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PARTNERSHIP COMMUNITIES

Public–Private Partnerships and Non-Market Infrastructure Development Around the World

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Abstract: We undertake the first quantitative and broadly comparative study of the structure and performance of public-private partnership communities: networked firms that partner with governments to build infrastructure. Our study addresses several important research questions. How connected are the members of partnership communities? How can we understand the quality of the projects a community undertakes? How do political institutions shape their structure and performance? After defining partnership communities as networked communities of private firms that form the consortia that enter into long-term contractual arrangements with governments, we show how they are affected by government demand for partners. We then provide an overview of those factors that predict success in financing projects. Finally, we focus on the political economy of partnership communities. We develop and test theoretical predictions about how national institutions shape partnership communities and the quality of projects. We also investigate voters' preferences over alternative arrangements of infrastructure delivery before drawing out implications for research and practice.

Keywords: infrastructure development, infrastructure finance, political economy, public administration, public–private partnerships

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A further Online Appendix can be accessed at www.cambridge.org/partnershipcommunities

1 Partnerships for Infrastructure

In this study, we address the broad question of how private firms and government become intertwined when providing public goods and services. To understand the significance of this question, and the confusing ways in which public and private actors are linked in practice, consider the unenviable task governments have faced in addressing a coronavirus pandemic that had killed more people by the end of 2020 than live in Philadelphia, Pennsylvania. In the United States, the federal response was coordinated through an initiative called Operation Warp Speed, officially described as follows:

> Operation Warp Speed's goal is to produce and deliver 300 million doses of safe and effective vaccines with the initial doses available by January 2021, as part of a broader strategy to accelerate the development, manufacturing, and distribution of COVID-19 vaccines, therapeutics, and diagnostics . . . [It is] a partnership among components of the Department of Health and Human Services . . . including the Centers for Disease Control and Prevention . . . the National Institutes of Health . . . and the Biomedical Advanced Research and Development Authority . . . and the Department of Defense . . . . [Operation Warp Speed] engages with private firms and other federal agencies, including the Department of Veterans Affairs. (US Department of Health and Human Services 2020)

The initiative clearly states that government agencies and private firms constitute a collective effort in order to create and distribute a vaccine. Indeed, a multinational group of pharmaceutical companies including the American Moderna and British AstraZeneca received federal funds to help them to develop and to manufacture a coronavirus vaccine (*New York Times* 2020).

On Monday, November 9, 2020, the pharmaceutical firms Pfizer and BioNTech announced that data from a late-stage clinical trial revealed that their coronavirus vaccine was more than 90% effective (Pfizer Inc. 2020). Four months earlier, Operation Warp Speed had given Pfizer a US$1.95 billion advance-purchase agreement, which was essentially a promise to purchase over 100 million doses of the vaccine when it became ready for safe distribution, but the company received no funding for manufacturing and development (*New York Times* 2020). Pfizer's head of vaccine research and development articulated her understanding of this agreement in an interview that Monday: "We were never part of the Warp Speed . . . we have never taken any money from the U.S. government, or from anyone" (*New York Times* 2020). Vice President Mike Pence thought otherwise, announcing that same morning on Twitter: "HUGE NEWS: Thanks to the public–private partnership forged by President @realDonaldTrump, @pfizer announced its Coronavirus Vaccine trial is EFFECTIVE, preventing infection in 90% of its volunteers." And in

the Rose Garden two days later, President Trump claimed credit for the vaccine: "As a result of Operation Warp Speed, Pfizer announced on Monday that its China virus [sic] vaccine is more than 90 percent effective" (White House 2020). What is more, the president's remarks were critical of Pfizer for claiming distance from his administration's signature effort. "Pfizer said it wasn't part of Warp Speed," the president continued, "but that turned out to be an unfortunate misrepresentation. They are part. That's why we gave them the $1.95 million – billion dollars" (White House 2020).

1.1 What Is a Public–Private Partnership?

What are public–private partnerships (PPPs)? Why are they so complex that business and political executives seem to find it difficult to understand and to describe them? For the World Bank, PPPs are defined as long-term contractual arrangements that combine the financing and operation of assets or services that benefit the public. A crucial feature of PPPs is that the private partner "bears significant risk and management responsibility" in the provision of the public asset and "remuneration is linked to performance" (World Bank 2017, 5). In the large literature on PPPs in the scholarly field of public administration, definitions converge on three requirements: (1) some form of cooperation between public- and private-sector organizations; (2) some form of risk sharing between the governments and private-sector organizations involved in an arrangement; and (3) the joint production of public services or assets having public benefit (e.g., Klijn and Teisman 2003; Savas 2000). In the literature, definitional disagreements are not policy neutral. Hodge and Greve (2007, 546) write that scholars seem to divide between those who "view PPPs as a tool of governance and those who think it is a 'language game'" and cast PPPs negatively and in a way reminiscent of the debates about privatization or contracting.

Two crucial elements of understanding PPPs are time and risk allocation. Forrer et al. (2010, 476) contend that for an arrangement to be considered a PPP, it must be that (1) "[t]he relationship between the public and the private sector organization is long term, rather than a one-time relationship" and that (2) the arrangement "involves a negotiated allocation of risk between the public and private sectors, instead of government bearing most of the risk." Those close to the practice agree. The PPP advisor to the Ministry of Finance of Uzbekistan told Cece (2020, 27) that "short term contracts are not PPP . . . the time horizon is important." The head of the Sustainable Infrastructure Policy Unit at the European Bank for Reconstruction and Development believed that a requirement is that "the private party bears significant risk and management responsibility throughout the life of the contract" (27). Moreover, the senior

PPP specialist at the World Bank similarly related the additional requirement that "more risk is taken by the private partner than the public partner in a PPP" (27).

Longevity and privately borne risk lie at the heart of this study. Interestingly, because of its focus on a single virus, Operation Warp Speed seems unlikely to meet the longevity criterion of our working definition of a PPP, even though risk allocation does take place in the agreements between the US government and pharmaceutical manufacturers.

1.2 Building Infrastructure through Partnerships

In the pages that follow, our focus will be on partnerships that create assets, specifically infrastructure, rather than public services. We call them *partnerships for infrastructure*. For some, what constitutes infrastructure may be as difficult to define as PPPs. At the end of March 2021, President Biden announced a $2 trillion plan to restore and enhance infrastructure in the United States. The plan was quickly attacked by Republicans for considering spending on affordable housing, care for the elderly and disabled, and the replacement of lead pipes for water supply as being outside of the definition of infrastructure. "When people think about infrastructure," said Senator Roy Blunt (R-MO) "they're thinking about roads, bridges, ports and airports" (Tankersley and Smialek 2021). Said a befuddled South Dakota Governor Kristi Noem: "I was shocked by how much doesn't go into infrastructure," noting that the money in President Biden's plan "goes into research and development, it goes into housing and pipes and different initiatives, green energy" (Sheffey 2021). White House senior advisor Anita Dunn shot back: "We think that the people in Jackson, [Mississippi], might be surprised to hear that fixing that water system doesn't count as infrastructure. We think the people of Texas might disagree with the idea that the electric grid isn't infrastructure that needs to be built with resilience for the 21st century" (Tankersley and Smialek 2021). While our sample does not include social programs such as elder care, it is more expansive than the Blunt–Noem consensus. Partnerships for infrastructure build, restore, and operate the highways, bridges, waste management sites, and the energy plants that improve citizens' quality of life and stimulate economic development.

As shown in Figure 1, our data reveal significant variation between 1990 and 2020 in the types of assets that are delivered through partnerships across the regions of the world. Wind, solar, and roads are popular sectors in Europe, followed by schools and combined-cycle gas turbine (CCGT) power plants. In the Americas, the picture is similar except that gas projects are also frequently

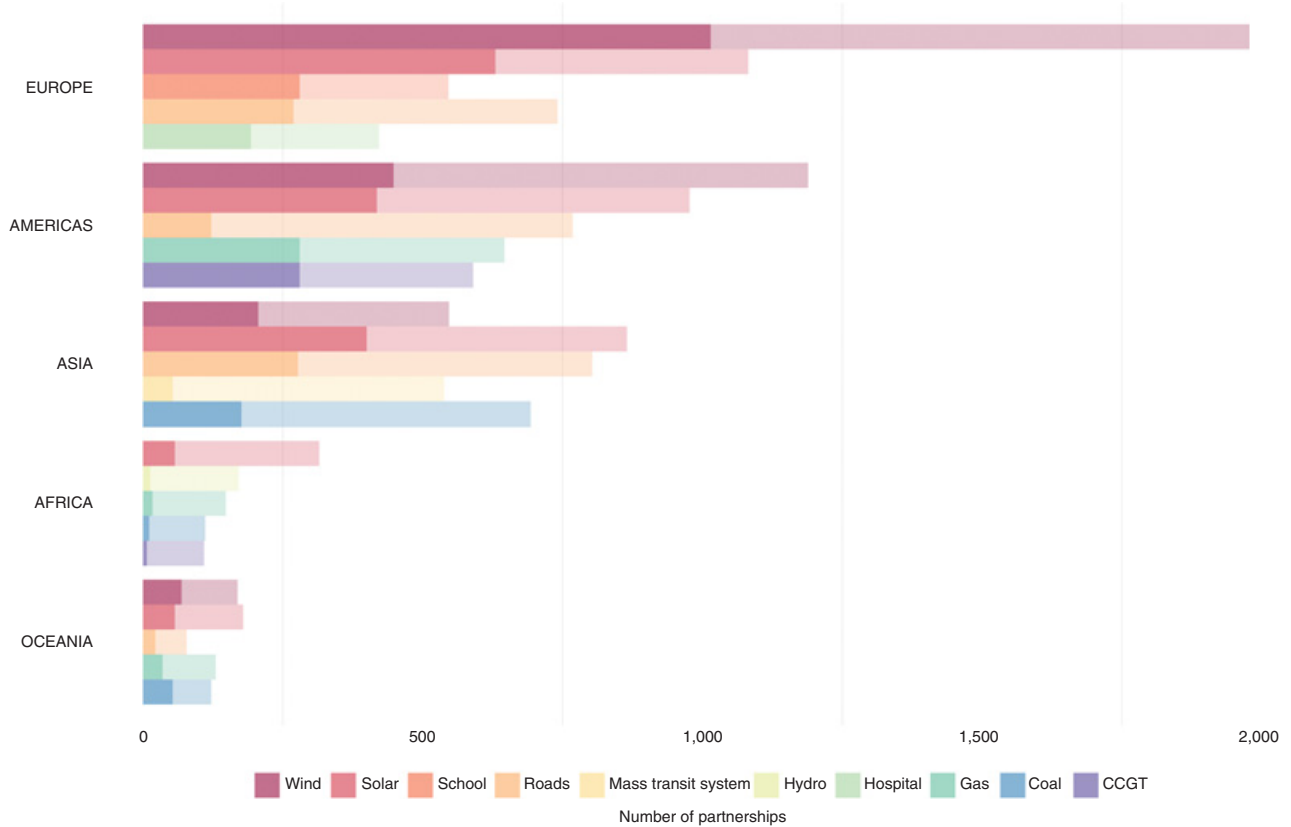

Figure 1 Partnerships for infrastructure by sector and region, 1990–2020. Source: SDC Platinum database. Top-five sectors only. Number of inanced projects in full shade, number of announced projects in faded shade.

delivered using partnerships for infrastructure. In the other regions of the world, the distributions are more idiosyncratic, reflecting the various needs of these regions. Solar, roads, and coal are the most popular sectors in Asia, with wind coming in closely behind. In Africa and Oceania, energy projects such as wind and solar also lead the way. And one cannot ignore the difference in magnitude across regions, with the top five of the 193 nations in our study – the United States, United Kingdom, Australia, India, and Brazil – accounting for 33% of all announced projects.

1.3 The Microeconomics behind Partnerships

The advantage of using partnerships rather than public administration to build infrastructure for microeconomic theorists lies in "bundling" construction and management such that a single consortium of private partners bears the risks for both phases (Engel, Fischer, and Galetovic 2014). By giving the consortium responsibility for building and operating, it has strong incentives to build well because it will be responsible for operating the asset for a significant amount of time. In this way, the very long duration of PPP contracts discussed earlier strengthens the incentives of the consortium to build or rehabilitate an asset in a sound way: a portion of their returns on the asset will depend upon its performance over decades.

An extensive literature analyzing the costs and benefits of partnerships for infrastructure constructs a more sanguine view of the strength of these incentives. They can only be enjoyed under certain conditions. For example, a better made bridge is less likely to need repairs ten years down the line. Bundling here is sensible as it mitigates moral hazard: if the same consortium will be maintaining the bridge well after its construction, it has a clear incentive to build it well (Martimort and Pouyet 2008). Now consider that building a more efficient water purification system is one thing, but operating it involves learning a vast amount about management, and that learning imposes a cost of operation. In this scenario, the agency problems at each stage – building and operating – do not improve inefficiency – that is, mitigating moral hazard in building makes the same problem in operating worse. Bundling does not improve efficiency and each phase of the water purification project should have its own consortium (Martimort and Pouyet 2008).

When compared against the benchmark of construction and management by the public sector, many things influence whether or not a PPP makes sense for building infrastructure. Recent work by the microeconomic theorists Elisabetta Iossa and David Martimort has revealed many important theoretical factors. Agency costs accrue for the government when project management is

effectively delegated to a private consortium (Iossa and Martimort 2012) – that is, the theoretical problem is similar to the problem of delegating to public agencies (e.g., Huber and Shipan 2002). Whether demand for the benefits of the asset is stable and easy to forecast also impacts the efficiency of bundling (Iossa and Martimort 2015). Moreover, if the government can write a more-or-less complete contract with the consortium, the influence of corruption within existing public administration can be lessened (Iossa and Martimort 2016; but see Bertelli, Mele, and Woodhouse 2020).

In many countries and political jurisdictions, partnerships for infrastructure are often the only feasible option for delivering large-scale infrastructure projects given the ability that these governments have to raise money (Yehoue, Hammami, and Ruhashyankiko 2006). Like bond issues, partnerships for infrastructure allow governments to build infrastructure on credit. But because important risks associated with the project are fully borne by the private consortium, its investments do not count against government budget deficits (Ball, Heafey, and King 2001). Indeed, governments have had a penchant for front-loading investment obligations onto private consortia, leaving the government itself with essentially no up-front costs (Post 2014). Regardless of whether or not a PPP offers efficiency gains, it may be more attractive to some governments because it shows them a way to deliver infrastructure without affecting their current balance sheets.

1.4 The Popularity of Partnerships for Infrastructure

The promise of efficiently delivering infrastructure with substantial help from the private sector and without engaging in normal budgetary politics has made partnerships for infrastructure incredibly popular across the globe, and among national and subnational levels of government. European countries increased fivefold their use of PPPs from 1990 to the mid-2000s, when the growth trajectory slowed through 2011 (Engel, Fischer, and Galetovic 2014, 4). Low- and middle-income countries, by contrast, saw investment in partnerships for infrastructure grow by a yearly average of 28.3% from 1990 to 1997. After a slow period during the Asian financial crisis, "a new growth spurt" began in 2003 and continued through the end of the first decade of the twenty-first century (4). In 2019, global investment levels in partnerships for infrastructure showed a 14% increase compared to 2018 and an 18% increase over the averages of the previous five years (World Bank 2019). What is more, in 2014, 59% of investment in partnerships for infrastructure occurring in OECD countries was made at the subnational level (OECD 2018). According to more recent data, this trend seems to have remained stable (if not slightly

increased). In 2019, locally sponsored projects accounted for almost two-thirds (63%) of the total number of projects recorded in the first half of 2019 (World Bank 2019).

Two pre-construction stages of PPPs will play an important role in this study. The announcement of a project indicates that the government is looking for a consortium of private partners. The financing of a project is a condition met when the private partners have raised the funds needed to develop the asset in question and the government matching funds, if any, are in place. Consortia of partners typically invest in a special-purpose vehicle (SPV), which has the single purpose of signing the long-term contract with the government for the project that was announced. The SPV handles all cash flows from the investments of consortium of partners, loans, and, eventually, the income from the use of the asset in the operating phase (Moore, Boardman, and Vining 2017, 210; Ng and Loosemore 2007, 9).[1]

Categorized by region of the world, Figure 2 shows the annual numbers of announced and financed projects in the data that we use in this study both globally and by region. As is to be expected, the number of financed partnerships for infrastructure is significantly lower than the number announced. But what is clear is that these partnerships have been growing in popularity consistently since the 1990s. The dashed gray line represents the number of global announced projects and the solid gray line represents financed projects worldwide. In Europe and Asia, partnerships for infrastructure have been highly successful in attracting investors since the early 2000s. The Americas, instead, became more successful in attracting investors in the mid-2010s (all regions experienced a drop in project financing in 2008 when the global financial crisis struck). The attraction of capital to partnerships for infrastructure is a crucial issue in understanding their promise for economic development worldwide.[2]

1.5 A New Focus: Partnership Communities

To date, the overwhelming focus of the literature on partnerships for infrastructure has been on individual projects, with qualitative accounts digging deep into their details and quantitative studies taking them as the unit of analysis for large-scale examination. We depart from this approach in an important way. At the heart of this study is the question of how the private firms involved in

[1] This practice is in evidence in the data we employ in this study. In approximately 95% of projects, the company managing the project is an SPV, not a financial sponsor. The very small number of remaining projects have large corporations in a management and financing role.

[2] In Figure 2, the graph kinks downward for the last available years in the data set. This is due to several factors, the main one being the timing of data collection, as the last projects entering our database (May 21, 2020) have not had time to be financed.

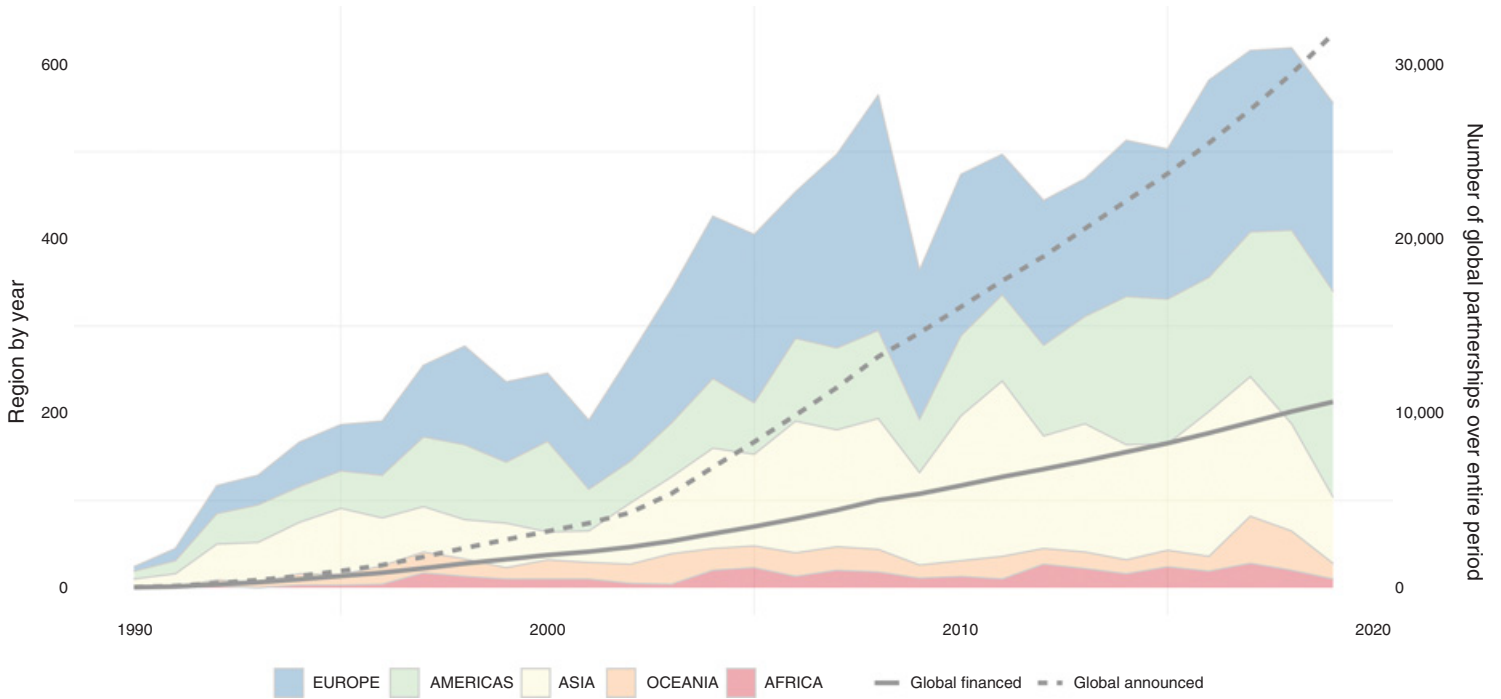

Figure 2 Number of announced and financed (global and regional) partnerships for infrastructure by sector and region, 1990–2020. Source: SDC Platinum database.

partnerships are interconnected, globally and domestically. We focus on partnership communities, and we examine how the marketplace for partners is structured within countries and across the world. This reframing helps us to overcome a major theoretical hurdle for understanding the supply of private partners, rather than simply their demand by governments.

Partnership communities are networked groups of private firms that form the consortia that enter into long-term contractual arrangements with governments. One of the main concerns about the market for partners is limited competition among private companies for bidding on announced projects, even in those markets, like the United Kingdom, where the number of successfully financed partnerships is relatively very high (Carrillo et al. 2008). The costs of bidding on announced projects, favoritism, and even a lack of efficiency gains from competitive bidding create a reality in which governments lack real choice among partners (cf. Bajari, Houghton, and Tadelis 2014; Bajari, McMillan, and Tadelis 2009; Coviello and Mariniello 2014; de Silva et al. 2008; Guasch 2004; Ohashi 2009). As markets for partners become less competitive, the private interests of the partners can become powerful enough to take precedence over the public interest (Herics et al. 2018). This is the non-market aspect of infrastructure development worldwide. It is essential to understand the interconnections between partners that both create and restrict the opportunities for governments.

How private interests organize around the delivery of public goods is crucial to understand our present context. Infrastructure is one of the fundamental ingredients for competitive industries to thrive, and its provision and upkeep is of the utmost importance for the competitiveness and economic success of nations (Porter 1990). Consequently, we take inspiration from Porter's (1998) theory of clusters, groupings of interconnected firms that are proximate in geography, in developing the partnership community as a group of potential and real partners for the government when it announces its desire to create a partnership for infrastructure. In Section 2, we estimate the number and characteristics of partnership communities across nations and time using concepts and methods from network analysis.

1.6 An Overview of the Study

To understand our argument, imagine a first phase in which a pathbreaking firm works with a government to create a demand for partners in infrastructure development. As Porter (1990; 1998) recognized, this firm can use local talent advantages to exploit economies of scale and scope in a second phase, attracting investment along the way. A third phase then reveals the partnership

community, in which the pathbreaking firm can marshal investors into a consortium and manage the partnership through its own contracts with more specialized firms with talent advantages. In this way, the partnership community of the pathbreaking, specialized, and additional firms providing private investment in PPPs becomes essential for the government to extract the efficiency and political benefits of these projects. Far from developing a more competitive marketplace, we expect the number of partnership communities to *diminish* as more partnerships for infrastructure are announced within a country. We find support for this claim in Section 2.

Our focus then turns to projects. What makes some projects "better" than others? As important as it is, the question of performance in long-term arrangements like partnerships for infrastructure is a tricky one. While the literature is replete with accounts of problematic projects (e.g., Chen, Hubbard, and Liao 2013) and discussions of the criteria for successful partnerships are many (e.g., Vining and Boardman 2008; Zhang 2005), the ultimate criterion of PPP failure – their cancellation – is a very rare event (Bertelli, Mele, and Whitford 2020). We view success through a political lens, and focus on the pre-construction phase, when political credit for launching infrastructure development is possible if a deal can be struck (Bertelli 2019). Our performance metric draws on a view of "good" partners as accelerating projects, rather than completing them (Guzman and Stern 2015). It ascribes greater quality to *present* projects when their partners have successfully moved *past* projects from announcement to financing. Financing is the crucial step in privately financed infrastructure; it is the moment when the promise of private capital can finally be leveraged for providing public goods. For politicians, it is a crucial moment too because incumbents can claim credit for the promise of what a partnership for infrastructure is expected to deliver (Bertelli 2019). Consequently, we examine the quality of projects from their launch, not, say, at the end of lengthy construction and operation phases. Our strategy for creating this metric is detailed in Section 3.

Partnerships for infrastructure are politically important, and because the rich literatures of political economy show that institutions shape both politics and economic activity, institutions surely matter in our context. Armed with measures of communities and the quality of the projects to which they contribute, we explore an argument that democracy and the rule of law are responsible for the development of partnership communities and the distribution of quality projects. We show that a minimal concept of democracy – that it is participatory and that power is contestable – is not enough to understand how democratic politics influences partnerships for infrastructure. Our focusing on relevant aspects of political and judicial institutions produces evidence consistent with a series of

claims about the predictability of the environment for partnership development. The risk to projects from the potential for partisan change in government is associated with lower quality but stronger communities to mitigate that risk. Corruption in the courts and the bureaucracy influence project quality and communities in very different ways. While broad perceptions that the rule of law adheres in a country are associated with higher-quality projects, judicial corruption invites weaker partnership communities. Side payments to the bureaucracy may well make bureaucratic application of rules to projects more predictable, but communities in countries where this is common form tighter linkages among partners to hedge risk. What is more, where pork-barrel politics is common, project quality is lower and partnership communities are stronger, but when government has a residual claim to an asset that enhances the potential for credit claiming (Bertelli 2019), quality is higher. Overall, the structure of national politics cannot be ignored, and its influence helps the network of partners to congeal into something quite distinct from a competitive marketplace.

Partnerships for infrastructure likely would be less appealing to politicians if citizens did not use the means of public goods provision when deciding which candidate deserves their votes. That is, it is crucial to understand whether the PPP as a form of public goods provision actually impacts the choices of voters. We ask whether partnerships for infrastructure influence citizens' thinking about electoral accountability to explore a mechanism that underlies important aspects of the institutional politics just described. Section 5 presents evidence that PPPs might be a very effective way for politicians to enhance vote share from providing public goods. Evidence from a survey experiment in the United States shows that partnerships are associated with a greater likelihood of voting for an incumbent member of Congress, but only before the project is completed. Once the infrastructure is in place, voters are influenced by the performance of the asset in delivering public benefits, not the actors – private or public – involved.

Our study shows that developing strong partnership communities is attractive to politicians who face the reality of being sanctioned by voters, and relying on them can positively influence voters' perceptions about how well an asset ultimately will do in delivering the benefits politicians promise when announcing its construction. This observation has a variety of policy and management implications as well as pathways for future research, which we explore in Section 6. In short, epistemic communities inspired by New Public Management (NPM) that advocate the potential of partnership communities are not misguided, but they cannot ignore the influence of national political and legal institutions on the attractiveness – and the success – of partnerships for infrastructure in political decision-making.