

2015
KENNETH R. MACGREGOR
LECTURE

WHEN PUBLIC-PRIVATE
PARTNERSHIPS MAKE SENSE:
TWO BASIC OBSERVATIONS

José A. Gómez-Ibáñez



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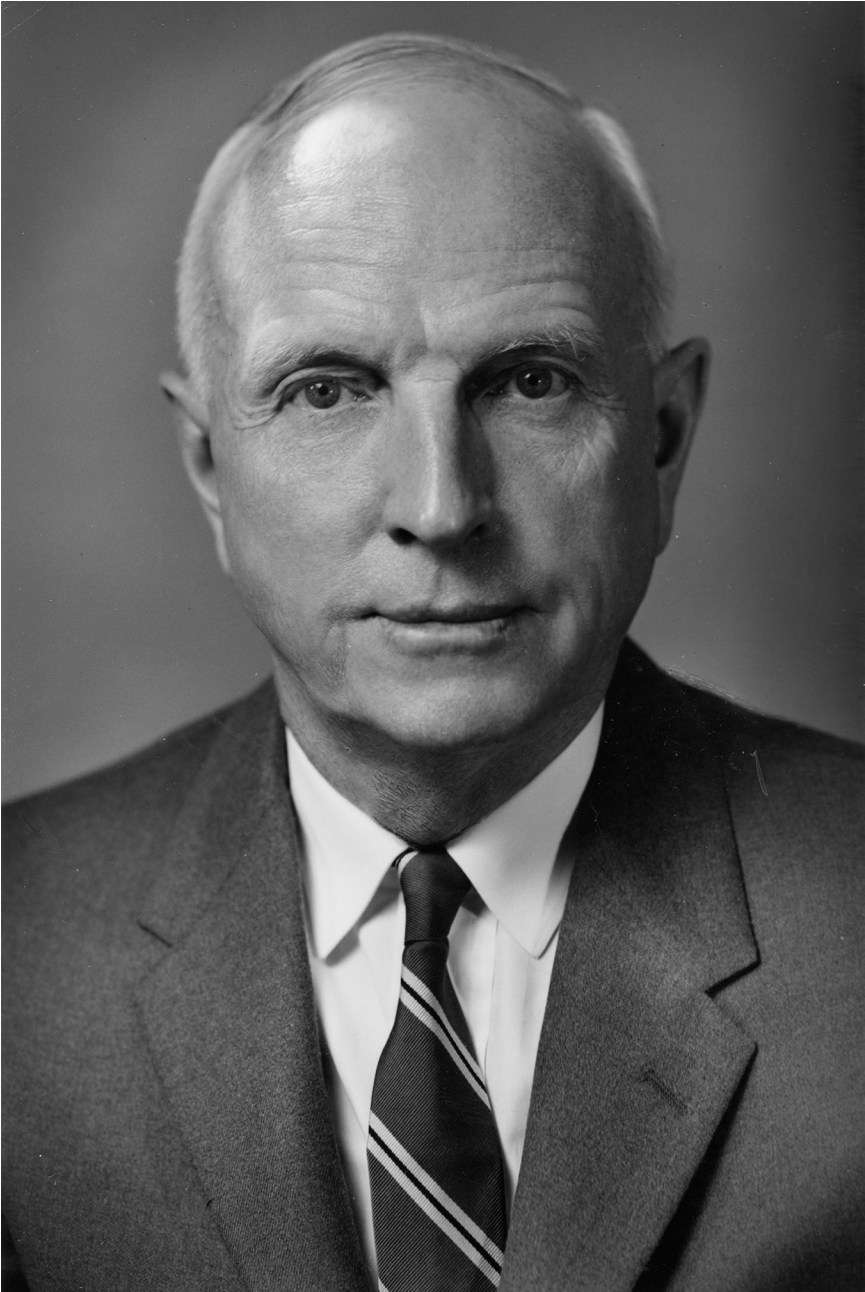
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FOREWORD

The 2015 MacGregor Lecture was integrated with that year's State of the Federation Conference of the Queen's Institute of Intergovernmental Relations. The series of which the lecture is part, the Kenneth MacGregor Lectureship, was established in 1982 and was funded by gifts from Mutual Life Assurance of Canada and from friends of Kenneth R. MacGregor. It was intended to honour Mr. MacGregor who had had a distinguished career both in public service and in business, serving as the federal Superintendent of Insurance and, subsequently, as the President of Mutual Life. He also served as a member of the Queen's Board of Trustees.

The goal of the Lectureship is served by bringing to the Queen's campus prominent public figures or scholars who can contribute significantly to the theory and practice of federalism, intergovernmental relations, or related matters, both in Canada and other nations. As the appended list attests, the lectureship has indeed brought to the campus a very distinguished group of lecturers, a record that is continued by our 2015 lecturer, Dr. José A. Gómez-Ibáñez, the Derek C. Bok Professor of Urban Planning and Public Policy at Harvard University. A detailed bibliography of Dr. Gómez-Ibáñez follows this Foreword.

Dr. Gómez-Ibáñez's lecture on the circumstances in which the use of public-private partnerships would be socially and economically advantageous was a particularly appropriate complement to the State of the Federation conference, which in 2015 focused on the problems of achieving adequate levels of infrastructure investment in the Canadian federation.



Kenneth R. MacGregor

THE MACGREGOR LECTURES

The Kenneth MacGregor Lectureship was established by Queen's University in 1982 in honour of Kenneth R. MacGregor, who was a member of the Queen's board of Trustees. Mr. MacGregor had a distinguished career in insurance and public service, serving as the federal Superintendent of Insurance and, subsequently, as President of Mutual Life Assurance of Canada. The endowment from which the lectureship is funded was created by a gift from Mutual Life and friends of Kenneth R. MacGregor.

The purpose of the MacGregor Lectureship is to bring to the campus prominent public figures or scholars who can make an important contribution to the understanding or practice of federalism, intergovernmental relations or related matters in Canada or other countries. The list of previous MacGregor Lecturers is as follows:

- 1985: **The Right Honorable Robert Stanfield** LL.D. Leader of the Progressive Conservative Party of Canada 1967-1976, and former Premier of Nova Scotia (1956-1967).
National Political Parties and Regional Diversity – Discussion Paper 22
- 1987: **The Honorable Peter Lougheed** PC, CC, AOE, QC, former Premier of Alberta (1971-1985).
Free Trade – Is a Fair Deal Possible? – unpublished
- 1987: **Professor Alan Cairns** OC, FRSC. Department of Political Science, University of British Columbia.
(Lecture I) “International Dimensions of Constitutional Change”
(Lecture II) “Constitutional Theory and the 1982 Constitutional Settlement”
(Lecture III) “Constitutional Refashioning of Community”
Charter versus Federalism: The Dilemma of Constitutional Reform – Book
- 1988: **The Honorable Allan Blakeney** PC, OC, SOM, QC, FRSC. Former Premier of Saskatchewan (1971-1982) and leader of the Saskatchewan New Democratic Party.
Canada: Its Framework, Its Foibles, Its Future – Reflection Paper 1
- 1989: **Professor Albert Breton** OC, FRSC, LL.D. Emeritus Professor of Economics, University of Toronto.
“The Organization of Governmental Systems” lecture title
Centralization, Decentralization and Intergovernmental Competition – Reflection Paper 4

- 1990: **Dr. (Robert) Gordon Robertson** PC, CC, FRSC. Former Secretary to the Cabinet and Clerk of the Privy Council, Chancellor of Carleton University. *Does Canada Matter? – Reflection Paper 7*
- 1992: **Professor Daniel Elazar** professor of political science at Bar-Ilan University and Temple University, Philadelphia, Pennsylvania. He was the Director of the Center for the Study of Federalism at Temple University and the founder and president of the Jerusalem Center for Public Affairs. (Lecture I) “Will Federalism Survive its Present Crisis?” (Lecture II) “Can Federal Principles Serve the Cause of Middle East Peace?” *Federalism and the Way to Peace – Reflection Paper 13*
- 1994: **Professor Roger Gibbins** FRSC, LL.D. Department of Political Science at the University of Calgary, Department Head (1987-1996), former President and CEO of Canada West Foundation *The New Face of Canadian Nationalism – Reflection Paper 14*
- 2000: **Professor Richard Simeon** FRSC. Faculty member at Queen’s University from 1968 to 1991. University of Toronto 1991 till his death in 1994 “Shifting Lenses: The Study of Federalism and Canadian Politics” *Political Science and Federalism – Book*
- 2002: **Professor Alan Cairns** OC, FRSC. Department of Political Science at the University of British Columbia. Department of Political Science, University of Waterloo (adjunct professor) till his death in 2018. *First Nations and the Canadian State: In Search of Co-Existence – Book*
- 2015: **José A. Gómez-Ibáñez** Derek C. Bok Professor of Urban Planning and Public Policy at Harvard University, where he holds a joint appointment at the Graduate School of Design and the John F. Kennedy School of Government. *When Public-Private Partnerships Make Sense: Two Basic Observations*. This lecture was included in *Canada: The State of the Federation 2015: Canadian Federalism and Infrastructure*.

All MacGregor lectures can be found on the IIGR website <https://www.queensu.ca/iigr/kenneth-macgregor-lectures>

2015 KENNETH R. MACGREGOR LECTURER



Professor José A. Gómez-Ibáñez

José A. Gómez-Ibáñez is the Derek C. Bok Professor of Urban Planning and Public Policy at Harvard University, where he holds a joint appointment at the Graduate School of Design and the John F. Kennedy School of Government. He has taught courses in economics, infrastructure and transportation policy in both schools.

Professor Gómez-Ibáñez's research interests are in transportation, infrastructure, and economic development, and he has authored or edited several books including:

- *Regulating Infrastructure: Monopoly, Contracts and Discretion* (Harvard University Press, 2003);
- *Essays in Transportation Economics and Policy: A Handbook in Honor of John R. Meyer* (with William Tye and Clifford Winston, Brookings Institution Press, 1999);
- *Going Private: The International Experience with Transport Privatization* (with John R. Meyer, Brookings Institution Press, 1993);
- *Regulation for Revenue: The Political Economy of Land Use Exactions* (with Alan Altshuler, Brookings Institution Press, 1993);

- *Autos, Transit and Cities* (with John R. Meyer, Harvard University Press, 1981); and
- *Cases in Microeconomics* (with Joseph Kalt, Prentice-Hall, 1990).

At the Kennedy School, Gómez-Ibáñez has served as the faculty chair of the Masters in Public Policy Program (1996-1998), co-chair of the Infrastructure in a Market Economy executive program (1998-2013) and chair of the Social and Urban Policy Area (2007-2012). At the Graduate School of Design, he has served as chair of the Department of Urban Planning and Design (1984-1988), program director of doctoral programs (1992-1995), and program director of the Masters in Urban Planning Program (2001-2004).

In addition to teaching, research and university administration, Gómez-Ibáñez has served pro bono on a number of government advisory commissions and been a consultant to international agencies, national and state governments and private businesses on infrastructure policy issues.

Professor Gómez-Ibáñez received his A.B. in government from Harvard College in 1970 and his M.P.P. and Ph.D. in Public Policy from Harvard in 1972 and 1975, respectively.

Kenneth MacGregor Lecture

WHEN PUBLIC-PRIVATE
PARTNERSHIPS MAKE SENSE: TWO
BASIC OBSERVATIONS

José A. Gómez-Ibáñez¹

It is a great honour and a pleasure to give the Kenneth MacGregor Lecture at Queen's University. It seems appropriate that infrastructure is the topic of this year's conference on the state of the Canadian federation, since infrastructure is typically a shared responsibility of national, provincial, and municipal governments. Moreover there has been a growing concern in many industrializing and developed countries that investments in infrastructure may be insufficient to support desired levels of safety and economic growth. Over the last three decades, this concern has led many countries to experiment with providing infrastructure through public-private partnerships, often abbreviated as P3s.

In this lecture I will draw primarily on the experience with P3s in highways in North America to argue that partnerships, although still something of a novelty, hold great potential for improving the delivery of infrastructure services but with two important caveats. First, the partnerships must be designed primarily as a means of increasing real efficiency in the delivery of infrastructure services and not simply as vehicles for accessing private capital markets or alleviating immediate government budget problems. Second, more care must be taken in drafting the contracts between the public and private partners to reduce the risk that the terms

1. The author would like to thank Andrew Deye for his advice and research assistance on the most significant highway public-private partnerships in North America.

eventually prove so unworkable for one or both parties that they lead to potentially controversial renegotiations.

PUBLIC-PRIVATE PARTNERSHIPS DEFINED

First let me start by defining what I mean by public-private partnerships in infrastructure. While there is no universally accepted definition, partnerships typically differ from traditional procurement in several ways. One of the most important is that they bundle together, in a single contract, activities that are traditionally procured separately. Thus a P3 may call for the private provider not just to design or build a highway but to finance, operate, and maintain it for several decades as well. This bundling increases the accountability of the private partner to the government, since it reduces the possibilities of one contractor blaming others, should something go wrong. And bundling motivates the private partner to take a longer-term, whole-life perspective in designing, building, and maintaining the facility, which can be important with costly and durable infrastructure.

Another difference with traditional procurement is that the contracts sometimes specify the services desired rather than the asset required. Thus, for example, a contract may call for a highway capable of safely carrying a specified quantity of traffic in the peak hours and direction at a minimum average speed rather than a highway with a specified alignment, number of lanes, minimum lane and shoulder widths, maximum grades, etc. The focus on services rather than assets gives the private partner leeway to investigate more cost-effective methods of providing the same services.

Finally, P3s generally require the private partners to assume more risk than they would under traditional provision. Much of the added risk is a consequence of the bundling of activities and the focus on services rather than assets. With bundling, the private partner essentially assumes the risk that the different components will work together as planned, and by specifying services, the private partner assumes the risk that the asset built can deliver the services promised.

PARTNERSHIPS IN NORTH AMERICAN HIGHWAYS

I use partnerships in high-performance highways in North America to illustrate these issues in large part because highways are among the most popular forms of P3 in many countries. Modern highway P3s date back to the 1980s in the United States and Mexico and a few years later in Canada. Only a small fraction of highway investments are made through P3s, with the exception of Mexico between 1989 and 1994. But P3s remain more common in highways than in other infrastructure sectors. By one rough calculation, highways accounted for roughly two-thirds by

value of the P3s that reached financial close in the past decade in both the United States and Canada.²

The popularity of P3s in highways means that there are many well-documented projects using a variety of different approaches. This talk is based primarily on a review of twenty-five significant highway P3 projects that reached financial close in the twenty-five years between 1989 and 2014. The criteria for inclusion were partly the value of the project but also a subjective assessment of its influence on the design of subsequent projects. Indeed, one of the projects on the list (the lease of the Pennsylvania Turnpike) was withdrawn before financial close but is included nonetheless because it was so influential. And Mexico's toll road program from 1989 to 1994 is listed as if it were a single project even though it consisted of fifty-two separate concessions.

As shown in the table, many of the earlier projects involve greenfield concessions to build a new highway and operate it for twenty or more years, for example, while some later projects are brownfield leases of existing highways often with the obligation to make some improvements during the life of the lease. In many early cases, the concessionaire or lessee assumes the revenue risk in that it is expected to recover its costs with the tolls collected from the highway users, while in other later cases the government assumes the revenue risk and makes payments to the concessionaire that are based on the days and hours the road is available to users rather than the tolls that users pay. The duration of the concessions or leases varies as well, with some in Mexico as short as a few years and others as long as ninety-nine.

The United States

The United States began to explore private toll roads in the mid and late 1980s, about the same time as Mexico and a little before Canada. The US experience has been shaped importantly by the country's 1956 decision to impose a federal tax on gasoline to finance a 41,000 mile Interstate and Defense Highway System. A number of eastern states had built high-performance highways financed by tolls starting in the 1930s, but federal legislators thought it would be difficult to fund

2. In a list of thirty-two infrastructure P3s with a total value of \$23.7 billion that closed in Canada between 2005 and 2015, for example, nineteen were highways with a value of \$15 billion. In a similar list for the United States, twenty-five of forty-nine projects, with a value of \$47.6 billion out of \$61.2 billion, were highways, while the second and third most popular types were parking (eight) and water and sewage utilities (six). Mexico was a pioneer in private toll highways, awarding concessions for thousands of kilometres between 1989 and the Mexican financial crisis of 1995, and more recently in 2007 received \$4 billion for leasing a package of four major toll roads totalling 590 kilometres that it had taken over in the aftermath of the 1995 crisis.

Table 1 Significant Highway PPPs

Project	State	Financial close	Open to traffic	Value (\$ million)	Miles	Years	Avail. or toll	Status
Mexico toll road program	Mex	1989–1994	1991–		5,200 km	Vary	Toll	Government has taken back 23 of 52 concessions
SR 91 Express Lanes, Orange County	CA		1995	\$135	10	35	Toll	Profitable; government buys back for \$207 million in 2003
Dulles Greenway	VA		1995	\$350	14		Toll	Restructured in 1999 and 2004
407 ETR Toronto	ON	1999	lease	C\$3,100	108 km	99	Toll	Highly profitable and controversial
SR 125 San Diego	CA	2003	2007	\$847	10	35	Toll	Bankrupt in 2010 (first TIFIA default); government buys back for \$341 million in 2011
Chicago Skyway	IL	2005	lease	\$1,800	8	99	Toll	In difficulty
Golden Ears Bridge	BC	2006	2009	C\$1,000	9	35.5	Avail.	Satisfactory
Indiana Toll Road	IN	2006	lease	\$3,800	157	75	Toll	Bankrupt in 2014
FARAC I (Mexico)	Mex	2007	lease	\$4,000	590 km	30	Toll	Satisfactory
Northwest Parkway	CO	2007	lease	\$603		99	Toll	In difficulty?
I 495 Express Lanes	FL	2007	2012	\$1,900	10	75	Toll	Restructured in 2014
SH 130	TX	2008	2012	\$1,400	41	50	Toll	Being restructured
East End Crossing	IN	2012	2016	\$763	4.4?	35	Avail.	
Goethals Bridge	NYNJ	2013	(2018)	\$1,500	1.5	40	Toll	

...continued

Table 1 Significant Highway PPPs, continued

Project	State	Financial close	Open to traffic	Value (\$ million)	Miles	Years	Avail. or toll	Status
Pennsylvania Turnpike	PA	2008	lease	\$12,800	498	75	Toll	Withdrawn before close
I 595 Express Lanes	FL	2009	2014	\$1,900	10.5	35	Avail.	
Port of Miami Tunnel	FL	2009	2014	\$903	1	30	Avail.	Satisfactory
North Tarrant Express	TX	2009	2014	\$2,000	13	52	Toll	
LBJ Managed Lanes	TX	2010	2013/15	\$2,700				Opening in phases
Simon Fraser Perimeter Road, Vancouver	BC	2010	2013	C\$660	40 km		Avail	Satisfactory
Presidio Parkway, SF	CA	2010		\$929	1.5	33	Avail.	
PR-22/PR-5	PR	2011	lease	\$1,400	52	40	Toll	
I 95 Express Lanes	VA	2012	2014	\$925	29	73	Toll	Open December 2014
Edmonton Ring Road	AB	2012		C\$1,800	27	34		
Elizabeth River Cross.	VA	2012	2016	\$2,000		58	Toll	
East End Crossing	IN	2012	2016	\$763	4.4?	35	Avail.	
Goethals Bridge	NYNJ	2013	(2018)	\$1,500	1.5	40	Toll	

Source: Prepared by José A. Gómez-Ibañez, with the assistance of Andrew Deye.

a transcontinental network with tolls, given the sparse traffic across the western plains. The states would build and operate the Interstate System segments in their territories and be reimbursed for 90 percent of the construction cost, but in return they were prohibited from collecting tolls on those segments. The restriction on tolling Interstate highways encouraged early proponents of private toll highways to search for greenfield routes that had enough traffic to be toll-funded but had been overlooked by the planners of the Interstate System.

This search for profitable greenfield projects was not very successful. Of the five major highway P3s proposed in the 1980s, two were eventually abandoned in the face of investor scepticism and two were built only after many years of delay and even then went bankrupt because of insufficient traffic.³ The only project that was a financial success involved building ten miles of “express lanes” in the median of the highly congested State Route (SR) 91 in Orange and Riverside Counties in California. The SR-91 express lanes offered motorists a faster alternative to the existing general traffic lanes that they could use if they were willing to pay a toll or to travel in a car with three or more occupants. SR 91 pioneered the concept of express lanes, which might be regarded as more brownfield than greenfield in that the lanes are typically built within the right-of-way of an existing highway. They are highly risky nonetheless because they can make money only a few hours of the day, when the regular lanes are congested. Moreover, there is often some uncertainty about how much motorists will pay for a faster trip.

The experiences of these early projects focused investor interest on two types of P3s in the decades that followed. The first were express lanes similar to SR-91 but in more difficult and complex situations that often required rebuilding the general traffic lanes. While SR-91’s lanes had been built for \$135 million, these projects, two each in Florida, Texas, and Virginia, had construction costs in the range of \$1 to \$2 billion each. At least two of these express lane projects originated as unsolicited proposals from private consortiums headed by construction contractors.⁴

The second type of P3 of interest was a brownfield lease of one of the toll roads that had been built before the Interstate System or without Interstate funding, and thus were not subject to the ban on tolling Interstate highways. These proposals came to be known as asset monetization or asset-recycling projects because they involved leasing the road and the right to collect tolls on it in return for an upfront

3. The five include the Dulles Greenway that began as an unsolicited proposal to the Commonwealth of Virginia in 1985 and four proposals that won a competition held by the State of California in 1989 for highway projects to demonstrate the effectiveness of private participation. Only the Greenway and two of the California projects (SR 91 Express Lanes and SH 125) were ever built. For a description of these projects, see José A. Gómez-Ibanez and John R. Meyer, *Going Private: The International Experience with Transport Privatization* (Washington, DC: Brookings Institution, 1993), 172–73.

4. The 495 express lanes and the I-95 express lanes in Virginia.

payment that could be used for other purposes. More than a half dozen asset-recycling leases would eventually be awarded, many for as long as seventy-five to ninety-nine years and for upfront payments in excess of \$1 billion. The most famous was a proposed seventy-five-year lease for the 537-mile Pennsylvania Turnpike which, when tendered, generated an astounding bid of \$12.8 billion; the bid was withdrawn in 2008 with the onset of the global financial crisis. These asset-recycling projects were typically advanced by mayors or governors facing budget crises, including Chicago Mayor Richard Daley, Indiana Governor Mitch Daniels, and Pennsylvania Governor Ed Rendell.

During this period the federal government began to offer financial support and technical assistance to highway P3s. In 1998 Congress passed the Transportation Infrastructure Finance and Innovation Act (TIFIA) that authorized the US Department of Transportation to make direct loans or issue loan guarantees on generous terms to qualified surface transportation P3s. And in 2012 Congress greatly increased the funding for TIFIA loans and guarantees and allowed them to finance up to 49 percent of a project's construction costs. Congress also gave the US Department of Transportation the power to allow states to issue up to \$15 billion in "private activity bonds" on behalf of private infrastructure providers. These bonds bore lower interest rates because the interest they paid was exempt from federal income taxation. Congress also clarified that states could toll new traffic lanes on the Interstate System as long as the number of untolled lanes was not reduced.

Canada

I hesitate to draw too heavily on the Canadian experience in this forum, since I am sure many in the audience are better informed than I am. But Canada cannot be ignored, since it has developed one of the best P3 programs in the world.

My understanding is that Canada began experimenting with highway P3s in 1993 when the federal government awarded a concession to build and maintain the Confederation Bridge, a 12.8 kilometre, Cdn\$739 million span connecting Prince Edward Island and the mainland.⁵ The provinces soon eclipsed the federal government in P3 activity, including Ontario which in 1999 awarded a ninety-nine-year concession to widen, extend, and maintain the 108-kilometre Highway 407-Electronic Toll Road on northern edge of Toronto in return for an upfront payment to the project of Cdn\$3.1 billion. The province used the proceeds from the lease to retire the nearly Cdn\$1 billion in debt it had incurred in building the

5. For a brief if slightly dated overview of the Canadian P3 programs in infrastructure, see Infrastructure Investor, "Canada: An Intelligence Report," December/January 2010/11, www.infrastructureinvestor.com.

first forty-one kilometres of the road, and it deposited the excess in the Ontario's general fund.

The 407 project became highly controversial in part because the contract gave the concessionaire substantial latitude to raise toll rates without public review. The combination of high toll rates and higher-than-expected traffic growth led to high profits and calculations that the concessionaire may have paid only half the value of the concession.⁶

Highway 407 was arguably the first asset-recycling P3 in North America, and it may have influenced the debut of recycling in the United States a few years later. But in Canada the controversy over 407-ETR sparked a sensitivity to the need to incorporate public interests in toll setting, including the option of compensating the concessionaire with availability payments so that the government enjoyed the discretion but also bore the financial consequences of setting tolls. In most of the subsequent major Canadian highway P3s the concessionaire received availability payments from the government while the government retained the toll receipts.

The 407 experience also may have contributed to the decision by many provinces to establish special procurement agencies to promote and oversee the award of P3 contracts, including guidance on the design of "value for money" tests. Alberta created the first such agency in 1999, followed by British Columbia in 2002, Quebec in 2004 and Ontario in 2006. In 2008 the federal government authorized the creation of its own promotion and technical assistance agency, PPP Canada, and the following year it began to administer a Cdn\$1.25 billion fund to pay up to 25 percent of the capital costs of P3s that would not otherwise be financially viable; a second fund with another Cdn\$1.25 billion was authorized a few years later.

These efforts seem to have been very successful in increasing the number of highway P3s that reached financial close, at least compared to the number in the United States. In the past decade and a half, Canada closed roughly half as many highway P3s as the United States despite the fact that it has a population one-tenth as large. Many observers give the credit to the provincial procurement agencies, which, unlike their US counterparts, pay competitive wages and thus do not suffer from high turnover.

Mexico

Mexico is worth mentioning since it was not just a pioneer but has the largest concession toll road network on the continent. The program was initiated in 1989 by President Carlos Salinas as a way to stimulate the economy and was so attractive

6. For a brief history of 407-ETR, see Minnesota Department of Transportation, "Innovative Finance in Action: Toronto 407 ETR," October 2009, www.dot.state.mn.us/funding/innovative

that by 1994 fifty-two concessions had been awarded for 5,200 kilometres, two-thirds offered by the national government and one-third by state governments. The awards stopped after the sharp devaluation of the peso in 1994 threw the economy into a recession, cutting traffic volumes and revenues while also raising the costs of debt service for many concessionaires who had borrowed in dollars but had not hedged their foreign exchange risk. The financial problems of the concessionaires also threatened to bring down major Mexican banks that had loaned generously to the sector, and so between 1995 and 1997 the national government paid the bank debts of and took back twenty-three of the worst-performing concessions. In 2003 the government began to auction some of these concessions to the private sector again.

The original Mexican program is often described as a failure because so many concessions had to be taken over at substantial cost to the government. And the effects of the peso devaluation were exacerbated by some errors in the design of the program. For example, President Salinas had been concerned that P3s would be controversial and so wanted the highways to be transferred to the government as soon as possible. To that end the concessions were awarded to the bidder who proposed the shortest duration for a given maximum toll, which resulted in some very short concessions based on toll rates that proved prohibitively high in a recession. Nevertheless, by 2003 many of the roads were profitable enough to concession again, and simple calculations suggest that most could have survived the recession had lenders been more patient.

THREE MOTIVES FOR PARTNERSHIP

What has all this activity taught us about where P3s are economically sensible and politically acceptable? To understand, it helps to consider the different motives that are often offered by proponents of P3s. At the risk of much simplification, proponents often offer three motives for partnerships in infrastructure.

The first motive is to tap private capital markets to finance badly needed investments. This motive is most often cited for greenfield projects such as a concession to design, finance, build, and operate a new toll road or power plant for a fixed term.

The second motive is to transfer resources to provide immediate budget relief for hard-pressed governments. This motive is most often associated with brownfield projects that involve the lease for a fixed term or outright sale of an existing facility or enterprise. Examples include the sale of an existing state-owned railroad or the lease of an existing toll road. The line between greenfield and brownfield projects is sometimes blurred, in that the lessee of the brownfield facility may have responsibility to improve it—but the primary motive is typically less to encourage investment than to provide the government with immediate budget relief by spinning off a loss-making activity or by capitalizing the surpluses of a profitable facility.

The third motive is to incentivize real efficiency gains. To understand the difference between this motive and the second, it is important to distinguish what economists call transfers from what they call real efficiency gains. Transfers occur when one simply shifts resources from one party to another without making significant additional changes in the way the resources are used. Real efficiency gains occur when one deploys resources so that they produce more or better output with the same inputs or so that they require fewer inputs to produce the same output. Partnerships often include a mix of transfers and real efficiency gains, but one form or the other usually dominates.

Tapping Private Capital Markets. Tapping private capital markets is widely recognized as a fairly unconvincing rationale for partnership. The objection is that governments can usually tap private capital markets directly—by issuing public debt—instead of borrowing through their private partner.

Partnerships are not a source of free funding. The private investors in a concession or a lease expect to be repaid, just as the holders of government bonds do. And they both draw on the same two main sources for repayment: either charges paid by infrastructure users, such as highway tolls, or taxes.

Moreover, government debt is often cheaper, at least nominally, than the returns that investors in private equity and debt expect. In the United States, for example, state governments can typically borrow at 5 percent to 6 percent while the weighted average return on debt and equity for private investors in infrastructure is on the order of 8 percent to 9 percent. Similarly, in developing countries, the interest paid on sovereign debt is almost always lower than the returns expected by investors in private enterprises in the same country.

The lower cost of government debt is at least partially an illusion for two reasons. The first, which I believe is peculiar to the United States, is that the interest paid on bonds issued by state governments is not subject to federal income tax. This favourable tax treatment accounts for roughly half the difference between the interest rates on state government bonds and the rate on otherwise comparable private bonds in the United States. But this savings in interest rates does not reflect a real difference in state and private risks; rather, that the federal treasury effectively subsidizes the interest on state bonds in the form of foregone tax revenues.

The second and more common reason that lower interest rates on government debt may be an illusion is that the taxpayers may not be fully compensated for the default risks they assume. If a government-financed project performs so poorly that it cannot make the required payments to its bondholders, then there is usually an explicit or implicit understanding that general tax revenues will be used to prevent default. But if the poorly performing project is privately financed, the taxpayers are not expected to step in to prevent bankruptcy. The government can issue revenue bonds, however, backed in theory only by the revenue stream from the project rather than by the full faith and credit of the Treasury. And comparisons are further complicated because government revenue bonds are often subject to minimum coverage ratios that provide a financial cushion similar to equity. In short, if one

made allowances for differences in tax treatment and default risk, the real costs of public and private finance would likely be similar.

The Private Activity Bonds program in the United States can be understood as an attempt to put public and private finance on an even footing by extending the tax advantages of state bonds to private infrastructure. However, the lower interest rates and forgiving terms of TIFIA program should be more properly regarded as a general subsidy to infrastructure, since TIFIA loans and guarantees are available to public as well as private infrastructure providers. This subsidy is substantial, moreover, since TIFIA debt can cover as much as 49 percent of a project's costs, interest rates are as low as 2.54 percent, and repayment can be up to thirty-five years including five years of capitalized interest.⁷

But the key point is that if the primary motive for partnership is to borrow money, then issuing government debt is a much less cumbersome way to do so. Even if the costs of public and private finance are comparable, the transaction costs of designing, awarding and administering a concession or a lease are much greater than the transaction costs of issuing a bond. And if public finance is actually cheaper than private finance (or if the nominal savings is politically salient) then the practice followed in Highway 407, the Chicago Skyway, and others of using some of the proceeds of asset recycling to retire public debt makes little sense. In essence one is borrowing money at interest rates of 8 percent to 9 percent to pay off debts charging only 5 percent to 6 percent.

Transfer Resources for Immediate Budget Relief. The second common motive for infrastructure partnerships is to transfer resources for immediate budget relief. Such partnerships generally take different forms in developing than in developed countries.

In developing countries, this type of project often involves the lease or sale of a state-owned infrastructure facility or enterprise that is losing money because its tariffs are unrealistically low, its staffing is unnecessarily high, or its services are too extensive. The expectation is that the private concessionaire will be better motivated to raise fares, shed excess labour, or cut services so that government financial support is reduced or no longer needed. In essence these projects transfer resources from the user (who pays more) or labour (who must find another job) to taxpayers (who no longer have to support the enterprise).

In developed countries, these partnerships often take the form of asset monetization or recycling—the lease or sale of a profitable infrastructure facility in return for an upfront payment that can be used for other public purposes. In essence such projects are just a means to transfer resources from future taxpayers (who no longer enjoy the current surpluses generated by the asset) to current taxpayers (who enjoy the use of the upfront payment).

7. TIFIA interest rates as of 31 March 2013.

If public-private partnerships are all about transfers, then partnerships become a zero-sum game where some parties lose at the expense of others. And to the extent that partnerships are zero-sum, they are bound to be more controversial. Early in the decade of the noughts, for example, there was a backlash against privatization of utilities in many developing countries that was fuelled by the perception that the distribution of the benefits and costs of the privatization was too unequal. And something similar has happened with some of the asset-recycling projects—perhaps most famously the uproar over the leasing of thousands of parking meters in downtown Chicago.

The likelihood of a backlash probably depends on how aggressive the asset recycling is, and particularly whether the upfront payment is financed primarily from existing surpluses or relies on raising tolls.

The Chicago Skyway, Indiana Toll Road, and Pennsylvania Turnpike leases all incorporated the same provision that toll rates could be increased every year by 2 percent, the increase in the CPI, or the increase in GDP per capita, whichever was higher. And the bids received implied that the winners were relying primarily on toll increases rather than on the current net cash flow. In the case of the Pennsylvania Turnpike, for example, the value of the current net cash flow accounted for roughly \$4 billion of the \$12.8 billion bid, and efficiency gains no more than another \$1 billion, while the balance of \$7–8 billion must have rested on expected increases in toll revenues.

If the upfront payment is primarily the capitalization of existing surpluses, then the transfer (from future taxpayers who lose the use of those surpluses to current taxpayers who gain their use) is likely to be lost in the broader ups and downs of the government budget. But if the upfront payment depends primarily on increasing tolls, then the transfer (from future motorists to current taxpayers) will become very visible over time as tolls increase.

Real Efficiency Gains. The third and most convincing motivation for P3s in infrastructure is to incentivize real efficiency gains. Real efficiency gains are the only way of converting a P3 from a zero-sum game to a win-win policy—or at least to a policy where most parties benefit and those who do not benefit lose only a little.

It is important to note here that the desire to motivate real efficiency gains is the principal reason for using costly private finance. The investments by equity and debt holders are needed to give them a stake in the success of the concession. And in this vein it is possible to have too little private investment.

Mindful that public finance is at least nominally cheaper than private finance, some projects are being designed to use a mixture of public and private finance. An increasingly common way of doing so is to compensate the concessionaire with a combination of milestone or progress payments and availability payments. The milestone payments are typically paid during construction and financed with inexpensive public debt while the availability payments are paid once the facility is in service and financed with private equity and debt.

The effect of such mixed finance can be to reduce the private investor's stake in the project to dangerously low levels. Imagine a concession for a bridge that costs \$1 billion to build where the construction and operating costs are to be repaid over several decades through availability payments financed with 70 percent private debt and 30 percent private equity. If instead half of the construction costs are repaid through progress payments during construction, the balance is repaid through availability payments over several decades and the 70–30 mix of debt and equity is retained, then effectively the equity investor would be left with only a 15 percent stake in a \$1 billion project. Lenders might insist on a larger equity share to compensate, but if not, the incentive of the concessionaire to walk away from serious problems would be significantly increased.

There are many anecdotes but little systematic evidence on the extent to which P3s generate real efficiency gains. Most Canadian provinces and a few US states require so-called “value for money” analyses to test whether a partnership would be cheaper than a traditional procurement before any partnership is approved. Those cost comparisons are difficult to do well, however, especially valuing the savings to the public sector from any risks transferred to the private partner. Moreover, their accuracy is hard to test in that only one of the two options will ever be built.

Several studies have attempted to match projects procured through P3s with otherwise similar projects procured through traditional approaches, and they find that the P3 projects are more likely to be built and opened on time and within budget. Most of the projects involve schools, hospitals, and other accommodations, although there is no reason to believe their results would not apply to highways. A more troublesome concern is that they examine only construction costs and timeliness. While savings in construction costs and putting the asset in service more quickly are classic efficiency gains, partnerships in infrastructure are advanced in part on the hope of lifecycle cost savings. And lifecycle savings are hard to observe because partnerships have not been around for long.

It is important to understand that the profitability of the concessionaire or lessee is not necessarily an indication of whether the project has generated real efficiency gains for society. The concessionaire's profits are potentially misleading in that they include only those costs and benefits that affect the concessionaire financially. What is needed is a social benefit-cost analysis that counts benefits and costs to whomsoever they accrue and whether they are measured in monetary terms or not. A highway lease could be highly profitable but cause real efficiency losses if, for example, the lessor sought to increase the upfront payment by raising toll rates to the point where the highway was underutilized while parallel roads were highly congested. And a lease could be highly unprofitable but generate real efficiency gains if the winning bidder was simply over-optimistic.

In sum, the key is to look for projects where there is reason to believe that the private provider can offer real efficiency gains and is not just in the business of borrowing money or promoting transfers.

DESIGNING CONTRACTS

The Role of Contracts. A second concern is the design of the concession and lease contracts that are used to implement these partnerships. Formal contracts are typically used for partnerships in infrastructure because highways and other forms of infrastructure are often thought to have the characteristics of natural monopoly.

A natural monopoly occurs when the economies of scale for producing a service are so large that the least-cost way of serving a market is through a single firm. If there are also no close substitutes for the service in question, then the firm may be able to exploit its position by charging tariffs well above its costs. High-performance highways typically enjoy economies of scale in that capacity often increases faster than cost as the road is widened or otherwise improved. And while there is competition from parallel roads or other modes of transport, the alternatives are not always attractive enough to prevent a toll-road operator from exercising market power.

Competitively procured concession or lease contracts offer a simple, transparent, and fair method of setting tariffs and service standards for a natural monopoly. These contracts attempt to prevent opportunistic behaviour by describing completely the obligations of the government and the private partner to one another. The usual concern is that the private partner will be vulnerable to the government because the investments the partner typically makes are durable and immobile. But the durability and immobility of the investments also make the government vulnerable to the private partner in that once those assets are in place the threat of entry by a competitor is much reduced. If the contract is competitively procured, then the public has some assurance that the terms are fair. And if the contract expires and is rebid periodically, then the terms will be up to date.

The Problem of Incomplete Contracts. A key drawback of the contractual approach is the risk that the contract will prove to be incomplete in some important way. A contract is incomplete if it fails to foresee some significant relevant development and provide an appropriate contingency for it. For example, traffic growth might be faster than expected so that the widening of the highway is needed sooner than anticipated.

If a contract proves to be incomplete in an important way, then the parties face a difficult choice of either (1) living with the shortcomings until the contract is scheduled to expire and can be rebid, or (2) renegotiating the contract before its expiration but without the protection of competitive bidding. Renegotiation may set a bad precedent by establishing the expectation that bids don't have to be realistic because they can be renegotiated if trouble arises. And renegotiation may undermine popular support for P3s, particularly in countries where citizens have less faith in the integrity of their government officials than they do in Canada or the United States.

The risk of an incomplete contract is obviously lower if the relevant technological, economic, and political environments of the project are stable so that it is

easier to predict the services that are likely to be desired in the future. The risk also falls to the extent that the project is standalone, in the sense that its success does not depend critically on the performance of many other actors. And perhaps most obvious, the risk decreases the shorter the term of the contract, since it is easier to foresee the near than the distant future.

By these standards the risk of an incomplete contract should be relatively low for highways in North America. Highway technology is relatively stable, at least compared to other forms of infrastructure, notably telecommunications and energy, as is the economic and political environment in North America, at least compared to that of many developing countries. Moreover, while a highway project often depends on access or connecting roads to feed it traffic and on limiting competition from parallel roads, these vulnerabilities are often manageable. Contracts can specify the standards to which key feeder and parallel routes should be maintained, for example, and who is responsible for meeting those standards. Or if specifying the standards for the life of the contract is too difficult, the government can take the demand risk by providing compensation based on the availability of the highway rather than actual traffic volumes. Managing the interfaces between the concessionaire or lessee and other relevant parties is not easy in highways, but the task is generally more obvious and tractable than in other forms of infrastructure.

A key problem, however, is that the lease and concession contracts in highways are often for fairly long terms. Of the twenty-five significant projects, for example, nine have contracts for fifty years or longer including three for ninety-nine years (Highway 407, Chicago Skyway, Northwest Parkway) and another three for seventy-three or seventy-five years. It is hard to imagine that these contracts will survive intact for fifty years, never mind for seventy-five or ninety-nine. Most of the extremely long-lived contracts are for asset-recycling projects where the desire to maximize the upfront payment appears to have overwhelmed realistic considerations of contractual completeness.

Among the remaining sixteen projects with contracts under fifty years, the shortest are two for thirty years, with most clustering around thirty-five to forty years. Many of these are greenfield projects where the main consideration probably was to set a time period long enough to recoup the capital investment without charging very high tolls. But even thirty to thirty-five years seems a long time to expect a contract to survive.

Solutions. Obviously it is important to try to foresee the important possibilities and write workable contingencies into the contract. But it will be difficult to foresee every eventuality even for a relatively simple concession in a comparatively stable environment. And even if one could identify all the uncertainties, inserting many contingencies can make the contract so complex that it introduces rigidities and vulnerabilities that are poorly understood.

Another possibility is to reduce the duration of the contracts. Relatively short contracts of twenty to twenty-five years might reduce the risk of incompleteness considerably without sacrificing greatly on upfront payments or reasonable tolls.

If the weighted average cost of private capital is 8 percent, for example, then shortening the life of a lease from thirty-five to twenty-five years would reduce the present value of equal annual availability payments by only 8.5 percent. And if one considers only returns to equity and where equity expects a return of 12 percent, then shortening the lease from thirty-five to twenty-five years reduces the present value of payments by only 5.2 percent.⁸ It is hard to know how much a twenty-five-year concession would reduce the risk of incompleteness, but the cost seems modest in terms of the reduced upfront payment or construction cost that partnership could support.

If the duration of the concessions is not reduced, then more attention should be devoted to various forms of dispute resolution in the contract, particularly buyout clauses and arbitration. Buyout clauses are important because they provide the government and the concessionaire an option to resolve unanticipated problems by ending the contract early and perhaps auctioning it again with revised terms. Most of the focus is on clauses that specify the compensation that the government must pay in the event that it terminates the contract for its convenience rather than for cause. Often the outstanding debt is paid in full and equity is compensated on a sliding scale depending on how long the concession has been in operation or the dividends actually distributed. Devising a formula for equity compensation that is fair is not easy, however.

A concession scheme created by Eduardo Engel provides a clever, simple, and fair method for determining compensation. In Engel's scheme the concession is awarded competitively to the bidder who requires payments that have the least present value at a specified discount rate. (The payments can be either toll revenues or availability payments, depending on whether the government wants to assume the demand risk.) The concession reverts to the government when the concessionaire has received the amount it bid. If the government wants to terminate the contract early, it simply pays the outstanding balance of the least present value. Concessionaires don't like this scheme because it caps the upside potential, but it has been used in a number of Latin American countries.

Buyout clauses for concessionaires have received less attention perhaps because the concessionaires can, and often do, respond to serious unanticipated problems by declaring bankruptcy or a financial restructuring in which the equity investors lose all or much of their investment. If other investors buy the concession from its original owners and assume its obligations to the government, they presumably pay a price discounted for the cost of the unanticipated difficulties.

Arbitration is of interest because it provides an opportunity to fashion remedies for unanticipated difficulties that are less draconian than buyouts. However, devising

8. At 8 percent interest the present value of an annuity of \$1 for thirty-five years is \$9.16 while \$1 for twenty-five years is worth \$8.78. At 12 percent interest, the present values are \$12.59 and \$11.53 respectively.

an arbitration scheme that both parties will be willing to use when the stakes are high is particularly difficult. For example, conventional three-person arbitration panels—where each party chooses a member and the two members must agree on a third—are often seen as risky since the decision seems likely to hinge heavily on the views of the third member. Best-and-final-offer arbitration—where the arbitrator must choose between the best and final offers of each party, without revisions—is more attractive because it encourages both parties to be reasonable, although it may leave the more risk-averse party at a disadvantage.

Among the twenty-five significant highway P3s, there are only two cases where the government bought out the concessionaire but ten cases where the concessionaire has declared bankruptcy or has undergone a significant financial restructuring (counting the early Mexico program as a single case). One government buyout was for the SR-91 express lanes and occurred because the Orange County Transportation Authority wanted to increase the number of general-purpose lanes on the highway to cope with unexpectedly rapid traffic growth but the terms of the concession prohibited it from doing so. The second buyout was of SR-125, a ten-mile toll road in San Diego that had gone bankrupt; in this case the San Diego Association of Governments took advantage of the bankruptcy to buy the road for roughly one-third of what it had cost the private concessionaire to build in order to ensure that future tolls would be reasonable. The ten financial restructurings are typically the result of shortfalls in traffic and thus are not so much the product of unforeseen problems as an overly optimistic assessment of the severity of a widely recognized problem.

This pattern of more bankruptcies than government buyouts presumably reflects in part the fact that many of the twenty-five P3s were awarded only recently, and the private party almost always assumes the risk of construction-cost overruns and often the risks of demand shortfalls as well—both risks that are resolved soon after the project is open to traffic. Over time one would expect government initiated buyouts or renegotiation to become more common.

CONCLUSIONS

Public-private partnerships in infrastructure are still something of a novelty in North America, although arguably less so in highways than in other sectors. Highway P3s began only in the late 1980s and, Mexico aside, accounted for only a handful of projects as late as the 1990s. And in the United States the prohibition on collecting tolls on those portions of the Interstate and Defense Highway System that were built using federal gas taxes continues to limit the possibilities.

There has been no careful ex-post empirical evaluation of the experience with highway P3s in North America. Part of the problem is that it is a little early for an evaluation because most of the highways involve long-term investments but many

have only just recently reached financial close or opened to traffic. Evaluation is further complicated by the fact that the projects selected for P3s often involve difficult or unusual construction challenges that make it hard to identify for comparison purposes similar projects that were procured with traditional procedures.

Nevertheless, both the North American experience and common sense suggest that highway P3s are more likely to be economically sensible and politically acceptable if the partnerships are designed primarily as a means of increasing real efficiency in the delivery of infrastructure services and not simply as vehicles for accessing private capital markets or alleviating immediate budget problems. If the main purpose of a P3 is to borrow money, then issuing government bonds is a less cumbersome and often cheaper way to do so. And if the main purpose is simply to transfer resources from one party to another, as in some of the more aggressive asset-recycling projects, then the P3 is likely to be politically controversial. Real efficiency gains are the only way that all or most of those affected by a project might benefit.

If we are to expand the use of P3s in infrastructure, however, we should take care to draft contracts between the public and private partners that reduce the risk that the terms eventually prove so unworkable for one or both parties that they lead to potentially controversial renegotiations. Incomplete contracts have been less of a problem for government than for concessionaires, although they are likely to become more common for government as the concessions age. Both parties should work hard to identify the problems that might arise and provide workable contingencies in the contracts. But recognizing that it is hard to foresee all the problems that might arise, they should also consider somewhat shorter contracts to reduce the risk of unanticipated problems and include workable buyout or arbitration clauses to deal with unanticipated problems.