

Urban Transport

Can Public-Private Partnerships Work?

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Abstract

Cities exist, grow, and prosper because they take advantage of scale economies and specialization wrought by agglomeration. But output growth inevitably stresses transport infrastructure because production requires space and mobility. To prevent congestion from crowding out agglomeration benefits and to expand the supply of urban land, cities must invest in transport infrastructure. Yet balancing the growing demand for infrastructure with its supply is often difficult. In particular, many cities lack the funding to maintain and expand streets and urban highways. Also problematic is that roads are managed like a social service rather than subjected to market

discipline. This leads to the central question of this chapter: Can public-private partnerships (PPPs) deal with these problems better than conventional public provision and ensure proper maintenance, timely expansion, and less congestion? And if so, how? To answer these questions, the paper examines what PPPs can do and what they need to work, focusing in particular on the role of institutions. This is followed by an investigation of common PPP pitfalls and the ways in which they can be avoided. The paper concludes with a case study of a successful transportation PPP in Chile that emphasizes the importance of planning.

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Urban Transport: Can Public-Private Partnerships Work?

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Cities exist, grow, and prosper because they take advantage of scale economies and specialization wrought by agglomeration. But output growth inevitably stresses transport infrastructure because production requires space and mobility. Similarly, on the demand side, wealthier people use more space, buy more cars, and are more mobile.

To prevent congestion from crowding out agglomeration benefits and to expand the supply of urban land, cities must invest in transport infrastructure. Yet balancing the growing demand for infrastructure with its supply is often difficult. Poor street and highway maintenance, excessive congestion, and slow capacity expansion are endemic in cities the world over.

Many urban commentators find that slow capacity expansion is not the problem, blaming congestion instead on an irrational preference for car travel—a harmful part of urban life akin to excess noise or pollution. They argue that building more infrastructure, especially highways, just fosters sprawl and fails to reduce congestion—that people respond to more capacity by driving more and wasting even more time.¹ In this view, a central task for policy makers and planners is to curb the preference for cars. Proponents of this view advocate subsidizing public transportation; enacting taxes and restrictions to raise the costs of owning and driving cars; and establishing zoning regulations to foster compact living, shrink the spatial distribution of activities, and reduce the number of vehicle trips.

We assert, by contrast, that space and mobility are both factors of production and consumption goods with positive income elasticity and that the conventional provision of transport infrastructure suffers from three important shortcomings. Heggie and Vickers (1998, 19) describe one compellingly:

[Roads] are not managed as part of the market economy with its formidable pricing dynamic. There is no clear price for roads, road expenditures are most often funded from general tax revenues, and the road agency is not subjected to any rigorous market discipline. This biases managerial incentives. Roads are managed like a social service with multiple goals. Road users pay taxes and user charges, but the proceeds are almost always treated as general tax revenues. Instead of being financed through user charges, roads are thus financed through budget allocations determined as part of the annual budgetary process. These allocations bear little relationship to underlying needs [...] or to users' willingness to pay. There is [...] no direct link between revenues and expenditures [...], there is no price to ration demand [...], and expenditures are not subjected to the rigorous tests of the marketplace [...].

Second, many cities lack the funding to maintain and expand streets and urban highways. And third, because streets and urban highways are interconnected networks, planning at the city level and coordination among jurisdictions (for example, among municipalities or between local and regional or national authorities), is lacking. Yet urban planners often lack formal and real authority to cut through the bureaucratic web of multiple authorities and jurisdictions. Can public-private partnerships (PPPs) deal with these problems better than conventional public provision and ensure proper maintenance, timely expansion, and less congestion?

Public-private partnerships: what they can do and what they need to work

What is a public-private partnership?

When delivering infrastructure, governments face three challenges: deciding what to build and when, building cost-effectively, and ensuring proper maintenance and service quality once the infrastructure is built. Until recently, highways were considered public goods and were thus built by governments, funded with budget appropriations, and managed by ministries or public agencies. But many countries have since introduced the PPP, a new contractual agreement used extensively around the world to build roads, bridges, and tunnels.

A PPP bundles finance, construction, and operation into a long-term service contract between the government's procurement authority and a standalone private firm—the special purpose vehicle (SPV; figure 1, panel a). The SPV takes charge of building and operating a legally and economically self-contained project for 10–30 years.

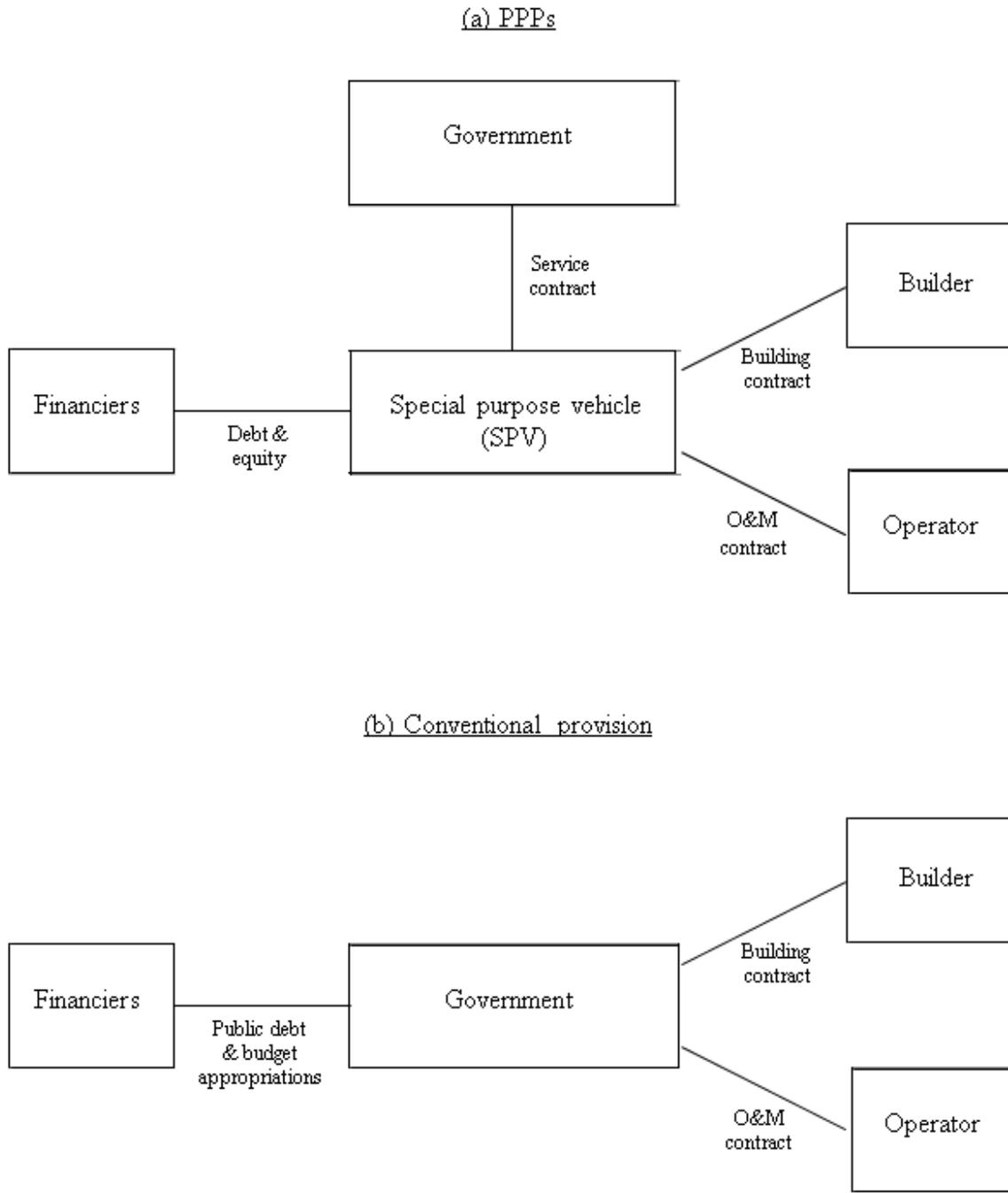
On the financing side, it pledges the cash generated by the project, which can come from tolls or government payments, to pay back both equity and debt financiers.² The SPV's narrow focus leaves little room to divert funds to other divisions, and PPP deals are usually highly leveraged.

On the production side, the SPV hires a firm to build the facilities and then operates the project and maintains the infrastructure. When the contract ends, assets revert to the government.

Compare PPPs with conventional provision, where the government deals directly with financiers, the builder, and the operator (figure 1, panel b). Under conventional provision, the project is financed with public debt and budget appropriations; a government agency hires the builder and then the operator. This basic structure has many variations, often influenced and sometimes determined by country, regional, and city laws and institutions. Sometimes the whole process is taken on by a single public institution (for example, a central government ministry or a city authority), with tasks split among agencies, among layers of government, or even within the same government institution. PPPs normally enter the conventional provision structure inheriting many of its shortcomings—and cities are unlikely to adopt radical institutional reform to change that.

Figure 1 omits the source of funding—tolls or government transfers—because both PPPs and conventionally procured projects may rely on one or both. There are many public toll roads around the world; conversely, many PPPs are funded with budget appropriations.

Figure 1. Contracting under public-private partnerships and conventional provision



When?

The appeal of PPPs stems from the glaring shortcomings of public provision. When PPPs began to spread around the world, many believed that private participation in infrastructure would by itself improve performance. To some extent, this prejudice is warranted. Public agencies in charge of infrastructure projects (for example, ministries of public works, city governments, or

municipalities) tend to have many objectives and are accountable to multiple principals, weakening incentives. Moreover, management practices in the public sector are more rigid, and public agencies are constrained by annual budgets—for good reasons. Public managers can neither use the earnings of their organization to reward employee's performance nor freely allocate factors of production. Indeed, constraints imposed by the legislature and the administration limit hiring, purchasing, contracting, and organizational structures.³ These constraints also imply that the design of institutions that manage infrastructure is seldom concerned with efficient scale and scope. Thus, while many projects are large enough to assign tasks to specialized service providers—such as construction companies or maintenance contractors—public agencies tend to manage all the infrastructure of a jurisdiction (sometimes the whole country), whose size far exceeds the efficient scale of operation. Poor street and highway maintenance is just one shortcoming stemming from the excessive scale of the institutions.

PPPs, by contrast, are the opposite type of organization. Because each project is managed by an SPV, their focus is narrow and incentives naturally sharp. Moreover, because SPVs are private firms, management is not constrained by public sector rigidities, and their goal is private gain. Last, it is far easier to pitch each PPP to its efficient scale of operation. All in all, PPPs substitute private management practices, incentives, and focus for public sector rigidities, weak incentives, and excessive scale.

In retrospect, however, it is easy to see that the view initially held by many that “privatization” through PPPs would work as liberalization of, say, international trade or goods markets, was naïve. Contrary to liberalization, PPPs do not relieve governments of most of their duties. Indeed, with single-project firms and temporary concessions, the government retains discretion to plan and coordinate network expansion as demand grows over time. Just as with public provision, performance depends heavily on the quality of project selection and appraisal. Moreover, public authorities must still manage externalities, ensure rights of way so that projects can be built, enforce project delivery and monitor contract execution thereafter. Thus, while PPPs take some responsibilities off the government's shoulders, at the same time they make the task of public authorities even harder because they have an additional agent to deal with.

How?

A central economic characteristic of transport infrastructure is the large, mainly exogenous demand risk: predicting initial use and growth rates is next to impossible. Demand forecasts depend on estimates of the macroeconomic cycle, which are tied to economic performance, and on estimates of microeconomic conditions, which reflect local demand fluctuations. Risk can also stem from uncertainties—about changes in the income elasticity of demand for motor vehicles and, when tolls are charged, about the toll elasticity. Either uncertainty can throw off demand forecasts, which are usually inaccurate in the short term (three to five years) and all but useless in the long term.

Consider the Dulles Greenway, a 14-mile (22.5-kilometer) road joining Leesburg, Virginia, with Washington-Dulles International airport, near Washington, DC. When the contract was granted in the mid-1990s, two consulting companies independently forecast that, with a toll of \$1.75, the Greenway would serve roughly 35,000 vehicles a day. Actual traffic turned out to be just 8,500 vehicles a day, because the public dislikes tolls and Virginia widened its nontolled State Route 7, which serves the same users. In this case, demand risk was policy related, but it was also beyond the firm's control and thus exogenous.

High demand risk makes risk sharing essential in PPP contract design. Consider PPPs that can be funded with tolls. Despite high demand uncertainty, tolls often pay for the project eventually; the question is only how long it will take. Even though the initial demand for the Dulles Greenway was much lower than expected, toll revenue eventually will pay for capital and operating expenses. For projects that will eventually pay for themselves, a present-value-of-revenue (PVR) contract offers many attractive properties. Under the flexible PVR contract, the regulator sets the discount rate and toll schedule, and firms bid the present value of toll revenue they desire. The firm with the lowest bid wins, and the contract lasts until the winning firm collects the toll revenue it demanded in its bid.

A PVR contract reduces risk. When demand is lower than expected, the franchise period is longer; when higher than expected, the period is shorter. Assuming the project turns profits in the long run so that it will eventually be paid for, all demand-side risks are eliminated, reducing the risk premium to far lower than what the firm would demand with fixed-term concessions.⁴ This should attract investors at lower interest rates than those offered by fixed-term PPPs. Each franchise generates the same toll revenue per year, but the PVR contract offers a variable franchise term. If demand is low, the franchise holder of a fixed-term contract may default; by contrast, a PVR contract extends until user-fee revenue equals the bid, ruling out default. The PVR bondholders do not know when they will be repaid, but that is better than not being paid at all. Reducing demand risk also mitigates the winner's curse and bids become more cost-oriented.⁵

The flexibility of PVR contracts works well for urban highways, because setting the right toll for highways is difficult. Unless traffic estimates are accurate—a rare event—the tolls will likely be either so low that they create congestion or so high that the highway is underused. In a PVR franchise, the regulator could set tolls efficiently to alleviate congestion without distorting the concessionaire's incentives.

When tolls are not an option, the government can pay a fixed periodic fee, contingent on the service quality standard being met—the availability contract. Availability contracts have become more popular in many countries, including France, the United Kingdom, and the United States. Under these contracts, the government selects an SPV to build public infrastructure. In exchange for the project services, the government remits the SPV a unitary payment, which covers principal and interest on the debt plus a return to the SPV's shareholders, known as the sponsors

or the private party. The SPV receives an amount to cover the costs of operations, maintenance, and service provision. The government guarantees the quality of service specified in the contract by making regular payments conditional on the contracted service being available.

Availability contracts, optimal if no tolls are charged, are often awarded to the firm requiring the lowest annual payment, so that demand risk is minimal. Availability payments cover the upfront investment, and the concessionaire profits on it regardless of actual demand.

Availability contracts can also maintain a network. For example, in summer 2007, Missouri's Department of Transportation selected a consortium to rebuild or replace 800 bridges and maintain them for at least 25 years. The costs were an estimated \$400–\$600 million, with the state making annual payments once the work was done. The contract provides strong incentives for the consortium by finessing it if contract specifications are not met: \$500 a day for each bridge for delays beyond the original construction deadline, \$2,000 a day for closing, and \$2,000 a day for each structure that fails to meet the quality standards set out in the contract. Similarly, cities could allocate street maintenance to a concessionaire in exchange for meeting service standards.

The role of institutions

PPPs cannot exist unless certain preconditions are met. Most important, property rights, including those arising from contracts with the government agency, must be protected. Otherwise, private firms will not commit large upfront investments to be paid by future revenue flows (tolls and availability payments); even if they do, they will demand a prohibitively high premium to bear the risk. A well-developed financial market helps PPPs because it allows firms to securitize the project locally after it is built without paying high premiums to compensate for exchange rate uncertainty and country risk. Where property rights are poorly protected, PPPs are not an option. Governments in those areas should thus strive to improve public infrastructure provision.

Pitfalls of public-private partnerships

Public finance

PPPs, contrary to misconceptions, do not free up public funds. Indeed, they affect the intertemporal government budget in much the same way as public provision. With a PPP, the current government saves the initial investment outlay, but it then relinquishes either future user-fee revenue (if the PPP is funded with tolls) or future tax revenue (if the PPP is funded with government payments).

Confusion about the intertemporal nature of PPPs underlies one of the most glaring and widespread defects of PPP programs: their use to anticipate spending. Because fiscal accounting rules keep most PPPs off the balance sheet, governments use PPPs to sidestep the normal budgetary process, just as off-balance sheet vehicles helped banks elude capital requirements and prudential regulation, igniting the 2008–09 global financial crisis.

Similarly, some governments have used PPPs to sell the cash flows from existing infrastructure, financing current expenditures with part of the proceeds. This danger looms large in cities, as the Chicago Skyway shows.⁶ The Chicago Skyway, a 7.8-mile (12.6-kilometer), six-lane, median-divided toll road linking downtown Chicago to the Indiana state line, was developed by the city in 1959, with bond financing linked to toll revenue. But the city could not raise tolls enough to pay off the debt and was ordered by the courts to increase tolls. Even with the increased tolls, however, the first principal payment (after paying off all interest due) was not made until 1991, when the project's financial situation improved as nearby nontolled roads became more congested. After retiring the original bonds in 1994, the city made no further toll adjustments until it leased the project in 2005.

From then on, the city used the Skyway revenue to fund other transportation projects and anticipated these revenues by issuing bonds in 1996 for the same purpose. In 2004, the city issued a Request for Qualifications, which brought in five qualified bidders for a 99-year lease of the Skyway. Three bidders competed to fund the highway's operations and maintenance in exchange for toll revenues according to a predetermined toll schedule, with an undisclosed reservation price estimated at \$700–\$800 million. Cintra-Maquarie's winning bid of \$1.83 billion, roughly twice its competitors' bids of well under a billion dollars, left it with the "winner's curse." Under all reasonable demand scenarios, Cintra-Maquarie paid too much for the project.⁷

Three points stand out from this case study. First, major toll increases were delayed until after the mayor's term. Second, Chicago procured in advance an exemption from leasehold taxes for the Skyway, thus raising its value at the expense of future revenues. Finally, the initial lease term was 55 years, but the actual lease extended for 99 at the insistence of potential bidders, perhaps for the tax advantages. Indeed, a private entity with a long lease gains asset ownership and can claim depreciation as an expense for federal tax returns. And over 2009–10, Cintra-Maquarie reported \$18.9 million in depreciation expenses for the Skyway.⁸ The PPP was financially advantageous for the city, because only under implausibly optimistic expectations of traffic growth and an undemonstrated ability to raise tolls could it have generated the revenue it collected from the winning bid.⁹ Private management has other potential efficiency gains (more efficient maintenance and operations), but their impacts are small (operating costs fell 11 percent, a gain of \$1 million a year, for example), so they should have an equally small impact on the overall valuation of the Skyway.

The short-term political benefits of the PPP were important. Part of the debt was used to retire Skyway bonds and city debt, and \$500 million was put into a long-term reserve. The remaining \$475 million went into discretionary funds, of which the city had spent 83 percent by the end of 2009.

How can we prevent spending anticipation and accounting shenanigans? Fiscally, PPPs should be treated much like public projects,¹⁰ following whatever accounting rules conventional

provisions follow. But few national governments, if any, have sound accounting rules, and cities keen to experiment with PPPs are not likely to either, keeping spending anticipation a driver of PPPs.

Renegotiations

PPP contracts are routinely renegotiated, often to the detriment of the public purse. True, circumstances can change over the life of a contract, but renegotiations usually occur shortly after contracts are awarded, and they tend to favor concessionaires. For example, 78 percent of the amounts awarded in Chilean PPP renegotiations have been brokered during construction, shortly after the contract was awarded.¹¹ And most renegotiations imply paying more for the works than set out in the contract. Thus, in principle renegotiations allow governments to expropriate concessionaires after they have sunk their investments, but in practice the private partner benefits the most.

Contract renegotiation is justified when all parties gain, including the public, such as when the environment changes, new information arises, or design errors are discovered. In other cases, however, contracts are modified strictly to benefit the procuring authority (expropriation of the PPP, for example), the project sponsor (by helping a failing project, offering a term extension, or lowering technical standards), or both—at user or taxpayer expense. In practice, it is difficult to distinguish the justifiable negotiations from the unjustifiable. And even when renegotiations are justifiable, the new agreement might not be fair, as contracts are renegotiated in a bilateral monopoly.

To snuff out opportunistic renegotiations, an independent panel of experts should ensure little to no change in discounted profits resulting for the concessionaire from any proposed contract renegotiation. A recent wave of legislative reforms in Latin American countries has implemented proposals along these lines.

Flexibility—adapting to changing circumstances

As stated above, circumstances change over the life of a long-term contract. If demand grows faster than expected, the PPP facility might need expanding; if the user-fee schedule proves inadequate, it might need amending. In these cases, the regulator should have the flexibility to change the contract or, perhaps, even to terminate it. This would facilitate regulatory takings, however, so many contract clauses restrict discretion to protect concessionaires.

A recent PPP concession highlights the tension of protecting the concessionaire from regulatory takings while avoiding the costs of inflexibility. In 1995, the California Department of Transportation (Caltrans) awarded a 35-year contract for a 10-mile segment of the four-lane Riverside Freeway (State Route 91), between the Orange-Riverside county line and the Costa Mesa Freeway (State Route 55), to the California Private Transportation Corporation. Motorists take the express lanes to avoid congestion in the nontolled lanes, paying up to almost \$11 round trip. The concessionaire raised tolls several times to relieve congestion. But by the late 1990s,

33,000 daily trips brought the express lanes to the brink of congestion at peak times, turning the concession into a financial success. At the same time and for the same reasons, the nontolled public lanes were congested, and expansion became urgent. The contract included a noncompete clause, however, that prevented Caltrans from raising capacity without the corporation's consent. Caltrans, in an attempt to sidestep the clause, argued that expansions were necessary to prevent accidents, but the corporation filed a lawsuit. The settlement stated that the contract's noncompete clauses ensure the corporation's financial viability, restricting Caltrans's right to adversely affect the project's traffic or revenue—to build new lanes.

Protracted negotiations ensued, and eventually the Orange County Transportation Authority negotiated to buy the tolled lanes. But the toll road's value was disputed; it would have equaled the present value of profits from the State Route 91 express lanes had the franchise continued as planned. Although the lanes cost \$130 million to build, the company's value was initially set at \$274 million in an unsuccessful buyout attempt by a nonprofit affiliated with the county. After several years of negotiations and continuing congestion, the authority bought the lanes for \$207.5 million in January 2003. The purchase was enabled by the state legislature, which allowed the authority to collect tolls and pay related financing costs and eliminated noncompete provisions in the franchise agreement to allow State Route 91 to be improved.

In principle, the government should be able to unilaterally buy back the concession, provided that it pays fair compensation for the profits forgone by the franchise holder—that is, the expected present value of future profits had the concession continued under the original terms. However, with a fixed-term concession, as with State Route 91, the value cannot be deduced from accounting data and is thus highly subjective. Here, neither discretion nor bilateral bargaining leads to an efficient solution.

Engel, Fischer, and Galetovic (2003) have shown that either a PVR contract (for projects funded with tolls) or an availability contract can be structured so that the government retains almost full flexibility while protecting the concessionaire against arbitrary takings. For example, it suffices to add a clause in PVR contracts allowing the regulator to buy out the franchise by paying the difference between the winning bid and the discounted value of collected toll revenue at the time of repurchase (minus a simple estimate of savings in maintenance and operations expenditures due to early termination). An availability contract can offer similar compensation. And in both cases, the government bears the risk of early termination—desirable because this risk is beyond the concessionaire's control. Termination under either contract is independent of future demand and therefore verifiable. Thus, the winning bid minus the payments already received by the concessionaire equals the fair compensation. The government cancels the contract only if doing so is efficient. The government's ability to cancel the contract at its discretion prevents protracted or inefficient renegotiations.

Coordination, multiple jurisdictions, and decentralization

Urban regulation developed in industrialized countries during the 19th and early 20th centuries to control negative externalities. In principle, externalities can be mitigated in several ways, such as with taxes, regulations, private bargaining, and contracts. But in practice, externalities are managed almost exclusively with top-down controls and regulations. The resulting system of laws, controls, and planning regulations specifies what can be done and where and is in charge of many authorities, including national, regional, municipal, and local governments. Sometimes, even authority within a level of government is dispersed among agencies. Conflicts across jurisdictions are thus quite common.

So, PPPs face a stiff challenge. No general rules prescribe how to deal with this preexisting system—the distribution of power varies by country—and tensions with urban regulations and institutions persist. An effective PPP requires long-term public planning. And a planner must have the authority to implement and execute it. But the plan's execution will inevitably involve other agencies and various levels of government. Many times these agencies will have a say in what can be done, when, and how; sometimes they will be pivotal to a project's execution. Moreover, the interests of each local authority might clash with community interests, especially when one jurisdiction bears the infrastructure costs but few of the benefits.

Interjurisdiction coordination, hard enough under conventional provision, is even harder with PPPs, as the long-lived contractual obligation with the concessionaire adds another constraint to the agreements that different authorities can reach. PPPs can also stand in tension with decentralization, as the need for planning and coordination can require local governments to surrender part of their authority to the agency in charge of the PPP.

The public-private partnership premium

PPPs have been roundly criticized for costing more per dollar of financing than public debt—the so-called PPP premium. The numbers quoted for this cost difference vary widely. Yescombe (2007) shows that the cost of capital for a PPP, once 200–300 basis points higher than the cost of public funds, has doubled since the credit crisis. He also shows that the spread over the lender's cost of funds is roughly 75–150 basis points, with highway projects on the upper limit.¹² So, when governments decide between public provision and PPPs, the argument goes, they trade off a lower cost of funds under public provision against a PPP's supposed higher efficiency.

Other authors, like Klein (1997), question whether there is a PPP premium. One argument claims that bondholder risk under public provision is subsumed under general government default risk—that public debt is cheaper because the public implicitly absorbs the risk through potentially higher taxes or less government spending in case of imminent default on all government debt.

Financial economists distinguish systematic risk—which varies with the market or the economy—from project-specific risk. The project's systematic risk cannot be diversified and

should affect public and private financing costs equally. Can the public sector diversify exogenous, project-specific risks better than PPP financiers? Probably not.

Both PVR and availability contracts assign all exogenous risk to the government. A PPP shifts endogenous risks to the concessionaire to prevent moral hazard and strengthen incentives to cut costs and provide adequate service quality. Unless risk-neutral, the concessionaire will charge for bearing that risk. Moreover, these risks cannot be diversified in the capital market; otherwise, there would be no incentive to improve performance and the agent might indulge in moral hazard. The question is thus whether shifting risks to the concessionaire buys an improvement in performance that justifies the higher cost of risk.

Should the government use an incentive contract to improve performance under public provision, it would have to transfer risks to an agent and pay accordingly. The cost of preventing moral hazard under public provision—a risk premium—should then be added to the public sector cost of financing. Of course, such an adjustment is never done before comparing—hence the PPP premium.

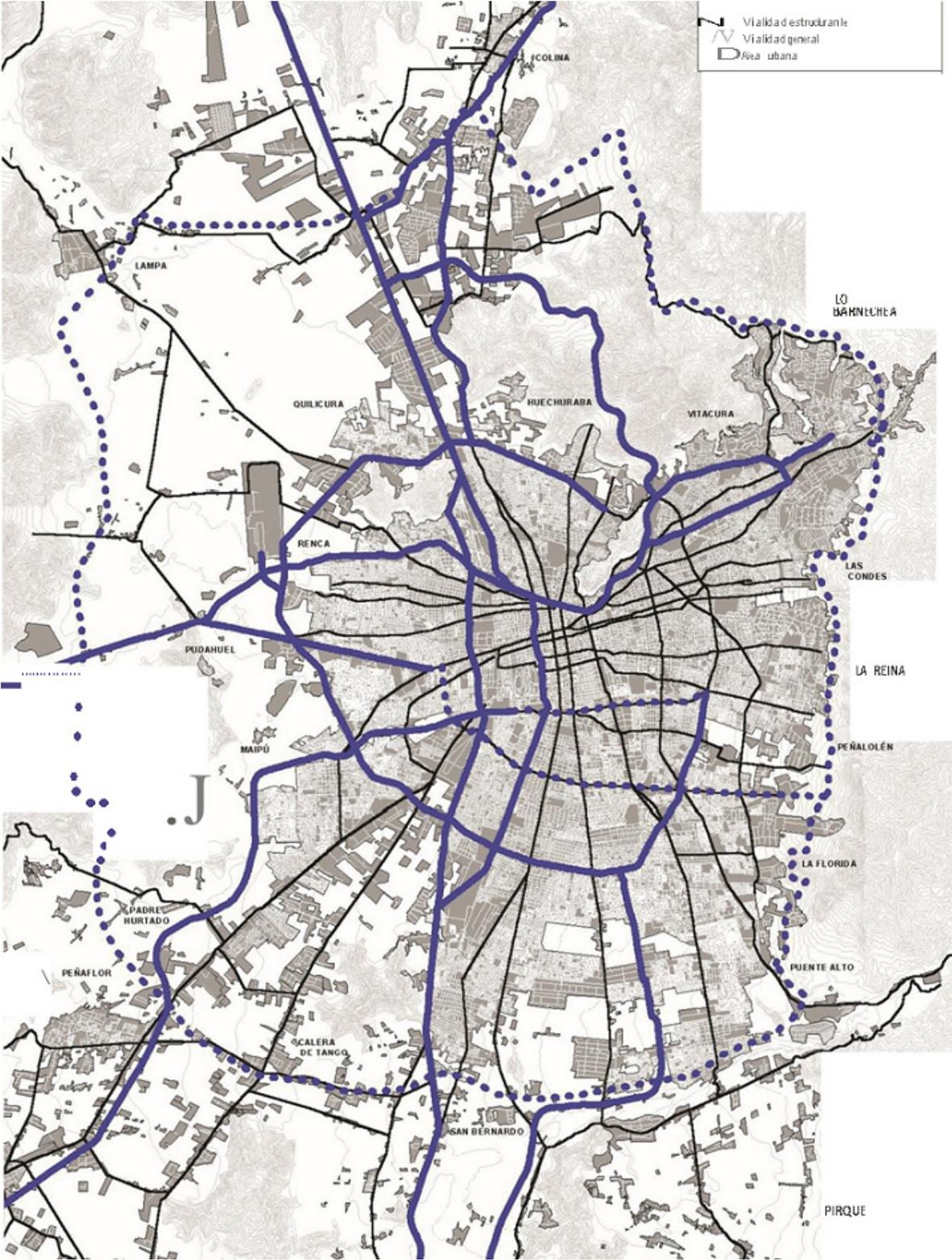
A case of prescient planning and successful implementation of public-private partnerships

Between 2000 and 2008, a 225-kilometer (140-mile) system of urban highways was built in Santiago, Chile's capital (shown in the blue lines in figure 2).¹³ The system was divided among eight PPP concessions. Most of the funding to pay for the \$3 billion investment will come from toll collections over the next 20 to 30 years. Tolls are charged by use and time of day through an electronic device attached to each car. Each month, users receive a bill and pay it like any other utility. Tolls vary by congestion and were fixed in each PPP contract.

How did Santiago build this system in less than a decade? The PPP program was planned and executed by a division in the Ministry of Public Works, which has authority over streets and highways across several municipalities. Urban PPPs were part of a broader national plan to upgrade Chile's urban highways through PPP concession. The program began in the early 1990s, along with studies to build urban highways. A law was passed to regulate concessions in 1996, and PPPs were put to tender between 2000 and 2005.

Yet the system's origin dates to the late 1950s and early 1960s. In 1960, the Ministry of Public works issued its Santiago plan, PRIS (a Spanish acronym for intercommunal urban regulation plan). Planners anticipated that Santiago's rapid growth, which had begun in the 1940s,¹⁴ would eventually transform it into a polycentric city covering a substantial, ever-expanding area. It was thus crucial to plan and build streets connecting metropolitan subcenters and municipalities, avoiding trips passing through the city center. The plan anticipated the necessary transport investments, reserved strips of land for roads, and gradually executed the investments to put the plan to work. When PPPs came 40 years later, most roads had already been built, though they were in need of substantial upgrading.

Figure 2. System of urban highways, Santiago, Chile



Conclusion

PPPs can help improve street and highway maintenance, relieve excessive congestion, and ensure timely capacity expansion, but they cannot substitute for good government. Indeed, PPPs can make government tasks more difficult and demanding.

PPPs can go a long way toward ensuring that transport infrastructure is well maintained. Their long-term contracts force the government to fund the SPVs in charge of the infrastructure. If the contract specifies adequate maintenance and service standards and punishes noncompliance, the concessionaire will be motivated to comply.

In addition, PPPs foster productive efficiency, because the concessionaire is a private firm free of the typical constraints that a public manager must obey. The concessionaire can freely choose factors of production and reward them contingent on performance. Moreover, SPVs have a narrow focus, answer to only one principal, and can adjust their scale and scope to fit the task at hand.

PPPs need not be funded with tolls, but they offer an opportunity to make tolls politically acceptable. Because free-flow tolling is now feasible, tolls can be charged to reduce congestion, ensure an adequate mix of public and private transportation, and help finance maintenance and new infrastructure. Indeed, there is no good argument against charging for transport infrastructure: congestion abounds, streets and highways are rival goods, and technology now makes them excludable. Also, making users pay for infrastructure is good public finance. Perhaps we should pay for using streets just as we pay for water, electricity, or garbage collection.

Of course, tolls need to be regulated by a public body. Moreover, SPVs cannot ensure proper and timely expansion of transport networks because planning, a long-term endeavor, must be handled by a public body with authority to achieve interjurisdiction coordination and ensure rights of way. Also, public bodies must take charge of delivering projects, monitoring contract compliance, and enforcing service standards. If these preconditions are met, PPPs can build, operate, and maintain urban highways. They can also maintain streets—a city can be divided into sectors, each delegated to a firm in charge of maintaining it under a long-term contract.

Cities should take care when developing a PPP program, noting at least three precautions. First, PPPs should be chosen only if they improve efficiency, and not for fiscal reasons, because they have the same impact as conventional provision on the intertemporal budget. So far, few countries (if any) have modified their accounting rules to acknowledge this fact, and city governments probably will not either. The temptation to use PPPs to anticipate spending is strong and casts doubts on their desirability.

Second, in a PPP the concessionaire's expenses are front-loaded, while revenue collection is back-loaded. Private firms will invest only if they know that revenue streams will not be

expropriated—that is, if rules of law and property rights are strong. Without this assurance, only traditional, less risky, public infrastructure provision is feasible. This insight suggests that PPPs are unattractive to low-income countries with weak institutions and governments.

Last, PPPs need even more sophisticated governance and public intervention than does conventional provision: planning and project delivery, contract monitoring and enforcement, and interjurisdiction coordination. These tasks are performed imperfectly today, and just adopting PPPs will not improve institutions. Experience so far has exposed many pitfalls, and inadequate governance has been the rule.

Notes

¹ Mogridge 1997.

² This financing technique is known as project finance. See Yescombe (2002, 2007).

³ See Wilson (1987, ch. 7).

⁴ For example, by an amount equal to a third of the upfront investment in the case considered in Engel, Fischer, and Galetovic (2003) and by an even larger amount in the case considered in Albaladejo and Bel (2009).

⁵ Tirole 1997.

⁶ Based on Cheng (2010).

⁷ Cheng 2010.

⁸ For the Indiana Toll Road, depreciation expenses for 2009–10 totaled \$73.6 million.

⁹ Cheng 2010.

¹⁰ See Engel, Fischer, and Galetovic (forthcoming [b]).

¹¹ Engel and others 2009.

¹² Yescombe 2007.

¹³ According to the 2011 census, 6.2 million people live in the Santiago metropolitan area (*Gran Santiago*), and the city covers 711.2 square kilometers (71.1 hectares or 274.6 square miles). Densities are 8,700 inhabitants per square kilometer, 87 per hectare, or 22,578 per square mile. *Gran Santiago* is divided into 37 municipalities.

¹⁴ Between 1940 and 1960, Santiago's population roughly doubled, from about 1 million to 2 million. Santiago's surface area doubled too, from about 100 square kilometers to 200 (10,000 hectares to 20,000, or 38 square miles to 77). By 1970, the population had increased by another million and surface area by another 100 square kilometers.

References

- Albalade, Daniel, and Germà Bel. 2009. "Regulating Concessions of Toll Motorways: An Empirical Study on Fixed vs. Variable Term Contracts." *Transportation Research Part A: Policy and Practice* 43: 219–29.
- Cheng, J. 2010. "The Chicago Skyway Concession." Senior thesis, Yale University.
- Engel, Eduardo, Ronald Fischer, and Alexander Galetovic. 2003. "Privatizing Highways in Latin America: Is It Possible to Fix What Went Wrong?" *Economia* 4: 129–58.
- . Forthcoming (a). *The Economics of Public-Private Partnerships: A Basic Guide*. Cambridge, UK: Cambridge University Press.
- . Forthcoming (b). "The Basic Public Finance of Public-Private Partnerships." To appear in the *Journal of the European Economic Association*.
- Engel, Eduardo, Ronald Fischer, Alexander Galetovic, and Manuel Hermosilla. 2009. "Renegociación de concesiones en Chile." *Estudios Públicos* 113: 151–205.
- Heggie, Ian G., and Piers Vickers. 1998. "Commercial Management and Financing of Roads." Technical Paper 409. World Bank, Washington, DC
- Klein, Michael. 1997. "The Risk Premium for Evaluating Public Projects." *Oxford Review of Economic Policy* 13: 29–42.
- Mogridge, Martin J.H. 1997. "The Self-Defeating Nature of Urban Road Capacity Policy." *Transport Policy* 4: 5–23
- Tirole, Jean. 1997. "Comentario a la propuesta de Engel, Fischer and Galetovic sobre licitación de carreteras." *Estudios Públicos* 65 Winter: 201-214.
- Wilson, James Q. 1989. *Bureaucracy: What Government Agencies Do and Why They Do It*. New York: Basic Books.
- Yescombe, Edward R. 2002. *Principles of Project Finance*. Burlington, MA: Academic Press.
- . 2007. *Public-Private Partnerships: Principles of Policy and Finance*. Waltham, MA: Butterworth-Heinemann.