The Impact of Government Governance on Private Investment in Public-Private Partnership Infrastructure Projects: Based on the Fuzzy-Set Qualitative Comparative Analysis

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Abstract. This study explores the co-movement effects and driving paths of government governance on private investment in PPP infrastructure projects based on fsQCA, using 364 samples from developing countries. This study reveals three government governance paths that promote private investment in PPP projects. The results show that single government governance cannot promote private investment. Control of corruption and government effectiveness play an important role in promoting private investment in PPP projects. There is a substitution between regulatory quality, rule of law and voice and accountability, and all are important ways to inhibit opportunistic behavior of governments. Political stability does not enhance or mitigate the negative impact of risk allocation on private investment in PPP projects.

Keywords: Government governance · Private investment · PPP · Infrastructure

1 Introduction

Infrastructure projects can promote economic growth and social development [1]. The government has been the sole investor in infrastructure projects for a long time, but government investment alone has proven insufficient to drive infrastructure development [2]. Infrastructure projects requiring huge investment are a heavy financial burden for most developing country governments [3]. To overcome the drawbacks of traditional public procurement, many countries and regions have started to adopt the Public-private partnerships (PPPs) [4]. PPP is a strategy for efficient delivery of quality public facilities and services through public-private synergies [5]. The emergence of PPPs address inefficiencies in the supply of public assets and achieve a synergy of public and private
sector strengths [6]. Therefore, PPPs are considered an important method of investing in and developing public infrastructure and services. Government and private investors are the main participants in PPP infrastructure projects [7]. The involvement of private investors is even a significant element of PPPs [8]. However, many developing country governments are unable to attract sufficient private investment to support the development of PPP projects [9]. Given the significant contribution of infrastructure to socio-economic development and the advantages of PPPs, the government, as the main governance body of the country and a main participant in PPP infrastructure projects, should take responsibility for promoting the private investment in PPP infrastructure projects.

Government governance is an important factor influencing private investment in PPP infrastructure projects [10]. Existing studies focus on the impact of a single aspect of government governance on private investment in PPP infrastructure projects using linear regressions, structural equation modelling and other methods, or explore the factors that influence private investment in PPP projects. No scholar has explored the impact of diverse government governance combinations on private investment in PPP projects. However, there is a general phenomenon of interdependence rather than independence between the conditions under which management practices occur [11]. There is often interdependence and configuration-equivalent between different dimensions of government governance, so existing research cannot explain the complexity of causal relationships arising from the interdependence of government governance.

Using the fsQCA method for the first time, this study reveals the co-movement effects and driving paths of government governance on private investment in PPP projects, based on 364 samples in developing countries obtained from the World Bank’s PPI database, revealing how government governance affects private investment in PPP projects through differentiated paths. This study can provide new insights for developing countries to promote private investment in PPP infrastructure projects through improving government governance.

2 Literature Review and Hypotheses Development

2.1 Literature Review

Government governance refers to the governance of the social public affairs by the government administration system as the main governance body, and it includes the public management activities carried out by the government for itself, the market and society [12]. Kaufmann, et al. [13] proposes that governance refers to the power exercised by a country through traditions and institutions, including the process of selecting, monitoring, and replacing governments, the ability of governments to effectively formulate and implement well-established policies, the respect for citizens, and the interpretation of institutions that govern economic and social interactions, which matches well with the definition of government governance. Therefore, scholars mainly study the government governance through the six dimensions of control of corruption, government effectiveness, political stability, regulatory quality, rule of law, voice and accountability, which proposed by Kaufmann [13–15].
Wang, et al. [16] conducted an empirical study and found that better control of corruption, government efficiency, regulatory quality, and rule of law in developing countries can promote private investment in PPP projects. Percoco [17] analyzed PPP projects in developing countries empirically and found that better control of corruption, voice and accountability, and regulatory quality can facilitate the participation of private investors in PPP projects. Zheng [10] empirically examined the relationship between PPP private investment and government governance in developing countries and found that private investors’ willingness to participate in PPP projects was significantly influenced by the control corruption, rule of law and government effectiveness. Through a case study of PPP projects in Hong Kong, China, Hayllar [18] found that government governance deficiencies in Hong Kong, China, have resulted in PPP projects failing to perform to their advantage, for example, the Hong Kong, China, government often ignores public opinion.

In conclusion, research on government governance in the PPPs mainly focuses on the net effect of a single government governance on the impact of public-private partnerships using linear regressions. However, in practice, there is often interdependence and configuration-equivalent between different dimensions of government governance, so existing research cannot reveal the complexity of causal relationships arising from the interdependence of government governance. Therefore, this study constructs the research hypothesis and theoretical model based on the six WGI indexes involved in control of corruption, government effectiveness, political stability, regulatory quality, rule of law, voice and accountability, aiming to explore the co-movement effect and driving path of government governance on private investment in PPP projects, to reveal how government governance affects private investment in PPP projects through differentiated paths.

2.2 Hypotheses Development

Private investors’ willingness to participate in PPP projects depends mainly on their expected costs and benefits [19]. The successful implementation of PPP projects requires favorable cooperation between private investors and the government, especially government support and assistance for private investors [20]. But countries with higher levels of corruption require private investors to invest more time and money to form good relationships with the government, thus increasing the costs and risks for private investors [21]. Hence, we propose H1: better control of corruption can promote private investment in PPP projects.

Government effectiveness reflects government capacity. Government capacity is an important factor influencing private investment in PPP projects [9]. The government should have the knowledge, skill and competence related to PPPs, both as a governance body and as a partner in PPPs [22]. For example, the special knowledge and skills to negotiate, operate and oversee PPP projects [23]. In addition, governments are better positioned than private investors to coordinate and integrate the various resources in social networks, which helps to provide private investors with PPP project guidance agencies, training programs and experience sharing sessions [24]. Therefore, an effective government can help improve the knowledge and skills required for private investors in PPP projects [25], and can facilitate the successful initiation and operation of PPP projects with efficient organizational coordination and project risk management [23].
Hence, we propose H2: higher government effectiveness can promote private investment in PPP projects.

Political stability ensures a stable investment environment. The purpose of private investors engaging in PPPs is to generate long-term returns by investing large capital in projects. However, the environmental uncertainty in the project construction and management process is an important situational factor that cannot be ignored [26]. Uncertainties such as the political environment will increase the risk and transaction costs for private investors [27]. Therefore, government need to ensure a stable political environment in order to attract private investment in PPP projects [28]: Hence, we propose H3: better political stability can promote private investment in PPP projects.

Regulatory quality reflects the government’s ability to develop and implement well-established policies and regulations that allow for, and promote, private sector development [13]. Government and private investors are the main participants in PPP infrastructure projects [7]. Well regulation can inhibit opportunistic behavior of government [29], protect the private investors’ legitimate rights [30, 31], and inspire private investors’ investment confidence [32]. Hence, we propose H4: better regulatory quality can promote private investment in PPP projects.

Rule of law reflects the agent’s perception of trust in and compliance with social rules. Lack of trust in government by private investors is an important barrier to public-private partnerships [33]. Inter-organizational trust depends on the extent to which organizational members have a tendency to trust the organization collectively [34]. Governments often promise a lot of unreasonable and unrealistic support to attract private investors, but they fail to meet their commitments [35]. Many developing countries have immature markets and inadequate rules of law [22]. The absence of the rule of law makes it difficult to restrain the opportunistic behavior of government [10]. This leads to the fact that most private investors do not trust the government in the PPPs, so they are reluctant to participate in PPP projects [36]. Hence, we propose H5: better rule of law can promote private investment in PPP projects.

Voice and accountability refers to the ability of the country’s citizens to participate in choosing their government and freedom of expression [13]. Developing country governments rarely invite the public to voice their opinions in the PPPs [37]. The lack of public voice and accountability will result in the actions of the government and other participants not being monitored by the public. In turn, more risk will be transferred to private investors [16]. Therefore, the government’s ignorance of public voice and accountability prevents private investment in PPP project [18]. Hence, we propose H6: better voice and accountability can promote private investment in PPP projects.

3 Research Methodology

This study aims to explore whether a single aspect of the government governance can promote private investment in PPP projects and further explore the impact of different government governance combinations on private investment in PPP projects. Traditional regression methods assume that variables act independently of each other and focus on analyzing the net effect of individual variables [38]. Therefore, traditional regression methods cannot achieve our objectives. FsQCA usually be used to deal with
Table 1. Descriptive statistics

<table>
<thead>
<tr>
<th>Condition</th>
<th>Source</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control of Corruption</td>
<td>World Bank WGI</td>
<td>-0.526</td>
<td>0.473</td>
<td>-1.713</td>
<td>1.423</td>
</tr>
<tr>
<td>Government Effectiveness</td>
<td></td>
<td>-0.315</td>
<td>0.547</td>
<td>-2.236</td>
<td>1.115</td>
</tr>
<tr>
<td>Political Stability</td>
<td></td>
<td>-0.596</td>
<td>0.760</td>
<td>-2.764</td>
<td>1.197</td>
</tr>
<tr>
<td>Regulatory Quality</td>
<td></td>
<td>-0.293</td>
<td>0.548</td>
<td>-2.287</td>
<td>1.125</td>
</tr>
<tr>
<td>Rule of Law</td>
<td></td>
<td>-0.467</td>
<td>0.489</td>
<td>-2.351</td>
<td>0.762</td>
</tr>
<tr>
<td>Voice and Accountability</td>
<td></td>
<td>-0.381</td>
<td>0.678</td>
<td>-2.001</td>
<td>1.315</td>
</tr>
<tr>
<td>Private Investment</td>
<td>World Bank PPI</td>
<td>1950.195</td>
<td>4778.778</td>
<td>1.130</td>
<td>44999.270</td>
</tr>
</tbody>
</table>

causally complex issues prevalent in social phenomena [11]. Therefore, fsQCA can help to achieve this study’s objectives.

3.1 Data Sources and Variable Measurements

This study uses the private investment amount in PPP infrastructure projects in that country during the year to measure the degree of private investors’ participation in PPP infrastructure projects. The original data was obtained from the World Bank PPI database and further statistical treatment was applied to it according to country and year. A higher value indicates a higher level of private investor participation in PPP projects. In addition, this paper uses control of corruption, government effectiveness, political stability, regulatory quality, rule of law, voice and accountability indicators from the World Bank WGI database to measure the level of government governance respectively.

To ensure the accuracy of the study results, the data were sorted through the following steps: (1) since projects marked as cancel in the World Bank PPI database did not incur actual investment, projects with the status of cancel were excluded from this paper. (2) the World Bank WGI data is only updated until 2020, and China officially proposed the “One Belt, One Road” initiative in 2013, which has a certain impact on the governments and markets of related countries, so the data from 2013 to 2020 was selected in this paper. (3) considering the lagged impact of government governance on private investment in PPP projects, this paper matches the government governance indicators of each country in the previous year with the investment amount in PPP projects in current year. (4) considering the missing data involved in the above indicators, the samples with incomplete data were excluded from this paper. The final data of 364 samples from developing countries were obtained. The descriptive statistics are shown in Table 1.

3.2 Calibration of Outcome and Conditions

Referring to Rihoux and Ragin [38] and actual context, this study uses the direct calibration method to calibrate all variables, and the 0.05, 0.95 and 0.5 were selected as the fully unaffiliated, fully affiliated and crossover points respectively. The calibration of conditions and outcome are shown in Table 2.
Table 2. Calibration of conditions and outcome

<table>
<thead>
<tr>
<th>Conditions and Outcome</th>
<th>Calibration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fully in</td>
</tr>
<tr>
<td>Conditions</td>
<td></td>
</tr>
<tr>
<td>Control of Corruption</td>
<td>0.305</td>
</tr>
<tr>
<td>Government Effectiveness</td>
<td>0.478</td>
</tr>
<tr>
<td>Political Stability</td>
<td>0.517</td>
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<tr>
<td>Regulatory Quality</td>
<td>0.530</td>
</tr>
<tr>
<td>Rule of Law</td>
<td>0.391</td>
</tr>
<tr>
<td>Voice and Accountability</td>
<td>0.585</td>
</tr>
<tr>
<td>Outcome</td>
<td>Private Investment</td>
</tr>
</tbody>
</table>

Table 3. Necessary conditions for Private Investment

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Consistency</th>
<th>Coverage</th>
<th>Conditions</th>
<th>Consistency</th>
<th>Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control of Corruption</td>
<td>0.715</td>
<td>0.606</td>
<td>Regulatory Quality</td>
<td>0.707</td>
<td>0.590</td>
</tr>
<tr>
<td>~ Control of Corruption</td>
<td>0.668</td>
<td>0.533</td>
<td>~ Regulatory Quality</td>
<td>0.630</td>
<td>0.510</td>
</tr>
<tr>
<td>Government Effectiveness</td>
<td>0.769</td>
<td>0.634</td>
<td>Rule of Law</td>
<td>0.715</td>
<td>0.610</td>
</tr>
<tr>
<td>~ Government Effectiveness</td>
<td>0.590</td>
<td>0.484</td>
<td>~ Rule of Law</td>
<td>0.667</td>
<td>0.530</td>
</tr>
<tr>
<td>Political Stability</td>
<td>0.664</td>
<td>0.528</td>
<td>Voice &amp; Accountability</td>
<td>0.688</td>
<td>0.548</td>
</tr>
<tr>
<td>~ Political Stability</td>
<td>0.709</td>
<td>0.604</td>
<td>~ Voice &amp; Accountability</td>
<td>0.650</td>
<td>0.552</td>
</tr>
</tbody>
</table>

4 Results Analysis

4.1 Necessity Analysis

When the consistency level is more than 0.9, then this condition is necessary for the outcome [39]. Fsqca 3.0 software was used to test for necessity in this study. Table 3 reports the results of the necessity analysis. As the consistency level for all conditions is below 0.9, single government governance is not sufficient to constitute the necessary condition to attract private investment.

4.2 Sufficiency Analysis

Referring to the study of Rihoux and Ragin [38] and actual distribution of the truth table, the raw consistency is set as 0.86. In addition, this study sets the PRI consistency at 0.5 by
referring to the studies of Pappas and Woodside [40] and the actual distribution of the truth table. Due to the large sample size involved in this study, the frequency threshold is set at 2. This study identifies 3 government governance configurations that promote private investment in PPP projects. The sufficiency analysis results are shown in Table 4. Within these configurations, (⬤) indicates the present of core condition, (●) indicates absent of core condition, (●) indicates the present of peripheral condition, (●) indicates the absent of peripheral condition, and the blank implies a contingent condition that may or may not be present. The configuration results presented in Table 4 show that the overall solution coverage is 49.4%, and the consistency of its individual solutions with the overall solution meets the minimum threshold requirement of the QCA study [38].

Configuration 1 consists of control of corruption and regulatory quality as the core presence conditions, and government effectiveness and rule of law as the peripheral presence conditions. Configuration 1 shows the highest consistency (0.857), indicating that configuration 1 provides the best interpretation of the outcome. Its case unique coverage is 0.076 and raw coverage is 0.459. This pathway can explain 45.9% of the cases of government governance and private investment in PPPs. Configuration 2a and 2b show the same core presence conditions, which are control of corruption, government effectiveness, voice and accountability as core presence conditions. However, there are differences in the peripheral presence conditions. In configuration 2a, regulatory quality is a peripheral presence condition. In configuration 2b, rule of law is a peripheral presence condition.

Cross-sectional comparison of configurations 1, 2a and 2b from individual conditions reveals that the presence of control of corruption and government effectiveness appears in all configurations, indicating that control of corruption and government effectiveness in government governance in developing countries has an important impact on private investment in PPP infrastructure projects. In addition, the presence of control of corruption, government effectiveness, and other conditions in the three paths can complement the absence of political stability and provides significant support for promoting private investment in PPP infrastructure projects. Finally, a comparison among the configurations reveals that there is a substitution relationship between regulatory quality, voice and accountability.

Table 4. Sufficiency Analysis

<table>
<thead>
<tr>
<th>Conditions</th>
<th>1</th>
<th>2a</th>
<th>2b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control of Corruption</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>Government Effectiveness</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>Political Stability</td>
<td>☞</td>
<td>☞</td>
<td>☞</td>
</tr>
<tr>
<td>Regulatory Quality</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>Rule of Law</td>
<td></td>
<td>⬤</td>
<td></td>
</tr>
<tr>
<td>Voice and Accountability</td>
<td></td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>Consistency</td>
<td>0.857</td>
<td>0.854</td>
<td>0.851</td>
</tr>
<tr>
<td>Raw coverage</td>
<td>0.459</td>
<td>0.398</td>
<td>0.403</td>
</tr>
<tr>
<td>Unique coverage</td>
<td>0.076</td>
<td>0.015</td>
<td>0.020</td>
</tr>
<tr>
<td>Overall solution consistency</td>
<td>0.848</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall solution coverage</td>
<td>0.494</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
rule of law and voice and accountability in groups 1, 2a and 2b. This finding also supports the theoretical derivation above that regulatory quality, rule of law, and voice and accountability are all important ways to inhibit opportunistic behavior of government.

5 Conclusions

This study uses the fsQCA for the first time to investigate the co-movement effects and driving paths of government governance on private investment in PPP projects based on 364 samples in developing countries from the World Bank PPI database. The main findings of this paper are shown below:

(1) Single government governance cannot attract private investors to participate in PPP projects. (2) Each pathway is created by combining control of corruption and government effectiveness with other government governance, so that control of corruption and government effectiveness play a universal role in promoting private investment in PPP projects. Developing country governments should focus on corruption control and improving government efficiency. (3) In the presence of control of corruption and government effectiveness, there is a substitution relationship between regulatory quality, rule of law and voice and accountability. Regulatory quality, rule of law, and voice and accountability are important ways to inhibit the opportunistic behavior of government and other participants. (4) When political stability is absent, control of corruption and government effectiveness can combine with other government governance to form combinations that promote private investment in PPP infrastructure projects. Therefore, political stability does not enhance or inhibit the negative impact of risk allocation on private investment in PPP projects, and this finding is also consistent with those of Wang, et al. [16].

This study firstly analyzes the impact of government governance on private investment in PPP projects of developing countries from a single perspective of government governance to a co-movement perspective of six government governance based on WGI. It reveals how government governance affect private investment in PPP projects through differentiated paths in developing countries. In addition, this study helps developing country governments to establish appropriate government governance strategies and provides developing country governments with more practically private investment solutions.

References


thoretical reflections and empirical findings. J. Public Money & Management, 42(4): 284–
90. https://doi.org/10.1080/09540962.2020.1801882
Analysis (QCA) and Related Techniques. Applied Social Research Series. USA: SAGE
Publications, Inc. https://doi.org/10.4135/9781452226569
Guidelines for research practice in Information Systems and marketing. J. International Journal

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