

Contextual recipes for adopting private control and trust in public-private partnership (PPP) governance

Abstract

In governing public-private partnerships (PPPs), the solutions of transferring control rights to the private sectors and building trust among partners are recognized as improving efficiency and adaptability. However, the implementation of such solutions requires the match of contexts, which raises the question of under what contexts can these solutions be adopted. Building on the relevant literature on project transactions, publicness attributes, and project environments, this article transforms the context into several crucial factors including asset specificity, project publicness, institutional completeness, market maturity, and regulatory quality. A fuzzy set qualitative comparative analysis (fsQCA) was conducted on 1,378 PPP projects in developing countries to examine the contexts that support the outcomes of private control and trust solutions. The results show that there is no factor that is a necessary, nor alone sufficient, condition for the considered outcomes. Six causal paths created by a combination of contextual conditions are found to be sufficient for the accomplishment of private control and trust, to which several factors and specific relationships among factors make unique contributions. Knowledge of these paths and context combinations can help to match the context to the considered governance solutions, thereby contributing to successful PPP governance.

Keywords: Public-private partnership (PPP) governance; contextual factors; fuzzy set Qualitative Comparative Analysis (fsQCA); private control; trust

Introduction

Public-private partnerships (PPPs) are seen as a well-established organizational arrangement, in which public and private partners jointly work to realize products and services and share the accompanying benefits, costs, and risks (Hodge et al. 2010). With contracts of up to several decades, much attention has gone towards how to best govern partnerships after the ribbon is cut and the infrastructure built (Hodge et al. 2017; Forrer et al. 2010). This agenda is facing the challenge of contextual contingencies related to project complexity and environmental uncertainty. Especially for developing countries with unstable macroeconomic environments, imperfect institutional frameworks or lack of project experience, their ability to effectively deploy governance solutions for given contexts is at risk (Bhattacharya et al. 2012).

Wide stream of literature addresses the issue of optimal governance solutions of PPPs. Following the neo-institutional economics paradigm, the importance of contract conditions are acknowledged: a well-written contract, the distribution of control rights, and the allocation of risks, which emphasize rational and possibly opportunistic behavior and the need to control this behavior (e.g., Jensen and Meckling 1976; Williamson 1996). Among these conditions, innovational distribution of control rights related to the parties' motivation of specialty investment is regarded as the core element. To maintain ex ante investment incentives, the private sector is supposed to have control, which in turn helps to avoid the hold-up problems caused by large-scale dedicated investments (Grossman and Hart 1986; Hart and Moore 1990). However, private control which relies on rigid contracts is subject to insufficient ex post adaptability of

long-term contracts and potentially leads to actor's conflicts (Gaski 1984). Therefore, given the embeddedness of economic behavior in the structure of social relations, relations subsequently improve the actor's behavioral motivation. Informal relationships, especially trust, are thought to help interpret actors' behavior in a more positive rather than defensive-oriented way, which could serve as a complement for formal contracts and allow contracts to be specified more loosely (Granovetter, 1985; Reeves 2008). In this way, a mixed formula of private control in the contract aspects and trust in the relationship aspects is expected to facilitate partnership governance by maintaining the incentive and adaptive intentions.

Nevertheless, the delivery of public services involves a number of contingencies that may make private control and trust solutions fall short of expectations. For example, quality shading may give the private sector an incentive to reduce product quality (Hart, 2003), and trust may be unable to withstand verification in a potentially volatile environment (Forrer et al. 2010). This raises the question of under what context these solutions can maintain their merits to benefit PPPs.

Scholars have identified a variety of contextual factors that do affect PPP governance, including project transaction attributes, such as asset specificity, uncertainty and transaction frequency, which are the causes of transaction costs and will lead to the alignment of specific governance structures to minimize transaction costs (Wang et al. 2019; Fleta-Asin et al. 2020). Also considered is the project's public goods essence, and its inevitable tension with commercial expectations, which affects the priority between project profit goal and public value in governance (Hodge et al. 2017;

Besley and Ghatak 2001; Francesconi and Muthoo 2011). Of course, environmental factors, notably the institutional framework, operating environment and government sides, are taken into account. These conditions support aspects of PPPs and alter the universal governance solutions linked to project success (Yang et al. 2013; Panayides et al., 2015). Although these factors are enlightening, previous studies have treated the overarching context as a reductionist summing-up of independent contextual conditions, without considering that they may superimpose or vitiate each other. In other words, how the combination of multi-faceted contextual conditions affects the governance solutions has not been adequately revealed. As a result, building on previous achievements in promising governance solutions and contextual contingencies, we ask, in what context of the combination of project attributes and project environmental conditions can private control and trust solutions be adopted?

Given the complex context of developing countries and their strong demand promoting PPP programs to achieve a growth agenda towards integrity and corruption avoidance (Brinkerhoff and Brinkerhoff 2011), we regard the developing countries as a fruitful unit of analysis, and select 1,378 PPP projects in these countries between 2000 and 2018, utilizing fuzzy set qualitative comparative analysis (fsQCA) to identify the pathways created by the combination of contextual conditions that can support the accomplishment of private control and trust solutions. Our efforts are expected to provide knowledge for deploying the germane solutions to fit the given contexts, and the identified contextual recipes may serve as a reflexive tool to assess whether a broader array of governance solution fits given context, thereby preventing solutions

from being matched suboptimally.

This article is structured as follows. First, the solutions of private control and trust are conceptualized and endowed with theoretical rationality. Next, we develop the exploratory propositions regarding the likely relationships between the adoption of these solutions and the contextual factors underlying project transactions, public attributes and project environment. Then, the research design and methodology of our study are outlined. Finally, the findings and implications are presented and conclusions drawn.

Rationality of private control and trust solutions in PPP governance

For the purposes of this paper, governance is defined as the management of long-term PPPs, including the rules that prescribe accountability for conduct within the partnership and the way that conduct should be exercised (Skelcher 2010). Debates are inevitable regarding the use of contract conditions based on a rational perspective to prevent opportunism or whether informal relationships might better govern long-term contracts. From existing studies, scholars have reached a consensus that a combination of the contract and relational conditions can be more effective than using either of them alone. Moreover, what specific conditions are expected to be used and combined has been discussed for a long time.

Based on the incomplete contract theory, the innovative distribution of control rights related to the ex ante investment incentives has become the first to be of concern, which can be clearly stipulated and endowed with the rationale by the use of enforceable contracts (Hoppe and Schmitz 2010). From another perspective, the extent

to which partners operate within the spirit of shared control and responsibility is the core expression in PPP definition, which in turn gives first priority to determine who has the authority to control over the project and its related service (Brinkerhoff and Brinkerhoff 2011). When the rights are distributed, they constitute a legally bound deal framework that defines the party's duties and strategies associated with project realization. This resolves the information asymmetry between the parties to a large extent, and will bring incentive consequences to the partner's cooperation (Argyres and Mayer 2007).

For PPP projects with high asset specificity characteristics, according to GHM model (Grossman and Hart 1986; Hart and Moore 1990), control rights should be distributed to the important or indispensable party to form the optimal right structure of maximizing total surplus. In this sense, the private sector that has made large-scale investment is expected to hold control rights, while the domination of the public sector will pose a serious obstacle to achieving synergy. Private control allows the subsequent implementation of projects, including the design of product rules, setting exchange rules and specifying what is needed to execute contracts are at the private party's discretion (Brown et al. 2016; Warsen et al. 2018), which enables them to take initiative in projects and to exercise their expertise in terms of design, construction and maintenance (Shaoul 2005). Here, for the sake of conceptual clarity, by private control, we mean the transfer of control rights from the public sector to the private sector. This is a governance solution providing ex ante investment incentives through contract, rather than the strict sense of privatizing ownerships that 'privatization' emphasizes (for

more on privatization, see Savas 2000).

Nevertheless, in long-term contracts, the solution of private control based on a 'hard' contract may lack flexibility (Brown et al. 2016) and fall short of adapting to potential disturbances during contract execution (Spiller 2011; Hodge et al. 2018). Based on the perspective of the embeddedness of economic activities, sociologists believe that social relations are able to re-modify actor's behaviors (Granovetter, 1985). In this light, the use of 'soft' informal relationships is expected to compensate for contractual control, by enabling actors to form more positive expectations of each other and giving room for partners to work collaboratively on disturbances (Hodge et al. 2017; Koppenjan and de Jong 2018).

Relationships are necessarily linked with trust (Hodge et al. 2018; Warsen et al. 2018; Das and Teng 1998). The trust generally refers to the predictability in one's expectations of another's behavior and confidence in another's good faith in a partner's moral integrity (Ring and Van De Ven 1994). This means that when trust is high, each party will assume that the other party is acting in good faith and will interpret behaviors in a more positive way (Abdi and Aulakh 2012; Warsen et al. 2018). Compared with traditional public projects, the long-term PPP contracts amplify the impact of disturbances from external events, and increase the possibility of friction during the allocation of unforeseen costs and periodic update process. In this case, once potential contingencies occur, high trust will trigger partner's loyalty or morality, thus facilitating collaboration, instead of causing them to focus on controversial clauses and excessive calculation of fault liability (Bertelli and Smith 2010).

In light of the above assertions, the approach of private control maintains the efficiency orientation of partnerships, while trust relationships enhance the adaptability of long-term contract execution. The combination of the two can certainly be expected to produce a theoretical ‘win-win solution’ (Warsen et al. 2020; Gulati 1995). In fact, a handful of empirical studies have concluded directly and indirectly that such combined solutions are conducive to making PPPs successful (Abdi and Aulakh 2012; Warsen et al. 2018), achieving project performance (Warsen et al. 2018; 2019), reducing contract drafting costs (Adler 2001; Chiles and McMackin 1996) and improving governance adaptability (Dyer and Singh 1998; Lu et al. 2015).

Contextual conditions determine the adoption of specific governance solutions

Despite the availability of private control and trust solutions, they are not unconditionally adopted and effective in all contexts. The premise of successful governance is to recognize and respond to actual contextual conditions (Lumineau 2017; Müller et al. 2017; Lenferink et al. 2013). The scholarly literature on the contexts affecting PPP development has plentiful content, mainly around the factors specific to a project and those specific to the external environments (e.g., Bazzoli et al. 1997; Fleta-Asin et al. 2020; Lippi et al. 2008).

In project-level factors, since New Public Management (NPM) imbues the public service administration’s preference for contractual arrangements (Scott 2013; Hodge et al. 2017), researchers tend to regard partnerships as contract trading (Hodge and Greve 2007), and focus on the project transaction attributes such as asset specificity, uncertainty and transaction frequency. Among them, asset specificity was considered

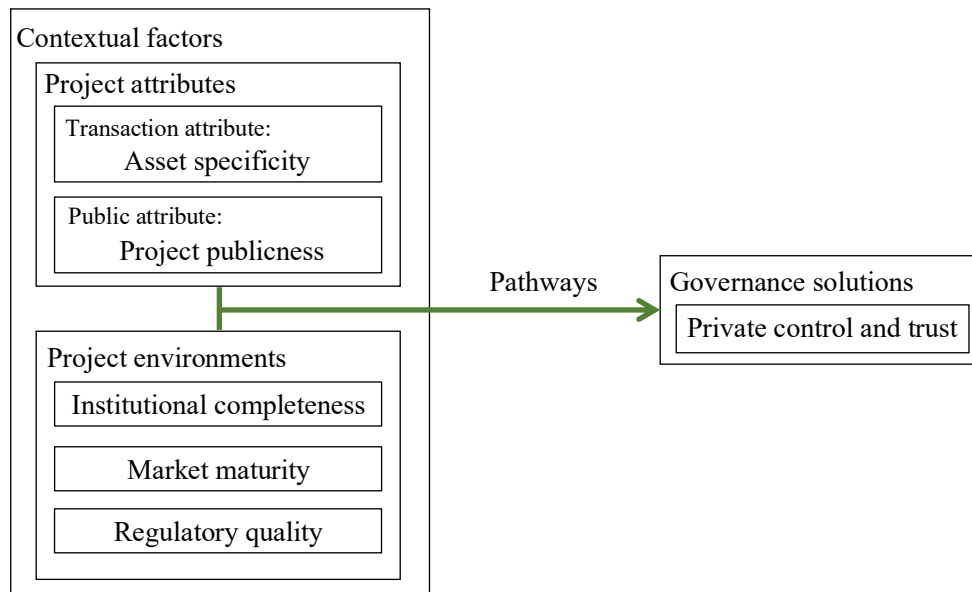
to be the main cause of contractor's opportunistic behavior and transaction costs (De Schepper et al. 2015). To minimize transaction cost, scholars have committed to the discriminating alignment of the degrees of asset specificity and the governance structure, and have concluded that the governance structure for high-specific activities is expected to be an internal option (Grossman and Hart 1986; Besanko et al. 2009).

Due to the nature of the public product attribute of PPP projects, some have questioned that studies under the lens of cost-benefit rationale may only encompass the normative aim of minimizing costs, which potentially downplay public value (Hodge et al. 2018). This query points to the examination of the impact of project publicness and its tension with commercial goals (Besley and Ghatak 2001; Francesconi and Muthoo 2011), which inevitably affects whether governance solution prioritizes prospective commercial profit or public value (Hodge et al. 2018; Besley and Ghatak 2001; Francesconi and Muthoo 2011).

In addition, following the idea that 'project is not an island', environmental factors will always alter the project governance (Engwall 2003), notably for the institutional, market, operating environment and government sides. These factors generally enhance or restrict the environmental resources required for PPP promotion, thus affecting the use and effectiveness of common solutions (Yang et al. 2013; Scott and Davis 2007; Panayides et al., 2015). More specifically, taking into account the characteristics of institutional embeddedness, institutional conditions such as legal and policy frameworks are described as the principal factor structuring the project's overall goals (Jamali 2004). Comparatively, market conditions tend to affect aspects of project

financing and operational processes. According to different market conditions, governance arrangements of optimizing resource deployment can be designed to improve the feasibility of financing and efficient operations. Another explanatory factor of PPP environment is the government side, which mainly involves the improvement and implementation of regulatory systems of government. Different from general institutional conditions, government regulation is resilient: project contracts can be designed in accordance with different regulatory environments, or the intensity and focus of regulation can be adjusted over contract execution (Caldwell et al. 2017).

Despite the achievements from the perspective of project-level attributes and their governance, or from the perspective of the project environment and its impact on the governance solution, when a variety of contextual factors are mixed together in reality, the causal relationship between the context and the adoption of governance solutions cannot be clearly explained. Returning to the private control and trust solutions addressed in this paper, the holistic context generated by different contextual factor combinations will actually determine whether they ‘fit’ well into a given context. For this reason, we transform a constellation of factors mentioned in the above analysis into the factors related to project transactions and public attributes including asset specificity and project publicness, and project external environments including institutional completeness, market maturity and regulatory quality, and attempt to reveal the causal pathways between the combination of contextual factors and private control and trust solutions. These conditions and relationships are contained in our theoretical framework, as shown in Figure 1.



- a. Factors related to project attributes and project environments are regarded as parallel factors/concepts that affect governance solutions. The purpose of this study is not to determine whether the project attributes or external environmental impacts are the priority items affecting governance but to focus on their relationship and combined impact on the considered outcomes.
- b. Only the representative contextual factors are included in this figure and discussed in the paper. This is by no means a full list of all factors but some of the most crucial and common ones in PPPs.

Figure 1. The combination of contextual factors leads to the adoption of governance solutions

Exploratory propositions on the relationships of private control, trust and contextual factors

Asset specificity

Asset specificity indicates the extent to which assets can be redeployed to alternative uses without sacrificing productivity (Williamson 1991). As investments in high-specificity assets deepen, the contracting party's engaging in opportunistic behavior on the part of the contracted party becomes more likely (De Schepper et al. 2015; Lieberman 1991). In this sense, in the enterprise-specific asset investment activities, enterprise may require holding control rights to prevent expropriation due to

other participants' opportunistic actions.

PPP projects usually exhibit high asset-specific characteristics (Casady et al. 2020). Therefore, such projects are expected to be controlled by the private party who carries out the investment, which can reduce the losses of private investment that may be caused by possible government defaults (Fleta-Asin et al. 2020). Still, there are reasons to be skeptical about whether the public sector's ceding control rights is conducive to the project's overall goals. Some studies have found that high-specificity investments may cause a lock-in effect that is manifested as extortion by private parties against the public sector to obtain excess profits (Wang et al. 2018).

As for the trust relationship, even if trust can be established in high-specificity activities, it tends to be too 'soft' to effectively prohibit the hold-up problems that due to the great lure of specificity (Spiller 2011). A conjecture is that when the trust solution is adopted in a project with high asset specificity, it also requires some other forceful supplementary mechanisms to resolve the events such as clear institutional frameworks and government regulations to prevent worse quality and equity of public service delivery.

Hence, we anticipate that when products or services have a high specificity, the solutions of private control and trust can be adopted but require auxiliary conditions to ensure successful governance, and propose the following:

Exploratory Proposition 1: High asset specificity is a strong contributing factor to private control and trust solutions. However, the successful adoption of such solutions requires the support of other auxiliary conditions.

Project publicness

The issue of publicness has long been a central topic in the stream of public service provision and management (Bozeman and Moulton 2011; Rainey et al. 1976). Project publicness refers to the extent to which a project belongs to public or private products, which involves a significant degree of complexity since its relevant considerations are not either-or issues (for example, public-private, individual-communal, state-market), but questions of relative degree (see Koppell 2010; Pesch 2005). According to the dimensional theory of publicness, the variation of publicness causes projects to be identified as either ‘more private’ or ‘more public’ (Bozeman and Moulton 2011). This results in varying degrees of tension between the private interests and public values implicit in the project, as well as different balances between the two sets of goals in the governance solution.

Besley and Ghatak (2001) concluded that if the value created by the parties’ investments constitutes a public good (i.e., being nonrival and nonexcludable), then the party with the highest valuation should be the owner, irrespective of the relative importance of the investments or production technology. In this sense, when a PPP project has high publicness, private control might have to be restricted even though this determination may undermine the anticipated benefits of partnerships. This argument is echoed in that of Hodge et al. (2017, p. 334) who claimed that it is a legitimate decision from the perspective of maintaining ‘democratic expectations’ because private control has hidden troubles: If private interests dictate the terms of the joint relationship, once arbitrariness, power abuse, and personal whims occur, democratic will and the

accountability of society might be threatened (Brinkerhoff and Brinkerhoff 2011; Hughes 2018). However, some of the efficiency-oriented research may oppose such an initiative. Because if a dispute occurs, it can be resolved by laws, proper arbitration procedures and sanctions without having to abandon the option of the private sector dictating in projects involving high publicness.

Mixed evidence of the above makes it difficult to formulate definitive expectations regarding the effects of project publicness. What can be assumed is that when the private sector controls a high-publicness project, there must be some especially guaranteed conditions to ensure the publicness inherent in PPPs. In addition, turning to the outcome of trust, publicness does not seem to have a direct impact on trust. However, highly public projects may cause a strong tension between the project's public goals and its profit goals. This makes it difficult for partners to believe that the other party will give up self-interest and pursue the overall goal, which may challenge the production of mutual trust.

To summarize, the degrees of project publicness are not expected to directly determine the adoption of private control and trust, while it could pose added challenges to the accomplishment of these solutions. Stated formally, we propose the following:

Exploratory Proposition 2: If the publicness of PPP projects is high, the possibility of private control and trust decreases; otherwise, to realize the accomplishments of private control and trust in high-publicness projects, certain guarantee conditions are required.

Institutional completeness

The institutional environment is a set of fundamental political, social, and legal rules that lay the foundation for production, exchange, and distribution (Davis and North 1970). When different countries seek generic governance modalities, institutional differences concerning the elements related to the protection of property rights, the quality of contract enforcements, and judicial independence will lead to varied expressions of the solutions adopted (Kaufmann et al. 2011).

A complete institutional framework allows complex and novel transactions in PPPs to occur in an efficient manner (Koppenjan and Enserink 2009). For example, evidence from the adjustments of price provisions in French toll road concession contracts suggests that proper laws and policies contributed to flexible adjustments regarding toll provisions and promoted the smooth execution of the contract (Athias and Saussier 2018). Meanwhile, a complete institutional framework includes incentive impacts to the investors by defining the ‘rules of the game’ that private parties rely upon and expect such as the stability of legislatures, the presence of anticorruption mechanisms, and effective sectoral supervision. This can certainly support the transfer of project control rights to private partners. In addition, encouraged by these favorable conditions, repeated transactions can be executed (Yang et al. 2013; Mota and Moreira 2015) that will provide broad support for the critical mass of trust (Gulati 1995).

Nevertheless, interestingly enough, there are studies that show that it is precisely because of a sound legal framework that can resolve not fulfilling the contract issues that the investing party actually has less necessity of controlling a project (Fleta-Asin

et al. 2020). Also, if a strict application of sanctions can be enforced fairly and clearly to deal with disagreements or conflicts, trust is not essential to build. Based on a comprehensive analysis of the impacts of institutional factors, what can be anticipated is that complete institutional frameworks are very likely to support the accomplishment of private control and trust. However, sometimes such an accomplishment cannot be achieved due to the consideration to maintain special governance intentions or the impact of the existence/absence of other contextual conditions. Hence, we propose the following:

Exploratory Proposition 3: High-completeness institutional frameworks increase the possibility of private control and trust. However, institutional completeness is not a prerequisite.

Market maturity

Market conditions will affect an enterprise's decision regarding whether to invest in a project by influencing the enterprise's estimation of option value and returns. Of particular relevance is a sophisticated financial market, such as the financing support of loans and special PPP funds, which for enterprises in raising funds at lower costs with less risks may, in turn, contribute to lowering the cost of public service delivery (Noel and Brzeski 2004). In practice, favorable financing markets have made substantial contributions to encouraging private-invest and private-led willingness (Mota and Moreira 2015; Zheng et al. 2008). In addition, accessible financing is certainly able to promote partner's mutual trust, since a partner's negotiations on permit, registration and funding terms that are relevant in starting a transaction can be easily

accomplished. Instead, less mature market environments will result in difficulties in obtaining loans or guarantees from financial institutions, leading to a shortage of capital flow and financial resource constraints. Such uncertainty in the financing market will ultimately reduce performance expectations and threaten the completion of the transaction. Hodge et al. (2018) claim that this uncertainty is due to potential market disturbances that can be adapted by a government leadership structure with resource acquisition and integration capabilities. Put another way, private control may be suboptimal to government control in achieving expected performance in immature markets (Crocker and Masten 1988; Luo 2005).

However, inconsistent with the argument that public control solutions are expected in immature markets, the relevant economic literature stresses that projects carried out in immature markets require the private parties to dictate the terms of the joint relationship. The literature regards immature markets as the main source of the external uncertainties (Mota and Moreira 2015), which can be reduced by a vertical integration structure in which the investors take control of their asset investments (Fleta-Asin et al. 2020). Considering the mixed evidence, when determining governance solutions, the contribution of market conditions may be exaggerated, or there may be other conditions that will produce effects that are similar to those of market conditions. Thus, we propose the following:

Exploratory Proposition 4: In mature markets, the adoption of private control and trust is more likely. However, market maturity is not a prerequisite, and the existence of other conditions may support these solutions even under low levels of

market maturity.

Regulatory quality

The existing literature expresses the intention of PPPs is that the day-to-day production and delivery of goods and services are left to private operators, and the government's involvement is primarily regulatory (Forrer et al. 2010). Different from traditional administrative intervention, government regulation assumes the role of overseer, serving to specify qualities of project delivery, monitor contract risk, and mediate adjustments to contract execution, by which to shield the public from the self-interested arbitrariness of project agents (House 2016; Kaufmann et al. 2011). For example, in water supply projects, price regulation could prevent water prices from rising due to monopoly power, which would avoid situations where low-income citizens cannot afford water tariffs (Iwanami and Nickson 2008).

A well-functioning and high-quality regulatory system can ensure the operational visibility and stability of project implementation and prevent incidents such as uncompetitive tender and operation cost overrun (Brown et al. 2006). When high-quality regulation exists, it is preferred to transfer project control rights to the private parties to motivate them to play a full role in project value-added. In addition, in a favorable regulation atmosphere, partners will have expectations that the other party will not behave opportunistically so that trustful relationships can be built. For example, by discussing examples such as the history of the UK railway and electricity regulation and French water concession regulation, Stern (2012) concluded that high-quality regulation can serve to reinforce trust and sustain contracts by resolving contract

misunderstandings and enabling simpler contracts.

Still, many studies are hostile to infrastructure regulation by agency (Stern 2012). Since the rise of the New Right in the 1970s and the advent of NPM in the 1980s, ‘privateness,’ that is, marketization and reduced regulation, have held sway as tools for assuming better outcomes of public service provision. A prominent standpoint is that excessive regulations may hinder private investment and cause high transaction costs due to possible policy intrusion by the government in private trade.

Based on the above argument, it can be inferred that high-quality regulation is a positive determinant of transferring control rights to private partners and building trust relationships. But these solutions can also be accomplished in the absence of regulatory conditions. In addition, it can be expected that high-quality regulation can supplement other external environmental conditions. Hence, we propose the following:

Exploratory Proposition 5: High-quality of government regulation increases the possibility of private control and trust, but it is not a prerequisite. In addition, high-quality regulation might make up for suboptimal institutional and/or market conditions.

Research design

To obtain the preconceived ideas about the full range of possible combined effects of contextual factors on the adoption of private control and trust, we follow the practice of other researchers by employing fsQCA (e.g., Andrews et al. 2019; Warsen et al. 2019) to identify the causal relationships among the theoretical derived contextual factors and the outcomes. The rest of this section first focuses on the analytical tool of fsQCA and then elaborates the data sets. Finally, the calibration of the conditions is described.

Methods

Considering our interest in evaluating alternative path of combinations of contextual conditions to obtain the considered outcome, the fsQCA approach is particularly well suited for our study. This approach allows researchers to derive configurational combinations of attributes associated with an outcome for research cases (Ragin et al. 2008). The analysis process often produces not only a fixed combination but also a differentiated combination that includes multiple factors (Schneider and Wagemann 2012). Practically, fsQCA is increasingly being utilized in the PPP governance research including studies of the mix and match of contractual aspects and relational characteristics in successful PPP projects (e.g., Warsen et al. 2019) and different combinations of institutional factors to achieve mature PPP market performance (e.g., Casady 2020).

In an fsQCA, causal relationships are discussed in terms of necessity and sufficiency (Warsen et al. 2019). Necessity means that a condition must exist for an outcome to occur; that is, if a condition is necessary, the outcome cannot be produced without the presence of that condition. Sufficiency implies that the presence of a condition always results in the considered outcome while the outcome may occur without the condition being present. The steps of necessity and sufficiency will produce the parameters of consistency scores and coverage scores to evaluate the results. The first parameter indicates the strength in which empirical evidence supports the relationships that have been found. The latter indicates the degree to which a causal combination accounts for instances of an outcome, in other words, how many cases are

covered by a single solution term (Schneider and Wagemann 2012).

The sample sizes that fsQCA can accommodate vary from a few cases to thousands of cases. Both its small-N and large-N approaches permit researchers to capture and explore the diversity of conditions through configurations. Most of the prior studies have used small-N settings (10-50 cases) to deductively test theories by constructing non-probabilistic evidence to either support or refute theories. However, recent studies have shown the promise of this approach for analyzing large-N situations that are more than 50 cases and even hundreds of cases with the primary goal of theory elaborations, which somewhat resembles the regression analysis approaches commonly used to study large samples. A rich foundation for large-N QCA research has been established in the current literature (e.g., Greckhamer et al. 2008; Fiss 2011; Misangyi and Acharya 2014).

Data and sample

Private control

The types of PPP projects can reflect the different degrees of private sector control over projects. Following the previous studies (Oxley 1999; Santoro and McGill 2005), we scale and order private control with an ordinal condition of the type of projects from the World Bank's Private Participation in Infrastructure (PPI) database, which is indicated by the liberalization index. This index is from 0 to 12, which indicates the lowest control up to the highest control over the projects held by the private parties (Zhang 2014). The numbers correspond to specific project types that exist in the PPI database. The indices of the management contract, lease contract, ROT (rehabilitate, operate and transfer), BROT (build, rehabilitate, operate and transfer), BOT (build, own

and operate), and partial- and full privatization are assigned numbers 1, 2, 3, 6, 7, 11 and 12, respectively.

Trust

Given that a precise calibration of the trust between the public sector and the private sector is problematic, a proxy measure using one-side government credibility is used to rate partner's trust. This proxy approach is derived from Zaheer et al. (1998) study of inter-organizational trust. They claim that inter-organizational trust describes the extent to which organizational members have a collectively held trust orientation toward the organization and that collective trust can reflect the level of trust between individuals. In this sense, the levels of trust between partners can be expressed through the credibility and predictability of the government side, which is the 'monitor' of the project organizations (Seppanen et al. 2007). Similar to our condition proxy approach, a PPP governance study conducted by Benítez-Ávila et al. (2018) treated trust between partners as a one-dimensional condition due to the difficulties in the operationalization and measurement of inter-organizational trust and its suggested dimensions.

The Government Integrity Index from the Heritage Foundation database is applied to measure the levels of government credibility, i.e., the degree of partner's trust. Government integrity conveys the levels of government decision making on practices such as bribery, extortion, nepotism, cronyism, patronage, embezzlement, and graft. Its values range from 0 to 100; a high score means that the government has high credibility, and, here, it indicates that a high level of trust exists between the public and private sectors.

Asset specificity

Asset specificity indicates the investments in assets that are dedicated to a particular supplier and whose redeployment entails considerable switching costs (Wu et al. 2017). There are six kinds of specificity distinction including site specificity, physical asset specificity, human-asset specificity, brand name capital, dedicated assets and temporal specificity (Williamson 1991). PPP projects are performed and specifically tailored to the characteristics of asset investment, especially associated with the investments of physical assets. For this reason, we apply total physical assets dedicated to the investment to rate asset specificity (Alvarez-Suescun 2010; De Schepper et al. 2015; Lieberman 1991) and label it through the physical asset investments recorded in millions of US dollars in the year of financial closure. The data set is obtained from the World Bank's PPI database.

Project publicness

The level of project publicness is represented by the reciprocal of project marketability index. Such treatment is based on the explanation that different degrees of project publicness can be understood as the project is 'more public' or 'more market', and publicness and marketization are two opposite descriptions of project characteristics (Bozeman and Moulton 2011).

Marketability index is the average score of the conditions related to project properties including the terms of production technology that lead to a natural monopoly, the potential for competition, the public nature of consumption, constraints on cost recovery, and distributional concerns, which range from 1 to 3 (World-Bank 1994).

Each PPP project type in the World Bank's PPI database has a corresponding marketization index score. A high score indicates that the project has a high level of marketization; that is, the project has low publicness. In practice, private investments are first allowed in segments of projects with a high marketability score; as low-scoring projects generally have high monopoly characteristics, the government is most cautious in granting private involvement in those projects (Bellier and Zhou 2003; Zhang 2015).

Institutional completeness

The level of institutional completeness can be represented by whether the existing legal and policy framework can promote investment activities and effectively protect the legitimate rights of investors (Panayides et al. 2015; Scott and Davis 2007). In view of this, we employ the International Property Rights Index from the Heritage Foundation database to describe the different levels of institutional completeness. This index usually measures the degree to which a country's laws protect private property rights and the degree to which the government enforces those laws, which fits well with the description of institutional completeness. It incorporates the level of physical and intellectual property rights, the strength of investor protection, and the quality of land administration, with scores from 0 to 100. In the existing PPP research, the International Property Rights Index and similar indices are largely used to investigate the national background of projects (Javorcik 2004; Cardenas et al. 2017).

Market maturity

To a certain extent, the market maturity of a country can be reflected by its economic development level. Countries with high economic levels always exhibit an

open market environment, trade liberalization, developed capital markets, and feasible financing means. These indicators are also signs of market maturity, which are used by project stakeholders to judge the project's market prospects and the expected profitability (Albalade et al. 2015; Wang et al. 2019). Some contributions of the related literature have applied gross domestic product (GDP) per capita to indicate the state of economic conditions of PPPs (Balassa 1985; Mota and Moreira 2015). In this study, a country's GDP per capita obtained from World Bank's World Development Indicators (WDI) database is used to express the market maturity, and the logarithm¹ of GDP per capita is employed to measure it (Ramirez-Aleson and Fleita-Asin 2016).

Regulatory quality

Regulatory quality is represented by the indicator of regulatory quality in the World Bank's Worldwide Governance Indicators (WGI) database, and it is scored from -2.5 to 2.5. This proxy indicator captures perceptions of the government's ability to formulate and implement policies and regulations that promote the private sector's execution of contracts. The score of regulatory quality is generated by combining the views of a variety of credible sources including enterprises, citizens, and expert survey respondents in industrial and developing countries, and is produced by a variety of survey institutes, think tanks, NGOs, international organizations, and private sector firms. High scores indicate that the government can better perform its regulatory functions to ensure the promotion of related activities. Regulatory quality is used in research on national background and government behavior in social and transactional

¹ Taking the logarithm of GDP per capita is to retain its data threshold at the same level as that of other conditions.

activities. Academics and policymakers have scrutinized this indicator and found that it has validity and reliability (Panayides et al. 2015).

After determining the conditions and their data sources, we conducted the selection of the research project cases. Then, the data sets of the conditions were matched to be ready for analysis. Based on references to the related research, we identified the initial research sample according to the following screening criteria: 1) a project investment year between 2000 and 2018; 2) projects that were canceled or distressed were excluded, and projects that were active or concluded were retained (see Yang et al. 2013); 3) a contract period of between 20 and 60 months; and 4) a project's total investment commitments amounted to at least one million US dollars (see Zhang 2015). The obtained data set involves a total of 70 developing countries and 1,380 PPP projects. The missing data was eliminated, including data of projects in the West Bank and Gaza and project data from before 2016 in Kosovo. Hence, the final sample consists of 1,378 PPP projects from 2000 to 2018 from 69 developing countries across Africa, Asia, Latin America, and the Middle East. Table 1 provides descriptive statistics of the data.

Table 1. Descriptive statistics: Means, SDs, Medians, Minimums, and Maximums

Condition	Source	Obs	Mean	SD	Min	Max
Private control (PriC)	PPI	1378	2.269	0.368	1.600	3.000
Trust (T)	Heritage Foundation	69	486.082	786.395	0.000	14800
Asset specificity (AsseS)	PPI	1378	11.222	0.895	9.237	13.084
Project publicness (ProjP)	PPI	1378	44.864	10.884	10.00	85.300
Institutional completeness (InstC)	Heritage Foundation	69	-0.081	0.388	-2.313	0.804
Market maturity (MarkM)	WDI	1378	6.593	1.416	1.000	11.000
Regulatory quality (ReguQ)	WGI	1378	34.435	7.020	10.000	65.000

Calibrating the condition

The so-called process of calibrating the conditions in fsQCA is that each condition with its original value will receive a score between 0 (non-membership) and 1 (full-membership), displaying its membership in each of the conditions and the outcome. In this study, condition preprocessing was undertaken using the direct method to obtain partial membership scores (Ragin et al. 2008). Following Rihoux and Ragin (2009) and Andrews et al. (2019), the qualitative anchors for condition memberships are derived as the 5th, 95th and 50th percentile value as lower threshold, upper threshold and crossover point, respectively. Considering that fsQCA technique allows only one outcome condition to be analyzed, the two conditions of private control and trust were shaped into an integrated condition through the following steps. The scores of these two conditions were normalized by a standard deviation method into the interval ranges of 0 to 1. Taking the average of the data groups of these two conditions as the split points, the two groups of data were split into four parts and then merged into four data sets combining different levels of private control and trust, which are the sets of ‘low level of private control and low level of trust’, ‘high level of private control and low level of trust’, ‘low level of private control and high level of trust’ and ‘high level of private control and high level of trust’. During this process, there were three overlapping parts between the four data sets, namely some data belonging to two or more data sets at the same time. According to the number of control elements and trust elements in the overlapping parts, these parts were further subdivided into three sets containing more control or more trust elements. Finally, seven data sets were formed, with different

distributions of control rights and levels of trust. According to the characteristics of data grouping, a seven-value fuzzy set was used to assign values between 0 and 1 to each group of data, among which the groups with a high level of private control and trust were assigned the highest threshold score. Table 2 summarizes the fuzzy set calibrations of conditions and results, displaying the anchors of upper threshold, crossover point, lower threshold, and their responding membership scores for each condition.

Table 2. Fuzzy set calibration of condition

Fuzzy Set Calibration								
		Fully In (0.95)		Crossover (0.50)			Fully Out (0.05)	
Condition	ProjP	2.600		2.400			1.800	
	AsseS	1601.720		257.300			103.850	
	InstC	55.000		50.000			30.000	
	MarkM	12.320		11.580			10.200	
	ReguQ	0.470		-0.080			-0.470	
		Fully In (1)		Crossover (0.50)			Fully Out (0)	
	PriC-T	1.400~1.180	1.380~1.400	1.050~1.380	0.800~1.050	0.600~0.800	0.550~0.600	0.40~0.550

^a For contextual conditions, fully in ≥ 0.95 , crossover = 0.50, fully out ≤ 0.05 .

^b We code the condition of PriC-T using a seven-value fuzzy set. It is scored by '1.400~1.180' and was coded as being fully in this set (1). It is scored by '0.800~1.050' and was coded as the crossover set (0.50). It is scored by '0.400~0.550' and was coded as being fully out (0). It is scored by '1.380~1.400' '1.050~1.380' and was classified as more in than out (set 0.800, 0.600, respectively). It is scored by '0.600~0.800' and '0.550~0.600' and was coded as being more out than in this set (set 0.400 and 0.220, respectively).

FsQCA results

Necessity analysis

Before reaching the analytic moment (Rihoux and Ragin 2009), we first conducted an analysis of the conditions required to test whether a single contextual condition is necessary for the outcome of PriC-T. Following Ragin (2000), the minimal consistency benchmark for necessity was set at 0.9. The results in Table 3 show that none of the

contextual conditions is a necessary condition for the outcome, namely that there is no prerequisite for the outcome to occur.

Table 3. Necessary conditions for private control and trust

Conditions	Consistency	Coverage
ProjP	0.62	0.63
AsseS	0.64	0.80
InstC	0.71	0.89
MarkM	0.64	0.68
ReguQ	0.71	0.73
~ProjP	0.57	0.64
~AsseS	0.78	0.72
~InstC	0.85	0.79
~MarkM	0.65	0.69
~ ReguQ	0.67	0.74

Sufficiency analysis

A truth table of 32 rows was initially constructed, displaying all logically possible combinations of conditions and assigning the empirical cases to each of these configurations. Regarding the processing of the truth table, we selected a consistency threshold of 0.8, which is regarded as a sufficient condition for the outcome. This is well above the required level of 0.75 and coincides with a gap in consistency scores visible in the data (Schneider and Wagemann 2012). Additionally, given the relatively large case set, we utilized a ‘rule of 3’ frequency threshold for causal recipes, which is well above the common level of 1 to mitigate possible measurement and coding errors in our case set (Park et al. 2020; Ragin 2012). After determining these thresholds, a sufficient condition analysis was performed. The results of the intermediate fsQCA solution are presented in Table 4. The scores of both overall solution consistency and overall solution coverage exceed the minimum threshold criteria, which proves that the

configuration result is valid. Table 4 contains six columns of a combination of different conditions, and each column represents an alternative causal combination of conditions linked to the outcome. Within these configurations, filled circles (●) indicate the presence of a condition while hollow circles (⊗) indicate the absence of a condition. Next, we discuss in detail the conditions and causal combinations thereof that produce the outcome.

Table 4. Sufficient conditions for private control and trust

	Private control and trust solution (PCT)					
	1	2	3	4	5	6
ProjP	●	●	⊗	⊗	●	⊗
AsseS		⊗	●		●	●
InstC	⊗		⊗	●	●	●
MarkM			⊗	●	⊗	
ReguQ	●	●		⊗		●
Consistency	0.958	0.887	0.971	0.975	0.977	0.978
Raw Coverage	0.411	0.403	0.227	0.238	0.256	0.256
Unique Coverage	0.020	0.025	0.034	0.094	0.014	0.031
Overall Solution Consistency	0.905					
Overall Solution Coverage	0.731					

^a Conditions are represented by ● (presence) and ⊗ (absence).

^b Analyses of minimum thresholds for the private control and trust solutions: raw consistency 0.8; PRI consistency 0.7; frequency 3 cases.

The first pathway, PCT 1, involves high publicness and high-quality regulation and incomplete institutional condition (ProjP*~InstC*ReguQ). The consistency score of this recipe is 0.958, meaning that project cases with this causal configuration are 95.8% consistent in the adoption of PriC-T solutions in governing PPPs. The coverage of this recipe for the outcome is 0.411, meaning that 41.1% of the sum of the membership scores in the outcome can be explained by this path.

The recipe of PCT 2 contains the same conditions of presence as the first path. The combination of project publicness and regulatory quality and the absence of asset

specificity appear to be sufficient conditions for the outcome ($\text{ProjP} * \sim \text{AsseS} * \text{GoveR}$).

Comparatively, the recipes of these two paths contain the presence of factors related to project public attributes and external environments, and these two factor types complement the absence of the factor of project transaction attributes.

PCT 3 comprises a low level of project publicness, institutional completeness, and market maturity and a high level of asset specificity ($\sim \text{ProjP} * \text{AsseS} * \sim \text{InstC} * \sim \text{MarkM}$). High asset specificity provides considerable support for the accomplishment of this path. This is because when the project is in a low-publicness state and faces incomplete institutional conditions and immature market conditions, the presence of high asset specificity can complement these conditions and still support path success. The characteristics of causality shown here correspond to the logic of TCE, that is, consideration of the degree of asset specificity is the main reason for the adoption of a specific governance modality.

PCT 4 combines the low levels of project publicness and regulatory quality and high levels of institutional completeness and market maturity ($\sim \text{ProjP} * \text{InstC} * \text{MarkM} * \sim \text{ReguQ}$). Favorable external environmental conditions contributed to the accomplishment of PCT 4. This configuration can be explained by the fact that mature institutions and market conditions make up for the lack of regulatory quality and support low-publicness projects to deploy PriC-T solutions.

PCT 5 contains a mixture of supportive conditions related to the project public and transaction attributes and project environments. It includes high levels of project publicness, asset specificity, and institutional completeness and a low level of market

maturity (ProjP*AsseS*InstC*~MarkM). In this path, the role of institutional completeness is highlighted because it can compensate for an immature market condition, and it ultimately supports high-publicness and high-specificity projects to adopt private control and trust solutions. In addition, factors of project attributes (both transaction and publicness) and external environment contribute to PriC-T with their presence types, which confirms our theoretical expectation that project attributes and external environment are both the premise considerations in governance design, and they play a certain role in determining final governance solutions together.

In PCT 6, the absence of project publicness is combined with the presence of asset specificity, institutional completeness, and regulatory quality (~ProjP*AsseS*InstC*ReguQ). The recipe highlights the supportive factors related to project transaction attributes and external environments, and the presence of these factors can contribute to the outcome of PriC-T. In addition, PCT 6 has the highest consistency score (0.978) indicating that it can best explain the outcomes. This indicates that if a project has high asset specificity, low publicness, and is in a high-level institutional framework and government regulatory environment, it can basically adopt PriC-T solutions.

Analysis of unique factors and relationships among factors of support pathways

When comparing the compositions of each path in Table 4, some insights about the factors that play a special role and the ways by which some specific factors are combined with others in obtaining the outcomes can be gleaned. Those unique factors and relationships are additional gains to the recipes that have been obtained, which go

beyond the basic causality within configurations and can contribute to the optimization of the pathways to the considered outcomes.

The first evident unique factor is project publicness, which is an essential factor that determines whether the pathway to PriC-T can be created. Table 4 shows that all the configurations involve some type of project publicness and create successful pathways by supplementing the other conditions in the presence and absence of project publicness. Another prominent factor is asset specificity, the presence of which is included in three causal configurations. Meanwhile, asset specificity has an extremely significant effect in PCT 3 and makes up for the absence of the other three conditions and supports the formation of PCT 3.

High project publicness significantly inhibits the supportive impact of asset specificity on PriC-T solutions, which can be captured by comparing the compositions of PCT 3 ($\sim\text{ProjP} * \text{AsseS} * \sim\text{InstC} * \sim\text{MarkM}$) and PCT 5 ($\text{ProjP} * \text{AsseS} * \text{InstC} * \sim\text{MarkM}$). In detail, the same conditions with different types are contained in PCT 3 and PCT 5: the former shows the absence of project publicness and institutional completeness, while in the latter, the presence of these two conditions is contained in the configuration. This change indicates that when the project has high asset specificity, private control and trust can be supported without the presence of other conditions (in PCT 3). However, if the project also has a high-publicness feature, then the supporting role of asset specificity on the considered outcomes will be offset, which is manifested by the fact that the presence of institutional completeness is additionally required to support PriC-T solutions (in PCT 5).

A complementarity between project publicness and regulatory quality can be detected by analyzing their absence/presence in the configurations. In terms of fsQCA logic, if the conditions substitute for each other, then either one or the other must be present for the solutions. In contrast, when the conditions complement each other, they both must be present for the solutions (Misangyi and Acharya 2014). Observing PCTs 1, 2 and 4, we find that project publicness and regulatory quality evidently combine with each other; however, they do so in different ways when there is non-asset specificity versus asset specificity. In the configurations with a non-asset specificity condition, these two conditions appear as complements to one another because the presence and absence of one is generally accompanied by the presence and absence of the other (in PCTs 1, 2, 4). This complementary relationship can be explained as follows: in a high-publicness project, if control rights are to be transferred to the private sector and the trust relationships between public and private partners are to be built, the presence of high-quality regulation is required to ensure that the public interest of the projects is maintained. Meanwhile, when there is the presence of asset specificity, the complementary relationship between project publicness and regulatory quality disappears (in PCTs 3, 5, 6). This change may be due to the fact that in projects with high asset specificity, the specificity characteristics have a considerable impact on the outcomes, and obscure the impact of other factors on the outcomes.

Robustness test

Despite our efforts to provide a valid threshold and calibration of the conditions used in this study, the risk of potential measurement errors still remains. Following the

suggestions of Schneider and Wagemann (2012) and Warsen et al. (2019), the robustness tests of QCA results are performed by artificially adjusting different consistency thresholds and using different calibrations of the condition. In the former operation, the determination of different consistencies will affect the number of rows in the truth table, thus affecting the results. Generally, if there is a clear subset relationship between the configurations caused by the change in consistency value, the results can be considered robust, even if they look different. Otherwise, the results are not considered to be robust. In the test operation of changing different calibrations of the specific condition, if the overall configurational results do not change, or only the state of the condition that has been altered appears to be different in the new configuration, and other conditions remain substantially unchanged, then it can be basically considered that there is no measurement error in the original analysis.

In the first robustness test, the consistency threshold was altered from 0.8 to 0.9. Using this threshold, we performed a new configurational analysis. The results of conditional causality were identical to the original analysis, which indicates that the robustness of the overall configuration is quite high. Furthermore, we adjust the PRI threshold from 0.7 to 0.73² to observe whether the configuration results are robust when the effective cases in the truth table are further reduced. The number of sufficient rows in the truth table changed from 15 to 10 after the PRI consistency threshold was raised. Using this new truth table, we performed the configurational analysis. The

² We observe changes in a sufficient number of rows in the truth table with the adjustment of the PRI consistency threshold. When its value is adjusted from 0.7 to 0.73, the number of sufficient rows changes from 15 to 10. This shows that the case used for robustness testing has undergone major changes compared to the case in the original analysis and is suitable for testing.

necessity analysis is identical to the original analysis. The sufficiency analysis displayed a few differences. Table 5 shows that the robustness analysis for contextual conditions of PRI threshold changed.

Table 5. Robustness analysis using adjusted PRI threshold

	Private control and trust-Robustness (PCT-R ₁)					
	1	2	3	4	5	6
ProjP		⊗	⊗	●	●	⊗
AsseS	●	●		●	⊗	●
InstC		⊗	●	●	⊗	●
MarkM	⊗	⊗	●	⊗	●	
ReguQ	●		⊗		●	●
Consistency	0.935	0.971	0.975	0.977	0.989	0.978
Raw Coverage	0.362	0.227	0.238	0.256	0.213	0.256
Unique Coverage	0.016	0.019	0.094	0.010	0.066	0.029
Overall Solution Consistency	0.939					
Overall Solution Coverage	0.620					

Compared with the results of the original analysis, the overall consistency and overall coverage changed slightly. The overall consistency increased from 0.905 to 0.939, which is higher than the acceptable minimum standard of consistency. The overall coverage decreased from 0.731 to 0.620, which still explains most cases. Further, comparing the terms of the set relationship between original and new configurations, what can be captured is that the robustness result in Table 5 also contains six configurations, among which PCT-R₁s 2, 3, 4, and 6 contain the same conditions as the original PCTs 3, 4, 5, and 6 in Table 4. Considering that PCT-R₁ 5 is different from the original configuration of PCT 2, PCT 2 is a subset of PCT-R₁ 5. Therefore, these two solutions are in a set relationship, which indicates that the results are robust (see Skaaning 2011; Schneider and Wagemann 2012). For PCT-R₁ 1, the configurational composition has changed. This result is not very good but still acceptable as the new

solution did not contradict the original one. In the new configuration, the project publicness disappears, asset specificity appears, and regulatory quality still exists. This change may occur because of the reduced number of effective rows in the truth table caused by raised PRI consistency; thus, the project cases that embody the role of project publicness and asset specificity have been changed. Nevertheless, the remaining cases emphasize the role of high asset specificity for obtaining solutions of the considered outcome, which is consistent with the original explanation that the presence of asset specificity makes the greatest contribution to configuration success.

To test for potential measurement errors, we performed another test by using different calibrations of ReguQ that has close relationships with several other conditions. In the alternative calibration, the upper threshold, crossover point, and lower threshold were set at 0.970, 0.520 and 0.100, respectively (original values are 0.950, 0.5 and 0.05, respectively)³. Thereafter, the threshold determining the difference between a membership score of 0.95 and 1 changed from -0.470 to 0.508. The crossover threshold changed from -0.080 to -0.078. The threshold determining the difference between a membership score of 0 and a score of 0.05 changed from -0.470 to -0.597. Using these altered thresholds, we performed the configurational analysis, and the sufficiency analysis results are displayed in Table 6. Compared with the result of the original configuration, the number of solutions and the composition of conditions have undergone some changes. The condition of regulatory quality that existed in the original

³ We determine these parameters by observing the ‘significant change points’ of the original membership scores as the thresholds change. When the three thresholds were increased by 0.02, 0.02, and 0.05, the original membership scores of the ReguQ began to show significant differences, and the parameters at this time were suitable for the test.

PCTs 1, 2 and 6 have disappeared in new configurations of PCT-R₂s 2, 5 and 6 while the other three new configurations, which are PCT-R₂s 1, 3, and 4, show little change compared with the original PCTs 3, 4, and 5. Therefore, after changing the calibration threshold of the ReguQ, the state of ReguQ for the configuration in the original analysis was changed while the other conditions composing the configuration are still stable, which indicates that the overall result of the original configuration is robust.

Table 6. Robustness analysis using different calibrations of ReguQ

	Private control and trust-Robustness (PCT-R ₂)					
	1	2	3	4	5	6
ProjP	⊗	●	⊗	●	●	⊗
AsseS	●			●	●	●
InstC	⊗	●	●	●		●
MarkM	⊗	⊗	●	⊗	●	●
ReguQ		⊗	⊗		⊗	
Consistency	0.971	0.978	0.981	0.977	0.954	0.980
Raw Coverage	0.227	0.287	0.247	0.256	0.231	0.238
Unique Coverage	0.026	0.066	0.045	0.033	0.064	0.032
Overall Solution Consistency	0.941					
Overall Solution Coverage	0.654					

Discussion and conclusion

This study is an attempt to theoretically derive the pathway of combination of multi-dimensional contextual factors underlying project transaction attributes, publicness attributes, project environments, to support the adoption of solutions that transfer control rights to the private sector and build trust between partners in PPP governance. Using fsQCA approach and project cases from developing countries, the manuscript provides a sound conceptualization of PPP context, and several insights emerge from causal relationships among contextual conditions and the outcomes.

Overall, the results of fsQCA reaffirm the notions of scholars who assume governance to be contingent on context (Casady 2020; Matos-Castano et al. 2014; Müller et al. 2008) and move it a step forward toward different combinations of contextual conditions, pointing to multi-dimensional contextual factors jointly determine the fitness of the solutions adoption. Returning to the research question of this article, it is concluded that there are six paths fitting to the adoption of private control and trust solutions created by the combination of conditions related to project attributes and external environments. Among these paths, Path 1 emphasizes the supporting role of transaction conditions, i.e., the presence of asset specificity; Path 3 stresses the guarantee effect of environmental factors, i.e., the presence of institutional completeness and market maturity; while the remaining paths highlight the mixed effects of multiple contextual conditions, especially Path 5, which is created by the combined effects of contextual factors in all dimensions extracted in this article, i.e., the presence of project publicness, asset specificity and institutional completeness. In addition, the cross-configuration analysis indicates that certain unique factors play a decisive role in obtaining the causal path, and some factors are usually bound together to create a successful path. In the following, we touch on the detailed research findings, which provide insightful theoretical and managerial implications.

An inspiring finding is that project publicness is constant across all paths, namely, each path is created by combining project publicness and other factors. This manifests that project publicness has a significant and substantial impact on PPP governance solutions in any given context. In addition, the configuration results show that high-

publicness could offset the contribution of asset specificity to the accomplishment of private control and trust solutions, which verifies the tension of decreasing transaction costs and adding democratic expectations in PPPs. This result is expected to inspire scholars to enlarge project publicness beyond project transaction nature, to reveal how PPP governance involves not simply to concepts in instrumental rationality, but also to the publicness, embodied in value rationality, which would potentially facilitate what Hodge et al. (2017) identified as the balance of democratic and commercial expectations and cultivate the potential to promote international norms associated with good governance (Brinkerhoff and Brinkerhoff, 2011).

Moreover, the results yield a meaningful conclusion that there is a ‘symbiotic’ relationship between project publicness and regulatory quality. If a high-publicness project aims to adopt private control and trust solutions, then it must be guaranteed by high-quality regulation. This finding supports scholars’ calls for reinforcing PPP regulation and shows that the role of regulation is inclined to safeguard the public values of projects, not only for performance monitoring. In this sense, developing countries should strengthen their regulatory systems, which will to a large extent promote the achievement of successful governance of highly public projects. From a practical perspective, this approach is worth an attempt as efforts to improve the quality of regulation, such as establishing an independent regulator and formulating feasible project access standards, are more accessible than attempts to improve institutional and market conditions, which require a long process in any country.

The encouraging finding is that although there is no ‘one-size-fits-all’ solution that

is universally applicable (Matos-Castano et al. 2014; Casady 2020), multiple pathways can be created by different contextual conditions to support the accomplishment of the considered solutions. Practically, given the variety of regulative, normative, and cultural-cognitive systems in developing countries where PPPs are located, it will be implausible to universalize certain governance solutions. However, according to the results of our configurational analysis, it allows for the customization of contexts in a reflexivity way to shape supportive pathways and achieve good fitness between contexts and the considered solutions, thereby to improve governance adaptability.

Despite the strengths of configurational analysis, the study has limitations that could be improved through further research. First, although our results are based on a large number of case data, we fail to consider the dynamic characteristics of the governance. The governance context, governance solutions and their permutations may alter over time and across project phases, which are subject to future research. Another limitation concerns the fact that our data does not involve projects in developed countries. Due to the specific settings of countries and the multifarious nature of PPPs, the causal path between contexts and governance solutions in countries in different development periods may be discrepant. For example, in emerging markets and developing economies, governance design is highly sensitive to institutional conditions, while the governance in developed countries may be relatively less rigorous in terms of institutional factors (Casady 2020). Comprehensive discussion involving different country settings may help create pathways to transfer specific ‘good practice’ from one country to another.

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