



Spatio-temporal dynamics of public private partnership projects in China

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Abstract

Public Private Partnership (PPP) has been widely applied in developing infrastructures around the world. In this research, a large database of PPP projects in China was firstly built to explore the spatio-temporal evolution in terms of regional differentiation, sectors, investors and contract types. It was found that China's PPP projects have undergone four stages with the characteristics of fluctuations along with time series, spatial differentiation and paradox of application. The mechanism behind these changes mainly include the momentum of economic development and impact of national policies, local settings, especially the local governments' motivation, preference, competency and reliability, as well as the feasibility and management of PPP projects. This paper tries to make its contribution in providing Chinese cases for international comparison, while helping Chinese national and local governments make customized policies, as well as laying foundation for further in-depth empirical and theoretical PPP research.

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1. Introduction

Public Private Partnership (PPP), an effective model for provision of infrastructure facilities and public services, has been increasingly developed in China over the past 30 years. PPP provides infrastructure products and services through establishing a long-term cooperation between public agencies and private sectors (Ke et al., 2010), which can help governments solve the problem of funding shortage, accelerate the construction of infrastructure, achieve better risk sharing,

promote the governing effectiveness, and improve public service and output efficiency (Erridge and Greer, 2002; Shen et al., 2006; Yuan et al., 2012). Since its emergence in the 1980s, PPP has been rapidly applied in many fields such as healthcare, education, national defense, transportation, energy, and municipal administration, which can be seen in many other countries around the world (Akintoye et al., 2003).

PPP was introduced to China in the 1980s, then officially adopted and developed to a larger scale in the mid-1990s. Thereafter, the development of PPP has experienced different stages during which unstable factors occasionally occurred (Adams et al., 2006). Nowadays, PPP has become a very hot topic and received a heavy media coverage due to the promotion of central government. It is hence a right time to review the implementation of PPP in China. However, most of researches on PPP in China were either qualitative analyses or theoretical model analyses (Zhang, 2014). Limited research efforts have been made in investigating the PPP market in

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China with the support of a large database mainly due to the fact that there are no formal PPP project databases in China until 2014.

Therefore, this paper aims to present a systematic review and analysis on the implementation of PPP in China based on a large self-collected project-oriented database. More specifically, the objective of this research is to address the following questions: 1) how do PPP projects evolve over time, to better understand their general development process and approach, in order to evaluate the impact of policy change on PPP and feel the pulse of future trend; 2) what is their spatial distribution characteristics, to recognize the regional disparities and common features in China in terms of PPP development stages and levels under the local context, in order to identify the customized policies for different regions or cities; 3) what is the dynamic mechanism of their spatio-temporal pattern, to explore the theoretical framework through the interactive factor system analysis, in order to find the best pathway for PPP implementation in China and other countries as well; and 4) what is the implication for current PPP policies and its future development.

The significance of this research lies in the following aspects: 1) academically and theoretically, a PPP framework from China's model can be drawn based on the comprehensive analysis, which will provide a good basis for the international comparative research in the future, especially with other developing countries; 2) institutionally, this research may help national and local governments with their PPP policy and law making to better ensure the benefits of each stakeholder involved; 3) practically, or maybe more importantly, this research can also provide the solid macro context for PPP project managers for their micro planning and design, as well as the operation and management.

2. Background

Although more and more academic papers have discussed the application of PPP, there is still no consensus on the precise and comprehensive meaning of the concept due to the fact that PPP development in different countries are quite different (Khanom, 2010). Definitions put forward by the UK HM Treasury, World Bank, Canada's National Committee of PPP and Asian Development Bank (ADB) are more widely recognized with a powerful influence. Regardless of various definitions, PPP generally refers to a contracted cooperative arrangement between the public and private sectors to provide public goods or services (Ke et al., 2011). The official definition of PPP has not come into formation until 2014 in China. The possible reason might be the State-owned Enterprises (SOEs) is the dominant player in China's PPP market, which is difficult to be categorized into public or private sectors (Ke et al., 2014). The term of PPP used in Chinese can be literally translated as the cooperation between governments and social capitals in the field of infrastructure and public services, where government agencies are mainly responsible for overseeing the price and quality of the delivery of products, while social investors are responsible for undertaking the design, construction, operation, and maintenance of infrastructures, thereby obtaining a reasonable investment return.

Since the first PPP project Shenzhen Shajiao B power plant was implemented through the model of Built-Operate-Transfer (BOT) in 1984, more PPP projects have been widely introduced to China for the last 30 years. However, there were no national agencies specialized in PPP in China to provide guidance, statistical, counseling and supervision services for PPP projects until 2014. On 26th May 2014, a PPP working group was established under the Ministry of Finance (MOF), which was then transformed into a PPP Center in early December 2014. The role and responsibility of this center is not yet validated as a national PPP unit, mainly because the members of this center are all affiliated to MOF.

Besides, there were no official PPP project databases until May 2015 when the National Development and Reform Commission (NDRC) published its PPP project database. The NDRC database include PPP projects existed in the market and potential PPP projects on the way, but does not include any past PPP projects. The information transparency is insufficient for statistical analysis. The exact number of PPP projects in China hence remains unclear. The World Bank Private Participation in Infrastructure (WBPII) Project Database, the only publicly available database, has collected data on 1226 PPP projects in China (as of 6th July 2015). The WBPII database classifies PPP projects into four categories including concessions, management and lease contracts, greenfield projects and divestiture. It is not convenient for research use because this classification is too general and also lacks locational reflection. More importantly, WBPII database excludes those PPP projects invested by SOEs. As mentioned above, SOEs can be the player and in fact they are the major players in PPP projects in China. The actual number of PPP projects is believed to be much greater than the World Bank has recorded. Some of China's PPP consulting firms claimed that the number was about 7000–8000 (Dayue consulting, 2014).

The topics of international PPP research mainly focused on risk management, critical factors for success, financing, investment environment, procurement, economic viability, concession agreements, concession periods and etc. (Ke et al., 2009; Tang et al., 2010), while the research interests of PPP in China on strategies and framework in choosing the right type of PPP, financing structure optimization, legal issues, concession period design and pricing mechanism (Shan and Ye, 2012). Regarding some of the topics, there are several review publications to summarize the PPP application in China in order to draw lessons for future references. For instances, Ke et al. (2014) summarized the application of PPP in China in terms of opportunities, environment and usage; Wang et al. (2014) analyzed the overall application of PPP by examining the characteristics and classical projects in different sectors; Adams et al. (2006) examined the PPP system and major models in China and identified the key constraints; Mu et al. (2011) analyzed and explained the institutional transition process of PPP in China's transportation based on the Path Dependence Theory; reviewed and assessed the development of PPP in China's urban water sector based on a self-collected project database on 152 water supply projects and 200 waste water treatment projects.

The limitation of these previous review publications is that they are based on either literature review or case studies, thereby lacking convincing evidence and support from

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