FUNDING NONPROFITS IN A NETWORKED SOCIETY: TOWARD A NETWORK FRAMEWORK OF GOVERNMENT SUPPORT

Ji MA*

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

The University of Texas at Austin

Forthcoming: Nonprofit Management & Leadership.

This author version contains Online Appendix.

May 12, 2020

Abstract

This study considers the effects of government funding to nonprofits from a network perspective. By analyzing a novel, 12-year panel dataset from the People's Republic of China, I find no evidence that government funding to a nonprofit crowds out private donations to the same organization. However, I find a substantial crosswise crowding-in effect at the ego network level: an increase of one Chinese *Yuan* in government funding to a nonprofit's neighbor organizations in board interlocking network can increase the private giving to the nonprofit by 0.4 Chinese *Yuan*. A nonprofit's network position measured by Katz centrality negatively associates with its private giving. The results suggest that, if we consider the funding system from a holistic network perspective, government should support nonprofits with confidence because of the spillover effect. Moreover, a nascent nonprofit cannot increase donor's confidence by only borrowing board members from renowned organizations.

Keywords: social relation; government funding; nonprofit organization; networked society; crowd out; crowd in; public economics

*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 and anonymous reviewers 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 have suggested that government funding may crowd out private donations, in which for every dollar increase in government funding, private donations may decrease by up to a dollar (e.g., Andreoni, 1989; Brooks, 2003; Nikolova, 2015). A common theoretical hypothesis in these studies posits that donors may see contributions to public goods through taxation as substitutes for private donations to nonprofit organizations. The crowd-out effect of government funding is one of the most important inquiries in public administration and public economics because of the demand to provide optimal goods and services—government spending is neutralized if the crowding-out effect on private donations is as high as a dollar.

By tracking and analyzing the activities of more than 4,000 charitable foundations in the mainland of People's Republic of China ("China" hereinafter) over the course of 12 years[1], this study provides more evidence for developing a network framework of government support to nonprofits and asks 1) What are government funding's direct and crosswise crowding effects on private donations? 2) What effect does network position have on private donations?

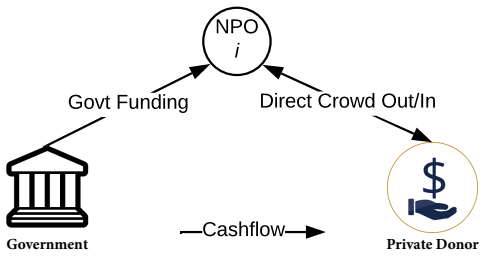
The paper made three major contributions. First, I examined the organizational social network in the crowding process. Second, I analyzed the social relations and direct and crosswise crowding effects in a single equation, which is critical to a holistic network framework. Third, I studied China, one of the largest economic entities in the world, in which this topic has never been examined. Nearly all of the existing studies on this topic use data from Western countries (de Wit & Bekkers, 2017, p. 303). Given that the nonprofit sector's growth in China is substantially influenced by the government, this study extends our knowledge on this topic outside of electoral democracies and generates important policy implications for authoritarian states.

1.1 Conventional approaches to understanding the crowding mechanisms

Since the 1980s, a considerable number of empirical studies has attempted to understand the relation between government funding and private donations (Figure 1) by using four types of research methods: laboratory and survey experiments, micro-level survey data, and archival data from tax returns (de Wit & Bekkers, 2017, p. 302). These studies initiated a debate about crowding mechanisms and conducted various robust analyses. However, the scholarship still suffers from numerous methodological challenges and theoretically underestimates the complexity between government support and private donations.

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

Figure 1: CONVENTIONAL APPROACHES TO STUDYING THE CROWDING MECHANISMS



Methodological challenges. For studying the crowing mechanisms, research methods can exert strong effects on findings, and there remains no consensus on crowding's size and direction (Tinkelman & Neely, 2018, p. 40). The problem of omitted variables (OVs) remains a central issue for using archival or survey data. Moreover, archival studies also suffer from missing data problems. Although projects using laboratory or survey experiments have the potential to rule out many of the confounding variables and generate high-quality data, they suffer from simplifying the decision-making process of giving and can hardly simulate the real-world situation (Eckel et al., 2005, p. 1557).

This study uses archival data. To cope with the OVs problem, I compiled a 12-year panel dataset and conducted extensive fixed-effect analyses and robustness tests. I also devised strategies for minimizing and testing the influence of missing data. Although these efforts cannot eliminate methodological concerns, they add more confidence to conclusions.

Theoretical challenges. As Figure 1 illustrates, the conventional approaches assume that the increase of one variable will sacrifice the growth of another (Tinkelman & Neely, 2018, p. 41; Khanna et al., 1995, p. 261), which limits the potential and scale of government-nonprofit partnership. Scholars should focus on the interactions and partnerships among revenues, donors, and service areas (Tinkelman & Neely, 2018, pp. 50–51).

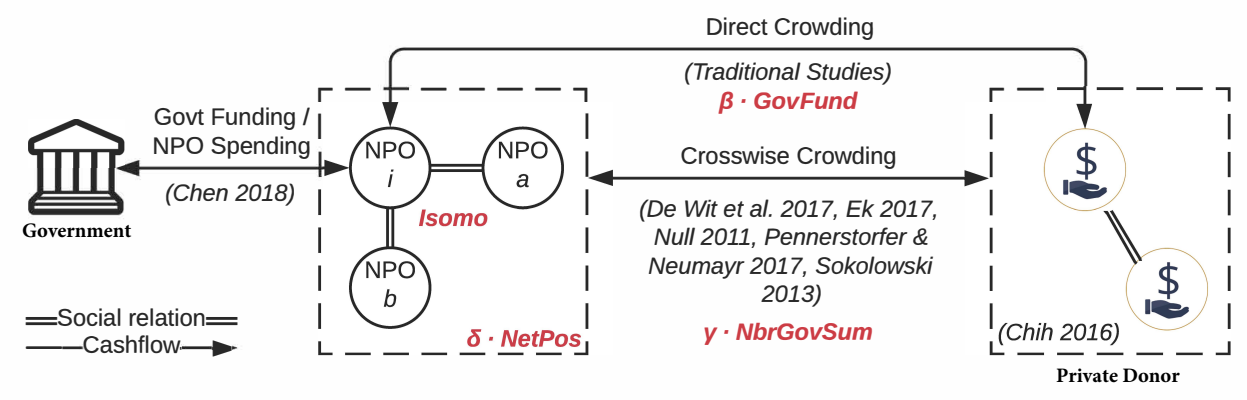
Several recent studies have approached these complex interactions. Cheng (2018) found the crowd-out effect of nonprofits' spending on government funding and revealed a two-way interaction between government support and nonprofit spending. Chih (2016, p. 84) examined the social relations in donors' networks. He suggested that, the government funding's crowd-out effect is less intense on donors who are heavily embedded in social networks because the social norms that encourage private giving are stronger for these people than for those less embedded. Scholars also have begun to focus on another phenomenon referred to as "crosswise crowding mechanisms" or "substitution of giving." These terms describe the situation in which donors' giving can shift to other similar organizations in the same service domain or even to dissimilar organizations in

different domains (De Wit et al., 2018; Ek, 2017; Null, 2011; Pennerstorfer & Neumayr, 2017; Sokolowski, 2013).

1.2 Considering social relations: Toward a network framework of government support

In general, four effects have emerged from all of these scholarly endeavors: no significant effect, crowding in, crowding out, and crosswise crowding. Taken together, we can develop a more holistic framework of the crowding mechanisms as Figure 2 illustrates.

Figure 2: A HOLISTIC UNDERSTANDING OF GOVERNMENT SUPPORT TO NONPROFITS



But there are still missing pieces, the first of which is the study of social relations from an organizational perspective. The social structures in which organizations are embedded constrain economic behaviors (Granovetter, 1985, p. 487). Although social relations' role in the crowding mechanisms has been examined from the donors' perspective (Chih, 2016), it has not been studied from the organizational perspective.

As one of the most important organizational social relations, the board interlocking relationship has been studied extensively. In a board interlocking network, nodes represent organizations, and two nodes are connected if they share one or more board members. The board interlocking practice is "a means by which organizations reduce uncertainties and share information about acceptable and effective corporate practices" (Borgatti & Foster, 2003, p. 996). Studies of nonprofit organizations also suggest that boards and board interlocking relationships have critical roles in resource acquisition and bridging external constituencies (Faulk et al., 2015; Guo, 2007; Paarlberg et al., 2020). Although critics remain, studying such networks is a valid approach to understanding the organizational behavior embedded in social relations. Davis (1996) and Mizruchi (1996) provided extensive reviews and critiques of board interlocking studies. Board and the board interlocking

relationship also have been shown to be a valid instrument for studying Chinese nonprofits (e.g., J. Ma & DeDeo, 2018; Ni & Zhan, 2017; Zheng et al., 2019).

For this study, as Figure 2 illustrates, government funding to organization *i*'s neighbor organizations *a* and *b* may influence private donations to *i*. For example, donors may shift their giving from *a* to *i* because they treat *i* as a trusted substitute, or these three organizations may coordinate their fundraising efforts to redistribute private giving.

To understand these interactions at organizational level, this study constructed the organizational networks using board interlocking relationships and analyzed the crowding mechanisms at two levels of analysis: ego and complete. In an *ego network*, as Figure 2 presents, organization *i*, *a*, and *b* form an ego network in which *i* is the ego, and I consider only *i*'s attributes that are relevant to its immediate neighbors *a* and *b* (e.g., neighbor government funding). In a *complete network*, I consider *i*'s network positions that are relevant to all of the other nodes in the network.

1.3 Considering research context: Nonprofit foundations in China

Nonprofit organizations in contemporary China 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 these three types, foundations are the most developed form and the units of analysis in this study. They receive over 76% of the national donations and constitute the dominant power in the Chinese nonprofit sector (J. Ma & DeDeo, 2018, p. 293).

The study of Chinese nonprofits and civil society long has focused on the nonprofits' relationship with the government and politics (e.g., Estes, 1998; J. Ma & DeDeo, 2018; Ni & Zhan, 2017; Spires, 2011). Chinese nonprofits fall typically into one of two categories: non-governmental organizations (NGOs) and government-affiliated NGOs (GONGOs). NGOs are funded and operated by private efforts from, for example, social elites, business executives, and ordinary citizens. In contrast, the public sector (i.e., the government) initiates and funds the GONGOs and connects to them closely.

A primary reason to establish GONGOs is to transfer a part of the government's functions, particularly those of providing social welfare (detailed history is available in Q. Ma, 2002). 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). CCYLCC's former principals 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 human rights, policy advocacy, and social stability (J. Ma & DeDeo, 2018, p. 4). For example, the State Council Information Office directs the China Foundation for Human Rights Development, and Huang Mengfu, a vice-chair of the Chinese People's Political Consultative Conference and a national leader of China, is its board president (China Foundation For Human Rights Development, 2017).

Given the historical and cultural context, it is not surprising that the government is a major influencer of nonprofits' growth in China (Lu & Dong, 2018; Q. Wang, 2018b). In general, having connections with government can positively affect a nonprofit's performance because of the endorsing effect. For example, having government officials on board or receiving government funding can increase nonprofit revenues and give donors more confidence (Ni & Zhan, 2017; Shen et al., 2019; Zheng et al., 2019). However, these positive effects are largely constrained within the nonprofits that focus on non-politically sensitive topics (J. Ma & DeDeo, 2018; Wei, 2017).

2 Research questions and empirical specification

By considering social relations and examining the topic in an authoritarian context, I propose two research questions: 1) What direct and crosswise crowding effects does government funding have on private donations? 2) Does the network position of an institution affect its private donations? Eq. 1 is the basic setup:

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

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 that measure i's network position ($NetPos_i$), and a set of control variables at the organizational ($Controls_i$) and regional levels ($Controls_r$)[2]. The coefficients β, γ, and δ, illustrated in Figure 2, measure the direct crowding effect, crosswise crowding effect, and network position effect, respectively.

The *pooled ordinary least square* (*pols*; Eq. 1) model is a baseline. Furthermore, I add *organization-* and *time-fixed effects* (*otfe*) to absorb more OVs.

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

3 Variables

3.1 Network measures at ego network level

What direct and crosswise crowding effects does government funding have on private donations? The network variables at ego network level are instruments for answering this question. In Eq. 2, d_{it} is a set of neighbor organizations that are directly connected to ego organization i through board interlocking relationships at year t. By summing the government funding to j ($GovFund_j$, $j \in d_{it}$) using weight $Isomo_{ijt}$ (Eq. 3), we can obtain the total amount of government funding to i's neighbor organizations at year t ($NbrGovSum_{it}$). The correlation between direct government funding and neighbor government funding is weak ($r = 0.24$; Table 1), suggesting the two variables are not collinear.

$$NbrGovSum_{it} = \sum_{j \in d_{it}} (GovFund_j \cdot Isomo_{ijt}) \tag{2}$$

The sum of neighbor government funding needs to be weighted because board interlocking relationships can vary in their ability to diffuse information and coordinate actions. For example, organization i and j have a better ability to share information and be isomorphic because their boards overlap largely, while i and k are less able to coordinate because they share only a few board members. The weight $Isomo_{ijt}$ measures the similarity between the boards of organizations i and j at year t, and is calculated by Eq. 3, in which $BoardShare_{ijt}$ is the number of board members i and j share at year t, and $BoardPooled_{ijt}$ represents the number of pooled individuals from the two boards.

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

There are two methodological caveats. First, I only consider the first-degree neighbors in this study (i.e., directly connected nodes). Although the influence of indirect connection is possible, such effect is expected to be small. Second, the operationalization of government funding to neighbor organizations (*NbrGovSum*) is an interval-level measure and can generate "network autocorrelation"—the tendency that neighbor nodes in a network may have similar attributes or behave in a similar way (e.g., organizations that receive large private donations are more likely to be board-interlocked). If such tendency is not appropriately controlled, it disrupts the statistical assumption that observations are independent; moreover, it can be an unobserved variable confounding the relationship between independent and dependent variables that are at the interval-level (Dow et al., 1984). However, the influence of network autocorrelation in this study is weak because of two reasons (Marsden & Friedkin, 1993, p. 136). First, the dependent variable of this

study is at individual level but not interval-level. It can be an issue, for example, the dependent variable is a peer evaluation measure. Second, the estimation uses fixed-effect models that demean the time- and entity-invariant factors. Given the institutional structural change is slow, the influence of network autocorrelation can be absorbed in the fixed-effect models. In general, these methodological caveats generate limited biases on the estimations.

3.2 Network measures at complete network level

Does the network position of an institution affect its private donations? A node's "importance" in a network can be interpreted and measured in different ways with respect to their strategic positions at the complete network level (Freeman, 1977, 1978; Wasserman & Faust, 1994). Among these measures, four types of centrality values are extensively used (Faust, 1997, p. 160), and we can also theoretically speculate they may influence private donations as detailed below. The math equations used to calculate these centrality values are discussed thoroughly in the literature of network analysis; hence, I omit the mathematical details and frame these concepts in a nonprofit studies context.

1. *Degree centrality* measures a given node's direct connection to other nodes; actors are central if directly connected to many other nodes. For example, the nonprofits with higher degree centrality in a board interlocking network have better-connected boards and may receive more grants (Paarlberg et al., 2020).
2. *Betweenness centrality* measures how often a given node falls along the shortest path between two other nodes. Nodes with higher betweenness centrality values can mediate heterogeneous information or resource flows between other actors. For example, the nonprofits in such positions may have more novel information about funding.
3. *Closeness centrality* measures the sum of geodesic distances from a given node to all other nodes in the network. Actors with higher closeness centrality values are closer (i.e., shorter path) to other nodes. For example, a nonprofit in such position can be familiar to more organizations and donors in the network.
4. *Eigenvector centrality* calculates a node's centrality based on that of its neighbors—actors are central if they are connected to nodes that are well-connected themselves. This measure has numerous variants, such as Katz centrality (Bonacich, 1987; Katz, 1953), which was used in studying how donors' social networks influence the crowd-out effect (Chih, 2016). Eigenvector centrality has advantages compared to other centrality measures (Bonacich, 2007), particularly in analyzing the exchange network which involves transferring valued

items (e.g., donations and giving information; Borgatti & Everett, 2006, p. 470; Cook et al., 1983, pp. 276–277).

Degree centrality is fundamental for calculating other network measures, thus, collinearity is expected. As Table 1 presents, degree centrality correlates strongly with betweenness and closeness centrality ($r > 0.7$) and moderately with Katz centrality ($r > 0.5$). Therefore, degree centrality is omitted in regression analysis.

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	.24	1.0				
Degree centrality	.053	.090	1.0			
Betweenness centrality	.031	.070	.79	1.0		
Closeness centrality	.029	.063	.55	.45	1.0	
Katz centrality	.0064	.016	.53	.49	.32	1.0

3.3 Organizational level controls

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

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

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.

[3]The number of full-time employees also may measure organizational capacity, but many Chinese foundations report "zero" full-time employees because external companies or supervising government departments sponsor their employees to minimize foundations' administrative costs; therefore, it is not a valid indicator of organizational capacity in the Chinese context.

Other than the dummy variable that measures being a GONGO or not, variables that count the number of government officials on boards also are used as controls, including the "number of government officials serving as principals" and "number of retired government officials who are provincial or above."

Foundation's work area is defined as politically sensitive or non-sensitive. J. Ma and DeDeo (2018) showed that foundations that work on politically sensitive topics (i.e., advocacy, international affairs, religious or ethnic issues, police or legal system, or social stability) have more government officials on their boards. Donors may be cautious to politically sensitive areas in which the party-state is a major player.

Fundraising type is dummy-coded as public or 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 allowed to solicit only through private channels and target specific individuals. This difference in fundraising capacity may influence private donations. Moreover, public fundraising foundations are more likely to be 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 that measures organizational capacity includes age, asset size, and board size. According to organizational ecology theory, external environments are more likely to influence new and/or small organizations, and these phenomena are referred to as the "liability of newness" and "liability of smallness," respectively (Baum & Shipilov, 2006, pp. 62–63). This perspective provides the rationale for controlling age and asset size. Organizations with larger boards of trustees may have stronger organizational capacity and more connections with donors. These variables are controlled in many studies (e.g., Ni et al., 2016; Ni & Zhan, 2017; Nie et al., 2016; Wei, 2017).

3.4 Regional level controls

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

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

4 Dataset

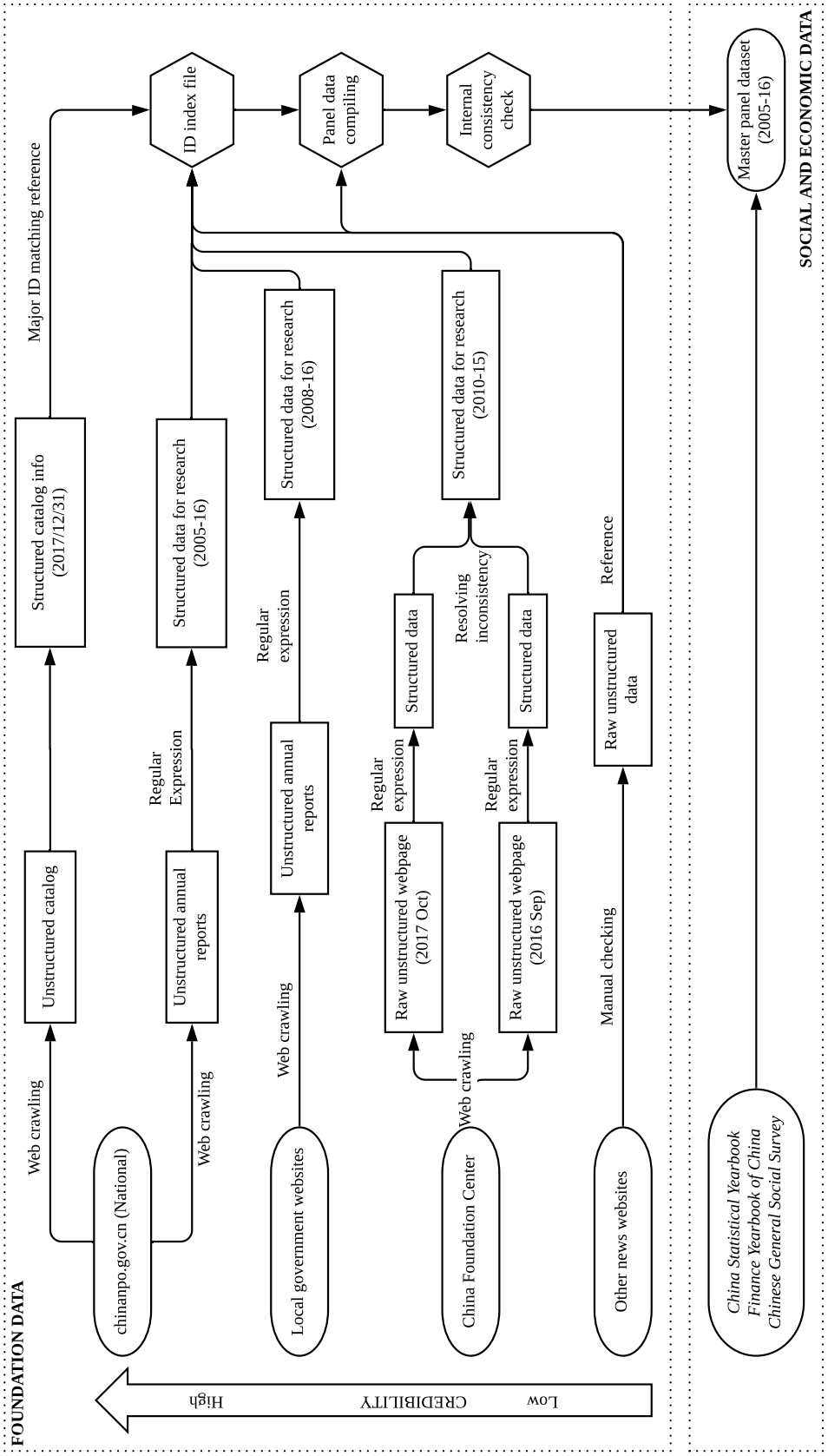
4.1 Dataset compilation

The master panel dataset includes two components: *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.). Figure 3 illustrates the workflow for compiling the dataset. The master panel dataset includes two components: *foundation data* (e.g., government funding, total assets, and organization age) 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). The data of foundations are primarily from the following four sources ranked by credibility:

1. China Social Organizations (CSO).[5] This is the official website that provides annual reports and other information on 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 administers this website. The annual reports released on this platform contain the most comprehensive and authoritative information about foundations. For example, basic organizational profile, board membership, financial position, and cash flow.
2. Local government websites. CSO systematically misses some foundations' annual reports. For example, it does not have the annual reports of foundations registered in Shanghai because Shanghai has its own information-disclosure platform.[6] Data were crawled from these local government websites to supplement the CSO's data.
3. China Foundation Center (CFC).[7] CFC is operated by a nonprofit in China and releases the information of foundations that are registered in mainland China. It provides, for example, foundation's 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 assets, total annual income, and total government funding).
4. Other credible news websites. For example, Xinhua News Agency[8] (China's official press agency), People's Daily[9] (Chinese Communist Party's official newspaper), and Baidu Encyclopedia[10] (the largest Chinese-language, collaborative, web-based encyclopedia).

[5] http://www.chinanpo.gov.cn
[6] http://xxgk.shstj.gov.cn
[7] http://foundationcenter.org.cn
[8] http://www.xinhuanet.com
[9] http://www.people.com.cn
[10] http://baike.baidu.com

Figure 3: WORKFLOW FOR COMPILING MASTER PANEL DATASET



Data from sources with higher credibility are used when discrepancy happens. The detailed methodologies and codebook are described in the Research Infrastructure of Chinese Foundations (J. Ma et al., 2017). Data on social and economic status are from the *China Statistical Yearbook* (National Bureau of Statistics of China, 2017), *Finance Yearbook of China* (China Financial Magazine, 2017), and the Chinese General Social Survey (Bian & Li, 2012). Table A2 in Online Appendix details all the variables, roles in equations, and data sources.

Table 2 shows the number of foundations by year and in comparison to those numbers recorded in the *China Statistical Yearbook* (National Bureau of Statistics of China, 2017) and the Research Infrastructure of Chinese Foundations (J. Ma et al., 2017). 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 and thus provide a dataset with very high quality.

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 (J. 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, $12.51\% = \frac{113}{(975+832)/2} \cdot 100\%$).

4.2 Missing financial information and approximation strategy

The financial statistics include missing observations and missing fields. Because inactive foundations may not disclose their annual reports regularly, this results in *missing observations* that

Table 3: COMPOSITION OF THE PANEL DATASET

Foundation type	Foundations	Observations	Foundation with 3+ records	Observations of foundations with 3+ records
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%)
Work 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.

cannot 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 donations is the sum of donations made by individuals and those made by corporations. Therefore, the missing values for individual donations can be imputed by subtracting corporate donations from total donations (detailed procedures in Online Appendix A.1). Otherwise, I made no imputation for the missing variables and omitted the observations. I also experimented with multiple imputation (King et al., 2001; Rubin, 1987) but found no significant improvement in the size of standard error, thus, multiple imputation is not employed. Because of missing observations, the dataset may be only a representative sample of active, not all foundations. The data fields that are missing at random can reduce statistical power, but the estimates are unbiased nonetheless. The analysis and conclusions should consider these caveats.

4.3 Missing board member information and approximation strategy

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

I used a Chow test (Chow, 1960) to statistically test whether data from the years using an 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 cannot be rejected, supporting that the two datasets can be pooled. However, *core* and *ss16* cannot be pooled because the null hypothesis is rejected ($F(22, 5542) = 4.07, p < 0.001$). Therefore, I prepared the following datasets:

- *Pooled dataset (pooled)* combines *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 advantages and disadvantages 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).

5 Results

5.1 Major variables' descriptive statistics

Table A3 in Online Appendix reports the summary statistics of the major variables. Most are highly skewed, for example, more than 75% of the foundations do not receive government funding, but the largest amount of government funding ever received is nearly 1.4 billion Chinese *Yuan* (CNY; approximately 287 million US Dollars in 2016), which went to China Education Development Foundation in 2016. The median value of individuals' private donations is 2,503 CNY, but the largest is almost 1.1 billion. The median board size is 10, but the largest one has 49 members. Government officials' presence on boards varies widely; there is 0.5 government official on each foundation's board on average, while the foundation with the strongest government connection has 41 officials on its board. These observations inform the robustness tests, in which winsorized variables are used to test the influence of extreme values.

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)	−.88	0 (0)	.016 (.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)	.41 (.55)	.81 (.90)	−8.1‡	0 (0)	0 (.29)	9.6 (9.6)
Betweenness centrality (10^3)	16643 (2966)	.25 (.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 (.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)	.46 (.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)	.43 (.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)	.12 (.25)	.63 (.74)	−9.2‡	0 (0)	0 (0)	36 (8)
Expenditure for charitable purposes (10^7 CNY)	16613 (2964)	.69 (2.6)	7.7 (31)	−6.7‡	0 (0)	.069 (.16)	570 (1200)
Neighbor expenditure for charitable purposes (10^7 CNY)	16643 (2966)	3.5 (4.3)	37 (42)	−1.1	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∗	.070 (.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‡	.70 (.93)	4.3 (4.0)	8.2 (8.2)
Per capita disposable income of households (10^4 CNY)	16135 (2939)	1.9 (1.8)	.67 (.64)	6.7‡	.71 (.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)	.030	.28 (.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. Inflation is adjusted using 2000 as the base year. $*p < 0.1$; $†p < 0.05$; $‡p < 0.01$.

It is more informative if we separate the statistics by foundations that receive government funding (RGs) and those that do not (NGs). As Table 4 shows, RGs (numbers in parentheses) have higher degree, betweenness, and closeness centralities than NGs (numbers outside parentheses) in the organizational network. RGs are older and larger in asset, board size, government connection, and expenditure for charitable purposes. RGs tend to be in the provinces that have smaller amounts of government spending on social security and employment, per capita gross regional product, households' per capita disposable income, and percentage of people who make donations and volunteer, but these provinces have larger young (aged 15 and under) and senior (aged 65 and above) population.

5.2 Board interlocking network and top recipients

Figure A1 in Online Appendix illustrates Chinese foundations' board interlocking networks in 2013.[11] Isolated nodes and dyads are removed in both graphs. 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). As the figure presents, 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 the corporate network in the United States, the Chinese foundations' board interlocking network is sparser (Davis et al., 2003).

Table 5 describes the top recipients of government funding and private donations. Between 2005 and 2016, 50 foundations were ranked as the top-10 government funding recipients (tgf), 46 as the top-10 neighbor government-funding recipients ($tngf$), and 67 as the top-10 private donation recipients (tpd). On average and annually, the government funds the top recipients of tgf with 56 million CNY, neighbor organizations of $tngf$ receive 310 million CNY from the government, the tpd foundations receive 84 million CNY from private individuals.

Different types of top recipients are similar in board size—they all have approximately 17 board members, much higher than the average (i.e., 12 members). Over 80% of all these top recipients are government-affiliated, and only about one-third of these foundations relate to politically sensitive topics. The average number of government officials on these foundations' boards is substantially higher than the average overall (i.e., 0.5 person per organization).

Foundations that appear in all rankings are 1) the Chou Pei-yuan Foundation, which is supervised by the United Front Work Department of the Central Committee of the Communist Party of China and focuses on international relations, education, and technologies; 2) the China Educa-

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

Table 5: PROFILE OF TOP RECIPIENTS 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 recipients; *tngf* = top 10 neighbor government funding recipients; *tpd* = top 10 private donation recipients. Numbers are mean values and standard deviations are in parentheses. Using standard competition rankings ("1224" rankings) and two digits of numeric precision.

tion 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.

5.3 Predicting private donations

Table 6 shows the regression results of the pooled ordinary least square (*pols*) and organization and time fixed effect (*otfe*) 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 the raw value, while the independent variables (i.e., direct government funding, neighbor government funding, and the three centrality measures) and dependent variables (i.e., individuals' private donations) are in raw scale. This allows us to control the effect of large variations and also determine one CNY increase in government funding can influence how much private donations.

The *pols* regressions on all datasets indicate a significant negative relationship between direct government funding and private donations, but after controlling the organization and time fixed effects (i.e., the *otfe* regressions), the significance disappears in all regressions. de Wit and Bekkers (2017, p. 309) found that studies that used archival or survey data reported a mean increase of $0.06 with a 95% confidence interval between -0.04 and 0.15. The finding also falls in this range and is congruent with many other empirical and meta-analysis studies that do not find a significant relationship between direct government funding and private donations.

Table 6: RESULTS OF REGRESSION MODELS ON DIFFERENT DATASETS

	pols-pooled	*pols-core*	*pols-3plus*	*otfe-pooled*	*otfe-core*	*otfe-3plus*
Direct govt. funding	$-.0085^{**}$	$-.012^{***}$	$-.013^{***}$	$-.025$	$-.010$	$-.010$
	(-2.3)	(-3.3)	(-3.6)	(-1.2)	$(-.74)$	$(-.74)$
Neighbor govt. funding	.16	.21	.20	$.41^{*}$	$.37^{**}$	$.37^{**}$
	(1.3)	(1.4)	(1.4)	(1.8)	(2.3)	(2.3)
Betweenness centrality	-1.7	$-.087$	.053	1.6	2.1	2.5
	(-1.0)	$(-.040)$	(.020)	(.80)	(.77)	(.87)
Closeness centrality	$.31^{***}$	$.28^{***}$	$.28^{***}$	$-.058$	$-.080$	$-.085$
	(3.4)	(2.9)	(3.0)	$(-.34)$	$(-.33)$	$(-.35)$
Katz centrality	$-.015$	$-.071$	$-.10$	$-.22$	$-.25^{*}$	$-.28^{*}$
	$(-.070)$	$(-.30)$	$(-.40)$	(-1.6)	(-1.7)	(-1.7)
Organizational controls	yes	yes	yes	p.o.	p.o.	p.o.
Regional controls	yes	yes	yes	p.o.	p.o.	p.o.
Observations	6880	5170	4923	6880	5170	4923
Adjusted/Within R^2	.026	.026	.030	.0076	.0072	.0080

Note: *Dependent variable* = private donations made by individuals; *pols* = pooled ordinary least square; *otfe* = organization and time fixed-effect; *pooled* = pooled dataset; *core* = core dataset; *3plus* = organizations with more than three observations in *core* dataset; p.o. = partly omitted. 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. t statistics in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

The coefficients of neighbor government funding are consistently positive across all regression models, and statistically significant and larger in the *otfe* models than in the *pols* models, suggesting there are time and entity-specific OVs that bias the OLS estimations. According to the regression results, if 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 the private donations to *i*, government funding to *i*'s neighbor organizations can crowd in the private donations to *i* in a substantial magnitude. The overall effect of government funding to nonprofit organizations is an increase in private donations.

Considering network position, the coefficients of closeness centrality are significantly positive in all *pols* regressions, but become insignificant after the organization- and time-invariant OVs are controlled in the *otfe* models. Katz centrality negatively associates with private donations in all of the regressions and is statistically significant in all *otfe* models. Although nodes with higher Katz centrality values do not tie to many other nodes, they tie to the influential nodes that are well-connected (Borgatti, 2005, pp. 61–62).

5.4 Robustness analysis

I analyze both statistical and theoretical robustness extensively. Statistical robustness tests include winsorization on extreme values, post-estimation analysis, sensitivities to other OVs, and lagged variables. Theoretical tests check the robustness of theoretical assumptions.

5.4.1 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 rather than errors. Therefore, "winsorization" can serve as an appropriate method to check the effect of extreme values on estimations (Erceg-Hurn & Mirosevich, 2008; Reifman & Keyton, 2010).

Table A4 in Online Appendix shows the regression results using the winsorized dependent variable (i.e., private donations) and key independent variables (i.e., direct government funding, neighbor government funding, and betweenness, closeness, and Katz centrality).[12] The regression models are more efficient after winsorizing: the standard errors of key independent variables are considerably smaller, and the goodness of fit is improved significantly in both *pols* and *otfe* models.

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

The coefficient of neighbor government funding also becomes statistically significant in the *pols* models. The coefficients of Katz centrality, although lower, remain statistically significant in all *otfe* models. These results give us more confidence to conclude that there is a substantial crosswise crowding-in effect, and the network position measured by Katz centrality has a negative influence on private donations.

Post-estimation analysis. The correlation matrix of the *otfe* models' coefficients does not suggest strong correlations between the coefficients (except the betweenness and Katz centrality). Table A5 in Online Appendix shows the *otfe* model for the *pooled* dataset.

Leadership change. Variants in organizational capacity may be independent of time, region, and organization, for example, the personnel changes in fundraising or leadership positions. Previous studies have used leadership change as an indicator of variation in organizational capacity, as data on staff mobility at the administrative and executive level are difficult to obtain (Hansmann & Thomsen, 2017; Ribar & Wilhelm, 2002). I operationalize foundations' leadership change as the turnover of either the executive principal or board chair.[13] Statistical tests show that the coefficient of leadership change is not significant, and leadership change influence all of the other coefficients minimally (Table A6 in Online Appendix).

Lagged variables. Table A7 in Online Appendix presents the regression results on different datasets using lagged variables of government funding. The results are consistent with other analyses.

5.4.2 Theoretical robustness

Interaction between network effect and revenue flows. The regression models do not consider the interaction between network measures and funding variables. We can examine such interaction by building the estimations incrementally, beginning without network measures and entering the centrality values singly. As Tables A8–A13 in Online Appendix present, the addition of centrality values has little impact on the coefficients of direct and neighbor government funding.

Neighbor foundations' expenditure. The estimation strategy takes an "input-based theory," in that, all of the variables measure the resources that flow into foundations (i.e., government funding and private donations). Using an "output-based theory," neighbor foundations' outputs (e.g., charitable expenditures) may also influence the crowd-out effect (Ribar & Wilhelm, 2002, p. 428). For example, with the increase in neighbor nonprofit a and b's charitable expenditures, recipients' (i.e., clients served by these nonprofits) demands may decrease and thereby result in fewer private donations to ego nonprofit i.

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

I use neighbor foundations' weighted total expenditures for charitable purposes (similar to Eq. 2) as one of the output-based OVs. Results show that it has little influence on all *otfe* models (Table A6 in Online Appendix), and we cannot reject the null hypothesis that this variable's coefficient is equal to zero by the Wald test ($p > 0.25$).

Operationalization of neighbor government funding. The raw values of neighbor government funding are weighted by Eq. 3 because the theoretical assumption is that the "isomorphicness" between boards matters. We can substitute the weighted values for raw values to examine this assumption. As Table A14 in Online Appendix shows, the substitution has minimal impact on all of the other independent variables. Although significant, the coefficients of raw neighbor government funding are much smaller than those in Table 6, supporting the effectiveness and validity of the weighting strategy.

6 Discussion

By analyzing a novel, 12-year panel dataset from the People's Republic of China, this study reexamines the crowding effect of government funding to nonprofits. It contributes to the knowledge on this topic from a network perspective and extends the research scope to one of the largest authoritarian countries in the world that has rarely been discussed previously.

6.1 Crowding effects: substantial crosswise crowding-in

Although I find no evidence of direct crowding out, 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 increase by approximately 0.4 CNY. Thus, the effect of government funding to nonprofits is an overall increase in private donations. The finding provides an important alternative explanation to the crowding debate: private donations in the organizational network may not be reduced, but instead, redistributed or even increased.

Neighbor government funding's crowding-in effect is surprisingly large compared to that reported previously. Studies have examined the direct crowding effect using archival or survey data and reported a mean increase of \$0.06 with a 95% confidence interval between -0.04 and 0.15 (de Wit & Bekkers, 2017, p. 309). Although not directly comparable, the number found in this study (i.e., ≈ 0.4) greatly exceeds that confidence interval.

How should we interpret this substantial crosswise crowding-in effect? For the direct crowding out effect, most empirical studies test two assumptions: 1) donors may reduce their giving to a nonprofit that receives government funding because they feel they have already gave through tax, 2) the nonprofits that have received government funding may reduce their fundraising efforts

(e.g., Andreoni & Payne, 2003, 2011). Both reasonable assumptions focus on the revenues of the nonprofits that receive government funding, but how will the two assumptions influence a donor's decision toward the nonprofits that are isomorphic or have connections to these nonprofits but are not government-funded?

From the donor's perspective, she may want to redirect her donations to other nonprofits and considers 1) whether the nonprofits are safe to donate given China's authoritarian context, 2) whether the nonprofits are governed by industry experts. Many studies have reported that the Chinese people have strong confidence in the government's decisions (Li, 2004; Shi, 2001; Z. Wang, 2005; Zhong, 2014), and 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 those neighbors, and a signal as such can increase donors' confidence in supporting the board interlocked i as well. As a result, the organizations that are board interlocked with the government-funded neighbors become ideal substitutes because they are safe to donate and governed by domain experts.

6.2 Distinction between existing and future donors: redirection vs. substitution

Two existing studies present a puzzle on the crosswise crowding effect: By surveying the donors, Horne et al. (2005, pp. 145–146) found that contributors are inelastic in changing their existing charitable giving. However, Ek (2017, p. 45) found that donors substitute their giving across similar or even dissimilar nonprofits in experiments. Taking the findings at face value, they do not support either study. 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, such that the direct and crosswise crowding effects will be of a similar magnitude, but in the opposite direction.

Two distinctions that no studies have made can possibly explain these inconsistent results. The first distinction is the fields of services: the crowding-out and crowding-in effects are more likely to occur in certain service areas, for example, the crowding-out effect is stronger in social services, healthcare, and nature conservation (De Wit et al., 2017), but is weaker in the arts (Kim & Van Ryzin, 2014). Horne et al. and Ek might consider different fields of services, therefore, result in the inconsistency.

Another distinction is between existing and future donors: Government funding may not substitute for existing donors' giving but can redirect future donors' giving to alternative nonprofits. Horne et al. (2005) surveyed existing givers who might be loyal to their current donees and unlikely to shift their contributions. However, the subjects in other experimental studies approximated fu-

ture rather than existing givers and did not consider the loyalty to current donees (Ek, 2017; Null, 2011). Taken together, Horne et al.'s study supports that government funding cannot substitute for existing donors' giving. While Ek and other experimental studies support the redirection of future donors' giving to alternative nonprofits.

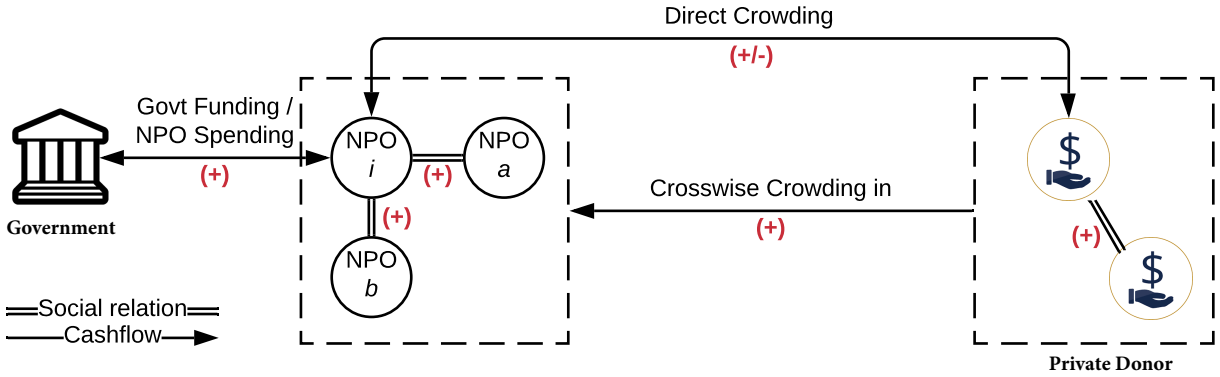
6.3 Network position and private giving

Previous studies have found that donors' social networks are important in private giving (Chih, 2016). This study suggests that organizational networks also matter: Katz centrality affects private donations negatively. Organizations with higher Katz centrality values tie to nodes that are well-connected. For nonprofits, especially those nascent ones, it is a popular strategy to borrow board members from renowned organizations. However, the result suggests that if a nascent nonprofit only associates with influential peers, such a strategy does not help with increasing private giving. From the donor's perspective, the transformation of reputation does not happen automatically by sharing board members, and donors make decisions on giving using various information.

6.4 Policy and practical implications from a network perspective

We can develop a more holistic understanding of government funding to nonprofits as shown in Figure 4. There is evidence supporting the two-way interaction between government funding and nonprofits' spending, the importance of organizational and interpersonal social relations, 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 particularly encouraging because all the empirical studies using data from different countries support this effect. This further suggests that the social network's role in resource distribution has a cross-cultural universality.

Figure 4: TOWARD A NETWORK FRAMEWORK OF GOVERNMENT SUPPORT TO NONPROFITS



This study has several policy and practical implications. First, the substantial crosswise crowding-in effect suggests that government should support nonprofit organizations with confidence because of the "spillover effect"—the increase of government funding is likely to increase the private donations to nonprofits in the same or related service areas. Second, the government should support nonprofits that are well-connected because they have more neighbor organizations to which private donations (probably future donations) can be redirected. From the perspective of a nascent nonprofit, an effective board interlocking strategy should, first, sharing board members with government-funded nonprofits because this can increase its political legitimacy, which is a key consideration in China and other authoritarian countries. Moreover, nonprofits should diversify their board interlocking relationships because only sharing members with renowned organizations can hardly increase private giving.

There are numerous possibilities for future studies. First, this study suggests the crosswise crowding-in effect is larger than the direct crowding-out effect, suggesting that there should be an overall increase in private giving. This finding conflicts with that of Tinkelman and Neely, who reported that the overall giving as a percentage of GDP has not changed in the United States in the past sixty years (Tinkelman & Neely, 2018, p. 38). However, the two studies may not be directly comparable because the data are from different countries. Future study can provide possible explanations. Second, the distinction between existing and future donors should be made, and private giving may also influence government funding, suggesting another two-way interaction and further complicating the holistic framework. Last but not least, as Zingales (2017) calls to develop a political theory of the government-firm interactions, the political implications of the crowding effects remain unclear. For example, the government can fund nonprofits in exchange for ideological and political support, characterizing not just China. But existing studies primarily approach this topic from an economic perspective.

Online Appendix

Additional materials are available at https://dx.doi.org/10.2139/ssrn.3262798.

References

Andreoni, J. (1989). Giving with Impure Altruism: Applications to Charity and Ricardian Equivalence. *Journal of Political Economy*, *97*(6), 1447–1458.

Andreoni, J., & Payne, A. A. (2003). Do government grants to private charities crowd out giving or fund-raising? *The American Economic Review*, *93*(3), 792–812.

Andreoni, J., & Payne, A. A. (2011). Is crowding out due entirely to fundraising? Evidence from a panel of charities. *Journal of Public Economics*, *95*(5-6), 334–343. https://doi.org/10.1016/j.jpubeco.2010.11.011

Baum, J. A., & Shipilov, A. V. (2006). Ecological Approaches to Organizations. In S. R. Clegg, C. Hardy, T. Lawrence, & W. R. Nord (Eds.), *The SAGE Handbook of Organization Studies*. SAGE Publications.

Bian, Y., & Li, L. (2012). The Chinese General Social Survey (2003-8). *Chinese Sociological Review*, *45*(1), 70–97. https://doi.org/10.2753/CSA2162-0555450104

Bonacich, P. (1987). Power and Centrality: A Family of Measures. *American Journal of Sociology*, *92*(5), 1170–1182.

Bonacich, P. (2007). Some unique properties of eigenvector centrality. *Social Networks*, *29*(4), 555–564. https://doi.org/10.1016/j.socnet.2007.04.002

Borgatti, S. P. (2005). Centrality and network flow. *Social Networks*, *27*(1), 55–71. https://doi.org/10.1016/j.socnet.2004.11.008

Borgatti, S. P., & Everett, M. G. (2006). A Graph-theoretic perspective on centrality. *Social Networks*, *28*(4), 466–484. https://doi.org/10.1016/j.socnet.2005.11.005

Borgatti, S. P., & Foster, P. C. (2003). The Network Paradigm in Organizational Research: A Review and Typology. *Journal of Management*, *29*(6), 991–1013. https://doi.org/10.1016/S0149-2063_03_00087-4

Brooks, A. C. (2003). Taxes, Subsidies, and Listeners Like You: Public Policy and Contributions to Public Radio. *Public Administration Review*, *63*(5), 554–561. https://doi.org/10.1111/1540-6210.00319

Cheng, Y. ((2018). Nonprofit Spending and Government Provision of Public Services: Testing Theories of Government–Nonprofit Relationships. *Journal of Public Administration Research and Theory*. https://doi.org/10.1093/jopart/muy054

Chih, Y.-Y. (2016). Social network structure and government provision crowding-out on voluntary contributions. *Journal of Behavioral and Experimental Economics*, *63*(Supplement C), 83–90. https://doi.org/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.

China Youth Development Foundation. (2017a). Our History - CYDF.

China Youth Development Foundation. (2017b). Our Mission - CYDF.

Chow, G. C. (1960). Tests of Equality Between Sets of Coefficients in Two Linear Regressions. *Econometrica*, *28*(3), 591–605. https://doi.org/10.2307/1910133

Cook, K. S., Emerson, R. M., Gillmore, M. R., & Yamagishi, T. (1983). The Distribution of Power in Exchange Networks: Theory and Experimental Results. *American Journal of Sociology*, *89*(2), 275–305.

Davis, G. F. (1996). The significance of board interlocks for corporate governance. *Corporate Governance: An International Review*, *4*(3), 154–159.

Davis, G. F., Yoo, M., & Baker, W. E. (2003). The Small World of the American Corporate Elite, 1982-2001. *Strategic Organization*, *1*(3), 301–326. https://doi.org/10.1177/14761270030013002

de Wit, A., & Bekkers, R. (2017). Government Support and Charitable Donations: A Meta-Analysis of the Crowding-out Hypothesis. *Journal of Public Administration Research and Theory*, *27*(2), 301–319. https://doi.org/10.1093/jopart/muw044

De Wit, A., Bekkers, R., & Broese van Groenou, M. (2017). Heterogeneity in Crowding-out: When Are Charitable Donations Responsive to Government Support? *European Sociological Review*, *33*(1), 59–71. https://doi.org/10.1093/esr/jcw048

De Wit, A., Neumayr, M., Handy, F., & Wiepking, P. (2018). Do Government Expenditures Shift Private Philanthropic Donations to Particular Fields of Welfare? Evidence from Cross-country Data. *European Sociological Review*. https://doi.org/10.1093/esr/jcx086

Dow, M. M., Burton, M. L., White, D. R., & Reitz, K. P. (1984). Galton's Problem as network autocorrelation. *American Ethnologist*, *11*(4), 754–770. https://doi.org/10.1525/ae.1984.11.4.02a00080

Eckel, C. C., Grossman, P. J., & Johnston, R. M. (2005). An experimental test of the crowding out hypothesis. *Journal of Public Economics*, *89*(8), 1543–1560. https://doi.org/10.1016/j.jpubeco.2004.05.012

Ek, C. (2017). Some causes are more equal than others? The effect of similarity on substitution in charitable giving. *Journal of Economic Behavior & Organization*, *136*, 45–62. https://doi.org/10.1016/j.jebo.2017.01.007

Erceg-Hurn, D. M., & Mirosevich, V. M. (2008). Modern robust statistical methods: An easy way to maximize the accuracy and power of your research. *American Psychologist*, *63*(7), 591–601. https://doi.org/10.1037/0003-066X.63.7.591

Estes, R. J. (1998). Emerging Chinese foundations: The role of private philanthropy in the new China. *Regional Development Studies*, *4*.

Faulk, L., Willems, J., McGinnis Johnson, J., & Stewart, A. J. (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*, 1–31. https://doi.org/10.1080/14719037.2015.1112421

Faust, K. (1997). Centrality in affiliation networks. *Social Networks*, *19*(2), 157–191. https://doi.org/10.1016/S0378-8733(96)00300-0

Freeman, L. C. (1977). A Set of Measures of Centrality Based on Betweenness. *Sociometry*, *40*(1), 35–41. https://doi.org/10.2307/3033543

Freeman, L. C. (1978). Centrality in social networks conceptual clarification. *Social Networks*, *1*(3), 215–239. https://doi.org/10.1016/0378-8733(78)90021-7

Granovetter, M. (1985). Economic Action and Social Structure: The Problem of Embeddedness. *American Journal of Sociology*, *91*(3), 481–510.

Guo, C. (2007). When Government Becomes the Principal Philanthropist: The Effects of Public Funding on Patterns of Nonprofit Governance. *Public Administration Review*, *67*(3), 458–473. https://doi.org/10.1111/j.1540-6210.2007.00729.x

Hansmann, H., & Thomsen, S. (2017). *The Governance of Foundation-Owned Firms* (SSRN Scholarly Paper No. ID 3112766). Social Science Research Network. Rochester, NY.

Horne, C. S., Johnson, J. L., & Van Slyke, D. M. (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*(1), 136–149. https://doi.org/10.1177/0899764004272192

Katz, L. (1953). A new status index derived from sociometric analysis. *Psychometrika*, *18*(1), 39–43. https://doi.org/10.1007/BF02289026

Khanna, J., Posnett, J., & Sandler, T. (1995). Charity donations in the UK: New evidence based on panel data. *Journal of Public Economics*, *56*(2), 257–272. https://doi.org/10.1016/0047-2727(94)01421-J

Kim, M., & Van Ryzin, G. G. (2014). Impact of Government Funding on Donations to Arts Organizations: A Survey Experiment. *Nonprofit and Voluntary Sector Quarterly*, *43*(5), 910–925. https://doi.org/10.1177/0899764013487800

King, G., Honaker, J., Joseph, A., & Scheve, K. (2001). Analyzing Incomplete Political Science Data: An Alternative Algorithm for Multiple Imputation. *American Political Science Review*, *95*(1), 49–69.

Li, L. (2004). Political Trust in Rural China. *Modern China*, *30*(2), 228–258. https://doi.org/10.1177/0097700403261824

Lu, J., & Dong, Q. (2018). What Influences the Growth of the Chinese Nonprofit Sector: A Prefecture-Level Study. *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations*, *29*(6), 1347–1359. https://doi.org/10.1007/s11266-018-0042-7

Ma, J., & DeDeo, S. (2018). State power and elite autonomy in a networked civil society: The board interlocking of Chinese non-profits. *Social Networks*, *54*, 291–302. https://doi.org/10.1016/j.socnet.2017.10.001

Ma, J., Wang, Q., Dong, C., & Li, H. (2017). The research infrastructure of Chinese foundations, a database for Chinese civil society studies. *Scientific Data*, *4*, sdata201794. https://doi.org/10.1038/sdata.2017.94

Ma, Q. (2002). Defining Chinese Nongovernmental Organizations. *Voluntas: International Journal of Voluntary and Nonprofit Organizations*, *13*(2), 113–130. https://doi.org/10.1023/A:1016051604920

Marsden, P. V., & Friedkin, N. E. (1993). Network Studies of Social Influence. *Sociological Methods & Research*, *22*(1), 127–151. https://doi.org/10.1177/0049124193022001006

Mizruchi, M. 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, N., Chen, Q., Ding, S., & Wu, Z. (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*. https://doi.org/10.1007/s11266-016-9765-5

Ni, N., & Zhan, X. (2017). Embedded Government Control and Nonprofit Revenue Growth. *Public Administration Review*, *77*(5), 730–742. https://doi.org/10.1111/puar.12716

Nie, L., Liu, H. K., & Cheng, W. (2016). Exploring Factors that Influence Voluntary Disclosure by Chinese Foundations. *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations*, *27*(5), 2374–2400. https://doi.org/10.1007/s11266-016-9689-0

Nikolova, M. (2015). Government Funding of Private Voluntary Organizations: Is There a Crowding-Out Effect? *Nonprofit and Voluntary Sector Quarterly*, *44*(3), 487–509. https://doi.org/10.1177/0899764013520572

Null, C. (2011). Warm glow, information, and inefficient charitable giving. *Journal of Public Economics*, *95*(5), 455–465. https://doi.org/10.1016/j.jpubeco.2010.06.018

Paarlberg, L. E., Hannibal, B., & McGinnis Johnson, J. (2020). Examining the Mediating Influence of Interlocking Board Networks on Grant Making in Public Foundations. *Nonprofit and Voluntary Sector Quarterly*, 0899764019897845. https://doi.org/10.1177/0899764019897845

Payne, A. A. (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.

Payne, A. A. (2009). Does Government Funding Change Behavior? An Empirical Analysis of Crowd Out. In *Tax Policy and the Economy*. Cambridge, Mass.; Chicago, Ill., National Bureau of Economic Research ; University of Chicago Press.

Pennerstorfer, A., & Neumayr, M. (2017). Examining the Association of Welfare State Expenditure, Non-profit Regimes and Charitable Giving. *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations*, *28*(2), 532–555. https://doi.org/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.

Reifman, A., & Keyton, K. (2010). Winsorize. In N. J. Salkind (Ed.), *Encyclopedia of Research Design* (pp. 1637–1638). SAGE Publications, Inc.

Ribar, D. C., & Wilhelm, M. O. (2002). Altruistic and Joy-of-Giving Motivations in Charitable Behavior. *Journal of Political Economy*, *110*(2), 425–457. https://doi.org/10.1086/338750

Rubin, D. B. (1987). *Multiple Imputation for Nonresponse in Surveys*. Wiley.

Shen, Y., Yu, J., Li, Y., & Huang, B. (2019). Government Funding and Nonprofit Revenues in China: A Cross-Regional Comparison. *Public Performance & Management Review*, *42*(6), 1372–1395. https://doi.org/10.1080/15309576.2019.1652660

Shi, T. (2001). Cultural Values and Political Trust: A Comparison of the People's Republic of China and Taiwan. *Comparative Politics*, *33*(4), 401–419. https://doi.org/10.2307/422441

Sokolowski, S. W. (2013). Effects of Government Support of Nonprofit Institutions on Aggregate Private Philanthropy: Evidence from 40 Countries. *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations*, *24*(2), 359–381. https://doi.org/10.1007/s11266-011-9258-5

Spires, A. J. (2011). Contingent Symbiosis and Civil Society in an Authoritarian State: Understanding the Survival of China's Grassroots NGOs. *American Journal of Sociology*, *117*(1), 1–45. https://doi.org/10.1086/660741

Tinkelman, D., & Neely, D. G. (2018). Revenue Interactions: Crowding Out, Crowding In, Or Neither? In B. A. Seaman & D. R. Young (Eds.), *Handbook of Research on Nonprofit Economics and Management: Second Edition* (pp. 35–61). Edward Elgar Publishing.

Wang, Q. (2018a). Have foundations become an independent sector in China? Exploring the links between foundations and the state. *Asia Pacific Journal of Public Administration*, *40*(1), 68–73. https://doi.org/10.1080/23276665.2018.1445804

Wang, Q. (2018b). A Typological Study of the Recent Development and Landscape of Foundations in China. *Chinese Political Science Review*, *3*(3), 297–321. https://doi.org/10.1007/s41111-018-0094-2

Wang, Z. (2005). Before the Emergence of Critical Citizens: Economic Development and Political Trust in China. *International Review of Sociology*, *15*(1), 155–171. https://doi.org/10.1080/03906700500038876

Wasserman, S., & Faust, K. (1994). *Social Network Analysis: Methods and Applications*. Cambridge University Press.

Wei, Q. (2017). From Direct Involvement to Indirect Control? A Multilevel Analysis of Factors Influencing Chinese Foundations' Capacity for Resource Mobilization. *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations*. https://doi.org/10.1007/s11266-017-9924-3

White, H. (1980). A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity. *Econometrica*, *48*(4), 817–838. https://doi.org/10.2307/1912934

Zheng, W., Ni, N., & Crilly, D. (2019). Non-profit organizations as a nexus between government and business: Evidence from Chinese charities. *Strategic Management Journal*, *40*(4), 658–684. https://doi.org/10.1002/smj.2958

Zhong, Y. (2014). Do Chinese People Trust Their Local Government, and Why?: An Empirical Study of Political Trust in Urban China. *Problems of Post-Communism*, *61*(3), 31–44. https://doi.org/10.2753/PPC1075-8216610303

Zingales, L. (2017). Towards a Political Theory of the Firm. *Journal of Economic Perspectives*, *31*(3), 113–130. https://doi.org/10.1257/jep.31.3.113

A Online Appendix

A.1 Data preprocessing procedures for imputing missing data

There are three types of erroneous entries[1]:

- 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.

[1] See Table A2 for the meaning of variables.

A.2 Tables

Table A1: ADMINISTRATIVE DIVISIONS OF THE PEOPLE'S REPUBLIC 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 & 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.	.025	4.6	11000
Direct government funding	19609	9.8	210	0.	0.	0.	0.	14000
Neighbor government funding (10^5 CNY)	19609	38	450	0.	0.	0.	0.	14000
Degree centrality (10^3)	19609	.43	.82	0.	0.	0.	.44	9.6
Betweenness centrality (10^3)	19609	.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	.070	2.7	3.7	4.7	9.1
Asset size (10^7 CNY)	19074	4.4	1.7	.70	2.9	4.3	5.5	8.2
Board size (#people)	19074	1.9	.67	.71	1.4	1.8	2.3	3.8
Number of government officials serving as principals (#people)	19074	5.5	3.0	.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.	.22	.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	.48	1.6	0.	0.	0.	0.	41
Percentage of population aged 65 and above (%)	16956	.14	.65	0.	0.	0.	0.	36
Percentage of people making charitable donations (%)	19577	.98	14	0.	.019	.080	.33	1200
Percentage of people volunteering (%)	19609	3.6	38	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 the base year.

Table A4: RESULTS OF REGRESSION MODELS ON DIFFERENT DATASETS AFTER WINSORIZATION

	pols-pooled	*pols-core*	*pols-3plus*	*otfe-pooled*	*otfe-core*	*otfe-3plus*
Direct govt. funding	.0034	.00069	−.020	−.12	.0022	−.0026
	(.070)	(.010)	(−.30)	(−1.0)	(.030)	(−.030)
Neighbor govt. funding	.16*	.18*	.17*	.29**	.22*	.23*
	(1.8)	(1.8)	(1.8)	(2.4)	(1.8)	(1.8)
Betweenness centrality	−.50	.33	.46	−.54	−.91	−.72
	(−.53)	(.29)	(.39)	(−.58)	(−1.1)	(−.89)
Closeness centrality	.15***	.14***	.14***	−.0063	−.028	−.036
	(3.2)	(3.2)	(3.2)	(−.080)	(−.47)	(−.59)
Katz centrality	−.023	−.061	−.086	−.073	−.071**	−.088***
	(−.28)	(−.69)	(−.88)	(−1.6)	(−2.3)	(−2.6)
Organizational controls	yes	yes	yes	p.o.	p.o.	p.o.
Regional controls	yes	yes	yes	p.o.	p.o.	p.o.
Observations	6880	5170	4923	6880	5170	4923
Adjusted/Within R^2	.074	.095	.11	.026	.015	.018

Note: *Dependent variable* = private donations made by individuals; *pols* = pooled ordinary least square; *otfe* = organization and time fixed-effect; *pooled* = pooled dataset; *core* = core dataset; *3plus* = organizations with more than three observations in *core* dataset; p.o. = partly omitted. 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. *t* statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A5: CORRELATION MATRIX OF COEFFICIENTS OF *otfe* MODEL ON *pooled* DATASET

	D	*N*	*B*	*C*	*K*
Direct government funding	1.0				
Neighbor government funding	−.24	1.0			
Betweenness centrality	−.12	−.0048	1.0		
Closeness centrality	−.045	−.13	−.49	1.0	
Katz centrality	.019	.011	−.59	−.11	1.0

Note: *otfe* = organization and time fixed-effect; *pooled* = pooled dataset.

Table A6: REGRESSION MODELS WITH LEADERSHIP CHANGE OR NEIGHBOR EXPENDITURE

	Considering Leadership Change			Considering Neighbor Expenditure		
	otfe-pooled	*otfe-core*	*otfe-3plus*	*otfe-pooled*	*otfe-core*	*otfe-3plus*
Direct govt. funding	−.023	−.000 13	−.000 12	−.025	−.012	−.012
	(−1.1)	(−.020)	(−.020)	(−1.3)	(−.92)	(−.93)
Neighbor govt. funding	.43*	.37**	.37**	.42*	.35**	.34**
	(1.8)	(2.3)	(2.3)	(1.9)	(2.3)	(2.3)
Betweenness centrality	2.4	2.6	2.6	1.6	1.5	1.8
	(.95)	(.82)	(.82)	(.84)	(.63)	(.73)
Closeness centrality	−.025	−.057	−.057	−.041	−.13	−.13
	(−.12)	(−.21)	(−.21)	(−.23)	(−.48)	(−.48)
Katz centrality	−.24	−.28*	−.28*	−.24*	−.22	−.26*
	(−1.5)	(−1.7)	(−1.7)	(−1.8)	(−1.6)	(−1.7)
Organizational controls	p.o.	p.o.	p.o.	p.o.	p.o.	p.o.
Regional controls	p.o.	p.o.	p.o.	p.o.	p.o.	p.o.
Observations	5570	4670	4552	6880	5170	4923
Within R^2	.010	.0096	.0096	.0048	.0044	.0051

Note: *Dependent variable* = private donations made by individuals; *pols* = pooled ordinary least square; *otfe* = organization and time fixed effect; *pooled* = pooled dataset; *core* = core dataset; *3plus* = organizations with more than three observations in *core* dataset; *p.o.* = partly omitted. 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. t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A7: RESULTS OF REGRESSION MODELS USING LAGGED VARIABLES

	otfe-pooled	*otfe-core*	*otfe-3plus*
Direct govt. funding	−.25	.026	.026
	(−1.1)	(.34)	(.34)
Neighbor govt. funding	.40	.26*	.26*
	(1.6)	(1.7)	(1.7)
Betweenness centrality	3.8	3.0	3.0
	(1.3)	(.88)	(.87)
Closeness centrality	.022	.042	.042
	(.15)	(.23)	(.23)
Katz centrality	−.42**	−.46**	−.46**
	(−2.2)	(−2.3)	(−2.3)
Organizational controls	p.o.	p.o.	p.o.
Regional controls	p.o.	p.o.	p.o.
Observations	5505	4713	4603
Within R^2	.011	.010	.010

Note: *Dependent variable* = private donations made by individuals; *otfe* = organization and time fixed-effect; *pooled* = pooled dataset; *core* = core dataset; *3plus* = organizations with more than three observations in *core* dataset; p.o. = partly omitted. 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. Variables of direct and neighbor government funding are lagged one year. 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. t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A8: BUILD ESTIMATIONS: POOLED ORDINARY LEAST SQUARE ON *pooled* DATASET

	pols-w/o	*pols-btw*	*pols-cls*	*pols-katz*	*pols-all*
Government funding	$-.0086^{**}$	$-.0086^{**}$	$-.0084^{**}$	$-.0085^{**}$	$-.0085^{**}$
	(.0037)	(.0037)	(.0036)	(.0037)	(.0037)
Neighbor government funding	.18	.18	.16	.18	.16
	(.13)	(.13)	(.13)	(.13)	(.13)
Betweenness centrality		$-.081$			-1.7
		(.84)			(1.7)
Closeness centrality			$.26^{***}$		$.31^{***}$
			(.076)		(.091)
Katz centrality				.000 90	$-.015$
				(.17)	(.21)
Organizational controls	yes	yes	yes	yes	yes
Regional controls	yes	yes	yes	yes	yes
N	6880	6880	6880	6880	6880
Adjusted R^2	.026	.025	.027	.025	.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. t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A9: BUILD ESTIMATIONS: POOLED ORDINARY LEAST SQUARE ON *core* DATASET

	pols-w/o	*pols-btw*	*pols-cls*	*pols-katz*	*pols-all*
Government funding	$-.012^{***}$	$-.012^{***}$	$-.012^{***}$	$-.012^{***}$	$-.012^{***}$
	(.0035)	(.0035)	(.0035)	(.0035)	(.0035)
Neighbor government funding	.22	.22	.21	.22	.21
	(.15)	(.15)	(.15)	(.15)	(.15)
Betweenness centrality		1.1			$-.087$
		(1.1)			(2.2)
Closeness centrality			$.26^{**}$		$.28^{**}$
			(.080)		(.095)
Katz centrality				$-.031$	$-.071$
				(.20)	(.24)
Organizational controls	yes	yes	yes	yes	yes
Regional controls	yes	yes	yes	yes	yes
N	5170	5170	5170	5170	5170
Adjusted R^2	.026	.025	.026	.025	.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. t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A10: BUILD ESTIMATIONS: POOLED ORDINARY LEAST SQUARE ON *3plus* DATASET

	pols-w/o	*pols-btw*	*pols-cls*	*pols-katz*	*pols-all*
Government funding	$-.013^{***}$	$-.013^{***}$	$-.013^{***}$	$-.013^{***}$	$-.013^{***}$
	(.0036)	(.0036)	(.0036)	(.0037)	(.0036)
Neighbor government funding	.22	.21	.20	.22	.20
	(.14)	(.14)	(.15)	(.14)	(.14)
Betweenness centrality		.96			.053
		(1.1)			(2.3)
Closeness centrality			$.26^{***}$		$.28^{***}$
			(.079)		(.095)
Katz centrality				$-.056$	$-.10$
				(.22)	(.26)
Organizational controls	yes	yes	yes	yes	yes
Regional controls	yes	yes	yes	yes	yes
N	4923	4923	4923	4923	4923
Adjusted R^2	.030	.030	.031	.030	.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. t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A11: BUILD ESTIMATIONS: ORGANIZATION AND TIME FIXED EFFECT ON *pooled* DATASET

	otfe-w/o	*otfe-btw*	*otfe-cls*	*otfe-katz*	*otfe-all*
Direct govt. funding	−.025	−.025	−.025	−.025	−.025
	(−1.2)	(−1.2)	(−1.2)	(−1.2)	(−1.2)
Neighbor govt. funding	.41*	.41*	.41*	.41*	.41*
	(1.8)	(1.8)	(1.8)	(1.9)	(1.8)
Betweenness centrality		.22			1.6
		(.16)			(.80)
Closeness centrality			−.066		−.058
			(−.45)		(−.34)
Katz centrality				−.20*	−.22
				(−1.7)	(−1.6)
Organizational controls	p.o.	p.o.	p.o.	p.o.	p.o.
Regional controls	p.o.	p.o.	p.o.	p.o.	p.o.
Observations	6880	6880	6880	6880	6880
Within R^2	.0069	.0069	.0069	.0075	.0076

Note: *Dependent variable* = private donations made by individuals; *otfe* = organization and time fixed effect; *w/o* = without all network measures; *btw* = betweenness centrality; *cls* = closeness centrality; *katz* = Katz centrality; *all* = with all network measures; *p.o.* = partly omitted. 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. t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A12: BUILD ESTIMATIONS: ORGANIZATION AND TIME FIXED EFFECT ON *core* DATASET

	otfe-w/o	*otfe-btw*	*otfe-cls*	*otfe-katz*	*otfe-all*
Direct govt. funding	−.010	−.010	−.010	−.010	−.010
	(−.76)	(−.76)	(−.77)	(−.75)	(−.74)
Neighbor govt. funding	.37**	.37**	.37**	.37**	.37**
	(2.3)	(2.3)	(2.3)	(2.3)	(2.3)
Betweenness centrality		.30			2.1
		(.17)			(.77)
Closeness centrality			−.088		−.080
			(−.42)		(−.33)
Katz centrality				−.23*	−.25*
				(−1.8)	(−1.7)
Organizational controls	p.o.	p.o.	p.o.	p.o.	p.o.
Regional controls	p.o.	p.o.	p.o.	p.o.	p.o.
Observations	5170	5170	5170	5170	5170
Within R^2	.0061	.0061	.0061	.0071	.0072

Note: *Dependent variable* = private donations made by individuals; *otfe* = organization and time fixed effect; *w/o* = without all network measures; *btw* = betweenness centrality; *cls* = closeness centrality; *katz* = Katz centrality; *all* = with all network measures; *p.o.* = partly omitted. 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. t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A13: BUILD ESTIMATIONS: ORGANIZATION AND TIME FIXED EFFECT ON *3plus* DATASET

	otfe-w/o	*otfe-btw*	*otfe-cls*	*otfe-katz*	*otfe-all*
Direct govt. funding	−.010	−.010	−.010	−.010	−.010
	(−.77)	(−.76)	(−.77)	(−.75)	(−.74)
Neighbor govt. funding	.37**	.37**	.37**	.37**	.37**
	(2.3)	(2.3)	(2.3)	(2.4)	(2.3)
Betweenness centrality		.42			2.5
		(.24)			(.87)
Closeness centrality			−.092		−.085
			(−.44)		(−.35)
Katz centrality				−.26*	−.28*
				(−1.8)	(−1.7)
Organizational controls	p.o.	p.o.	p.o.	p.o.	p.o.
Regional controls	p.o.	p.o.	p.o.	p.o.	p.o.
Observations	4923	4923	4923	4923	4923
Within R^2	.0067	.0067	.0067	.0078	.0080

Note: *Dependent variable* = private donations made by individuals; *otfe* = organization and time fixed effect; *w/o* = without all network measures; *btw* = betweenness centrality; *cls* = closeness centrality; *katz* = Katz centrality; *all* = with all network measures; *p.o.* = partly omitted. 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. t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

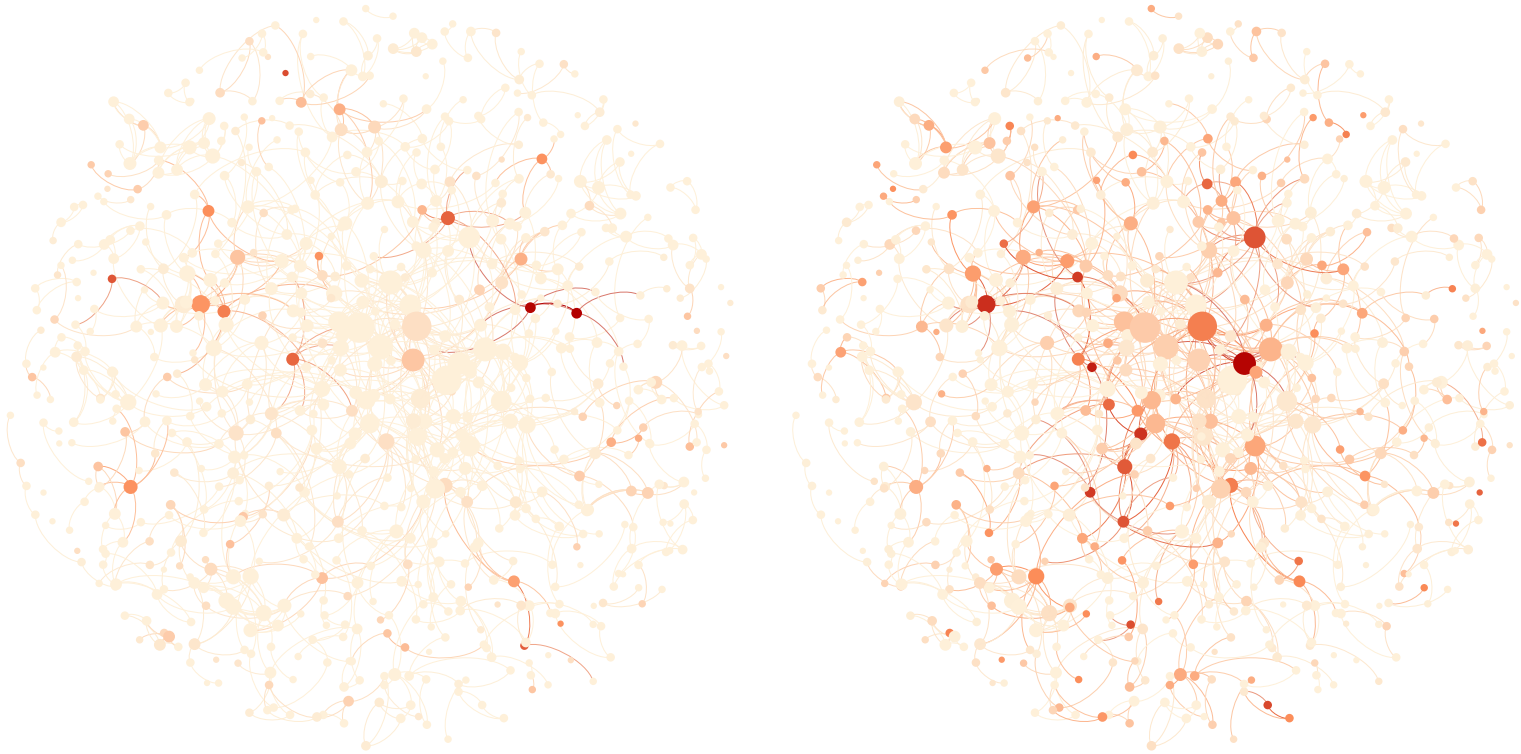
Table A14: REGRESSION MODELS USING RAW VALUES OF NEIGHBOR GOVERNMENT FUNDING

	pols-pooled	*pols-core*	*pols-3plus*	*otfe-pooled*	*otfe-core*	*otfe-3plus*
Direct govt. funding	$-.0081^{**}$	$-.012^{***}$	$-.012^{***}$	$-.025$	$-.0086$	$-.0089$
	(-2.0)	(-2.7)	(-2.9)	(-1.3)	$(-.68)$	$(-.70)$
Raw neighbor govt. funding	.0070	$.0088^{*}$	$.0086^{*}$	$.011^{*}$	$.0091^{**}$	$.0091^{**}$
	(1.6)	(1.7)	(1.7)	(1.9)	(2.1)	(2.1)
Betweenness centrality	-1.1	.41	.61	.43	1.1	1.4
	$(-.66)$	(.20)	(.27)	(.24)	(.52)	(.64)
Closeness centrality	$.22^{***}$	$.24^{***}$	$.23^{***}$	$-.0082$	$-.050$	$-.049$
	(3.0)	(2.8)	(2.7)	$(-.060)$	$(-.37)$	$(-.35)$
Katz centrality	$-.014$	$-.073$	$-.097$	$-.25^{*}$	$-.26^{*}$	$-.30^{*}$
	$(-.070)$	$(-.31)$	$(-.38)$	(-1.9)	(-1.9)	(-1.9)
Organizational controls	yes	yes	yes	p.o.	p.o.	p.o.
Regional controls	yes	yes	yes	p.o.	p.o.	p.o.
Observations	14931	12020	11016	14931	12020	11016
Adjusted/Within R^2	.029	.026	.029	.0066	.0046	.0054

Note: *Dependent variable* = private donations made by individuals; *pols* = pooled ordinary least square; *otfe* = organization and time fixed-effect; *pooled* = pooled dataset; *core* = core dataset; *3plus* = organizations with more than three observations in *core* dataset; *p.o.* = partly omitted. 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. t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

A.3 Figures

Figure A1: THE BOARD INTERLOCKING NETWORK OF CHINESE FOUNDATIONS IN 2013



(a) OPACITY REPRESENTS GOVERNMENT FUNDING

(b) OPACITY REPRESENTS PRIVATE DONATIONS

Note: Isolated nodes and dyads are removed in both graphs. 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).

References

Bian, Y., & Li, L. (2012). The Chinese General Social Survey (2003-8). *Chinese Sociological Review*, *45*(1), 70–97. https://doi.org/10.2753/CSA2162-0555450104

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

Ma, J., Wang, Q., Dong, C., & Li, H. (2017). The research infrastructure of Chinese foundations, a database for Chinese civil society studies. *Scientific Data*, *4*, sdata201794. https://doi.org/10.1038/sdata.2017.94

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

White, H. (1980). A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity. *Econometrica*, *48*(4), 817–838. https://doi.org/10.2307/1912934