

## Public-Private Partnerships to Revamp U.S. Infrastructure

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## MISSION STATEMENT

The Hamilton Project seeks to advance America's promise of opportunity, prosperity, and growth. The Project's economic strategy reflects a judgment that long-term prosperity is best achieved by fostering economic growth and broad participation in that growth, by enhancing individual economic security, and by embracing a role for effective government in making needed public investments. We believe that today's increasingly competitive global economy requires public policy ideas commensurate with the challenges of the 21st century. Our strategy calls for combining increased public investments in key growth-enhancing areas, a secure social safety net, and fiscal discipline. In that framework, the Project puts forward innovative proposals from leading economic thinkers — based on credible evidence and experience, not ideology or doctrine — to introduce new and effective policy options into the national debate.

The Project is named after Alexander Hamilton, the nation's first treasury secretary, who laid the foundation for the modern American economy. Consistent with the guiding principles of the Project, Hamilton stood for sound fiscal policy, believed that broad-based opportunity for advancement would drive American economic growth, and recognized that “prudent aids and encouragements on the part of government” are necessary to enhance and guide market forces.





# Public-Private Partnerships to Revamp U.S. Infrastructure

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NOTE: This discussion paper is a proposal from the authors. As emphasized in The Hamilton Project's original strategy paper, the Project was designed in part to provide a forum for leading thinkers across the nation to put forward innovative and potentially important economic policy ideas that share the Project's broad goals of promoting economic growth, broad-based participation in growth, and economic security. The authors are invited to express their own ideas in discussion papers, whether or not the Project's staff or advisory council agrees with the specific proposals. This discussion paper is offered in that spirit.

**BROOKINGS**

# Abstract

Public-private partnerships are often touted as a “best-of-both-worlds” alternative to public provision and privatization. But in practice, they have been dogged by contract design problems, waste, and unrealistic expectations. Governments sometimes opt for a public-private partnership, for example, because they mistakenly believe that it offers a way to finance infrastructure without adding to the public debt. In other cases, contract renegotiations have resulted in excessive costs for taxpayers or losses for private firms. This paper proposes a series of best practices that communities can undertake to ensure that public-private partnerships provide public value. These include choosing partnerships for the right reasons; relying on flexible-term Present-Value-of-Revenue (PVR) contracts; including partnerships on government balance sheets; and implementing good governance practices. Enacting these reforms will help maximize taxpayer value and reduce risks for each party involved in a public-private partnership.

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# Introduction

After years of underfinancing much-needed repairs and maintenance to America's infrastructure—by as much as \$2.2 trillion, according to some estimates—digging out of the current deficit will be costly. And with state and local governments facing tight budgets, it may be decades before the work will be affordable. The lack of resources for infrastructure improvement and maintenance extends beyond highways and affects a range of public capital investments, from levees to wastewater treatment and from transportation to schools. The dismal state of the nation's current infrastructure could hamper future growth.

The ways that governments allocate new funding for infrastructure projects and the ways they build, operate, and maintain those projects has contributed to the problem. New spending often flows to less valuable new construction at the expense of funding maintenance on existing infrastructure. Further hindering efficiency, the traditional process for building infrastructure decouples the initial investment—the actual building of a highway, for example—from the ongoing costs of maintaining that highway. As a result, the contractor building the highway often has little incentive to take steps to lower future operations and maintenance costs. Such inefficiencies likely contribute to falling rates of return on public capital investments.

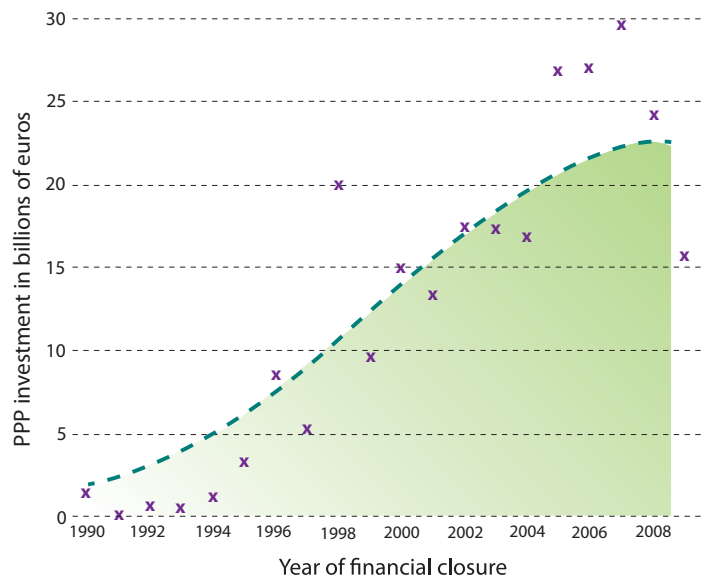
One solution to these incentive problems is to bundle construction with operations and maintenance in what is known as a public-private partnership (PPP). Indeed, many governments around the world are turning to PPPs as a way to tap these efficiencies and to leverage private sector resources to augment or replace scarce public investment resources.

Such partnerships between the public and private sectors have clearly caught on in governments abroad. As Figure 1 shows, PPPs in Europe increased sixfold, on an annual basis, between 1990 and 2005–2006. In certain countries, such as the United Kingdom and Portugal, PPPs now account for 32.5 and 22.8 percent, respectively, of infrastructure investment during the 2001–2006 period (see Table 1).<sup>1</sup> While the transportation sector is the largest beneficiary of PPP investments, European countries have used PPPs for projects in defense, environmental protection, government buildings, hospitals, information technology, municipal services, prisons, recreation, schools,

solid waste, transport (airports, bridges, ports, rail, roads, tunnels, and urban railways), tourism, and water.

The United States is a relative newcomer to PPPs. Even though there is an old nineteenth-century tradition of privately provided public infrastructure and even of private tolled roads and bridges, the United States still depends almost exclusively on the government for its public transport infrastructure (with the important exception of railroads).<sup>2</sup> The two-decade trend toward PPPs that has revitalized the ways that many countries provide infrastructure has gained only little traction in the United States. Whereas the United Kingdom financed \$50 billion in transportation infrastructure via PPPs between 1990 and 2006, the United States, an economy more than six times as large as that of the United Kingdom, financed only approximately \$10 billion between those years. The use of PPPs to provide U.S. infrastructure increased fivefold between 1998–2007 and 2008–2010, however, in the immediate aftermath of the Great Recession (see Figure 2).

FIGURE 1  
Public-Private Partnership Investment in Europe



Source: Public-Private Infrastructure Advisory Facility (PPIAF).

TABLE 1

## Public-Private Partnership Investment in Europe

Country*	Total Investment (1990–2006, MM €)	Fraction of Public Investment (2001–2006, %)
Belgium	2,112	3.5
France	7,670	1.3
Germany	5,658	1.5
Greece	7,600	5.9
Hungary	5,294	7.3
Italy	7,269	2.5
Netherlands	3,339	2.2
Portugal	11,254	22.8
Spain	24,886	6.9
United Kingdom	112,429	32.5**

Source: Blanc-Brude, Goldsmith, and Valilla (2007).

\* These are the ten countries with the most investment.

\*\* If the London Underground is excluded, this becomes 20 percent.

MM = millions

High-profile bankruptcies of several partnered U.S. highway projects and swift contract renegotiations of other projects raise concerns about selecting the right projects, hiring the right private partners, and establishing durable long-term contracts.

Drawing on the early PPP experiences in the United States and other countries, this paper proposes several ways to optimize the use of PPPs. Our four main recommendations address best practices—when, where, and how to use PPPs.

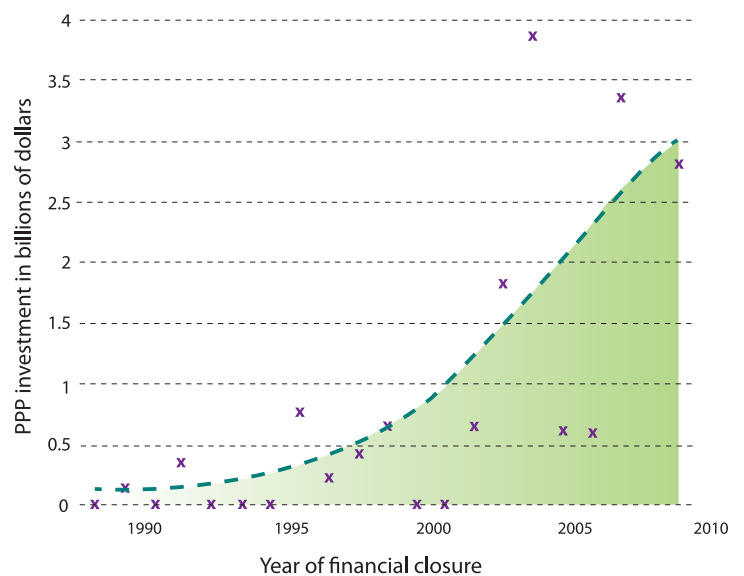
### 1. CHOOSE A PPP FOR THE RIGHT REASONS

PPPs can be an effective way to provide infrastructure. However, they are not a free lunch, and have costs very similar to public investments. For example, when a state or local government sets up a PPP to build, maintain, and operate a highway in exchange for toll revenue, drivers are still on the hook for tolls and the government relinquishes future toll revenues. Similarly, if the government leases an existing highway in exchange for a lump sum payment, it is exchanging future flows of toll revenue for present funds.

PPPs have the greatest potential to achieve efficiency gains by bundling responsibility for the initial capital investment with future maintenance and operating costs. This ensures that a firm has the right incentives to appropriately minimize operating and maintenance costs at the time of the initial investment.

FIGURE 2

## Public-Private Partnership Investment in the U.S. Transport Sector



Source: Public Work Financing, October 2010, and other sources.



Although billed as a way to screen against projects that create no social value—such as the infamous “bridge to nowhere”—PPPs do not always guard against wasteful spending. If the project is repaid by user fees, the presumption is that private firms will not participate unless the project is profitable, which provides a defense against bad projects. But in the case of projects financed by future taxation (as in the case of jails), there is no market test for the desirability of the project. For this reason, PPPs that require public funds should be subject to cost-benefit analysis to determine if the project is a good use of scarce resources. Needless to say, this requirement also applies to other (nonpartnership) infrastructure projects.

## 2. USE THE RIGHT PUBLIC-PRIVATE PARTNERSHIP CONTRACT

PPPs should be well-defined projects that are awarded in competitive auctions and not through bilateral negotiations. The transparency and efficiency of competitive auctions can allay the suspicions of those who oppose tolls and private sector involvement in infrastructure provision. New infrastructure projects financed with user fees generally are awarded to the firm that charges the lowest fee schedule for a contractually-specified number of years. We propose, as an alternative, to award the project to the firm that asks for the smallest accumulated user fee revenue in discounted value, or what we call the Present-Value-of-Revenue (PVR). This type of contract would compensate for the risk—and risk premium—by tying the length of the concession to demand for the project. If there is high demand, user fee revenue would accrue quickly and the duration of the PPP would be shorter than if demand is lower. This reduces the risk of the project and the required risk premium. Having the firm face less risk also reduces opportunistic renegotiations, which have been a major problem with PPPs in many countries.

There are other advantages to PVR contracts: it is easier to buy back the project if it becomes necessary to do so, because the uncollected revenue (minus reasonable expenses for operations and maintenance) defines a fair compensation. Other award options do not have such a straightforward compensation mechanism for a possible buyback. In addition, it is easy to adjust user fees to respond to congested demand conditions, since the only effect is to shorten the concession; doing so would not be unfair to users. The main disadvantage of using revenue’s present value is that it provides fewer incentives to increase demand for the project. Therefore, it is appropriate for passive investments, such as water reservoirs, airport landing fields, and highways.

## 3. ACCOUNT FOR PUBLIC-PRIVATE PARTNERSHIPS TRANSPARENTLY IN GOVERNMENT BUDGETS

PPPs provide the illusion that there are ready funds available for infrastructure repair, improvement, and construction at little or no cost. This is not the reality, however. Investors ask for returns through user fees or future taxes. We suggest that governments work under rules that consider not only the benefits, but also the costs, of PPPs. Since the apparent release of budgetary constraints is dangerous and can lead to excessive spending by current governments, at the expense of the future, we propose that the projects be treated in the government balance sheet as if they were public investments. This reduces the temptation to overspend and ensures that PPPs will be chosen for the right reason—that is, they will be chosen when they will lead to significant efficiency gains.

## 4. IMPLEMENT BEST PRACTICES FOR GOVERNING PUBLIC-PRIVATE PARTNERSHIPS

The internal structure of the public works authority (PWA) of state and local governments should be split between a unit responsible for planning, project selection, and awarding projects, and an independent unit responsible for contract enforcement and the supervision of contract renegotiations. By splitting the objectives of the two agencies, governments avoid the temptation to weaken enforcement of contracts in favor of better relations with construction companies or PPP firms. The division of responsibilities also leaves less scope for corruption. Our proposal respects the principle that there should be one instrument for each objective. Since the roles of planning and contracting new works are opposed to the objective of supervising existing contracts, separation of the roles is a healthy principle.

The benefits of implementing these recommendations can result in important improvements in U.S. infrastructure delivery. Implementing PVR, by itself, can lead to large reductions in the required return on the project and in the revenue that must be collected from users. (The reduction is as much as 33 percent in some simulations.) Furthermore, if service standards are monitored and enforced by the PWA, enforcement is more likely than it would be without the private role because of the stakes that are at risk for the private partner. Many advantages of PPPs stem from the fact that they bundle construction, operations, and maintenance in a single contract. This provides incentives to minimize life-cycle costs, which are typically not present when the project is publicly provided.

These proposals can go a long way toward ensuring that a project will be successful, allowing PPPs to show their advantages, unimpaired by erroneous considerations.

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# Chapter 1: Public-Private Partnerships in Theory and Practice

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One of the main tasks of government is to provide public infrastructure—bridges, highways, streets, jails, and airports—that serves the requirements of society at a reasonable cost.

Because these projects are usually large sunk investments, it is critical to make good decisions about what is to be built, both in terms of which projects are built and in terms of those projects' design and characteristics. Furthermore, once built, facilities require resources for maintenance and operation.

Traditionally, these infrastructure projects have been publicly provided; a PWA would award the construction of a project designed by the PWA to a private firm. The private firm would build the project; after receiving the agreed payment, its contractual link with the project would end.

One concern with the traditional arrangement was that, in most cases, the separation between construction and operation gave the builder little incentive to account for life-cycle costs, such as future maintenance and operations costs, beyond what was specified in general construction standards for infrastructure projects. Combined with the fact that governments have tended to allocate financing to new projects rather than to maintaining existing infrastructure, this has contributed to a stop-go approach to project maintenance, resulting in higher costs and lower quality standards. Years of neglect and suboptimal service have generated concern and demand for better maintenance of U.S. infrastructure.<sup>3</sup> Forgone investment opportunities and design choices during the building phase, as a result of the separation between construction and operation, could have lowered costs.

Responding to these problems, a number of infrastructure projects have been constructed using PPPs, an arrangement by which the government's PWA contracts with a private firm. The services provided by the private firm include building an infrastructure facility and maintaining and operating that facility for an extended period. In exchange, the firm receives user fee revenues for the duration or other periodic payments. (In another variation, an existing facility is "sold" to the private partner, who then maintains and operates the facility in exchange for user fee revenues. We refer to these cases as "leases.")

In our terminology, the characteristic feature of a PPP is a heavy initial investment that must be recovered in a long-term contract. The private partner builds, operates, and maintains a project, and internalizes the life-cycle costs of the project. Since the firm is rewarded for the provision of infrastructure services, it is in its interest to provide adequate maintenance while reducing life-cycle costs. The infrastructure eventually reverts to government control. PPPs are used for various types of infrastructure provision: in schools, jails, and hospitals, as well as in the transport sector, which is the main focus of this paper.

PPPs can improve the efficiency of infrastructure provision by bundling maintenance and operations with construction of the infrastructure project. Because the private partner builds, operates, and maintains the project, the incentives for durable construction and efficient maintenance and operation are aligned.

The academic literature has emphasized the importance of *bundling* construction and maintenance as a source of efficiency gains. With public provision, a construction firm minimizes building costs subject to design characteristics. In a PPP, by contrast, the private firm minimizes life-cycle costs, which include building, operations, and maintenance costs. A strong argument for the PPP over traditional provision is that the concessionaire internalizes life-cycle costs during the building phase. To the extent that investments during the building phase can lower maintenance and operations costs, efficiency gains should result.

We are not aware of studies illustrating the quantitative importance of bundling. Yet once we consider the interaction of bundling with the political economy of infrastructure provision, the efficiency gains from bundling are probably large. Most governments spend too little on routine maintenance and too much on new projects or on major reconstruction of existing projects, since it is more attractive for politicians to inaugurate new projects than to do routine maintenance on existing facilities. By contrast, under a PPP that specifies and enforces quality standards, maintaining the infrastructure adequately is usually optimized.

There is also anecdotal evidence that PPPs can lower construction and operation costs. For example, the private concessionaire that built express lanes on the Riverside Freeway (State Route 91, SR91) in Orange County, California reduced construction time substantially by improving traffic management during construction (see Small 2010; also, we describe this project below). In addition, the consortium that proposed the I-495 Capital Beltway HOT (high occupancy/toll) lanes in Fairfax County, Virginia, built HOT lanes for one-third of the cost of the high occupancy vehicle (HOV) lanes then planned by the Virginia Department of Transportation (Poole 2006).

Another example of efficiency gains is the Chicago Skyway. During the first four years under a PPP, operating costs decreased by 11 percent, in real terms, compared with the previous four years under city management (average traffic was similar in both four-year periods). A large part of this decrease in operating costs was due to lower labor costs: the private firm replaced city workers that had been paid at least \$20 per hour with those paid at market rates of \$12 to \$15 per hour (*TOLLROADSnews* 2005).<sup>4</sup>

## Public-private partnerships can improve the efficiency of infrastructure provision by bundling maintenance and operations with construction of the infrastructure project.

PPPs offer strong incentives to finish the project early, since profits increase when users can be charged at an earlier date. Incentives of this sort are usually absent (or weaker) under traditional public provision.

### PRACTICAL EXPERIENCE WITH PUBLIC-PRIVATE PARTNERSHIPS

While PPPs have the potential to achieve these efficiency gains, the public has not yet fully realized the benefits. One reason is that PPPs have sometimes been used to anticipate future revenues and thereby temporarily improve budgets—rather than used to achieve efficiency gains. A second reason some PPPs have been less successful than they could have been is that PPP contracts are incorrectly designed, by misallocating risks, or by being excessively inflexible, or, at times, excessively flexible. Examples of each type of problem are discussed below:

### CHOOSING THE RIGHT PROJECT FOR THE RIGHT REASON

Some PPPs have been promoted because of short-run budgetary imperatives rather than efficiency gains. Forging an alliance with a private firm is seen as a way of building new infrastructure when governments are cash-constrained, or as a means of generating financial resources from already built infrastructure. For example, after Indiana received \$3.8 billion from a private company to operate, maintain, and upgrade the Indiana Toll Road in exchange for receiving toll revenue for the next seventy-five years, Governor Mitch Daniels of Indiana stated, “One year ago, Indiana faced twin deficits: a fiscal deficit stemming from years of government outspending its means, and an infrastructure deficit, a \$3 billion shortfall between the cost of needed transportation projects and the dollars due to come in. . . . Today, state government is operating on a balanced budget, and is on its way to paying back its debts to schools and local governments” (*TOLLROADSnews* 2006).

Similarly, a ninety-nine-year contract for the Chicago Skyway was exchanged for a large sum, of which government spent an important fraction. In these instances, PPPs can be used to anticipate spending.

PPPs with the private sector also have the advantage of allowing governments to build projects even when other forms of financing are restricted by legislative or other constraints (Engel, Fischer, and Galetovic 2009; see also House of Lords 2010, p. 16).

The Chicago Skyway and the Indiana Toll Road are cases where the short-term political benefits of these programs are important. In both cases, the contract was used to anticipate government spending and to lease existing infrastructure.<sup>5</sup> And in both cases, unexpectedly high bids suggest that the city of Chicago and the state of Indiana are likely to benefit. In Chicago, the portion of the lease payment that was not set aside to retire Skyway bonds and city debt or to go into the long-term reserve had been almost spent by 2010, before the retirement of Mayor Daley (see Box 1).

The results for the Indiana Toll Road were similar. The Indiana Toll Road, part of the U.S. Interstate Highway System, runs for 157 miles, connecting the Chicago Skyway to the Ohio Turnpike. A consortium with the same firms that leased the Chicago Skyway paid \$3.8 billion for a seventy-five-year lease of the road. This sum was much larger than the estimates of a state-commissioned analysis that valued future cash flows at \$1.9 billion. Part of the difference is due to having the

economies of both highways under a single administration, since they linked. Clearly, there was also an element of “winner’s curse,” and the consortium, Cintra-Macquarie, has written down the capital value of the concession.

In both these cases, politicians managed to convert future revenues into current spending, and were lucky that the

winning bid was much higher than the value of the road. This allowed them to develop a reputation for prudence by using part of the resources to pay down debt and invest for the long-term, while using the windfall to increase current expenditures. Perhaps the most significant feature of the lease was that the city managed to enhance the value of its asset by committing to higher tolls.

#### BOX 1

### The Chicago Skyway

The Chicago Skyway is an eight-mile six-lane median-divided toll road in Chicago that links downtown to the Illinois-Indiana state line. (Much of the material for this box appears in Cheng 2010.) The Skyway was initially developed by the city of Chicago in 1959, with bond financing linked to toll revenue. However, the city was unable to raise tolls enough to service the debt and had to be ordered by the courts to do so. Even then, the first principal payment (after paying off all due interest) only came in 1991, when the financial situation of the project improved due to congestion in untolled alternative roads. After retiring the original bonds in 1994, the city made no further toll adjustments until leasing the project in 2005.

From this point on, the city started using the revenue from the Skyway to fund other transportation projects and to anticipate the revenues from the Skyway by issuing bonds in 1996 for the same purpose. In 2004, the city issued a request for qualifications that led to five qualified bidders for a ninety-nine-year lease on the Chicago Skyway. The bidders competed for the operations and maintenance of the highway in exchange for future toll revenues according to a predetermined toll schedule.

There were three active bidders, and an undisclosed reservation price estimated to lie in the range of \$700 million to \$800 million. The winning bid of \$1.83 billion was submitted by Cintra-Maquarie. The other two bids were more than \$1 billion smaller, providing some indications of the winner’s curse. Cheng (2010) estimates that under all reasonable demand scenarios, Cintra-Maquarie paid too much for the project.

There are a few issues to note in this case. First, major toll increases were pushed into the future, past the time of retirement of the then-current mayor. Moreover, before leasing the Skyway, the city procured an exemption from leasehold tax for the facility, thus raising its current value at the expense of future revenues. Finally, the original lease was for fifty-five years, but the final lease was extended (at the insistence of the firms) to ninety-nine years, an extension that might loom large in future renegotiations, but whose current present value is just \$3 million.

Cheng (2010) shows that the PPP was financially convenient for the city, because only under implausibly optimistic expectations of traffic growth and a so-far unobserved ability to raise tolls would it have been able to generate the amount of discounted revenue it received from the winning bid. There are other potential efficiency gains from private management (more efficient maintenance and operations), but their impact is relatively minor (operational costs fell by 11 percent, a gain of \$1 million per year). Thus, efficiency gains should have a correspondingly small impact on the overall valuation of the facility.

The short-term political benefits of the program were important. Part of the debt was used to retire Skyway bonds and city debt; \$500 million went into a long-term reserve; and the remaining \$475 million remained in discretionary funds, of which the city had spent 83 percent as of 2010.

## SUBOPTIMAL CONTRACTING OF PUBLIC-PRIVATE PARTNERSHIPS

Some PPP contracts have been incorrectly designed, misallocating risks, and some have been excessively inflexible, or at times excessively flexible. An example of incorrect risk allocation is the Dulles Greenway project in Virginia, which went into default in its first few years due to overestimating demand for the road. Alternatively, a contract may be too inflexible in the face of changing conditions, leading to large costs while the parties reach a new agreement. This is the case of Orange County SR91, where the private party used a noncompete clause to oppose an expansion of the competitive public road until it was bought out by the county.

One result of these contracting failures is that government PPPs with private concessions around the world are routinely renegotiated. From Table 2 below, we observe that this is also common in the United States: six out of twenty projects have undergone a major change in the initial contractual agreement, favoring the concessionaire, and two additional projects have pending renegotiations. If we consider that, on average, seven years have passed since financial closure for these U.S. projects, this is a high renegotiation rate.

TABLE 2

### Transport Public-Private Partnerships in the United States: 1991–2010

Project	State	Investment (in US\$ millions)	Year of financial closure	Selection process*	Renegotiation**	Current status
IH 635 Managed Lanes	TX	2,800	2010	CB	No	Construction begins 2011.
Eagle Commuter Rail Project	CO	2,100	2009	CB	No	Under construction.
Port of Miami Tunnel	FL	914	2009	CB	Yes	Under construction.
North Tarrant Express	TX	2,047	2009	CB	No	Under construction.
I-595 Corridor	FL	1,814	2009	CB	No	Under construction.
I-495 Beltway HOT Lanes	VA	1,998	2008	UO	PR	Under construction.
SH 130 Seg. 5-6	TX	1,358	2008	CB	No	Under construction.
Northwest Parkway	CO	603	2007	CB	No	Operational. Went from public road to PPP.
Pocahontas Parkway	VA	611	2006	UO	Yes	Near default 2005, renegotiated, expected completion 2011.
Indiana Toll Road	IN	3,850	2005	CB	Yes	In operation. Went from public road to PPP.
Chicago Skyway	IL	1,830	2004	CB	No	Operational. Went from public road to PPP.
Southbay Expressway (SR 125)	CA	658	2003	CB	Yes	Operational. Bankrupt 2010.
Las Vegas Monorail	NV	650	2000	None	PR	Operational. Bankrupt 2010.
Rte. 3 Boston	MA	385	1999	CB	No	Operational.
Foley Beach Express	AL	44	1999	UO	No	Operational. Governor's son main proponent.
Greenville Southern Connector	SC	240	1998	CB	No	Operational. Bankrupt 2010.
JFK Terminal 4	NY/NJ	689	1997	CB	No	Operational.
Camino Colombia Toll Road	TX	85	1997	UO	No	Foreclosed 2003, repurchased by Texas DOT.
Dulles Greenway	VA	350	1993	UO	Yes	See main text for details.
Orange County SR 91 Express Lanes	CA	130	1991	CB	Yes	See main text for details.

Source: Public Work Financing, October 2010, and other sources.

\* CB=competitive bidding. UO=unsolicited offer.

\*\* Significant changes in initial contract terms to the advantage of the firm. PR=pending renegotiation.



Industry participants often claim that circumstances change over the life of a concession. Because most infrastructure facilities last for several decades, renegotiations of inherently incomplete contracts are to be expected. If so, the argument runs, there is little to be worried about, because renegotiations provide the necessary flexibility to adapt to changing circumstances.

While there is some truth to this point, it ignores three rather disturbing features of renegotiations. First, sometimes they occur shortly after contracts are awarded. Second, renegotiations typically seem to favor the private party. Third, renegotiations are often used to circumvent budgetary controls and anticipate government spending because they typically involve additional financial commitments by the PWA that are paid mostly by future administrations. The high frequency of renegotiations of PPP contracts represents a serious problem, which alters the conceptual basis of the industry.

The problem with renegotiations is that they undo the potential advantages of competitive auctions when these are used to assign the project.<sup>6</sup> Since renegotiations occur in the absence of competition, the results can be very profitable to the private party. Furthermore, pervasive renegotiation tends to give an edge in projects to firms with more-developed lobbying abilities (because they can offer better conditions initially in the expectation of improving the conditions after renegotiation), and this ability is not necessarily related to technical proficiency in providing the infrastructure.

Some states, including Florida and Indiana, require legislative approval of PPP projects *after* the concessionaire has been selected. Legislative approval may be viewed as renegotiation by design, because the conditions under which the concessionaire is selected are modified after the competitive selection process.

## The problem with renegotiations is that they undo the potential advantages of competitive auctions when these are used to assign the project.

This is likely to favor firms that are well-connected with the legislators who determine the final contract, and may result in selection of a firm that is good at lobbying but less good at building and operating projects.

## RENEGOTIATIONS AND THE U.S. EXPERIENCE

Circumstances change over the life of a long-term contract. For example, if demand grows faster than expected, the PPP facility may need to be enlarged before the current concession ends; or if the original user-fee schedule proves inadequate, it may need to be changed. In those cases, one would like to grant the PWA flexibility to change the contract and, perhaps, even terminate it unilaterally. But, of course, this would also facilitate regulatory takings. Not surprisingly, many contract clauses restrict discretion to protect the private concessionaires.

The tension between protection against regulatory takings and the costs of inflexibility can be illustrated with the two main U.S. PPP concessions during the 1990s. In 1995, the California Department of Transportation (Caltrans) contracted a four-lane ten-mile segment of SR91 between the Orange County–Riverside County line and the Costa Mesa Freeway (SR55) to a private firm, California Private Transportation Corporation (CPTC) for thirty-five years. Motorists use the express lanes to avoid congestion in the nontolled lanes, paying up to almost \$11 for a round trip. The firm that was awarded the concession was allowed to raise tolls freely to relieve congestion, which it did several times. By the late 1990s, 33,000 daily trips brought the express lanes to the brink of congestion at peak time, turning the concession into a financial success. At the same time and for the same reasons, users in the nontolled public lanes were suffering extreme congestion, and an expansion became urgent. Nevertheless, the contract included a noncompete clause, which prevented Caltrans from raising capacity of SR91 without CPTC’s consent during the thirty-five years of the concession. Caltrans tried to go around the clause, arguing that expansions were necessary to prevent accidents, but CPTC filed a lawsuit to prevent that move. The settlement stated that noncompete clauses were meant to

ensure the financial viability of CPTC and restrict Caltrans’s right to adversely affect the project’s traffic or revenues. Consequently, no new lanes could be built.

Protracted negotiations ensued and eventually the Orange County Transportation Authority (OCTA) was empowered to negotiate the purchase of the tolled lanes. Unfortunately, the value of the toll road was controversial because, strictly speaking, it should have been the present value of profits from the SR91 express lanes if the franchise had continued as originally planned. Even though the lanes cost \$130 million to build, the company initially set a price of \$274 million in a controversial (and ultimately unsuccessful) attempt at a

buyout by a nonprofit associated with Orange County. After several years of negotiations, while frustrated commuters on the SR91 were stuck in traffic, OCTA bought the express lanes in January 2003 for \$207.5 million. The purchase was enabled by the California legislature, which gave OCTA authority to collect tolls and pay related financing costs, and eliminated noncompete provisions in the franchise agreement for needed improvements on SR91.

In this case, the noncompete clause proved inefficient, and one might believe that Caltrans made a mistake by including it in the original contract. But consider the fourteen-mile Dulles

## The tension between protection against regulatory takings and the costs of inflexibility can be illustrated with the two main U.S. public-private partnership concessions during the 1990s.

Greenway that was designed as a greenfield build-operate-transfer facility that would become the property of the state of Virginia after forty-two and a half years.

Virginia's general assembly authorized private development of toll roads in 1988. A group of investors thought that a toll road linking Washington's Dulles International Airport and Leesburg, Virginia, would be a promising investment. Their expectations were based on the prospect of residential and commercial growth in the area, which was expected to increase congestion on existing arterial roads serving the corridor. To finance the Greenway, investors put up \$40 million in cash and secured \$310 million in privately placed taxable debt. Loans were to be repaid with toll revenues. Investors underestimated how much users disliked paying tolls, and initial revenues were much lower than forecasted. Furthermore, investors did not count on the Commonwealth of Virginia widening the congested Route 7, which serves the same users. Two independent consulting companies had predicted that when the road opened in 1996, with an average toll of \$1.75, there would be a daily flow of 35,000 vehicles. In practice, however, the average number of vehicles per day turned out to be only 8,500, one-fourth of the initial estimates. After tolls were lowered to \$1.00, daily ridership increased to 23,000, still far below predictions. Bonds that were issued to finance the project were renegotiated and some of the initial investors wrote off their equity. After refinancing and an extension of the franchise term to sixty years, the project became financially viable.

The SR91 freeway example shows that inflexibility may be costly, while the Dulles Greenway example suggests that inflexibility may be justified. Both examples highlight the importance of designing contracts that facilitate good faith renegotiations while deterring bad faith renegotiations, a topic we return to below.

### THE UNITED KINGDOM'S PRIVATE FINANCE INITIATIVE

In the United Kingdom, the private finance initiative (PFI) has become an important part of the public investment process.

PFI's use PPPs to build and operate assets such as hospitals, schools, and other infrastructure projects. As of September 2009, the total estimated capital value of these projects across the United Kingdom was £55.1 billion.<sup>7</sup> The United Kingdom is the most important international test bed for PPPs, given that 667 projects have been signed as of 2009, 599 of them operational; their diversity

is shared among transport, education, health, prisons, defense, leisure, housing, courts, technology, government offices, and other projects.

In 2002, the U.K. government's treasury conducted a sample study of 61 projects, out of 451 operational projects at the time. The conclusions were positive. First, the percentage of projects that were late was much lower than the percentage under public provision, both in studies by the National Accounting Office and by the U.K. Treasury.<sup>8</sup> Furthermore, the Treasury reported that there were four bidders, on average, for each project, signaling healthy competition. The Treasury claimed that there were no excess costs in PFI projects, but it did not include excess costs associated to changes in the specifications—that is, those whose contracts were renegotiated. In fact, according to the figures presented in the report, in 22 percent of projects there were increased costs due exclusively to changes in the specifications.

An additional problem, described in the report, were the long lead times necessary for PFI projects, which averaged twenty-two months (though there is no public sector comparison). However, it must be noted that similar long delays would also occur under the traditional provision approach if the project were as carefully designed as it was under a PFI. The only delay that can be unambiguously assigned to PPPs is that delay caused by arranging private financing. Also, because of high contracting costs, the United Kingdom considers PPP contracts only for large projects (£20 million minimum).

A further topic of interest is the issue of contract flexibility. The government keeps the right to change any aspect of the building or service, subject to agreement with the contractor on cost. If the change exceeds £100,000, competitive tendering is required, but this occurs in only 29 percent of cases. It is also interesting to observe that 20 percent of the changes requested by the public sector correspond to the reinstatement of requirements that had been excluded from the initial contract due to their cost. The Treasury's report is correct in indicating that it is not appropriate to eliminate items at the competition stage and then reinstate them when the project has already been awarded.

In retrospect, it seems clear that the original motivation for the introduction of PPPs in the United Kingdom was to have a source of off-budget public investment. Only 23 percent of capital costs of 599 PFI projects up to April 2009 are on-balance sheet, which explains why *The Economist* wrote, "cynics suspect that the government remains keen on PFI not because of the efficiency it allegedly offers, but because

it allows ministers to perform a useful accounting trick" (*The Economist* 2009). Since the United Kingdom faced no rationing in the credit markets, using PPPs to provide more funds for public investment served no social purpose, but did help the government comply with the debt limit of the Treaty of Maastricht.

Also, some of the problems faced in the United Kingdom have been exacerbated by the extensive use of availability contracts, in which user fees (if they exist) pay only for operations and maintenance costs, and not for capital costs. When users pay fees (especially when those fees are sufficient to defray the capital costs of the project), they are less willing to accept cost increases and quality reductions. There is a tendency to renegotiate contracts during the construction process, leading to cost increases in 35 percent of projects. And, as we have already mentioned, in a substantial number of projects requirements were dropped at the bidding stage and were again included after award of the franchise.

**There is a tendency to renegotiate contracts during the construction process, leading to cost increases in 35 percent of projects.**



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# Chapter 2: Detailed Recommendations

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## PROPOSAL 1: CHOOSE PUBLIC-PRIVATE PARTNERSHIPS FOR THE RIGHT REASONS

Advocates have offered many arguments to show that PPPs may help governments provide infrastructure more efficiently. One argument is that PPPs relieve budgetary restrictions and release public funds. Second, because financing of the project is private, it is subject to the discipline of the financial market, which leads to important efficiency gains. A third argument is that PPPs can mimic a competitive market, since they are often adjudicated in competitive auctions. Fourth, even though user fees can be charged under public provision and under PPPs,

**A standard argument in favor of privatization is that private firms are more efficient than state-owned enterprises. This argument does not apply when comparing public-private partnerships to public provision because...governments rely on private firms to build, maintain, and operate infrastructure under both organizational forms.**

the fact that there is at least one interested party in setting profitable tolls under PPPs balances the political pressures to lower fees. A fifth argument is that PPPs should help filter out wasteful projects. Sixth, various arguments have been given to justify PPPs on distributional grounds. We review and weigh each of these arguments next. Several contain myths that should be dispelled.

### **Public-Private Partnerships seldom relieve government budgets.**

Governments often justify the use of PPPs because the private sector finances these projects, which they argue frees up scarce government resources that may be used in programs

that are socially attractive but not privately profitable. Or, in what amounts to the same idea, PPPs are attractive because governments can get the infrastructure without raising taxes. Of course, this argument does not apply to projects whose capital costs are funded by future government payments, as in the case of the various projects that specify a schedule of capital charges payable in the future and that bind the budget to that time schedule. Examples include the I-595 Corridor Roadway Improvements Project in Florida, the Port of Miami Tunnel, and the Eagle Commuter Project in Denver, all of which are under construction (see Table 2). In these cases,

PPP help state and local governments perform a useful accounting trick, in which future obligations are kept off the balance sheet for no clear economic reason.

That PPPs relieve government budgets under strain is also a doubtful argument for projects whose capital costs are partially or totally covered by user fees. In this case, user fees also could have been used to pay the capital costs under public provision. The resources saved by the government by not paying the upfront investment under a PPP should be equal, in present value, to user-fee revenue reaped by the private firm with the concession. There is one exception to this argument,

which occurs when a (local, state, or national) government temporarily faces borrowing constraints. A PPP might be the only option to finance a given project in the necessary time frame, after separating the revenue flows of the project from the rest of the public budget, something that may be hard to do if the government cannot borrow.

We conclude that in many cases governments choose PPPs because they allow them to make public investments while keeping future obligations off the balance sheet and beyond legislative control. This is not a valid economic justification for partnership with the private sector.

### **Public-Private Partnerships are not more efficient solely because they are private.**

A standard argument in favor of privatization is that private firms are more efficient than state-owned enterprises. This argument does not apply when comparing PPPs to public provision because, as mentioned earlier, governments rely on private firms to build, maintain, and operate infrastructure under both organizational forms. Furthermore, the firms responsible for construction are often the same under the traditional approach and PPPs.

### **Public-Private Partnerships do not necessarily introduce more competition.**

Setting the appropriate level of user fees can be difficult because many infrastructure projects command market power. One option is to have tariffs set by a regulator, which poses a host of well-known problems. Long ago, Chadwick (1859) argued that PPPs can avoid these regulatory difficulties if the firm is chosen via a competitive auction (see also Demsetz 1968). In Chadwick's terms, competition *for* the field is a close substitute for competition *in* the field, eliminating economic rents for the provider of the service.

To achieve the benefits of Demsetz auctions, there must be real competition for the contract. This is often not the case. In some countries (Brazil, for example) the PPP legislation biases auctions in favor of domestic participants—for example, by demanding documentation that is only available to domestic firms. In other cases, the government's overt or covert objective is to divide the projects among the main domestic construction firms. Since there is less competition, the cost of infrastructure goes up and the quality may be lower. However, the most important limitation of Demsetz auctions when applied to PPPs is the pervasive use of renegotiations.

The selection process for fourteen out of twenty public-private contracts in the U.S. transport sector during the 1991–2010 period involved competitive bidding (see Table 2). Bidding usually followed a request for qualifications used to determine which firms were technically and financially able to participate in the bidding process. The remaining six contracts, three of which were adjudicated during the 1990s, were unsolicited offers and were assigned to the firm that proposed the project.

### **Public-Private Partnerships do not guarantee that user fees are appropriate.**

The usual concern under traditional public provision is that user fees are set too low because politicians fear voters. Another concern is that groups with effective lobbying power—such as truckers, in the case of highways—are often charged less than the cost of the damage and congestion they cause.<sup>9</sup>

Evidence exists that PPPs have helped maintain the real value of user fees in the face of inflation. Tolls for the Indiana Toll Road remained unchanged in nominal terms for more than twenty years under state ownership and management; in real terms, they fell substantially. When the road was auctioned as a PPP in January 2006, however, tolls doubled and were indexed to inflation, because potential private firm concessionaires were unwilling to bear inflation risk for seventy-five years. Other states, among them Florida, Pennsylvania, and Texas, have since adopted toll indexation for their projects. However, the rise in tolls in Indiana led to the introduction of a shadow toll (a payment from the government to the firm linked to usage of the project). Hence, a PPP does not totally solve the problem of low tolls due to political pressure.

### **Public-Private Partnerships cannot always filter out wasteful projects.**

Adam Smith mentions that when infrastructure is privately provided and sustained with user fees, a market test filters out the waste: “When high roads are made and supported by the commerce that is carried on by means of them, they can be made only where that commerce requires them” (Smith 1776, V.1.III.1).

This filter works only when PPPs are financed mainly with user fees. Projects that are not expected to be profitable (and therefore are not socially valuable in many cases) will fail to attract a concessionaire. Financing capital expenses with user fees may lead to charges that are higher than socially optimal, an outcome that can be avoided under public provision. The large number of infrastructure projects that are evidently wasteful suggests that the benefits of having a market test that avoids overengineered (or outright unjustified) projects is likely to outweigh these costs. PPPs will not filter such projects out if they are financed with subsidies or if there is an implicit guarantee that the government will bail out a troubled concessionaire. This is the reason for using cost-benefit analysis for most infrastructure projects (with the exception of those fully financed by user fees). In the United States, many federal infrastructure projects do not go through a process of cost-benefit analysis, which explains the “pork barrel” projects that are valued by the federal legislature. Yet, as noted, such projects need generous government subsidies to be attractive to private firms, since user fees alone will not suffice.

Various public projects with private partners in the United States have gone bankrupt. The South Bay Expressway in San Diego, California opened in 2007, but filed for Chapter 11 bankruptcy in 2010, citing traffic at less than 40 percent of initial projections. Similarly, the Camino Colombia Toll Road

in Texas was foreclosed by a district court in 2003—the only such case in the United States—due to vastly overestimated demand: effective revenues were only 6 percent of projections.

The Greenville Southern Connector in South Carolina filed for Chapter 9 bankruptcy in 2010. A demand forecast study predicted \$14 million in revenue by 2007 while actual revenue only reached \$5.4 million. That forecast failed to notice that the road made no sense as an access road to local commercial developments. Traffic barely justified a two-lane road, let alone the four-lane expressway that was actually built, suggesting this project was unnecessary.

This is one of three projects that have gone bankrupt, associated with so-called 63-20 nonprofits that benefited from tax exemptions, in which the promoters had nothing at stake. According to the *TOLLROADSnews* newsletter, these projects were enthusiastically promoted by a combination of consultants, engineering firms, financiers, and construction firms who made money at the expense of bondholders during the development, design, and construction phases, and who had nothing at stake thereafter.<sup>10</sup>

## There are several ways in which lower-income users benefit from the existence of new or improved toll roads.

The evidence we could find from public sources suggests that demand turned out to be higher than forecasted for only one of the twenty projects in Table 2. It is therefore likely that firms have incentives to overestimate demand for PPP projects. One reason may be to profit at the expense of bondholders, as occurred with South Carolina’s Southern Connector. Another reason could be an implicit agreement that the concessionaire will be bailed out by the government should demand be much lower than expected. As we discuss above in the section “Renegotiations and the U.S. Experience,” concession terms have been extended and tolls raised to help concessions with revenues below projections.

### User fees can be progressive and toll roads are not Lexus lanes.

Most highway PPPs in the United States, with the significant exception of a few projects that receive availability payments

in Florida, Colorado, and Massachusetts, derive their revenue from tolls.<sup>11</sup>

This raises a frequent criticism of PPPs in terms of their impact on different income segments. For example, a common complaint against HOT lanes built under PPPs is that they are “Lexus lanes.” More generally, the argument is that toll roads are unfair to lower-income users. This is an argument for rationing (by congestion) and against a market solution.

In fact, there are several ways in which lower-income users benefit from the existence of new or improved toll roads. First, these roads divert some users from the original roads to the toll highways, thus reducing congestion in the remaining roads. Second, whenever there is an urgent need for rapid transportation, there is the option of paying for it, which must be better than not having the option. Third, those who benefit most directly from the new or improved highway pay for it, so the burden does not fall on other users of the road system. Finally, even in the case of HOT lanes, there is little evidence for a preponderance of expensive cars among users. A study of the SR-167 HOT lanes showed that the most common makes of car using the lanes were Ford, Chevrolet/GMC, Toyota, Honda, and Dodge.

The case of leases, where there is temporary transfer of property but no improvement to the facility, is different and cannot be justified on distributional grounds. Usually, as part of the lease user fees are allowed to rise after the contract is signed and users end up paying more without the benefits of new infrastructure. Unless the proceeds from the lease are used to invest in socially productive projects, the government will overspend and “mortgage its future.” In terms of public policy as well as to avoid hostile public reactions, it is wise to explain the benefits of new or improved toll roads to the public. For example, the Commonwealth of Virginia, specifically the Virginia Department of Transportation and the Department of Rail and Public Transportation, developed an extensive public outreach and public information campaign to inform the public of the project’s purpose and benefits when it introduced HOT lanes. This campaign changed the perception of the public, initially 75 percent against the introduction of HOT lanes, to a 65 percent approval rate. This change was accomplished by clearly explaining the project benefits to users: new travel choices (e.g., dedicated HOT lanes), first-capacity enhancement of the Beltway in a generation, congestion relief, improved safety and performance, and replacement of aging infrastructure.<sup>12</sup>

Summing up, some of the arguments in favor of PPPs have little merit, while others are valid. Thus, PPPs provide better incentives for adequate maintenance relative to public

provision. PPPs also help governments avoid the temptation of charging inefficiently low user fees. Bringing in the private sector has not done a good job of filtering waste, possibly because high demand uncertainty has facilitated opportunistic behavior by various agents promoting this organizational form. PPPs often have beneficial distributional impact when they involve new infrastructure or a major improvement of existing infrastructure, as long as they are financed with user fees, since those who do not use the project do not pay for it but may benefit from less congestion on free alternatives. Finally, contrary to widespread belief, PPPs do not relieve strained budgets: they just change the timing of revenues and disbursement.

## PROPOSAL 2: USE THE RIGHT PUBLIC-PRIVATE PARTNERSHIP CONTRACT

As a general principle, it is better to select a private concessionaire through a competitive auction of a well-defined project (or a project with clear and enforceable service standards) than through direct negotiations. As discussed above, a competitive auction dissipates the rents that are extracted from users, which can be large, since projects often have substantial market power. A competitive auction is also more transparent than the alternative of selecting the concessionaire via bilateral negotiations, thus avoiding discretionary decisions by public servants.

Next, we discuss our proposals for a competitive auction mechanism, offering separate proposals for the case of projects that are financed mainly via user fees and for those where user fees do not cover the capital cost of the project.

### The Present-Value-of-Revenue contract

For various infrastructure services that are financed by means of service fees, demand risk is large. Assuming quality standards can be contracted and supervised, this risk is exogenous to the firm and arises because demand forecasts are unreliable. As discussed above, the Dulles Greenway, the Camino Colombia Toll Road, and the Greenville Southern Connector are among many U.S. examples that illustrate the difficulty of making accurate demand forecasts, even in the short run. It follows that risk sharing is an essential part of the problem when designing a public-private contract.

The fact that opportunistic renegotiations have been a major problem under PPPs suggests using contractual forms where the firm bears little demand risk. This will provide fewer excuses to renegotiate the contract in the event of low usage.

Despite the usage uncertainty faced by many PPP contracts, it is often the case that user fees will eventually pay for the

project; the question is how long it will take for that to happen. For example, even though demand for the Dulles Greenway turned out to be much lower than expected, accumulated toll revenue would have eventually paid for capital and operating expenses. For projects like these—we refer to them as “high-demand” projects—we argue next that flexible-term contracts, more precisely a PVR contract, offer a number of attractive properties.<sup>13</sup> Under a PVR contract, the regulator sets the discount rate and user-fee schedule, and firms bid the present value of user fee revenue they desire. The firm that makes the lowest bid wins and the contract term lasts until the winning firm collects the user fee revenue it demanded in its bid.

The first advantage of a PVR contract is that it reduces risk: When demand is lower than expected, the franchise period is longer, whereas the period is shorter if demand is unexpectedly high. Under the assumption that the project is profitable in the long run so that repayment eventually can occur, all demand-side risks have been eliminated. This reduces the risk premium demanded by firms when compared to fixed-term concessions (e.g., by one-third in the case considered by Engel et al. 2001). This should attract investors at lower interest rates than are found in traditional Demsetz franchises with fixed terms.<sup>14</sup> Annual user fee revenues are the same under both franchises, but the franchise term is variable under a PVR. If demand is low, the franchise holder of a fixed-term contract may default; in contrast, a PVR concession is extended until user fee revenue equals the bid, which rules out default. Of course, under a PVR the bondholders do not know when they will be repaid, but that is less costly than not being paid at all. PVR schemes also reduce the need for guarantees because the risk to investors is much smaller.

The United Kingdom was probably the first country to use a contract similar to a PVR. Both the Queen Elizabeth II Bridge over the Thames River and the Second Severn bridges on the Severn estuary were franchised for variable terms. The franchises will last until toll collections pay off the debt issued to finance the bridges and are predicted to do so several years before the maximum franchise period.

Chile was the first country to use an outright PVR auction.<sup>15</sup> In February of 1998, a franchise to improve the Santiago-Valparaíso-Viña del Mar highway was assigned in a PVR auction. The reason for choosing the PVR option was that it would be easy to calculate fair compensation for the concessionaire if early termination of the contract was desirable for the government (see Box 2). Beginning in 2008, PVR auctions became the standard to auction highway PPPs in Chile: seven highway PPPs have been auctioned using this approach, with winning bids adding up to close to \$2 billion



TABLE 3

## Present-Value-of-Revenue Highway Concessions in Chile and Winning Bids

Name of Project	Month/year auctioned	Winning bid (MM US\$)
Ruta 68 (Santiago-Valparaíso-Viña del Mar)	02/1998	513
Ruta 160, Tramo Coronel - Tres Pinos	04/2008	342
Acceso Vial Aeropuerto Arturo Merino Benítez	07/2008	56
Conexión Vial Melipilla-Camino de la Fruta	08/2008	46
Ruta 5 Vallenar-Caldera	11/2008	288
Autopista Concepción-Cabrero	01/2011	318
Alternativas de acceso a Iquique	01/2011	167

Source: Dirección de Concesiones, Ministerio de Obras Públicas, Chile.

Exchange rate: 1UF = US\$43. (UF [Unidad de Fomento] is a unit of account that is used in Chile.)

MM = millions.

### BOX 2

#### First Present-Value-of-Revenue Auction

The Route 68 concession, joining Santiago with Valparaíso and Viña del Mar, was auctioned in February 1998. It was the first road ever to be franchised with a PVR auction. The Route 68 concession contemplated major improvements and extensions of the 130-kilometer highway and the construction of three new tunnels. Five firms presented bids, one of which was disqualified on technical grounds. For the first time in the Chilean concessions program, minimum traffic guarantees were not included for free, but instead were optional and at a cost. That the pricing of guarantees by the government was not way off the mark can be inferred from the fact that two of the bidders chose to buy a guarantee, while the winner declined. Bidders could choose between two rates to discount their annual incomes: either a fixed (real) rate of 6.5 percent or a variable (real) rate given by the average rate of the Chilean financial system for operations between 90 and 365 days. A 4 percent risk premium was added to both discount rates. Three firms, including the winner, chose the option with a fixed discount rate. Somewhat surprisingly, the PVR demanded by the winner turned out to be below construction and maintenance costs estimated by the ministry of public works (Ministerio de Obras Públicas, or MOP): the winning bid US\$374 million while MOP estimated costs to be US\$379 million. One possible explanation for this outcome is that the regulator

set a risk premium (and hence a discount rate) that was too high, neglecting the fact that PVR auctions substantially reduce the risk faced by the franchise holder. A return on capital in the 10–20 percent range is obtained if a more reasonable risk premium (in the 1–2 percent range) is considered.

It is also interesting to mention that, apart from the pressure exerted by the ministry of finance, the main reason why MOP decided to use the PVR mechanism is that it facilitates defining a fair compensation should the ministry decide to terminate the franchise early. This feature of PVR is relevant in this case since MOP estimates that, at some moment before the franchise ends, demand will have increased sufficiently to justify a substantial expansion of an alternative highway (La Dormida) that competes with some sections of Route 68. Thus, the contract of the Route 68 concession allows MOP to buy back the franchise at any moment after the twelfth year of the franchise, compensating the franchise holder with the difference between the winning bid and the revenue already cashed, minus a simple estimate of savings in maintenance and operational costs due to early termination. As pointed out in the main text, no such simple compensation is available if the franchise term is fixed.

(see Table 3). Portugal also recently adopted flexible-term contracts for all its highway PPPs.

A second advantage of a PVR is that it allows for nonopportunistic renegotiations of contracts. Indeed, an advantage of PVR contracts is that they provide a natural fair compensation, should the PWA decide to terminate the franchise early. It suffices to add a clause allowing the PWA to buy out the franchise by paying the difference between the winning bid and the discounted value of collected toll revenue at the point of repurchase (minus a simple estimate of savings in maintenance and operations expenditures due to early termination). No such simple compensation is available if the franchise term is fixed.

A third advantage is that the flexibility incorporated into PVR contracts is convenient for urban highways. Setting the appropriate ex ante toll for these projects is a complex task. Unless traffic forecasters are unusually accurate in their estimates, the resulting tolls are likely to be incorrect—either so low that they create congestion or so high that the highway is underutilized. In the case of the Orange County SR-51 HOT lanes, fees responded directly to congestion, but this made the franchise holder reluctant to consider expansions for the untolled adjacent road, leading to excessive congestion. In a PVR franchise, the regulator could set tolls efficiently to alleviate congestion without distorting the incentives of the concessionaire (although the regulator must take care to ensure that the tolls generate sufficient revenue to pay for initial capital expenditures).

A fourth advantage of a PVR approach is that it reduces the likelihood of bad faith renegotiations. Traditional fixed-term infrastructure contracts are often renegotiated by either extending the length of the concession, increasing user fees, providing a government transfer, or combining these approaches. Extending the concession term in a PVR contract is not possible because, by definition, the term is variable. Increasing user fees is ineffective because it shortens the concession term without increasing overall income. Government transfers are not logically impossible under a PVR but, because the partner cannot claim that it will receive less user fee revenue than it expected, a government transfer would be difficult to explain to the public. Furthermore, to the extent that firms are more likely to act opportunistically under financial duress, PVR contracts reduce the incentives firms have to lobby for renegotiations, since scenarios with losses for the firm are less likely under a PVR. Yet both fixed-term and PVR arrangements do not deter renegotiations that involve building additional infrastructure, which motivates the proposals we make below to improve PPP governance.

Although PVR schemes have a big advantage in terms of facilitating good faith renegotiations and deterring bad

faith renegotiations, as well as reducing risk, they have a downside: the PPP franchise holder has fewer incentives to manage demand for the infrastructure project because any action that increases demand will shorten the contract term. Projects earn their income regardless of the concessionaire's efforts. By contrast, demand-increasing investments are more attractive under fixed-term franchises. This suggests that the PVR method is applicable in cases in which quality of service is contractible and demand for the infrastructure is inelastic to the actions of the concessionaire—that is, when demand is mainly exogenous. Another important assumption underlying our analysis is that major investments are not needed frequently. Thus, port infrastructure (not operations), water reservoirs, airport landing fields and highways are natural candidates for a PVR, while mobile telephony is not.

### **Conventional provision, shadow fees, or an availability contract**

When it is impossible to charge user fees that pay for the capital costs of the project (though they may pay for the marginal costs of providing services), there are three alternatives. First, the government can use conventional provision. Second, it may use shadow fees, where the government pays the private operator a fixed fee for each user of the infrastructure. Finally, it can pay a fixed periodic fee, contingent on a quality-of-service standard being met, under an availability contract.

A fixed-term contract where the firm is remunerated with shadow fees introduces demand risk, because the firm and taxpayers are forced to bear the opposite sides of risks they could avoid under an availability contract. This will increase the risk premium included in the winning bid. Since having the firm bear this risk brings no countervailing benefit, this approach should be deprecated. The purported benefit of shadow tolls is that, because they are demand dependent, they avoid waste. Consider, however, that a project in which all the payments are made by the government is a project that should be subjected to careful social evaluation, so the benefits of filtering waste are limited. It follows that, at least for projects with contractible quality, availability contracts should be the preferred option when financing mainly out of general funds.

### **PROPOSAL 3: ACCOUNT FOR PUBLIC-PRIVATE PARTNERSHIPS TRANSPARENTLY IN GOVERNMENT BUDGETS**

One of the reasons for PPPs has been the desire of governments (local, state, or national) to provide public works even when they are restricted by budgetary constraints. For this reason, the accounting standards-setting organizations have struggled to determine when a project with a private partner

should be included on the balance sheet of the public sector. Governments would prefer that the implicit debt incurred (or the temporary asset transfer) not be considered in the budget in order to observe debt covenants or keep rating agencies from downgrading government debt. Taking projects off the balance sheet allows governments to circumvent spending and debt caps. Under conventional provision, on the other hand, caps on spending or net fiscal debt are reasonably effective in controlling the bias toward spending anticipation, because projects must be included in the budget. This is the reasoning behind the comments of Governor Mitch Daniels of Indiana quoted in the introduction.

## Including public-private partnerships on the balance sheet in the same way as conventional public investment can reduce the incentives to anticipate government spending.

In Europe, a standard-setting committee, Eurostat, has promoted a system by which PPP investment is off the public balance sheet if the private party bears a large fraction of the risks of the project. The reasoning seems to be based on an analogy with the fact that, with full privatization, the private party assumes all risks. However, since the definition of a *large fraction* is discretionary, most PPP projects ended up off the balance sheet.

How should PPPs be accounted for in the budget? The starting point is to note that, as we have already seen, PPPs change the timing of government revenues and disbursements and the composition of financing, but do not alter the intertemporal budget constraint. Given a demand trajectory, the present discounted budget will be the same under public and optimal PPP provision. The main conclusion is that PPPs should be treated just as standard government investments. To see why, consider first a project fully financed by future payments from the budget. From an accounting point of view, this PPP just substitutes debt to the private concessionaire for standard public debt. Thus, there is no reason to treat PPPs differently from projects under traditional public provision. It follows that, upon award of the PPP, the present value of the contract should be counted as a public capital expenditure and public debt should be increased by the same amount.

In the case of projects whose main source of revenues is user fees, the analysis is somewhat different, but reaches a similar

conclusion. To see this, consider a project whose user-fee revenues will pay all expenses, including capital expenses, over the lifetime of the PPP. In that case, the project will have no effect on the intertemporal budget constraint of the government. Under conventional provision, project revenues from user fees would have accrued to the government and would have been registered as revenues during each year of the operational phase. At the same time, the government would have made interest and principal payments to pay back the debt. Under a PPP, therefore, one should, as before, register user fees as current revenues and credit those revenues as payments for interest and principal of the “debt” with the concessionaire. At the end of the concession, the debt will be run to zero.

Including these projects in the government balance sheet in the same way as conventional public investment has several advantages. First, the incentives to anticipate spending—which are chronic with PPPs—are reduced, so

that PPPs will be chosen when they are socially beneficial and not because they help avoid budgetary controls. Second, treating partnerships with private firms the same way as public provision implies that both types of projects compete on a level playing field for scarce resources. In particular, both types of projects should be subject to social cost-benefit analysis. Third, the possibility of increasing spending by renegotiating PPP contracts decreases, because any additional investment that results from a renegotiation will also add to recorded debt and thereby be forced to compete with other projects.

### PROPOSAL 4: IMPLEMENT BEST PRACTICES FOR GOVERNING PUBLIC-PRIVATE PARTNERSHIPS

In many local, state, and national governments, the same public works agency is in charge of planning the infrastructure, designing and awarding the PPP contract, monitoring compliance, and renegotiating contracts. (Although there may be higher-level supervision, it is generally limited in its reach.) We believe this represents bad governance.

First, public works agencies tend to be biased in favor of building. This means that project selection is inefficient and that building projects rather than providing efficient infrastructure services is the goal of the agency. Even when this is not the case, an inherent conflict of interest exists between promoting infrastructure projects and monitoring compliance with contractual conditions.

We believe that the governance of the agency in charge of PPPs should be designed to separate contract design and award from contract monitoring; it should also subject renegotiations to independent review.

Our recommendation is that different functions should be kept separate. First, there should be an independent planning agency that designs, evaluates (through cost-benefit analysis), and selects projects, with the possibility of accepting public input and suggestions. An independent comptroller should review a sample of the projects approved by the planning agency to ensure that the agency has done its homework, and should publish its findings. The PPP's authority should award the project in a competitive process and supervise the contract.

After the award of the project, the comptroller or another independent supervisory agency should ensure that both the PPP's authority and the private party have complied with the contract. It should also monitor performance standards and service quality, and provide information to users and the public. A well-defined conflict-resolution mechanism should exist, ensuring that contract renegotiations do not change the profitability of the project for the private party. This would prevent regulatory takings and opportunistic behavior by the private party.

Finally, it is a bad idea to require legislative approval of PPP projects *after* the private concessionaire has been selected because this may lead to choosing firms with good lobbying abilities rather than firms that are the most efficient. Any legislative approval should take place before the project is put up for tender.

### Handling Unsolicited Proposals

Encouraging the private sector to generate innovative ideas can have merit. When a private party approaches the PWA with the idea for an infrastructure project and the idea is good, however, the question becomes how to structure a workable procedure. This requires the development of mechanisms for compensating the private parties for their ideas without affecting the transparency and efficiency of existing PPP awards. (See Hodges and Dellacha 2007, for details on unsolicited proposals.) Countries that have developed systems for receiving unsolicited proposals must deal with large

numbers of proposals, running into the hundreds in the case of Chile, South Korea, and Taiwan, the countries with the most mature systems.

One possibility is for the PWA to contract with the proponent to develop the project as a PPP, but the lack of competition and transparency make this option unattractive.

The alternative is to design a clear-cut mechanism for remuneration. The first stage consists of the approval or rejection of the unsolicited proposal, according to clear guidelines (in particular, excluding obviousness). Once an unsolicited proposal is approved, there are various options that have been used to remunerate the proponent. In some countries, the proponent has an advantage in the competitive auction for the project (or the proponent can transfer its option). Its bid is chosen if it is no more than say, 5 or 10 percent off the best bid. In other countries, the proponent can match the best offer. The problem with these approaches is that the advantage possessed by the proponent may detract from participation in the auction, and therefore lead to projects awarded with little competition.

The alternative that we espouse is to separate the proposal stage from the award stage. Each year only a small number of proposals should be chosen by the PWA, rewarding the selected proponents with a fixed prize that is sufficiently attractive to attract good projects. The prize would be paid by the PWA, but it would be reimbursed by the winner of the project once it is awarded under standard competitive conditions. This proposal combines incentives for competition in unsolicited proposals but does not alter the competitiveness and transparency of the award process.



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# Conclusion

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The advice provided in this paper should be easier to implement in states that are starting PPP programs from scratch rather than in states where many PPPs are already established. One of our recommendations already has been accepted: most recent projects have been assigned by competitive mechanisms.

On the remaining recommendations, government bureaucracies prefer not to change methods that have worked in the past because they fear the new procedures may fail and that they will be blamed by politicians seeking scapegoats. In addition, industry incumbents oppose the changes because of the threat they pose to their established advantages. The capture of the PWA by political interests represents a major hurdle when reforming the public works sector in general, and the PPP industry in particular, with the objective of improving the selection process of infrastructure projects.

Our proposal of using cost-benefit analysis before approving infrastructure projects faces deeply ingrained political mechanisms that favor uncontrolled earmarks at the state and federal levels. The Obama administration, which has promoted cost-benefit analysis in other areas, might be in favor of increasing the scope of programs that use this tool, but state and federal lawmakers value the ability to use earmarks. The separation of roles within governments' PWAs may also clash with well-entrenched interests, but may be workable after a sufficiently large corruption scandal, a recurrent feature of PWAs.

Next, consider the adoption of flexible-term contracts for transport PPPs. Adoption has been slow, given their desirable characteristics. These contracts are opposed by incumbent firms and industry lobbies, which seem to fear that the added transparency of the PVR mechanism will limit their ability to renegotiate contracts, a major source of rents. The PWA

tends to support the concession lobby, since its governance structures are oriented toward new projects (and therefore wants to be in good relations with industry) rather than toward supervision and regulation of existing contracts.

By contrast, budgetary authorities favor PVR contracts, since they reduce the need for revenue guarantees. It is not surprising, therefore, that flexible-term PPPs have been adopted when the budgetary authority had the upper hand over the PWA. In Portugal, the first wave of highway concessions that began in 1999 used shadow tolls, which led to massive deficits. Portugal switched to PPPs based on flexible-term contracts and, in 2004, auctioned the €795 million Litoral Centro highway, whose project finance won the Eurofinance prize for project of the year.

In Chile, after the 2001–2003 minister of public works had committed the resources of the ministry for several years in the future, the finance minister managed to make PVR contracts the standard for highway PPPs. Since 2008, six PVR-using contracts have been awarded, amounting to more than \$1.2 billion. These international examples, coupled with the dysfunctional outcomes of many recent PPPs, results that were partly caused by the economic crisis, should make stakeholders more amenable to PVR contracts.

PPPs can be expected to become increasingly popular as cash-constrained (local, state, and federal) governments seek means to provide infrastructure services. We have shown that this is not an appropriate motive for PPPs and that such projects should be included in the government balance sheet. This might be difficult to implement, except as the result of public campaigns against “mortgaging the future.” There are good reasons to use PPPs, but releasing public resources is not one of them.

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# Endnotes

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1. Other advanced economies with significant PPP programs are Australia, the Czech Republic, and Hungary (see Hemming 2004). Among emerging economies, PPPs have been used by China and India, and by several countries in Latin America.
2. From the 1790s to 1821, more than 2,000 companies, looking for ways to make profits by providing road links between interior agricultural markets and ports, financed, built, and operated toll roads with a combined extension of more than 10,000 miles.
3. Pennsylvania shifted its highway bridge funds on maintenance from 75 percent in 2007 to 96 percent currently.
4. However, as stipulated by the concession agreement, the city of Chicago gave existing employees the opportunity to move to other public jobs, an offer taken by 100 of 105 unionized workers (Transportation Research Board of the National Academies 2009). This suggests that, at least in the short run, efficiency gains at the Chicago Skyway were the flip side of efficiency losses elsewhere in the city.
5. Note, however, that for the Indiana Toll Road there is a commitment by the leaseholder of \$770 million in improvements, so it has some aspects of a brownfield partnership.
6. In the United States and in the United Kingdom, it is not uncommon to have the design of projects negotiated directly with the private party. This requires much confidence in the incorruptibility of the public officials involved in these negotiations.
7. These data are from Her Majesty's Treasury, 2009.
8. See Hellowell and Pollock (2007) for a criticism of the methodology, however.
9. Road wear and tear is proportional—as a rule of thumb—to the fourth power of axle loading. See <http://pavementinteractive.org/index.php?title=ESAL>. The implication is that, in most countries, the tolls paid by trucks are much lower than the wear and tear costs they cause.
10. See “Greenville SC Southern Connector toller files for bankruptcy,” June 25, 2010, <http://www.tollroadsnews.com/node/4808>.
11. The exceptions are the Port of Miami Tunnel, the I-595 corridor in Florida, the Eagle Commuter Rail Project in Denver, and Route 3 in Boston.
12. Personal communications with Richard B. Norment and John D. Lynch. Note, however, that the following states do not charge tolls (except, in some cases, for bridges crossing to another state): Arizona, Connecticut, Hawaii, Idaho, Mississippi, Montana, New Mexico, North Carolina, South Dakota, Tennessee, and Wyoming.
13. In Engel et al. (2007) we derive a flexible-term contract where firms bid both a cap on the present value of user fee revenue they desire and a minimum income guarantee. The regulator combines both bids using a scoring function. We show that these “two-threshold” contracts have many (but not all) of the advantages of PVR contracts in the case of intermediate- and low-demand projects.
14. Traditionally, firms bid on the lowest toll, the shortest contract term, or the lowest payment to the government. In all these cases, the contract length is set before demand for the project can be known.
15. Colombia ran a flexible-term auction a couple of years before where firms bid on total income, without discounting.

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## Fast Facts:

- 1.** In the wake of the Great Recession, governments around the world are turning to public-private partnerships (PPPs) for their infrastructure needs. The use of PPPs in the United States increased fivefold between 1998-2007 and 2008-10.
- 2.** PPPs can be an effective vehicle to provide infrastructure. The efficiency gains that can potentially accrue under PPPs are due to bundling. When a single firm has responsibility for both project construction and operation and maintenance, it internalizes life-cycle costs and has a greater incentive to adequately maintain infrastructure.
- 3.** PPPs are not a free lunch and should not be used to address state budget woes. When a state or local government sets up a partnership to build, maintain, and operate a highway in exchange for toll revenue, drivers are still on the hook for tolls, and the government relinquishes future toll revenues.
- 4.** PPPs financed by user fees should be structured using Present-Value-of-Revenue (PVR) contracts. This reduces risk, and the need for a risk premium, by tying the length of the concession to user demand. A PVR contract would also lower the likelihood of opportunistic renegotiation.
- 5.** Using more PVR contracts could lead to large reductions in the required return on projects and in the revenue that must be collected from users (by 33 percent in some simulations).
- 6.** PPPs should be included on governments' balance sheets and treated as public investments. This reduces the temptation to overspend and ensures that partnerships will be chosen for the right reason, that is, when they lead to significant efficiency gains.
- 7.** In order to minimize conflicts of interest and the potential for corruption, different agencies at the Public Works Authority (PWA) of state and local governments should be responsible for planning and awarding projects and contract enforcement, respectively.



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