Can P3s Contribute to the Upgrade of Canada's Asia-Pacific Trade Infrastructure?

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ABSTRACT

The expansion of Canada’s Asia-Pacific trade is likely to continue over the foreseeable future. Investments in gateway and related corridor infrastructure may be publicly funded, privately funded or it may be some combination of both. Given provincial and federal governments’ desires to minimize current expenditures, public-private partnerships (P3s) are a likely mechanism. This article reviews the theoretical reasons for public funding of tangible and intangible infrastructure investments and discusses the potential role for P3s. It also reviews the recent evidence concerning the use of P3s in Canada. While P3s are politically attractive, there are a number of concerns over their use. In particular, they do not work well when governments attempt to transfer all of the risks to a P3.

1. INTRODUCTION

The expansion of Canada’s Asia-Pacific trade is likely to continue for the foreseeable future. Although there is some debate whether Canada currently suffers from any significant aggregate infrastructure deficit (Gillen, 2001; Swimmer, 2001), there is surely a need for new capital investments in gateway and related corridor infrastructure on the west coast as trade with Asia increases quite rapidly. Both the federal government and the government of British Columbia have specifically committed to a set of policy measures that focus on facilitating trade with the Asia-Pacific region. However, just because governments are going to either spend or “incentivize” funds, does not mean that they should. The appropriate government action depends on the nature and extent of the market failures and what specific options they plan to pursue.

The rationale for significant public funding for gateway and corridor infrastructure may be strong on both theoretical grounds and on applied cost-benefit grounds (positive expected net social benefits). However, a major problem is governments’ constrained fiscal capacities and their political incentives to avoid current budget outlays. A federal conservative government is likely to be reluctant to
provide large direct subsidies for major infrastructure projects (except while in election mode!). It is more likely to provide encouragement through other mechanisms that provide incentives for private sector actors to fund these capital investments.

One particular option it is likely to favour is public-private partnerships (P3s). The use of P3s is a growing around the world: “opportunities for the private sector to invest in public-transportation infrastructure through public-private partnerships are likely to be worth more than $330 billion from 2005 to 2010, accelerating a growth trend that began in the mis-1990s” (Cheatam and Oblin, 2007). P3s are becoming popular globally for a number of reasons. (All) governments normally prefer off-budget expenditures to on-budget expenditures because stakeholders receive infrastructure benefits, and are less likely to perceive the (deferred) costs. Furthermore, holding everything else constant, current governments prefer expenditures that appear in future budgets (with potentially different politicians) to present expenditures. P3s deliver on these dimensions, although they are not the only mechanism that does so. In addition, P3s are likely to appeal to right-of centre governments that have a natural preference for using private-sector mechanisms and institutions, both for ideological reasons and due to an expectation of greater efficiency.

Hope floats, but is it justified? As we explore in this article, the use of P3s for gateway and corridor infrastructure raises many of the same issues as it does in other circumstances. The first issue that requires consideration in any project proposal is whether the public sector should be involved at all. As we discuss in Section 2, where markets work well—that is, where there is no “market failure”—there is little justification for government financing or provision of any other assistance. Many small capital investments fall into this category. For these kinds of investments, profit-maximizing private firms have the correct incentives, and private and public interests mesh. Where there are market failures, in contrast, private sector firms and governments will normally have conflicting objectives and there is a prima facie rationale for government intervention. Private-sector profit maximization would result in inefficient prices and output levels. Of course, this does not necessarily imply that there should be some form of government intervention—much depends on the particular alternative mechanisms, the pricing policies and other factors. Nonetheless, moderate or severe market failure provides a rationale for some form of government intervention.

The second issue, and the major focus of this article, is the appropriateness of P3s as a useful instrument for dealing with market failures in particular instances. We address this issue in the three following sections. In Section 3, we consider the commonly posited (normative) rationales for P3s as a legitimate policy instrument. We conclude that several of these rationales are not valid. This is especially so with respect to the rationale based on moving infrastructure expenditures off public budgets. The primary legitimate rationale for a P3 is its potential ability to deliver projects at lower cost or superior value due to superior private-sector incentives or expertise. However, just because the private sector can deliver a project at lower cost does not mean that it should be done as a P3. For one thing, the cost savings may not be passed on to the public sector. We argue that governments should pick the policy instrument or mechanism that minimizes total social costs, which are defined as production costs incurred by government, plus transaction costs, plus (net) negative externalities, holding quality constant. In Section 4, we adopt a positive perspective.
We specify objective functions for the public and private participants and examine the conditions under which P3s make sense from a social perspective. The cost-lowering goal of public sector actors may waver with political realities or it may conflict with the goal of the private partners. In some circumstances, which we spell-out in some detail, the transactions costs of a P3 will be high and this form should not be adopted. Finally, in Section 5 we review the recent Canadian experience with P3s and make the case that this experience is broadly consistent with the positive perspective presented in Section 4. Section 6 presents some conclusions and very briefly mentions some alternative mechanisms for delivering needed gateway and corridor infrastructure.

2. MARKET FAILURES AND GATEWAY INFRASTRUCTURE

In order to justify any government intervention, the case for market failure needs to be made. A priori, government should normally assume there is “no market failure”, unless there is fairly clear evidence to the contrary. The presence of market failure provides a *prima facie* rationale for government involvement. But, it is only an a priori assessment: social cost-benefit analysis or other analysis is then required to decide among alternative strategies (Boardman et al., 2006). In practice, the nature, extent and severity of the market failure will affect the desirability of engaging in any kind of public intervention, including a P3. This section discusses market failures that pertain to some gateway or corridor projects: public goods, imperfect competition and externalities. It then classifies different gateway and corridor projects in terms of these failures.

2.1 Market Failures Pertaining to Gateway Projects

Many gateway and corridor projects have public good characteristics. By definition, public goods display some combination of *non-rivalry* (in consumption) and *non-excludability* (Weimer and Vining, 2005). A perfectly non-rivalrous good is one whose consumption by one person does not decrease the consumption by any other. In such cases, discouraging consumption (through positive pricing, for example) involves some social cost. An (uncongested) highway, for example, is non-rivalrous in consumption and should be provided at a zero price (toll). As congestion increases, social costs increase and tolls should rise. Many forms of infrastructure are prone to congestion at some times, but not others, which implies that different peak and off-peak tolls are required to maximize efficiency (Boardman and Lave, 1977; Winston, 1991). A non-excludable good is one whose consumption cannot be easily denied to anyone. Once it has been provided to one person, others can free ride. In such cases, private firms cannot usually capture sufficient revenues to justify the cost of providing the good. On some highways, it is practical to install toll booths at all points of entry and thereby deny access to drivers who want to free ride. Thus, the highway becomes excludable and private provision may be possible, possibly preferable. For most urban roads, however, doing this has been prohibitively costly, normally resulting in government provision.

The public goods concept is not only relevant to the tangible, or physical, aspects of infrastructure. Many aspects of regulatory oversight relating to, for example, safety, sub-system reliability and system integration have public good characteristics. Individuals and private-sector firms will have an incentive to free ride...
and not to invest in such services. These intangible goods will be undersupplied by the private sector.

Imperfect competition can arise in a number of different ways. Natural monopoly is one form of imperfect competition that is pervasive to infrastructure. In this situation, a single supplier can realize lower average costs than could multiple suppliers. These “businesses” are characterized by large up-front capital costs and significant economies of scale. Where the private sector is willing to make the initial investment, it will have incentives to profit maximize, resulting in prices that are higher than desirable and output that is lower than desirable. Under these circumstances, government regulation or government provision has the potential to improve allocative efficiency. However, problems of technical inefficiency are likely to arise in these situations, especially when governments provide infrastructure (Frantz, 1992).

Another form of market failure that arises from imperfect competition is more subtle. In large infrastructure projects, it is often necessary to assemble large areas of land. Knowing this, owners of relatively small parcels of land could act strategically and hold-up private developers, demanding excessive prices. One solution is to provide government with eminent domain for land assembly and the acquisition of right of ways (Munch, 1976).

A third market failure results from externalities. As discussed earlier in this section, congestion on highways imposes social costs on users. Ports, airports and corridors are also susceptible to congestion at certain times. Pricing (tolls) is often the preferred method of reducing such congestion externalities.

Gateway and corridor projects may also generate other forms of externalities. New, large, unique infrastructure projects may require substantial learning (investment in human capital). Such learning can be beneficial for subsequent projects. However, if private sector participants are not sure they will “win” the subsequent projects, they will be reluctant to invest in projects with substantial learning. Government may wish to stimulate projects that provide these positive externalities though subsidies or training programs. These externalities can be thought of as a form of human capital externality and may have broader economic benefits to the economy as a whole (Lucas, 1988; Barro, 2001).

Some infrastructure projects exhibit network externalities or agglomeration effects (Button, 2006). These effects are most likely to arise in “corridor” projects, or projects that combine corridor and gateway elements. Network economies may be related either to straightforward demand economies of scale (where unit costs decrease as the size of the network increase) or economies of density (where the benefits increase with the number of nodes on a given corridor or where the benefits increase as the distances between the nodes decrease). Small, but growing, corridors (networks) with few nodes (gateways, for example) or small catchment areas are examples of the latter.

2.2 A Classification of Gateway Projects

The degree to which gateway infrastructure “markets” suffer from the market failures discussed above varies considerably. At one end of the spectrum, for example, there will be markets with pure public good characteristics and private sector organizations are unlikely to supply the goods. At the other end of the spectrum, the market failures
may be relatively minor and there may be close to optimal private-sector supply.

Table 1 classifies gateway and infrastructure projects according to their type and the extent of the market failure. Type of infrastructure is categorized as physical infrastructure or intangible infrastructure, as shown on the horizontal axis. Market failure is categorized into three levels of severity (high, medium and low), as shown on the vertical axis. Each cell in the table contains a few illustrative examples of the kind of infrastructure involved as well as a summary in bullet form of some of the most important relevant public policy issues pertaining to that cell. The top four cells involving moderate or severe market failure are the relevant ones and are discussed below. The cells involving low market failures are included in the table for completeness. Here, private sector provision generally works reasonably well. The primary role of government is related to its general watchdog role.

Table 1: A Classification of Gateway and Corridor Infrastructure Projects by Level of Market Failure and Type of Project

<table>
<thead>
<tr>
<th>Severe market failure</th>
<th>Physical Infrastructure</th>
<th>Intangible Infrastructure</th>
</tr>
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<tbody>
<tr>
<td>Large metropolitan airports and seaports; some rail infrastructure (e.g. RAV project); most urban roads systems</td>
<td>Regulatory functions (e.g. Marine safety); Inter-modal integration; Port authorities</td>
<td></td>
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<tr>
<td>Public supply versus tendering for private supply versus P3; evaluation of willingness-to-pay and determination of optimum supply, public sector governance (e.g., monitoring quality)</td>
<td>Extent of public support, measurement of productivity of alternate teaching methods, public sector governance (e.g. public sector salary determination, degree of budgetary devolution, role of charter schools and vouchers)</td>
<td></td>
</tr>
<tr>
<td>Moderate market failure</td>
<td>Some airports and seaports; some rail infrastructure; large container facilities</td>
<td>Facilitating Trade; Training; Learning (education)</td>
</tr>
<tr>
<td>Potential for privatization design of efficient regulatory system, public sector governance (e.g., provincial versus federal responsibility, design of commercial Crown corporations)</td>
<td>Assuring productivity of public supply pricing (e.g., setting tuition fees), public sector governance (e.g., degree of autonomy granted to universities and colleges)</td>
<td></td>
</tr>
<tr>
<td>Low market failure</td>
<td>Small container loading and unloading facilities; Trucking</td>
<td>Asian language/cultural awareness training</td>
</tr>
<tr>
<td>Need to ensure maintenance of competition</td>
<td></td>
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Severe Market Failure / Physical Infrastructure

There are two categories of severe market failure: natural monopoly and public goods. Regarding the first category, some international (long-runway) airports have a *de facto* regional monopoly. A “first-mover” airport in a large metropolitan region was usually started before massive regional growth. It typically expanded as the region expanded, making it difficult for a competing airport to enter. The further the metropolitan area is removed from other metropolitan areas, the greater the monopoly power. Many major seaports also have *de facto* regional monopolies as they face limited competition—for example, Seattle and San Francisco are a fair distance away from Vancouver and are in a different country. These seaports are not really competitors to each another for destination traffic. Additionally, there are few close substitutes (alternative modes), for most major regional ports or airports: it tends to make sense to transport most products by either air or ship, not both.

A privately owned monopoly airport or seaport would have extensive pricing power. It would raise prices above socially efficient levels and would almost certainly engage in (rent-extracting) price discrimination. This raises the question of the appropriateness of some form of public ownership. However, the evidence suggests that this is not a panacea. Maintaining technical efficiency over time is a continuing issue (Johnson and Libecap 1989; Frantz, 1992; Globerman and Vining 1996). Also, public managers may pursue a variety of goals unrelated to efficiency. While they may have little incentive to monopoly price in the conventional sense, they may still have institutional incentives to over-charge relative to the social optimum. For example, commentators outside Toronto have vocally criticized Pearson Airport’s intention to impose a tax on transiting passengers.

The second category of severe market failure is public goods. Road systems and some railed urban passenger transit systems (e.g., the Canada (RAV) Line in Vancouver) projects have public good characteristics. As discussed above, they have tended to be provided by the public sector, though in some circumstances (if density is high and it is possible to exclude free riders), parts of such systems might be provided by the private sector.

Severe Market Failure / Intangible Infrastructure

Market failure is likely to be most severe for functions that integrate corridor and gateways, such as such as intermodal integration of highways and ports. Although they may own some land and operate some loading and unloading facilities, port authorities basically provide a form of intermediation or brokerage. Also, many regulatory oversight, security and safety functions have pure public good characteristics. When things are going well, there is little (interest group) attention on these functions because there is no apparent need for them. Therefore, there is often resistance from beneficiaries to paying for them. However, the need for government pro-activeness (being “ahead of the curve”) is likely to be great because growth leads to a variety of increased risks (e.g., bottlenecks, congestion, congestion accidents) and when there are problems, they can be severe. This cell presents the strongest case for direct government provision.
**Moderate Market Failure / Physical Infrastructure**

In this cell there is some limited competition as there are reasonably close substitutes or there is a credible threat of entry (contestability). Thus the potential to act like a monopolist and raise prices above competitive levels is constrained to some extent. For example, there is considerable competition among airports in the United Kingdom, as they are quite close to one another, although competition is dampened by the fact that one company (BAA) operates many of them. Specialized port facilities are also often reasonably competitive because of upstream and downstream competitive pressures (e.g. Westport Coal terminal).

Since market failure is less severe than in the cell above, the potential for private sector solutions is greater. However, when private firms supply infrastructure with moderate market failure, public policymakers face a balancing act. They must choose a regulatory regime bearing in mind an inevitable tradeoff: “aggressive” regulation may avoid most market failure outcomes, but may induce government failure. Politically induced inefficiencies may be worse than those caused by market failure (Gomez-Ibanez and Meyer, 1993; Bowden and Klay, 1996; Engel, Fischer, and Galetovic, 1997). In some circumstances, it may be more efficient to have no government intervention at all.

Negative externalities may also be an important issue in this cell. In principle, port authorities collect revenues from private operators (e.g. wharf renters) and use the revenues to “balance” local needs, i.e., to eliminate or minimize negative externalities. Consequently the idea of transferring the management of such facilities to nonprofit corporations whose directors represent local interest groups makes some sense. However, local interest group owners tend to ignore costs or benefits that are borne outside their locality. In response to such issues, various federal ministers of transport have proposed new legislation regarding airport governance, for example (Constantineau, 2001). If, on the other hand, these operations were fully privatized, there might be more responsiveness to some users, e.g., airlines or passengers, but other stakeholders might be ignored (e.g. providers of complementary services, such as cruise ship operators or other local businesses). Also, as discussed above, users may be over-charged.

**Moderate Market Failure / Intangible Infrastructure**

A number of different intangible infrastructure services have moderate market failure characteristics. The two major categories are “trade juicing” functions and various aspects of training, education and project learning. Trade juicing includes the supply of cross-cultural awareness, brokering personal contacts, providing interim financing, ensuring quality control, facilitating border crossings, and getting payment. Private sector firms may provide some of these services, but there may be asymmetric information problems concerning the choice of provider, especially when dealing with firms in undeveloped countries.

Externalities also arise in this cell. There is considerable evidence that training, education and learning has extensive positive externalities (beyond those accruing directly to the recipients in enhanced learning), including a positive effect on economic growth (Barro, 2001, but see Heckman and Klenow, 1997). Consequently, governments should (and do) engage in these activities. However, the rationale for extensive government involvement must be looked at on a case-by-case basis. General business and language training are not subject to this level of market failure and
belong in the cell below. Moderate market failures are more likely with specialized education related to gateways and corridors, such as civil engineering. Here, the real issue is the dynamic one: whether existing public education institutions given rigid budgets and a non-competitive culture can adjust quickly to changing needs. If they can, there may be no need for government provision.

2.3 Conclusion on Market Failures and Implications for the Use of P3s

Many gateway and corridor infrastructure projects exhibit moderate to severe market failures. Thus there is a large potential role for government intervention. However, the need for government intervention and the appropriate role of government varies between the cells and even within the cells - from project to project. Thus, the potential use of P3s is also likely to vary from project to project. It is clear, though, that P3s are not likely to be used in the top right-hand cell (severe market failure, intangible infrastructure); and direct government provision is likely due to the public good problem. In the middle right hand cell (moderate market failure, intangible infrastructure), the private sector may provide some goods (if they can make a profit) while government will provide others. The major impetus for P3s will be for physical infrastructure projects. These projects tend to be capital-intensive and involve large “up-front” expenditures. While the life-cycle costs and expenditures costs of intangible infrastructure “projects” can exceed those of major physical projects, they typically have much lower up-front costs and incremental intangible infrastructure investments will tend to come (or not come!) from within existing institutional budgets. Our expectation that P3s will be used primarily for physical infrastructure is consistent with the evidence of the use of P3s in Canada and other countries (see below).

P3s make potential normative sense for infrastructure projects with moderate to severe market failures. However, whether they should be used in these circumstances requires further analysis: “The devil is in the details.” In the next three sections, we consider these details. In the first of these three sections (Section 3), we consider the normative arguments that have been put forward as to why the P3 form is a legitimate public policy instrument. In the second of them (Section 4), we sketch a positive perspective on P3s. This recognizes that governments as P3 partners may not always (or even often!) act as welfare-maximizing angels; they tend to act like vote-maximizing politicians. It also considers the goals of private partners in P3s. In the third (Section 5), we illustrate the positive perspective with a review of the recent history of some major P3s in Canada.

3. Government Rationales for P3s and Normative Considerations

Governments have articulated three major rationales for engaging in P3s (Vining, Boardman, and Poschmann, 2006; Vining and Boardman, 2008). The first rationale is the minimization of on-budget government expenditures and/or the desire not to increase current debt levels. The second derives from the private sector’s ability to provide goods or services at lower cost. The third rationale relates to the transfer of a variety of risks to the private sector (and implicitly to reduce government’s own risk). We consider each of these rationales in turn.

By using a P3, government does not have to pay significant up-front costs, but can spread them out over time. Thus, on-budget costs are minimized in the short run.
Furthermore, no debt shows up on the books either. Of course, it is theoretically possible (through an appropriate bond) to structure exactly the same annual cash payments with a government-only project, assuming (for the moment) that cost-efficiency and financing costs are the same. The difference is that in a government-only project the liabilities show up on the government budget books immediately. In a P3 they do not—government pays “as it goes.” However, since costs are not actually reduced, the normative basis of this rationale for P3s is weak. Of course, there is an obvious political advantage—governments are seen to provide services without appearing to incur costs. As we discuss further below, this is consistent with a public choice interpretation for the adoption of P3s: current politicians can provide voters with the benefits of projects and can defer the costs to future politicians or future (myopic) users.

The second rationale for P3s is that they can provide infrastructure and services at lower cost because the private sector is more technically efficient. There are a number of strands to this cost-superiority argument. The major argument is that private sector firms have superior scale, scope or learning economies because they are more specialized, larger and have more experience in the construction and operation of the relevant businesses. Another cost-superiority argument is that the private sector has superior incentives to minimize costs. Dosi (1988) argues that these superior incentives are likely to become most evident in the dynamic aspects of projects; for example, in a greater willingness to alter project specifications or to utilize new technologies to reduce costs. Also, the private sector may also have lower wage costs, possibly due to hiring non-union labour (Gregory and Borland, 1999).

A third rationale is that, through the use of P3s, governments can reduce their risk associated with construction cost overruns, higher than projected operating costs and lower usage levels (revenue). The private sector partner often engages in many similar projects simultaneously and can, therefore, spread the risk of a particular project over a number of other similar projects, although governments may have more ability to spread risks over a larger number of projects in total and a more varied set of projects. The U.K. government has been a leader in arguing that the various dimensions of risk transfer should be the primary goal of P3s (UKNAO, 1999; NHS, 1999; HM Treasury, 2000). Other governments also often start the P3 process by trumpeting the potential for risk transfer. Of course, a key question is: at what price?

Either way, however, risk transfer does not provide a strong normative justification for P3s, as it does not reduce risk per se, it only transfers it. This transfer might be normatively useful if the private sector is able to price the risk more effectively and thereby lower it. Usually, the private sector does have (or can more easily acquire) sophisticated financial instruments and better access to secondary markets that can allocate risks to parties most able to price and bear it efficiently.

Potentially more important for government, in a P3 it can transfer some political risks to the private sector, which does not directly face voters or other public “stakeholders.” Of course, the private sector may face some indirect political risk, but its greater distance from stakeholders tends to reduce the political risks. This argument suggests that there may be some risk lowering as well as risk transferring benefits. However, this is also not correct. Instead, costs have been shifted from government to consumers and other stakeholders who have less ability to accomplish their goals.
A fourth rationale, which is usually not articulated, is that governments believe (or at least want to believe) that private-sector operation makes it politically more feasible to impose user fees, resulting in lower net expenditures for government. The implicit reasoning is that the public is more willing to accept that the private sector must cover its costs, repay its debt or make a profit than they will accept the argument that the public sector needs to do so. Again, this may be a positive reason for P3s, but whether it has a strong normative rationale depends on the particular circumstances, specifically whether imposing fees would result in prices closer to marginal social cost.

A number of critics of P3s argue that the potential advantages of P3s are offset by the fact that financing costs will generally be lower for the public sector. Government bonds generally carry a lower interest rate than corporate bonds. Also, governments may have more ability to spread risk over a larger number of projects. However, de Bettignies and Ross (2004) conclude that it is not clear that governments are generally able to borrow at a lower cost than the private sector. Furthermore, there is a trend for some governments to provide equivalent tax-exempt status to P3 projects, further levelling the playing field on the financing dimension.

The second rationale is clearly the strongest on normative grounds and it is backed by extensive empirical evidence of superior private sector efficiency (Boardman and Vining, 1989) and governments’ underestimating project costs (Boardman, Mallory and Vining, 1994; Taylor, 1995; Flyvbjerg, Holm and Buhl, 2002; Altschuler and Luberoff, 2003; USGAO 2003; UKNAO 2003). However, it is not clear that technical efficiency is the correct normative criteria to use to decide whether to engage in a P3 or to appraise a P3. There are three major problems with it.

First, it is important to bear in mind that the first-order outcome of private sector cost-superiority is higher private sector profits rather than lower public sector costs. Government should consider its payments to the private sector, which include private-sector profits, not private-sector production costs per se. Although it can be somewhat confusing, when governments make payments to the private sector, as in a P3, these “production costs” refers to all payments to the private sector, including its profits. Second, as Williamson (1975) and others have emphasized, technical efficiency is concerned with production costs. It ignores transaction costs, which include the cost of negotiating, monitoring, and, if necessary, re-negotiating contracts with private sector partners, both ex ante (prior to the award of a contract) and ex post (after the contract has been let). Many of the transaction costs associated with projects are usually not included in government project budgets, although they may be captured in other government budgets, for example, in government legal and procurement departments. A full cost perspective implies that governments should choose the form that minimizes the sum of its production costs and transaction costs. However, even this does not cover all social costs: it omits, for example, the cost impact on consumers, which should be included in a comprehensive social accounting (Globerman and Vining, 1996). Boardman and Hewitt (2004) argue that government should minimize the sum of its production costs, plus transaction costs, plus (net) negative externalities, holding quality constant. We argue that this criterion is the most appropriate normative criterion by which to judge the appropriateness of using P3s versus any other form of provision. For convenience, we refer to the sum of these costs as total social costs.
4. ARE P3S THE ANSWER? SOME (HARD-NOSED) THEORY

This section sketches a positive theory perspective that attempts to determine whether and in what circumstances P3s will actually have lower total social costs (Boardman and Vining, 2008). It also throws some light on the non-efficiency rationales for P3s, in spite of their normative murkiness.

While the language of “partnership” is endemic to P3s our basic premise is that the public and private participants in a P3 have conflicting goals (Teisman and Klijn, 2002; Reeves, 2003; Trailer et al., 2004; Vining and Boardman, 2006) and that efforts to pursue these divergent goals are likely to raise transaction costs or to cause externalities. Private sector participants wish to maximize their risk-adjusted profits over and during the contract period. In contrast, public sector participants wish to minimize the sum of the current government’s expected short-term expenditures, on-the-books debt and political costs. The details in these objective functions are important, as they foreshadow the reasons for conflict and high transaction costs, both before, and after, contract agreement in P3s.

Private sector participants wish to maximize profits over and during the contract period. Rather obviously, they want to maximize the net present value of their profits ex ante. But also, if private sector actors can find ways to appropriate additional profits as a contract unfolds over time, they will seek to do so. Of course, if contracts are written very tightly, there will be little opportunity to do so. However, with complex infrastructure projects, the evidence suggests that there is often considerable scope to engage in opportunistic behaviour, especially when dealing with naive or myopic politicians.

Private sector participants maximize their risk-adjusted profits: they are willing to forego some profits if they can reduce risk sufficiently. Indeed, private sector participants may be more risk-averse than governments are in practice, at least ex ante. A major reason is that they bear the consequences directly and personally if they take risks that turn out badly. Therefore, private companies generally require high premiums to accept risk. They are especially reluctant to take on use risk (also often called revenue or demand risk) because they have less control over and are relatively unfamiliar with assessing the use risks associated with P3s. For example, a private operator that constructs and operates a toll highway will have little influence over regional transportation policy that might affect their toll revenues. Use risk is often potentially subject to ex post manipulation by the political partner. In order to accept such risks private partners will require a very large premium. Sophisticated private sector partners are likely to minimize their total risk by: (1) forming stand-alone P3 corporations (Brown, 2005; Hood, Fraser and McGarvey, 2006), thereby reducing their worst-case costs by declaring the stand-alone corporation bankrupt, if necessary (Quiggin, 2005), and/or (2) limiting their capital exposure through the utilization of extensive third-party debt financing (Roll and Verbeke, 1998; Brown, 2005).

The specific governmental objective function that we propose is to minimize the sum of current expected short-term expenditures, on-the-books debt and political costs. This suggests that governments are not primarily concerned with aggregate public sector budget expenditures, nor are they generally focused on minimizing total social costs. Rather, they focus on the political benefits that result from the minimization of both present expenditures and on-budget debt (Coghill and
Woodward, 2005). In general, vote-maximizing behaviour by politicians increases aggregate social costs (Hartle, 1988; Sproule-Jones, 1996).

Governments normally prefer off-budget expenditures and debt to on-budget expenditures and debt because voters receive infrastructure benefits, but are less likely to perceive the costs, a form of fiscal illusion (Joulfaian and Marlow, 1991). Furthermore, holding all else constant, a current government prefers future expenditures that appear in future budgets (with potentially different politicians) to present expenditures. While a government that expects to stay in power over several electoral cycles may have a lower discount rate than one that does not and will weight the cost of future expenditures more heavily, this is a fairly pervasive preference.

Governments trade-off the present political benefits that a “future expenditures and off-budget debt” mechanism, such as a P3, generates against other political costs. These “other” political costs could relate to public dissatisfaction with “letting the private sector gouge us”, whether through high user prices or poor service levels. Such costs, however, are typically discounted because they occur in the future. However, if they do occur, they can have high saliency. Evidence suggests that rising user fees often provoke voter discontent. When government’s face voter discontent, the private sector participant may be able to “hold-up” government and extract additional payments because governments (specifically, elected politicians) often panic in such situations.

Different goals imply that there will inherently be some conflict between the public and private partners. Attempts to avoid or mitigate such conflicts can result in high transaction costs, both in the pre-contract phase and the post-contract phase. The work of Williamson (1975), Globerman and Vining (1996), Boardman and Hewitt (2004), and Vining, Boardman and Poschmann (2006) suggests that the risk of hold-up is higher in any contractual situation when the degree of asset specificity is high, construction complexity (essentially whether the project involved a standard production technology) is high and transferred to the private partner, uncertainty (especially use risk) is high and transferred to the private partner, and the contract management skills of the government partner are low. When the risk of hold-up is high, transactions costs are also likely to be high. As we argue above, the success of a P3 depends on these transaction cost factors (as well as production costs, the extent to which externalities will be imposed on third parties, and quality).

This theory implies that the expected success of a P3 will depend on its particular characteristics. Furthermore, casual observation suggests that the “right” circumstances are not likely to prevail in many situations and, as a consequence, many P3s will fail. This prediction is consistent with a fair amount of emerging global evidence on P3s, which indicates considerable dissatisfaction with the outcomes of many P3s in a number of countries including the United Kingdom (Pollitt, 2005; Shaoul, 2005), Ireland (Reeves, 2003), the Netherlands (Klijn and Teisman, 2003), Denmark (Greve and Ejersbo, 2003) and Australia (Hodge, 2005).

5. THE EVIDENCE ON CANADIAN P3S

A number of projects with P3 characteristics began to emerge across Canada in the 1980s, but it was not until the mid-1990s that P3s really began to take hold. Here we provide a very brief overview of the major P3s that have been executed in Canada, and consider the evidence on their performance. Obviously, the latter purpose is the
most important going forward, as P3s may be a major mechanism for providing gateways and corridors.

P3s have been used for quite a few major infrastructure projects in Canada. These have been in many different areas, including transportation (roads, airports and bridges), water and wastewater, hospitals, recreation facilities, power and energy, and for other facilities (see Vining and Boardman, 2008, Table 2). In addition to these kinds of projects, P3s have been used to deliver many other smaller projects.

Unfortunately, independent studies of P3 performance are rare, and admittedly difficult. However, in Vining and Boardman (2008) we were able to review ten Canadian P3 projects in depth: Alberta Special Waste Management System, Confederation Bridge, Highway 407, Highway 104 Western Alignment Project, Evergreen Park School, O’Connell Drive Elementary School, Britannia Mine Water Treatment Plant, Moncton Water Treatment Facility, Cranbrook Multiplex and Waterloo Landfill Gas Power Plant. These projects were selected because of the availability of information, the size and profile of the projects, the jurisdictional coverage that they present and the lessons they offer for P3 contract theory, design and implementation. We do not maintain that these studies are representative of all P3s in Canada. Indeed it is quite possible that our set of P3s collectively performed worse than average.

Earlier we suggested that the appropriate test of success of a P3 is whether it has lower total social costs relative to the alternative, including production costs, transaction costs and externalities. Transaction costs are critical. As discussed earlier the factors that affect transaction costs are: the degree of asset specificity, construction complexity (essentially whether the project involved a standard production technology), whether construction cost risk is transferred to the private partner, use risk uncertainty, whether use is risk transferred to the private partner, and contract management skills of the government partner. Total social costs also depend on the extent to which externalities are imposed on third parties. Table 2 summarizes our assessment of the values of these transaction cost factors in each of the case studies and whether there are any negative externalities. The table also includes an estimate of the total level of transaction costs in each P3 and an overall assessment of “success”.

The overall results are mixed. Overall, four projects were successes, four were failures and two were qualifies successes or failures. All of these projects had high asset specificity. Thus, the likelihood of hold-up was high in all of these projects. Complexity refers to the difficulty of the project itself (e.g. whether it requires a new technology) and to the measurement of performance outcomes (e.g. whether construction was performed according to specifications). In infrastructure P3s, complexity pertains primarily to construction complexity. None of the projects studied were unique (i.e., especially different from previous projects), and quality was reasonably straightforward.

Thus, no project was highly complex. The school and building construction projects were low in complexity, while the highway projects, the bridge, and the water treatment plants were moderately complex. One might, therefore, expect that the public sector would have been able to transfer all of the construction risk to the private sector, but this did not occur in two of the case studies. To monitor and measure.
Can P3s Contribute to the Upgrade of Canada’s Asia-Pacific Trade Infrastructure?

Table 2: Assessment of Ten Canadian P3 Case Studies Based on Transaction Cost Factors

<table>
<thead>
<tr>
<th>Project P3</th>
<th>Asset Specificity</th>
<th>Construction Complexity</th>
<th>Cost Risk Transferred</th>
<th>Use Revenue Uncertainty</th>
<th>Use Risk Transferred</th>
<th>Gov. Contract Management Skills</th>
<th>Externaities or other Negative Events</th>
<th>Transaction Costs</th>
<th>Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alberta Special Waste Management System</td>
<td>Yes</td>
<td>Moderate</td>
<td>Partially</td>
<td>Moderate</td>
<td>Not for first 10 years</td>
<td>Poor</td>
<td>Yes</td>
<td>High</td>
<td>No</td>
</tr>
<tr>
<td>The Confederation Bridge</td>
<td>Yes</td>
<td>Moderate</td>
<td>Yes</td>
<td>High</td>
<td>Small (revenue guarantees)</td>
<td>Fair</td>
<td>Moderate</td>
<td>Qualified</td>
<td>Yes</td>
</tr>
<tr>
<td>Highway 407</td>
<td>Yes</td>
<td>Moderate</td>
<td>Yes</td>
<td>High</td>
<td>No</td>
<td>Poor</td>
<td>Yes</td>
<td>High</td>
<td>No</td>
</tr>
<tr>
<td>Highway 104</td>
<td>Yes</td>
<td>Moderate</td>
<td>Yes</td>
<td>High-Moderate</td>
<td>No</td>
<td>Fair</td>
<td>Toll level problems</td>
<td>Moderate</td>
<td>Qualified</td>
</tr>
<tr>
<td>Evergreen Park School</td>
<td>Yes</td>
<td>Low</td>
<td>Yes</td>
<td>Low</td>
<td>Yes</td>
<td>Fair</td>
<td>Moderate</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>O’Connell Drive Elementary School</td>
<td>Yes</td>
<td>Low</td>
<td>Yes, but costs high</td>
<td>Low</td>
<td>No</td>
<td>Poor</td>
<td>High</td>
<td>High</td>
<td>No</td>
</tr>
<tr>
<td>Britannia Mine Water Treatment Plant</td>
<td>Yes</td>
<td>Moderate</td>
<td>Yes</td>
<td>Moderate</td>
<td>Yes</td>
<td>Good</td>
<td>Low</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Moncton Water Treatment Facility</td>
<td>Yes</td>
<td>Moderate</td>
<td>Yes</td>
<td>Low</td>
<td>Partially</td>
<td>Good</td>
<td>Low</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Cranbrook Multiplex</td>
<td>Yes</td>
<td>Low</td>
<td>No, in effect</td>
<td>Moderate</td>
<td>Partially</td>
<td>Fair-Poor</td>
<td>High</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Waterloo Landfill Gas Power Plant</td>
<td>Yes</td>
<td>Low</td>
<td>Yes</td>
<td>Low</td>
<td>Yes</td>
<td>Good</td>
<td>Average</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

Source: Vining and Boardman (forthcoming)
In the Alberta Special Waste Management System, the government retained some construction cost risk due to poor contract management skills. In the Cranbrook Multiplex case, the government ended up paying for cost overruns, presumably because of a combination of poor contract management skills and changes in political costs.

Consideration of revenue risk is more complicated. While most of these projects appear to have been relatively predictable from a construction cost perspective, they were highly uncertain from a usage, and consequently, revenue perspective. Part of governments’ motivation for P3s have certainly been to transfer this risk to the private sector. However, it is not clear that the private sector is any more willing or able to accept this risk than the public sector. Also, the operating risk may be higher for the private sector than for government. This is because it is relatively easy for the government to affect usage, either positively or negatively. For example, the government compelled large trucks to use Highway 104, thereby helping its partner. But government can hurt its private sector “partner”.

Given that the private sector is not keen to take on revenue risk, it is not surprising that government has been unsuccessful in transferring this risk. Governments were able to transfer most of the use risk to the private sector for the Evergreen Park School and the Waterloo Landfill Gas Power plant, but the level of revenue uncertainty in both projects was low. Where the level of revenue uncertainty is high, as in the two highway projects and the confederation bridge, the private sector was simply not willing to assume revenue risk. Alberta Waste Management and Moncton Water treatment have medium uncertainty and some risk transfer. Britannia Mine and O’Connell Drive School may represent the outliers. However, The Britannia mine is in relatively early days and we do not yet have full information about this project. The O’Connell Drive school project clearly had poor government contract management. The Confederation Bridge, Highway 407 and Highway 104 are the three projects with the highest use uncertainty and also happen to be the largest projects. The private sector may be especially unwilling to take on revenue risk when projects are large.

The Alberta Special Waste Management example exhibited high transactions costs. These came about because asset specificity was high, complexity was moderate, use uncertainty was moderate and government contract management was poor. These factors, combined with attempts to pass on some but not all of the construction risk and use risk, led to negative externalities and high transactions costs. It is a clear failure from a social perspective. The Confederation Bridge had high asset specificity, moderate complexity and high use risk. Thus, there was the potential for high transaction costs. However, contract management effectiveness was fairly good and while the construction risk was transferred to the private sector, the use risk was not. As a result, the transaction costs were moderate and this project can be considered a qualified success. Highway 407 had high asset specificity, moderate complexity and high use uncertainty; consequently, like the Confederation Bridge, it potentially had high transaction costs. In this case, contract management effectiveness was also poor. The result was significant negative impacts on users of the highway and adjacent highways, which led to high transaction costs. Although the production costs were reasonable, the negative externalities and high transaction costs lead us to conclude that this project was “poor” from a social perspective.
CONCLUSION

Governments are likely to perceive P3s as an attractive candidate institutional mechanism for the delivery of capital-intensive gateway and corridor infrastructure over the next decade. This is especially likely to be the case in contexts where the demand for these investments and improvements are rising quickly, while government on-the-budget expenditures remain static or even decline (the most probable situation if the Conservative or Liberal parties achieve a sustainable majority government).

This article has explained why the P3 form can appear seductive to governments. But, we have also attempted to explain why P3s have a number of theoretical limitations that reduce the likelihood of success in specific circumstances. These limitations have been exemplified in the empirical Canadian evidence and elsewhere although we do not extensively review this evidence here.

P3s make the most sense when the private sector can construct and operate projects at lower cost, where it does not assume high use risk and where transactions costs are likely to be low. Our expectation is that most physical gateway and corridor infrastructure will not require the kind of unique expertise that can only be delivered by a small number of specialized private sector global firms (due to their superior cost efficiency). If this is the case, it would negate one of the primary appropriate normative motivations for P3s. Another pressing motivation for governments’ interest in the P3 is the “build now-somebody else pay later” syndrome. This can often lead to inefficient social pricing (see other articles in this conference). More fundamentally, though, this motive is not limited to P3s. Infrastructure capital pools with securitization or other financing mechanisms mean that more traditional forms of provision can have the same characteristic, negating another motive for P3s.

REFERENCES


