Funding nonprofits in a networked society: Toward a holistic theory of government support

Ji Ma*

LBJ School of Public Affairs and RGK Center for Philanthropy and Community Service

University of Texas at Austin

2315 Red River St, Austin, TX 78712, USA

Abstract

This paper puts forward a holistic theory on the crowding process of government support – the effect that government funding to nonprofits may crowd out or crowd in private donations. By using a novel panel dataset across 12 years from the People's Republic of China, we find no evidence to support that government funding to a nonprofit can crowd out private donations to the same organization. However, we find a substantial crosswise crowding-in effect, suggesting private donations are not reduced but redirected to other nonprofits in the organizational network. Policy and practical implications are discussed.

Keywords: Crowd Out, Crowd In, Social Relation, Government Funding, Nonprofit Organization, Networked Society

*Corresponding author, email: maji@austin.utexas.edu. I thank Dr. Richard Steinberg, Dr. Mark Ottoni-Wilhelm, Dr. Leslie Lenkowsky, and Dr. Amir Pasic for advising me on this paper; Dr. Joseph Galaskiewicz, Dr. Peter Frumkin, Dr. Yuan Cheng, Dr. Huafang Li, Dr. René Bekkers, and Dr. Raissa Fabregas for their constructive comments. This paper was presented at the 15th Annual West Coast Nonprofit Data Conference (Salt Lake City, Utah, USA; April 28, 2018) and UPenn Summer Doctoral Fellows 10 Year Reunion (Amsterdam, Netherlands; July 7-10, 2018). I thank the panel attendees for their constructive comments. I also thank Zhejiang Dunhe Foundation for their support to the RICF project.

Contents

1 Introduction

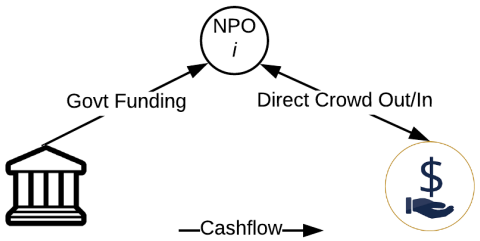
Government funding to nonprofits aims to increase the provision of under-provided public goods or services. However, theoretical studies suggest that government funding may crowd out private donations: for every dollar increase in government funding, private donations may decrease by up to a dollar (e.g., Abrams and Schmitz 1978; Andreoni 1989, 1990; Roberts 1984; Warr 1982). A common theoretical hypothesis for these studies posits that donors may see contributions to public goods through taxation as substitutes of private donations to nonprofit organizations. The crowd-out effect of government funding is one of the most important inquiries in public economics because it is critical to the government and policy makers in providing optimal goods and services – government spending becomes undermined if the crowding-out effect on private donations is by one entire dollar.

1.1 Traditional Approaches to Understanding the Crowding Mechanisms

Since the 1980s, a considerable number of empirical studies have attempted to understand the relationship between government funding and private donations (Figure 1), but the academic community still lacks consensus on the size and direction of crowding (Tinkelman and Neely 2018, 40). Scholars have typically used four types of research methods on this topic: laboratory experiments, survey experiments, archival data from tax return forms, and micro-level survey data (de Wit and Bekkers 2017, 302). These research methods can exert strong effect on findings. For example, laboratory experiments are more likely to find large crowd-out effects than non-experimental methods (de Wit and Bekkers 2017, 309; Tinkelman and Neely 2018, 44). Further, in experimental studies, the results are highly dependent on how the research settings are framed, such as, how the subjects are informed about the government's support and the relationship between private donations and government funding (Eckel, Grossman, and Johnston 2005, 1557). In general, two-thirds of previous estimates support the crowd-out hypotheses, while one-third are against the hypothesis and support the crowd-in effect (de Wit and Bekkers 2017, 311).

Two types of methodological problems reside in previous empirical studies (Ribar and Wilhelm 2002, 437–438). The first is the mismatch between private donations and government support using data extracted from tax returns or general surveys; this issue was solved by using data compiled on an organization-by-organization basis in later studies. The second problem results from omitted variables, since government funding and private donations may be jointly determined by some unobserved variables (Payne 2009, 163-164; Steinberg 1985,

Figure 1: Traditional Approaches to Understanding the Crowding Mechanisms



62). For example, people who are more altruistic are likely to both give more and vote for higher levels of government provisions and support.

The issue of omitted variables still is one of the most challenging problem while estimating the crowd-out effect. The use of panel data and fixed effect analysis is one solution. For example, the time or organization fixed effect analysis can address the problem of omitted variables that are time or individual invariant. However, this approach cannot exhaust all omitted variables, for instance, the changing preference of government officials can be captured by neither time nor organization fixed effect. Another practice is to use instrumental variables (or instruments for short) in two-stage least square (2SLS) analysis. Appropriate instruments must be able to strongly predict government funding and do not directly predict private donations. In the first-stage estimation, government funding is predicted by the instruments; in the second-stage analysis, the predicted values of government funding are used to evaluate the crowding-out effect on private donations. The quality of instruments can be evaluated by statistical tests, but a convincing argument that explains why the instruments are appropriate and accurate is critical (Payne 2009, 165). However, instruments used in existing studies can hardly be convincing (Ribar and Wilhelm 2002, 438).

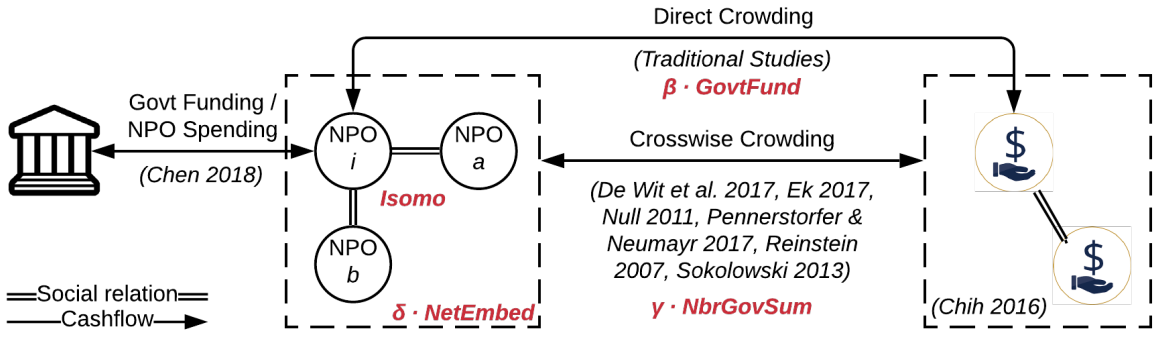
Traditional studies following the paradigm illustrated by Figure 1 initiated a debate about the crowding mechanisms and established various methodologies for studying this topic. But the literature may underestimate the complexity between government support and private donations. As one meta-analysis suggested, existing studies have found the relationship between government grant and private donations to be trivial (Lu 2016, 396), and "it seems clear that a tipping point exits" (Tinkelman and Neely 2018, 50) – shifting scholarly focus from the traditional paradigm to a holistic perspective to understand the interactions is a promising direction.

1.2 Considering New Findings: Toward a Holistic Theory of Government Support

The traditional approaches to studying the crowding mechanisms are based on a paradigm of "neutrality theorem" (Tinkelman and Neely 2018, 41; Khanna, Posnett, and Sandler 1995, 261). There is a need for additional studies that focus on the "interactions" among different types of revenues, donors, and service areas (Tinkelman and Neely 2018, 50-51).

A few recent studies approached such complex interactions. Cheng (2018) found the crowd-out effect of nonprofits' spending on government funding, disclosing a "two-way interaction" between government support and nonprofit spending. The author of a recent paper examined the social relations in donors' networks and suggested that the crowd-out effect of government funding is less intense on donors who are more embedded in the social networks because the social norms that encourage private donations are stronger for these people than those less embedded (Chih 2016, 84). Regarding the relationship between government funding and private donations, researchers began to focus on another phenomenon termed as "crosswise crowding mechanisms" or "substitution of giving." These terms describe the situation in which the donors' giving can shift to other similar organizations in the same service domain or even to dissimilar organizations in different service domains, complicating the impact of government funding on private donations (Pennerstorfer and Neumayr 2017; Ek 2017; De Wit et al. 2018; Sokolowski 2013; Reinstein 2007; Null 2011). Putting all these recent academic endeavors together, we can start to picture a view of the crowding mechanisms that are more holistic, as illustrated in Figure 2.

Figure 2: A HOLISTIC THEORY OF GOVERNMENT SUPPORT TO NONPROFIT ORGANIZATIONS



But there are still missing pieces. The first pertains to the study of social relations from an organizational perspective. The social structures in which the organizations are embedded

constrain economic behaviors, known as the "problem of embeddedness." Economic behaviors are "embedded in concrete, ongoing systems of social relations" (Granovetter 1985, 487). Although the role of social relations has been understood from the donor's perspective (Chih 2016), it has not been studied from the side of nonprofit organizations. Private donations to organization i may be influenced by the government funding to i's neighbor organizations a and b (Figure 2), and a nonprofit's position in the network may also influence its private donations. Second, some recent studies, though innovative in approaching this topic from different perspectives, did not compile separate results for a holistic theory. For example, researchers did not analyze social relations and direct and crosswise crowding effects in one equation system to understand their interactions.

1.3 Operationalizing Organizational Social Relations

A network consists of nodes (vertices) and links (edges), and the study of social relations is the analysis of social structure through networks (graphs). In a network, nodes can be any entity of interests, for example, organizations, individuals, events, countries, or even abstract political concepts. The links represent relationships (e.g., friendship or affiliation) between nodes.

In an organizational network, nodes represent organizations. Links can represent any meaningful relationship between organizations, for example, working in the same service area, sharing board members, or being established by the same founder or supported by the same sponsors. The identification of which relationships are meaningful largely depends on the research questions.

Because of the critical role of the board in organizational governance, board interlocking relationship (i.e., the practice of sharing board members across organizations) is used extensively to study organizational social relations. In a board interlocking network, nodes represent organizations; and two nodes are connected if they share one or more board members. The values, information, and decisions can diffuse among the boards of different organizations through the shared board members. The board interlocking practice is "a means by which organizations reduce uncertainties and share information about acceptable and effective corporate practices" (Borgatti and Foster 2003, 996), and there is an empirical study of nonprofit organizations supporting the critical role of board interlocking relationships in resource acquisition and information sharing (Faulk et al. 2015). Although critics remain, studying such networks is a valid approach to understanding the organizational behavior embedded in social relations. Davis (1996) and Mizruchi (1996) provide extensive reviews and critiques of board interlocking studies.

This study uses board interlocking relationships to construct the organizational network and considers the network at two levels of analysis: ego network (Section 2.1) and complete network (Section 2.2).

1.4 An Overview of Chinese Foundations

Nonprofit organizations in the mainland of People's Republic of China ("China" hereafter) exist in three legal forms including foundations (*jijinhui*), membership-based associations (*shehui tuanti*), and social service organizations (*shehui fuwu jigou*), formerly known as *minban feiqiye danwei* PRC National People's Congress 2016. Among the three types of nonprofits, foundations are the most developed form and receive over 76% of the national donations, forming the dominant power of the nonprofit sector in China (Ma and DeDeo 2018, 293).

The study of Chinese nonprofits and civil society has long focused on the nonprofits' relationship with the government and politics (e.g., Chamberlain 1993; Estes 1998; Kang and Han 2008; Ma and DeDeo 2018; Ma 2002a, 2002b; Spires 2011; Teets 2017; Unger and Chan 1995). Chinese nonprofits typically fall into one of the two categories: non-governmental organizations (NGOs) and government-affiliated NGOs (GONGOs). NGOs are funded and operated by private efforts from social elites, business executives, and ordinary citizens, etc. On the contrary, the GONGOs are initiated and funded by and well-connected to the public sector (i.e., the government).

A major reason to establish GONGOs is to transfer a part of the government's functions, especially the functions of providing social welfare (detailed history is available from Ma 2002a). For example, the Chinese Communist Youth League Central Committee (CCYLCC) established the China Youth Development Foundation (CYDF) in March 1993 (China Youth Development Foundation 2017a). Former principals of CCYLCC include Li Keqiang, the current Premier of China, and Hu Jintao, the former General Secretary of the Communist Party Central Committee and the President of China. CYDF is committed to "helping young people build capacity and to improving the environment for their growth by providing aid services, giving a voice to the interests of young people and by carrying out social advocacy" (China Youth Development Foundation 2017b). The government also transfers functions that are politically sensitive to GONGOs, such as those pertaining to social issues on human rights, policy advocacy, and social stability (Ma and DeDeo 2018, 4). As an example, the State Council Information Office directs the China Foundation for Human Rights Development, and its president of the board is Huang Mengfu, a vice chair of the

Chinese People's Political Consultative Conference and a national leader of China (China Foundation For Human Rights Development 2017).

By tracking and analyzing the activities of more than 4,000 charitable Chinese foundations for over 12 years[1], this study responds to the missing pieces in constructing a holistic theory of the crowding mechanisms. We contribute to the literature from three aspects. First, we consider the social relations in the organizational network. Second, we analyze the social relations and direct and crosswise crowding effects in one equation model, which is critical to providing a holistic theory of the crowding mechanisms. Third, we study one of the largest economic entities in the world, the mainland China, which has never been examined on this topic before. Almost all the existing studies on this topic use data from Western countries (de Wit and Bekkers 2017, 303), but we know nothing about China. Given the specific state–society relationship and popularity of government–nonprofit social service contracting (Ma and DeDeo 2018; Zhao, Wu, and Tao 2016), this study extends the knowledge on this topic to an authoritarian country and generates important policy implications.

2 Research Questions and Empirical Specification

In responding to the missing pieces in the holistic theory, we propose two research questions: 1) What are the direct and crosswise crowding effects of government funding on private donations? 2) Does network position have an impact on private donations? The basic empirical specification for answering the two questions is Eq. 1:

$$\begin{aligned} Donations_i = &\alpha + \beta \cdot GovFund_i + \gamma \cdot NbrGovSum_i + \delta \cdot NetPos_i + \\ &\omega \cdot Controls_i + \mu \cdot Controls_r + \varepsilon_i \end{aligned} \tag{1}$$

The amount of private donations to organization i ($Donations_i$) is regressed on the amount of government funding to i ($GovFund_i$), the weighted sum of government funding to i's neighbor foundations ($NbrGovSum_i$; defined by Eq. 2), a set of variables measuring i's network position ($NetPos_i$), and a set of control variables at the organizational level ($Controls_i$) and regional level ($Controls_r$)[2]. The coefficients β, γ, and δ, illustrated in Figure 2, measure the direct crowding effect, crosswise crowding effect, and network position effect, respectively.

[1]The panel dataset is unbalanced and with missing variables, so the number of observations in different regression models varies.

[2]The "regions" in this study include the following administrative divisions of China: 22 provinces, 5 autonomous regions, and 4 municipalities. See Appendix A1 for a list of these regions.

2.1 Measuring Similarities at Ego Network Level

Existing studies of crosswise crowding effects at the organizational level treat the similarity among organizations as a critical independent variable. Two nonprofits are "similar" if they work in the same service area. Ek (2017) found that, although donors shift their donations to dissimilar nonprofits as well, the substitution between similar alternatives is substantially larger.

However, nonprofit organizations can be similar in many ways. "Birds of a feather flock together" – the board interlocking relationship can be a better operationalization of "similarity" because it provides perfect channels for the three *isomorphic* processes to happen: coercive, mimetic, and normative (DiMaggio and Powell 1983, 150). *Coercive isomorphism* is a result of both formal and informal pressures. The general public, for example, expects foundations to lower their administrative costs; further, they are required by law to disclose their financial reports in a standardized format. The board, as a governing body, has the right to enforce these requirements, and board interlocked organizations are more likely to enforce the same requirements. *Mimetic process* results from the response to environmental uncertainty. For example, new foundations may mimic the operations of well-established forerunners in the same field, or even invite their board members, to reduce the risk of uncertainty and secure more resources. *Normative pressures* happen because of professionalization. For example, board-interlocked organizations are more likely to share standards of services and operations. In other words, board interlocks also provide an institutional basis for the formal, legal, and informal social psychological processes in building interorganizational relationships (Ring and van de Ven 1994).

$$NbrGovSum_i = \sum_{j \in d_i} (GovFund_j \cdot Isomo_{ij}) \tag{2}$$

In Eq. 2, d_i is a set of neighbor organizations that are directly connected to the ego organization i through board interlocking relationships, and these organizations together form an ego network in which the organizations are "similar" to each other. Take Figure 2 for another example: organization i, a, and b form an ego network in which i is the ego, and these three organizations are isomorphic. By summing the weighted values of government funding to j where $j \in d_i$ using the weight $Isomo_{ij}$ (Eq. 3), we have the total amount of government funding to i's neighbor organizations. We only consider the first-degree neighbors in this study. Although the influence of indirect connection is possible, we expect that the effect is small and save this topic for future study. The correlation between direct government

funding and neighbor government funding is weak ($r = 0.24$; Table 1), suggesting the two variables are not collinear.

The sum of neighbor government funding needs to be weighted because of the "isomorphousness" between organizations. Board interlocking relationships can vary in the ability to diffuse information and coordinating. For example, organization i and j are more capable of sharing information and being isomorphic because their boards largely overlap, while i and k are less capable of doing so because they only share few board members. The weight $Isomo_{ij}$ measures the similarity between the boards of the organizations i and j. It is calculated by Eq. 3 in which $BoardShare_{ij}$ is the number of board members shared by i and j, and $BoardPooled_{ij}$ represents the number of pooled individuals from the two boards:

$$Isomo_{ij} = \frac{BoardShare_{ij}}{BoardPooled_{ij}} \tag{3}$$

2.2 Measuring Structural Positions at Complete Network Level

Scholars have developed various metrics to measure the importance of nodes in terms of strategic positions at the whole network level (Freeman 1977, 1978; Wasserman and Faust 1994). Among these metrics, concepts and measures of centrality have been used extensively (Abbasi, Hossain, and Leydesdorff 2012, 406). In general, there are four types of centrality describing the importance or embeddedness of nodes in a network (Faust 1997, 160). The math equations for calculating these centrality values can be found in the cited references and are discussed thoroughly in the network literature; hence, we omit the detailed introduction. The four types of centrality are as follows:

1. *Degree centrality* measures a given node's direct connection to other nodes; actors are central if directly connected to many other nodes.

2. *Betweenness centrality* measures how often a given node falls along the shortest path between two other nodes. Nodes with high betweenness centrality are central because they are capable of mediating information or resource flows between other actors.

3. *Closeness centrality* measures the sum of geodesic distances from a given node to all the other nodes in the network, actors are central if they can reach many other nodes through efficient (i.e., short) paths.

4. *Eigenvector centrality* calculates the centrality of a node based on the centrality of its neighbors. Actors are central if they are connected to other nodes that are, themselves, important. Based on different algorithms, eigenvector centrality has numer-

Table 1: Correlation matrix of government funding and network centrality values

	DG	N	D	B	C	K
Direct government funding	1.0					
Neighbor government funding	0.24	1.0				
Degree centrality	0.053	0.090	1.0			
Betweenness centrality	0.031	0.070	0.79	1.0		
Closeness centrality	0.029	0.063	0.55	0.45	1.0	
Katz centrality	0.0064	0.016	0.53	0.49	0.32	1.0

NOTE.–Degree centrality is excluded in regression models because it strongly correlates with betweenness and closeness centrality ($r > 0.7$) and moderately correlates with Katz centrality ($r > 0.5$).

ous variants, such as, the Katz centrality (Katz 1953; Bonacich 1987) was used in a study that assessed the impact of donors' social network on the crowd-out effect (Chih 2016). Eigenvector centrality shows advantages compared to other centrality measures (Bonacich 2007), especially in analyzing exchange networks (Borgatti and Everett 2006, 470), a type of network involving the transfer of valued items, for example, donations and information provision (Cook et al. 1983, 276-277).

Among the four measures, degree centrality is fundamental and we can expect that it may be collinear with the other network variables. The other three measures, though they all measure the importance of position in a network, differ in nature because they are built on different theoretical assumptions. Correlation analysis (Table 1) supports this hypothesis: Degree centrality strongly correlates with betweenness and closeness centrality ($r > 0.7$) and moderately correlates with Katz centrality ($r > 0.5$). Therefore, we exclude degree centrality and use betweenness, closeness, and Katz centrality in regression analysis.

2.3 Control Variables

2.3.1 Organizational Level Controls

Control variables at the organizational level include variables that measure government connections (government or non-government affiliated and the number of government officials on board), foundation's working area, fundraising type, and a set of variables measuring organizational capacity (age, asset size, and board size)[3].

[3]The number of full-time employees may also measure the organizational capacity, but many Chinese foundations have "zero" full-time employees because they have their employees sponsored by external companies or supervising government departments to minimize foundations' administrative expenditure; therefore, a poor indicator of organizational capacity in the Chinese context.

Variables measuring government connections. As previously mentioned, the GONGOs are more likely to receive government funding because of their close connections with the government. In this study, a foundation is identified as GONGO if it meets one of the following criteria (Ni and Zhan 2017, 735; Q. Wang 2018):

1. The founding organization is governmental or quasi-governmental;
2. The initial endowment is from a governmental agency;
3. The current or retired government officials are employees or board members;
4. They share the same office address with supervising or sponsoring governmental or quasi-governmental organizations.

Other than the dummy variable measuring being GONGO or not, variables counting the number of government officials on board are also used as controls including "number of government officials serving as principals" and "number of retired government officials who are provincial or above."

Foundation's working area is defined as politically sensitive and politically non-sensitive. Ma and DeDeo (2018) show that foundations working on politically sensitive topics (i.e., engaging in advocacy, international affairs, religious or ethnic issues, and the police or the legal system, or related "social stability" issues) have more government officials on board; thus, people may be less likely to donate to these foundations.

Fundraising type is dummy-coded as public fundraising and non-public fundraising. The public-fundraising foundations can solicit donations publicly (e.g., advertising in shopping malls or subways); while non-public fundraising foundations are only allowed to solicit through private channels and target specified individuals. The difference in fundraising capacity may influence private donations. Meanwhile, the public-fundraising foundations are more likely to be well connected with the government than non-public fundraising foundations. Therefore, the status of being public or non-public may confound the relationship between government funding and private donations.

A set of variables measuring organizational capacity includes age, asset size, and board size. According to organizational ecology theory, new and/or small organizations are more likely to be influenced by the external environment, these phenomena are termed the "liability of newness" and "liability of smallness" respectively (Baum and Shipilov 2006, 62-63). This perspective sets the rationale for controlling age and asset size. Organizations with larger boards of trustees may be stronger in organizational capacity and have more social connections with donors. These control variables were also used in numerous previous studies (e.g., Ni et al. 2016; Ni and Zhan 2017; Nie, Liu, and Cheng 2016; Wei 2017).

2.3.2 Regional Level Controls

The control of social and economic characteristics of geographical regions include individuals' experience of volunteering and willingness to volunteer, per capita gross regional product, the population at year-end, per capita disposable income of households, and government spending on social security and employment[4]. (Andreoni and Payne 2003, 2011; Payne 1998, 2009).

2.4 Estimation Strategy

2.4.1 Omitted Variables and Endogeneity Bias

The omitted variables (OVs) that change both the dependent and endogenous variables will cause the endogeneity problem, resulting in biased estimations of β, γ, and δ in the basic setup (Eq. 1). In this study, there are three types of possible OVs that may bias the estimation:

1. *Organization-specific* OVs: These OVs, which cause variation in both government funding and private donations, measure the characteristics of the foundations.

2. *Time-specific* OVs: These OVs are related with time, for example, a natural disaster that can increase both government funding and private donations to foundations.

3. *Region-specific* OVs: The OVs that measure the characteristics of a geographical region. For example, a province may have a special policy that encourages both government funding and private donations.

2.4.2 Regression Models

Since the dataset in this study consists of nonprofits' annual data, and these organizations rarely change their locations, we expect the organization fixed-effect regression model should be able to control for many of the time- and region-specific OVs. Therefore, we use two regression models to estimate the coefficients:

Pooled ordinary least square (pols) uses Eq. 1 to estimate the coefficients of independent variables. This estimation serves as the baseline model and does not consider the OVs and panel structure.

[4]This category includes 17 subcategories consisting of public social welfare spending, basic living stipend, and natural disaster relief, etc. See PRC Ministry of Finance (2006) for details.

Organization fixed-effect regression (*ofe*; Eq. 4) considers the organization-specific OVs and adds an entity fixed effect (α_i) to the baseline equation.

$$\begin{aligned} Donations_i = \alpha_i + \beta \cdot GovFund_i + \gamma \cdot NbrGovSum_i + \delta \cdot NetPos_i + \\ \omega \cdot Controls_i + \mu \cdot Controls_r + \varepsilon_i \end{aligned} \tag{4}$$

3 Dataset

3.1 Dataset Compiling

Figure 3 illustrates the workflow of dataset compiling. The master panel dataset includes two components of data: the *foundation data* (e.g., government funding, total assets, and organization age, etc.) and *social and economic statistics* (e.g., the percentage of the population that volunteered in the last year, per capita gross regional product, and population at year-end, etc.). The data on foundations are mainly drawn from the following four sources ranked by credibility:

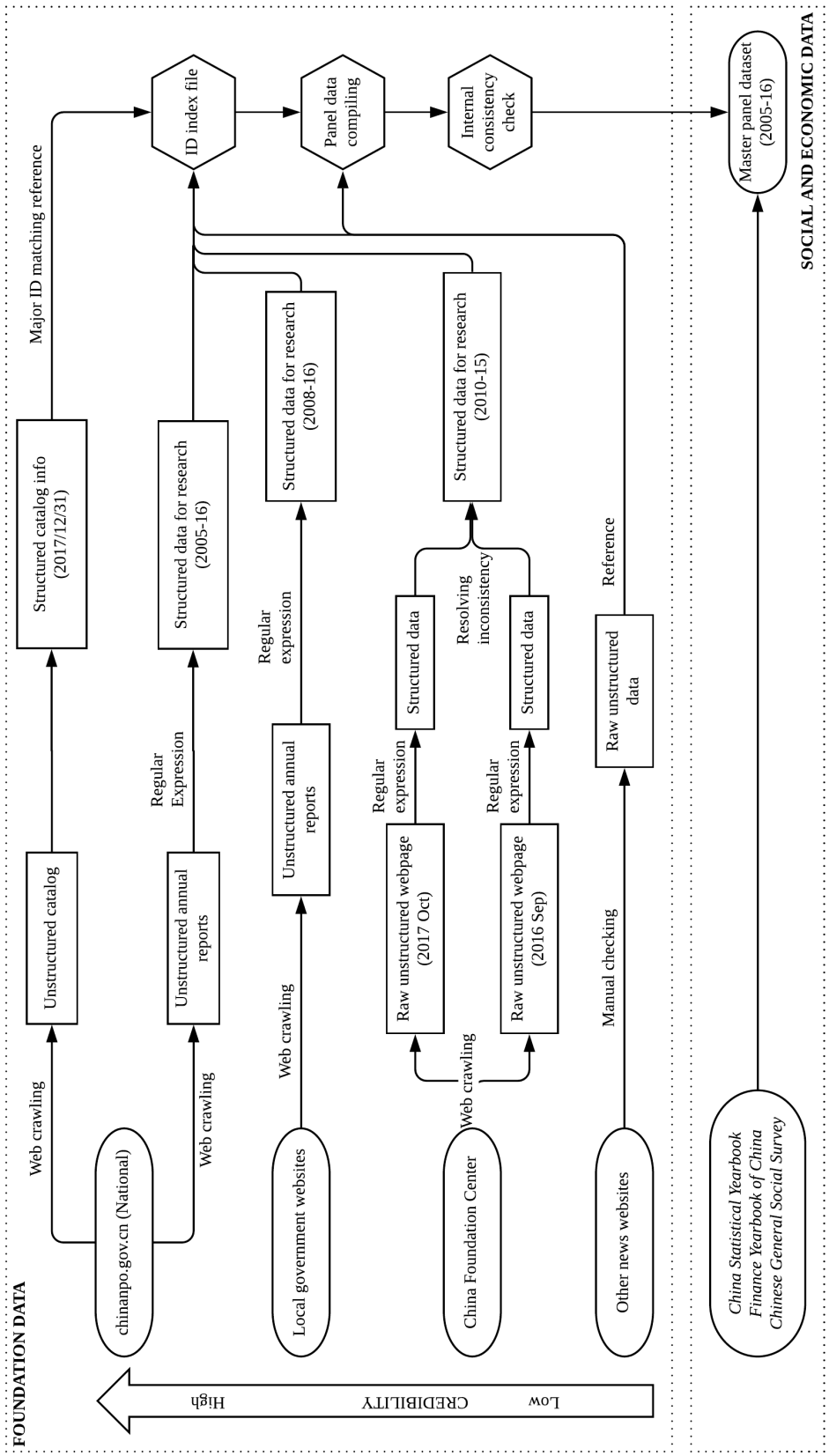
1. China Social Organizations (CSO)[5]. This is the official website disclosing annual reports and other information of social organizations registered in mainland China (i.e., foundations *jijinhui*, membership-based associations *shehui tuanti*, and social service organizations *shehui fuwu jigou*). The Ministry of Civil Affairs of China holds the website. The annual reports released by CSO contain the most comprehensive information about foundations, including basic information, board member information, financial position, financial activities, and cash flow, etc.

2. Local government websites. CSO misses some of the foundations' annual reports; for example, it does not have the annual reports of foundations registered in Shanghai because Shanghai has its own information-disclosing platform[6]. Data were crawled from these local government websites to supplement the CSO's data.

3. China Foundation Center (CFC)[7]. CFC releases limited information of foundations registered in mainland China. Data released by CFC includes basic profile (e.g., foundation name, founding date, and board member information), program information (e.g., program name and description), and financial overview (e.g., net asset, total annual income, and total government funding).

[5]http://www.chinanpo.gov.cn
[6]http://xxgk.shstj.gov.cn
[7]http://foundationcenter.org.cn

Figure 3: Workflow for compiling master panel dataset



4. Other credible news websites. For example, Xinhua News Agency[8] (the official press agency of China), People's Daily[9] (an official newspaper of the Chinese Communist Party), and Baidu Encyclopedia[10] (the largest Chinese-language, collaborative, web-based encyclopedia).

When data from different sources have discrepancies, those from sources with higher credibility are used. Detailed methodologies and codebook are described in the Research Infrastructure of Chinese Foundations (Ma et al. 2017); RICF). The data on social and economic status are pulled from *China Statistical Yearbook* (CSY) (National Bureau of Statistics of China 2017), *Finance Yearbook of China* (FYC) (China Financial Magazine 2017), and the Chinese General Social Survey (CGSS) (Bian and Li 2012).

3.2 Dataset and Variable Description

Table 2 describes the number of foundations by year and in comparison to those numbers recorded by *China Statistical Yearbook* (National Bureau of Statistics of China 2017) and RICF. Table 3 describes the composition of the dataset. Although unbalanced overall, the dataset has 3,230 foundations with at least 3 observations, and these foundations generate a total of 18,037 observations, rendering a dataset with very high quality.

3.3 Missing Data and Approximation Strategy

The missing financial statistics and board member information are critical to our analysis. For *financial statistics*, there are missing observations and missing fields. Because the inactive foundations may not disclose their annual reports regularly, this results in *missing observations* that can hardly be imputed. For *missing fields*, some of the observations omit variable values that can be inferred from other data about the organization. For example, the amount of total donation is the sum of donations made by individuals and those made by corporations. Therefore, the missing values of individual donation can be imputed by subtracting corporate donation from total donation (detailed procedures in Appendix B). Otherwise, we made no imputation for the missing variables and omitted the observations. Multiple imputation (MI; King et al. 2001; Rubin 1987) is not employed because 1) the missing values in our dataset are not likely to meet the assumptions of MI, and 2) we tried MI and did not find significant improvements regarding the size of standard error. Because of missing observations, the dataset may only be a representative sample of active but not

[8]http://www.xinhuanet.com
[9]http://www.people.com.cn
[10]http://baike.baidu.com

Table 2: Dataset size compared to the numbers of foundations recorded by Yearbook and RICF

Year	Yearbook	RICF	Financial Rec.	Board Rec.
2005	975	832	113 (12.51%)	–
2006	1,144	982	192 (18.06%)	–
2007	1,340	1,188	194 (15.35%)	–
2008	1,597	1,416	490 (32.53%)	–
2009	1,843	1,665	695 (39.62%)	–
2010	2,200	2,040	1,923 (90.71%)	591 (27.88%)
2011	2,614	2,430	2,130 (84.46%)	2,287 (90.68%)
2012	3,029	2,880	2,508 (84.89%)	2,540 (85.97%)
2013	3,549	3,344	3,100 (89.95%)	3,156 (91.57%)
2014	4,117	4,233	3,478 (83.31%)	3,577 (85.68%)
2015	4,784	4,895	3,320 (68.60%)	3,454 (71.37%)
2016	5,559	–	1,466 (26.37%)	1,343 (24.16%)

NOTE.–Yearbook = *2017 China Statistical Yearbook* (National Bureau of Statistics of China 2017); RICF = Research Infrastructure of Chinese Foundations (Ma et al. 2017). The right two columns (i.e., "Financial Rec." and "Board Rec.") show the number of organizations having corresponding records. The percentage shows the dataset's size in the proportion of the average number of foundations recorded by Yearbook and RICF (e.g., for 2005, $12.51\% = \frac{113}{(975+832)/2} \cdot 100\%$).

Table 3: Composition of the panel dataset

Foundation type	#of foundations	# of observations	# of foundation with 3+ observations	# of observations for foundations with 3+ observations
Fundraising type				
Public	1407	8212	1309 (93.0%)	8056 (98.1%)
Non-public	2458	10862	1917 (78.0%)	9964 (91.7%)
Total	3865	19074	3226 (83.5%)	18020 (94.5%)
Working area				
Sensitive	1202	5728	927 (77.1%)	5297 (92.5%)
Non-sensitive	2977	13663	2273 (76.4%)	12559 (91.9%)
Total	4179	19391	3200 (76.6%)	17856 (92.1%)
All foundation	4238	19609	3230 (76.2%)	18037 (92.0%)

NOTE.–Numbers in parentheses indicate the percentages in the proportion of the total organizations or observations.

all foundations. The data fields that are missing at random can reduce statistical power but our estimates are unbiased. The analysis and conclusion should consider these caveats.

The *board member information* is the only source for constructing board interlocking networks, but it was too rarely reported during the years 2005-2010 and 2016 to construct reliable networks (see Table 2 "Board Rec." column). Rather than omitting these years, we construct approximate networks using board membership in the nearest reliable year. That is, using the 2011 network for 2005 to 2010 and 2015 network for 2016. The quality of this approximation depends on the rate of board turnover, which is generally low in the nonprofit sector (Ma and DeDeo 2018, 293).

We use a Chow test (Chow 1960) to test statistically whether data from the years using approximated network can be combined with data from other years. Because the records from 2011–2015 are more reliable, subset 2011–2015 (*core*) is used as a baseline in comparisons with subsets 2005–2010 (*ss10*) and 2016 (*ss16*). For *core* and *ss10*, $F(22, 6836) = 1.31, p = 0.15$, the null hypothesis that there is no structural break between datasets can not be rejected, supporting the two datasets are poolable. However, *core* and *ss16* can not be pooled together because the null hypothesis is rejected ($F(22, 5542) = 4.07, p < 0.001$). We therefore prepared the following datasets:

- *Pooled dataset (pooled)* combines data *ss10* and *core*. The *ss10* dataset uses the 2011 board interlocking network as an approximation for 2005-2010.
- *Core dataset (core)* is compiled using records from 2011-2015. The records from these years have the best quality (Table 2).
- *Subset 3+ (3plus)* consists of records generated from the organizations that have at least three observations in the *core* dataset.

There are both pros and cons of using different datasets. The *pooled* dataset is aggressive and may result in a higher risk of Type I errors ("false positive" findings). Conversely, the *3plus* subset is conservative and may increase the risk of Type II errors ("false negative" findings).

4 Results

4.1 Descriptive Analysis

4.1.1 Descriptive Statistics of Major Variables

Appendix A3 reports the summary statistics of major variables. Most of these variables are highly skewed, for example, more than 75% of the foundations do not receive any funding from the government, but the largest amount of government funding ever received is nearly 1.4 billion Chinese *Yuan* (CNY; about 287 million US Dollars in 2016), which is received by the China Education Development Foundation in 2016. The median value of private donations made by individuals is 2,503 CNY, but the largest value is almost 1.1 billion. The median board size is 10 people, but the largest board has 49 members. Government officials' presence on board is widespread; there is 0.5 government official on each foundation's board on average, and the foundation that has the most extensive government connection has 41 officials on its board. These observations inform our robustness tests in which regressions use winsorized variables to test the impact of extreme values.

It is more informational if we separate the statistics by foundations receiving government funding (RG) and those not receiving (NG). As Table 4 shows, RGs have a higher degree, betweenness, and closeness centralities than NGs in the organizational network. RGs are established earlier and have larger asset and board size, more government connections, and more expenditure for charitable purposes. RGs tend to be in the provinces that have smaller numbers of government spending on social security and employment, per capita gross regional product, per captia disposable income of households, and percentage of people making donations and volunteering, but these provinces have more young (aged 15 and under) and senior (aged 65 and above) population. Surprisingly, for many of our key variables of interests (i.e., private donations, neighbor government funding, and Katz centrality), RGs and NGs do not significantly differ.

Table 4: Descriptive statistics of major variables by whether receiving government funding

Variable	Obs.	Mean	Std. deviation	t	Min	50%	Max
Private donations made by domestic individual (10^5 CNY)	16643 (2966)	19 (21)	130 (140)	−0.88	0 (0)	0.016 (0.10)	11 000 (6200)
Neighbor government funding (10^5 CNY)	16643 (2966)	36 (48)	440 (510)	−1.3	0 (0)	0 (0)	14 000 (14 000)
Degree centrality (10^3)	16643 (2966)	0.41 (0.55)	0.81 (0.90)	−8.1‡	0 (0)	0 (0.29)	9.6 (9.6)
Betweenness centrality (10^3)	16643 (2966)	0.25 (0.32)	1.2 (1.2)	−3.0‡	0 (0)	0 (0)	26 (26)
Closeness centrality (10^3)	16643 (2966)	14 (16)	23 (24)	−5.0‡	0 (0)	0 (0.32)	95 (94)
Katz centrality (10^3)	16643 (2966)	8.4 (8.9)	17 (17)	−1.4	−320 (−210)	6.9 (6.9)	320 (320)
Organization age (#year)	16135 (2939)	11 (14)	7.3 (8.4)	−22‡	3 (3)	8 (11)	36 (36)
Asset size (10^7 CNY)	16634 (2966)	2.4 (4.3)	11 (17)	−7.7‡	0 (0)	0.46 (0.91)	440 (480)
Board size (#people)	16643 (2966)	11 (15)	6.3 (6.9)	−31‡	1 (1)	10 (15)	49 (49)
Number of government officials serving as principals (#people)	14300 (2659)	0.43 (0.72)	1.5 (2.0)	−8.5‡	0 (0)	0 (0)	41 (28)
Number of retired government officials who are provincial or above (#people)	14297 (2659)	0.12 (0.25)	0.63 (0.74)	−9.2‡	0 (0)	0 (0)	36 (8)
Expenditure for charitable purposes (10^7 CNY)	16613 (2964)	0.69 (2.6)	7.7 (31)	−6.7‡	0 (0)	0.069 (0.16)	570 (1200)
Neighbor expenditure for charitable purposes (10^7 CNY)	16643 (2966)	3.5 (4.3)	37 (42)	−1.1	0 (0)	0 (0.0067)	1300 (1200)

Continued on next page

Table 4 – *Continued from previous page*

Variable	Obs.	Mean	Std. deviation	t	Min	50%	Max
Government spending on social security and employment (10^{10} CNY)	15891 (2908)	3.8 (3.7)	1.5 (1.4)	1.9∗	0.070 (0.28)	3.7 (3.7)	7.9 (9.1)
Per capita gross regional product (10^4 CNY)	16135 (2939)	4.4 (4.2)	1.7 (1.7)	7.3‡	0.70 (0.93)	4.3 (4.0)	8.2 (8.2)
Per capita disposable income of households (10^4 CNY)	16135 (2939)	1.9 (1.8)	0.67 (0.64)	6.7‡	0.71 (0.81)	1.8 (1.7)	3.8 (3.8)
Population at year-end (10^{11} #people)	16135 (2939)	5.5 (5.5)	3.0 (2.8)	0.030	0.28 (0.56)	5.5 (5.5)	11 (11)
Percentage of population aged 15 and under (%)	16135 (2939)	14 (15)	3.6 (3.6)	−7.6‡	7.6 (7.6)	14 (15)	27 (25)
Percentage of population aged 65 and above (%)	16135 (2939)	9.8 (10.0)	1.8 (1.8)	−5.3‡	4.8 (6.2)	9.6 (10)	14 (14)
Percentage of people making charitable donations (%)	16068 (2934)	34 (33)	15 (14)	4.8‡	8.7 (8.7)	32 (32)	72 (72)
Percentage of people volunteering (%)	16068 (2934)	8.6 (8.2)	4.7 (4.5)	4.7‡	0 (0)	6.9 (6.8)	18 (18)

NOTE.–Observations of foundations receiving government funding are shown in parentheses. Using two digits of numeric precision for all statistics except the numbers of observations. Inflation is adjusted using 2000 as the base year. $*p < 0.1$; $\dagger p < 0.05$; $\ddagger p < 0.01$.

4.1.2 Board Interlocking Network and Top Receivers

Figure 4 illustrates the board interlocking network of Chinese foundations by direct government funding and private donations in 2013[11]. In both graphs, isolated nodes and dyads are removed. Node size represents node degree (i.e., the number of connected nodes), and node color represents the z-score transformed values of direct government funding or private donations (the larger the deeper). According to the visualizations, well-connected organizations are more likely to receive larger amounts of private donations, but the relationship between connectedness and direct government funding is not obvious. The average degree of the network is 3.18, the average path length is 6.73, and the network diameter is 22. Compared to what has been found about the corporate network in the United States, the board interlocking network of Chinese foundations is much sparser (Davis, Yoo, and Baker 2003).

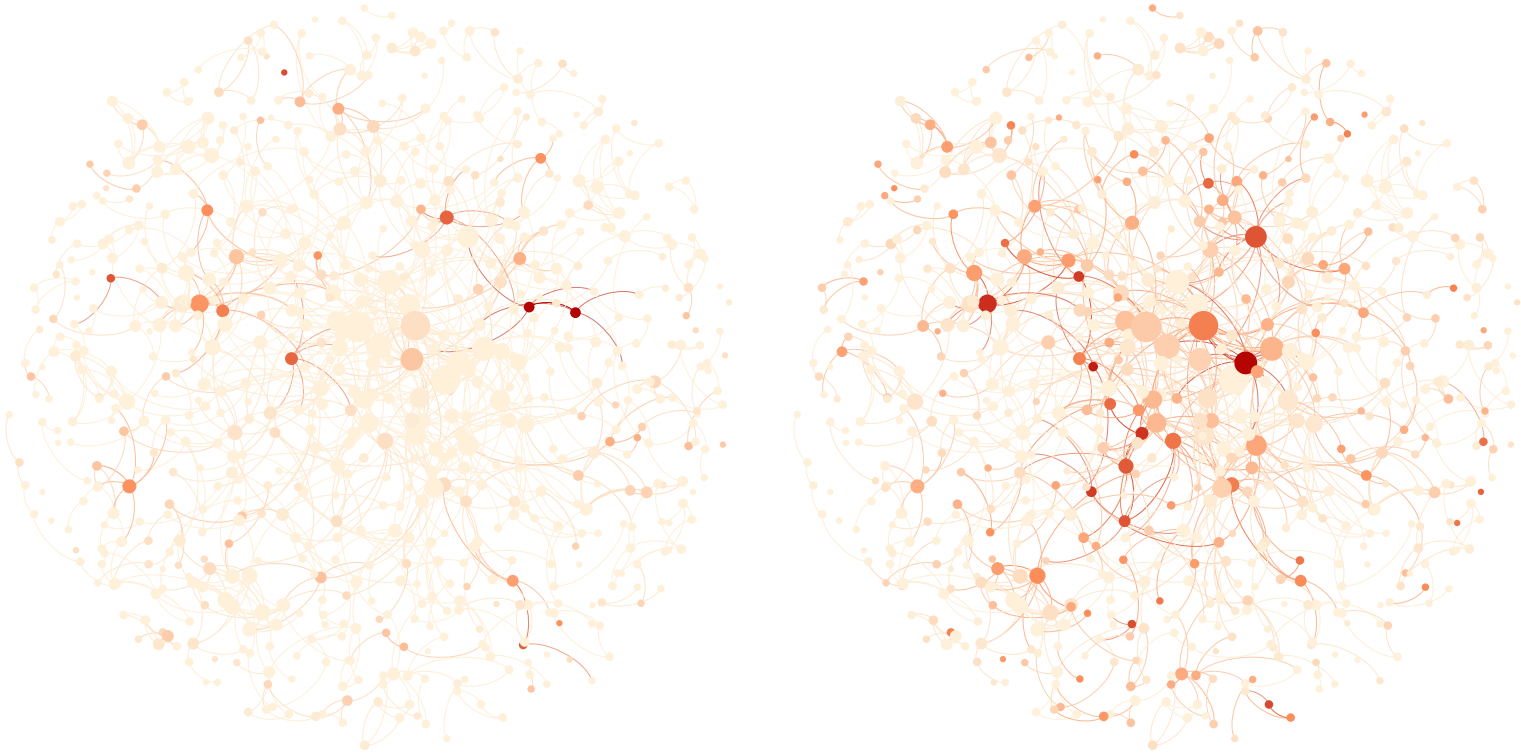
Table 5 describes the top receivers of government funding and private donation. Between 2005 and 2016, 50 foundations were ranked as the top-10 government funding receivers (tgf), 46 top-10 neighbor government-funding receivers ($tngf$), and 67 top-10 private donation receivers (tpd). Top receivers of tgf are funded by the government with 56 million CNY a year on average. Neighbor organizations of $tngf$ receives 310 million CNY from the government per year on average. In addition, the tpd foundations receive 84 million CNY from private individuals on average annually.

An interesting pattern of board size reveals that different types of top receivers are very close in board size; they all have a board with about 17 members, which is higher than the overall average 12. Over 80% of all these top receivers are GONGO, and the average number of government officials on the boards of these foundations is substantially higher than the overall average (i.e., 0.5 person per organization).

Foundations that appear in all rankings are as follows: 1) the Chou Pei-yuan Foundation which focuses on international relations, education, and technologies and is supervised by the United Front Work Department of the Central Committee of the Communist Party of China; 2) the China Education Development Foundation supervised by the Ministry of Education; 3) the China Postdoctoral Science Foundation supervised by the Ministry of Human Resources and Social Security; 4) the China Women's Development Foundation supervised by the All-China Women's Federation; 5) the China Legal Aid Foundation supervised by the Ministry of Justice; and 6) the Chinese Red Cross Foundation supervised by the Red Cross Society of China.

[11] We choose the 2013 network because board member information of this year is the most comprehensive (Table 2).

Figure 4: The board interlocking network of Chinese foundations in 2013



(a) Color depth represents government funding (b) Color depth represents private donations

NOTE.–In both graphs, isolated nodes and dyads are removed. Node size represents node degree (i.e., the number of connected nodes), and node color represents the z-score transformed values of government funding or private donations (the larger the deeper).

Table 5: Profile of top receivers between 2005 and 2016

	tgf	*tngf*	*tpd*
N	50	46	67
Degree	3.6 (3.3)	5.4 (4.7)	3.1 (3.9)
Direct government funding (10^6 CNY)	56 (110)	25 (120)	1.5 (9.1)
Neighbor government funding (10^6 CNY)	24 (95)	310 (320)	14 (67)
Private donations (10^6 CNY)	4.8 (15)	6.8 (13)	84 (100)
Board size (#people)	18 (6.8)	17 (7.6)	16 (7.0)
Government official on board (#people)	2.8 (3.9)	2.9 (7.7)	1.3 (3.9)
Percentage of government-affiliated (%)	92%	80%	82%
Percentage of public-fundraising (%)	76%	48%	54%
Percentage of politically sensitive (%)	34%	28%	36%

NOTE.–*tgf* = top 10 government funding receivers; *tngf*= top 10 neighbor government funding receivers; *tpd* = top 10 private donation receivers; NGO = non-governmental organizations. Numbers are mean values and standard deviations are in parentheses. Using standard competition rankings ("1224" rankings) and two digits of numeric precision.

4.2 Regression Analysis

Table 6 shows the regression results of pooled ordinary least square (*pols*) and organization fixed-effect (*ofe*) models on all three datasets. Because of large variations, the continuous variables of regional and organizational control are transformed using the natural logarithm of one plus original value, while the independent variables (i.e., direct government funding, neighbor government funding, and three centrality measures) and dependent variables (i.e., private donations made by individuals) are in raw scale. This allows us to control for the impact of large variations and know the marginal effect of a one CNY increase in government funding on private donations.

The *pols* regressions on all datasets indicate a significant negative relationship between direct government funding and private donations, but after controlling for the organization-specific omitted variables (i.e., the *ofe* regressions), the significance disappears in all regressions. de Wit and Bekkers (2017, 309) find that studies using archival or survey data report a mean increase of $0.06 with a 95% confidence interval between -0.04 and 0.15. Our finding also lies in this range. In addition, congruent with many of the empirical and meta-analysis studies, we found no evidence supporting the direct government funding and private donations are significantly associated.

The coefficients of neighbor government funding are consistently positive across all regression models, and statistically significant and larger in the *ofe* models than in the *pols* models, suggesting there are time and entity-specific OVs biasing the estimations. According

to the regression results, if the organization i's neighbors have a one CNY increase in government funding, i itself tends to have a 0.4 CNY increase in private donations, suggesting a substantial crosswise crowding-in effect.

Taken together, the results suggest that, although we have no evidence supporting that the direct government funding to organization i may crowd out private donations to i, the government funding to i's neighbor organizations can crowd in the private donations to i by a substantial magnitude. The overall effect of government funding to nonprofit organizations is an increased provision of private donations.

Considering network position, the coefficients of closeness centrality are significantly positive in all *pols* regressions but become insignificant after controlling for the organization specific omitted variables in the *ofe* models. Katz centrality, a variant of eigenvector centrality, has a negative impact on private donations suggested by all the regressions and is statistically significant in all *ofe* models. That is to say, by keeping all the other predictors and controls constant, nodes with higher Katz centrality receive less private donations. Nodes with higher Katz centrality values may not be important by themselves, but they are connected nodes that are more influential in a network (Borgatti 2005, 61-62). Therefore, a possible explanation is that the influential nodes attract more flows of private donations, leaving less attention to the nodes tied to them. In general, these findings support the notion that private donations can be redirected through social relations.

Table 6: Results of regression models on different datasets

	pols-pooled	*pols-core*	*pols-3plus*	*ofe-pooled*	*ofe-core*	*ofe-3plus*
Direct government funding	−0.0085†	−0.012‡	−0.013‡	−0.025	−0.012	−0.012
	(0.0037)	(0.0035)	(0.0036)	(0.020)	(0.013)	(0.013)
Neighbor government funding	0.16	0.21	0.20	0.42∗	0.36†	0.36†
	(0.13)	(0.15)	(0.14)	(0.22)	(0.15)	(0.15)
Betweenness centrality	−1.7	−0.087	0.053	1.7	1.6	1.9
	(1.7)	(2.2)	(2.3)	(1.9)	(2.3)	(2.4)
Closeness centrality	0.31‡	0.28‡	0.28‡	−0.030	−0.11	−0.11
	(0.091)	(0.095)	(0.095)	(0.19)	(0.29)	(0.28)
Katz centrality	−0.015	−0.071	−0.10	−0.24∗	−0.22	−0.26∗
	(0.21)	(0.24)	(0.26)	(0.13)	(0.14)	(0.15)
Organizational controls	yes	yes	yes	partly omitted	partly omitted	partly omitted
Regional controls	yes	yes	yes	partly omitted	partly omitted	partly omitted
N	6880	5170	4923	6880	5170	4923
Adjusted/Within group R^2	0.027	0.026	0.030	0.0048	0.0044	0.0050

NOTE.–*Dependent variable* = Private donations made by individuals; *pols* = pooled ordinary least square; *ofe* = organization fixed-effect; *pooled* = pooled dataset; *core* = core dataset; *3plus* = organizations with more than three observations in *core* dataset. For *ofe*, within group R^2 are reported. Heteroskedasticity-consistent standard errors (White 1980) are in parentheses. Continuous variables of regional and organizational control are transformed using the natural logarithm of one plus original value. Dependent and independent variables (i.e., direct government funding, neighbor government funding, and three centrality measures) use raw values. Using two digits of precision. $*p < 0.1$; $\dagger p < 0.05$; $\ddagger p < 0.01$.

4.3 Robustness Analysis

Robustness of the estimations is analyzed from two perspectives, statistical and theoretical. Statistical robustness tests include winsorization on extreme values, post-estimation analysis, and sensitivities to other omitted variables. Theoretical tests check the robustness of our theoretical assumptions.

4.3.1 Statistical Robustness

Winsorization on extreme values. As informed by the descriptive statistics, many of the variables contain extreme values. By randomly checking a sample of these outliers, the records are found to be valid data instead of errors. Therefore, "winsorization" can serve as an appropriate method for checking the impact of extreme values on our estimations (Reifman and Keyton 2010; Erceg-Hurn and Mirosevich 2008).

Table 7 shows the regression results using winsorized dependent variable (i.e., private donation) and key independent variables (i.e., direct government funding, neighbor government funding, betweenness centrality, closeness centrality, and Katz centrality)[12]. The regression models are more efficient after winsorizing: the standard errors of key independent variables are largely reduced, and the goodness of fit is significantly improved in both *pols* and *ofe* models. The coefficient of neighbor government funding becomes statistically significant in *pols* models. The coefficients of Katz centrality, although decreased, are still statistically significant in all *ofe* models. These results give us greater confidence to conclude our findings; there is a substantial crosswise crowding-in effect, and the network position measured by Katz centrality has a negative influence on private donations.

[12]For each variable and each year, there are roughly less than 5 extreme values, so we pick a cutoff point of 0%-99.5% (the extreme values on bottom are all zeros).

Table 7: Results of regression models on different datasets after winsorization

	pols-pooled	*pols-core*	*pols-3plus*	*ofe-pooled*	*ofe-core*	*ofe-3plus*
Direct government funding	0.0033	0.000 70	−0.020	−0.099	−0.0033	−0.0081
	(0.046)	(0.065)	(0.065)	(0.11)	(0.084)	(0.084)
Neighbor government funding	0.16∗	0.18∗	0.17∗	0.29†	0.22∗	0.22∗
	(0.090)	(0.096)	(0.094)	(0.13)	(0.12)	(0.12)
Betweenness centrality	−0.50	0.33	0.46	−0.29	−0.85	−0.67
	(0.93)	(1.1)	(1.2)	(0.90)	(0.81)	(0.81)
Closeness centrality	0.14‡	0.13‡	0.14‡	0.075	0.015	0.010
	(0.045)	(0.042)	(0.043)	(0.067)	(0.060)	(0.060)
Katz centrality	−0.023	−0.061	−0.086	−0.075∗	−0.074†	−0.093‡
	(0.084)	(0.089)	(0.097)	(0.043)	(0.029)	(0.032)
Organizational controls	yes	yes	yes	partly omitted	partly omitted	partly omitted
Regional controls	yes	yes	yes	partly omitted	partly omitted	partly omitted
N	6880	5170	4923	6880	5170	4923
Adjusted/Within group R^2	0.074	0.095	0.11	0.014	0.013	0.016

NOTE.–*Dependent variable* = Private donations made by individuals; *pols* = pooled ordinary least square; *ofe* = organization fixed-effect; *pooled* = pooled dataset; *core* = core dataset; *3plus* = organizations with more than three observations in *core* dataset. For *ofe*, within group R^2 are reported. Heteroskedasticity-consistent standard errors (White 1980) are in parentheses. Continuous variables of regional and organizational control are transformed using the natural logarithm of one plus original value. Dependent variable (i.e., private donation) and key independent variables (i.e., direct government funding, neighbor government funding, betweenness centrality, closeness centrality, and Katz centrality) use winsorized raw values at the 0%-99.5% cutoff point. Using two digits of precision. $*p < 0.1$; $\dagger p < 0.05$; $\ddagger p < 0.01$.

Table 8: Correlation matrix of coefficients of *ofe* model on *pooled* dataset

	D	N	B	C	K
Direct government funding	1.0				
Neighbor government funding	−0.25	1.0			
Betweenness centrality	−0.16	−0.0014	1.0		
Closeness centrality	0.057	−0.097	−0.54	1.0	
Katz centrality	0.017	−0.0024	−0.70	0.070	1.0

NOTE.–*ofe* = organization fixed-effect; *pooled* = pooled dataset.

Post-estimation analysis. The correlation matrix of coefficients of *ofe* models does not suggest strong correlations between the coefficients (except the betweenness-Katz centrality). Table 8 shows the *ofe* model for the *pooled* dataset.

Leadership change. Variants in organizational capacity may be time, region, and organization independent, for example, the personnel changes in fundraising or leadership positions. Previous studies used leadership change as an indicator of variation in organizational capacity since data of staff mobility at the administrative and executive level can hardly be obtained (Ribar and Wilhelm 2002; Hansmann and Thomsen 2017). This study operationalizes foundation's leadership change as the turnover of either executive principal or board chair [13]. Statistical tests show that the coefficient of leadership change is not significant, and leadership change has minimal impact on all the other coefficients (Appendix A10).

4.3.2 Theoretical Robustness

Interaction between network effect and revenue flows. Our theoretical assumption does not consider the interactions between network measures and funding variables that may skew the estimations. We can examine the impact of interaction by building the estimations incrementally. That is, starting without network measures and entering the centrality values singly. As Appendix A4–A9 in appendix shows, the addition of centrality values has little impact on the coefficients of direct and neighbor government funding.

Neighbor foundations' expenditure. Our estimation strategy takes an "input-based theory," that is, all the variables measure the resources that flow into foundations (e.g., government funding and private donations to foundations). Using an "output-based theory," neighbor foundations' outputs (e.g., charitable expenditure) may also influence the crowd-out effect (Ribar and Wilhelm 2002, 428). For example, along with the increase of charitable ex-

[13]Dummy variable with 0 indicating the same with the previous year and 1 otherwise.

penditures from neighbor nonprofit a and b, recipients' demands may be decreased, resulting in the decrease of private donations to ego nonprofit i.

We use weighted neighbor foundations' total expenditures for charitable purposes (similar to Eq. 2) as one of the output-based OVs. Results show that it has little impact on all the *ofe* models (Appendix A10), and we cannot reject the null hypothesis that the coefficient of this variable is equal to zero by Wald test ($p > 0.25$).

Operationalization of neighbor government funding. The raw values of neighbor government funding are weighted by Eq. 3 since our theoretical assumption is that the "isomorphicness" between boards regarding the similarity of board composition matters. We can substitute the weighted values for raw values to examine this assumption. As Appendix A11 shows, the substitution has minimal impact on all the other independent variables. The coefficients of raw neighbor government funding, although significant, are much smaller than those in Table 6, supporting the effectiveness and validity of weighting using "isomorphicness."

5 Concluding Remarks

By using a novel panel dataset across 12 years from the People's Republic of China, this study puts together the research findings on the impact of government support to nonprofits on private donations. It contributes to an understanding of the missing pieces in building a holistic theory from a network perspective and broadening the research scope on this topic to one of the largest countries not previously examined.

5.1 Crowding Effects: Substantial Crosswise Crowding-In

Although no evidence of direct crowding out is found, the crosswise crowding-in effect is substantial – for every one CNY increase in government funding to the ego organization i's neighbors, the private donations to the ego nonprofit can increase by about 0.3 CNY. The impact of government funding to nonprofits is an overall increase in private donations. Our finding provides an important alternative explanation to the crowding debate: the private donations may not be reduced but redistributed or even increased in the organizational network.

The crowding-in effect of neighbor government funding is surprisingly large compared to what has been reported. Studies examining direct crowding effect and using archival or survey data report a mean increase of \$0.06 with a 95% confidence interval between -0.04 and

0.15 (de Wit and Bekkers 2017, 309). The number found in this study (i.e.,$\tilde{0}.4$), although not directly comparable, is way beyond the 95% confidence interval.

The large coefficient of crosswise crowding effect may be a mixed result of the high trust in government and redistribution of private giving. Many studies have reported that the Chinese people have strong confidence in government's decisions (Shi 2001; Li 2004; Z. Wang 2005; Shi 2001; Zhong 2014), and the government funding is a positive signal of endorsement. Such endorsement is especially important in China, where political sensitivity is vital for a nonprofit's survival. When the government supports nonprofit i's neighbors, it is endorsing the neighbors, and such signal can increase donors' confidence in supporting isomorphic nonprofit i as well – although individuals may not donate to the nonprofits that have been well supported by the government, they can be more confident in supporting similar organizations, resulting in the redirection of private giving. The impact of high trust in government and redistribution were both reported in previous studies (Pennerstorfer and Neumayr 2017, 536).

5.2 The Distinction between Existing and Future Donors: Redirection vs. Substitution

Two existing studies present a puzzle on the crosswise crowding effect: Horne, Johnson, and Van Slyke (2005, 145-146) found that contributors are inelastic in changing their existing charitable giving by surveying the donors, but Ek (2017, 45) found that donors substitute their giving across similar or even dissimilar nonprofits in experiments. Take our findings at face value, we do not support either study. Our observation of the substantial crosswise crowding-in effect does not support the "inelastic" hypothesis. If the "substitution" hypothesis is true, donors will shift their contributions from one organization to another, leading to the result that the direct and crosswise crowding effects are in a similar magnitude but opposite direction.

Two distinctions that few or non-existing studies have made can provide possible explanations. The first distinction is the fields of services: the crowding-out and crowding-in effects are more likely to happen in some of the service areas, for example, the areas of social services, health, and nature (De Wit, Bekkers, and Broese van Groenou 2017). Another distinction is between the "existing donors" and "future donors": 1) government funding may not substitute existing donors' giving, 2) but can redirect future donors' giving to alternative nonprofits. Horne, Johnson, and Van Slyke (2005) surveyed the existing donors who might be loyal to their beneficiary nonprofits and unlikely to shift their contributions. The subjects in experimental studies approximated future donors instead of existing ones,

and the loyalty to beneficiary nonprofits is not considered (Ek 2017; Null 2011; Reinstein 2007). By putting all findings together, Point 1 can be supported by the survey study and the minuscule coefficient of direct crowding effect in our study. Point 2 can be supported by the experimental study and the substantial crosswise crowding-in effect in our study.

In general, direct government funding has little impact on existing private contributions, but can substantially crosswise crowd in future private giving. That is, it can redirect future donations to similar nonprofits, which is a "redirection" instead of a "substitution."

5.3 Resource Redistribution through Social Relations

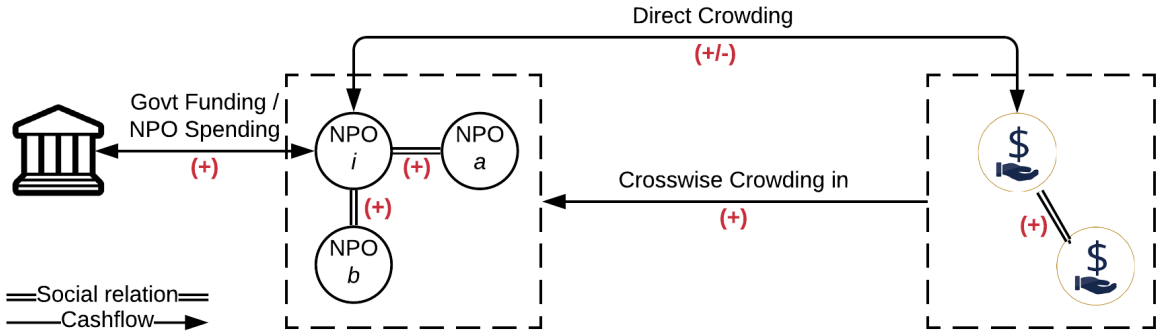
Existing studies have found donors' social networks matter in private giving (Chih 2016). Our study suggests the organizational networks also matter: Katz centrality has a negative impact on private donations, suggesting if the organization is connected with nodes that are more influential, it receives less private donations because the donation flows may be attracted by its influential neighbor foundations. For nascent organizations, although sharing board members and personnel with influential forerunners is a possible approach to accessing more resources, it can also put the nascent organizations in a disadvantaged position because the influential foundations may attract more donation flows, leaving their neighbor organizations less attention. Putting these results together, we have empirical evidence to support that the social and organizational networks serve as important media for the resource redistribution in the crowding processes.

5.4 Toward A Holistic Theory of Government Support: Policy Implication and Future Study

Putting all of the results together, we can start to build a holistic theory of the government funding to nonprofits as shown in Figure 5. There is evidence supporting the two-way interaction between government funding and nonprofits' spending, the importance of social relations in both organizational and donors' networks, and the crosswise crowding-in effect of government funding on private donations. The results of direct crowding are mixed. The crosswise crowding-in effect is especially encouraging because it is supported by all the empirical studies using data from different countries, suggesting a cross-cultural universality.

Our findings have several policy and practical implications. First, the substantial crosswise crowding-in effect suggests that the government should support nonprofit organizations with confidence because the increase of government funding is likely to increase private donations to similar nonprofits. Second, the government should support nonprofits that are well connected because these organizations have more neighbor organizations to which the

Figure 5: Toward A Holistic Theory of Government Support to Nonprofit Organizations



private donations (probably future donations) can be redirected. Third, nonprofits should establish more connections with each other because the private donations to nonprofits can be redistributed through social relations. Fourth, for organizations that are interested in having more private donations, they can establish connections with foundations which receive large government support but not private donations, since these influential players are more capable of attracting resource flows, overshadowing their peers.

For future studies, numerous improvements can be made. First, this study suggests the crosswise crowding-in effect is larger than the direct crowding-out effect, suggesting there should be an overall increase in private giving. This notion conflicts with what has been reported by Tinkelman and Neely (2018): the overall giving as a percentage of GDP did not change in the past sixty years in the United States (38). However, the two studies may not be directly comparable because the data are from different countries. Future studies should provide possible explanations. Second, as we suggest in Section 5.2, the distinction between existing and future donors should be made. Third, the social relations can be operationalized from different perspectives; for example, donors' social network can be operationalized by sharing associational membership, and the organizational network can be constructed through sharing geolocations. Fourth, with the help of technology and online social network platforms, experiments can be designed within a naturalistic context to overcome the simplicity of laboratory environments (Jilke et al. 2018; Tinkelman and Neely 2018, 55). Finally, comparable and cross-national studies should be conducted to examine how cultural difference plays a role in the crowding process.

References

Abbasi, Alireza, Liaquat Hossain, and Loet Leydesdorff. 2012. "Betweenness Centrality as a Driver of Preferential Attachment in the Evolution of Research Collaboration Networks." *Journal of Informetrics* 6, no. 3 (July): 403–412. ISSN: 1751-1577. doi:10.1016/j.joi.2012.01.002.

Abrams, Burton A., and Mark D. Schmitz. 1978. "The 'crowding-out' Effect of Governmental Transfers on Private Charitable Contributions." *Public Choice* 33, no. 1 (March): 29–39. ISSN: 0048-5829, 1573-7101. doi:10.1007/BF00123940.

Andreoni, James. 1989. "Giving with Impure Altruism: Applications to Charity and Ricardian Equivalence." *Journal of Political Economy* 97 (6): 1447–1458. ISSN: 0022-3808.

———. 1990. "Impure Altruism and Donations to Public Goods: A Theory of Warm-Glow Giving." *The Economic Journal* 100, no. 401 (June): 464–477. ISSN: 0013-0133. doi:10.2307/2234133.

Andreoni, James, and A. Abigail Payne. 2003. "Do Government Grants to Private Charities Crowd out Giving or Fund-Raising?" *The American Economic Review* 93 (3): 792–812.

———. 2011. "Is Crowding out Due Entirely to Fundraising? Evidence from a Panel of Charities." *Journal of Public Economics* 95, nos. 5-6 (June): 334–343. ISSN: 00472727. doi:10.1016/j.jpubeco.2010.11.011.

Baum, Joel AC, and Andrew V. Shipilov. 2006. "Ecological Approaches to Organizations." In *The SAGE Handbook of Organization Studies*, edited by Stewart R. Clegg, Cynthia Hardy, Tom Lawrence, and Walter R. Nord. SAGE Publications, June. ISBN: 978-1-4462-2461-8.

Bian, Yanjie, and Lulu Li. 2012. "The Chinese General Social Survey (2003-8)." *Chinese Sociological Review* 45, no. 1 (October): 70–97. ISSN: 2162-0555. doi:10.2753/CSA2162-0555450104.

Bonacich, Phillip. 1987. "Power and Centrality: A Family of Measures." *American Journal of Sociology* 92 (5): 1170–1182. ISSN: 0002-9602.

———. 2007. "Some Unique Properties of Eigenvector Centrality." *Social Networks* 29, no. 4 (October): 555–564. ISSN: 03788733. doi:10.1016/j.socnet.2007.04.002.

Borgatti, Stephen P. 2005. "Centrality and Network Flow." *Social Networks* 27, no. 1 (January): 55–71. ISSN: 0378-8733. doi:10.1016/j.socnet.2004.11.008.

Borgatti, Stephen P., and Martin G. Everett. 2006. "A Graph-Theoretic Perspective on Centrality." *Social Networks* 28, no. 4 (October): 466–484. ISSN: 0378-8733. doi:10.1016/j.socnet.2005.11.005.

Borgatti, Stephen P., and Pacey C. Foster. 2003. "The Network Paradigm in Organizational Research: A Review and Typology." *Journal of Management* 29, no. 6 (January): 991–1013. ISSN: 0149-2063, 1557-1211. doi:10.1016/S0149-2063_03_00087-4.

Chamberlain, Heath B. 1993. "On the Search for Civil Society in China." *Modern China* 19 (2): 199–215. ISSN: 0097-7004.

Cheng, Yuan (Daniel). 2018. "Nonprofit Spending and Government Provision of Public Services: Testing Theories of Government–Nonprofit Relationships." *J Public Adm Res Theory* (September). doi:10.1093/jopart/muy054.

Chih, Yao-Yu. 2016. "Social Network Structure and Government Provision Crowding-out on Voluntary Contributions." *Journal of Behavioral and Experimental Economics* 63, no. Supplement C (August): 83–90. ISSN: 2214-8043. doi:10.1016/j.socec.2016.05.008.

China Financial Magazine. 2017. *Finance Yearbook of China*. China State Finance Magazine.

China Foundation For Human Rights Development. 2017. *Introduction: China Foundation For Human Rights Development*. http://rqjjh.china.cn/node_543938.htm, November.

China Youth Development Foundation. 2017a. *Our History - CYDF*. http://en.cydf.org.cn/OurHistory/.

———. 2017b. *Our Mission - CYDF*. http://en.cydf.org.cn/OurMission/.

Chow, Gregory C. 1960. "Tests of Equality Between Sets of Coefficients in Two Linear Regressions." *Econometrica* 28 (3): 591–605. ISSN: 0012-9682. doi:10.2307/1910133.

Cook, Karen S., Richard M. Emerson, Mary R. Gillmore, and Toshio Yamagishi. 1983. "The Distribution of Power in Exchange Networks: Theory and Experimental Results." *American Journal of Sociology* 89 (2): 275–305. ISSN: 0002-9602.

Davis, Gerald F. 1996. "The Significance of Board Interlocks for Corporate Governance." *Corporate Governance: An International Review* 4 (3): 154–159.

Davis, Gerald F., Mina Yoo, and Wayne E. Baker. 2003. "The Small World of the American Corporate Elite, 1982-2001." *Strategic Organization* 1, no. 3 (January): 301–326. ISSN: 1476-1270, 1741-315X. doi:10.1177/14761270030013002.

de Wit, Arjen, and René Bekkers. 2017. "Government Support and Charitable Donations: A Meta-Analysis of the Crowding-out Hypothesis." *J Public Adm Res Theory* 27, no. 2 (April): 301–319. ISSN: 1053-1858. doi:10.1093/jopart/muw044.

De Wit, Arjen, René Bekkers, and Marjolein Broese van Groenou. 2017. "Heterogeneity in Crowding-out: When Are Charitable Donations Responsive to Government Support?" *Eur Sociol Rev* 33, no. 1 (February): 59–71. ISSN: 0266-7215. doi:10.1093/esr/jcw048.

De Wit, Arjen, Michaela Neumayr, Femida Handy, and Pamala Wiepking. 2018. "Do Government Expenditures Shift Private Philanthropic Donations to Particular Fields of Welfare? Evidence from Cross-Country Data." *Eur Sociol Rev* (January). doi:10.1093/esr/jcx086.

DiMaggio, Paul J., and Walter W. Powell. 1983. "The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields." *American Sociological Review* 48, no. 2 (April): 147–160. ISSN: 0003-1224. doi:10.2307/2095101.

Eckel, Catherine C., Philip J. Grossman, and Rachel M. Johnston. 2005. "An Experimental Test of the Crowding out Hypothesis." *Journal of Public Economics,* The Experimental Approaches to Public Economics, 89, no. 8 (August): 1543–1560. ISSN: 0047-2727. doi:10.1016/j.jpubeco.2004.05.012.

Ek, Claes. 2017. "Some Causes Are More Equal than Others? The Effect of Similarity on Substitution in Charitable Giving." *Journal of Economic Behavior & Organization* 136 (April): 45–62. ISSN: 0167-2681. doi:10.1016/j.jebo.2017.01.007.

Erceg-Hurn, David M., and Vikki M. Mirosevich. 2008. "Modern Robust Statistical Methods: An Easy Way to Maximize the Accuracy and Power of Your Research." *American Psychologist* 63 (7): 591–601. ISSN: 1935-990X(Electronic),0003-066X(Print). doi:10.1037/0003-066X.63.7.591.

Estes, Richard J. 1998. "Emerging Chinese Foundations: The Role of Private Philanthropy in the New China." *Regional Development Studies* 4.

Faulk, Lewis, Jurgen Willems, Jasmine McGinnis Johnson, and Amanda J. Stewart. 2015. "Network Connections and Competitively Awarded Funding: The Impacts of Board Network Structures and Status Interlocks on Nonprofit Organizations' Foundation Grant Acquisition." *Public Management Review* (December): 1–31. ISSN: 1471-9037, 1471-9045. doi:10.1080/14719037.2015.1112421.

Faust, Katherine. 1997. "Centrality in Affiliation Networks." *Social Networks* 19, no. 2 (April): 157–191. ISSN: 0378-8733. doi:10.1016/S0378-8733(96)00300-0.

Freeman, Linton C. 1977. "A Set of Measures of Centrality Based on Betweenness." *Sociometry* 40, no. 1 (March): 35–41. ISSN: 0038-0431. doi:10.2307/3033543.

———. 1978. "Centrality in Social Networks Conceptual Clarification." *Social Networks* 1 (3): 215–239. ISSN: 0378-8733. doi:10.1016/0378-8733(78)90021-7.

Granovetter, Mark. 1985. "Economic Action and Social Structure: The Problem of Embeddedness." *American Journal of Sociology* 91, no. 3 (November): 481–510. ISSN: 0002-9602.

Hansmann, Henry, and Steen Thomsen. 2017. *The Governance of Foundation-Owned Firms.* SSRN SCHOLARLY PAPER ID 3112766. Rochester, NY: Social Science Research Network, July.

Horne, Christopher S., Janet L. Johnson, and David M. Van Slyke. 2005. "Do Charitable Donors Know Enough—and Care Enough—About Government Subsidies to Affect Private Giving to Nonprofit Organizations?" *Nonprofit and Voluntary Sector Quarterly* 34, no. 1 (March): 136–149. ISSN: 0899-7640. doi:10.1177/0899764004272192.

Jilke, Sebastian, Jiahuan Lu, Chengxin Xu, and Shugo Shinohara. 2018. "Using Large Scale Social Media Experiments in Public Administration: Assessing Charitable Consequences of Government Funding of Nonprofits." *Journal of Public Administration Research and Theory.*

Kang, Xiaoguang, and Heng Han. 2008. "Graduated Controls The State-Society Relationship in Contemporary China." *Modern China* 34, no. 1 (January): 36–55. ISSN: 0097-7004, 1552-6836. doi:10.1177/0097700407308138.

Katz, Leo. 1953. "A New Status Index Derived from Sociometric Analysis." *Psychometrika* 18, no. 1 (March): 39–43. ISSN: 0033-3123, 1860-0980. doi:10.1007/BF02289026.

Khanna, Jyoti, John Posnett, and Todd Sandler. 1995. "Charity Donations in the UK: New Evidence Based on Panel Data." *Journal of Public Economics* 56, no. 2 (February): 257–272. ISSN: 0047-2727. doi:10.1016/0047-2727(94)01421-J.

King, Gary, James Honaker, Anne Joseph, and Kenneth Scheve. 2001. "Analyzing Incomplete Political Science Data: An Alternative Algorithm for Multiple Imputation." *American Political Science Review* 95, no. 1 (March): 49–69. ISSN: 1537-5943, 0003-0554.

Li, Lianjiang. 2004. "Political Trust in Rural China." *Modern China* 30, no. 2 (April): 228–258. ISSN: 0097-7004. doi:10.1177/0097700403261824.

Lu, Jiahuan. 2016. "The Philanthropic Consequence of Government Grants to Nonprofit Organizations." *Nonprofit Management and Leadership* 26, no. 4 (June): 381–400. ISSN: 1542-7854. doi:10.1002/nml.21203.

Ma, Ji, and Simon DeDeo. 2018. "State Power and Elite Autonomy in a Networked Civil Society: The Board Interlocking of Chinese Non-Profits." *Social Networks* 54 (July): 291–302. ISSN: 0378-8733. doi:10.1016/j.socnet.2017.10.001.

Ma, Ji, Qun Wang, Chao Dong, and Huafang Li. 2017. "The Research Infrastructure of Chinese Foundations, a Database for Chinese Civil Society Studies." *Scientific Data* 4 (July): sdata201794. ISSN: 2052-4463. doi:10.1038/sdata.2017.94.

Ma, Qiusha. 2002a. "Defining Chinese Nongovernmental Organizations." *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations* 13, no. 2 (June): 113–130. ISSN: 0957-8765, 1573-7888. doi:10.1023/A:1016051604920.

———. 2002b. "The Governance of NGOs in China since 1978: How Much Autonomy?" *Nonprofit and Voluntary Sector Quarterly* 31, no. 3 (January): 305–328. ISSN: 0899-7640, 1552-7395. doi:10.1177/0899764002313001.

Mizruchi, Mark S. 1996. "What Do Interlocks Do? An Analysis, Critique, and Assessment of Research on Interlocking Directorates." *Annual review of sociology:* 271–298.

National Bureau of Statistics of China. 2017. *China Statistical Yearbook.* China Statistical Yearbook.

Ni, Na, Qiu Chen, Shujun Ding, and Zhenyu Wu. 2016. "Professionalization and Cost Efficiency of Fundraising in Charitable Organizations: The Case of Charitable Foundations in China." *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations* (August). ISSN: 0957-8765, 1573-7888. doi:10.1007/s11266-016-9765-5.

Ni, Na, and Xueyong Zhan. 2017. "Embedded Government Control and Nonprofit Revenue Growth." *Public Admin Rev* 77, no. 5 (September): 730–742. ISSN: 1540-6210. doi:10.1111/puar.12716.

Nie, Lin, Helen K. Liu, and Wenhao Cheng. 2016. "Exploring Factors That Influence Voluntary Disclosure by Chinese Foundations." *Voluntas* 27, no. 5 (October): 2374–2400. ISSN: 0957-8765, 1573-7888. doi:10.1007/s11266-016-9689-0.

Null, C. 2011. "Warm Glow, Information, and Inefficient Charitable Giving." *Journal of Public Economics,* Charitable Giving and Fundraising Special Issue, 95, no. 5 (June): 455–465. ISSN: 0047-2727. doi:10.1016/j.jpubeco.2010.06.018.

Payne, A. Abigail. 1998. "Does the Government Crowd-out Private Donations? New Evidence from a Sample of Non-Profit Firms." *Journal of Public Economics* 69 (3): 323–345.

———. 2009. "Does Government Funding Change Behavior? An Empirical Analysis of Crowd Out." In *Tax Policy and the Economy,* vol. 23. Cambridge, Mass.; Chicago,

Ill.: National Bureau of Economic Research ; University of Chicago Press. ISBN: 978-0-226-07654-6.
Pennerstorfer, Astrid, and Michaela Neumayr. 2017. "Examining the Association of Welfare State Expenditure, Non-Profit Regimes and Charitable Giving." *Voluntas* 28, no. 2 (April): 532–555. ISSN: 1573-7888. doi:10.1007/s11266-016-9739-7.
PRC Ministry of Finance. 2006. *Government Revenue and Expenditure Classification.*
PRC National People's Congress. 2016. *Charity Law of the People's Republic of China,* March.
Reifman, Alan, and Kristina Keyton. 2010. "Winsorize." In *Encyclopedia of Research Design,* edited by Neil J. Salkind, 1637–1638. SAGE Publications, Inc., June. ISBN: 978-1-4129-6127-1.
Reinstein, David. 2007. "Substitution Between (and Motivations for) Charitable Contributions: An Experimental Study" (October): 40.
Ribar, David C., and Mark O. Wilhelm. 2002. "Altruistic and Joy-of-Giving Motivations in Charitable Behavior." *Journal of Political Economy* 110, no. 2 (April): 425–457. ISSN: 0022-3808. doi:10.1086/338750.
Ring, Peter Smith, and Andrew H. van de Ven. 1994. "Developmental Processes of Cooperative Interorganizational Relationships." *The Academy of Management Review* 19 (1): 90–118. ISSN: 0363-7425. doi:10.2307/258836.
Roberts, Russell D. 1984. "A Positive Model of Private Charity and Public Transfers." *Journal of Political Economy* 92 (1): 136–148. ISSN: 0022-3808.
Rubin, Donald B. 1987. *Multiple Imputation for Nonresponse in Surveys.* Wiley, June. ISBN: 978-0-471-08705-2.
Shi, Tianjian. 2001. "Cultural Values and Political Trust: A Comparison of the People's Republic of China and Taiwan." *Comparative Politics* 33 (4): 401–419. ISSN: 0010-4159. doi:10.2307/422441.
Sokolowski, S. Wojciech. 2013. "Effects of Government Support of Nonprofit Institutions on Aggregate Private Philanthropy: Evidence from 40 Countries." *Voluntas* 24, no. 2 (June): 359–381. ISSN: 1573-7888. doi:10.1007/s11266-011-9258-5.
Spires, Anthony J. 2011. "Contingent Symbiosis and Civil Society in an Authoritarian State: Understanding the Survival of China's Grassroots NGOs." *American Journal of Sociology* 117, no. 1 (July): 1–45. ISSN: 0002-9602. doi:10.1086/660741.
Steinberg, Richard. 1985. "Empirical Relations Between Government Spending and Charitable Donations." *Journal of Voluntary Action Research* 14, nos. 2-3 (April): 54–64. ISSN: 0094-0607. doi:10.1177/089976408501400209.
Teets, Jessica C. 2017. "The Power of Policy Networks in Authoritarian Regimes: Changing Environmental Policy in China." *Governance* (March). ISSN: 09521895. doi:10.1111/gove.12280.
Tinkelman, Daniel, and Daniel Gordon Neely. 2018. "Revenue Interactions: Crowding Out, Crowding In, Or Neither?" In *Handbook of Research on Nonprofit Economics and Management: Second Edition,* edited by Bruce A. Seaman and Dennis R. Young, 35–61. Edward Elgar Publishing, June. ISBN: 978-1-78536-352-8.
Unger, Jonathan, and Anita Chan. 1995. "China, Corporatism, and the East Asian Model." *The Australian Journal of Chinese Affairs,* no. 33: 29–53. ISSN: 0156-7365. doi:10.2307/2950087.
Wang, Qun. 2018. "Have Chinese Foundations Become An Independent Sector? An Examination of the Links between Government and Foundations." *Asia Pacific Journal of Public Administration* Forthcoming.
Wang, Zhengxu. 2005. "Before the Emergence of Critical Citizens: Economic Development and Political Trust in China." *International Review of Sociology* 15, no. 1 (March): 155–171. ISSN: 0390-6701. doi:10.1080/03906700500038876.
Warr, Peter G. 1982. "Pareto Optimal Redistribution and Private Charity." *Journal of Public Economics* 19, no. 1 (October): 131–138. ISSN: 0047-2727. doi:10.1016/0047-2727(82)90056-1.

Wasserman, Stanley, and Katherine Faust. 1994. *Social Network Analysis: Methods and Applications.* Cambridge University Press, November. ISBN: 978-0-521-38707-1.

Wei, Qian. 2017. "From Direct Involvement to Indirect Control? A Multilevel Analysis of Factors Influencing Chinese Foundations' Capacity for Resource Mobilization." *Voluntas* (November): 1–17. ISSN: 0957-8765, 1573-7888. doi:10.1007/s11266-017-9924-3.

White, Halbert. 1980. "A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity." *Econometrica* 48 (4): 817–838. ISSN: 0012-9682. doi:10.2307/1912934.

Zhao, Rong, Zhongsheng Wu, and Chuanjin Tao. 2016. "Understanding Service Contracting and Its Impact on NGO Development in China." *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations* (April). ISSN: 0957-8765, 1573-7888. doi:10.1007/s11266-016-9714-3.

Zhong, Yang. 2014. "Do Chinese People Trust Their Local Government, and Why?: An Empirical Study of Political Trust in Urban China." *Problems of Post-Communism* 61, no. 3 (May): 31–44. ISSN: 1075-8216, 1557-783X. doi:10.2753/PPC1075-8216610303.

A Appendix: Tables

Table A1: Administrative divisions of China in this study

#	Name of Region in English
1	Anhui Province
2	Beijing Municipality
3	Chongqing Municipality
4	Fujian Province
5	Gansu Province
6	Guangdong Province
7	Guangxi Zhuang Autonomous Region
8	Guizhou Province
9	Hainan Province
10	Hebei Province
11	Heilongjiang Province
12	Henan Province
13	Hubei Province
14	Hunan Province
15	Inner Mongolia Autonomous Region
16	Jiangsu Province
17	Jiangxi Province
18	Jilin Province
19	Liaoning Province
20	Ningxia Hui Autonomous Region
21	Qinghai Province
22	Shaanxi Province
23	Shandong Province
24	Shanghai Municipality
25	Shanxi Province
26	Sichuan Province
27	Tianjin Municipality
28	Tibet Autonomous Region
29	Xinjiang Uyghur Autonomous Region
30	Yunnan Province
31	Zhejiang Province

Table A2: Fantastic variables and where to find them

Letter Code	Meaning	Role in Equation	Data Type	Source	Note
ricf_oid	Organization ID	Fixed effect	Nominal	RICF	–
ba_rdt	Year of records	Fixed effect	Ordinal	RICF	–
ba_cn	Organization name	–	Nominal	RICF	–
ao_ddc	Cash donations from domestic individuals	Dependent	Continuous	RICF	–
ao_ddi	Cash donations from domestic corporations	Auxiliary	Continuous	RICF	–
ao_odn	Cash donations from oversea individuals	Auxiliary	Continuous	RICF	–
ao_odi	Cash donations from oversea corporations	Auxiliary	Continuous	RICF	–
ao_ad	Total domestic and oversea cash donations	Auxiliary	Continuous	RICF	–
cf_govc	Government funding	Endogenous	Censored continuous	RICF	–
sc_gongo	Is government-affiliated NGOs	Control	Dummy	Self-coded	0=no; 1=yes
ba_gvm	Number of government officials serving as principals	Control	Count	RICF	–

Continued on next page

Table A2 – *Continued from previous page*

Letter Code	Meaning	Role in Equation	Data Type	Source	Note
ba_pgv	Number of retired government officials who are provincial or above	Control	Count	RICF	–
sc_psen	Works on political-sensitive issues	Control	Dummy	Self-coded	0=non-sensitive; 1=sensitive
sc_age	Organization age	Control	Continuous	Self-coded	=2017-ba_fdt
ba_fdt	Founding date	–	Date	RICF	For calculating age
ba_ntr	Foundation type	Control	Dummy	RICF	0=non-public; 1=public
ba_nfe	Number of Fulltime employees	Control	Count	RICF	–
ba_prv	Region	–	Nominal	RICF	–
fp_asto	Total asset	Control	Continuous	RICF	–
yb_gssw	Government spending on social security and employment by region	Control	Continuous	FYC	2007-2016: directly reported; 2005-2006: calculated, pensions relief funds for social welfare+social security subsidiary expenses.
yb_pcgp	Per capita gross regional product	Control	Continuous	CSY	
yb_popu	Population at year-end by region	Control	Continuous	CSY	

Continued on next page

Table A2 – *Continued from previous page*

Letter Code	Meaning	Role in Equation	Data Type	Source	Note
yb_po15	%of population aged under 15 by region	Control	Continuous	CSY	–
yb_po65	%of population aged 65 and over by region	Control	Continuous	CSY	–
yb_dihr	Per capita disposable income of households by region	Control	Continuous	CSY	2013-15: urban+rural; 2010-12: urban.
cgss_do	Percentage of people making charitable donations by region	Control	Continuous	CGSS	Use 2012 for all years as approx.
cgss_vo	Percentage of people volunteering by region	Control	Continuous	CGSS	Use 2012 for all years as approx.

NOTE.–RICF = Research Infrastructure of Chinese Foundations (Ma et al. 2017); CSY = *China Statistical Yearbook* (National Bureau of Statistics of China 2017); FYC = *Finance Yearbook of China* (China Financial Magazine 2017); CGSS = Chinese General Social Survey (Bian and Li 2012).

Table A3: Descriptive statistics of major variables

Variable	Obs.	Mean	Std. deviation	Min	25%	50%	75%	Max
Private donations made by domestic individual (10^5 CNY)	19609	19	130	0.	0.	0.025	4.6	11 000
Direct government funding	19609	9.8	210	0.	0.	0.	0.	14 000
Neighbor government funding (10^5 CNY)	19609	38	450	0.	0.	0.	0.	14 000
Degree centrality (10^3)	19609	0.43	0.82	0.	0.	0.	0.44	9.6
Betweenness centrality (10^3)	19609	0.27	1.2	0.	0.	0.	0.	26
Closeness centrality (10^3)	19609	14	24	0.	0.	0.	27	95
Katz centrality (10^3)	19609	8.5	17	−320	4.3	6.9	9.5	320
Organization age (#year)	18799	3.8	1.5	0.070	2.7	3.7	4.7	9.1
Asset size (10^7 CNY)	19074	4.4	1.7	0.70	2.9	4.3	5.5	8.2
Board size (#people)	19074	1.9	0.67	0.71	1.4	1.8	2.3	3.8
Number of government officials serving as principals (#people)	19074	5.5	3.0	0.28	2.5	5.5	7.9	11
Number of retired government officials who are provincial or above (#people)	19074	14	3.6	7.6	12	14	17	27
Expenditure for charitable purposes (10^7 CNY)	19074	9.8	1.8	4.8	8.5	9.7	11	14
Neighbor expenditure for charitable purposes (10^7 CNY)	19002	34	15	8.7	23	32	48	72

Continued on next page

Table A3 – *Continued from previous page*

Variable	Obs.	Mean	Std. deviation	Min	25%	50%	75%	Max
Government spending on social security and employment (10^{10} CNY)	19002	8.5	4.7	0.	5.2	6.9	13	18
Per capita gross regional product (10^4 CNY)	19074	11	7.6	3.0	6.0	9.0	13	36
Per capita disposable income of households (10^4 CNY)	19600	2.6	13	0.	0.22	0.52	1.5	480
Population at year-end (10^{11} #people)	19609	12	6.6	1.0	7.0	10	17	49
Percentage of population aged 15 and under (%)	16959	0.48	1.6	0.	0.	0.	0.	41
Percentage of population aged 65 and above (%)	16956	0.14	0.65	0.	0.	0.	0.	36
Percentage of people making charitable donations (%)	19577	0.98	14	0.	0.019	0.080	0.33	1200
Percentage of people volunteering (%)	19609	3.6	38	0.	0.	0.	0.35	1300

NOTE.–Using two digits of numeric precision for all statistics except the numbers of observations. Inflation is adjusted using 2000 as base year.

Table A4: Build estimations: pooled ordinary least square on *pooled* dataset

	pols-w/o	*pols-btw*	*pols-cls*	*pols-katz*	*pols-all*
Government funding	−0.0086†	−0.0086†	−0.0084†	−0.0085†	−0.0085†
	(0.0037)	(0.0037)	(0.0036)	(0.0037)	(0.0037)
Neighbor government funding	0.18	0.18	0.16	0.18	0.16
	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)
Betweenness centrality	–	−0.081	–	–	−1.7
		(0.84)			(1.7)
Closeness centrality	–	–	0.26‡	–	0.31‡
			(0.076)		(0.091)
Katz centrality	–	–	–	0.000 90	−0.015
				(0.17)	(0.21)
Organizational controls	yes	yes	yes	yes	yes
Regional controls	yes	yes	yes	yes	yes
N	6880	6880	6880	6880	6880
Adjusted R^2	0.026	0.025	0.027	0.025	0.027

NOTE.–*Dependent variable* = Private donations made by individuals; *pols* = pooled ordinary least square; *w/o* = without all network measures; *btw* = betweenness centrality; *cls* = closeness centrality; *katz* = Katz centrality; *all* = with all network measures. Heteroskedasticity-consistent standard errors (White 1980) are in parentheses. Continuous variables of regional and organizational control are transformed using the natural logarithm of one plus original value. Endogenous variables (i.e., government funding, neighbor government funding, and three centrality measures) and dependent variables are in raw values. Using two digits for precision. $*p < 0.1$; $\dagger p < 0.05$; $\ddagger p < 0.01$.

Table A5: Build estimations: pooled ordinary least square on *core* dataset

	pols-w/o	*pols-btw*	*pols-cls*	*pols-katz*	*pols-all*
Government funding	−0.012‡	−0.012‡	−0.012‡	−0.012‡	−0.012‡
	(0.0035)	(0.0035)	(0.0035)	(0.0035)	(0.0035)
Neighbor government funding	0.22	0.22	0.21	0.22	0.21
	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)
Betweenness centrality	–	1.1	–	–	−0.087
		(1.1)			(2.2)
Closeness centrality	–	–	0.26†	–	0.28†
			(0.080)		(0.095)
Katz centrality	–	–	–	−0.031	−0.071
				(0.20)	(0.24)
Organizational controls	yes	yes	yes	yes	yes
Regional controls	yes	yes	yes	yes	yes
N	5170	5170	5170	5170	5170
Adjusted R^2	0.026	0.025	0.026	0.025	0.026

NOTE.–*Dependent variable* = Private donations made by individuals; *pols* = pooled ordinary least square; *w/o* = without all network measures; *btw* = betweenness centrality; *cls* = closeness centrality; *katz* = Katz centrality; *all* = with all network measures. Heteroskedasticity-consistent standard errors (White 1980) are in parentheses. Continuous variables of regional and organizational control are transformed using the natural logarithm of one plus original value. Endogenous variables (i.e., government funding, neighbor government funding, and three centrality measures) and dependent variables are in raw values. Using two digits for precision. $*p < 0.1$; $\dagger p < 0.05$; $\ddagger p < 0.01$.

Table A6: BUILD ESTIMATIONS: POOLED ORDINARY LEAST SQUARE ON *3plus* DATASET

	pols-w/o	*pols-btw*	*pols-cls*	*pols-katz*	*pols-all*
Government funding	−0.013‡	−0.013‡	−0.013‡	−0.013‡	−0.013‡
	(0.0036)	(0.0036)	(0.0036)	(0.0037)	(0.0036)
Neighbor government funding	0.22	0.21	0.20	0.22	0.20
	(0.14)	(0.14)	(0.15)	(0.14)	(0.14)
Betweenness centrality	–	0.96	–	–	0.053
		(1.1)			(2.3)
Closeness centrality	–	–	0.26‡	–	0.28‡
			(0.079)		(0.095)
Katz centrality	–	–	–	−0.056	−0.10
				(0.22)	(0.26)
Organizational controls	yes	yes	yes	yes	yes
Regional controls	yes	yes	yes	yes	yes
N	4923	4923	4923	4923	4923
Adjusted R^2	0.030	0.030	0.031	0.030	0.030

NOTE.–*Dependent variable* = Private donations made by individuals; *pols* = pooled ordinary least square; *w/o* = without all network measures; *btw* = betweenness centrality; *cls* = closeness centrality; *katz* = Katz centrality; *all* = with all network measures. Heteroskedasticity-consistent standard errors (White 1980) are in parentheses. Continuous variables of regional and organizational control are transformed using the natural logarithm of one plus original value. Endogenous variables (i.e., government funding, neighbor government funding, and three centrality measures) and dependent variables are in raw values. Using two digits for precision. $*p < 0.1$; $\dagger p < 0.05$; $\ddagger p < 0.01$.

Table A7: Build estimations: organization-fixed effect on *pooled* dataset

	ofe-w/o	*ofe-btw*	*ofe-cls*	*ofe-katz*	*ofe-all*
Government funding	−0.025	−0.025	−0.025	−0.025	−0.025
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
Neighbor government funding	0.42∗	0.42∗	0.42∗	0.42∗	0.42∗
	(0.22)	(0.22)	(0.22)	(0.22)	(0.22)
Betweenness centrality	–	0.26	–	–	1.7
		(1.2)			(1.9)
Closeness centrality	–	–	−0.0091	–	−0.030
			(0.17)		(0.19)
Katz centrality	–	–	–	−0.22∗	−0.24∗
				(0.12)	(0.13)
Organizational controls	yes	yes	yes	yes	yes
Regional controls	yes	yes	yes	yes	yes
N	6880	6880	6880	6880	6880
Within group R^2	0.0039	0.0039	0.0039	0.0047	0.0048

NOTE.–*Dependent variable* = Private donations made by individuals; *ofe* = organization-fixed effect; *w/o* = without all network measures; *btw* = betweenness centrality; *cls* = closeness centrality; *katz* = Katz centrality; *all* = with all network measures. Heteroskedasticity-consistent standard errors (White 1980) are in parentheses. Continuous variables of regional and organizational control are transformed using the natural logarithm of one plus original value. Endogenous variables (i.e., government funding, neighbor government funding, and three centrality measures) and dependent variables are in raw values. Using two digits for precision. $*p < 0.1$; $\dagger p < 0.05$; $\ddagger p < 0.01$.

Table A8: Build estimations: organization-fixed effect on *core* dataset

	ofe-w/o	*ofe-btw*	*ofe-cls*	*ofe-katz*	*ofe-all*
Government funding	−0.012	−0.012	−0.012	−0.012	−0.012
	(0.012)	(0.012)	(0.013)	(0.013)	(0.013)
Neighbor government funding	0.35†	0.35†	0.36†	0.35†	0.36†
	(0.15)	(0.15)	(0.16)	(0.15)	(0.15)
Betweenness centrality	–	−0.18	–	–	1.6
		(1.2)			(2.3)
Closeness centrality	–	–	−0.088	–	−0.11
			(0.26)		(0.29)
Katz centrality	–	–	–	−0.21∗	−0.22∗
				(0.12)	(0.14)
Organizational controls	yes	yes	yes	yes	yes
Regional controls	yes	yes	yes	yes	yes
N	5170	5170	5170	5170	5170
Within group R^2	0.0034	0.0034	0.0035	0.0043	0.0044

NOTE.–*Dependent variable* = Private donations made by individuals; *ofe* = organization-fixed effect; *w/o* = without all network measures; *btw* = betweenness centrality; *cls* = closeness centrality; *katz* = Katz centrality; *all* = with all network measures. Heteroskedasticity-consistent standard errors (White 1980) are in parentheses. Continuous variables of regional and organizational control are transformed using the natural logarithm of one plus original value. Endogenous variables (i.e., government funding, neighbor government funding, and three centrality measures) and dependent variables are in raw values. Using two digits for precision. $*p < 0.1$; $\dagger p < 0.05$; $\ddagger p < 0.01$.

Table A9: Build estimations: organization-fixed effect on *3plus* dataset

	ofe-w/o	*ofe-btw*	*ofe-cls*	*ofe-katz*	*ofe-all*
Government funding	−0.012	−0.012	−0.012	−0.012	−0.012
	(0.012)	(0.012)	(0.013)	(0.013)	(0.013)
Neighbor government funding	0.35†	0.35†	0.36†	0.35†	0.36†
	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)
Betweenness centrality	–	−0.11	–	–	1.9
		(1.2)			(2.4)
Closeness centrality	–	–	−0.085	–	−0.11
			(0.25)		(0.28)
Katz centrality	–	–	–	−0.24∗	−0.26∗
				(0.14)	(0.15)
Organizational controls	yes	yes	yes	yes	yes
Regional controls	yes	yes	yes	yes	yes
N	4923	4923	4923	4923	4923
Within group R^2	0.0038	0.0038	0.0039	0.0049	0.0050

NOTE.–*Dependent variable* = Private donations made by individuals; *ofe* = organization-fixed effect; *w/o* = without all network measures; *btw* = betweenness centrality; *cls* = closeness centrality; *katz* = Katz centrality; *all* = with all network measures. Heteroskedasticity-consistent standard errors (White 1980) are in parentheses. Continuous variables of regional and organizational control are transformed using the natural logarithm of one plus original value. Endogenous variables (i.e., government funding, neighbor government funding, and three centrality measures) and dependent variables are in raw values. Using two digits for precision. $*p < 0.1$; $\dagger p < 0.05$; $\ddagger p < 0.01$.

Table A10: Regression models with leadership change or neighbor expenditure

	Considering Leadership Change			Considering Neighbor Expenditure		
	ofe-pooled	*ofe-core*	*ofe-3plus*	*ofe-pooled*	*ofe-core*	*ofe-3plus*
Direct government funding	−0.023	−0.0042	−0.0042	−0.025	−0.012	−0.012
	(0.021)	(0.0061)	(0.0061)	(0.020)	(0.013)	(0.013)
Neighbor government funding	0.44∗	0.37†	0.37†	0.42∗	0.34†	0.34†
	(0.24)	(0.16)	(0.16)	(0.22)	(0.15)	(0.15)
Betweenness centrality	1.9	2.0	2.0	1.6	1.5	1.8
	(2.1)	(2.7)	(2.7)	(1.9)	(2.3)	(2.4)
Closeness centrality	−0.0074	−0.094	−0.094	−0.041	−0.13	−0.13
	(0.24)	(0.32)	(0.32)	(0.18)	(0.27)	(0.27)
Katz centrality	−0.26∗	−0.25	−0.25	−0.24∗	−0.22	−0.26∗
	(0.15)	(0.16)	(0.16)	(0.13)	(0.14)	(0.15)
Organizational controls	partly	partly	partly	partly	partly	partly
	omitted	omitted	omitted	omitted	omitted	omitted
Regional controls	partly	partly	partly	partly	partly	partly
	omitted	omitted	omitted	omitted	omitted	omitted
N	5570	4670	4552	6880	5170	4923
Within group R^2	0.0065	0.0058	0.0058	0.0048	0.0044	0.0051

NOTE.–*Dependent variable* = Private donations made by individuals; *pols* = pooled ordinary least square; *ofe* = organization-fixed effect; *pooled* = pooled dataset; *core* = core dataset; *3plus* = organizations with more than three observations in *core* dataset. Heteroskedasticity-consistent standard errors (White 1980) are in parentheses. Continuous variables of regional and organizational control are transformed using the natural logarithm of one plus original value. Endogenous variables (i.e., direct government funding, neighbor government funding, and three centrality measures) and dependent variables are in raw values. Using two digits for precision. $*p < 0.1$; $\dagger p < 0.05$; $\ddagger p < 0.01$.

Table A11: Regression models using raw values of neighbor government funding

	pols-pooled	*pols-core*	*pols-3plus*	*ofe-pooled*	*ofe-core*	*ofe-3plus*
Direct government funding	−0.0081†	−0.012‡	−0.012‡	−0.025	−0.011	−0.011
	(0.0041)	(0.0042)	(0.0042)	(0.019)	(0.012)	(0.012)
Raw neighbor government funding	0.0070	0.0088∗	0.0086∗	0.011∗	0.0089†	0.0088†
	(0.0044)	(0.0051)	(0.0051)	(0.0059)	(0.0042)	(0.0042)
Betweenness centrality	−1.1	0.41	0.61	0.73	0.96	1.3
	(1.6)	(2.1)	(2.2)	(1.7)	(1.9)	(2.0)
Closeness centrality	0.22‡	0.24‡	0.23‡	0.061	−0.022	−0.020
	(0.074)	(0.084)	(0.084)	(0.14)	(0.15)	(0.15)
Katz centrality	−0.014	−0.073	−0.097	−0.26†	−0.25∗	−0.28∗
	(0.21)	(0.23)	(0.26)	(0.13)	(0.13)	(0.15)
Organizational controls	yes	yes	yes	partly omitted	partly omitted	partly omitted
Regional controls	yes	yes	yes	partly omitted	partly omitted	partly omitted
N	14931	12020	11016	14931	12020	11016
Adjusted/Within group R^2	0.029	0.026	0.029	0.0047	0.0033	0.0039

NOTE.–*Dependent variable* = Private donations made by individuals; *pols* = pooled ordinary least square; *ofe* = organization fixed-effect; *pooled* = pooled dataset; *core* = core dataset; *3plus* = organizations with more than three observations in *core* dataset. For *ofe*, within group R^2 are reported. Heteroskedasticity-consistent standard errors (White 1980) are in parentheses. Continuous variables of regional and organizational control are transformed using the natural logarithm of one plus original value. Independent variables (i.e., direct government funding, neighbor government funding, and three centrality measures) and dependent variables are in raw scale. Using two digits of precision. $*p < 0.1$; $\dagger p < 0.05$; $\ddagger p < 0.01$.

B Appendix: Data Preprocessing Procedures for Imputing Missing Data

There are three types of erroneous entries[14]:

- Type 1 Sum value valid but not equal to `ao_ad`:

  `ao_ddc+ao_ddi+ao_odi+ao_odn!=0` and;

  `ao_ddc+ao_ddi+ao_odi+ao_odn!=NaN` and;

  `ao_ddc+ao_ddi+ao_odi+ao_odn!=ao_ad`.

- Type 2 `ao_ad` valid but not itemized:

  `ao_ad!=0 and ao_ad!=NaN` and;

  `ao_ddc+ao_ddi+ao_odi+ao_odn==0`.

- Type 3 Treat zero as `NaN`:

  `ao_ad==ao_ddc+ao_ddi+ao_odi+ao_odn` but;

  there is `NaN` in `[ao_ddc, ao_ddi, ao_odi, ao_odn]`.

- The `ao_*` values can all be zero, but cannot be `NaN`, or logically erroneous values.

Possible causes of errors:

- Type 1: `ao_ad` should be the sum of `[ao_ddc, ao_ddi, ao_odi, ao_odn]` calculated by the system automatically; however, by checking the original report, `ao_ad` is not always equal to the sum. So it should be system error.
- Type 2: `ao_ad` is not itemized, the value of `ao_ad` is reported using other data fields.
- Type 3: record zero as `NaN`.

Solutions:

- Type 1: substitute `ao_ad` with the sum values.
- Type 2: substitute `ao_ddc, ao_ddi, ao_odi, ao_odn` with `NaN` (to be imputed).
- Type 3: substitute `NaN` with zero.

[14]See Appendix A2 for the meaning of variables.