

The governance function of public-private partnerships in transport infrastructure

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Abstract

The paper analyzes the effect of public private partnerships on the governance of infrastructure investment projects. Project costs are uncertain ex ante. The pre-evaluation of projects allows to identify the future costs of part of the potential projects. Without pre-evaluation of financial intermediaries, accounting costs and budget constraints are instruments to contain the deviation of decisions of government officials from welfare maximization. Apart from a sub-class of low cost projects, costs have to be covered by cost-plus contracts. With private participation, and the pre-evaluation by financial intermediaries, fixed price contracts become optimal. This leads ceteris paribus to an increase in investment in transport infrastructure.

As a consequence of the recent financial crisis allocations of fiscal resources to transport infrastructure have been drastically expanded while private capital flows have drained. The paper shows how this can lead to an increase of investments favoring particular interest groups.

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1 Introduction

The financial crisis of recent years was preceded by major changes in public sector policies. Waves of privatization have materialized in developed and developing countries, outsourcing towards the private sector of production activities that were formerly publicly provided, a shift towards more competition in segments which were previously ruled by public enterprises and sometimes heavy regulation are features of this trend. Private public partnerships are contractual arrangements which are of major importance for the provision of infrastructure services in the transport sector. Major examples of this trend are the British Private Finance Initiative and similar initiatives in Canada and the US.

Much of the economic literature on PPP's has focussed on the bundling of the contractual relations of designing a project, financing it, building the corresponding infrastructure, and finally managing it on a day-to-day basis. Positive effects of this bundling are due to the fact that cost minimization in one task might lead to higher costs for other tasks. The internalization of externalities between the different tasks leads to the reduction of overall costs.

Negative consequences have been drawn from the fact that bundled public private partnership arrangements require high powered incentive regulation, increasing the domain of regulatory capture. (Martimort and Pouyet, 2008) The provision of government guarantees for public private partnerships has been criticized as alleviating budget pressures in the short-run but increasing fiscal problems in the long-run. (International Monetary Fund, 2005)

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2 The model

To fix ideas on the effects of the financial crisis on the effects of PPP's on governance we use a model that builds on Maskin and Tirole (2008). There are two periods, $t = 1, 2$. For the sake of simplicity, and without loss of generality, there is no discounting. There is a large number of interest groups in a certain municipality 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 is associated with known and certain costs I_1 in the first period. In the second period the project has ex ante stochastic costs of I_2^i . The total cost of the project is therefore

$$C_i = I_1 + I_2^i = \begin{cases} C_H \\ C_L \end{cases} \quad (1)$$

The high of the possible values C_H will be achieved with probability ρ and the low value with probability $1 - \rho$. Interest groups are not able to influence the distribution of the financing burden, i.e. costs of all projects have to be borne equally by everyone. By contrast, only group i will enjoy the benefits B of the project.

Without information on period 2 costs of the project the total costs have the prior mean

$$\bar{C} = \rho C_L + (1 - \rho) C_H \quad (2)$$

To pin down the governance problem we assume that

$$C_H > B > \bar{C} \quad (3)$$

That is, the social benefits B are enjoyed by all members of society. Benefits are smaller than the costs of high-cost projects. An official who maximizes social welfare would implement a project with the mean cost level *overline* C , but not project C_H , C_H being a project where high costs are known to the government official and the contractor ex ante.

For each project there is a contractor, which we will distinguish to be a private contractor or a public enterprize. The contractor will incur total costs (unless there is unbundling of the period 1 and period 2 costs). To cover the costs

the contractor will receive a transfer payment as a function of the costs. For contractors without access to the capital market (the public company), they will receive either a cost-plus or a fixed price contract.

The public official favors a fraction $f \in (0, 1)$ of the total population. This manifests itself in a welfare weight $\alpha_f > 1$. The government official assigns a weight $\alpha_u < 1$ to the unfavored portion $(1 - f)$ of the population.

The favoritism of the official may lead to a tendency to discriminate against projects with relatively low costs and a tendency to overspend. These tendencies result if

$$\alpha_f B - C_H > \alpha_u B - \bar{C} > 0 \quad (4)$$

The next section discusses spending caps and accounting rules to constraint the official's intended deviation from the social optimum.

3 Budget constraints and accounting costs

The policy to contain the deviation of an official or an implementation agency from social welfare maximization is formulated as the imposition of accounting costs, \hat{C}_L, \hat{C}_H and \hat{C} for low fixed price, high fixed price and cost-plus contracts respectively, and a spending limit G . The government official is then constrained to choose a set of contracts which satisfy

$$n_L \hat{C}_L + n_H \hat{C}_H + n \hat{C} \leq G, \quad (5)$$

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. All contracts are publicly observable, so that contracts cannot be misrepresented by the officials to the public, and in particular high fixed-price and cost-plus contracts could be reported as low fixed-price to the public. In line with the the political economy literature (Engel et al., 2006), it is assumed that public officials cannot be punished ex post, once a project has been realized.

Equation 3 implies that C_H projects are not socially desirable, which means that they are never carried out under a fixed price contract. If high cost projects C_H are to be carried out, they have to be performed through cost-plus contracts. Projects without an ex ante knowledge about the costs of the \bar{C} must also be associated with cost-plus contracts. The official trying to favor groups of the population will therefore try to disguise high-cost projects as

projects with ex ante unknown costs. Public accountants cannot distinguish ex ante between \bar{C} and C_H projects. Faced with a system of accounting costs and a budget constraint, the official solves the following program

$$\begin{aligned} \max_y \quad & x\rho[fy^{Lf}(\alpha_f B - C_L) + (1-f)y^{Lu}(\alpha_u B - C_L)] \\ & + x(1-\rho)[fy^{Hf}(\alpha_f B - C_H) + (1-f)y^{Hu}(\alpha_u B - C_H)] \\ & + (1-x)[f\bar{y}^f(\alpha_f B - \bar{C}) + (1-f)\bar{y}^u(\alpha_u B - \bar{C})] \quad (6) \end{aligned}$$

subject to

$$\begin{aligned} x\rho[fy^{Lf} + (1-f)y^{Lu}]\hat{C}_L + x(1-\rho)[fy^{Hf} + (1-f)y^{Hu}]\hat{C} \\ + (1-x)[f\bar{y}^f + (1-f)\bar{y}^u]\hat{C} \leq G, \quad (7) \end{aligned}$$

where y^{Lf} is the proportion of favored C_L projects that are implemented, and y^{Lu} , y^{Hf} , y^{Hu} , \bar{y}^f and \bar{y}^u the corresponding proportions of favored and unfavored projects of the different types. From equations 5 and 7 we have

$$\begin{aligned} n_L &= x\rho[fy^{Lf} + (1-f)y^{Lu}] \\ n_H &= x(1-\rho)[fy^{Hf} + (1-f)y^{Hu}] \\ n &= (1-x)[f\bar{y}^f + (1-f)\bar{y}^u] \end{aligned}$$

With μ denoting the shadow price of the budget constraint, the solution is given by the following conditions

$$y^{Lk} = 1 \Leftrightarrow \alpha_k B \geq C_L + \mu\hat{C}_L \quad (8)$$

$$y^{Hk} = 1 \Leftrightarrow \alpha_k B \geq C_H + \mu\hat{C} \quad (9)$$

$$\bar{y}^k = 1 \Leftrightarrow \alpha_k B \geq \bar{C} + \mu\hat{C}, \quad (10)$$

where $k = f, u$.

Determining a budget cap G is equivalent to defining the shadow price μ . Because of equation 4, with $\alpha_u B - C_L > 0$ we can set $\hat{C}_L = C_L$, without loss of generality. As $B - C_L > 0$ it is socially desirable all C_L projects should be realized. The optimal accounting system should take this into account by setting μC_L small enough such that inequality 8 holds for all k .

From equation 4 we have a ranking of the official who intends to choose

projects to favor certain interest groups.

$$\alpha_f B - \bar{C} > \alpha_f B - C_H > \alpha_u B - \bar{C} > \alpha_u B - C_H \quad (11)$$

Omitting low cost projects, which should always be implemented, the ranking shows that the official prefers favored \bar{C} projects to favored high cost projects to unfavored projects for which the second period costs are not known ex ante and to unfavored projects with high costs.

If the implementation of undesirable projects is to be excluded, the spending limit has to be such that no C_H projects are undertaken, but only favored projects for which the total costs are unknown ex ante. Such a limit would be achieved by choosing μ and \hat{C} such that

$$\alpha_f B = \bar{C} + \mu \hat{C} \quad (12)$$

By taking the real costs as the accounting costs which has been argued above, then at the optimum

$$\alpha_u B - C_L - \mu \hat{C}_L \geq 0, \quad (13)$$

which implies

$$\frac{\alpha_u B - C_L}{C_L} \geq \mu \quad (14)$$

We can summarize this framework for studying favoritism of government officials and the design of accounting cost systems and spending caps to control them in the following.

Given the preferences of the government officials, and no access to private finance, second-best social welfare can be maximized using a linear public accounting system with spending limit G under which (i) C_L projects are always undertaken, (ii) the accounting cost of a low cost project of the C_L type is set equal to its true cost C_L .

4 Contractual changes with private capital

Private intermediated finance is introduced by assuming that, at a cost of $m \geq 0$, not only the government official but also a financial intermediary can pre-evaluate a project together with the project's contractor. The pre-evaluation allows to identify the cost in the second period with a probability of x . The pre-evaluation and the support by private finance allows the contractor to accept a fixed-price contract and all the project risk. The pre-evaluation by the financial intermediary excludes that subsets of the population are discriminated against, and the welfare expression under fixed-price contracting is

$$\rho x(B - C_L) + (1 - x)(B - \bar{C}) - m \quad (15)$$

¹ It excludes that high cost projects are financed based on high evaluations of the interests of a subset of the population.

This implies that

- there is a pre-valence of fixed-price contracts,
- there is no benefit from private finance for low cost projects, as they were implemented in any case under fixed-price contracts,
- the beneficial effect of private finance consists of the constraining of the government officials decision options by certifying a project's costs to public accountants (or courts),
- the fiscal space increases relative to the spending cap in the case without private finance.

5 Consequences of the financial crisis

The financial crisis of 2008/2009 manifested itself in the draining of sources of public finance. At the same time, public expenditures were increased to compensate for the shortfall of effective demand. In the framework of the above analysis, such an external change leads to consequences in the discretionary powers of government officials and therefore in the quality of transport infrastructure facilities:

The increase of government spending lifted the spending caps, which together with the accounting cost systems were designed to control the discretionary powers of government officials. This reduced the shadow price of the spending cap. Equations 8 to 10 suggest that the reduction of the shadow price would

¹ It is assumed that the social surplus of the project is higher than the cost of the pre-evaluation.

allow the financing of projects of the type C_H which according to the assumptions under 3 are not socially beneficial. Decisions to adopt such projects are driven by the intent to favor special consumer groups by putting a high weight on their preferences.

While the consequences of the financial crisis for public expenditures may be of a temporary nature, the long lifetimes of transport infrastructure facilities will lead to a long-term worsening of the quality of infrastructure stock. Policy measures to induce private finance for public infrastructure projects could reduce the risk of the worsening of the governance in transport infrastructure policies and the ensuing worsening of the quality of infrastructure services.

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