Public-Private Partnerships and Government Spending Limits [*]

Eric Maskin[†] Jean Tirole[‡]

July, 2006

[*] A very preliminary version of this paper was presented at the conference on "Public Services and Management" (Toulouse, January 14, 2006). We are grateful for the helpful comments of our discussant, Steve Tadelis. Jean Tirole thanks the Veolia Institute for financial support of IDEI and its members for useful discussions on public-private partnerships. Eric Maskin thanks the NSF for research support.
[†] Institute for Advanced Study and Princeton University.
[‡] IDEI and GREMAQ (UMR 5604 CNRS), Toulouse, and MIT.

1 Introduction

Public procurement accounts for a sizeable share of economic activity in most countries. Thus, how to deliver high-quality public services at low cost to the taxpayer and user is an important problem. An interesting recent development in the effort to find solutions is the growth of *public-private partnerships* (PPPs), both in industrialized countries (e.g., the United Kingdom, as in its Private Finance Initiative launched in 1992) and in emerging economies (e.g., Latin America, Eastern Europe, and China during the 1990s). PPPs have been created for large-scale projects in transportation (rail systems, highways, subways), medical care, telecommunications, energy, water systems, and even orphan drugs.

Although the variety of risk-sharing arrangements and governance structures makes a precise characterization difficult, a PPP is usually defined as a *long-term development and service contract* between government and a private partner. The government engages its partner both to develop the project and to operate and service it. The partner may bear substantial risk and even raise private finance. Its revenue derives from some combination of government payments and user fees.

In comparing PPPs to more traditional procurement (in which project development on the one hand and operations and maintenance on the other are generally arranged under *separate* contracts), the literature has generally focused on the incentives of the *private partner*. For example, one much-discussed potential advantage of PPPs is that, by "bundling" construction and operations, they induce the developer to internalize cost reductions at the operations stage that are brought about by investment at the

development stage.[1] But, by the same token, bundling may lead to a loss in operational efficiency because the best developer might not also be the best operator.[2] Moreover, it may encourage choices that reduce future costs at the expense of service quality. [3,4]

The literature's focus on the private agent is understandable in view of the standard presumption in academic and policy work on public procurement that the government acts to maximize social welfare. Assuming governmental benevolence is a reasonable first step in the analysis of PPPs, but, of course, over-simplifies reality. Accordingly, a fair number of recent studies have departed from the benevolence assumption by supposing that the private agent or other parties may capture the procurement process by side-contracting (colluding) with the government.[5]

In this paper we consider a less-explored reason for why procurement projects may not align with the public's best interest: government officials may have preferences that differ from those of a social welfare maximizer. More specifically, ideology, social ties, or political connections may induce an official to favor the pet projects of particular interest groups—i.e., to practice "pork-barrel" politics—even though these projects may

[1] Sometimes such internalization can be achieved without bundling if the project developer can be made fully accountable for the profits of the operator who succeeds him, as in case of second-sourcing (Iossa-Legros 2004). However, internalization may well be imperfect, either because of developer risk aversion (Martimort-Pouyet 2005) or because of collusion between the operator and its regulator, who can together manipulate accounts to the detriment of the developer (Laffont-Tirole 1988 and Stein 1989).
[2] Laffont-Tirole (1988)
[3] Hart (2003), Bennett-Iossa (2004), and Martimort-Pouyet (2005). The latter allow for quality incentives as well as observable costs.
[4] Because of their complexity, PPPs may also be costly to negotiate; see Välilä (2005, section 5)
[5] E.g., Grossman-Helpman (1994), Laffont-Martimort (1999), Laffont-Tirole (1991), and Martimort (1999). The literature includes two results on the increased scope for capture under PPP contracts: Martimort-Pouyet (2005) show that separate contracts tend to entail lower-powered incentives and therefore make capture more difficult then under bundling. Laffont-Tirole (1993, chapter 16) argue that separate contracts may be optimal despite the potential efficiency gains from bundling, because a future government (which itself may be corruptible) may undo collusion if not bound by a long-term contract signed by its predecessor.

not be justifiable from the standpoint of social welfare. We are particularly interested in how *spending caps* can mitigate the official's biases.

There is substantial evidence that politicians' project choices are influenced significantly by the desire to please constituencies and by budgetary constraints. Levin-Tadelis (2006) document that local political institutions in the U.S. have a profound impact on such choices. Less formal evidence in France suggests that efficiency considerations in the production of public goods are secondary to the government's determination to deliver visible private benefits to particular interest groups, with costs hidden or delayed as much as possible. For that matter, the very fact that governments in many countries are made to face budgetary constraints at all would be quite mysterious if their goal were truly to maximize social welfare.

Indeed, the marked increase in PPP contracts worldwide is often attributed less to the intrinsic qualities of such contracts than to governments' attempts to evade budget constraints by taking liabilities off the balance sheet.[6] For this reason, some commentators worry that accounting gimmickry may become the primary motive behind PPPs, so that "governments may not take the care to properly design contracts to ensure that appropriate incentives are in place" (Mintz-Smart 2005, page 17; see also IMF (2005), p. 27).[7]

[6] Traditionally, many countries often record PPPs off the public sector's balance sheet. Indeed, PPP financing is often provided via "special purpose vehicles" involving banks and other financial institutions, which can be used as a private veil to hide explicit or implicit government guarantees. To combat this tendency, Eurostat (2000) requires that PPPs be recorded on the public balance sheet unless the private partner carries the construction risk and either the availability or demand risk.

[7] Interestingly, PPPs are sometimes actually *justified* on the grounds that they alleviate government budgets and substitute cheap private funding for discretionary finance. Engel et al (2006) show that this argument is highly suspect, as the future user revenue lost by ceding income flows to the private sector exactly offsets the investment savings made by the government early on in the relationship. See Bassetto-Sargent (2005), Beetsman-Uhlig (1999), Blanchard-Giavazzi (2004), Calmfors (2005), Inman and Rubinfeld (1997), Koen-

Our paper builds on Maskin-Tirole (2004 and 2006) to examine PPPs as an exercise in pork-barrel politics. However, to keep the analysis simple, we limit our focus to the constraining role of public accounting systems, and, unlike our earlier papers, ignore the restraints imposed by electoral accountability.[8]

We lay out our model in section 2. In section 3, we study PPPs when contractors are "cashless," i.e., they can bear no risk in their costs. We show that a public official with biased preferences favoring some interest groups over others can be constrained to behave more in line with social welfare when subjected to a spending limit and a public accounting system. We show that the system can be assumed to be linear, and derive its optimal form. Then, in section 4, we allow contractors to be privately financed, a possibility that can raise welfare provided that financiers' monitoring costs are not too high. Private finance allows cost-plus PPP arrangements to be replaced by more efficient fixed-price contracts.

In section 5, we compare PPPs with the more conventional "unbundled" framework in which there are separate contracts for development and operations. We find that PPPs offer the potential advantage that, through the public accounting system, projects' true costs may be assessed earlier than in unbundled contracts. However, section 6 points out that PPPs also introduce the countervailing danger that contractors may be able to mask high costs by accepting low initial payments in exchange for high rents later on. Section 7 concludes by suggesting a few avenues for further work.

---

van den Noord (2005), and Milesi-Ferretti (2000) for further discussion of the proper control of public deficits and borrowing.

[8] Two other papers that examine public spending and electoral accountability are Canes-Wrone et al (2001) and Dewatripont-Seabright (2005). As explained in section 3 (see footnote 14), the most straightforward way of incorporating accountability in our model changes none of our qualitative conclusions.

2 Model

There are two periods, $t = 1, 2$ (but no discounting) and a large number of interest groups (technically, a continuum) indexed by $i \in [0,1]$. At date 1, the public official decides, for each *i*, whether or not to invest in a project that benefits that interest group. Each project *i* costs I_1 (which is deterministic) at date 1 and I_2^i (which *ex ante* is stochastic) at date 2. Because of I_2^i's randomness, the total cost $C_i = I_1 + I_2^i$ can assume either of two values : $C_i = C_L$ with probability ρ and $C_i = C_H$ with probability $1-\rho$.

Costs are independently distributed across interest groups and are borne equally by everyone (i.e., by all the interest groups). By contrast, the benefit *B* from project *i* accrues only to interest group *i*.[9] Thus if y_i denotes the decision about project *i*—where $y_i = 1$ denotes "invest in *i*" and $y_i = 0$ "do not invest"—the welfare of interest group *i* is

$$y_i B - E\left[y_j C_j\right],$$

where "*E*" denotes the expectation operator. For each project *i*, there is probability *x* that the public official (but not the public at large) learns the value of C_i in advance. In that event (which is independent across projects), we will speak of a "C_L-project" or a "C_H project." With probability $1-x$, the official does *not* learn C_i's value. We will then refer to a "$\overline{C}$-project," where

$$\overline{C} = \rho C_L + (1-\rho) C_H,$$

i.e., $\overline{C}$ is the prior mean. We assume that

[9] The exact timing of this accrual is not crucial; for concreteness, assume that it occurs at date 2 (but is anticipated by the interest group at date 1).

(1) $$C_H > B > \bar{C},$$

and so if the official maximized social welfare—i.e., the expected sum of the interest groups' welfare—she would undertake the C_L - and $\bar{C}$ - but not the C_H -projects.

For each project *i*, there is a corresponding contractor,[10] who has the same information as the official. In line with our focus on PPPs, we shall suppose for now that contractor *i* incurs both the costs I_1 and I_2^i (below in section 5, we will contrast this model with the "unbundled" case in which there are separate contractors for development and for service/operations). In return, it receives payment $t(C_i)$ as a function of its cost, as specified in the procurement contract.

We are interested in two alternative possibilities: (i) the case where the contractor has no cash and must receive $t(C_i) \geq C_i$ for any realized C_i; and (ii) that where the contractor has "financial muscle," so that it can commit to more general incentive contracts (this latter case includes the possibility that a contractor is initially cashless but can borrow from financial intermediaries).

We will start with case (i), which implies that because the official wishes *ceteris paribus* to minimize her payments, she will offer the contractor either a "cost-plus" contract, specifying $t(C_L) = C_L$ and $t(C_H) = C_H$ or a "fixed-price" contract, where $t \equiv C_L$ or $t \equiv C_H$. Note that a fixed price contract with $t \equiv C_L$ is feasible only if the official and contractor know that $C_i = C_L$; otherwise the contractor cannot be sure of covering its costs.

[10] We assume that the contractor is a private firm, i.e., independent of the government. It would be worthwhile extending the model to accommodate the trade-offs between having private and public contractors: in particular, public firms might face less severe cash constraints than their private counterparts (see below), but could give the official an additional way to channel benefits to specific interest groups.

The public official "favors" a fraction $f \in (0,1)$ of the interest groups and weights their welfare by $\alpha_f > 1$. The remaining fraction $1-f$ consists of "unfavored" groups, with welfare weight $\alpha_u < 1$. Without loss of generality, we assume that $E[\alpha_i] = f\alpha_f + (1-f)\alpha_u = 1$, where $\alpha_i \in \{\alpha_f, \alpha_u\}$ is the welfare weight on interest group *i*. The official wishes to maximize the expected sum of weighted welfare across interest groups:

$$E\left[(\alpha_i B - C_i) y_i\right]. \tag{2}$$

To introduce (i) a potential conflict between the official's actions and social welfare maximization and (ii) a tendency for the official to overspend, we assume that

$$\alpha_f B - C_H > \alpha_u B - \bar{C} > 0, \tag{3}$$

which implies, from (1), that the official will wish to replace a $\bar{C}$-project benefiting an unfavored group with a C_H-project benefiting a favored group.

We focus on how spending caps and accounting rules can be designed to best constrain the official's deviation from the social optimum.[11] A *linear accounting system* consists of a *spending limit G* on public expenditure and *accounting costs* $\hat{C}_L, \hat{C}_H,$ and $\hat{C}$, corresponding to low fixed-price, high fixed-price, and cost-plus contracts respectively. The official is then constrained to choose a set of contracts that satisfies

$$n_L \hat{C}_L + n_H \hat{C}_H + n\hat{C} \le G, \tag{4}$$

[11] We suppose that the accounting system can be specified *a priori*, e.g., by a constitution. But clearly it would also be of interest to examine the self-serving choices of accounting rules by politicians. As noted by Mintz-Smart (2005, p.2): "In practice, governments have often initiated capital accounts to provide an opportunity to escape the impact of the fiscal rule. Alternatively, they have pushed debt finance off their own books to quasi-public agencies not consolidated in the budget or to the private sector under public-private partnership arrangements." An example of this last strategem 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.

where n_L, n_H, and n are the proportions of all potential projects corresponding to low fixed-price, high fixed-price, and cost-plus contracts, respectively. We will show in section 3 that, we can impose this linear structure without loss of generality.[12] Note that we are implicitly assuming in (4) that all contracts are *publicly observable*, so that, in particular, the official cannot report a high fixed-price or cost-plus contract as a low fixed-price contract. [13]

Following the political economy literature, we suppose that the public official can be enjoined *ex ante* from exceeding her spending limit (say, by a court order), but that she cannot be punished or rewarded *ex post* (i.e., after costs are realized) for any date 1 pronouncement she makes about costs. This assumption rules out schemes in which she is induced to reveal what she knows about costs at date 1 for fear of punishment *ex post* if her cost forecast deviates from realized costs. Such schemes could, in fact, generate the full social optimum in our continuous model with independent costs (implying that there is no aggregate uncertainty), since *perfect* forecasts would be possible. However, in a somewhat more elaborate model that includes aggregate cost uncertainty and sufficient risk aversion on the part of the official, these schemes would no longer be significantly useful.

3 Optimal Accounting Systems with Cashless Contractors

[12] Because investment is the only item on our simplified government balance sheet, we can avoid the debate on the relative merits of cash accounting (which charges government investment expenses to a single budget) and accrual accounting (with the concomitant Pigou-Keynes' golden rule policy that capital—but not current—expenditures are financed through public borrowing). Our "spending cap" can equivalently be interpreted as a limit on borrowing to finance public investment.

[13] To avoid the possibility that an official can arrange a low fixed-price contract for a C_H-project by telling the contractor that she will pay it more later, we suppose that any such informal arrangement is unenforceable.

Supposing that the contractor is cashless, we now derive the linear accounting system that is optimal in the sense of inducing the official to choose the set of contracts closest to the social optimum. We also show that this scheme is optimal in the broader class of *all* feasible accounting schemes.

We note first that, since (1) implies C_H-projects are not socially desirable, we might as well take $\hat{C}_H = \infty$, so that the official will never undertake a C_H-project under a fixed-price contract. Instead, any such project will be carried out on a cost-plus basis. Of course, $\bar{C}$-projects must also be performed through cost-plus contracts. So, in effect, the official is disguising high-cost projects as $\bar{C}$-projects (the contractor obviously will not object to this gimmick since it fares equally well under cost-plus and high fixed-price contracts, and public accountants cannot prevent the gimmick since they cannot distinguish *ex ante* between C_H- and $\bar{C}$-projects).

The official solves

$$\begin{aligned}\max\Big[& x\rho\left(fy^{Lf}\left(\alpha_f B - C_L\right) + (1-f)\, y^{Lu}\left(\alpha_u B - C_L\right)\right) \\ & + x(1-\rho)\left(fy^{Hf}\left(\alpha_f B - C_H\right) + (1-f)\, y^{Hu}\left(\alpha_u B - C_H\right)\right) \\ & + (1-x)\left(f\,\bar{y}^{\,f}\left(\alpha_f B - \bar{C}\right) + (1-f)\,\bar{y}^{\,u}\left(\alpha_u B - \bar{C}\right)\right)\Big]\end{aligned} \tag{5}$$

subject to

$$\begin{aligned} & x\rho\left(fy^{Lf} + (1-f)\, y^{Lu}\right)\hat{C}_L + x(1-\rho)\left(fy^{Hf} + (1-f)\, y^{Hu}\right)\hat{C} \\ & + (1-x)\left(f\,\bar{y}^{\,f} + (1-f)\,\bar{y}^{\,u}\right)\hat{C} \le G, \end{aligned} \tag{6}$$

where y^{Lf} is the proportion of favored C_L-projects that are undertaken, and $y^{Lu}, y^{Hf}, y^{Hu}, \bar{y}^{\,f}$, and $\bar{y}^{\,u}$ are the corresponding proportions for unfavored C_L-projects,

favored C_H -projects, unfavored C_H -projects, favored $\overline{C}$ -projects, and unfavored $\overline{C}$ -projects, respectively. In view of (4) and (6) we note that

$$n_L = x\rho\left(fy^{Lf} + (1-f)y^{Lu}\right), n_H = x(1-\rho)\left(fy^{Hf} + (1-f)y^{Hu}\right), n = (1-x)\left(f\overline{y}^{f} + (1-f)\overline{y}^{u}\right).$$

Letting μ denote the shadow price of the budget constraint, we can characterize the solution by:

$$y^{Lk} = 1 \Leftrightarrow \alpha_k B \geq C_L + \mu\hat{C}_L \tag{7}$$

$$y^{Hk} = 1 \Leftrightarrow \alpha_k B \geq C_H + \mu\hat{C} \tag{8}$$

$$\overline{y}^{k} = 1 \Leftrightarrow \alpha_k B \geq \overline{C} + \mu\hat{C}, \tag{9}$$

where $k = f, u$.

Note that, given $\hat{C}_L$ and $\hat{C}$, the choice of a spending cap *G* is equivalent to specifying a value of μ. Moreover, there is one dimension of freedom in how parameters are scaled, so that the accounting costs $\hat{C}_L$ and $\hat{C}$ and the shadow price μ can be scaled up or down without changing the solution. Thus, because from (3), $\alpha_u B - C_L > 0$ we can assume, without loss of generability, that $\hat{C}_L = C_L$.

Because $B - C_L > 0$, it is socially desirable that C_L -projects always be chosen by the official. Furthermore, this desideratum is attainable by the optimal accounting system since, no matter what value is chosen for $\hat{C}, \mu\hat{C}_L$ can be taken small enough so that the inequality in (7) holds for $k = f, u$.

From (3), we have

$$\alpha_f B - \overline{C} > \alpha_f B - C_H > \alpha_u B - C_H .$$

That is, omitting low-cost projects, the official's ranking in order of decreasing preference is: (A) favored $\overline{C}$-projects, (B) favored C_H-projects, (C) unfavored $\overline{C}$-projects and (D) unfavored C_H-projects.[14] Note that because there is no way for an accounting system (whether linear or not) to distinguish between $\overline{C}$- and C_H-projects, *any* such system simply induces a *cut-off* point: all projects above that point in the official's ranking will be implemented and those below will not. Observe, furthermore, that a cut-off between (B) and (C) makes no sense: if favored C_H-projects (whose contribution to social welfare is negative) are accepted, then unfavored $\overline{C}$-projects (with a positive net contribution) should be included also. Similarly, a cut-off that either excludes or includes all projects cannot be optimal.

We conclude that the only two cut-offs that can potentially be optimal are those (i) between (A) and (B), and (ii) between (C) and (D). The former corresponds to a "tight" spending limit—in which only favored $\overline{C}$-projects are undertaken—and can be achieved through a linear accounting system by choosing μ and $\hat{C}$ so that

$$\alpha_f B = \overline{C} + \mu\hat{C}. \tag{10}$$

The latter corresponds to a "loose" spending limit—in which only unfavored C_H-projects are not undertaken—and can be attained by taking μ and $\hat{C}$ so that

$$\alpha_u B = \overline{C} + \mu\hat{C}. \tag{11}$$

[14] If we added a reelection motive to the official's objectives by supposing that a (random) fraction of the interest groups would vote for her provided that she invested in their projects, then this ranking would remain the *same*, and so none of our conclusions would be altered. If, however, there were differences across groups in the visibility of public spending or in the elasticity of voting response to such spending, then electoral accountability could make a difference.

Notice that if we take $\hat{C}_L = C_L$ (which is justifiable, as argued above) then at the optimum

$$\alpha_u B - C_L - \mu C_L \geq 0,$$

so that

$$\frac{\alpha_u B - C_L}{C_L} \geq \mu \,. \tag{12}$$

Hence, if the tight limit is optimal, (10) and (12) imply that

$$\alpha_f B \leq \bar{C} + \frac{\alpha_u B - C_L}{C_L}\hat{C} \,.$$

This means that if $\alpha_f C_L < \alpha_u \bar{C}$, we may choose $\hat{C}$ either bigger or smaller than $\bar{C}$ and still satisfy all the conditions for optimality. From (11) and (12), the same is true *a fortiori* if the loose limit is optimal.

The loose limit is optimal if and only if favored C_H-projects and unfavored $\bar{C}$-projects are *together* socially desirable on net, i.e., if

$$x(1-\rho)\, f\left(B - C_H\right) + (1-x)(1-f)\left(B - \bar{C}\right) > 0 \tag{13}$$

Summarizing, we have:

Proposition 1: Given the official's preferences and a cashless contractor, second-best social welfare can be maximized using a linear public accounting system with spending limit *G* in which (i) C_L-projects are always undertaken; (ii) the accounting cost of a C_L-project is set equal to its true cost C_L; (iii) if $\alpha_f C_L < \alpha_u \bar{C}$, the accounting cost of a $\bar{C}$-project is set either above or below its true cost $\bar{C}$; (iv) the optimal constraint is loose

(i.e., admits all $\overline{C}$-projects and favored C_H-projects) rather than tight (i.e., admits only favored $\overline{C}$-projects) if and only if (13) holds.

Remark: From (13), a loose constraint is optimal provided that the probability of *ex ante* knowledge about costs is small enough (*x* is low) or the proportion of favored groups is small enough (*f* is low).

4 Private Finance

We now introduce intermediated finance in a highly stylized fashion. Assume that at cost $m \geq 0$, financial intermediaries can monitor a project and thereby learn the date-2 cost *ex ante* (the case $m = 0$ can be interpreted as corresponding to a contractor with "deep pockets"). Backed by a private financier, a contractor has financial muscle and so can accept a fixed-price contract even for $\overline{C}$-projects.

Let us assume that *m* is sufficiently low not to render $\overline{C}$-projects socially undesirable:

$$\overline{C} + m < B .$$

With monitoring, all contracts will be of the fixed-price variety, and social welfare becomes:

$$\rho x\left(B - C_L\right) + \left(1 - x\right)\left(B - \overline{C} - m\right).$$

It is easy to check that a linear accounting system that mandates fixed-price contracts can dominate the optimal system of section 3 if and only if:

$$m \leq \min\left\{\left(1 - f\right)\left(B - \overline{C}\right), \frac{\left(1 - \rho\right) xf}{1 - x}\left(C_H - B\right)\right\}.$$

Three points follow:

(a) The benefit of intermediated finance exhibited here differs from those typically emphasized in the corporate finance literature.[15] In our framework, the contractor faces no internal incentive problem, and so intermediated finance does not—unlike in standard models—serve to reduce production costs. Instead, its role is to constrain the public official by certifying a project's cost to public accountants (or to the courts). Put differently, it enables the "securitization of public sector liabilities" and thereby provides a clearer picture of public sector performance.

(b) Private finance is associated with a higher frequency of fixed-price contracts.

(c) We cannot conclude that private finance leads to greater public investment. But, of course, it does enhance public investment if the optimal policy in the model of section 3 is a *tight* spending limit.

To summarize, we have:

Proposition 2: By monitoring the contractor, private financiers certify the cost of a project and potentially raise welfare by preventing C_H -projects from being undertaken. Private finance induces a higher incidence of fixed-price contracts.

5 Unbundling

We have assumed so far that the public official enters into long-term (two-period) contracts with contractors and have labeled such arrangements "public-private partnerships." To assess the value of PPPs, let us contrast them with arrangements in which development and operations are "unbundled." In the unbundled scenario, each project has *two* contractors: one at date 1, and one at date 2. Because date 1 costs always

[15] Summarized, for instance, in chapter 9 of Tirole (2006).

equal I_1, any date-1 contract involves payment $t_1 = I_1$ to the date-1 contractor. Thus, the spending constraint becomes

$$y\hat{C} < G,$$

where *y* is the proportion of all potential projects that are undertaken and $\hat{C}$ is the accounting cost (which now must be the *same* for all projects regardless of the actual total cost). If, as before, μ denotes the shadow price of the budget constraint, the official will undertake group *i*'s project if and only if

$$\alpha_i B \geq C_i + \mu\hat{C} \text{ with } C_i \in \left\{C_L, \overline{C}, C_H\right\} \text{ and } \alpha_i \in \left\{\alpha_f, \alpha_u\right\}. \tag{14}$$

Comparing (7)-(9) with (14), we obtain

Proposition 3: Unbundling prevents early public assessment of projects' costs and therefore (weakly) reduces social welfare.

6 Time Shifting and Hidden Rents

The import of Proposition 3 is that, compared to unbundled contracts, PPPs can increase the transparency of public accounts. However, with this benefit comes a potential countervailing danger, namely, that bundling may make hidden intertemporal transfers possible. Specifically, suppose that a PPP contract is designed so that the contractor gets a date-2 rent that is *invisible* to public accountants at date 1. The contractor will then be willing to settle for a contractual payment *smaller* than its total cost, since it knows that it will recoup the shortfall through the subsequent rent. Notice that there is no mechanism to backload payments in this way under unbundled contracts

and so there, in contrast with PPPs, the date-1 contractor would be unwilling to agree to a payment below the investment cost.

"Invisible" rents can result from deliberate omission of contractual specifications, i.e., from "strategically incomplete" contracts. For example, the contract may "neglect" to specify certain obligations on the part of the contractor that will make renegotiation later on necessary to ensure acceptable service. Such renegotiation can then create hold-up rents for the contractor. Alternatively, the contract may assign the contractor control rights whose impact is not reflected in the public accounts. According to Engel et al (2003, page 6), a case in point was a major public highway construction project in Argentina in the 1990s: the location of the toll booths was left unspecified, allowing the contractor to place them strategically and thereby raise motorists' costs well above the anticipated level.

Assume that $x = 1$, so that fixed-price contracts are always feasible. Let us formalize strategic incompleteness in a simple-minded reduced form: incompleteness (which is not publicly observable) creates a date-2 rent $r = C_H - C_L$ for the contractor, but reduces the public benefit from B to B_L. Such incompleteness allows the contractor to break even on a C_H-project when paid only C_L. The public official can then exploit the incompleteness to undertake C_H-projects for her favored groups in place of C_L-projects for unfavored groups, provided that:

$$\alpha_f B_L > \alpha_u B .$$

Note that such an undesirable substitution is not feasible with unbundled contracts because there the date-1 contractor cannot obtain a date-2 rent.

An implication of this analysis is that PPP contracts need to be carefully reviewed by independent authorities that can expose hidden rent backloading. Of course, introducing such an authority is typically expensive, so that PPPs can be expected to entail higher transaction costs than their unbundled counterparts.[16]

Proposition 4: PPP contracts may allow hidden backloading of contractor profits through strategic incompleteness of contracts.

7 Further Research

Our analysis in this paper is only a first step and leaves open many questions. Here are a few issues for further exploration:

(1) We have left electoral accountability out of our model in order to focus on accounting systems. But obviously in practice public investment is often strongly motivated by the credit that politicians can take for it. As we have noted in footnote 8, the most straightforward model of accountability would not change our conclusions at all. But more elaborate departures (e.g., those described in footnote 14) would be worthwhile exploring.

(2) Our analysis has focused on "greenfield" projects, and neglects the official's incentives to invest in such projects rather than maintain existing ones. Such a trade-off will depend both on the nature of the accounting system and on the public credit an official can derive from each activity. We might conjecture that politicians would be biased against maintenance projects, especially if those projects were initiated by others, since performance evaluation would then be subject to a "moral hazard in teams" problem.

[16] Unbundling may save on transaction costs in another way: when the uncertainty about date 2 costs resolves, it may be possible to draft simpler (and therefore cheaper) contracts at date 2.

(3) We have focused on taxpayer-financed projects. Although this may be a reasonable approximation for environmental and cultural projects (e.g., parks or museums) or education, many PPPs in practice are largely user-financed ("self-liquidating"). In fact, the mix of financing by taxpayers and users is ordinarily a policy-choice variable: the allocation of the costs for highways, airports, bridges or water-treatment facilities between taxpayers and users is subject to considerable discretion. Of course, this allocation will depend on the same considerations as already mentioned: public sector accounting and public officials' electoral concerns. Strict accounting rules are likely to favor self-liquidating investments. Yet, just as public accountants may be fooled by a public official, so may the beneficiaries of public projects. The Argentinean highway toll booths provide a good example.

(4) Spending caps can be justified by negative externalities beyond the one considered in this paper (the effect of public spending on future taxpayers). For example, public spending may also constrain future *governments*. Furthermore, future difficulties in repaying public debt can spill over to other states, regions or countries.

(5) Politicians' incentives to shift liabilities to the future suggest a complementary role for independent agencies. Such agencies (e.g., the World Bank, the General Accounting Office, or the Insitut de Gestion Déléguée in France) can provide *ex ante* advice on best-contracting and best-accounting practices and can analyze performance *ex post* to create public pressure for good overall governance.[17]

(6) Public accounting is more complicated than the process of simply labeling projects as "high-cost" or "low-cost." For example, governments often try to shift liabilities (e.g.,

[17] In the same way that the Congressional Budget Office in the United States estimates the future budgetary impact of legislation, agencies can help warn public accountants and users about the likely impact of PPPs.

unfunded pensions and future bank bailouts) off the public sector's balance sheet *altogether*. Despite the extensive discussions on fiscal constitutions throughout the world and a voluminous policy literature on constitutional design, there is essentially no analytic analysis of this important issue.

References

[1] Bassetto, M., and T. Sargent (2005) "Politics and Efficiency of Separating Capital and Ordinary Government Budgets," Federal Reserve Bank of Chicago WP No 07.

[2] Beetsma, R., and H.Uhlig (1999) "An Analysis of the Stability and Growth Pact," *Economic Journal*, 109:546-571.

[3] Bennett, J., and E. Iossa (2004) "Building and Managing Facilities for Public Services." Brunel University and CMPO (University of Bristol) Working paper.

[4] Blanchard, O., and Giavazzi (2004) "Improving the SGP through a Proper Accounting of Public Investment," CEPR Discussion Paper N1 4220.

[5] Calmfors, L. (2005) "What Remains of the Stability Pact and What Next?," report, *Swedish Institute for European Policy Studies*, 8 http://www.iies.su.se/˜ 1calmfor.

[6] Canes-Wrone, B., Herron, M. and K. Shotts (2001) "Leadership and Pandering: A Theory of Executive Policymaking," *American Journal of Political Science*, 45: 532-50.

[7] Dewatripont, M. and P. Legros (2005) "Public-Private Partnerships: Contract Design and Risk Transfer," *European Investment Bank Papers*, 10(1): 120-145.

[8] Dewatripont, M. and P. Seabright (2005) "A Theory of Wasteful Public Spending Projects," ECARES/IDEI, mimeo.

[9] Eurostat (2004) "New Decision of Eurostat on Deficit and Debt: Treatment of Public-Private Partnerships," February 11.

[10] Engel, E., Fisher, R., and A. Galetovic (2001) "Least-Present-Value-of-Revenue Auctions and Highway Franchising," *Journal of Political Economy*, 109(5): 993-1020.

[11] —2003 "Soft Budgets and Highway Franchising," mimeo, Yale University and University of Chile.

[12] — (2006) “The Basic Public Finance of Public-Private Partnerships,” mimeo.

[13] Grossman, G., and E. Helpman (1994) “Protection for Sale,” *American Economic Review*, 84: 833-850.

[14] Hart, O. (2003) “Incomplete Contracts and Public Ownership: Remarks and an Application to Public-Private Partnerships,” *The Economic Journal*, 113: 69-76.

[15] Holmström B., and P. Milgrom (1991) “Multi Task Principal-Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design,” *Journal of Law, Economics and Organization*, 7: 24-52.

[16] IMF (2005) “Government Guarantees and Fiscal Risk,” document prepared by the Fiscal; Affairs Department, April 1.

[17] Inman, R., and D. Rubinfeld, (1997) “Rethinking Federalism,” *Journal of Economic Perspectives*, 11(4): 43-64.

[18] Iossa, E., and P. Legros (2004) “Auditing and Property Rights,” *Rand Journal of Economics*, 35: 356-372.

[19] Koen, V., and P. van den Noord (2005) “Fiscal Gimmickry in Europe: One-off Measures and Creative Accounting,” OECD Economic Department Working Papers, No 417.

[20] Laffont J.J., and D. Martimort (1999) “Separation of Regulators against Collusive Behavior,” *Rand Journal of Economics*, 30: 232-262.

[21] Laffont J.J., and J. Tirole (1988) “Repeated Auctions of Incentive Contracts, Investment and Bidding Parity, with an Application to Takeovers,” *Rand Journal of Economics*, 19: 515-537.

[22] — (1991) "The Politics of Government Decision Making: A Theory of Regulatory Capture," *Quarterly Journal of Economics*, 106: 1089-127.

[23] — (1993) *A Theory of Incentives in Procurement and Regulation*, Cambridge and London: MIT Press.

[24] Levin, J., and S. Tadelis (2006) "Contracting for Government Services: Theory and Evidence from the U.S. Cities," mimeo.

[25] Martimort, D. (1999) "The Life Cycle of Regulatory Agencies: Dynamic Capture and Transaction Costs," *Review of Economic Studi*es, 66: 929-948.

[26] Martimort, D., and J. Pouyet (2006) "Build it or Not: Normative and Positive Theories of Public-Private Partnerships," mimeo IDEI Toulouse and Ecole Polytechnique.

[27] Maskin, E. and J. Tirole (2004) "The Politician and the Judge: Accountability in Government," *American Economic Review*, 94:1034-1054.

[28] — (2006) "Pandering and Pork-Barrel Politics," mimeo, IAS Princeton, and IDEI Toulouse.

[29] Milesi-Ferretti, G.M. (2000) "Good, Bad or Ugly? On the Effects of Fiscal Rules with Creative Accounting," IMF Working Paper WP/00/172.

[30] Mintz, J., and M. Smart (2005) "Incentives for Public Investment under Fiscal Rules," mimeo, University of Toronto.

[31] Stein, J. (1989) "Efficient Capital Markets, Inefficient Firms: A Model of Myopic Corporate Behavior," *Quarterly Journal of Economics*, 104: 655-669.

[32] Tirole, J. (2006) *The Theory of Corporate Finance*, Princeton University Press.

[33] Välilä, T. (2005) "How Expensive are Cost Savings? On the Economics of Public-Private Partnerships," *European Investment Bank Papers*, 10(1): 94-119.