

DOES MUNICIPAL MANAGEMENT CAPACITY MATTER? COMPETITIVE VERSUS NEGOTIATED PROCUREMENT IN CHINA'S PUBLIC-PRIVATE PARTNERSHIPS

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ABSTRACT

This study attempts to investigate the relationship between municipal management capacity and PPP procurement methods in PPP projects. Using a comprehensive pooled cross-sectional dataset at the municipal level in China, this study finds that, while the complexity of contract types significantly reduces the probability of using more competitive and market-led procurement methods, municipal organizational capacity, fiscal capacity and also prior PPP experiences of the municipal government will lead to more competitive procurement methods. This study helps understand the decision-making mechanism and managerial behavior of municipal governments in China's recent PPP development. The findings provide policy insight into the regulation and administration of PPPs in China and other developing countries.

Keywords: management capacity; organizational capacity; fiscal capacity; public-private partnership; procurement method

INTRODUCTION

After several decades of slow development, public-private partnerships (PPP) are currently in vogue in China, actively promoted by the central government and pursued by many cities, as an innovative way to engage societal resources (or “social capital”, as it is often translated from Chinese) to support infrastructure development or public services delivery (Zhao, Su & Li, 2018). More than 10 thousand PPP projects have been rolled out since 2014, with a total financing target surpassing 15 trillion RMB. Meanwhile, the rise of PPPs is raising concerns about whether they are real partnerships between the public and private sectors. Many believe that the investment environment in China's PPP market is not open and non-discriminatory for private firms to compete with state-owned enterprises (SOEs) on an equal footing. A Bloomberg News article blatantly stated, “in China, public-private partnerships are really public-public” since most project partners turn out to be state-owned enterprises (SOEs). Thus, whether the PPP formation process is open and transparent for potential partners to have fair competition is one of the raising concerns.

One important step of the PPP formation, i.e. the procurement, in which the government selects private partners to reach contract agreements. The methods of procurement may include open tendering, invited tendering, competitive negotiations, competitive consultations, and single source procurement (China PPP Center). Some of these methods are more competitive and transparent while others are less so and relying mostly upon negotiations. The distinction between market-led and nonmarket-led transaction methods is important because procurement methods will significantly affect contract arrangement and associated financial costs from the public perspective, and also private investors' confidence in the PPP schemes (Solino and de Santos, 2016) and accordingly private investment in PPPs (Wang et al, 2018) from the private perspective.

Competitive tendering is generally preferred to negotiation in PPP procurement because a competitive tendering process is believed to be more transparent and fair than a negotiated process, thus higher accountability and less

corruption opportunities. It is also generally believed that competition has the advantage of cost savings, efficiency gain and value for money. For instance, Lalive and Schmutzler (2011) shows that procurement prices are lower when auctions are used instead of negotiations to procurement railway passenger services in Germany. A trans-European study found that tenders tend to decrease delivery costs compared with using negotiation during the procurement process (Bel and Rosell, 2016).

However, missing from the aforementioned political and economic perspectives is a discussion of how municipal management capacity can influence the selection of PPP procurement methods. The success or failure of PPPs likely depends on how well municipal governments can manage the entire PPP formation process, from project initiation and planning, through procurement to contract management and monitoring— activities that require strong government management capacity. Municipal governments with higher management capacity may be better positioned to harness the promise of effective PPP formation. Despite extant studies on government capacity required throughout the PPP cycle across the world and in China, missing from the discussion is a rigorous analysis of the management capacity needed for PPP procurement method decisions. No systematic research has been conducted to understand how municipal governments make related decisions and what factors influence their selection of procurement methods in PPP projects.

This study attempts to do just that. In particular, it focuses on the relationship between municipal management capacity and the use of procurement methods, using China’s PPP projects as our empirical data. China has the world’s largest PPP market, thus providing us an excellent case for investigating our research question. In particular, this study hypothesizes that, holding control for PPP contract characteristics (contract types, contract duration and project size), the administrative status, size and fiscal capacity of the municipal government, and previous PPP experiences will lead to the selection of more competitive and market-led procurement methods. It will help understand the decision-making mechanism and the managerial behavior of municipal governments in China’s recent PPP development. The findings from this study will also provide policy insight into the regulation and administration of PPPs in China and the rest of the world.

In the following sections, after a literature review, the authors develop hypotheses about the relationship between municipal management capacity and the selection of PPP procurement methods, then discuss models and data, followed by presentation of empirical findings. Finally, the authors conclude by addressing policy implications and discussing future directions of research.

LITERATURE REVIEW

Procurement is a standard government function, and in the last few decades, traditional public procurement has expanded beyond contracting out goods and services to include Public-private partnership (PPP) projects. Despite extant studies on traditional project procurement, few examine the procurement of PPP projects. PPP projects differ from projects contracted out in the traditional way and the procurement process for PPP projects takes longer and is more complex than traditional procurement processes. Although there are differences between PPP and traditional procurements, theoretical and empirical analysis of procurement methods beyond PPPs to include traditional projects in contracting out provides a useful lens through which to examine the management factors that affect transaction methods during the PPP procurement process. The following sections will have a literature review of both traditional and PPP procurement research.

Competitive versus Negotiated Procurement

Competition is a fundamental principle of the regulations governing both PPP and traditional procurements. Competitive procurement procedures, and more particularly both open tendering and invited tendering, promote the appearance of an open, transparent and fair process, thus, has traditionally been seen as more effective to achieve value for money and to avoid favouritism and corruption during the procurement process. According to an Ohio Court, competitive bidding “gives everyone an equal chance to bid, eliminates collusion, and saves

taxpayers' money... It fosters honest competition in order to obtain the best work and supplies at the lowest possible price because taxpayers' money is being used. It is also necessary to guard against favoritism, impudence, extravagance, fraud and corruption.” (Sweet, 1994, p.379) In contrast, negotiated procurement is considered as opaque and prone to favoritism and corruption. Yet, where qualified market operators are few and thus there is no existence of a competitive bid market, governments can consider less market-led methods, for example, negotiations, consultations and single source procurement. It is therefore not surprising to observe that competitive procurement is used to award 82% of the procurement contracts in the public works sector in Europe (Internal Market Scoreboard, 2009) while in Northern California of the United States, they correspond to 97% of public sector building construction projects (Tadelis and Bajari, 2006).

However, recent developments in the traditional procurement research tend to mitigate this conventional wisdom and suggest that the advantages of competitive procurements are not as clear as traditionally claimed. For instance, Vellez (2011) find that the use of competitive tendering does not necessarily lead to lower prices in public procurement of medical technology in Italy compared with negotiations. Gauasch et al. (2008) and Estache et al. (2009) also show that contracts awarded via competitive tendering are more likely to be renegotiated than contracts awarded via negotiation, and the resulting additional costs are estimated to amount to 10% of the initial contracted costs. Instead, recent development in the literature has recognized some limitations of competitive tendering and suggested that in some cases, notably for complex goods or services, negotiation is more efficient than competitive tendering. Competitive tendering may perform poorly when projects are complex, contractual design is incomplete and there are few available bidders; furthermore, competitive tendering may stifle communication between buyers and sellers, preventing the buyer from utilizing the contractor's expertise when designing the project (Bajari et al., 2008; Hensher and Stanley, 2008; Tadelis and Bajari, 2006).

Interestingly, while competitive tendering is promoted in the public sector, research shows that negotiation is actually the preferred procurement method in the private sector in the U.S. due to some advantages of negotiation (see Bajari and Tadelis, 2001; Bajari et al., 2006, 2009; Tadelis and Bajari, 2006). According to Tadelis and Bajari (2006), from 1995 to 2000, 43% of private sector non-residential building construction projects in Northern California were procured through negotiations while only 18% through competitive tendering, as compared to 97% of the projects in the public sector. As Tadelis and Bajari (2006) has argued, “as private sector firms are more sensitive to cost minimization, it is reasonable to conclude that their behavior is more responsible to optical choices.”

Tadelis and Bajari (2006) also shows two channels through which negotiations can be more attractive than competitive tendering. The first channel is the need for flexibility and changes to incompletely specified designs of complex projects, and the second is using the knowledge and experience of a contractor before the designs are complete and construction begins. As they have argued, if a project is awarded through competitive bidding, “a contractor has an incentive to hide information about design flaws, submit a low bid, and recoup profits when changes will be required.” (p.14)

Furthermore, competitive tendering process is not immune to favoritism and corruption (Burguet and Che, 2004; Compte et al., 2005; Lambert-Mogiliansky and Sonin, 2006). Evidence of favoritism and corruption in public procurement has been found in both developing (e.g. Svensson, 2003) and developed countries (e.g. Hyytinen et al., 2009). For instance, Hyytinen et al. (2009) documented favoritism in public procurement auctions of a clearly defined low-tech product, (internal) cleaning service contracts, using data from Swedish municipalities in the 1990s. Their data show that the lowest bid does not win 58% of the time, and municipalities pay on average 43% more than the lowest bid. Their results demonstrate that favoritism may quickly occur even Sweden, a country that is one of the least corrupted countries in the world.

The procurement method issue investigated above is generally applicable to China's context since the central government has also attempted to promote market mechanisms via competitive tendering, in particular including open tendering and invited tendering, as compared to competitive negotiations, competitive consultations, and single source procurement though market mechanisms do not guarantee better value for money and less

corruption.

Factors Affecting Procurement Methods

The two primary motivations for public procurement through competitive tendering or negotiation are efficiency gain and hampering corruption, though the advantages and disadvantages of competitive versus negotiated procurements have both been highlighted in the public procurement research literature. Thus, the trade-off between competitive and negotiated procurements should be made according to the characteristics of the project (notably its contract type, size and duration) and also of the clients (notably the public buyers' expertise and competencies in public procurement), as well as degree of competition among suppliers (Bajari and Tadelis, 2001; Bajari et al. 2006, 2009; Estache et al., 2009; Chong et al., 2010).

A transaction costs-based model has been introduced to explain the drivers of procurement method selection made by municipalities. Transaction costs are the expenses incurred in managing service delivery that can occur under both in-house and contracted services and can be divided into two categories: the *ex ante* or front-end transaction costs (EATCs) and *ex post* or back end transaction costs (EPTCs) (Williamson, 1981, 1985). EATCs refer to the tasks of defining, negotiating, and maintaining an agreement. They include search and information costs, i.e., transaction costs incurred in determining whether the required good is available on the market, its lowest price and so on, and bargaining costs, i.e., costs to reach an agreement and draft an appropriate contract; while EPTCs include the monitoring and enforcing costs, due to the need for monitoring that the other party fulfils the terms of the contract and taking an appropriate action if not (Arrow, 1974; Williamson, 1981). The consensus view is that PPPs are prone to higher transaction costs than traditional public provision, although PPPs can offer considerable benefits and significant savings over the entire life cycle of the project (Selino and de Santos, 2010). Furthermore, the higher complicity of the tendering processes in PPPs compared to traditional procurement increases the transaction costs, i.e., the cost of procuring, monitoring and enforcing contracts, much more than traditional procurement (Carbonara, Costantino and Pellgrino, 2016). Therefore, municipal governments have to take into account the amount of transaction costs when making PPP decisions, which must be set against any benefits in terms of economic efficiency gains (Zitron, 2006).

Selino and de Santos (2010) considered the transaction costs incurred at the stage of project preparation and bidding, and observed that transaction costs for the public sector are higher for the Negotiated than the Open procurement procedure in transport PPPs in the EU.¹ In their sample of 25 projects across three different EU countries (the UK, Spain and Austria) during the period of 1992-2007, the average value for transaction costs for the public sector under Open procedure is 0.92% of capital value, while the average value for projects tendered under Negotiated procedure is 2.54%. Applying their model, the estimated transaction costs to the public sector in the case of a PPP road project of medium capital value (€200 million) are €1.34 million (0.67% on capital value) in the Open procedure and €4.18 million (2.09% on capital value) in the Negotiated procedure. In the case of a railway project with the same capital, the transaction costs would be €2.41 million (1.20% on capital value) in the Open procedure and €7.52 million (3.76% on capital value) in the Negotiated procedure.² Carbonara et al. (2016) further developed a conceptual model that relates the procurement procedures described in the EU legal framework and the transaction costs by considering the level of information managed by each procurement procedure and the impact that project- and country-related factors have on the choice of the procurement procedure that minimizes the transaction costs.

Some recent studies attempt to address the role of politics in public procurement. Hyytinen et al. (2009) studied public procurement of cleaning services in Swedish municipalities, showing that political identity of the

¹ The procurement procedures described in the EU legal framework to launch PPPs are namely Open procedures, Restricted procedures, Negotiated procedures and Competitive Dialogue.

² The study also estimated the transaction costs for the winning bidders and failed bidders (on average, 48% of transaction costs for the winning bidders), and the difference between the Open procedure and the Negotiated procedure is greater than in the case of transaction costs for the public sector.

governing party has an impact on procurement outcome notably concerning the choice of local firms. Coviello and Gagliarducci (2010) used Italian data and found that political turnover affects the functioning of public procurement auctions. Spiller (2009, 2011) and Moszoro and Spiller (2011) showed the impact of “third party opportunism,” arguing that probity, and the suspicion of lack of probity, is the driver of public contracting, and leads to more rigid public contracting. Similarly, Chong et al. (2010) argued that the choice between auction and negotiation in public procurement can be affected by the desire of a public buyer to avoid suspicions of favouritism and corruption. Based on a French database of 2,671 public work procurement contracts in 2007, the empirical work by Chong et al. (2012) shows that the electoral pressure, measured as the extent of political market concentration and the score obtained by the political competitor, does affect the municipalities’ decision to award public procurement contracts through auctions or negotiations.

In contract theories, both internal and external factors have been identified influencing the selection of procurement systems. Internal factors include client and project characteristics, with client characteristics comprising variables such as client’s level of knowledge and control, political and social consideration, familiarity of the procurement systems, competition, funding arrangements, government (public/private sector projects) and risk allocation, whereas project characteristics comprise factors such as size and technical complexity of the project, influence of the project life cycle, expedited project delivery, time, quality and price certainty; and external factors include market competition, information technology, regulatory environment, natural cases and globalization (see NEDO, 1985; Skitmore and Marsden, 1988; Turner, 1997; Love et al., 1998; Cheung et al., 2001; Ng et al., 2002; Mathonsi and Thwala, 2012). For instance, a study on factors influencing the choice of procurement methods for construction facilities in Guangdong Province of China has found that quality, risk, dispute, arbitration and price certainty were the most important determinants (Smith et al., 2004).

The Role of Management Capacity

The factors identified above mostly rely on economic, political and project-related considerations. Notably absent from extant research is extensive scholarship on the role of management capacity in traditional and PPP procurements. Procurement method decision for both traditional and PPP projects is a highly complex process requiring multiple types of expertise from public managers. Management capacity is public managers’ ability to know “whether they are doing the ‘right’ thing programmatically, whether they are doing it ‘well’, and whether they are doing ‘enough’ or ‘too much of it’” (Honadle and Howitt, 1986, p.2). Specifically, Honadle (1981) offers the following framework for management capacity building: anticipate change, make informed decisions about policy, develop programs to implement policy, attract and absorb resources, manage resources, and evaluate performance to guide future actions. Expanding the scope of management capacity to include the capacity of municipal government to organize and engage in a PPP is necessary in a world in which governments are increasingly providing services through PPPs. Management capacity is particularly important to ensure successful procurement of PPP projects. Furthermore, the realization of any potential benefits of PPPs and, in particular, the efficiency gains and other incentives of a competitive procurement method, will depend on the capacity of municipal governments to extract and deploy those savings. That is to say, procurement method decision is contingent upon the management capacity of the municipal governments under PPP projects.

Public management scholars have become increasingly concerned with the lack of needed management capacity for governments to develop and manage PPPs. Gestel et al. (2012) developed a PPP governance model by including the four dimensions of organizational capacity developed by Christiansen and Gazley (2008): human resources, external capacity, infrastructure capacity and financial capacity. Contract theories have mentioned or alluded to required expertise and competencies of governments as clients in traditional public procurement. For instance, Brown and Potoski (2003) identified three components of contract-management capacity for ensuring contract performance: feasibility assessment capacity, implementation capacity and evaluation capacity. They also identified four categories of factors that shape contract-management capacity: prior contracting experience, transaction costs, characteristics of the government’s structure and organization, and characteristics of the government’s external environment.

Most of these studies discuss the management issues throughout the entire life cycle of contracts, with few focusing on management capacity in the procurement process. No systematic research has been conducted to examine the possible association between management capacity and the selection of procurement methods. To fill the gap in the existing literature, this study investigates whether municipal management capacity has any impact on the selection of procurement methods in PPP projects. In particular, this study posits that municipal governments with higher management capacity may be better positioned to harness the promise of effective PPP formation by selecting contractors via competitive tendering, so they are more likely to select private partners through the method of competitive tendering.

THEORIES AND HYPOTHESES

PPP Procurement is a highly complex process requiring multiple components of management capacity. Given the higher complexity and transaction costs of competitive procurement compared with negotiated procurement, this study expects that higher management capacity is required for competitive procurement methods. A more complex procurement procedure with more actors (competing bidders) involved requires that the public sector has the requisite in-depth financial, legal, economic and project management skills. Higher level of management capacity is needed to assess the market situation, design the contract and evaluate potential bidders for specific PPP projects. Following past research on traditional and PPP procurements, this study identifies the following components of management capacity that might affect the selection of procurement methods: fiscal capacity, organizational capacity (including population, government size and administrative status of the city), and policy experience (prior PPP experience in this study).

Fiscal Capacity

The amount of transaction costs should affect the procurement method selected. Despite its more attractive benefits of a competitive bidding process, the *ex-ante* transaction costs are higher compared with negotiated procurement for two reasons: first, it requires higher degree of contract specificity to reduce future *ex post* transaction costs, which requires more time, information, knowledge and expertise (examples include hiring more staff trained in market analysis and contract design) and thus more initial resource investment compared with negotiated procurement; second, a competitive procurement procedure involves more actors, in particular, higher number of competing bidders, thus demanding more resources for qualification review and bid evaluation. Therefore, when fiscally weak cities look for private partners, they are more likely to select a less complex and costly procurement method. It can thus be expected that:

Hypothesis 1: Fiscal capacity is positively associated with the probability that a municipality selects a competitive procurement method.

Organizational Capacity: Municipality Size and Administrative Status

In addition to the fiscal capacity to attract and retain resources, municipalities must also have the organizational capacity to manage them effectively. According to Honadle (1981, p.17), “[w]ithout effective management of personnel, finances, time, information, and the other resources assigned to an organization, such resources will be dwindled away, and personnel will become demoralized by the lack of organization and direction.” This internal management capacity, or organizational capacity, refers to specific techniques that are important to effectively manage resources and performance (Higgins, 1986). While it may be difficult to quantify organizational capacity, it has been generally demonstrated that economies of scale exist for management capacity (Simonsen et al., 2001). Small and understaffed governments typically do not have the same level of organizational capacity, in terms of skilled staff and resources as larger and more sophisticated governments (Lehan, 1991; Sokolow and Honadle, 1984, Reed and Green, 1980). It is also clear from the literature that population size is often associated with a municipality’s complexity, the size and specialization of that government’s staff, thus, population is an important surrogate for a jurisdiction’s management capacity (Simonsen et al., 2001). The implications of this difference in

organizational capacity are likely to be more pronounced in the formulation and administration of PPPs. Smaller municipalities are more likely to report a lack of staff capacity to manage a more competitive but sophisticated procurement system. Accordingly, this study includes both government size and population size in the hypotheses:

Hypothesis 2a: Government size is positively associated with the probability that a municipality selects a competitive procurement method.

Hypothesis 2b: Population size is positively associated with the probability that a municipality selects a competitive procurement method.

Besides municipality size, one of the local institutional features that may also shape the organizational capacity of municipal governments is a city's administrative status. Chinese cities have different administrative ranks in the vertical hierarchical administrative structure. As the administrative rank is lower, administrative autonomy decreases, as does the rank of the leadership. Compared with lower status cities, cities with higher administrative status tend to have a higher level of autonomy, accountability and transparency (Zhang, 2014) and more technical ability to ensure the effectiveness of long-term contracts (Pistor, Raiser & Gelfer, 2000). In addition, higher status cities in China also have more subordinate governments and accordingly larger and more heavily populated jurisdictions, which signifies a more heterogeneous local economy with a larger pool of potential private partners. All these advantages enable higher status cities to mobilize more political and administrative resources and generate more support to deal with more complex management issues. This study thus expects:

Hypothesis 2c: Administrative status is positively associated with the probability that a municipality selects a competitive procurement method.

Prior PPP Experience

PPP is a new and infrequent practice for most governments compared with direct public provision and contracting out. Many governments lack the needed large government capacity (mainly in terms of experience, knowledge and expertise) to be able to develop and govern PPP projects (Gestel et al., 2012). When PPP began to be used, due to a lack of experience with long-term contracts, it was generally accepted in most countries that a Negotiated procedure was necessary to specify all aspects of the contract (Selino and de Santos, 2010). Once a government has undergone the onerous process of developing PPP projects, the previous experience of generating internal and external support for successful PPP procurement will help build up both the needed large government capacity and contract-management capacity. The enhanced capacity will enable the government to consider more complex procedures for new PPP projects. Thus, guided by this reasoning, this study develops the third hypothesis:

Hypothesis 3: Prior PPP experience is positively associated with the probability that a municipality selects a competitive procurement method.

PPP Contract Characteristics

Contract theory and transaction cost theory suggest that key project-related factors such as the type, size, duration and complexity of PPP contracts will influence the selection of procurement methods through the causal mechanism of transaction costs. From a transaction costs perspective, some contract types are more complex than others, requiring more specialized knowledge which is a high *ex ante* transaction cost, and contracts with larger project size and longer duration tend to be more complex projects. All these contract characteristics might influence the selection of the most suitable procurement method to minimize overall transaction costs. Accordingly, this study includes three PPP contract characteristics, contract types, contract duration and the size of the project, in the hypotheses:

Hypothesis 4a: Complexity of contract types is negatively associated with the probability that a municipality

selects a competitive procurement method.

Hypothesis 4b: Contract duration is negatively associated with the probability that a municipality selects a competitive procurement method.

Hypothesis 4c: Project size is negatively associated with the probability that a municipality selects a competitive procurement method.

DATA AND METHODOLOGY

Dependent Variable

The dependent variable in this paper is the procurement method decision of PPP projects. It is coded as an ordinal variable, with higher values referring to more competitive procurement methods. Table 1 gives more details.

Table 1. Procurement Methods of PPP Projects in China

Value	Procurement Method Decision
1	Single-source Procurement
2	Competitive Consultations
3	Competitive Negotiations
4	Invited Tendering
5	Open Tendering

Data on PPP projects are obtained from the China Public Private Partnerships Center³ which has an extensive database of PPP projects. This study focuses on PPP projects from 2008 to 2017 to concentrate on the gradual popularization of PPP from 2008 to 2014, and also the recent PPP boom from 2014 to 2017.

Independent Variables

Following our hypotheses, our independent variables are divided into four categories: organizational capacity, fiscal capacity, prior PPP experience, and contract characteristics. First, fiscal capacity is measured as per capita budgetary revenue. Second, variables in the Organizational Capacity category include government size (measured as share of government expenditure in GDP), log of population, and administrative status of the municipal government – status more important than population. This study includes dummy variables for whether a city is directly administered by the central government as well as whether a city is a provincial capital to measure the administrative status of the municipal government. These two categories of cities have higher administrative status than other cities and thus are expected to have higher organizational capacity. City data for population, government expenditure and revenue, and GDP are obtained from the CEIC database⁴.

Third, variables in the Prior PPP Experience category include the number of PPP projects the city has previously initiated, the logged number of days since the city's first PPP project, as well as the start year of the project (as a proxy for national experience of PPP). Data for this category of variables are derived from the PPP project dataset.

Lastly, variables for Contract Characteristics include contract type, contract duration of the PPP project (in years), as well as project size. Several types of contracts are observed in the PPP project dataset: BOT (Build-Operate-Transfer), BOO (Build-Own-Operate), O&M (Operate and Maintain), ROT (Rehabilitate-Operate-Transfer), TOT

³ In Pinyin, this is "Cai Zheng Bu Zheng Fu He She Hui Zi Ben He Zuo Zhong Xin". Website: <http://www.cpppc.org/>

⁴ <https://www.ceicdata.com/>

(Transfer-Operate-Transfer), BOT + TOT (a combination of BOT and TOT), and OTHERS. O&M only shifts the responsibilities of operation and maintenance to the private partner while still leaving investment and ownership with the public sector. Thus, it is a much less complex contract type than BOT, BOO, ROT, TOT, and BOT + TOT (a combination of BOT and TOT). BOO is generally regarded as the most complex contract type since it involves the shifting of not only operation and maintenance, but also investment and ownership of the project. The other categories of projects, BOT, ROT, TOT, and BOT + TOT, are very similar and this study collectively denotes them as “BOT+”⁵. Thus, dummy variables are used for whether a project is under the BOO category, O&M category, or the “OTHERS” Category (though in certain robustness checks, all observations from the “OTHERS” Category are removed and hence the coefficient is dropped). Contract duration of the PPP project (in years) and the project size (in yuan) are also observed in the dataset.

Control Variables

Control variables include the logged distance from Beijing, the provincial capital, as well as the city’s fiscal transparency. Google Maps is used to calculate the driving distance between the city and the provincial capital, as well as the distance between the city and Beijing⁶. The distance from Beijing as well as from the provincial capital are mainly used to control for access to external resources. As the distance between the city and higher authorities decreases, it becomes easier for the city government to “go to the ministry and seek money” (Pao Bu Qian Jin in *pinyin*, which ostensibly means “run forward,” but also can be translated as “go to the ministry and seek money”) and similarly seek money from the provincial government. Fiscal transparency is used to reflect the transparency of local PPP policy environment. This study assumes that a more fiscally transparent city government has a more open and transparent policy environment which might influence its decision to choose a more transparent and competitive procurement method for PPP projects. Data for this variable is from the “Chinese City Government Fiscal Transparency Report” published annually by the Center for Public Finance and Governance of Tsinghua University, China. Including this variable would thus lower standard errors and possibly reduce bias.

Regression Methodology

Since our dependent variable (procurement method decision) is an ordinal variable, our analysis relies on ordered logit models. The advantage of ordered logit models over OLS is that ordered logit models do not make any assumptions about the size of gaps between different values of the dependent variable. For example, OLS would assume that the difference in competitiveness between open tendering (category 5) and invited tendering (category 4) is the same as the difference in competitiveness between invited tendering and competitive negotiations (category 3). In contrast, under the ordered logit framework, category 5 is more competitive than category 4, which in turn is more competitive than category 3, but no assumptions are made about the size of differences between categories (because such comparisons may be difficult or impossible). However, a disadvantage of the ordered logit model is that it does not have closed form solutions, and hence parameters must be estimated using maximum likelihood estimators (MLE). To ensure quick convergence of MLE estimates, all variables are standardized (their mean is set to 0 and their standard deviation is set to 1 by subtracting the variable mean from each value, and then dividing by the standard deviation of the variable). Provincial fixed effects are also added to control for differences across provinces that do not change over time (e.g. geographic factors such as latitude and longitude).

RESULTS

Descriptive Statistics are included in table 2. Notice that several variables (e.g. government size) are right skewed and have outliers, as is evident from the summary statistics. This study verifies whether or not the results are driven by outliers by examining what happens if observations that are in the top 2% of outliers are dropped.

⁵ The number of BOT projects far exceeds the number of ROT, TOT, and BOT + TOT projects

⁶ For directly administered cities, Beijing is considered to be the provincial capital.

Table 2. Descriptive Statistics

	Mean	SD	Median	Min	Max
POP	5354.48	3602.71	4645.8	234.4	30484.3
GOVTSIZE	20%	11%	17%	6%	100%
CAPREV	4.57	3.57	3.36	0.23	21.94
MUNICIP	0.02	0.12	0	0	1
PCAPITAL	0.11	0.31	0	0	1
STYEAR	2015.78	1.27	2016	2008	2018
PPPCOUNT	7.36	10.66	4	1	83
PPPHIST	3.85	6.51	1.29	0.00	27.79
PPPINV	153081.08	353898.23	55130	1220	4520700
DURATION	20.01	8.61	18	3	100
BOO	0.05	0.22	0	0	1
O&M	0.01	0.07	0	0	1
OTHERS	0.1	0.31	0	0	1
D_BEIJING	1388.85954	950.14709	1159.372	0	4360.66
D_PCAPITAL	267.08396	284.98048	215.619	0	2279.912
TRANSP	53.09	14.61	52	0	90

POP	Population (thousands of permanent residents i.e. “Chang Zhu Ren Kou”)
GOVTSIZE	Government expenditure as percentage of GDP
CAPREV	Government revenue per capita ('000 yuan)
MUNICIP	Directly administered city (dummy variable)
PCAPITAL	Provincial capital (dummy variable)
STYEAR	Start year of project
PPPCOUNT	Number of previous PPP projects
PPPHIST	Days from first PPP project
PPPINV	Size of PPP projects ('0000 yuan)
DURATION	Duration (in years) of PPP project
BOO	Build-Order-Operate Project (Dummy variable)
O&M	Operate-and-Manage Project (Dummy variable)
OTHERS	Project not classified as BOO, O&M, BOT, TOT, ROT
D_BEIJING	Driving distance from Beijing in meters
D_PCAPITAL	Driving distance from provincial capital in meters
TRANSP	Fiscal Transparency index (Tsinghua University)

Regression results are presented in table 3. In Model 1 and Model 2, projects classified as “OTHERS” are left out, recall that these are projects not classified as BOO, O&M, BOT, ROT, TOT, or BOT + TOT. Model 3 and Model 4 contain such projects, along with a dummy variable to control for such projects. (Notice that there are dummy variables for contract types BOO and O&M. Hence the omitted categories of projects are BOT, ROT, TOT, and

BOT + TOT, which are collectively denoted as “BOT+”, since ROT, TOT, BOT + TOT are very similar to BOT, and in any case the number of BOT projects far exceeds the number of projects in the other categories).

Also, while Model 1 and Model 3 do not test for interaction effects, Model 2 and Model 4 interact contract types with our measures of fiscal capacity, namely population, government size, and government revenue per capita.

Table 3. Regression Results

Variable	M1	M2	M3	M4
POP (log)	0.295 **	0.311 ***	0.290 ***	0.308 ***
GOVTSIZE	0.415 ***	0.400 ***	0.449 ***	0.432 ***
CAPREV	0.208 *	0.218 *	0.110	0.116
MUNICIP	0.092	0.078	0.189	0.176
PCAPITAL	0.005	0.031	-0.075	-0.051
STYEAR	0.115	0.135 *	0.168 **	0.188 ***
PPPCOUNT	-0.065	-0.066	-0.076	-0.077
PPPHIST (log)	0.179 **	0.162 **	0.141 *	0.124 *
PPPINV (log)	-0.009	-0.024	-0.036	-0.049
DURATION	0.028	0.023	-0.012	-0.018
BOO	-0.263 ***	-0.409 ***	-0.246 ***	-0.386 ***
O&M	-0.042	-0.041	-0.028	-0.027
OTHERS			-0.110 *	-0.114 *
D_BEIJING (log)	-0.151	-0.172	0.047	0.032
D_PCAPITAL (log)	-0.248	-0.208	-0.416 **	-0.379 **
TRANSP	-0.108	-0.116	-0.107	-0.115
Pop*BOO		0.104		0.086
GovtSize*BOO		-0.221 **		-0.232 **
GovRevPerCapita*BOO		-0.096 *		-0.092 *
Observations	1410	1410	1385	1385
AIC	2292.14	2288.45	2539.01	2535.19

Our results are as follows: Fiscal capacity appears to be associated with procurement method decisions. In both Models 1 and 2, fiscal capacity is positively correlated with procurement method decisions, though the coefficients are statistically insignificant in Model 3 and 4 (the two specifications with interactive terms). Hence, in our view, Hypothesis 1 is confirmed.

The results regarding organizational capacity are mixed. Both government size and population are positively associated with procurement method decisions in all models. However, whether a city is directly administered by the central government, or whether it is a provincial capital, does not appear to affect procurement method decisions. As such, Hypothesis 2 is partially verified.

Regarding prior PPP experience, the number of PPP projects the city has previously initiated is not significantly related to procurement method decisions. However, the (logged) number of days since a city's first PPP project is positively and significantly related to procurement selection decisions in all four models. Also, the (value of the) start year of the PPP project is positively and significantly associated with the procurement decision in all models except Model 1. In other words, projects that started later are more likely to use more transparent procurement processes. As such, Hypothesis 3 is partially verified.

Hypothesis 4a states that more complex PPP contract types should on average use less competitive procurement methods than less complex contract types. It is observed that BOO projects indeed use less competitive procurement methods compared to less complex contract type BOT+ (the omitted category), and the same with OTHER contract types (compared with the omitted category), and in both cases (BOO and OTHER projects) the difference is statistically significant. However, there is no significant difference between O&M projects and non-O&M projects, though this could be due to low statistical power (there are only seven O&M projects in our sample). Hence, H4a is verified.

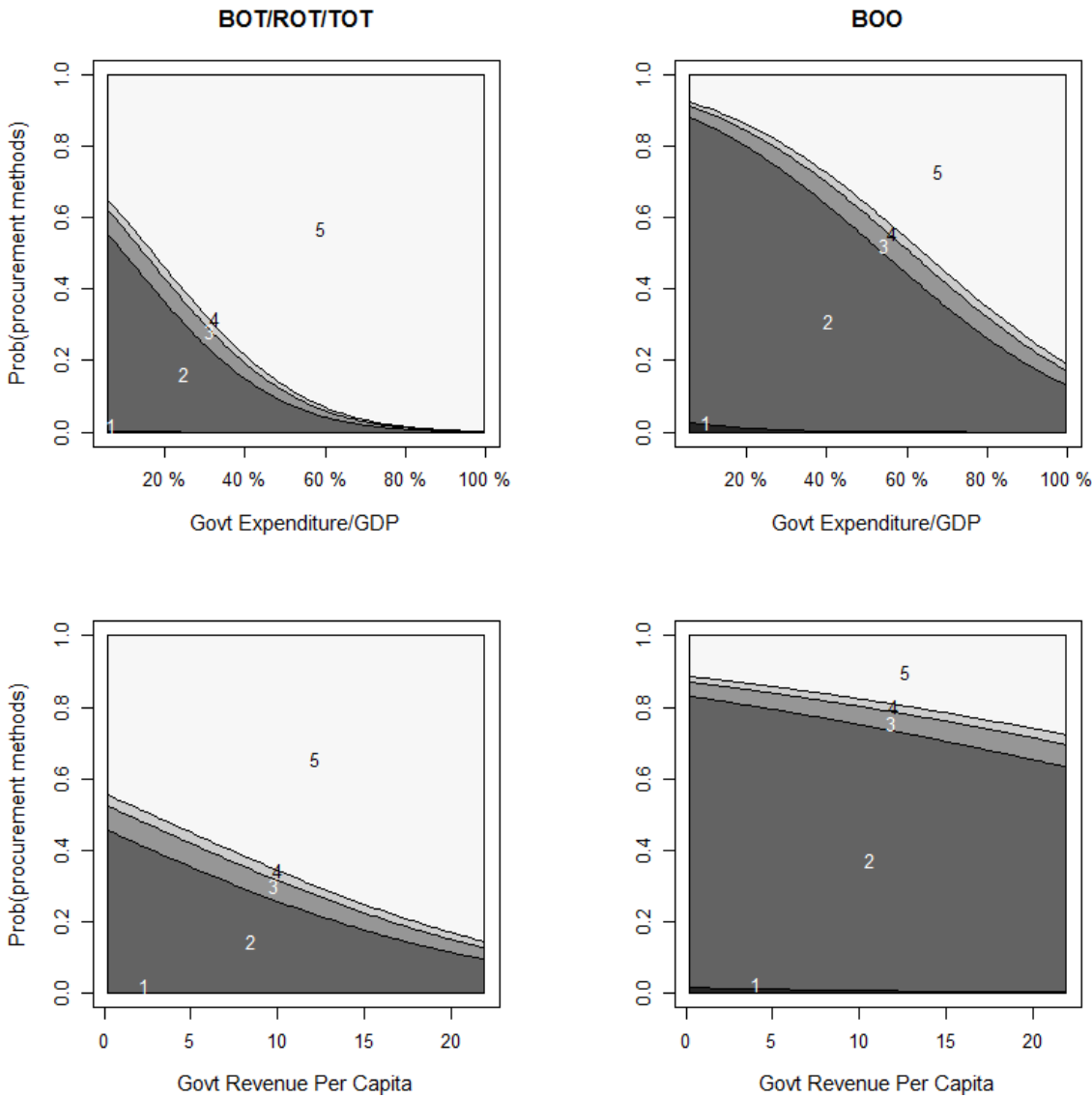
It is also observed that contract duration is not significantly associated with procurement competitiveness. Hence, Hypothesis 4b is not verified. Project size (in yuan) is also not significantly associated the probability that a municipality selects a competitive procurement method. Hence, H4c is not verified.

Regarding the control variables, this study reveals that the city's driving distance to Beijing and fiscal transparency does not have any effect. However, the driving distance between the city and its provincial capital has a negative effect in Models 3 and 4.

In terms of interaction effects, it is found that there is a negative interaction between measures of government size and BOO projects, as well as the interaction between fiscal capacity and BOO. A possible explanation is that although there is a positive relationship between fiscal and organizational capacity and the probability that a municipality selects a competitive procurement method, the complexity of contract types significantly reduces or eliminates the positive effects of fiscal and organizational capacity examined in Hypothesis 1 and 2a.

Figure 1 illustrates graphically how government size and per-capita revenue affect procurement competitiveness. The two figures on the left column illustrate BOT+ projects, while the two figures on the right column illustrate BOO projects. Notice from the top-left figure that as government size increases from 0.06 to 1 (the minimum to the maximum), the probability that the most competitive procurement method is used for a BOT project increases from 35 percent to almost 100 percent. In contrast, the probability that the most competitive procurement method is used for a BOO project increases from 7 percent to 81 percent (which is a larger effect, whether measured as a percentage, or in terms of percentage points). That said, the BOT+ curve is steeper than the BOO curve at certain points, illustrating that the relative effect of increasing government size depends on initial government size. However, the bottom two graphs reveal that the slopes of the BOT+ graphs tend to be steeper than the BOO graphs throughout all (or almost all) of the entire domain of government revenue per capita, suggesting that increasing government revenue has a stronger effect on BOT+ projects than BOO projects.

Figure 1. Effect of government size and revenue on procurement decisions



DISCUSSION AND CONCLUSION

This study attempts to understand how China’s municipal governments select procurement methods in PPP projects and what factors influence their decisions. In particular, this study focuses on municipal management capacity, investigating the relationship between municipal management capacity and PPP procurement methods. Using a comprehensive pooled cross-sectional dataset at the municipal level, with PPP data that are newly available from the website of China PPP Center under the Ministry of Finance, this study finds that fiscal capacity (measured as per capita revenue) and organizational capacity (measured as government size and population size) as well as prior PPP experience (measured as the length of time, in both years and logged number of days, since the city’s first PPP project) of the municipal government will lead to the selection of more competitive and market-led procurement methods. It is also observed that complexity of contract types significantly reduces the probability that a municipality selects a competitive procurement method. Specifically, BOO projects use less competitive procurement methods than other less complex contract types, and the positive effects of fiscal and organizational capacity are also significantly lower for BOO projects.

In summary, despite its attractive political and economic benefits, competitive procurement methods are complex with high transaction costs and the decisions appear to be affected by multiple factors. Among those factors, management capacity does matter, as it enables municipalities to deal with complex transactions such as PPPs. However, Smaller municipalities are more likely to encounter a lack of fiscal and organizational capacity to use more competitive procurement methods, and that they would postpone developing such capacity to deal with their short-term problems. Thus, the policy implication is that in order to capitalize the distinctive benefits of a competitive procurement process, it is important for Chinese municipal governments, especially smaller municipalities, to develop fiscal and organizational capacity and accumulate national experience with PPPs.

It is also important to point out that municipal governments should consider the complexity of PPP contracts in procurement method decision-making. More complex PPP contracts, which are more difficult to specify *ex ante* and/or enforce *ex post*, tend to be awarded through more flexible mechanisms such as negotiations. The decision should also take into account the interactions between management capacity and complexity of contract types. The interactive effects between management capacity and complexity of contract types suggest that the effects of fiscal and organizational capacity would be less for more complex contract types. One possible explanation is that more complex PPP contracts such as BOO projects require not only fiscal and organizational capacity analyzed in this study, but also development of contract-management capacity of the municipal government to organize and engage in a PPP. Future study should expand the scope of managerial factors to include contract-management capacity for empirical analysis.

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