

Research Article

Credit Default of Local Public Sectors in Chinese Government-Pay PPP Projects: Evidence from Ecological Construction

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Received 13 March 2019; Accepted 25 June 2019; Published 17 July 2019

Academic Editor: Behzad Esmaili

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Credit is regarded as a key factor to maintain the sustainability of cooperation between public authorities and social capitals in Government-Pay Public-Private Partnership (PPP) projects. The credit default of local public sectors has become a formidable force to cause termination in several cases. The study aims to explore the critical conditions and main logics behind opportunistic behaviours through literature analysis. In this research, political performance, fiscal illusion, subjective willingness, and objective limitation are identified as four certain conditions. Additionally, the crisp-set Qualitative Comparative Analysis (csQCA) method is applied to determine the connections between conditions and the credit default in the Chinese Government-Pay PPP projects according to 15 cases from the field of ecological construction. Consequently, two combinations with complete sufficiency leading to severe extent of credit default are categorized. The configuration of political performance and fiscal illusion is dominant, thereby causing severe extent of credit default in the preimplementation link. Correspondingly, the configuration of subjective willingness, objective limitation, and nonpolitical performance is crucial in the implementation and postimplementation links. Moreover, fiscal illusion alone could be totally sufficient to lead to a termination. This research not only enriches the theoretical system on credit default of public authorities in Government-Pay PPP projects but also provides reference for all participants to forecast the potential risks especially the credit default in PPP projects.

1. Introduction

Over the past two decades, the Public-Private Partnership (PPP) mode has greatly contributed to the expansion of the supply of urban infrastructures and public services in China [1].

As the central public sectors (CPSs, including the State Council, Ministry of Finance, and the National Development and Reform Commission) have issued policies to constantly promote the PPP mode since 2014, the new wave of PPP rapidly emerged in China [2]. The PPP mode is widely acknowledged to help release the burden of government spending [3, 4], improve the quality and efficiency of infrastructures [5–8], promote the transformation of government functions, and market opening levels [9, 10]. Under these circumstances, the local public sectors (LPSs) in nearly all provinces also issued relevant guidelines and recommendations in response to CPSs [11]. Meanwhile, the risk for the credit default of LPSs has grown as PPP projects were increasingly implemented [12].

Government-Pay is one of the three subsystems according to the “Operational Guidelines for Public-Private Partnership Mode” issued by CPSs [13]. Such subsystem is also a payment version based on the Private Finance Initiative (PFI) mode of the UK [14], which has been widely accepted by LPSs. Information shows that more than 90% of PPP projects implemented in China adopted Government-Pay or Government-and-User-Pay as the returning mechanism for the second quarter of 2018 [15]. Although CPSs started to realize the risk of abusing Government-Pay PPP projects and the huge debt pressure in the payment period to LPSs [16], the enthusiasm for Government-Pay remained because of two reasons: first, Government-Pay is in line with the public financial budget and is thus the steadiest return mechanism to meet the need of social capitals that prefer projects with less risk [17]. Second, some LPSs made unrealistic guarantees to social capitals and even disguised some unsuitable construction projects as Government-Pay PPP projects in response to CPSs with the aim to improve

their administrative performance [18, 19]. Revenue from most of the disguised projects with poor performance and low profits may not cover the costs [12], a situation which heightens the probability of early termination and credit default. With LPSs as the resource tender, decision-maker, and market supervisor [20], the credit default of LPSs means power dissimulation and behaviour misconduct. Consequently, the sustainability of PPP projects may be breached and the reputation of LPSs may be damaged [21].

The Government-Pay PPP mode was widely used in the field of ecological construction, including water treatment, waste incineration, and sewage treatment. Compared with the User-Pay subsystem, Government-Pay (or Government-and-User-Pay) with LPSs endorsement (which is based on local fiscal expenditure) has been recognized as the most prudent return mechanism for potential investors [17]. In terms of social capitals, the state-owned enterprises (SOE) often undertake large-scale municipal engineering construction with low benefits because of policy orientation and strong risk resistance [22]. Moreover, private enterprises (as distinguished from SOE) with the orientation of profit-seeking also preferred the reliable Government-Pay approach, especially in ecological construction that considers the restrictions of risk attitude, capital scale, and market environment. These endeavours met the basic concept of PPP: “profit reasonably rather than hugely.” The preference from both public sectors and social capitals led to an excess of Government-Pay PPP projects. This occurrence was an important reason for budget deficit and subsidy overruns. Consequently, public expenditure will be locked in the future [23]. The CPSs have clearly specified that “the expenditure for all of the PPP projects out of budget shall account for no more than 10% of the expenditure of the general public budget” [24]. However, LPSs could break through this rigid restriction with PPP funds or earmarks that generate the hidden danger of credit default.

Some LPSs regarded this mode as an approach to highlight political achievements and postpone government expenditures. This view arises from these characteristics of PPP projects: long duration, large investment, complicated evaluation, and limited liquidity [25]. In this case study, the credit default of LPSs in Government-Pay PPP projects is concluded into two aspects by principal-agent theory: Adverse Selection and Moral Hazard [26]. This study analyses Adverse Selection from the perspectives of political performance and fiscal illusion. Similarly, Moral Hazard can also be examined from the two aspects of subjective willingness and objective limitation.

This study seeks to explore the logic of the credit default of LPSs in Chinese Government-Pay PPP Projects and identify critical conditions through a literature review. Then, crisp-set Qualitative Comparative Analysis (csQCA) is applied to elucidate the relationship between critical conditions and the severe extent of credit default from LPSs for Chinese Government-Pay PPP Projects in ecological construction. The findings of this work not only enrich the theoretical research of credit default among stakeholders but also provide reference to regulate the behaviours of LPSs.

2. Literature Review and Background

2.1. Behaviours among Stakeholders in PPP Projects. Institutional framework and opportunistic behaviour are two streams used by scholars. Institutional framework could be subdivided into formal institution, informal institution, and a combination of both [27]. As a puzzle making up the formal institution in PPP projects, a contract is inevitably incomplete because of high transaction cost, bounded rationality, asymmetric information, and signalling trust [28]. Strategies used to reduce the negative implication of an incomplete contract in PPP projects include changing the form of the contract by a lottery model [29], optimizing the contract by the martingale methods [30], and designing a governmental compensation contract based on game theory [31]. Additionally, some studies in the field of informal institution in PPP projects examined mutual trust [32, 33], working relationship [34, 35], ethical partnership [36], and social responsibility [37]. Moreover, both formal and informal institutions could be interacted as the form of contractual and relational governance in PPP projects [38–40]. Relational governance is suggested as a compensatory part of contractual governance [41], while contractual governance may also enhance relational governance performance [42].

Opportunism is another literature stream. Most studies focused on the opportunistic behaviours of governments or social capitals, which are the key stakeholders in PPP projects. Previous research revealed that the opportunism of governments in PPP projects could be caused by the long-term contractual agreement [43], multitier hierarchy [44], and deficiency of anticorruption policies [45]. In addition, several studies explored the opportunistic behaviour of social capitals in PPP projects. Principal-agent theory was used to analyse the logic of opportunism [46], the hold-up problem, and optimal incentive mechanism of social capitals [47].

Considering the unique system of China in terms of politics, culture, and economics [48], systematic analysis remains lacking in relation to these following questions: What is the logic behind the credit default of LPSs in Chinese Government-Pay PPP projects and what are the most critical conditions?

2.2. Promotion of Government-Pay PPP Projects in China. Since the 1994 fiscal reform, a mismatch has emerged between expenditure responsibility and the revenue power of local governments in China [49]. Most local governments were under the pressure of spending on education, health care, and social services without corresponding fiscal transfers from the central government [50]. Thus, the “Land Finance” mode became a compensatory approach of revenue for public expenditure [51]. With this mode spread nationwide, the supplements of infrastructures were assured and debt crises also arose. In the “Post-Land Finance” era, the PPP mode could become a new financing channel for local governments [52]. The modern PPP concept was introduced to China in 2014, and the institutional framework was built using the PFI mode as reference [53]. On the one hand, the Government-Pay as the return mechanism of the

PFI mode is appropriate for the designed institution (such as for risk allocation and value for money) in China [54]. On the other hand, in the beginning of this PPP tide, the market environment was immature. Considering the existing operation process (from UK's PFI mode) and endorsement of public sectors, the Government-Pay PPP projects could have served as the trigger to attract investment from social capitals; therefore, they helped the infrastructure market to gradually transform to a high level with the subsystem of User-Pay [53].

A massive "PPP movement" with distinctive features of "Campaign-Style Governance" has rolled out since 2014 [55] and is defined as a type of policy implementation involving extraordinary mobilization of administrative resources under political sponsorship to achieve an urgent policy goal within a required time [56, 57]. CPSs issued relevant policies to form the flexible incentive structure with preferential support from financial subsidy [58], low interest loan, and intensive PPP funding [59]. Meanwhile, incorporating the PPP promotion effect into the scope of LPSs officials' executive performance creates a rigid constraint [60]. Thus, a bureaucratic system for promoting the PPP mode in a short time was built by the flexible incentive and rigid constraint (Figure 1).

However, task conflict exists in LPSs [61]. In line with Public Choice theory, an LPS official corresponds to the "Politician" described by G. Tullock and one with multiple political goals to achieve a public goal for social development and a private goal for personal gains [62, 63]. On the one hand, individuals in LPSs are oriented by social values to serve public interest. On the other hand, they are also motivated by personal values to seek agent rent. In response to the call from CPSs for the enforcement of policies, LPSs had to promote the PPP mode in accordance with a Campaign-Style movement. Additionally, due to political performance improvement, officials disguised inappropriate construction projects as Government-Pay PPP projects to implement them as soon as possible. Thus, the personal goal was achieved with the execution of massive fake PPP projects (especially in the Government-Pay mode). Campaign-Style Governance [64] provided a strong monitoring and incentive mechanism within a defined period time [57]. During this time, the pressure and motivation of LPSs officials were increased, a situation which could be recognized as an opportunity to fulfil private goals instead of comprehending more PPP concepts and values [65, 66]. Accordingly, a phenomenon of "Doing PPP in purpose not in need" emerged, with surging risk of credit default in PPP projects [67].

2.3. Path Dependence of LPSs. Institutional change is described as a consequence of changes in formal rules, in informal constraints, and in certain kinds of enforcement [27]. The process of institutional change is implied by path dependence, which, in turn, comes from the increasing return mechanisms that reinforce the direction once on a given path [68]. In infrastructure investment, this round of PPP promotion could be viewed as an institutional change from the traditional mode (represented by Government

Financing Platform mode) to the PPP mode [2]. CPSs frequently issued policies to establish and strengthen the structure of formal rules of PPP promotion. However, the change of informal constraints with noticeable time lag could hardly make rapid responses to the change of explicit and dominant formal rules. Path dependence is caused by informal constraints with vague direction and social inertia [27] (Figure 2).

Government Financing Platforms have played an important role in urbanization and economic development in China, with several potential principles [69]. First, LPSs as the dominant stakeholder of information control, resource allocation, and project approval faced few power restrictions in transactions with social capitals at their jurisdiction [70]. Second, LPSs have provided implicit guarantees for Government Financing Platforms, consequently overdrawing government credit to lend money recklessly [71]. Finally, the inertia of central planning caused the lack of market spirit in LPSs and the prevalence of the "Administration upon Profession" phenomenon.

The potential rules above make up the informal constraints of the traditional mode. Given the high transaction costs, informal constraints constitute a significant complement to formal rules with certain sunk costs [27, 72]. Moreover, LPSs are also the vested interests and the game leaders who could affect the direction of institutional change. Thus, LPSs have the motivation to make the traditional mode long lasting so as to apportion sunk costs.

As we noted above, institutional change in China's infrastructure investment could be analysed from formal rules and informal constraints. In the change of formal rules, CPSs have strong administrative power to implement a unidirectional and complete transformation process. With the rapid establishment of formal rules matching the PPP mode, LPSs eagerly turned toward PPP projects in response to CPSs. In the conversion of informal constraints, accepting the PPP mode meant abandoning the potential benefits in the traditional mode. The contradictory mentality, Campaign-Style Governance, and immature market environment linked together to create an equilibrium in the PPP promotion in China, specifically a PPP mode with Chinese characteristics (Figure 3).

This equilibrium emerged from the PPP stakeholders' temporary compromises rather than from Pareto evaluation and was consequently difficult to maintain [73].

Motivated by this background, this research seeks to investigate the key conditions that affect credit default in Government-Pay PPP projects of LPSs synergistically.

3. Research Approach and Hypotheses Formulation

Our research adopts a qualitative research approach. Figure 4 depicts the framework of this research. First, the literature and background related to the promotion of Chinese Government-Pay PPP projects are discussed. Second, the study identifies the conditions and formulates the hypotheses to develop a csQCA model based on 15 cases in ecological construction. Moreover, csQCA is used to analyse the

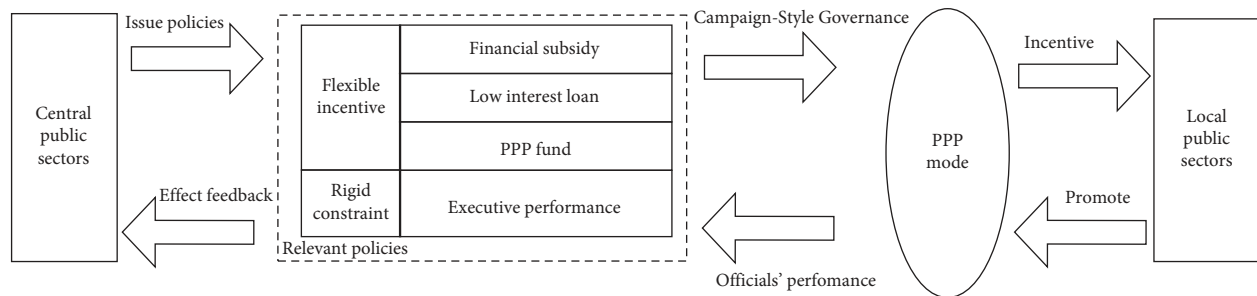


FIGURE 1: Campaign-Style Governance of the PPP movement.

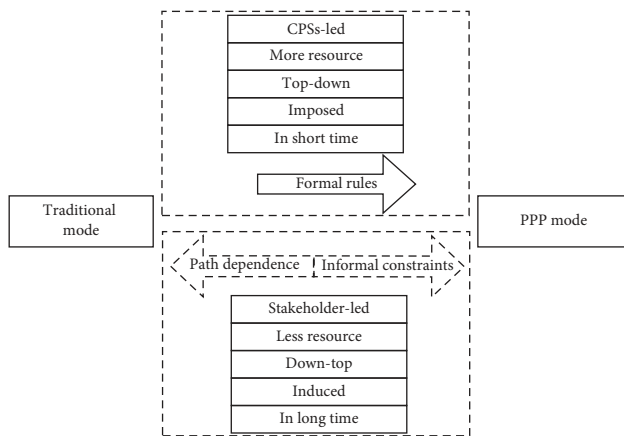


FIGURE 2: Process of institutional change.

relationship of the four key conditions and the severe extent of credit default in Government-Pay PPP projects. Finally, we present the result and a discussion on data analysis.

According to the literature and background analysis above, four conditions related to the credit default of LPSs in Government-Pay PPP projects are proposed in this study from Adverse Selection and Moral Hazard using principal-agent theory. Adverse Selection includes two conditions: political performance and fiscal illusion. Moral Hazard also has two conditions: subjective willingness and objective limitations. Thus, the following four hypotheses are proposed:

H1. Political performance contributes to the severe extent of credit default for LPSs in Government-Pay PPP projects.

The traditional “Tournament” competition mechanism and Campaign-Style Governance in this round of PPP promotion provide LPSs officials with strong constraints and incentives [66, 67, 74]. To meet the requirements of both public and personal goals, officials often implemented policies in a “flexible” way, including adaptive actions to fit policy goals, local conditions, and deviation from intended policy goals, due to interest conflicts or political sabotage [19]. These “flexible” behaviours could be categorized into three types:

- (i) Separating the unsuitable project into several parts and then bundling some of them with the nonpublic welfare project which may have high rates of return [75]

- (ii) Distinguishing the low-profit public project or commercial project as a Government-Pay PPP project on the basis of endorsement from public authorities [76]

- (iii) Creating repurchase agreements with social capitals in Government-Pay PPP projects [77]

Through these behaviours, LPSs developed many Government-Pay PPP projects in a short term, a development which apparently not only eased the debts pressure in response to CPSs, but also met the requirement of personal gains. Thus, the opportunism of Adverse Selection started to arise with the emergence of numerous fake PPP projects.

H2. Fiscal illusion contributes to severe extent of credit default for LPSs in Government-Pay PPP projects.

While the investment return of Government-Pay PPP projects still comes from public expenditure, such return underwent a transformation from spot payment or deferred payment in the traditional mode to instalment in the PPP mode. Extension of the payment term fully dissipated the financial pressure [54]. Public authorities are prone to believe a fiscal illusion that the PPP mode could be cheaper than the traditional mode or even be free [78]. To some extent, this mode could also be viewed as a mega-credit card which leads intergenerational inequality in bureaucracy, with moving expenditures off-budget and transferring costs on to future governments (or taxpayers) [54, 79, 80]. Some local governments have made unreasonable promises of revenue to private sectors to enhance the attractiveness of a project [81, 82]. In China, each term of public officials is regulated in five years [83], thereby causing a mismatch between the term of officials and PPP projects. Thus, future successors may face higher budgetary risks from last governors and are prone to halt the project to save transaction costs.

H3. Subjective willingness contributes to the severe extent of credit default for LPSs in Government-Pay PPP projects.

A critical difference exists between institutional change and technological change; specifically, vested interests often generate resistance in the process of institutional change [84]. LPSs officials as the vested interests in the traditional mode exhibit subjective willingness arising from power and costs.

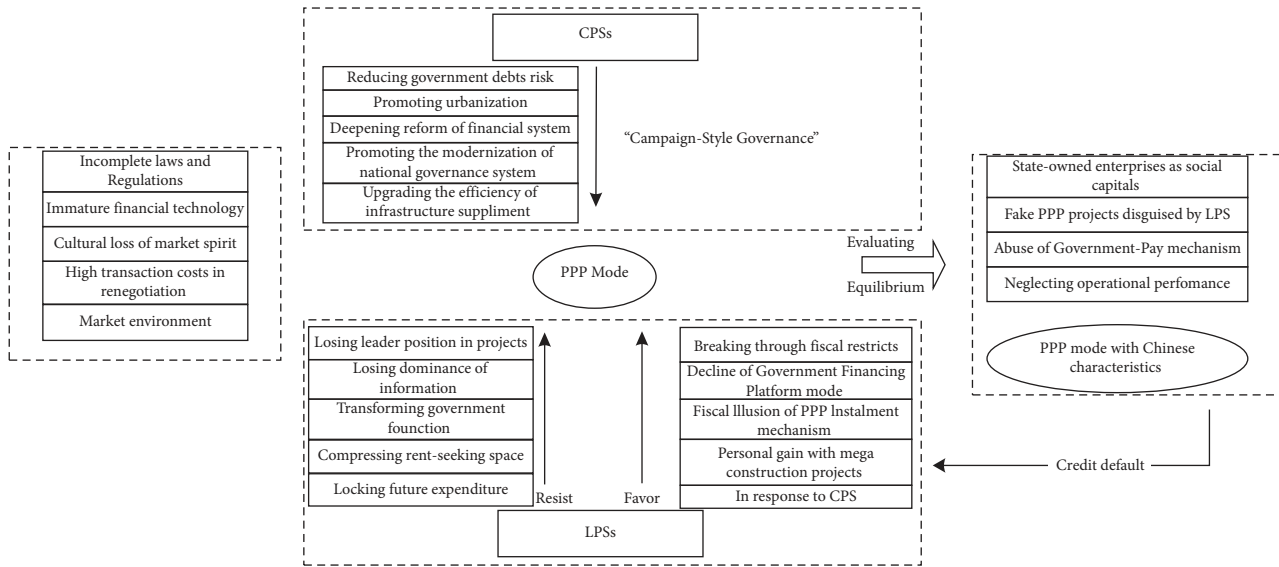


FIGURE 3: Equilibrium of China PPP promotion.

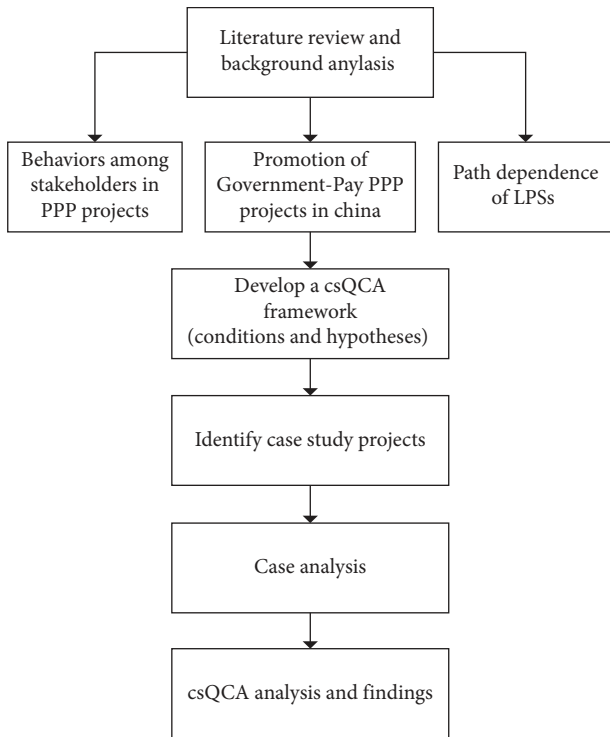


FIGURE 4: Diagram of the research process.

As mentioned in Section 2, LPSs, as the resource allocator, decision-maker, and information controller in the traditional mode, have the motivation of path dependence. Implementing Government-Pay PPP projects means shrinking power boundaries, increasing responsibility of future expenditure, and losing implicit benefits.

From the cost perspective, the formation and expansion of Government Financing Platforms are accompanied by huge sunk costs. That cost could be divided into these following types:

- (i) The cost of establishment, operation, and transformation in a new circumstance for Government Financing Platforms that involve urban investment companies, urban construction companies, and urban assets management companies
- (ii) Transaction costs incurred in the signing, implementation, and information searching of contracts
- (iii) Other nontangible costs for the traditional mode

Therefore, LPSs have the motivation to make the traditional mode long lasting for apportioning sunk costs.

The subjective willingness from power and costs creates the endogenous tendency of LPSs to follow the regulations, the logic of decision-making, and the behaviours under the traditional mode [85]. This tendency apparently contradicts the values of equal cooperation [86], benefit sharing, and risk allocation under the PPP mode [66].

H4. Objective limitation contributes to the severe extent of credit default for LPSs in Government-Pay PPP projects.

The deficiencies in the approval system, legal system, and LPSs professional management also limit the implementation and operation of Government-Pay PPP projects. As two critical parts in the identification phase, the quality of Value for Money (VfM) and Financial Affordability Assessment (FAA) have impacts on the performance of Government-Pay PPP projects [87]. However, VfM and FAA are gradually becoming formalistic in practice. They are just regarded by relevant participants as written procedures in formality. Moreover, the quantitative analysis of VfM relies excessively on conditional assumptions and estimated data, while qualitative analysis also entails many subjective presumptions [88]. Furthermore, the 10% expenditure limitation regulated by CPSs is not acceptable for all regions in China given the varying degrees of economic development and demand for infrastructure [89]. Additionally, LPSs lack the professional ability of renegotiating when PPP projects are under dispute.

4. Identification: Logic of Credit Default

On the basis of extensive studies from industrial colleagues, this research categorizes four conditions about the logics of LPSs opportunistic behaviours.

4.1. Political Performance. Political and governance risks are always critical to PPP projects [54]. The opportunistic motivations of LPSs in Government-Pay PPP projects could be categorized into three aspects. First, during a defined period of time, LPSs are under high pressure from CPSs in the bureaucratic structure to approve or halt certain construction projects [12, 19, 82, 90–92]. Apparently, political performance is results-orientated and relies less on how LPSs finished the tasks [19, 67]. Second, LPSs officials are regarded as “Politician” who make efforts for public affairs and also for personal gains [62, 63]. Thus, some unsuitable Government-Pay PPP projects were implemented because of rent-seeking or corruptive actions from LPSs officials [12, 44, 93–99]. Third, public opposition in areas with inferior PPP projects could make LPSs halt the project [1, 3, 100–102]. Therefore, three logics of credit default in political performance are identified: political pressure, official corruption, and public opposition. Political pressure and corruption often take place before project implementation, and public opposition usually happens after project identification.

4.2. Fiscal Illusion. Two aspects are concluded under fiscal illusion. On the one hand, the lack of cognition about the PPP mode leads LPSs officials to assume that applying this mode could be cheaper and more efficient than the traditional pattern, especially during the period when local governments have high debts [54, 78, 103, 104]. Thus, LPSs may have incorrect ideas for attracting more investment from social capitals without reasonable consideration of future expenditure [105]. On the other hand, some local authorities reach unrealistic agreements with private sectors in relation to revenue that could be difficult to fulfil [12, 82, 106, 107]. The two sides above cause LPSs to fall into a fiscal illusion.

4.3. Subjective Willingness. Three aspects fall under this condition. First, the abuse of power by LPSs is still typical in China, given the overwhelming transformation from central planning to a market economy under 30 years [12, 19, 82, 91, 108]. Local authorities could intervene in the process from project design to operation without appropriate power restriction [7, 109–113]. Second, when the projects with unreasonable revenue promises went into the operation stage, LPSs had poor motivation to promptly execute their obligation for payment [7, 112]. Third, under the change of policies and regulations, LPSs would choose to halt projects rather than make timely remedial measurements [25, 92, 110, 114, 115]. These three logics above stem from the path dependence on the traditional mode and make up the subjective willingness of credit default.

4.4. Objective Limitation. Under this condition, three logics are identified from the literature on government opportunistic behaviours in PPP projects. First, the poor decision-making in the prophase of PPP projects could increase the probability of contract implementation considering the low professional skills in market estimation, project approval, procedure process, and other preparations [92, 116, 117]. Second, the lack of operational experience causes inefficient management [109, 115, 118, 119], and LPSs need a scientific performance appraisal system as a payment basis in Government-Pay PPP projects. Finally, insufficient expertise in renegotiation could also contribute to opportunism from LPSs [120, 121]. When projects encounter unforeseen conditions, LPSs face a few dispute resolution processes to modify or renew the contract. These three logics are categorized on the basis of the timeline of project implementation.

Certain logics under each condition were identified based on the literature review (Table 1). All these conditions could be divided into two aspects according to the processes of the links (Figure 5). That is, political performance and fiscal illusion often occur in the preimplementation period, and subjective willingness and objective limitation occur in the other period.

5. Research Method: Crisp-Set Qualitative Comparative Analysis

5.1. Introduction to csQCA. Qualitative Comparative Analysis (QCA) was proposed by Charles Ragin in 1987 [122]. It could be regarded as a combination of qualitative and quantitative analysis based on case and variable [123]. QCA makes a comparison among certain cases to identify the difference and similarity. Additionally, this method could be specifically divided into crisp-set Qualitative Comparative Analysis (csQCA) and fuzzy-set Qualitative Comparative Analysis (fsQCA). Comparing csQCA, fsQCA could break through the limitation of binary value. However, considering the specific logics have been concluded under four conditions in section four, it is obvious to confirm the binary value. Thus, csQCA is applied in this paper. One of the characteristics of csQCA is that it could identify multiple conjunctural causation [123]. The steps of applying csQCA [124] are shown in Figure 6.

5.2. Data Collection. Following the research by Axel Marx in 2013 [124], 5% was set as the threshold in this manuscript. Thus, 15, as the number of cases, is suitable under the four conditions for an acceptable benchmark.

5.2.1. Case Selection. Based on typical case studies on critical factors, this research was implemented in the following three steps: (1) case selection according to specific criteria, (2) data collection and analysis, and (3) discussion of the identified factors.

Considering that Government-Pay is a common mechanism applied widely in Chinese ecological construction, certain cases were examined in our manuscript through the following criteria:

TABLE 1: Logic of credit default for LPSs in Government-Pay PPP projects.

Political performance	Fiscal illusion	Subjective willingness	Objective limitation
M1: political pressure	M4: poor cognition	M6: abuse of power	M9: poor decision-making procedure
M2: official corruption	M5: unreasonable guarantee	M7: repudiation of payment	M10: lack of operational experience
M3: public opposition		M8: response to policy changes	M11: insufficient expertise in renegotiation

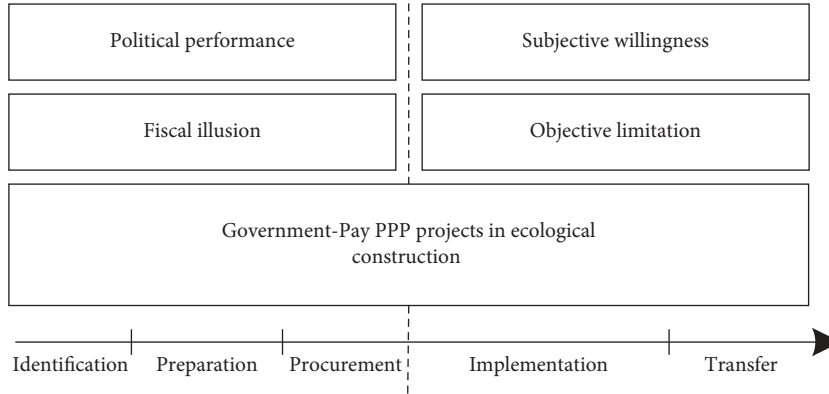


FIGURE 5: Distribution of each condition according to the processes of links.

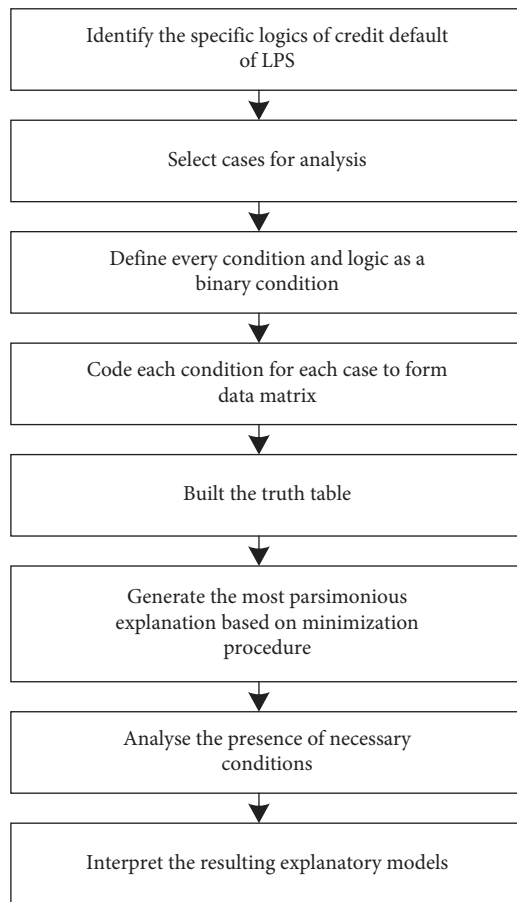


FIGURE 6: Steps of applying csQCA.

- (ii) All selected cases suffered from credit default by LPSs
- (iii) All selected cases are from fields of water plants, waste incineration plants, and sewage treatment
- (iv) Participants from all selected cases are available to contact and were willing to cooperate with the authors for the study

Consequently, 15 sample cases were identified: (1) Lianjiang Tangshan Water Plant, (2) Shandong Zhonghua Project, (3) Tianjin Shuanggang Waste Incineration Plant, (4) Western Qinhuangdao Waste Incineration Plant, (5) Wuxi Xidong Waste Incineration Plant, (6) Beijing Liulitun Waste Incineration Plant, (7) Kunming Wuhua Waste Incineration Plant, (8) Qingdao Veolia Sewage Treatment Project, (9) Changzhou Hengshanqiao Sewage Treatment Project, (10) Changchun Huijin Sewage Treatment Project, (11) Wuhan Tangxuhu Sewage Treatment Project, (12) Shenyang no. 9 Water Plant, (13) Hancheng Sewage Treatment Project, (14) Luoyang Sewage Treatment Project, and (15) Muping Waste Incineration Plant. Tables 2 and 3 list information on all selected cases.

5.2.2. *Case Collection.* Basic information on the 15 selected cases was collected from various sources, including internal publications, annual reports, academic databases, the China PPP Center, and industry news. Given the limitation of approaches for searching data and because certain details of the Government-Pay PPP contracts cannot be disclosed by public authorities because of commercial confidentiality, limited controversial information may be identified and will be examined in future research.

- (i) All selected cases are typical cases based on the payment mechanism of Government-Pay or Government-and-User-Pay

5.2.3. *Data of Interview and Questionnaire Survey Collection.* Previous studies indicate the data collection of csQCA is implemented through interviews or questionnaire surveys.

TABLE 2: General information on 15 cases from ecological construction.

Number	Project	Contract period	Extent of Government-Pay	Levels of credit default
1	Lianjiang Tangshan Water Plant	30 years	Total	Bought back by the government in 2009
2	Shandong Zhonghua Project	20 years	Partial	Revenue declined since 2002
3	Tianjin Shuanggang Waste Incineration Plant	22 years	Total	Bought back by the government in 2006
4	Western Qinhuangdao Waste Incineration Plant	Uncertain	Total	Halted temporarily by the government in 2011
5	Wuxi Xidong Waste Incineration Plant	Uncertain	Total	Halted temporarily by the government in 2011
6	Beijing Liulitun Waste Incineration Plant	Uncertain	Total	Halted temporarily by the government in 2011
7	Kunming Wuhua Waste Incineration Plant	30 years	Partial	Social capitals withdrew investment in 2006
8	Qingdao Veolia Sewage Treatment Project	25 years	Partial	Social capitals withdrew investment in 2014
9	Changzhou Hengshanqiao Sewage Treatment Project	30 years	Partial	Government took over temporarily in 2011
10	Changchun Huijin Sewage Treatment Project	25 years	Partial	Bought back by the government in 2005
11	Wuhan Tangxuhu Sewage Treatment Project	20 years	Partial	Bought back by the government in 2004
12	Shenyang No. 9 Water Plant	20 years	Partial	Bought back by the government in 2006
13	Hancheng Sewage Treatment Project	30 years	Total	Halted by the government in 2018
14	Luoyang Sewage Treatment Project	20 years	Total	Halted by the government in 2018
15	Muping Waste Incineration Plant	30 years	Total	Halted by the government in 2018

TABLE 3: General information on 15 cases from ecological construction.

Number	Project	Contract period	Investment (RMB)	Data source	Brief information
1	Lianjiang Tangshan Water Plant	1997–2027	130 million	[1, 125]	(i) Actual demand and water price were much lower than the contracted level and the contract may be lost. The water plant was forced to be idle.
2	Shandong Zhonghua Project	1997–2017	17.6 million	[119, 126]	(i) Pricing standards approved by LPSs made it difficult to meet the promised level, and LPSs failed to fulfil the uniqueness of the project in the local market.
3	Tianjin Shuanggang Waste Incineration Plant	2013–2035	580 million	[119, 127]	(i) LPSs were committed to provide subsidies, but the amount of the subsidies promised was not defined clearly. Moreover, toxic gases from waste incineration caused public opposition.
4	Western Qinhuangdao Waste Incineration Plant	2008–2038	220 million	[128]	(i) The public objected to the project and reported that the environmental impact report may be fraudulent. LPSs revoked the environmental impact report.
5	Wuxi Xidong Waste Incineration Plant	2008–2028	140 million	[129]	(i) Public opposition arose after the construction stage was finished. LPSs shirked their responsibilities and did not provide a satisfactory explanation. Moreover, media and social organizations misled the public. The project had to be halted.
6	Beijing Liulitun Waste Incineration Plant	2006–2026	126 million	[130]	(i) The project was meant to be implemented 15 years ago. Many residents around the planned location and thousands of people opposed it.
7	Kunming Wuhua Waste Incineration Plant	2003–2033	320 million	[127, 131]	(i) It was difficult to collect the waste fee. In addition, LPSs and the SPV were not in agreement in terms of adjusting the waste disposal fee.
8	Qingdao Veolia Sewage Treatment Project	2003–2038	171 million	[119, 132]	(i) LPSs had limited understanding of the PPP and the frequent changes in attitude towards the project led to long contract negotiations. Moreover, the LPSs also promised an unrealistic rate of return.
9	Changzhou Hengshanqiao Sewage Treatment Project	2005–2035	60 million	[1, 133]	(i) The project closed several times and caused pollution through the sewage from the pipe network overflow. Considering the public opposition, LPSs shut it down temporarily.

TABLE 3: Continued.

Number	Project	Contract period	Investment (RMB)	Data source	Brief information
10	Changchun Huijin Sewage Treatment Project	2000–2020	200 million	[1, 134]	(i) LPSs reneged on the agreement and refused to pay for SPV, thereby causing them to be charged in 2003.
11	Wuhan Tangxuhu Sewage Treatment Project	2001–2021	90 million	[1]	(i) LPSs failed to accomplish promised work (such as supporting pipe network construction and sewage fee charge). The project was terminated by government buyback.
12	Shenyang No. 9 Water Plant	1996–2016	160 million	[1, 135]	(i) The agreed rate of return on investment was unreasonable, with 18.50% in the first 2–4 years, 21% in the 5th to 14th year, and 11% in the 15th to 20th year. The project was finally terminated by LPSs.
13	Hancheng Sewage Treatment Project	2014–2044	931 million	[136]	(i) The construction period is 10 years, and the project covered an area of 21751 m ² . The project was terminated by CPSs in 2018 due to poor decision-making process.
14	Luoyang Sewage Treatment Project	2015–2035	190 million	[137]	(i) The project could process 20 kt of sewage daily and was terminated by the Ministry of Finance in 2018 due to poor decision-making process.
15	Muping Waste Incineration Plant	2012–2042	428 million	[137]	(i) The project covered an area of 66,600 m ² . It could process 800 t of municipal solid waste daily and was terminated by the Ministry of Finance in 2018 due to poor decision-making process.

Perceptual feelings can be determined through communications, and rational and quantitative data should be obtained from the questionnaire [138–141].

We referenced and improved the research process of Ahuja and applied a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree), thereby improving the accuracy and objectivity of the original data [123]. Thus, certain conditions for each case could be identified by confirming the existence of corresponding logics under each condition shown in Table 1.

Data in this research came from two steps. First, we selected 42 interviewees from the parties in the 15 cases, including private sector, LPSs, and experts from consultancy. Then, we confirmed the identity of our interviewees through a brief communication on the phone, through e-mails, and via WeChat (a social media chat app in China). We also invited our interviewees to complete the questionnaire survey through several reminders. This data collection process lasted for two months from September to October 2018. The respondent demographics and questionnaire items are shown in Table 4 and Appendix 1 in Supplementary Materials, respectively.

5.3. Variables: Identification of Conditions. In this research, a binary value of 1 is assigned to a case if one or more than one logics are presented under each condition. Conversely, a binary value of 0 is assigned to a case if no logic is presented under each condition. The binary values of the conditions are described below:

- (i) Political performance was assigned with the binary value of 1 if the logics occurred within this aspect and 0 otherwise
- (ii) Fiscal illusion was assigned with the binary value of 1 if the logics occurred within this aspect and 0 otherwise

- (iii) Subjective willingness was assigned with the binary value of 1 if the logics occurred within this aspect and 0 otherwise

- (iv) Objective limitation was assigned the binary value of 1 if the logics occurred within this aspect and 0 otherwise

Moreover, we aimed not only to explore the connection between each condition and credit default of LPSs in ecological projects, but also to ascertain the relationship between the severe extent of credit default and these conditions. Considering the different levels of credit default by LPSs, this manuscript assigns the binary value of 1 if the case with severe extent of credit default involves government buyback, social capitals withdrawing investment, and government halting the project. Similarly, a binary value of 0 was assigned for the common extent of credit default, including revenue decline, government halting the project temporarily, and government taking over temporarily.

Additionally, the answers that presented values greater than or equal to 4 were assigned a value of 1 and those that presented values less than or equal to 3 were assigned a value of 0 [142].

Tables 5 and 6 reveal the results of each case under each logic of credit default by LPSs in Chinese Government-Pay PPP projects.

Thus, the csQCA data matrix based on computing the compatibility of 15 cases under 11 logics is identified (Table 7).

6. Analysis

6.1. Analysis on Truth Table. The truth table shown in Table 8 represents the relationship between selected cases, four conditions, and levels of credit default. All cases with

TABLE 4: Respondent demographics.

Type	Frequency	Percentage
<i>Gender</i>		
Male	37	88.10
Female	5	11.90
<i>Work experience</i>		
3–5 years	6	14.29
6–10 years	15	35.71
11–15 years	18	42.86
More than 15 years	3	7.14
<i>Occupation</i>		
Private sector	29	69.05
Public sector	8	19.05
Experts from consultancy	5	11.90
<i>Position</i>		
Administrative staff	34	80.95
Basic staff	8	19.05
<i>Case</i>		
Lianjiang Tangshan Water Plant	2	4.76
Shandong Zhonghua Project	3	7.14
Tianjin Shuanggang Waste Incineration Plant	2	4.76
Western Qinhuangdao Waste Incineration Plant	3	7.14
Wuxi Xidong Waste Incineration Plant	3	7.14
Beijing Liulitun Waste Incineration Plant	5	11.90
Kunming Wuhua Waste Incineration Plant	2	4.76
Qingdao Veolia Sewage Treatment Project	4	9.52
Changzhou Hengshanqiao Sewage Treatment Project	2	4.76
Changchun Huijin Sewage Treatment Project	3	7.14
Wuhan Tangxuhu Sewage Treatment Project	3	7.14
Shenyang No. 9 Water Plant	3	7.14
Hancheng Sewage Treatment Project	2	4.76
Luoyang Sewage Treatment Project	3	7.14
Muping Waste Incineration Plant	2	4.76

same outcome and conditions are transformed into 6 configurations. It is generated with the software Tosmana 1.6.0.0.

While 15 cases are shown in the study, the truth table reveals that limited diversity exists, not all logically possible combinations among these four conditions could be empirically observed. Moreover, it also can be presented visually by Venn diagram (Figure 7).

6.2. Analysis on csQCA Solution Formula. The solution formula is consisted in outcome and certain conditions which are linked with Boolean operators. There are three basic Boolean operators: logical AND (*), logical OR (+), and logical NOT (where lowercase letter was used to replace uppercase letter). This analysis reveals two sufficient primitive expressions that can be expressed in Boolean terms (Figure 8).

The solution formula above shows two combinations leading to severe extent of credit default. The conditions of political performance (PP) AND fiscal illusion (FI) are both existed OR the condition of political performance (pp) is absent AND the conditions of subjective willingness (SW) AND objective limitation (OL) are both existed which will result in severe extent of credit default.

6.3. Measures of Fit: Consistency and Coverage. Consistency and coverage are two critical parameters for assessing the fit of QCA results [143].

In csQCA method, the relation of consistency reveals the proportion of cases with given condition or combination of causes which leads to the outcome [144]. Thus, as shown in Table 8, all eight cases with PP * FI (rows 6–9) display 1 as the binary value of outcome; hence, the consistency of PP * FI is $8/8 = 100\%$. Similarly, the consistency of pp * SW * OL is $2/2 = 100\%$. These results are presented in Table 9.

The other parameter is coverage which could be divided into raw coverage and unique coverage. The higher the coverage for the given conditions, the more the cases presenting certain outcome covered. Table 8 shows that ten cases display 1 as the outcome and the solution formula PP * FI + pp * SW * OL covers all of them. Thus, the overall of all sufficient conjunction combined is $10/10 = 1.00$. The solution formula PP * FI alone covers eight of ten cases and pp * SW * OL covers two of ten cases, therefore, the raw coverage for PP * FI is $8/10 = 0.80$, similarly, the raw coverage for pp * SW * OL is $2/10 = 0.20$. In addition, subtraction is used to calculate the unique coverage for each combination. The unique coverage of PP * FI is calculated by subtracting the raw coverage of pp * SW * OL (20%) from solution formula (100%). Thus, it is $1 - 0.2 = 0.80$. Similarly, the unique coverage of pp * SW * OL is 20%. All of the results calculated above are summarized in Table 10.

7. Research Findings

7.1. Combination Analysis. Based on the conclusion found by Ragin, the consistency score should be as closer to 1 as possible.

The results of consistency for each combination which is shown in Figure 7 clearly illustrate PP * FI OR pp * SW * OL is sufficient to severe extent of credit default. As only two combinations were depicted in the manuscript, the raw consistency and unique consistency are equal for each combination. The research findings are analysed as follows.

7.1.1. PP * FI. For this approach, the raw coverage is 0.80 which shows that it is 80% possibility for LPSs with PP * FI to make a severe extent of credit default in Government-Pay PPP projects.

This result could be well accepted corresponding to the reality in China. Most of the logics under PP * FI are emerged in the preimplementation period, which could be generalized into Adverse Selection. In this time, LPSs officials are often under intense pressure to attract more

TABLE 5: Results of each case under each logic.

Numbers	Number of respondents	Political performance (PP)			Fiscal illusion (FI)		Subjective willingness (SW)			Objective limitation (OL)		
		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
Case 1	2	3.50	2.00	2.00	4.00	2.50	3.00	2.00	2.00	4.50	4.00	2.50
Case 2	3	1.00	2.33	4.00	2.66	1.67	1.67	3.67	2.33	2.00	2.33	3.67
Case 3	2	1.50	1.50	3.00	3.50	3.50	2.50	1.00	2.50	2.00	2.00	2.00
Case 4	3	2.67	2.00	3.67	1.67	1.33	2.67	2.00	2.33	4.00	2.67	2.33
Case 5	3	2.00	4.00	4.33	2.00	1.67	1.67	2.00	2.00	3.00	2.67	2.33
Case 6	5	3.20	2.20	4.20	2.00	2.00	2.00	2.00	2.20	2.00	2.20	3.00
Case 7	2	3.00	1.50	1.00	3.00	3.50	2.50	3.00	2.00	2.50	1.50	1.00
Case 8	4	3.50	2.50	2.50	4.00	3.50	2.00	2.00	2.00	2.00	2.50	3.00
Case 9	2	2.00	2.50	4.00	2.50	2.00	2.50	3.50	2.00	2.00	1.00	1.50
Case 10	3	4.00	1.67	1.67	3.00	3.33	2.67	3.33	3.67	2.67	2.00	2.33
Case 11	3	2.00	2.00	2.33	2.33	1.67	2.00	3.00	2.33	3.33	2.33	2.00
Case 12	3	2.67	4.00	2.67	3.00	3.00	2.67	4.00	2.00	2.33	2.33	3.00
Case 13	2	4.00	2.00	2.00	3.50	2.50	2.00	3.00	3.50	4.00	2.50	2.00
Case 14	3	3.00	2.33	2.00	4.33	2.33	2.67	2.00	3.00	3.33	2.67	2.67
Case 15	2	2.50	2.50	2.00	3.00	3.50	2.50	2.50	4.00	3.50	2.50	2.50

TABLE 6: Results of each case under each logic.

Number	Political performance (PP)			Fiscal illusion (FI)		Subjective willingness (SW)			Objective limitation (OL)		
	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
Case 1	√			√		√			√	√	
Case 2			√				√				√
Case 3			√	√	√						
Case 4			√						√		
Case 5		√	√						√		
Case 6	√		√								√
Case 7	√			√	√		√				
Case 8	√			√	√						√
Case 9			√				√				
Case 10	√			√	√		√	√			
Case 11							√		√		
Case 12		√		√	√		√				√
Case 13	√			√			√	√	√		
Case 14	√			√				√	√		
Case 15				√	√			√	√		

TABLE 7: Data matrix of each condition and damaged level.

Projects	PP	FI	SW	OL	Outcome (levels of credit default)
Case 1	1	1	1	1	1
Case 2	1	0	1	1	0
Case 3	1	1	0	0	1
Case 4	1	0	0	1	0
Case 5	1	0	0	1	0
Case 6	1	0	0	1	0
Case 7	1	1	1	0	1
Case 8	1	1	0	1	1
Case 9	1	0	1	0	0
Case 10	1	1	1	0	1
Case 11	0	0	1	1	1
Case 12	1	1	1	1	1
Case 13	1	1	1	1	1
Case 14	1	1	1	1	1
Case 15	0	1	1	1	1

TABLE 8: Truth table of conditions and outcome.

Case number	PP	FI	SW	OL	Outcome
11	0	0	1	1	1
15	0	1	1	1	1
4, 5, 6	1	0	0	1	0
9	1	0	1	0	0
2	1	0	1	1	0
3	1	1	0	0	1
8	1	1	0	1	1
7, 10	1	1	1	0	1
1, 12, 13, 14	1	1	1	1	1

investments by PPP mode during their term of office. Thus, logics like unrealistic guarantee and corruption are revealed in certain cases. When officials or policies are changed, LPSs

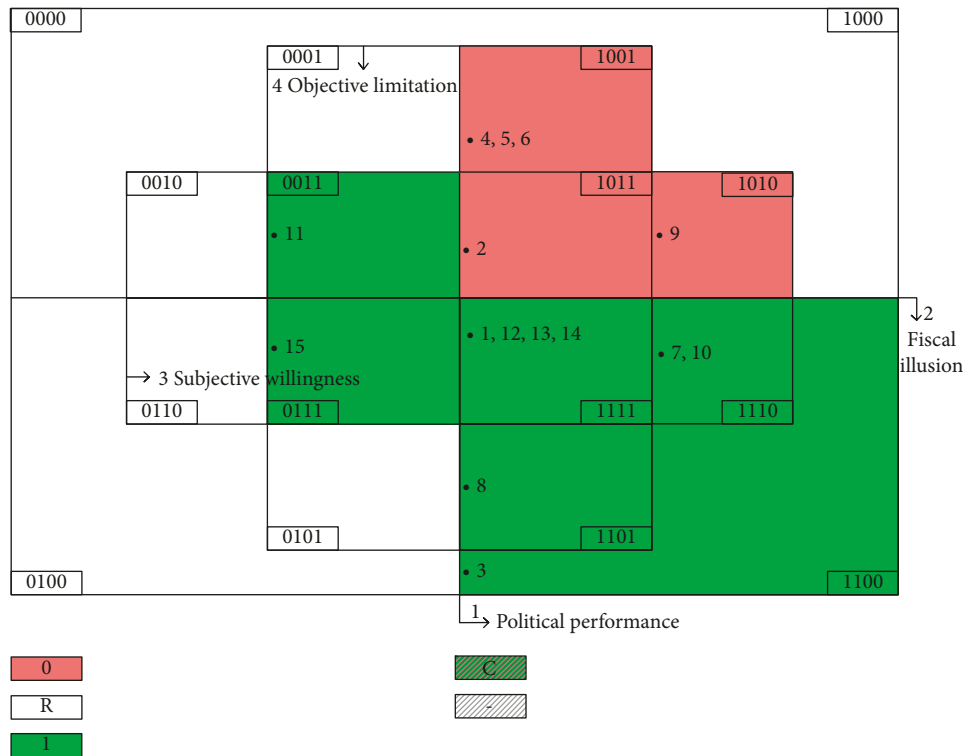


FIGURE 7: Credit default solution formula.

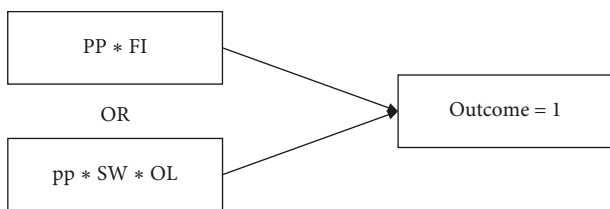


FIGURE 8: Credit default solution formula.

are tending to take the straightforward measurements (involving government buyback, social capital withdrawn investment, and government halt) to regain the projects in short time. Comparing to other behaviours of credit default, government buyback and halting the project directly are most usual; additionally, LPSs could also be tempted to make SOE take over the control power belonging to social capitals in Government-Pay PPP projects.

The unique regime and special financial system should never be neglected. As Case 13–Case 15 revealed, when LPSs disputed several orders to emphasize the risk of government debts in 2018, some local authorities regarded all kinds of Government-Pay PPP projects as government obligations and halted them promptly to make response. Once the logics under PP * FI are existed, the projects are highly possible to be early terminated and hard to continue.

7.1.2. *pp * SW * OL*. For this approach, the raw coverage is 0.20 which shows that it is 20% possibility for LPSs with pp * SW * OL to make a severe extent of credit default in Government-Pay PPP projects. The logics under pp * SW * OL are used to occur in the implementing period

or the postimplementing period; they could be generalized into Moral Hazard.

When PPP projects get into construction or operation stage without suffering from the credit default of PP, there will be new risks to face: SW * OL. The path dependence towards traditional mode leads to the abuse of power without effective supervision. As Case 10 and Case 12 depicted, in operation stage, LPSs may start to realize that they are hard to fulfil the commitments they ever promised. In consideration of the insufficient expertise in renegotiation for LPSs, the cooperation between social capitals and public authorities is going to be collapsed by government buyback or cut off. Only few private sectors with strong antirisk ability could make adjustment for renegotiation with LPSs to avoid a breach. In addition, transaction costs in signing, performance, revising, and information searching of contracts may cause more loss than termination. From this perspective, halting the projects is not always irrational.

While the raw coverage is different between two combinations, the consistency for each one is 100% which is obviously to reveal that PP * FI and pp * SW * OL are both completely sufficient for leading severe extent of credit default.

7.2. *Condition Analysis*. The consistency and raw coverage for each condition alone are presented in Table 11.

Apparently, FI is the most critical among four conditions to lead severe extent of credit default with the highest score of consistency and coverage. Especially, the consistency of FI is 100% which means it is completely sufficient to cause a grave consequence. To be more specific, each case shown in Table 8 with the logics of M4 (poor cognition) and M5

TABLE 9: Sufficient conditions with severe extent of credit default as the variable outcome.

(a) Cross-tab showing “PP * FI” as a sufficient condition for credit default	Without “PP * FI”	With “PP * FI”	
Outcome is 0	5	0	5
Outcome is 1	2	8	10
	7	8	N = 15
(b) Cross-tab showing “pp * SW * OL” as a sufficient condition for credit default	Without “pp * SW * OL”	With “pp * SW * OL”	
Outcome is 0	5	0	5
Outcome is 1	8	2	10
	13	2	N = 15
(c) Cross-tab showing “PP * FI” or “pp * SW * OL” as a sufficient condition for credit default	Without “PP * FI” or “pp * SW * OL”	With “PP * FI” or “pp * SW * OL”	
Outcome is 0	5	0	5
Outcome is 1	0	10	10
	5	10	N = 15

TABLE 10: Results of coverage and consistency analysis.

Casual configuration	Raw coverage	Unique coverage	Consistency
PP * FI	0.80	0.80	1.00
pp * SW * OL	0.20	0.20	1.00
Solution coverage: 1.00			
Solution consistency: 1.00			

(unreasonable guarantee) is doomed to make a bad ending. The result illustrates that LPSs kept an unclear cognition on the meaning, purpose, and process of Government-Pay PPP mode. Some authorities always believed that PPP projects could be implemented with lower costs even noncost. Thus, irrational promises were made to tout for investment from social capitals which is totally impossible to execute. Hence, H2 could be accepted and it will lead a dire ending more than credit default.

The consistency for PP, SW, and OL alone is not 100%, and there is no dominant connection for each one of them to cause severe extent of credit default like FI does. However, the consistency for PP * FI or pp * SW * OL is 100%, and each one of the three conditions does contribute to credit default in different levels. Thus, H1, H3, and H4 should be accepted. More quantitative analysis could be generated to figure out the precise relationship between certain condition and outcome in the future.

8. Discussion

After the data analysis, we contacted the respondents in our research and conducted follow-up interviews to test the validity of the identified approaches. Among the 42 interviewees, 37 took part in the follow-up interviews and confirmed the findings of this study. However, several findings must be discussed.

In terms of “PP * FI,” two points should be emphasized. First, considering China’s unique political system, the combination between the logics of political pressure and unreasonable guarantee from certain backgrounds of the times contributes critically to the emergence of “PP * FI.” For example, Shenzhen Shajiao B Power Plant, China’s first PPP project, was an attempt to introduce foreign capital and

TABLE 11: Results of raw coverage and consistency for each condition.

Casual configuration	Raw coverage	Consistency
PP	0.80	0.62
FI	0.90	1.00
SW	0.80	0.80
OL	0.70	0.64

explore marketization during the special time of reform and opening. In Case 8, Qingdao was selected as the host city of the water-related events of the 2008 Olympic Games. Qingdao had to raise its urban environmental conditions to a higher standard before the Olympic Games. Thus, a partnership was established with the water giant France Veolia Group in the PPP Sewage Treatment Project with LPSs. Local authorities lacked time to undertake a feasibility research, and therefore, several unrealistic guarantees were made, leading to a complicated and inconsistent negotiation process. As one interviewee from LPSs in Case 8 responded:

“Exactly. We lacked experience in 2003. The sewage treatment fee was 1 yuan/t in Qingdao, which was higher than in most cities in China. However, it still failed to meet the contracted level of return. Raising sewage treatment fee in a short term must lead to public opposition, and we realized the contracted level is unfair.”

The construction of the Beijing Liulitun Waste Incineration Plant in Case 6 was also under the background of the Olympic Games. Local governments favored the professional competence of social capitals to improve the environment of Beijing as soon as possible, but eventually led to strong public opposition. Most of the logics under “PP * FI” have a typical effect on the intention and actual behaviour in the decision-making process of LPSs. Once “PP * FI” emerged, it was nearly impossible to reconcile in negotiation.

Second, the consistency of PP and FI alone is $8/13 = 0.62$ and 1.00, respectively, which indicates that PP may not lead to the severe extent of the credit default with 38% possibilities independently. It could be examined in the specific logic. On the one hand, public opposition is a certain logic under the condition of PP and is also a common problem that emerged in ecological construction as shown in Cases

2–6 and in Case 9. The “not in my backyard” movement often happens in sewage treatment and waste incineration projects. Information gaps and professional barriers exist between the technical indicator and the public’s traditional consciousness. The public is highly susceptible to the media, which aggravates the dispute, consequently leading to a mass incident. As explained by one of the local officials in Case 6:

“Actually we could not find such a large space in Beijing to build a waste treatment plant and all citizens would protest against it if this project is located in their community...”

Under this circumstance, relocation and temporary cessation could be deemed as effective approaches for LPSs to avoid the severe extent of credit default as shown in Cases 4–6 and Case 9. On the other hand, all cases with FI could be identified with the existence of poor cognition, which in turn will cause the credit default of LPSs as shown in Cases 1, 3, 7, 8, 10, 12, 13, 14, and 15. In China, CPSs have a relatively clear value orientation in this round of PPP promotion. However, misunderstanding of the Government-Pay PPP mode by LPSs occurs because of the multilayer principal-agent structure in the bureaucracy and the cognitive bias of public officials. The extreme cognition that “PPP is much cheaper or even free” generated many unsuitable projects for implementation. As the evidence from Case 13 revealed, the project was ejected from the Demonstration Projects Database of the China PPP Center because of the perfunctory procedure of Vfm.

As for “pp * SW * OL,” an interesting difference must be emphasized. The consistencies of “pp * SW * OL,” “FI * SW * OL,” and “SW * OL” are $2/2 = 1.00$, $5/5 = 1.00$, and $6/7 = 0.86$, respectively. Table 11 reveals that FI completely embraces sufficiency to cause a grave consequence of the Government-Pay PPP project. Thus, selected cases with FI in “SW * OL” reveal a severe extent of the credit default of LPSs, which make up $5/7 = 0.71$ of all cases with “SW * OL.” However, the different results from Cases 2, 15, and 11 confirmed the sufficiency of the absence of PP. Thus, “pp * SW * OL” was identified as a credit default solution formula of LPSs in Government-Pay PPP projects reaching its severe extent by utilizing the Tosmana 1.6.0.0 software. The response to the policy changes of LPSs must be highlighted, because cases with this logic are doomed to fail. In Case 10, LPSs of Changchun signed a PPP contract with the private sector and made certain unreasonable guarantees on the level of revenue. However, CPSs approved the banning of PPP projects with fixed return in 2002 [145]. The local governments had to respond, and they did by voiding the agreement and refusing to pay for SPV, which led to their being charged in 2003. Policy change could damage the sustainability of PPP projects directly, especially those with the Government-Pay mechanism.

9. Conclusion

This research analyses the connection between certain critical conditions and credit default of LPSs in Chinese Government-Pay PPP projects based on the cases selected in the field of ecological construction. By literature review, four conditions are determined as variables: political performance, fiscal

illusion, subjective willingness, and objective limitation. Thus, four hypotheses are made in accordance with each condition. Additionally, we categorize eleven logics under four conditions for more accurate assignment in csQCA method. The results of csQCA not only illustrate the hypotheses that could be accepted that political performance, fiscal illusion, subjective willingness, and objective limitation contribute to opportunism of LPSs in Government-Pay PPP projects but also explore the sufficiency of each condition to severe extent of credit default.

Moreover, several findings are shown as follows: (1) the configurations of PP * FI and pp * SW * OL are both completely sufficient to severe extent of credit default. We may simplify that the opportunistic logics leading to the termination of Government-Pay PPP projects in preimplementation link are attributed to PP * FI, and similarly, others in the periods of implementation or transfer could be attributed to pp * SW * OL; (2) Government-Pay PPP projects with the potential risks cited in fiscal illusion are doomed to cause a serious breach because of the poor cognition on PPP mode or unrealistic promises made by LPSs; (3) while the research findings reveal that political performance, subjective willingness, and objective limitation contain incomplete sufficiency to severe extent of credit default based on the selected cases, attention should also be paid to the specific logics like political pressure, repudiation of payment, abuse of power, and poor decision-making procedure. Further studies could be conducted in these aspects.

The values of this manuscript are not confined in the following two aspects. Theoretically, it enriches the research of credit default from LPSs in Government-Pay PPP projects, but also analyses the connections between certain conditions and serious breach. From practical perspective, the research findings could be reference for both public authorities and social capitals. On the one hand, CPSs can issue more pertinent regulations to restrain the opportunistic behaviours of stakeholders in PPP projects and supervise the excise of power by LPSs based on our study. On the other hand, social capitals may forecast the potential risks and make allocation structure in more rational way according to the findings.

However, there are still some limitations considering the objectives in our research. All cases selected in this manuscript are from the field of ecological construction. Though Government-Pay mechanism is widely used in ecological construction and environment protection, the result based on these cases may not fully reveal the connection between certain condition and credit default in all Government-Pay PPP projects. Moreover, csQCA has limitation in Quantitative analysis, and further details on the impact mechanism of each condition should be explored by other methods. In the future, the deeper analysis will be facilitated to find more valuable cases and critical conditions for normalizing the behaviours of not only public authorities but also all participators in Chinese Government-Pay PPP projects.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Disclosure

The founding sponsors had no role in the design of the study; the collection, analyses, and interpretation of data; the writing of the manuscript; and the decision to publish the results.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

This research received funding from Major Financial Application Projects of Shandong Province, China (CJ-2017-04), and Social Science Planning Project of Shandong Province, China (16CGLJ22).

Supplementary Materials

The information of questionnaire is shown in Appendix 1: variables and survey items are revealed in column 1, and scoring of Likert scale is provided in row 2. Based on the description, the supplementary materials could be easier to understand. (*Supplementary Materials*)

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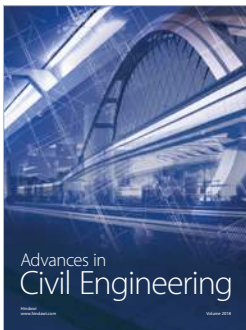
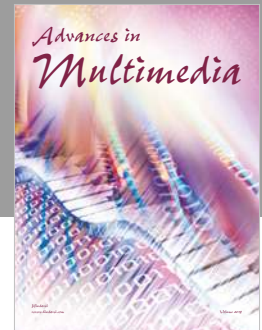
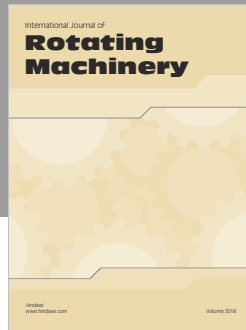
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