.

1. Introduction

Social scientists have long argued that an individual's pure altruism may not be a sufficient explanation for economic behavior on voluntary contributions to public goods. According to the pure altruism model (Warr, 1982; Roberts, 1984; Andreoni, 1988), private contributions to a public good are completely crowded out by government provisions. However, this theoretical prediction is sharply violated in practice. A majority of the investigations concerning the crowding effects of government provision indicate that this type of crowding out is normally incomplete.[1] In general, empirical evidence from large populations demonstrates little to no crowding-out effects[2], whereas experimental investigations in a laboratory environment provide evidence of partial but relatively sizable crowding-out effects.[3]

Several different economic approaches have been developed to provide insights into the incomplete crowding-out effects that are observed widely in the literature, such as impure altruism (warm-glow), norm-based motivation, reputation, commitment, and moral motivation. As reviewed by Nyborg and Rege (2003), the distinctions between these approaches are not clear-cut because they share some analytical features, including non-material feelings embedded in an individual's preference aside from self-interested economic consideration in the traditional model (Gintis, 2003a,b). In this study, we mainly focus on the economic approach of norm-based motivation that has evolved from social interactions with others, and analyze the crowding-out effect of public policy when people in the network have a non-material preference for social approval.

The social network analysis is introduced and plays a critical role in our study because it has an advantage of providing a het-

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[1] Refer to Nyborg and Rege (2003); Bekkers and Wiepking (2011), and Heutel (2014) for comprehensive reviews.

[2] In econometric analyses, Abrams and Schmitz (1978, 1984); Clotfelter (1985); Kingma (1989); Simmons and Emanuele (2004); Brown and Finkelstein (2008), and Parker and Thurman (2011) reported low crowding-out effects of government provision, ranging from 5% to 30%, while Ribar and Wilhelm (2002) concluded that crowding-out effects are very small and not significantly different from 0 in the econometric data with large populations. Andreoni and Payne (2003) proposed an institutional hypothesis that organizations tend to reduce fund-raising efforts after receiving grants. Their result suggests that an additional $1,000 in grants decreases fund-raising expenditure by $265 for arts organizations while it decreases such expenditure by $54 for social service organizations.

[3] In the laboratory environment, Andreoni (1993); Bolton and Ockenfels (2000); Alpizar et al. (2008), and Smith et al. (2014) found high (45% to 74%) but incomplete crowding-out effects.

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erogeneous reference point for individuals. Previous studies have generally assumed that an individual's motivation for social approval is determined by comparing her own contribution to the average contribution in the society (homogeneous reference point for all players) and have derived some insightful implications[4]. This homogeneous reference setting is justifiable given that social norms are standardized and widely accepted in the economy. For instance, the tipping custom in the US is 10% to 15% of the bill for buffet or family-style restaurants and 20% for excellent service in upscale restaurants (Azar, 2003, 2004, 2005, 2007b), both for regular and non-repeat customers (Lynn and Grassman, 1990; Azar, 2007a). Another example is that the general norm of first response times for the academic review process is 3–6 months in economics, but could be only 1–2 months in finance and accounting and a few weeks in physics (Azar, 2005, 2008). In addition, some non-profit organizations, such as the Metropolitan Museum of Art (Met), provide a suggested donation amount ($25 for the Met for adults) even if they do not have a fixed admission fee. It is reasonable to assume that norm-conscious individuals simply adhere to the uniform reference point without doubt, and therefore, it is desirable to study the evolution of social norms over time and to discuss an individual's optimal economic decisions.

However, in many cases of voluntary contributions, references on social norms are rather diverse among individuals. For instance, what would be an acceptable donation amount for a local resident to help restore public facilities destroyed in the Central Texas (San Marcos) flood in 2015? Because there is no widespread consensus or any suggestions as to a donation amount, the answer varies based on an individual's socio-economic situation, personality, and interpersonal relationships. Is a $75 donation a sufficient amount to earn social approval for an individual who teaches in college? The answer is, possibly, yes if most of her colleagues donate a similar amount. What is a sufficient donation for a successful small business owner who has extensive interpersonal connections in Central Texas? The business owner might feel embarrassed or experience social disapproval if most of the business owner's friends donate more than $1,000 and she donates only $75. Similarly, an individual who recently moved to San Marcos may not feel guilty for not participating voluntarily in the donation campaign, but is this the case for an individual who has lived there for decades with strong interpersonal connections and who fails to contribute?

When the uniform reference point is unavailable or costly to obtain, there is a feasible and less costly tendency for an individual to observe the most frequent behavior in her reference group, composed of acquaintances, such as colleagues, friends, or neighbors, and to compare her own voluntary contribution to the acquaintances (Smith et al., 2014). Moreover, because of the heterogeneous nature of interpersonal relationships among individuals, it is reasonable to assume that each individual has her own motivation for social approval rather than sharing the uniform social norm[5] (Bowles and Gintis, 2004). Our study, therefore, represents an attempt to develop a model in which the network structure leads to an individual-specific level for social approval, and highlights the variety of crowding-out effects to the voluntary contributions because of the network effect. Instead of studying the evolution of social norms by applying the game-theoretical approach (Sethi, 1996; Sethi and Somanathan, 2003; Kolstad, 2007; Ostrom, 2014; Acemoglu and Jackson, 2015) or dynamic evolutionary models (Sethi and Somanathan, 1996; Azar, 2004, 2008)[6], we develop a general equilibrium model by applying the network techniques developed by Ghiglino and Goyal (2010) to capture the complexity of interpersonal relationships. It is important to acknowledge that our study is not the first attempt to analyze heterogeneous settings. To name a few, Azar (2004) allowed heterogeneity among populations with positive feelings toward tipping in a dynamic model. Moreover, Azar (2008) assumed heterogeneity among referees in several dimensions, including preferred refereeing time from the referee's perspective, whether the topic interests the referee, how much the reference tends to procrastinate, and how busy the referee is. Reuben and Riedl (2013) conducted an experimental study that allowed group members to differ in either their endowment or marginal benefit from the public good. Our study, however, provides an alternative perspective of norm-based motivation for voluntary contributions when the uniform reference point is not available in an economy, and introduces social network analysis into the literature. Specifically, we assume players have different desires for social approval because of different network linkages (social interaction) rather than personal heterogeneous preferences.

Our general theme is that the crowding effect of government provision of public goods crucially depends on some economic features, particularly an individual's degree of social interaction. Specifically, we derive the following results. First, by applying the network framework, we show that individuals more involved in social interactions contribute more to public goods. This is because the standard of social norms that an individual encounters is reinforced by social interactions. When an individual is detached from society, her self-interested behavior will not make her feel social disapproval because she disregards others' thoughts. On the other hand, when an individual interacts with others, social norms form, and the greater the social information an individual receives, the more peer pressure she senses from others. To earn social approval from her peers, she increases her contribution to the public good to conform to social norms (Vesterlund, 2003; Penner et al., 2005; Alpizar et al., 2008; Shang and Croson, 2009).[7] Although this outcome is in accordance with the finding from Ghiglino and Goyal (2010) in status consumption, we show that, given the same utility level derived from social approval and private status competition, an individual's public provision for social approval is less than her private status consumption for status competition because of the nonrival and nonexcludable properties of public goods.

Second, we show that the government provision of public goods crowds out private contributions. However, the crowding-out size is hard to determine across different degrees of centrality/connectivity. This is because although the government provision largely reduces social responsibility on central players, at the same time, high connectivity makes central players tend to adhere to the social norms of the network and become less sensitive to the change in government provision. This conclusion is verified by checking relative crowding-out effects, which show that the relative change in voluntary contributions is less responsive for players with higher connectivity.

Third, we turn our attention to the comparison of different network structures. We find that, on average, voluntary contributions in networks with higher connectivity are less affected by government provision. The remainder of the paper proceeds as follows. In Section 2, we derive analytical outcomes based on the network framework from Ghiglino and Goyal (2010) as well as verify our

[4] For instance, Holländer (1990) showed that government intervention for the public good partially crowds out private donations, and results in "a colder social climate that is not necessarily compensated by the welfare gain."

[5] For instance, Adam and Eve are colleagues with identical disposable income, and through each other, they gain ideas about the level of contribution that is considered appropriate. However, if Eve's friends are in general more altruistic than Adam's friends are, Eve will face more pressure to donate more.

[6] Refer to Sethi and Somanathan (2003); Azar (2004); Festré (2010), and Festré and Garrouste (2015) for comprehensive reviews.

[7] Shang and Croson (2009) suggested that social information positively influences an individual's voluntary contribution.