Government Outsourcing: Public Contracting with Private Monopoly

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Introduction

- The paper studies private participation in regulated and/or publicly owned industry.

- Between 1980 and 1996 state ownership in LDC went from 16% to 8% of GDP.

- LDC account for 1/3 of worldwide proceeds of privatization.

  $\Rightarrow$ Privatisation and PPP are a massive phenomenon

Theoretical Literature on Privatization

- Poor economic performance of public enterprises ⇒ Privatization

- Focus on micro-economic explanations:
  - Conflicts between governments and firm's objectives (e.g., malevolence, paternalism)
  - Time Inconsistency and Soft Budget Constraint (e.g., inefficient level of subsidies, re-nationalization)

Privatization in Practice

- It coincides with situations of growing public debts and large trade deficits
  - Japan 1982 $\Rightarrow$ deficit was 41.2% of GDP.
  - France 86 $\Rightarrow$ proceeds reduced public deficit.
  - U.S. $\Rightarrow$ privatizations more likely in States with binding fiscal constraints.
- It has been a major component of structural adjustment programs in LCDs.
- Proceeds are used to reduce domestic financing on one-for-one basis.

$\Rightarrow$ **Macro-Economics Concerns**

The Paper Setting

- The paper focuses on *natural monopoly* under adverse selection.
- Theory: regulation is always better than *laissez-faire* because the regulator can always mimic the market outcome (revelation principle).
- Practice: deregulation and privatization reforms have been implemented in utilities, transportation and communication industries.

$\Rightarrow$ **WHY?**

REGULATION IS COSTLY

- Regulation is not anonymous $\Rightarrow$ It depends on the opportunity cost of public funds λ.
- Soft budget constraint $\Rightarrow$ public firms are *ex-post* profitable.
- Asymmetric information $\Rightarrow$ a regulated firm has a higher cost function than a private one: virtual cost $>$ marginal cost.

$\Rightarrow$ **Cost/benefit analysis.**

The Model

- Natural Monopoly: $C(Q, \beta) = K + \beta Q$
  - $\beta \in [\underline{\beta}, \bar{\beta}]$ according to $G(\beta)$.
  - $F =$ franchise fee; $t =$ public transfer
  - $\Pi(\beta, Q, t, F) = P(Q)Q - \beta Q - K + t - F$
- Gross consumer surplus: $S(Q) = \int_0^Q P(x)dx$
- Government is utilitarian:

  $W(\beta, Q, t, F, \lambda) = S(Q) - \beta Q - K + \lambda(F - t)$

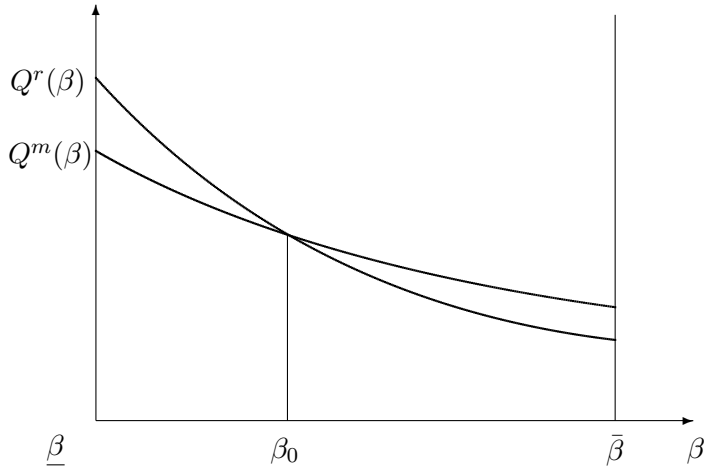
Public vs. Private Outcome

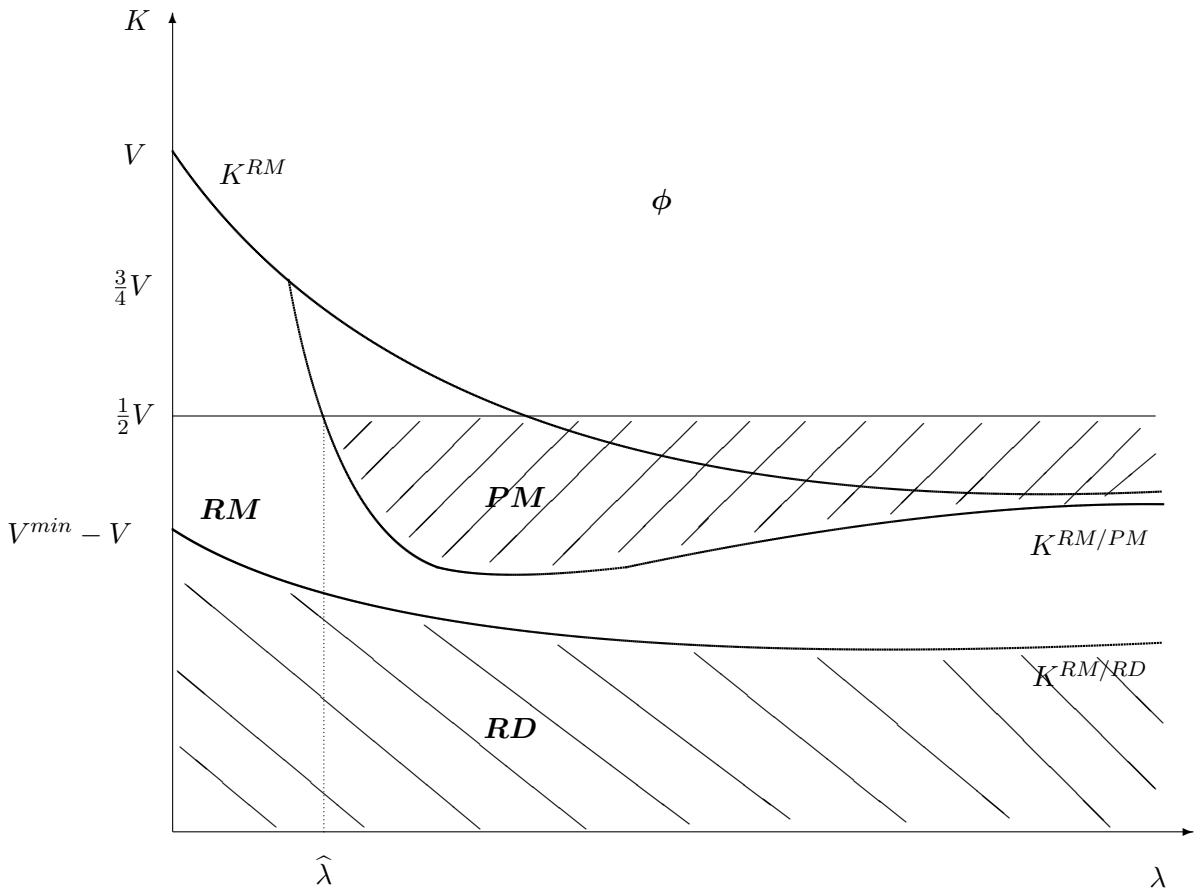
- Private monopoly under laissez-faire sets $Q^m(\beta)$:

$$\frac{P(Q)-\beta}{P(Q)} = \frac{1}{\epsilon}$$

- Public firm under Regulation sets $Q^r(\beta)$:

$$\frac{P(Q)-(\beta+\frac{\lambda}{1+\lambda}\frac{G(\beta)}{g(\beta)})}{P(Q)} = \frac{\lambda}{1+\lambda}\frac{1}{\epsilon}$$


$Q^r(\beta)$
$Q^m(\beta)$
$\underline{\beta}$
β_0
$\bar{\beta}$
β



Optimal Industrial Policy: Public Vs Private Outcome

PPP: Government Outsourcing

- Timing
  - *Government sets franchise fee F*
  - Private entrepreneur invests F and K
  - Nature chooses β; Entrepreneur learns β
  - Government proposes contract $\{t^c(\cdot), Q^c(\cdot)\}$
  - *Entrepreneur is free to pick a contract.*
  - Firm produces and sells output.
- Major changes w.r.t. public ownership:
  - $F \neq 0$
  - (PC) $\quad \Pi^c(\beta) \geq \Pi^m(\beta) \neq 0$

Quantity and profit under outsourcing

Let $\beta_0 \in [\underline{\beta}, \overline{\beta}]$ be such that:

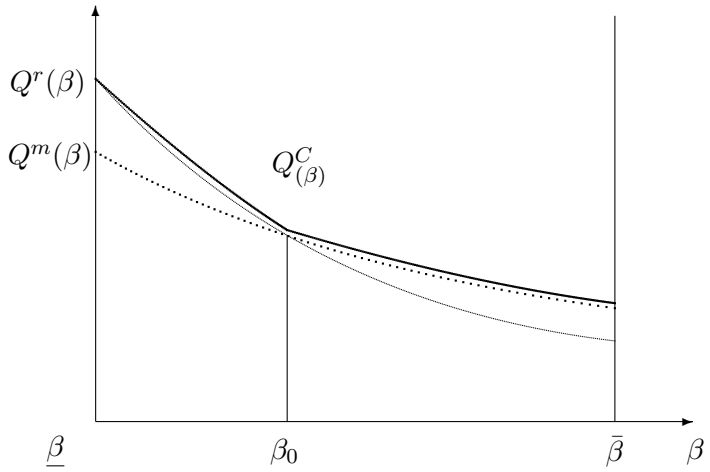
$$P(Q^m(\beta_0)) = \beta_0 + \lambda \frac{G(\beta_0)}{g(\beta_0)}.$$

Lemma 1 *Output and profit of the firm under ex-post contracting are equal to*

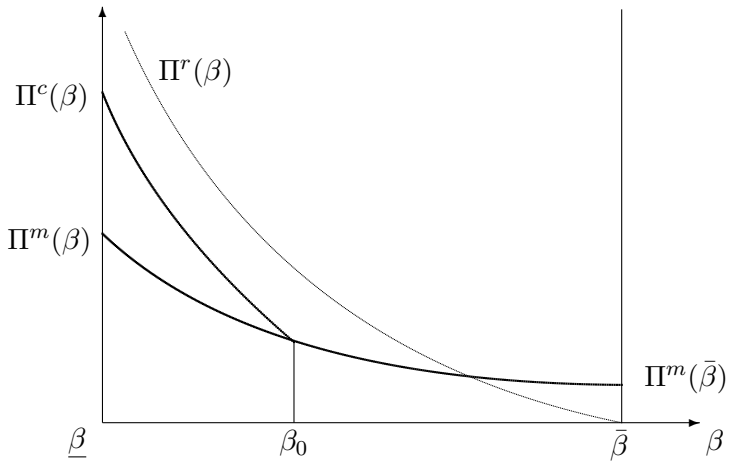
$$Q^c(\beta) = \begin{cases} Q^r(\beta) > Q^m(\beta) & \text{if} \quad \beta < \beta_0 \\ Q^m(\beta) & \text{if} \quad \beta \geq \beta_0 \end{cases}$$

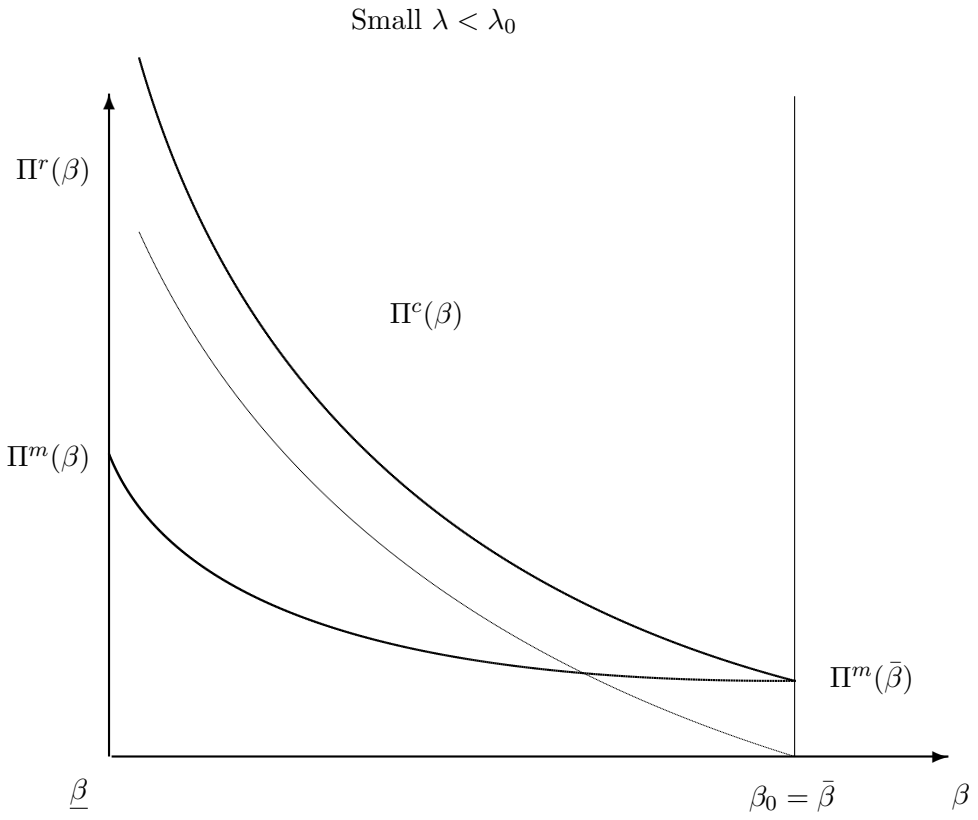
$$\Pi^c(\beta) = \begin{cases} \Pi^m(\beta_0) + \int_{\beta}^{\beta_0} Q^r(\beta)\, d\beta > \Pi^m(\beta) & \text{if} \quad \beta < \beta_0 \\ \Pi^m(\beta) & \text{if} \quad \beta \geq \beta_0 \end{cases}$$

High $\lambda > \lambda_0$



High $\lambda > \lambda_0$




Small $\lambda < \lambda_0$
$\Pi^r(\beta)$
$\Pi^c(\beta)$
$\Pi^m(\beta)$
$\Pi^m(\bar{\beta})$
$\underline{\beta}$
$\beta_0 = \bar{\beta}$
β

Proposition 1 *Let* $\lambda_0 = g(\overline{\beta})\left[P(Q^m(\overline{\beta})) - \overline{\beta}\right]$.
(i) If $\lambda \leq \lambda_0$ *all firms receive an ex-post contract.*
(ii) If $\lambda > \lambda_0$ *the fraction of private firms that receives an ex-post contract decreases with* λ *and tends to zero when* $\lambda \to \infty$.

Welfare Comparaison

Proposition 2 *Let* $\Delta t = \Pi^m(\beta_0) - \Pi^r(\beta_0)$.
Outsourcing is preferred to public ownership iff $EW^c(\lambda) - EW^r(\lambda) \geq 0$.

$$EW^c(\lambda) - EW^r(\lambda) = \lambda\left\{F - \Delta t G(\beta_0) + \int_{\beta_0}^{\overline{\beta}} t^r(\beta)\, dG(\beta)\right\}$$
$$+ \int_{\beta_0}^{\overline{\beta}} \left[\, W(\beta, Q^m, \lambda) - W(\beta, Q^r, \lambda) \,\right] dG(\beta)$$

Small λ

Proposition 3 *For $\lambda \leq \lambda_0$, outsourcing is preferred to public ownership iff $F > \Pi^m(\overline{\beta})$.*

$\Rightarrow$ Risky business, high technology industry.

Proof

$EW^c(\lambda) - EW^r(\lambda) \geq 0$ iff

- $\lambda\{F - \Delta t G(\beta_0) + \int_{\beta_0}^{\overline{\beta}} t^r(\beta)\, dG(\beta)\}$
  $+ \int_{\beta_0}^{\overline{\beta}} [\, W(\beta, Q^m, \lambda) - W(\beta, Q^r, \lambda)\,]\, dG(\beta) \geq 0$

- $\lambda \leq \lambda_0 \Rightarrow \beta_0 = \overline{\beta}$, $\Delta t = \Pi^m(\overline{\beta}) \Rightarrow$
  $EW^c(\lambda) - EW^r(\lambda) = -\lambda \Pi^m(\overline{\beta}) + \lambda F.$

High Franchise Fees

Proposition 4 *Outsourcing is preferred to public ownership for any λ if F is sufficiently close to the expected profit of the firm under outsourcing $F^{max} = E\Pi^{c}_{F=0}$.*

$\Rightarrow$ Efficient financial markets.

Corollary 1 *If F is endogenously determined by an efficient bargaining process then outsourcing is always preferred to regulation. F can be positive or negative.*

Proof

$$EW^c(\lambda) > EW^r(\lambda) \text{ iff}$$

$$\lambda\left[E\Pi_0^c - F\right] < \begin{cases} \lambda \int_{\underline{\beta}}^{\overline{\beta}} \Pi^r(\beta)\, dG(\beta) & (>0) \\ +\lambda \int_{\beta_0}^{\overline{\beta}} [\Pi^m(\beta) - \pi(\beta, Q^r)] dG(\beta) & (>0) \\ + \int_{\beta_0}^{\overline{\beta}} [W(\beta, Q^m, \lambda)) - W(\beta, Q^r, \lambda)] dG(\beta) & (>0) \end{cases}$$

Conclusion

- Contracting with private monopoly can be welfare improving w.r.t. public ownership.
- Outsourcing is especially relevant when λ is small and F is high $\rightarrow$ rich countries.
- But also with high uncertainty $\rightarrow$ High Tech
- Pharmaceutical industry:
  - High private investment (17% of sales)
  - Uncertainty ($\frac{1}{1000}$ patented drugs marketed)
  - Patent and private monopoly
  - Ex-post subsidies of drugs