Public Works Management & Policy

Public––Private Partnerships : Eight Rules for Governments
Aidan R. Vining and Anthony E. Boardman
Public Works Management Policy 2008 13: 149
DOI: 10.1177/1087724X08323843

The online version of this article can be found at:
http://pwm.sagepub.com/content/13/2/149

Additional services and information for *Public Works Management & Policy* can be found at:

Email Alerts: http://pwm.sagepub.com/cgi/alerts

Subscriptions: http://pwm.sagepub.com/subscriptions

Reprints: http://www.sagepub.com/journalsReprints.nav

Permissions: http://www.sagepub.com/journalsPermissions.nav

Citations: http://pwm.sagepub.com/content/13/2/149.refs.html

>> Version of Record - Nov 20, 2008

What is This?

Public–Private Partnerships

Eight Rules for Governments

Aidan R. Vining
Simon Fraser University

Anthony E. Boardman
University of British Columbia

This article provides eight rules for government concerning the administration of public–private partnerships (P3s). The basis for these rules draws on transaction cost economics. First, however, the article provides some background on alternative modes for the provision of infrastructure and their associated transactions costs. Second, it outlines a positive theory perspective of P3s that takes into account the divergent goals of the partners in a P3 (the profit maximization goals of private sector participants, and the budgetary and political goals of public sector participants). This section throws light on the adoption and outcomes of P3s. Third, it shows that many aspects of the theory are illustrated in the Metronet (the London Underground P3) case, which went bankrupt in 2007. Finally, the article proposes rules that governments should follow in the P3 process if they wish to avoid high transaction costs and poor P3 outcomes.

Keywords: *public–private partnerships; administration; transaction costs; rules for government*

W elfare economics provides well-developed normative theory on *when* governments might intervene in markets in the presence of market failures. However, it provides much less guidance on *how* governments should intervene in such conditions (Vining & Weimer, 2005). For the provision of infrastructure, the need for government financing may be clear, but this does not mean that government provision is the optimal strategy. An important question for government is, "Which delivery mechanism (or mode) would make the most sense?"

There are three major options for infrastructure delivery (although each has many variations): direct public provision, contracting-out (i.e., design, build, transfer), or public–private partnerships (P3s). The first two modes can be thought of as the usual suspects. Direct government provision is, of course, a realistic option in many situations. This is especially true for large national governments because they have broad taxing powers and can achieve minimum efficient scale in both technical expertise and risk assessment. The Army Corps of Engineers is the exemplar of this approach. In addition, various forms of governmental corporations (corporatization) and

state-owned enterprises (SOEs) also fall under the direct government provision option (although often the corporate format is sometimes an attempt to obscure this reality). In the United States, this option is widely used for airport and seaport ownership and associated infrastructure provision. Throughout the 20th century, contracting-out was probably the most widely used format for the delivery of most major governmental infrastructure. More recently, P3s have come back in fashion not only in the United States but also around the world.[1]

149

What criteria should society use to judge the best way to provide infrastructure? From a normative perspective, one potential criterion is that governments should seek to minimize the sum of total social costs. More specifically in the context of infrastructure provision, Vining and Boardman (2008) argued that this means that governments should minimize the sum of the production costs they incurr (including payment to third parties), plus their transaction costs, plus (net) negative externalities, holding quality constant. As some of these costs, especially for major infrastructure projects, can occur over an extensive time period, government should seek to minimize the present value of these costs. This criterion emphasizes that in assessing the consequences of alternative ways to provide infrastructure, one should include all government transaction costs that derive from the project even if they do not appear in the project's budget. Also one should include all externalities and account for quality differences; these costs rarely show up in any budget.

Although this criterion may seem uncontroversial, in practice it is not. There are two reasons. First, the analysis of the choice of mode frequently concerns only production costs, and transaction and externality costs are ignored. However, these additional costs are likely to vary systematically across delivery modes and extant knowledge suggests that we can make some order-of-magnitude estimates of how these costs will vary across the three different delivery modes under particular circumstances. Needless to say, the inclusion of these costs could alter the ranking of delivery modes. Second, it is important to note that in a social cost-benefit analysis (CBA) of the project, payments between government and contractors would be treated as a cost to one and a benefit to the other and would therefore net out, that is, they are transfers.[2] The aggregate payment to the contractor may include a healthy profit for the contractor. This is a cost to government (and is important for deciding which mode to adopt), but is a benefit to the contracting company or their shareholders: It would be a transfer in a CBA. Similarly, tax reductions or exemptions on P3 projects may encourage more projects, but they are transfers (from government to investors) and do not represent incremental social benefits.

This article is organized as follows: The next section provides background on alternative modes of providing public services, specifically infrastructure, and their relationships to total social costs. Section 3 presents a positive theory perspective that attempts to throw light on both the adoption and the outcomes of P3s. It focuses on the objective functions of the public sector participant and private sector participant, and the potential conflict that may ensue. Section 4 examines the Metronet case (the London underground P3) in light of the positive theory perspective. Drawing on this evidence, Section 5 presents some rules for governments concerning the administration of P3s. Section 6 contains a brief conclusion.

Alternative Forms of Public Provision and Transaction Costs

When there is government provision, production costs will largely determine the total social costs. Because production is internalized, transaction costs are likely to be low (unless there is interagency conflict). On the other hand, considerable evidence suggests that production costs may be high because of managerial inefficiency; this is called X-inefficiency in the economics literature (Frantz, 1992). There is considerable evidence indicating that state-owned enterprises are less efficient than private corporations (Boardman & Vining, 1989; Vining & Boardman, 1992). Furthermore, there is extensive evidence that, in a wide variety of jurisdictions, large government infrastructure projects have often been way over budget (Altshuler & Luberoff, 2003; Arena, Leonard, Murray, & Younossi, 2006; Boardman, Mallery, & Vining, 1994; Flyvbjerg, Holm, & Buhl, 2005; Pickrell, 1990; Taylor, 1995; U.K. National Audit Office [UKNAO], 2003; U.S. Government Accounting Office [USGAO], 2003).

The evidence suggests that contracting-out can lower production costs because of competitive pressures that eliminate X-inefficiency (Hodge, 2000). Private firms may have lower production costs due to economies of scale (Williamson, 1975). But private production can raise transaction costs because government has to negotiate with, and monitor, suppliers who have their own (profit-maximizing) incentives (Globerman & Vining, 1996). Also, governments incur transaction costs when they have to maintain expertise to effectively monitor the P3 contract (Boardman & Hewitt, 2004). In some circumstances, they may also have to demonstrate the capability to produce in-house if necessary. Negative externalities may appear to be higher with private provision because the internalization of externalities usually raises production costs (van Bueren & Macdonald, 2004). However, Boardman and Hewitt (2004) found that negative externalities were higher for contracted out orderly services.

The total social costs of infrastructure projects are likely to be particularly high when projects are idiosyncratic, complex, and uncertain. Typically, there are few potential competitors to carry out such projects, before or after initiation, and this can be a problem (Hewitt & Boardman, 2006). Indeed, this has been a major rationale

for turning suppliers into partners. In addition, once begun, major infrastructure projects involve extensive asset specificity and sunk costs which can provide either public sector or private sector participants with opportunities for hold-up (opportunism) (Globerman & Vining, 1996; Williamson, 1975).

The Federal Highway Administration normally places design-build projects in the P3 category, but they are best thought of as contracting out because these kinds of contracts rarely involve "project aggregators and financiers" (explained later) as the major private sector partner. Transaction cost theory suggests that contracting costs are likely to be high when projects exhibit high asset specificity, high complexity or uncertainty, low competitiveness, and low government contract management skills (Boardman & Hewitt, 2004; Globerman & Vining, 1996; Williamson, 1975). Public sector infrastructure—such as roads, hospitals, and schools—usually involves considerable asset specificity. Most design work for a particular project is not useable for any other project and is therefore sunk (although knowledge and expertise that can be used elsewhere is not sunk). The value of infrastructure in other uses is very low and often negative. Thus transactions costs in these circumstances are likely to be quite high.

There is another form of contracting-out, which is also sometimes labeled as a P3 (again, the Federal Highway Administration comes to mind), but is essentially a franchising story. Here the government sells off the toll rights to an already built facility to a concessionaire in exchange for an up front payment or some mix of up-front payment and a share of ongoing tolls.[3] The Chicago Skyway and the Indiana Toll Road are examples of these kinds of arrangements. Obviously, the private toll operators are not concerned with setting tolls equal to marginal social costs. Indeed, they will pay large sums (US$3.8 billion in the case of the Indiana Toll Road) because they expect tolls to produce a positive net present value (NPV).

One might wonder why the governments would not introduce and collect these tolls. There are three related reasons. First, a current government prefers the money now. Selling to a concessionaire provides a revenue shot that can be used for other (vote gaining) purposes (Partially counterbalancing this are some political costs that arise because some users—often voters—know they will be paying more). Second, present and future governments find it difficult to be ruthless on raising tolls (or any other prices). The private sector has a greater incentive to be ruthless because they keep the fiscal residual (see, for example, Chong, Huet, Saussier, & Steiner, 2006). Furthermore, users may be more willing to accept paying tolls to a private sector operator. By taking the money up front, governments do not have to worry about the political costs of imposing subsequent toll increases (at least, they think they don't!). In other words, they solve their credible commitment problem. Third, these kinds of projects appear to be of relatively low, risk to the government. Almost by definition, these kinds of projects involve no construction risk; they are essentially financial (or, more accurately, refinancing) projects. The contract can contain a clause that ensures the facility reverts to the government if the concessionaire will not continue under the present terms of the agreement. However, even here, the evidence suggests there can be extensive renegotiation of these contracts driven by political electoral cycles and economic shocks, which then impinge on political costs (see below; Guasch, Laffont, & Straub, 2008). Furthermore, as we illustrate later in this article, these contracts are not without political risk.

The overall P3 story is similar to the contracting-out story: It's the transaction costs. We argue that to understand how transaction costs arise, it is essential to consider the conflicting goals of the partners in a P3. The relationship between the partners is longer-term and more complex than in most contracting-out situations. It is impossible to write complete contracts. Thus there is a longer time frame for opportunism to emerge from either side of the transaction. By understanding how transaction costs are determined, it is possible to develop some rules for government to minimize these costs—if governments can discipline themselves to impose them on themselves.

A Positive Theory Perspective on P3 Transaction Costs

Here we sketch a positive theory (also sometimes labeled a political economy or public choice) perspective that attempts to throw light on both the adoption and the outcomes of P3s. It is based on four sources of P3 material. First, a synthesis of our own previously published studies of P3s in North America (Boardman, Poschmann, & Vining, 2005; Vining & Boardman, 2008; Vining, Boardman, & Poschmann, 2006). Second, a consideration of recent water system P3 cases in Hamilton (Ontario) and Atlanta (Jehl, 2003; Ouyahia, 2006). Third, a review of the extensive global literature that includes studies of P3s in the United Kingdom (Broadbent, Gill, & Laughlin, 2003; Grout & Stevens, 2003; Pollitt, 2005; Pollock, Price, & Dunnigan, 2000; Shaoul, 2005, 2006), Ireland (Reeves, 2003), France (Chong et al., 2006), the Netherlands (Klijn & Teisman, 2003; Koppenjan, 2005), Denmark (Greve & Ejersbo, 2003), and Australia

(English, 2005; Hodge, 2005). Fourth, a recent P3 failure: the 2007 collapse of two London Underground (i.e., subway) P3s (Metronet). This case study is discussed in detail in the next section.

Although the language of partnership is endemic to P3s, the foundation of our positive theory perspective is that public and private participants have conflicting goals (Trailer, Rechner, & Hill, 2004). This divergence of goals is likely to raise transaction costs and lead to negative externalities or reductions in quality. Studies have shown that in other interorganizational contexts with conflicting goals, the result is often high contract bargaining costs, opportunistic behavior by one or both sides, failure to achieve goals, and partnership dissolution. For example, firms that are jointly owned by private shareholders and government can lead to the worst of both worlds, achieving neither high profitability nor worthwhile social goals (e.g., Boardman & Vining, 1989; Chui, 2003; Eckel & Vining, 1985; Sueyoshi, 1998). Contracting-out by government is also prone to the risk of hold-up and high bargaining costs (Boardman & Hewitt, 2004; Brown & Potoski, 2003). Even private sector joint ventures and alliances, where both partners have profit goals, also frequently experience high conflict, extensive opportunism, and high failure rates (Das, Sen, & Sangupta, 1998; Geringer & Hebert, 1991; Hansen, Hoskinsson, & Barney, 2008).

In P3s, conflict emanates from two factors: (a) the contract cannot be fully specified, or complete (Milgrom & Roberts, 1992, pp. 126-165); (b) the participants have differing objective functions (less formally, they have different goals). We begin with a discussion of the relevant objective functions.

The private sector participants wish to maximize risk-adjusted profits over the contract life. Given that the contract cannot be fully specified *ex ante*, this implies that private sector participants maximize the expected NPV of the contract at the beginning and at any other time during the life of the contract.

The public sector participants (in this case, it is primarily politicians rather than civil servants) wish to minimize the sum of the current government's current expenditures, its on-budget debt and political costs. Over the life of the P3, there may be several governments. With each new government, the objective function restarts anew; in other words, the prior government cannot totally commit the new government to the project or the existing contract.

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. We now consider each objective function in more detail.

Private Sector Objective Function

Perhaps we restate the obvious, but firms wish to maximize profits not pass on their superior production efficiency to government in the form of lower prices. Furthermore, private sector participants wish to maximize the NPV of their profits over the contract life. In other words, at any point in time after the project has started (*in medias res*), private sector participants want to maximize the NPV of future profits computed at that time. The point we emphasize here is that profit maximization is not a one-period phenomenon: If private sector actors find new profit opportunities as the contract unfolds, they will seek to capture them. Of course, if contracts are complete, they will have no opportunity to do so, but there is usually some scope to engage in this form of opportunistic behavior. (The evidence certainly suggests that governments often perceive contract renegotiation efforts as opportunistic.) It seems to be a particular problem if the private sector partner changes ownership perhaps because new owners are less bound by tacit understandings. The Hamilton case illustrates that many changes of private sector ownership can arise in a P3. The P3 commenced in 1994 and was terminated in 2004. During that 10-year period, Philip Utilities Management Corporation, the original operator, was acquired by Azurix Corporation in 1999, by American Water Works in 2001 and finally by RWE Thames, a German multinational, in 2003 (Ouyahia, 2006). When ownership changes, it becomes harder to pin the blame on anyone.

In addition, private sector participants are risk-adjusted profit maximizers: They are willing to forego some expected profits if they can reduce risk sufficiently. Indeed, private sector participants may be considerably more risk-averse than public sector participants, at least *ex ante*. The Canadian P3 evidence, for example, indicates that the willingness of private sector firms to bear user risk quite rationally declines with the level of user risk (Vining & Boardman, 2008). The evidence from the United Kingdom and Australia also shows that governments have not been very successful at shifting risk to the private sector (Asenova & Beck, 2003; Edwards & Shaoul, 2003; English & Guthrie, 2003; Shaoul, 2002). Nor is it surprising that contract negotiations associated with attempts to shift risk have been extremely costly (Li, 2003).

One reason for not taking on large amounts of risk is that private sector managers and equity investors typically bear the consequences more directly and personally if risks turn out badly. As a result, private sector participants require high premiums to accept risk, especially use risk (also often called revenue or demand risk).

Many private firms are relatively unfamiliar with the particular use risks associated with government projects. But this is less true of the global firms that have specialized in P3-type projects. As a corollary, however, these sophisticated firms are more aware that they often have little control over many of the factors that drive demand and that use risk is almost always potentially subject to *ex post* manipulation by their political partners or their successors. For example, if they secure the contract to construct and operate a toll highway, they know that they will have little influence over regional transportation policy that might dramatically affect the highway's demand and toll revenues. As a consequence, sophisticated private sector partners are expert at nibbling away at risk transfer during the negotiation stage.

Of course, the private sector will formally accept use risk if the premium is high enough; just as we can get a fixed-price contract for our house renovation if we are prepared to pay a high enough price. In the end though this price is usually so high that we opt for the variable labor-and-materials contract where the price is not fixed.

To maximize their risk-adjusted profits, even when use risk has been avoided, sophisticated private sector partners are likely to engage in some combination of the following. First, they form stand-alone P3 corporations and subsidiaries (Brown, 2007; Hood, Fraser, & McGarvey, 2006). This reduces their worst-case costs because they can declare the stand-alone corporation bankrupt if necessary. Second, they limit their capital exposure through the utilization of extensive third-party debt financing (Roll & Verbeke, 1998). Large consortia of European and South American banks have often taken on this debt. Third, they fairly quickly sell off much or all of their equity to other parties, sometimes in syndicates, limited partnerships, and closed-end funds. None of these strategies are particularly problematic when things go right. However, in combination, these actions can result in a considerable decline in transparency over the life cycle of a P3 (Hood et al., 2006). If things go wrong, it can be problematic.

Finally, the likelihood that P3s will deliver projects with lower production costs to government depends on private sector partners having the appropriate incentives to minimize costs. If, for example, firms are remunerated de facto on a cost-plus basis because of poorly written or enforced contracts, they will have an incentive to increase, rather than lower, project costs (McAfee & McMillan, 1988) as this will result in higher remuneration. Similarly, if firms can form stand-alone corporations or limit their equity participation, they may have opportunities to minimize losses (a form of profit maximization) even though this raises costs for government.

Public Sector Objective Function

To reiterate, we suggest the governmental objective function is to minimize the sum of current government expenditures, on-the-books debt, and political costs. This implies that a current government displays some degree of self-interest and values the political benefits that result from the minimization of both on-budget expenditures and on-budget debt (Coghill & Woodward, 2005). Political self-interest explicitly introduces the public choice idea that vote-maximizing behavior by politicians raises transaction costs and aggregate social costs (Downs, 1957; Mueller, 2003).

Simply shifting a project from the government's books to another off-budget organization may not alter the social costs or benefits (Jenkinson, 2003; Vining et al., 2006). But it remains extremely attractive to governments that face budget constraints: "An example of this . . . stratagem is Ispa, the Italian off-budget agency created to form PPPs and raise capital by issuing state-guaranteed bonds, so as to finance new infrastructure, while complying with the European Stability and Growth Pact" (Maskin & Tirole, 2008, p. 415). This also appears to be a factor in the attractiveness of P3s for other governments as well (e.g., Reeves, 2003; Shaoul, 2006). Also governments normally prefer off-budget expenditures to on-budget expenditures because voters receive infrastructure benefits, but are less likely to perceive the costs, a form of fiscal illusion (see Vining & Boardman, 2008, for a more extensive discussion of this issue).

Note that this objective function focuses on the goals of the current government. Holding all else constant, a current government prefers expenditures that will appear in future budgets (with potentially different politicians) to present expenditures. Of course, deferring expenditures (costs) does not lower costs. Indeed, we would expect deferment to raise the net present cost of projects: You cannot get something for nothing. Although we would argue that the preference for cost deferment is fairly pervasive, current governments' discount rates do vary—a government that expects to stay in power over several electoral cycles will weight the cost of future expenditures more heavily. But, in sum, again holding everything else constant, a current government prefers infrastructure delivery mechanisms that postpone government expenditures.

When considering P3s, government must trade-off the political benefits that arise from off-budget current expenditures and debt, combined with postponed government expenditures, against any other political costs and benefits. These other costs could relate to eventual public dissatisfaction with subsequent private sector

gouging, poor service, high user prices or whatever. The objective function focuses on the expected costs for the current government. The governments', especially politicians', expenditure-costs-versus-political-costs equation can change unpredictably. Indeed, political costs can shift from a weighting of 0 *ex ante* (i.e., before construction) to a weighting of 1 *ex post* (i.e., some period after construction completion, but before the expiration of the P3 contract). In addition, future political costs do not have high saliency for current politicians. If they do arise, however, they have high saliency for the new cohort of politicians. When they arise, the private sector participant may be able to hold-up government and extract additional payments of various kinds because governments (especially elected politicians subject to voter discontent) often panic when faced with rising political costs (Guasch et al., 2008). Rising user fees most often provoke user-voter discontent.

An important additional feature of politicians' behavior is a tendency for "escalation of commitment" (Dietz-Uhler, 1996; Ross & Staw, 1986). Politicians may be vulnerable to escalation because a government beginning a P3 process is committing to relatively radical ideological change. Thus there is symbolism as much as substance at stake (Brown, 1994; Edelman, 1964). Engaging in a P3 regime often involves some degree of conflict and arm-wrestling with "nattering nabobs of negativism" (i.e., civil servants) that nearly always tend to favor traditional direct government production or contracting-out. In addition, politicians in executive positions—governors (in the United States), premiers and prime ministers (in Canada)—abhor the perception that they are vacillating or weak. Thus even if a P3 develops major problems—either before or after contract finalization—it is often very difficult for political proponents to pull the plug. This can encourage the private sector to engage in strategic behavior: making their best offer first, especially if they sense desperation. This problem can be at its most severe when a P3 is still in the construction phase. Here, there is only one effective provider and Williamson's "fundamental transformation" has taken place. This problem is well known in defense contracting (Melese, Franck, Angelis, & Dillard, 2007). It is important to note that escalation of commitment tends to be a function of an individual or group of politicians in power at a particular time (i.e., it is an intragovernmental cohort problem). This does not detract from (and, indeed, may reinforce) government's general difficulty with credibly committing to future actions (Kydland & Prescott, 1977); this is an intergovernmental cohort problem.

Transaction Costs

Goal conflict between public and private participants in a joint venture is not surprising. Still if the potential gains from private provision are sufficiently large due, for example, to superior private sector efficiency, P3s could produce win-win outcomes. However, a number of factors associated with infrastructure projects both raise the transaction costs of utilizing the P3 format to deliver these projects and reduce the likelihood that the public sector will achieve its cost-reduction goal.

Transaction costs in infrastructure P3s are likely to be high because almost all infrastructure projects present relatively complex contracting situations, especially larger projects that embody technological innovation. Indeed, one can think of such P3s as simply contracting-out under relatively unfavorable conditions. There is some complexity or uncertainty in all P3 infrastructure projects because they are unique to some degree, if only in terms of topography. Many major projects are complex and may be unique on multiple dimensions. Uniqueness also raises the uncertainty around future usage and future willingness-to-pay for use. Finally, in many circumstances, competitiveness and contestability is low. For example, two multinationals—Veolia (formerly Vivendi) and Suez-Lyonnaise—dominate most of the global market for water systems, while a third firm, SAUR, has a dominant position in Africa. These firms have specialized or proprietary technology and benefit from economies of scale.

A note of caution is that our perspective is based on the availability of available public information about P3s. For media around the world, conflict, problems and bankruptcy are inherently more newsworthy than cooperation and everyday delivery of services.[4] Thus our purpose is not to claim that this positive model always means P3 failure. Rather the purpose is to foster better institutional design and reduce the probability that governments raise rather than lower total P3 social costs. We return to this issue after discussing the Metronet case.

The Metronet Case

Although technically divided into two P3s (BCV and SSL), the London underground P3s are collectively known as Metronet. Metronet was a £15.7 billion P3 signed in 2003 and personally championed by the then Chancellor of the Exchequer, Gordon Brown, who is now the Prime Minister of UK. It collapsed in 2007. Metronet represents a recent, and very big, infrastructure P3 failure. We do not argue or claim that Metronet is a typical P3. It

is certainly bigger in dollar terms than the typical P3 project and is also almost certainly more complex and multi-faceted than most projects. However, it does offer important lessons that we use to help formulate rules for government in managing P3s. One reason that Metronet can be used to illustrate the positive theory perspective and derive these lessons is that the initiation, development, and bankruptcy of Metronet is well documented and on the public record. Although P3s are putatively in the public domain, there is often little available public information on their operations, or of any problems.

A number of facets of the theory are starkly highlighted by the Metronet experience. First, goal conflict emerged in its starkest form when the parties soon disagreed on the fundamental nature of the contract. The government acted as though it had purchased an output-based fixed price contract. The private sector acted as though it had agreed to a series of heterogeneous, cost-plus contracts (United Kingdom, House of Commons, Transport Committee [UKHCTC], 2008, pp. 12-13). Not surprisingly, this created ongoing conflict and was inevitably the source of much of the *ex post* transaction costs during the relatively short period that the contract was operational. This fundamental disagreement seems unbelievable in an enterprise of this magnitude although the next paragraphs explain why it is not as strange as it appears. Until the government triggered an Extraordinary Review in 2007, the government had essentially begun to act as if it agreed with the private partners interpretation of the contract. Escalation of commitment also had much to do with this.

Second, the Metronet case study illustrates the difficulty of risk transfer even though it was a major initial rationale for the P3 contracts. The House of Commons Committee of Public Accounts (UKHCCPA, 2005, p. 11) noted that by the time of contract finalization, there was almost no risk transfer to the private sector (i.e., to the Infracos):

> There are caps, caveats and exclusions to project risks borne by the Infracos. The risk of cost overruns in repairing assets of unknown condition, such as tunnel walls, is excluded because knowledge of their residual life and associated costs is incomplete. In the case of assets whose condition has been fully identified against specific engineering standards, the cost overruns that the Infracos have to bear are capped, so long as the Infracos can demonstrate that they are acting economically and efficiently. In the case of Metronet, the limit in each 7 1/2 year period is £50 million . . . There is no definition of economic and efficient behavior in the contracts; an independent

arbiter can make a ruling if asked. Exclusions to the risks borne by the Infracos include passenger demand, lower income with fewer users, and capacity constraints in the face of increased use. These are borne by London Underground.

Third, as with many infrastructure P3s that require large capital expenditures, the project had a high debt-to-equity ratio. However, even by normal P3 standards, the Metronet debt ratio was high: approximately 88.3% debt to 11.7% equity (Blaiklock, 2008). So, if there had been risk transfer, in the worst-case scenario of bankruptcy, it would largely have been borne by debt holders (major banks such as Deutsche Bank and the European Investment Bank). However, in the end, the government guaranteed 95% of their £3.8 billion loan ("London Underground," 2008). The House of Commons Transport Committee estimated even then that the banks charged £450 million more than they would have for debt issued directly by the government (UKHCTC, 2008). It is interesting to note that the government had to provide such a guarantee for this project because in the previous near collapse of rail track there is some evidence that it had acted opportunistically (Shaoul, 2006).

In sum, the House of Commons Transport Committee concluded, "in terms of borrowing, the Metronet contract did nothing more than secure loans, 95% of which were in any case underwritten by the public purse, at an inflated cost—the worst of both possible worlds" (UKHCTC, 2008, p. 11). After the bankruptcy of Metronet, the UK government had no choice but to settle with the banks and agree to pay them £1.7 billion

Fourth, the five equity participants—all large corporations—split the equity requirement of £350 million between them, approximately £70 million each. This amounted to approximately £250 million after taxes on bankruptcy (the eventual outcome); for these corporations, this was certainly not a huge write-off. Furthermore, these firms—WS Atkins, Balfour Beatty, Bombardier, EDF Energy, and Thames Water were major suppliers to the project. The UK House of Commons Transport Committee described this as "the tied supply chain" (UKHCTC, 2008, pp. 7-8). Indeed, Metronet received £3 billion in service charges from 2003 to 2007, or approximately 60% of all capital expenditures. A large percentage of this was passed on to Bombardier or to Trans4m, a stand-alone corporation owned by the other four equity partners. As the Transport Committee wryly noted:

> We are not persuaded that Metronet's shareholders had any inclination to address the problem of the tied

supply chain nor, as the intended beneficiaries of the system, did they have very much incentive to do so. . . . [t]he fact that such a management structure was judged to be capable of efficient and economic delivery seems extraordinary now that Metronet has collapsed but the ultimate recipients of the money which was paid to the company have walked away with limited losses. (UKHCTC, 2008, p. 8)

In sum, "[t]here simply wasn't enough equity at risk to give incentives for Metronet to perform" (Stephen Glaister, quoted in *The Economist*, February 7, 2008, para. 4). Perhaps not surprisingly, Blaiklock (2008) concluded:

[I]t is most likely that overall the shareholders may not have lost any money on the PPP at all (e.g., 20% of £2 billion is £400 million)!! It will be just that they—the shareholders—have made less money on the PPP than they had originally hoped! (p. 51)

Fifth, the overall transaction costs were, and will continue to be, extremely high. The House of Commons Committee of Public Accounts (UKHCCPA, 2005) estimated the (*ex ante*) transaction costs of Metronet as follows:

Transaction costs for the deal were £455 million, or 2.8% of the NPV of the deal. London Underground's own costs were £180 million. It also reimbursed bid costs of £275 million. The Department said that it had learned a lesson about controlling bid costs. (p. 14)

Two circumstances raise the probability of high transaction costs. First, when the government initiating the P3 has poor contract management skills (Boardman & Hewitt, 2004). Governments with weak contracting ability and experience will not have the skill to anticipate these contracting problems or to write appropriate contract provisions for them before the contract is finalized. The foregoing quote from the Public Accounts Committee certainly suggests an absence of contract management skills in the Metronet case. Second, when a public sector leader gets caught up in an escalation of commitment cycle and is determined to deliver the project as a P3. In the Metronet P3, the political commitment of the Chancellor of the Exchequer was widely known. As the *London Times* reported in 2004 (Wheatcroft, 2004):

Gordon Brown is the driver. The Chancellor was determined that Ken Livingstone would not have his way and finance the much needed revamp of the

Underground through a bond issue. As far as the Chancellor was concerned, it was PPP or nothing and eventually he fought London's mayor through the courts to get his way. Mr. Brown's devotion to the PPP was not wasted on those who might put it into practice. They saw a desperate customer coming and, as the National Audit Office relates, pitched their charges accordingly. (para. 4-5)

In the Metronet case, both circumstances appear to have been present.

Rules for Government

What can government do to avoid high transaction costs and P3 failure? Based on our preceding analysis, here are eight proposed rules.

Rule 1: Establish A Jurisdictional P3 Constitution

This rule is really a metarule. Adopt, as closely as possible, quasi-constitutional provisions to ensure transparency for all P3s. The most important requirement for real transparency is that there be consistent and timely budget reporting on anything that smells remotely like a P3. Another valuable aspect of transparency is the deposit and public availability of all contracts. Siemiatycki (2007) reviews this issue in detail. Legitimate trade secrets should be protected through the sealing of specific contract provisions with a neutral third party adjudicating the legitimacy of particular claims to secrecy.

The rationale for this meta-rule is simple: If there is no credible *ex ante* tying of hands on transparency for the whole P3 process, the potential private partners will always chip away, claiming various special reasons for secrecy in their particular P3. Politicians who favor a particular P3 (perhaps because infrastructure will be located in their constituency) will aid-and-abet in this process. So this rule is the hardest. There will be pressure to just get going because "the infrastructure is crumbling" although almost by definition it always is. Later on, these constitution-like mechanisms also serve to partially commit later generations of politicians, so that political shocks (a surge of voter discontent over increasing tolls, for example) cannot panic them into renegotiating on pricing and so on. This usually involves increasing direct or indirect subsidies to the private partner or partners.

Rule 2: Separate the Analysis, Evaluation, Contracting/Administrating, and Oversight Agencies

Separate the agency that (a) analyzes the desirability of projects; that is, performs an *ex ante* analysis of a particular project, preferably a social CBA; (b) decides which of the alternative provisioning modes to employ (government production, contracting or P3) in that project; that is, it evaluates whether a P3 would provide best social value (the lowest total social costs); (c) administers the P3 process—the agency that organizes the tendering of bids, selects the partners, makes the final decision whether to proceed with a P3 (or not) and monitors the implementation of the contract; and (d) evaluates the overall success of projects: Did the P3 provide the lowest social cost?

These separations may seem like bureaucratization gone mad, but otherwise any monolithic P3 agency will turn into an agency that sees its main job as boosting P3s. Although it may be inevitable that the administering agency turns into a political poodle, it needs to be flanked by junkyard dogs. Although the skills involved in agencies (b) and (d) are similar and potentially combinable, a combination would create incentive problems: Agencies almost never like to criticize their own earlier decisions. In the United States, because of separation of powers, governments have fewer problems generating separate oversight agencies and avoiding their capture compared with some other countries. California, for example, has a pretty good tradition of hard-nosed oversight agencies.

The evaluation agency and the administering agency will need to communicate and coordinate with the appropriate government line agency. For example, they will have to communicate with the Transportation department for a new P3 highway and with the Health department for a new hospital. The overall effectiveness of the P3 contracting agency will depend on both its contract management capabilities *per se*, which it should have, and knowledge of the specific function or business for which the P3 is required (e.g., transportation or health), which it would probably not have. The appropriate line agency should be involved in the P3 process from the beginning. At some point, when contracting negotiations become routine, contract monitoring and administration could be transferred to the line agency.

Ideally, the oversight agency should evaluate each P3 in terms of the present value of its social cost relative to the next best alternative, not just the status quo or government provision. These evaluations should be ongoing: What may appear to be a disastrous choice at one time may turn out later to have been the right choice, and vice versa. As part of this process, the oversight agency should keep track of all future liabilities. A major motivation for P3s is to minimize current government expenditures and to keep debt low. However, expenditures are only delayed, never avoided. It is important to keep an eye on these future liabilities.

Rule 3: Ensure That the Bidding Process Is Reasonably Competitive

There are a number of aspects to actually making the bidding process as competitive as possible. First, ideology should be kept in check and public sector entities should be permitted, even encouraged, to bid. They may have valuable location-specific knowledge that would give them a cost advantage. Realistically, however, this will not work for major projects unless mechanisms are in place for them to access private capital markets and package all of the necessary complementary skills (some of which may be in the private sector). This could result in a mini-P3 rather than a maxi-P3. Second, the (government) P3 promoter should be proactive in searching for bidders when there are no optimal number of bidders. What is optimal? There is surprisingly little hard empirical evidence on the impact of bidders (competitors) on driving down prices to competitive levels. However, for most infrastructure projects, at least three to five bidders are probably close to optimal. Generating this number of bidders should trump inevitable political pressures to favor local bidders or restrict bidding to domestic producers. Where possible, the P3 promoter should discourage consortia unless clearly based on complementary skill sets. This does present some dilemma for government. The preparation of bids for major, inherently unique, projects can be high. One proven method of encouraging bidding is to remunerate some or all of the bidding costs. This encourages competition, but inevitably increases government costs.

Rule 4: Be Wary of Projects That Exhibit High Asset-Specificity, Are Complex or Involve High Uncertainty, and Where In-House Contract Management Effectiveness Is Low

This rule applies to any public–private interaction, such as contracting out, not just P3 infrastructure projects. When projects involve considerable uncertainty and are complex (the two often go together), changes in plans and/or implementation are inevitable after the project has begun. Long-term projects (many infrastructure projects have expected life-cycles of 40-50 years) inevitably involve a fair amount of uncertainty. It is impossible to foresee every possible contingency and, even if it were possible, the costs of anticipating every

possible contingency would be prohibitively high. When, in addition, one participant (usually the private sector participant) has made an asset-specific investment associated with the project, the costs of renegotiating can be very high. The ability to renegotiate at a reasonably low cost can be thought of as a (valuable) option. There are usually not many options available with major infrastructure projects once commenced because they involve high asset specificity and significant minimum efficient scale Unless, explicitly built into the contract, this option is foregone with a P3. Either party is potentially at risk and may be held-up by the other. Government is particularly vulnerable to opportunistic behavior by private sector participants when it has low contract management skills, either related specifically to the project or pertaining to contracting more generally. We are aware of an irony. Complex and uncertain projects are exactly the ones where government would like to reduce risk.

Rule 5: Include Standardized, Fast, Low-Cost Arbitration Procedures in All P3 Contracts

The first advantage of this rule is that it directly reduces transaction costs from lawsuits. In certain cases, these costs have been extremely high. Even more problematically, they have taken an extremely long time to complete. It will normally make sense to think about two distinct arbitration procedures. The first procedure should be for those disputes that the parties agree are minor. This procedure should be subject to strict specified time limits (never more than several weeks). It probably makes sense to have shotgun decisions: The arbitrator simply announces a decision and the remedy (if so, obviously remedies and penalties must be specified *ex ante*). The second form of arbitration is for disputes that at least one party considers to be a major breach of contract. In this case, the arbitrator would be able to declare a breach of contract sufficient to abrogate the contract. Although these procedures may seem draconian, the reduction of legal dispute costs provides reasonably symmetric benefits to both parties.

Rule 6: Avoid Stand-Alone Private Sector Shells With Limited Equity From the Real Private Sector Principals

The key point is to ensure that the private sector partner or partners have sufficient equity at risk to give them the proper incentives. Forming a separate, stand-alone corporation for a particular P3 project may make it easier for the parent organizations to minimize the amount of their own capital at risk. If a stand-alone organization is formed, then the parent companies should cosign the contract and accept liability. Whether or not a separate corporation is formed, government should ensure that the project debt-to-equity ratio is clearly specified. A too high debt-to-equity ratio can create an incentive, if problems arise, for equity participants to declare bankruptcy rather than finding operational solutions.

Closely related to this issue are the problems associated with a large consortium of private sector partners. With a large number of partners, it may not be in the interests of any single partner to provide the needed organizational leadership, which is a public good, even though it means losing its equity investment. This "large numbers" phenomenon certainly played a role in the collapse of Metronet. In general, the public sector is unwise to contract with more than two or three equity partners unless one is clearly dominant.

Rule 7: Prohibit the Private-Sector Contractor From Selling the Contract too Early

One of the primary purported advantages in a P3 is that there is synergy between the design-construction phase and the operating phase. The argument goes that private sector firms will be willing to invest money up front in the design and build phases if they can more than lower their costs or increase their revenues during the operating phase. Up front investment will lead to lower total costs. Indeed this may happen. Furthermore, at the operational stage, it may well make sense for some other contractor to take over the contract. However, there are many potential problems if the contract is sold too early—prior to when all parties are quite sure what is entailed at the operating phase. The obvious problem is that if something goes wrong during the operating phase then it may not be clear which private sector firm or consortium was at fault. Not knowing who to pin the blame on can seriously increase government transaction costs. Furthermore, if a contractor thinks that it can sell a contract before all of the bugs are known, they will have an incentive to underinvest in the project, especially in the early phases.

Rule 8: Have a Direct Conduit to Debt Holders

This rule should be avoided if possible as it may raise the cost of capital. If the other rules are adopted, it is probably unnecessary. Here is the rule: If the private sector equity participant declares bankruptcy, there should be a clear, legally enforceable conduit to the debtholders. Without it, governments may face serious delays and difficulties as the trustee in bankruptcy or courts will

normally control this negotiation. This rule, of course, begs the question of why governments could not have accessed this capital directly themselves. Of course, some do. But that is a story for another day.

Conclusion

Some of reasons why governments are drawn to P3s clearly have some validity—especially lower construction costs and ongoing maintenance costs. The general argument that "there is no money" or more specifically "there is no public money" is manifestly weak. Real economic growth per capita in the United States has probably averaged at least 2% annually over the past five decades or so (Jones, 2001; Moore, Boardman, Vining, Weimer, & Greenberg, 2004; Prescott, 2002), so we are considerably richer than we were at any point in history. There may, of course, be a lack of political will to buck public antipathy towards paying for infrastructure but that is a different argument. Public antipathy to taxes for infrastructure could possibly represent, a considered, if somewhat implicit, attitude for two reasons. First, as society gets richer, it may prefer less public goods and more private goods (in other words, public goods may, in a technical sense, be inferior goods). The infrastructure may be crumbling, but it may not be crumbling enough (yet) to worry most citizens. Second, it is not clear that the infrastructure is crumbling. The evidence on a systematic significant infrastructure deficit in most places is still relatively weak (for a brief review, see Argimon, Gonzalez-Paramo, & Roldan, 1997, pp. 1001-1002). The case for incremental infrastructure investment is likely to be clearest where a jurisdiction faces significant population growth.

Even if the private sector has lower production costs and can be forced to pass them along as lower prices for the public sector without compromising quality, it is important to emphasize that, from a social perspective, the key issue is whether the total social cost, including production costs and all contracting costs together with externality costs, is lower for a P3 than for government provision or any other alternative provision mechanism. To investigate this issue, we developed a positive theory perspective of P3s, based primarily on transaction cost economics, recognizing that partners have conflicting goals. This theory is supported by a wide range evidence with P3s and, in particular, the Metronet case, which we summarized briefly.

Finally, we addressed the question: What can governments do to avoid high transaction costs and P3 failure? Based on our preceding analysis, we proposed eight rules for government. We suggested what governments should do in the administration of P3s—mostly to themselves.

Notes

1. Early in the history of European North America, a form of P3 (between the Crown and the British aristocracy) was an important colonization mechanism (a form of infrastructure not necessarily valued by those being infrastructured).

2. The payment represents a negative impact for the corporate entity making the payment and a positive impact for the government receiving it; these impacts essentially offset (see Boardman, Greenberg, Vining, & Weimer, 2006). However, it is quite common for P3 discussions to treat these payments as real benefits:

> One of the key drivers of value in the Indiana Toll Road, Chicago Skyway, and Texas SH 121 leases was the ability of the concessionaire to make an upfront payment in return for the future cash flows that the project would produce. (Brown, 2007, p. 322)

For an example of a government agency cash flow analysis, in contrast to a cost-benefit analysis, see Gallay (2006).

3. These kinds of projects are sometimes described as brownfield P3s to distinguish them from P3s that deliver incremental infrastructure (greenfield projects). Some brownfield projects do include some infrastructure upgrading and these are labeled as hybrids.

4. On the other hand, lack of controversy and low visibility does not necessarily mean that the P3 was a good project from the social perspective of minimizing aggregate social costs. This could especially be the case with brownfield projects where governments get their money upfront and the private sector concessionaire makes (excess) profits, but users pay tolls in excess of marginal social costs.

References

Altshuler, A., & Luberoff, D. (2003). *Mega-projects: The changing politics of urban public investment*. Washington, DC: Brookings Institution.

Arena, M. V., Leonard, R., Murray, S., & Younossi, O. (2006). *Historical cost growth of completed weapon systems*. Santa Monica, CA: RAND.

Argimon, I., Gonzalez-Paramo, J., & Roldan, J. (1997). Evidence of public spending crowding-out from a panel of OECD countries. *Applied Economics, 29*, 1001-1010.

Asenova, D., & Beck, M. (2003). The U.K. financial sector and risk management in PFI projects: A survey. *Public Money & Management, 23*, 195-203.

Blaiklock, T. (2008). Memorandum from T. Martin Blaiklock (PPP 02). In House of Commons, Transport Committee, *The London underground and the public–private partnership agreements: Second report of session 2007-2008* (pp. 49-51). London: The Stationary Office.

Boardman, A., Greenberg, D., Vining, A., & Weimer, D. (2006). *Cost-benefit analysis: Concepts and practice*. Upper Saddle River, NJ: Pearson Prentice Hall.

Boardman, A., & Hewitt, R. (2004). Problems with contracting out government services: Lessons from orderly services at SCGH. *Industrial and Corporate Change, 13*, 917-929.

Boardman, A., Mallery, W., & Vining, A. (1994). Learning from *ex ante/ex post* cost-benefit analysis comparisons: The coquihalla highway example. *Socio-Economic Planning Sciences, 28*, 69-84.

Boardman, A., Poschmann, F., & Vining, A. (2005). North American infrastructure P3s: Examples and lessons learned. In G. Hodge & C. Greve (Eds.), *The challenge of public–private partnerships: Learning from international experience* (pp. 162-189). Cheltenham, UK: Edward Elgar.

Boardman, A., & Vining, A. (1989). Ownership and performance in competitive environments: A comparison of the performance of private, mixed and state owned enterprises. *Journal of Law and Economics, 32*, 1-34.

Broadbent, J., Gill, J., & Laughlin, R. (2003). The development of contracting in the context of infrastructure investment in the UK: The case of the private finance initiative in the National Health Service. *International Public Management Journal, 6*, 173-197.

Brown, A. (1994). Politics, symbolic action and myth making in pursuit of legitimacy. *Organization Studies, 15*, 861-878.

Brown, K. (2007). Are public–private transactions the future of infrastructure finance? *Public Works Management & Policy, 12*, 320-324.

Brown, T., & Potoski, M. (2003). Managing contract performance: A transaction cost approach. *Journal of Policy Analysis and Management, 22*, 275-297.

Chong, E., Huet, F., Saussier, S., & Steiner, F. (2006). Public–private partnerships and prices: Evidence from water distribution in France. *Review of Industrial Organization, 29*, 149-169.

Chui, Y.-H. (2003). Estimating the cost efficiency of mixed enterprises in Taiwan. *International Journal of Management, 20*, 81-87.

Coghill, K., & Woodward, D. (2005). Political issues of private–private partnerships. In G. Hodge & C. Greve (Eds.), *The challenge of public–private partnerships: Learning from international experience* (pp. 81-94). Cheltenham, UK: Edward Elgar.

Das, S., Sen, P., & Sangupta, S. (1998). Impact of strategic alliances on firm valuation. *Academy of Management Journal, 41*, 27-41.

Dietz-Uhler, B. (1996). The escalation of commitment in political decision-making groups: A social identity approach. *European Journal of Social Psychology, 26*, 611-629.

Downs, A. (1957). *An economic theory of democracy*. New York: Harper and Bros.

Eckel, C., & Vining, A. (1985). Elements of a theory of mixed enterprise. *Scottish Journal of Political Economy, 32*, 2-94.

Edelman, M. (1964). *The symbolic uses of politics*. Urbana: University of Illinois Press.

Edwards, P., & Shaoul, J. (2003). Partnerships: For better or worse. *Accounting, Auditing & Accountability Journal, 16*, 397-421.

English, L. (2005). Using public–private partnerships to deliver social infrastructure: The Australian experience. In G. Hodge & C. Greve (Eds.), *The challenge of public–private partnerships: Learning from international experience* (pp. 290-304). Cheltenham, UK: Edward Elgar.

English, L., & Guthrie, J. (2003). Driving privately financed projects in Australia: What makes them tick? *Accounting, Auditing & Accountability Journal, 16*, 493-511.

Flyvbjerg, B., Holm, M., & Buhl, S. (2005). How inaccurate are demand forecasts in public works projects? The case of transportation. *Journal of the American Planning Association, 71*, 131-144.

Frantz, R. (1992). X-efficiency and allocative efficiency: What have we learned? *American Economic Review, 82*, 434-438.

Gallay, D. (2006). Public–private partnerships for financing federal capital: Useful or chimerical? *Public Works Management & Policy, 11*, 139-151.

Geringer, J., & Hebert, L. (1991). Measuring performance of international joint ventures. *Journal of International Business Studies, 22*, 249-263.

Globerman, S., & Vining, A. (1996). A framework for evaluating the government contracting-out decision with an application to information technology. *Public Administration Review, 56*, 40-46.

Greve, C., & Ejersbo, N. (2003, November 29-December 1). *When public–private partnerships fail–the extreme case of the NPM-inspired local government of Farum in Denmark*. Paper for Nordisk Kommunalforskningskonference, Odense, Denmark.

Grout, P., & Stevens, M. (2003). The assessment: Financing and managing public services. *Oxford Review of Economic Policy, 19*, 215-234.

Guasch, J. L., Laffont, J.-J., & Straub, S. (2008). Renegotiation of concession contracts in Latin America: Evidence from the water and transportation sectors. *International Journal of Industrial Organization, 26*, 421-442.

Hansen, M., Hoskinsson, R., & Barney, J. (2008). Competitive advantage in alliance governance: Resolving the opportunism minimization–gain maximization paradox. *Managerial and Decision Economics, 29*, 192-208.

Hewitt, E., & Boardman, A. (2006). Key questions to ask when contracting out government services: An application to orderly services. In P. Barrar & R. Gervais (Eds.), *Global outsourcing strategies: An international reference on effective outsourcing relationships* (pp. 285-301). Aldershot, UK: Gower.

Hodge, G. (2000). *Privatization: An international review of performance*. Boulder, CO: Westview.

Hodge, G. (2005). Public–private partnerships: The Australasian experience with physical infrastructure. In G. Hodge & C. Greve (Eds.), *The challenge of public–private partnerships: Learning from international experience* (pp. 305-331). Cheltenham, UK: Edward Elgar.

Hood, J., Fraser, I., & McGarvey, N. (2006). Transparency of risk and reward in U.K. public–private partnerships. *Public Budgeting & Finance, 26*, 40-58.

Jehl, D. (2003, February 10). As cities move to privatize water, Atlanta steps back. *New York Times*. Retrieved August 8, 2008, from http://query.nytimes.com/gst/fullpage.html?res=9D02E1DD113BF933A25751C0A9659C8B63

Jenkinson, T. (2003). Private finance. *Oxford Review of Economic Policy, 19*, 323-334.

Jones, C. (2001). Was an industrial revolution inevitable? Economic growth over the very long run. *Advances in Macroeconomics, 1*. Retrieved August 7, 2008, from http://www.bepress.com/bejm/advances/vol1/iss2/art1

Klijn, E.-H., & Teisman, G. (2003). Institutional and strategic barriers to public–private partnerships: An analysis of Dutch cases. *Public Money & Management, 23*, 137-146.

Koppenjan, J. (2005). The formation of public–private partnerships: Lessons from nine transport infrastructure projects in the Netherlands. *Public Administration, 83*, 135-157.

Kydland, F., & Prescott, E. (1977). Rules rather than discretion: The inconsistency of optimal plans. *Journal of Political Economy, 85*, 614-641.

Li, B. (2003). *Risk management of public/private partnership projects*. Unpublished doctoral dissertation, School of the Built and Natural Environment, Glasgow Caledonian University, Glasgow, United Kingdom.

London underground: Mind the money gap. (2008, February 7). *The Economist*. Retrieved August 8, 2008, from http://www.economist.com/world/britain/displaystory.cfm?story_id=10653954

Maskin, E., & Tirole, J. (2008). Public–private partnerships and government spending limits. *International Journal of Industrial Organization, 26*, 412-420.

McAfee, R., & McMillan, J. (1988). *Incentives in government contracting*. Toronto, Ontario, Canada: University of Toronto Press.

Melese, F., Franck, R., Angelis, D., & Dillard, J. (2007). Applying insights from transaction cost economics to improve cost estimates for public sector purchases: The case of U.S. military acquisition. *International Public Management Journal, 10*, 357-386.

Milgrom, P., & Roberts, J. (1992). *Economics, organization & management*. Englewood Cliffs, NJ: Prentice Hall.

Moore, M., Boardman, A., Vining, A., Weimer, D., & Greenberg, D. (2004). Just give me a number! Practical values for the social discount rate. *Journal of Policy Analysis and Management, 23*, 789-812.

Mueller, D. (2003). *Public choice III*. New York: Cambridge University Press.

Ouyahia, M. (2006, May). *Public–private partnerships for funding municipal drinking water infrastructure: What are the challenges?* Ottawa, Ontario, Canada: Policy Research Initiative (PRI), Government of Canada.

Pickrell, D. (1990). *Urban rail transit projects: Forecasts versus actual ridership and costs*. Washington, DC: U.S. Department of Transportation.

Pollitt, M. (2005). Learning from UK private finance initiative experience. In G. Hodge & C. Greve (Eds.), *The challenge of public–private partnerships: Learning from international experience* (pp. 207-230). Cheltenham, UK: Edward Elgar.

Pollock, A., Price, D., & Dunnigan, M. (2000). *Deficits before patients: A report on the Worcestershire Royal Infirmary PFI and Worcestershire Hospital configuration*. London: School of Public Policy, University College.

Prescott, E. (2002). Prosperity and depressions. *American Economic Review, 92*, 1-15.

Reeves, E. (2003). Public–private partnerships in Ireland: Policy and practice. *Public Money & Management, 23*, 163-170.

Roll, M., & Verbeke, A. (1998). Financing of the trans-European high-speed rail networks: New forms of public–private partnerships. *European Management Journal, 16*, 706-713.

Ross, J., & Staw, B. (1986). Expo 86: An escalation prototype. *Administrative Science Quarterly, 31*, 274-297.

Shaoul, J. (2002). A financial appraisal of the London underground public–private partnership. *Public Money & Management, 22*, 53-61.

Shaoul, J. (2005). The private finance initiative or the public funding of private profit? In G. Hodge & C. Greve (Eds.), *The challenge of public–private partnerships: Learning from international experience* (pp. 190-206). Cheltenham, UK: Edward Elgar.

Shaoul, J. (2006). The cost of operating Britain's privatized railways. *Public Money & Management, 26*, 151-158.

Siemiatycki, M. (2007). What's the secret? Confidentiality in planning infrastructure using public/private partnerships. *Journal of the American Planning Association, 73*, 388-403.

Sueyoshi, T. (1998). Privatization of Nippon Telegraph and Telephone: Was it a good policy decision? *European Journal of Operational Research, 107*, 45-61.

Taylor, B. (1995). Public perceptions, fiscal realities, and freeway planning: The California case. *Journal of the American Planning Association, 61*, 43-56.

Trailer, J., Rechner, P., & Hill, R. (2004). A compound agency problem: An empirical examination of public–private partnerships. *Journal of American Academy of Business, 5*, 308-315.

U.K. House of Commons, Committee of Public Accounts. (2005, March 31). *London underground public private partnerships* (Seventeenth Report of Session 2004-2005). London: The Stationary Office.

U.K. House of Commons, Transport Committee. (2008). *The London underground and the public–private partnership agreements* (Second Report of Session 2007-2008). London: The Stationary Office.

U.K. National Audit Office. (2003). *PFI: Construction performance* (Report by the Comptroller and Auditor General, HC 700, Session 2002-2003). London: HMSO.

U.S. Government Accounting Office. (2003). *Federal-aid highways: Cost and oversight of major highway and bridge projects—issues and options* (GAO-03-764T). Washington, DC: Testimony before the Subcommittee on Transportation, Treasury and Independent Agencies, Committee on Appropriations, House of Representatives; Statement for the Record by JayEtta Z. Hecker, Director, Physical Infrastructure Issues.

van Bueren, M., & Macdonald, D. (2004). *Addressing water-related externalities: Issues for consideration*. Paper presented at a Water Policy Workshop convened by the Australian Agricultural and Resource Economics Society, Melbourne. Retrieved August 8, 2008, from http://www.thecie.com.au/content/publications/CIE-water_externalities.pdf

Vining, A., & Boardman, A. (1992). Ownership versus competition: Efficiency in public enterprise. *Public Choice, 73*, 205-223.

Vining, A., & Boardman, A. (2008). Public–private partnerships in Canada: Theory and evidence. *Canadian Public Administration, 51*, 9-44.

Vining, A., Boardman, A., & Poschmann, F. (2006). Public–private partnerships in the U.S. and Canada: There are no free lunches. *Journal of Comparative Policy Analysis, 7*, 1-22.

Vining, A., & Weimer, D. (2005). Economic perspectives on public organizations. In D. Ferrin, L. Lynn, & M. Pollitt (Eds.), *Oxford handbook of public management* (pp. 209-233). Oxford, UK: Oxford University Press.

Wheatcroft, P. (2004, June 18). Even the underground's gravy trains are crowded: The tube's public private partnership was a £450 million ticket to ride. *The Times*. Retrieved August 8, 2008, from http://www.timesonline.co.uk/tol/comment/article446851.ece

Williamson, O. (1975). *Markets and hierarchies: Analysis and antitrust implications*. New York: The Free Press.

Aidan R. Vining is the CNABS Professor of Government and Business Relations at the Segal Graduate School of Business, Simon Fraser University in Vancouver, British Columbia. He has a PhD from the Goldman School of Public Policy at Berkeley. His research interests include privatization, corporatization, contracting-out, and policy analysis methods. He has published extensively in leading public policy and public administration journals, such as *Journal of Public Administration Research and Theory*, *Journal of Policy Analysis and Management*, and *Public Administration Review*, and is a coauthor of *Cost-Benefit Analysis: Concepts and Practice*.

Anthony E. Boardman is a Van Dusen Professor of Business Administration, Strategy and Business Economics Division, Sauder School of Business, University of British Columbia. He has a PhD from the Heinz School at Carnegie Mellon University. His research interests include privatization, contracting-out, and cost-benefit analysis. He has published extensively in leading academic journals, including the *Journal of Law and Economics*, *Journal of Public Economics*, and the *Journal of Policy Analysis and Management*, and is a coauthor of *Cost-Benefit Analysis: Concepts and Practice*.