

# Arm's Length Delegation of Public Services\*

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## Abstract

Delegation is a key feature of political decision making: Mayors or prime ministers delegate to subordinates, voters delegate to elected representatives. We analyze the effect of political delegation on public service provision and the choice between private or public providers when contracts are incomplete and incentives therefore distorted. We identify two important effects: The *incentive effect* increases the incentive part of service providers' remuneration and delegation may therefore be a substitute for an explicit complete incentive contract. The *bargaining effect* improves the bargaining position vis a vis a private firm with market power. In general, these effects imply that delegation improves public service provision.

**Keywords:** Outsourcing, Strategic Delegation, Public Service Provision, Incentives, Incomplete Contracting, Market Power, Representative Democracy.

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# 1 Introduction

Public services are fundamental aspects of modern welfare states. They claim a significant part of government budgets and are in most societies subject to stark political debates. During the last decades private procurement of public services has been increasingly common (see surveys by World Bank 1995, Shleifer 1998, and Megginson and Netter 2001). Key aspects of public and private service contracting are often subject to political delegation: Prime ministers', mayors' and other politicians' calendars are so packed that they are forced to delegate important part of the contracting, monitoring and renegotiation with public and private service providers to subordinates. Furthermore, in representative democracy, voters delegate political decisions to elected representatives. In this article, we analyze how delegation of political decision making influences both the quality and cost of public service provision and the incentives to outsource to private contractors.

In many areas, such as health, child and elderly care, police or military service, where it is difficult to describe, monitor and contract upon quality, the outsourcing of public service provision involves a trade off between cost and quality.<sup>1</sup> Focusing on this case, we consider a simple framework where a *principal* delegates to a politically motivated *agent*. Our model is sufficiently general to cover both the case of a mayor or prime minister who delegates to a politically motivated subordinate (or NGO) to decide on the service provision and the case of representative democracy where voters (in effect the median voter) elect a politician. We show that delegation can be used strategically to provide service providers with better incentives and to counter private market power and that it therefore has important implications for the public budget and the effects of outsourcing.

We consider a world where contracts are necessarily incomplete as in Hart (1995). The incompleteness of contracts makes direct incentive contracts unfeasible and makes the service provider's incentives indirect and come through renegotiation of the contract. The incentives are therefore in general not optimal and typically stronger (for good and bad) in the private sector where the firm is the residual claimant. In our model, this implies that a government faces a cost-quality trade off when it chooses between contracting with a public or a private service provider.

We build on the framework of Hart, Shleifer and Vishny (1997) but extend this in three ways: First, we take into account that the public manager is hired in a market and that his total pay therefore reflects the outside option this market provides for him. Secondly, we consider the case where there may be market power in the private sector. Thirdly, we assume that even though contracting with the firm is not complete, there is a possibility that the government can block

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<sup>1</sup>In other areas, like for instance, electricity provision or garbage collection, where quality is easy to contract upon ex ante and monitor ex post, outsourcing and/or privatization can imply cheaper service provision at a higher level of quality.

cost reductions in the firm since they hurt quality. In this case, the firm and the government will renegotiate and split the surplus (if any is present) from implementing the cost reductions.

We identify two important effects of delegation: *The incentive* and *the bargaining effects*. The principal can influence the service provider's incentives by delegating the future renegotiation of the contract to an agent with different preferences. For instance, an agent who is more keen on cost reductions is willing to pay the service provider more for reducing cost. The service provider therefore has a larger incentive to spend effort on cost reductions when he foresees contract renegotiations with such an agent. The principal likes the stronger incentives, but dislikes the higher payment. However, when the initial contract is made with service provider, the income from the renegotiation is taken into account and the fixed pay is lowered since the service providers's total pay reflects his outside option. *The incentive effect* of delegation, therefore, effectively shifts part of the fixed pay towards incentive based pay. Hence, *delegation essentially substitutes for an explicit incentive contract*.

Secondly, delegation may counter private market power through the *bargaining effect*. Depending on agents' preferences on the cost-quality trade off they will be more or less keen to outsource. The principal can take advantage of this by delegating to an agent, who only reluctantly outsources. Facing a high price from the private firm, this agent will not outsource, which forces the firm to lower the price. The *bargaining effect* implies, therefore, that delegation is an effective tool for *achieving lower prices* from private service providers. The appointment of an agent reluctant to outsource forms a credible commitment to a tough stance in the bargaining.

In many cases, delegation is necessary because of the simple fact that leading politicians (whether prime ministers, presidents or mayors) have limited time and packed calendars. This implies that the important political choice for them is whom to delegate to. This is also the situation voters face in a representative democracy. The institutional framework has implications for the range of possibilities. In many countries, the law prescribes that certain services, such as policing, defence, and central services of the welfare state like elderly care or parts of public medicare, should be provided by the public sector; from the perspective of the politician there is *mandatory inhouse provision*. Even though outsourcing is not an option, the principal may delegate the authority to contract with the public manager. In other situations, outsourcing is an option. Then there are two distinct sets decisions, the outsourcing decision as well as authority to renegotiate the contract with the chosen service provider. The principal may delegate both decisions to one agent, we denote this case *arm's length delegation*. A prominent case is representative democracy, where voters delegate these decisions to an elected representative. Other prominent cases are where a prime minister delegates to a department minister with full powers or where a government delegates to an NGO.

We also consider *partial delegation*, where the principal decides on "the big decision" whether the service should be outsourced or not but delegates the authority to renegotiate midway with

the service provider; for example, the prime minister takes the outsourcing decision and leaves the subsequent authority to a resort minister or a referendum on outsourcing was held among voters and an elected representative was in charge of the midway renegotiation with the service provider. Finally, as a benchmark, we shortly discuss *double delegation* where each decision is delegated to different independent agents.

Under *partial delegation* delegation always improves efficiency. The principal chooses the agent exclusively with an eye on *the incentive effect* and the renegotiation. In fact, *the incentive effect* implies that for a large part of the parameter space (as long as solutions in the model are interior), delegation leads to first best. From an efficiency point of view, *partial delegation* is the optimal institution.

Under *arm's length delegation* the principal's choice of agent is motivated both by the outsourcing decision and the subsequent recontracting. These two motives implies that the *incentive effect* is not exclusively in focus. If the principal prefers a particular mode of provision, she has to make sure that the agent also prefers this mode, and this sometimes limits the available choices. Furthermore, when the principal prefers outsourcing, she has an eye on the *bargaining effect*. In the end, *arm's length delegation* may improve efficiency compared with no delegation, this is when the principal prefers inhouse provision and takes advantage of the *incentive effect*. When however, outsourcing is chosen, the *bargaining effect* dominates (in large parts of the parameter space) and this actually may hurt efficiency.

For the principal there is always the option to delegate to a type like herself; if she does something else, it is because it improves her situation. The option to use the *incentive effect* without worrying about whether the agent will outsource or not makes *partial delegation* best when the principal prefers inhouse provision. When, however, the principal prefers outsourcing *the bargaining effect* may imply that she prefers *arm's length delegation*. The paper contains a proposition giving the full characterization.

The outsourcing decision in equilibrium is the same under *no delegation* and *arm's length delegation*, while outsourcing is optimal for a larger range of parameter values under *partial delegation*. Hence, delegation may lead to more outsourcing, but does not necessarily do so.

In a representative democracy voters delegate decisions to politicians as is the case under *arm's length delegation*. An interpretation of the model is that the principal is the median voter and the agent the elected politician. It is hardly realistic to assume that voters could do without delegation of the renegotiation authority. However, one could imagine that major decisions regarding outsourcing of the services of the welfare state are put to referenda. This would be like *partial delegation*. We show that there is outsourcing for a larger range of parameters under *partial delegation*, hence the model predicts that referenda should make outsourcing more likely.

The theoretical literature has focused on welfare consequences of privatization and outsourcing focusing on asymmetric information (Laffont and Tirole (1991), Schmidt (1996) and

Shapiro and Willig (1993)), political failures (Shleifer and Vishny (1994) and Bennesen (1999)) and incomplete contracting (Hart, Shleifer and Vishny, 1997). Besley and Ghatak (2001) study optimal ownership structures among two parties, governments or NGO's, that both care about and invest in public projects. Debande and Friebe (2004) analyze why governments engage in mass privatization; Börner (2006) studies why governments implement political reforms; and, Ellman (2006) focusses on when a government's loss of control reduces its responsiveness to public opinion which can reduce the public's political involvement. Contrary to these studies we consider strategic delegation in the sense of Vickers (1985) and Fershtman, Judd and Kalai (1987) in an incomplete contracting environment.<sup>2</sup>

A growing number of empirical studies address local governments' outsourcing. Lopez de Silanes et.al. (1997) document that political ideologies affect the outsourcing decision at the county level in US. Brown and Potoski (2003) and Levin and Tadelis (2005) show the importance of transaction costs in contracting when local governments decide on outsourcing of public services. The latter study develops a measure of contracting difficulty of different services and shows that it is strongly correlated with whether services are provided inhouse in US municipalities. This literature documents that political preferences, degree of contractual incompleteness and complexity of service provisions are all important factors in deciding the type of service provision. Our analysis highlights that delegation is a powerful instrument in such environments.

Our model focuses on the trade off between cost and quality of service provision. We believe that this trade off is essential in many kind of governmental services although not all. The *quality shading* hypothesis argues that quality may deteriorate when service production is transferred to the private sector (Jensen and Stonecash, 2005). Hartley (2004) and Fredland (2004) analyze provision of combat and support functions to sovereign governments by private companies. The studies conclude that there are substantial potential cost saving from outsourcing military activities but their economic role will be limited due to contractual hazards. There are a number of studies that link ownership structures of hospitals to the quality of the delivered health care (a.o. Sloan et al. 1998, Devereaux et.al. 2002 and Deber 2002) where the ultimate measure of quality is likelihood of death. Similarly, Crampton and Starfield (2004) discusses the quality effects of private provision of primary health service.<sup>3</sup> Many other empirical studies of privatization have focused on how increased competition has affected the cost of maintaining facilities and providing public and private services (see e.g. Vickers and Yarrow (1988), World Bank (1995) and (1997), and the survey by Megginson and Netter (1999)).

The structure of the paper is as follows: The basic framework with the benchmark case of no delegation is considered in section 2. Inhouse provision and delegation under mandatory

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<sup>2</sup>Our paper is also related to the large literature on central bank independency following Rogoff (1985). The focus in central bank delegation is on the ability to commit to a certain future policy.

<sup>3</sup>Some studies have investigated the quality effects of outsourcing garbage collection (a.o. McDavid (2002)) an area where outsourcing generally reduces cost and frequently increase quality.

inhouse provision is studied in section 3. Section 4 considers outsourcing and delegation under mandatory outsourcing. The different kinds of delegation are analyzed in section 3, while the principal's ranking of these are discussed in section 4. Partial and arm's length delegation are considered in section 5 and 6. Efficiency and the principal's preferred mode of delegation is discussed in section 7. Section 8 offers a few concluding remarks.

## 2 The basic framework

The government provides a service, which can be produced inhouse or outsourced. Apart from providing the service, the crucial task faced in service provision is a reduction of cost. The service provider - whether the public manager or the firm - performs cost reducing effort,  $e$ , at a private cost of  $\frac{1}{2}e^2$  which results in plans. Effort is observable but ex ante non-contractible: The service provider's investment in cost reduction is observable but not verifiable to third parties, i.e. it cannot be written into contracts that are enforceable ex post.<sup>4</sup> The total costs of producing the service consists of remuneration of the manager (if such a one is present) plus other costs. If the cost reduction plans are implemented, the non-managerial cost of producing the service is lowered from  $C_0 > 0$  to

$$C(e_c) = C_0 - e. \quad (1)$$

If the government produces inhouse, the government bears the total costs. In case of outsourcing, the firm bears the cost, but is paid a price from the government to provide the service. The firm is owned by its manager so it has no managerial wage cost.

If the cost reduction plans are implemented, the quality of the service will be reduced to

$$Q(e_c) = Q_0 - \theta e. \quad (2)$$

The parameter  $\theta \geq 0$  reflects how severe the quality effect is. The principal cares about public service provision and likes quality,  $Q$ , but dislikes the government expenditure associated with paying the total costs of the service  $Y$ . Her utility is

$$v(Q, Y) = \phi_p Q - Y, \quad (3)$$

where  $\phi_p \geq 0$  is the weight she puts on quality. The gross surplus from cost reducing effort is therefore

$$s(e, \phi_p, \theta) = (1 - \theta\phi_p) e. \quad (4)$$

In the sequel, we will focus on the case, where the principal faces a genuine trade off so the optimal solution involves some cost reduction, i.e. the case where  $\phi_p \leq 1/\theta$ .

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<sup>4</sup>This is a standard assumption in the incomplete contracting literature (Hart 1995). For a discussion of this assumption we refer to Maskin and Tirole (1999) and Hart and Moore (1999).

The principal may retain the decision rights and herself perform the necessary negotiations with the public manager or the private firm. It may however also be possible that she can delegate the decision authority to an agent. The principal can choose among politically motivated agents, who care about quality and cost; they have utility functions like (3), but have different weights on quality,  $\phi_a$ . We will assume that potential agents are sufficiently heterogeneous so that for any positive  $\phi_a$  there is an agent with  $\phi_a$ . We exclude the existence of malevolent agents, with  $\phi_a < 0$ , who benefit directly from low quality public service. It would, in fact, make the analysis simpler, if we did not impose this - reasonable - restriction.

### 3 Inhouse provision

We first consider *inhouse provision* and the case where there is no delegation. Here the principal is the decision maker for the government. Under inhouse provision, the principal hires a manager at the market for managers at a fixed wage  $w$ . When hired, the manager spends effort,  $e$  in order to come up with plans for cost reduction. With total income  $I$ , and effort level,  $e$ , his utility is

$$u^m = I - \frac{1}{2}e^2. \quad (5)$$

Since effort is non-contractible, the manager's contract gives no direct incentive to perform it. However, after effort is performed, the plans are tangible and it is possible to write a contract specifying that he should implement them. The parties then renegotiate his contract. If negotiations break down, the principal can replace the manager, but only a fraction  $1 - \lambda$  of the gross gains can be realized, since the new manager does not have the detailed knowledge and human capital of the old manager. The size of  $\lambda$  depends on how important the human capital of the manager is. One would expect this to be very important if the service is very complicated and technical, and cost reductions involve serious R&D, while it perhaps is smaller if the service is less complicated like for instance cleaning.<sup>5</sup> In the sequel, we will conceive of  $\lambda$  as reflecting the "technicality" of the task. As the government can recoup  $1 - \lambda$  even without the manager, the gains from renegotiation consist of the other fraction  $\lambda$ , which is split evenly so the manager's total income  $I = w + \frac{\lambda}{2}s(e, \phi_p, \theta)$ . The manager foresees this so his optimizing effort choice is

$$e^{in}(\phi_p, \theta, \lambda) = (1 - \theta\phi_p) \frac{\lambda}{2}, \quad (6)$$

if  $\phi_p \leq 1/\theta$  and zero otherwise.

At the hiring stage, the parties foresee the upcoming renegotiation<sup>6</sup> and the wage  $w$  makes

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<sup>5</sup>Notice, that one could conceive of situations where even in simple tasks like cleaning, human capital is important, e.g. because of good staff relations.

<sup>6</sup>Hart, Shleifer and Vishny 1997 assume that the public manager receives a fixed wage weakly larger than his outside option. It is implicit in this formulation that the government does not foresee the renegotiation implying that the manager ends up with a total compensation strictly larger than his outside option. We believe that a rational government recognizes that it can lower the fixed part of the manager's remuneration below the

the manager indifferent between taking the job and going for his outside option, which we normalize to 0, so

$$w = 0 - \frac{\lambda}{2}s(e^{in}(\phi_p, \theta, \lambda), \phi_p, \theta) + \frac{1}{2}e^{in}(\phi_p, \theta, \lambda)^2.$$

The principal's total expenditure consists of the direct costs of providing the service plus the payment to the manager,

$$Y^{in}(\phi_p, \theta, \lambda) = C_0 - e^{in}(\phi_p, \theta, \lambda) + w + \frac{\lambda}{2}s(e^{in}(\phi_p, \theta, \lambda), \phi_p, \theta), \quad (7)$$

and her utility from in-house provision is

$$v^{in} = \phi_p(Q_0 - \theta e^{in}(\phi_p, \theta, \lambda)) - Y^{in}(\phi_p, \theta, \lambda), \quad (8)$$

which becomes

$$v^{in} = \phi_p(Q_0 - \theta e^{in}(\phi_p, \theta, \lambda)) - \left(C_0 - e^{in}(\phi_p, \theta, \lambda) + \frac{1}{2}e^{in}(\phi_p, \theta, \lambda)^2\right). \quad (9)$$

The first best level of effort maximizes the net surplus between the manager and the principal,  $N(e, \phi_p, \theta) = s(e, \phi_p, \theta) - \frac{1}{2}e^2$ . For  $\phi_p < 1/\theta$  it is

$$e^*(\phi_p, \theta) = 1 - \theta\phi_p, \quad (10)$$

otherwise it is zero. The contractual incompleteness lead to inefficiency under inhouse provision: Since the renegotiation only gives the public manager part of the surplus generated by his effort, it provides him with too weak incentives and his effort level, given by (6), is too low.

### 3.1 Delegation under mandatory inhouse provision

Here, inhouse provision is mandatory, but the principal may delegate the authority to contract and renegotiate with the manager after he has come up with the plans for cost reduction to a politically motivated agent. The agent has a utility function like the principal's but he may value quality differently, agent  $\phi_a$  puts weight  $\phi_a$  on quality. Such an agent will therefore achieve a different negotiation result with the manager. When the manager faces renegotiation with agent  $\phi_a$ , his optimal effort choice is given by  $e^{in}(\phi_a, \theta, \lambda)$ . The principal can take advantage of this.

Mandatory inhouse provision occurs for instance when the law prescribes that municipalities cannot outsource primary school provision, hospital services or elderly care. Principal  $\phi_p$ 's utility when the renegotiation with the public manager is delegated to agent  $\phi_a$  becomes

$$v^{in}(\phi_a|\phi_p, \theta, \lambda) = \phi_p(Q_0 - \theta e^{in}(\phi_a, \theta, \lambda)) - \left(C_0 - e^{in}(\phi_a, \theta, \lambda) + \frac{1}{2}e^{in}(\phi_a, \theta, \lambda)^2\right), \quad (11)$$

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relevant reservation wage, because both manager and government know that additional payment will follow in the renegotiation process.

Hart, Shleifer and Vishny briefly discuss the possibility that the manager offers the government some of his post contractual rent but categorize such actions as corruption.

The principal's preferred agent,  $\phi_a^{mi}(\phi_p, \theta, \lambda)$ , maximizes  $v^{in}(\phi_a | \phi_p, \theta, \lambda)$  over  $\phi_a \geq 0$ .<sup>7</sup> This gives

$$\phi_a^{mi}(\phi_p, \theta, \lambda) = \begin{cases} 0 & \text{if } \phi_p \leq (1 - \frac{\lambda}{2}) \frac{1}{\theta} \\ \frac{2}{\lambda} \phi_p - \frac{2-\lambda}{\lambda} \frac{1}{\theta} & \text{if } (1 - \frac{\lambda}{2}) \frac{1}{\theta} \leq \phi_p \leq \frac{1}{\theta} \end{cases} \quad (12)$$

The preferred agent put less weight on quality than the principal does. This agent induces the manager to choose effort  $e^{in}(\phi_a, \theta, \lambda)$ . Inserting (12), we see that this is the efficient choice given in (10) when the agent's type given in (12) is positive.

$$e^{in}(\phi_a^{mi}(\phi_p, \theta, \lambda), \theta) = e^*(\phi_p, \theta)$$

for  $(1 - \frac{\lambda}{2}) \frac{1}{\theta} \leq \phi_p \leq 1/\theta$  i.e. for interior solutions.

The principal takes advantage of the *incentive effect* of delegation. She bears in mind that too little effort is spent by the public manager on cost reductions, since he only internalizes  $\lambda/2$  of the gross surplus, cf. (6) and (10). This problem is countered by choosing an agent who cares less about quality than the principal. This agent is more favorable to cost reductions, so the surplus from cost reductions is higher when the public manager renegotiates with the agent than with the principal. The manager receives part of the surplus, so his marginal pay from putting more effort into cost reductions is higher and he responds by making more effort. While the principal likes the higher effort, she dislikes the increased pay to the manager. However, this is partly offset in the initial contracting. The public manager is hired at the competitive market for managers, so his total pay will cover his effort cost plus his outside option. When signing the initial contract with the agent, he rationally foresees the income from the renegotiation and is willing to accept a lower base wage. Hence, the principal only ends up covering the manager's extra effort cost. The *incentive effect* implies that a larger fraction of the manager's pay is related to incentives. Delegation, therefore, substitutes for a formal incentive contract. Notice, it is crucial for delegation to work that the renegotiation outcome is foreseen at the time of the initial contracting with the service provider.<sup>8</sup>

The preferred agent values quality more, the more severe the quality effects of cost reductions are. The preferred agent also values quality more, when  $\lambda$  is higher. In this case, the incentive problem faced by the public manager is less, and hence the principal does not need to rely so heavily on the incentive effect. In fact, it is quick to check that the principal's gain in utility from delegating is decreasing in  $\lambda$ . Assuming that  $\lambda$  is higher for more technical tasks as argued above, we would expect the incentive effect and the delegation to be more important for less technical tasks.

<sup>7</sup>Here and in the sequel, it is straightforward to check that the second order condition for maximum is fulfilled.

<sup>8</sup>As noticed above our approach and the analysis in Hart, Shleifer and Vishny (1997) differ at this point. In their framework, delegation would not improve resource allocation because the service provider's fixed income does not reflect the expected future pay from renegotiation. Whereas delegation could improve incentives in their analysis the principal would find it too costly and she would choose not to delegate.

The incentive effect improves efficiency. In fact, when the preferred agent puts positive weight on quality (i.e. the solution is interior), then delegation can offset all distortions following from contractual incompleteness under mandatory inhouse provision. Delegation perfectly substitutes for a complete incentive contract in this environment of incomplete contracts. Principals with lower  $\phi_p$  would prefer to delegate to extreme types  $\phi_a < 0$ , who cannot be found in the population. For such principals, delegation improves the situation without removing all distortions.

We have shown

**Proposition 1** *Under mandatory inhouse provision, the principal takes advantage of the incentive effect. Her preferred agent values quality given by (12) less than the principal:  $\phi_a^{mi}(\phi_p, \theta, \lambda) < \phi_p$ . Furthermore, when  $(1 - \frac{\lambda}{2}) \frac{1}{\theta} \leq \phi_p \leq 1/\theta$ , so solutions are interior, i.e. the preferred agent has positive  $\phi_a$ , delegation results in a first best effort choice. In this case delegation substitutes for a complete incentive contract.*

## 4 Outsourcing.

Under *outsourcing*, the service is produced by a private firm. Again we start by considering the case of no delegation, where the principal is the decision maker of the government. The principal and a private firm first conclude a contract stipulating that the firm produces the service for the price  $p_0$  and bears the associated costs. The contract can be renegotiated, but it cannot be terminated prematurely. Then the firm exerts effort on plans for cost reduction. Just like under inhouse provision, cost reductions hurts the quality of the service. Again effort cannot be contracted upon ex-ante and a complete contract on quality cannot be written. We assume that with probability  $\rho$ , the cost savings hurt the quality in ways which are verifiable and the principal can block the implementation of the cost savings arguing that it breaks the contract since quality is lowered. In this case, the firm needs the approval of the principal in order to implement the cost reduction, so renegotiation takes place, just as it was the case with the public manager. However, the principal cannot by itself terminate the contract with the firm prematurely and implement the plans through contracting with another firm. If negotiations break down, the result is, therefore, that the firm continues providing the service, but the cost reduction is not implemented. Hence, the firm is needed in order to reap the surplus from the cost reduction and in the renegotiation the firm will appropriate 1/2 of the surplus from the cost reduction. The surplus from the cost reduction is  $e - \phi_p \theta e$ . This is shared among the two parties, so the firm pays the principal a transfer  $t$  such that the firm's gain from the implementation  $e - t$  equals the principal's gain  $t - \phi_p \theta e$ . This means that the transfer is

$$t = \frac{1}{2} (1 + \theta \phi_p) e.$$

With probability  $1 - \rho$  it is not verifiable that quality has been reduced, so the principal cannot block the cost reduction and the firm appropriates the full cost savings. We assume that the likelihood that the principal can block cost reductions is low, reflecting the fact that we consider an environment where complete contracting is impossible. In particular, we assume that  $0 < \rho \leq 1/2$ .<sup>9</sup>

The firm's expected payoff is therefore

$$u_f = p_0 - C_0 - \frac{1}{2}e^2 + (1 - \rho)e + \rho \left( e - \frac{1}{2}(1 + \theta\phi_p)e \right).$$

The firm chooses an effort level maximizing  $u_f$  so

$$e^o(\phi_p, \theta, \rho) = 1 - \frac{\rho}{2}(1 + \theta\phi_p). \quad (13)$$

Comparing (6) and (13)

$$e_c^{in}(\phi_p, \theta, \lambda) < e^o(\phi_p, \theta, \rho). \quad (14)$$

Cost reductions are larger under outsourcing than under inhouse provision. Contrary to the firm, the public manager has no direct interest in cost reductions and takes to some extent into account that they hurt the principal. The firm only takes the principal's interests into account because there is a chance the principal can force renegotiation. If the principal cares sufficiently much about quality, the effort under outsourcing is larger than first best

$$e^o(\phi_p, \theta, \rho) > e^*(\phi_p, \theta) \text{ iff } \phi_p > \frac{\rho}{2 - \rho} \frac{1}{\theta}. \quad (15)$$

The principal's expected utility from outsourcing is

$$v^o = \phi_p Q_0 - (1 - \rho)\phi_p \theta e^o(\phi_p, \theta, \rho) + \rho \left( \frac{1}{2}(1 + \theta\phi_p) - \theta\phi_p \right) e^o(\phi_p, \theta, \rho) - p_0. \quad (16)$$

The joint surplus of the principal and the firm from outsourcing is

$$\Omega(\phi_p, \theta, \lambda) = v^o + u^f - (v^{in} + 0)$$

Inserting gives that for  $\phi_p \leq 1/\theta$  it is

$$\Omega(\phi_p, \theta, \lambda) = \frac{1}{8} (2 - \rho - \lambda + (\lambda - \rho)\theta\phi_p) (2 - \lambda + \rho - (4 - \lambda - \rho)\theta\phi_p). \quad (17)$$

We envision outsourcing through a bidding process, where the lowest bidder wins the contract. The winning price depends on the competitive environment. If the government is a large buyer in a market with a competitive selling side, it is reasonable to assume that the price

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<sup>9</sup>It is worth noticing, that Hart, Shleifer and Vishny (1997) assume that it is impossible for the firm to block cost reductions, in our notation this is the case where  $\rho = 0$ .

will equal the competitive price, where the government reaps the whole surplus from outsourcing.<sup>10</sup> If, however, competition is weak and the firms are able to collude the outcome will not be competitive. Suppose many local governments face a monopolistic firm, the firm then has significant bargaining power. If a local government invites tenders, the firm will only need to submit a bid, which exactly makes the principal indifferent between outsourcing and producing in-house. In this case the private monopoly will reap the surplus from outsourcing. The degree of market power,  $\gamma$ , determines the firm's share of the surplus. If  $\gamma = 1$ , the firm reaps all surplus - the monopoly case - if  $\gamma = 0$  the principal reaps all surplus - the perfectly competitive case, for intermediate values of  $\gamma$  the surplus is shared. The principal's utility from outsourcing is therefore

$$v^o = (1 - \gamma) \Omega(\phi_p, \theta, \lambda) + v^{in}, \quad (18)$$

from which it is clear that the principal outsources when the joint surplus is positive. Let

$$G(\theta, \lambda, \rho) \equiv \frac{2 - \lambda + \rho}{4 - \lambda - \rho} \frac{1}{\theta}. \quad (19)$$

We then have

**Proposition 2** *Under no delegation, a principal of type  $\phi_p$  outsources if and only if her valuation of quality,  $\phi_p$ , does not exceed the threshold  $G(\theta, \lambda, \rho)$ .*

Outsourcing involves a trade-off. The private firm will spend more effort than the public manager in order to reduce costs but this lowers quality. In face of this trade off principals who care less for quality outsource while principals who care more for quality do not. The higher is  $\theta$ , the more severe is the trade-off and the smaller is the threshold value of  $\phi_p$ ,  $G(\theta, \lambda, \rho)$ . The threshold also depends on  $\lambda$ , the share of the surplus which cannot be realized without the present public manager. The higher  $\lambda$ , the lower is the threshold and the less is the chance that a principal outsources. The reason is that a higher  $\lambda$  makes for better incentives for the public manager, so the disadvantage of inhouse production is reduced. Hence, Proposition 2 implies that one should see more outsourcing of less technical tasks like cleaning etc. We also see that the higher is the probability the principal can block cost reductions,  $\rho$ , the higher is  $G$  and the more likely is outsourcing. In this case the private firm's incentives to reduce costs are diminished and the principal's chance of reaping part of the surplus from cost reductions are increased.

Furthermore, *the outsourcing decision is independent of the competitiveness of the market* -  $\gamma$  does not enter in condition in Proposition 2. While perhaps surprising at first sight, the reason is straightforward: Outsourcing takes place when the surplus from outsourcing is positive. Market power does not affect the existence of the surplus, it only affects how it is split.

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<sup>10</sup>This will in principle also be the consequence if the principal holds some standard auction, for instance an English auction, and there are at least two bidders who do not coordinate their bids.

The firm's payoff equals its outside option, zero, plus its share of the surplus. The firm pays the costs  $C_0 - e^o$  and has an effort cost equal to  $1/2(e^o)^2$ . Hence the outsourcing price equals

$$p_0(\phi_p, \theta, \lambda) = C_0 - e^o(\phi_p, \theta, \lambda) + \frac{1}{2}e^o(\phi_p, \theta, \lambda)^2 + \gamma\Omega(\phi_p, \theta, \lambda). \quad (20)$$

As the surplus decreases in  $\phi_p$  for  $\phi_p \leq G(\theta, \lambda, \rho)$ , the price does as well. Principals who value quality more are more hurt by the quality reductions from the private firm's cost reductions. *The principal's quality preference affects the outsourcing price.* When the principal is of type  $\phi_p = G(\theta, \lambda, \rho)$ , she values quality so much that the outsourcing surplus is zero. Facing such a principal, regardless of the degree of market power,  $\gamma$ , the firm can only get a contract if  $p_0 = C_0 - e^o + \frac{1}{2}(e^o)^2$ .

#### 4.1 Delegation under mandatory outsourcing

Here inhouse provision is not an option but the principal can delegate the authority to contract and renegotiate with the firm. Mandatory outsourcing does not make much sense, if the market is not fully competitive and the price is determined as described above. Then the principal would fall prey to the market power of the firm. But if there is perfect competition among the firms, or the earnings of the firm are capped, for instance determined by law, this is not an issue. In this case the price is determined so that the firm receives the value of its outside option which we have normalized to zero (possibly plus a stipulated fixed profit,  $\bar{\pi}$ )

$$u^f = p_0 - C_0 - \frac{1}{2}e^2 + (1 - \rho)e + \frac{\rho}{2}(e - \theta\phi_p e) = \bar{\pi}. \quad (21)$$

When the firm faces an agency with preference  $\phi_a$  the optimal effort level is given by  $e^o((\phi_a, \theta, \rho))$ , cf. (13). The price,  $p_0(\phi_a, \theta, \lambda)$ , is determined so that (21) is fulfilled for  $e^o((\phi_a, \theta, \rho))$ . Using (16), the utility to the principal from delegating to agency  $\phi_a$  therefore becomes

$$v^o(\phi_a|\phi_p, \theta, \rho) = \phi_p(Q_0 - \theta e^o(\phi_a, \theta, \rho)) + \rho\frac{1}{2}(1 + \theta\phi_p)e^o(\phi_a, \theta, \rho) - p_0(\phi_a, \theta, \lambda). \quad (22)$$

The principal's preferred agency,  $\phi_a^{mo}(\phi_p, \theta, \rho)$  maximizes  $v^o(\phi_a|\phi_p, \theta, \rho)$  over  $\phi_a \geq 0$ . This gives

$$\phi_a^{mo}(\phi_p, \theta, \rho) = \begin{cases} 0 & \text{if } \phi_p \leq \frac{\rho}{2}\frac{1}{\theta}, \\ \frac{2}{\rho}\phi_p - \frac{1}{\theta} & \text{if } \frac{\rho}{2}\frac{1}{\theta} \leq \phi_p \leq \frac{1}{\theta} \end{cases} \quad (23)$$

The preferred agent values quality more than the principal,  $\phi_a^{mo}(\phi_p, \theta, \rho) > \phi_p$ , if and only if  $\phi_p > \frac{\rho}{2-\rho}\frac{1}{\theta}$ . Just as under mandatory inhouse provision the principal takes advantage of the *incentive effect*. However, the incentive effect can go two ways. If the principal herself cares sufficiently much about quality, when  $\phi_p > \frac{\rho}{2-\rho}\frac{1}{\theta}$ , her worry is that the firm spends too much effort on cost reductions, which hurts quality too much. If the firm were to renegotiate with the principal, its effort level would be above first best, as is clear from (15). In this case the optimal delegation is to an agency which puts even more weight on quality. This agency will

not reward the firm so much for high effort if renegotiation occurs. The firm's incentives to put in effort are reduced and it responds by reducing effort. If on the other hand,  $\phi_p < \frac{\rho}{2-\rho} \frac{1}{\theta}$ , the firm's effort level would still be below first best if she were facing the principal. In this case, the principal strengthens the incentives by delegating to an agency, who cares less about quality. Again the incentive effect improves efficiency. For interior solutions where the second line in (23) is relevant, we have that the incentive effect is sufficient to restore efficiency

$$e^o((\phi_a^{mo}, \theta, \rho)) = e^*(\phi_p, \theta)$$

Clearly, for principals with a high valuation of quality  $\phi_p$  this takes that there are agents in the population with even higher valuation of quality. If  $\rho$  is very low, this may in practise be hard to find, and if this is the case, principals with a high valuation of quality cannot achieve first best.

We have shown,

**Proposition 3** *Under mandatory outsourcing, the principal takes advantage of the incentive effect. Her preferred agent is given by (23). The preferred agent values quality more than the principal,  $\phi_a^{mo}(\phi_p, \theta, \rho) > \phi_p$ , if  $\phi_p > \frac{\rho}{2-\rho} \frac{1}{\theta}$  and values quality less than the principal otherwise. When  $\frac{\rho}{2} \frac{1}{\theta} \leq \phi_p \leq \frac{1}{\theta}$ , so that solutions are interior, i.e. the preferred agent puts positive weight on quality, the principal can achieve first best effort by delegating under mandatory outsourcing. In this case delegation substitutes for a complete incentive contract.*

## 5 The outsourcing decision under partial delegation

In this section we consider the case, where the principal retains the decision to outsource or not but delegates the authority to renegotiate with the chosen service provider to an agent. When the mode of provision is chosen - and the initial contract is signed - the principal chooses the best agent to conduct the renegotiation. The best agent then depends on the chosen mode of provision, just as it was the case under mandatory inhouse provision and mandatory outsourcing. In the price negotiations with the private firm both parties realize this.

As is clear from Propositions 1 and 3, the optimal choices of agents depend on whether the service is outsourced or not. We have to consider three cases, depending on whether  $0 < \phi_p < \frac{\rho}{2} \frac{1}{\theta}$ ,  $\frac{\rho}{2} \frac{1}{\theta} < \phi_p < (1 - \frac{\lambda}{2}) \frac{1}{\theta}$ , or  $(1 - \frac{\lambda}{2}) \frac{1}{\theta} < \phi_p < \frac{1}{\theta}$ . In the latter case, the principal can achieve first best through inhouse provision and appropriate all surplus, since the manager is hired in the competitive market. In this case, inhouse provision is clearly optimal for the principal and the outsourcing surplus is zero. Since first best can also be achieved through outsourcing, as is clear from Proposition 3 the principal is in fact indifferent between the modes in this case.

When  $0 < \phi_p < \frac{\rho}{2} \frac{1}{\theta}$ , the optimal choice of agent involves  $\phi_a = 0$  in both cases. From (6) and (13) we see that the effort under inhouse provision is smaller than the effort under

outsourcing,  $e^{in} = \frac{\lambda}{2} < 1 - \frac{\rho}{2} = e^{out} < e^* = 1 - \theta\phi_p$ . The larger effort under outsourcing makes for an outsourcing surplus and the principal's optimal choice is therefore outsourcing. When  $\frac{\rho}{2\theta} < \phi_p < (1 - \frac{\lambda}{2}) \frac{1}{\theta}$ , the principal can realize first best effort under outsourcing and not under inhouse provision. This gives rise to an outsourcing surplus, and provided  $\gamma < 1$ , the principal gets a share of this surplus. Hence, in this case outsourcing is optimal. We therefore have

**Proposition 4** *Under partial delegation, the principal chooses outsourcing if  $\phi_p \leq (1 - \frac{\lambda}{2}) \frac{1}{\theta}$  and the choice of agent is given by (23). If  $(1 - \frac{\lambda}{2}) \frac{1}{\theta} \leq \phi_p$ , the principal can realize first best through inhouse provision, and therefore there is no outsourcing surplus. The principal can also realize first best through outsourcing in this case. If inhouse provision is chosen the optimal choice of agent is given by (12). If outsourcing is chosen, the optimal choice of agent is given by (23).*

Notice that if a principal of a type  $\phi_p > (1 - \frac{\lambda}{2}) \frac{1}{\theta}$  chooses outsourcing, this may involve choosing an agent, who cares very much about quality if the contracting environment with the firm features a large degree of incompleteness, i.e. if  $\rho$  is low. If such an agent with a very high  $\phi_a$  does not exist in the population, only inhouse provision is optimal.

Outsourcing is a better option under partial delegation than under no delegation. The reason is that the principal can take advantage of the incentive effect in two ways. First it makes outsourcing more efficient, secondly it also makes inhouse provision more efficient. The last effect implies that the principal's bargaining position towards the private firm is strengthened. This also makes outsourcing more interesting.

If  $\rho < \frac{(2-\lambda)^2}{4-\lambda}$ , then  $G((\theta, \lambda, \rho)) < (1 - \frac{\lambda}{2}) \frac{1}{\theta}$  and inhouse provision is optimal for a smaller range of  $\phi_p$ 's under partial delegation than under no delegation.

## 6 Arm's Length Delegation

As discussed in the Introduction, delegation can be an institutional choice as in the case of representative democracy. However, it can also be the only feasible arrangement, since political leaders have limited amounts of time and necessarily have to delegate many tasks to subordinates, including decisions on service provision. In these cases the principal delegates to an agent, who both decides on outsourcing, the hiring of and the recontracting with the service provider. Under arm's length delegation, the agent is the decision maker for all decisions and the principal is aware that agents with  $\phi_a$  above  $G(\theta, \lambda, \rho)$  will outsource, while those with lower  $\phi_a$  will choose inhouse provision, as we know from Proposition 1.

Principal  $\phi_p$ 's utility when agent  $\phi_a$  outsources is

$$v^{out}(\phi_a | \phi_p, \theta, \lambda) = \phi_p Q_0 - \theta \phi_p e^o(\phi_a, \theta, \rho) + \rho \frac{1}{2} (1 + \theta \phi_a) e^o(\phi_a, \theta, \rho) - p_0(\phi_a, \theta, \rho).$$

When agent  $\phi_a$  outsources, the price is determined so that the firm's share of the outsourcing surplus is  $\gamma$ . Hence

$$u_f = p_0(\phi_a, \theta) - \left( C_0 - e^o(\phi_a, \theta, \rho) + \rho \frac{1}{2} (1 + \theta \phi_a) e(\phi_a, \theta, \rho) + \frac{1}{2} e(\phi_a, \theta, \rho)^2 \right) = \gamma \Omega(\phi_a, \theta, \rho)$$

and this implies that

$$p_0(\phi_a, \theta) = C_0 - e^o(\phi_a, \theta, \rho) + \rho \frac{1}{2} (1 + \theta \phi_p) e^o(\phi_a, \theta, \rho) + \frac{1}{2} e^o(\phi_a, \theta, \rho)^2 + \gamma \Omega(\phi_a, \theta, \rho).$$

The principal's most preferred agent among those who outsources maximizes  $v^{out}(\phi_a | \phi_p, \theta, \lambda)$  on  $0 \leq \phi_a \leq G(\theta, \lambda, \rho)$ . The principal's most preferred among those who prefer inhouse provision maximizes  $v^{in}(\phi_a | \phi_p, \theta, \lambda)$  (as given in (11)) on  $\phi_a \geq G(\theta, \lambda, \rho)$ . Let

$$M(\theta, \lambda, \rho) \equiv \frac{(2\theta\phi_p - \rho)\rho + \gamma \left( (2 - \lambda)^2 - (2 - \rho)\rho \right)}{\rho^2 - \gamma(\lambda - \rho)(4 - \lambda - \rho)} \frac{1}{\theta}$$

and

$$N(\theta, \lambda, \rho) \equiv \left( \frac{3 - \lambda}{4 - \lambda - \rho} \rho - \frac{(1 - \rho)(2 - \lambda)}{\rho} \gamma \right) \frac{1}{\theta}$$

Tedious calculations give that the principal's preferred agent under arm's length delegation  $\phi_a^{al}(\phi_p, \theta, \lambda)$  is therefore given by

$$\phi_a^{al}(\phi_p, \theta, \lambda, \rho) = \begin{cases} \max[0, M(\theta, \lambda, \rho)] & \text{if } \phi_p < N(\theta, \lambda, \rho) \\ G(\theta, \lambda, \rho)^- & \text{if } N(\theta, \lambda, \rho) < \phi_p \leq G(\theta, \lambda, \rho) \\ G(\theta, \lambda, \rho)^+ & \text{if } G(\theta, \lambda, \rho) \leq \phi_p \leq \frac{4 - 2\lambda - \rho + \lambda\rho}{4 - \lambda - \rho} \frac{1}{\theta} \\ \frac{2\phi_p}{\lambda} - \frac{2 - \lambda}{\theta\lambda} & \text{if } \frac{4 - 2\lambda - \rho + \lambda\rho}{4 - \lambda - \rho} \frac{1}{\theta} \leq \phi_p \leq \frac{1}{\theta} \end{cases} \quad (24)$$

where  $\phi_a^{al}(\phi_p, \theta, \lambda, \rho) = G(\theta, \lambda, \rho)^-$  denotes that the agent chooses outsourcing and  $\phi_a^{al}(\phi_p, \theta, \lambda, \rho) = G(\theta, \lambda, \rho)^+$  that he chooses inhouse provision<sup>11</sup>. We thus have:

**Proposition 5** *Under arm's length delegation, the principal delegates to an agent who takes the same outsourcing decision as she would herself. Principal's preferred agent,  $\phi_a^{al}(\phi_p, \theta, \lambda, \rho)$ , is given by (24). If the principal prefers inhouse provision, she chooses an agent who cares less about quality than herself. If she prefers outsourcing, the optimal agent cares more about quality than the principal iff  $\phi_p > \max[0, \frac{\rho^2 - \gamma(4 - 4\lambda - 2\rho + \lambda^2 + \rho^2)}{2\rho - \rho^2 - \gamma(\rho - \lambda)(4 - \lambda - \rho)} \frac{1}{\theta}]$ .*

Principals with a low preference for quality, who prefer outsourcing, take two effects into account. Just as was the case with mandatory outsourcing, they take advantage of the *incentive effect*. If the firm has no market power, so that  $\gamma = 0$ , we see that the delegation is to exactly

<sup>11</sup> An agency with  $\phi_a = G(\theta, \lambda, \rho)$  is indifferent between inhouse provision and outsourcing. We assume that in this case the agency chooses the principal's most preferred option. Otherwise, the principal could delegate to a type  $G(\theta, \lambda, \rho) - \varepsilon$  if she preferred outsourcing and type  $G(\theta, \lambda, \rho) + \varepsilon$  if she preferred inhouse provision, where  $\varepsilon$  is vanishingly small.

the same type as with mandatory outsourcing, compare with (23). However, when the firm has market power and  $\gamma > 0$ , the principal also takes the *bargaining effect* into account. Except for principals with very low  $\phi_p$ , the principal then delegate to agencies who care even more about quality than if there was no market power. By delegating to an agency who cares more about quality, the principal effectively reduces the outsourcing price. A large group of principals take full advantage of this and delegate to an agent of type  $\phi_a = G(\theta, \lambda, \rho)^-$ . This agent is at the brink of preferring inhouse provision, the outsourcing surplus is zero, and the agent is therefore a very tough negotiator with the firm getting the lowest possible outsourcing price. When  $\rho$  is very low, so that the *incentive effect* does not matter very much, we see that all principals, who prefer outsourcing take full advantage of the *bargaining effect* and chooses an agent of type  $\phi_a = G(\theta, \lambda, \rho)^-$ .

Principals, who prefer inhouse provision, take advantage of the *incentive effect*, just as under mandatory inhouse provision. They delegate to agents, who care less about quality. However, principals with intermediate valuations of quality, where  $G(\theta, \lambda, \rho) \leq \phi_p \leq \frac{4-2\lambda-\rho+\lambda\rho}{4-\lambda-\rho} \frac{1}{\theta}$ , encounter the problem that the preferred agent under mandatory inhouse provision would wish to outsource. Hence, the principal modifies the choice of agent to a type who just chooses inhouse provision. This still allows some incentive effect. Principals with even higher preference for quality do not encounter this problem, their most preferred agent also prefers inhouse provision.

Arm's length delegation does not change the outsourcing decision: Principals delegate to an agent, who makes the same decision on outsourcing as the principal would herself. The intuition for this result is the following: For principals, who just prefer outsourcing, the *bargaining effect* dominates and induces the pricipal to choose an agent who values quality *more* than herself. For a principal who just prefers inhouse provision, the *incentive effect* induces her to choose an agent who values quality *less*. Consider a principal of type  $G(\theta, \lambda, \rho) + \varepsilon$ , where  $\varepsilon$  is very small. Even though she could get (almost) as good a bargain with the private firm as agent  $G(\theta, \lambda, \rho)^-$ , she prefers inhouse provision under no delegation. When she delegates, she will, therefore, not be interested in delegating to agent  $G(\theta, \lambda, \rho)^-$  who outsources and essentially gets the same deal as she could have obtained herself. Similarly, principal  $G(\theta, \lambda, \rho) - \varepsilon$  prefers outsourcing under no delegation even though she herself would induce (almost) as strong incentives for the public manager as the lowest type agent, who chooses inhouse production, type  $G(\theta, \lambda, \rho)^+$ . Type  $G(\theta, \lambda, \rho) - \varepsilon$  will therefore not be interested in delegating to an agent, who chooses inhouse provision.

The effort level under Arm's length delegation, when inhouse provision is chosen and  $\phi_a = G$  is

$$e = 1 - \frac{\rho}{2} \left( 1 + \theta \frac{2 - \lambda + \rho}{4 - \lambda - \rho} \frac{1}{\theta} \right) = (1 - \rho) \frac{4 - \lambda}{4 - \lambda - \rho}.$$

It is straightforward to check that this effort level is lower than the effort level under no delegation (given by (13) for  $\phi_p \leq G$ ) and that is is lower than the first best level  $1 - \theta\phi_p$ .

Except for extreme principals with very low  $\phi_p$ ,  $\phi_p < \frac{\rho^2 - \gamma(4 - 4\lambda - 2\rho + \lambda^2 + \rho^2)}{2\rho - \rho^2 - \gamma(\rho - \lambda)(4 - \lambda - \rho)} \frac{1}{\theta}$ , all other types of principals prefer to delegate to agents, who are closer to being indifferent between outsourcing and inhouse provision than the principal herself is. If one interprets arm's length delegation as the situation in representative democracy, where the voters delegate to a politician, this implies that voters vote for politicians who are more moderate than themselves. As a principal's preferred agent is weakly increasing in  $\phi_p$  it follows that if different voters in the electorate have different  $\phi_p$ , the preferred agent of the voter with the median value of  $\phi_p$  is a Condorcet winner.

## 7 Efficiency and the principal's preferred delegation mode

The table below summarizes the results on the chosen service provision mode, efforts and the outsourcing surplus the three cases no, partial, and arm's length delegation. The table is made under the assumption  $\rho < 1/3$  and that market power is non-negligible, so that  $\gamma > \frac{\rho^2}{2 - \lambda} \frac{3 - \lambda}{(1 - \rho)(4 - \lambda - \rho)}$ .<sup>12</sup> In the table, the intervals for  $\phi_p$  are listed in increasing order and we let  $e^{nd}$  denote the effort under no delegation.

$\phi_p$ in interval	No delegation	Partial delegation	Arm's length delegation
$0, \frac{\rho}{2} \frac{1}{\theta}$	out $e^{nd} < e^*, \Omega > 0$	out $e^{nd} < e < e^*, \Omega > 0$	out $e < e^{nd} < e^*, \Omega > 0$
$\frac{\rho}{2} \frac{1}{\theta}, \frac{\rho}{2 - \rho} \frac{1}{\theta}$	out $e^{nd} < e^*, \Omega > 0$	out $e = e^*, \Omega > 0$	out $e < e^{nd} < e^*, \Omega > 0$
$\frac{\rho}{2 - \rho} \frac{1}{\theta}, G$	out $e^{nd} > e^*, \Omega > 0$	out $e = e^*, \Omega > 0$	out $e < e^{nd} < e^*, \Omega > 0$
$G, \left(1 - \frac{\lambda}{2}\right) \frac{1}{\theta}$	in $e^{nd} < e^*, \Omega < 0$	out $e = e^*, \Omega > 0$	in $e^{nd} < e < e^*, \Omega < 0$
$\left(1 - \frac{\lambda}{2}\right) \frac{1}{\theta}, \frac{4 - \lambda(2 - \rho) - \rho}{4 - \lambda - \rho} \frac{1}{\theta}$	in $e^{nd} < e^*, \Omega < 0$	out/in $e = e^*, \Omega = 0$	in $e^{nd} < e < e^*, \Omega < 0$
$\frac{4 - \lambda(2 - \rho) - \rho}{4 - \lambda - \rho} \frac{1}{\theta}, \frac{1}{\theta}$	in $e^{nd} < e^*, \Omega < 0$	out/in $e = e^*, \Omega = 0$	in $e = e^*, \Omega < 0$

Table 1. Service provision mode, efforts and outsourcing surplus

It is clear from the table that among the three modes Partial Delegation is the most efficient: For all types of principals, except principals with very low preference for quality,  $\phi_p < \frac{\rho}{2} \frac{1}{\theta}$ , the first best effort level is obtained under Partial Delegation. The reason is that partial delegation allows the principal to exploit the *incentive effect* fully and this leads to efficiency. Even with principals  $\phi_p < \frac{\rho}{2} \frac{1}{\theta}$ , partial delegation leads to effort levels closer to the efficient level than the other two modes.

Comparing no delegation and Arm's length delegation, Arm's length delegation is the most efficient mode when the principal has a high preference for quality so that he prefer inhouse provision. For principals  $\phi_p > \frac{4 - 2\lambda - \rho + \lambda\rho}{4 - \lambda - \rho} \frac{1}{\theta}$  full efficiency is obtained. For other principals  $\phi_p > G$ , effort is improved compared with no delegation but not all the way to full efficiency. The reason is that the principal is constrained in her choice of agent. Full utilization of the

<sup>12</sup>This is just to simplify the exposition: In this case  $N(\theta, \lambda, \rho) < 0$  and  $\phi_a = G^-$  for all  $\phi_p$ , in  $[0, G]$  cf (24). This simplifies the Table. If we did not make this assumption, we would have to consider a separate case for low  $\phi_p < N$ . For higher  $\phi_p$  the results are the same.

*incentive effect* would require choosing an agent who would outsource, and this is not in the principal's interest. For principals, with lower  $\phi_p$  who prefer outsourcing, the efficiency properties are opposite, here no delegation gives the most efficient (although not fully efficient) effort choice. The reason is that when market power is not negligible,  $\gamma > N(\theta, \lambda, \rho)$ , the principal dismisses the *incentive effect* and takes advantage of the *bargaining effect* instead. As we saw this involves choosing an agent at the brink of choosing inhouse provision, this agent in fact gives *less* incentives to the firm than the principal herself would.

We thus have

**Proposition 6** *Assume that  $\rho < 1/3$  and market power is non-negligible,  $\gamma > \frac{\rho^2}{2-\lambda} \frac{3-\lambda}{(1-\rho)(4-\lambda-\rho)}$ . Partial delegation dominates no delegation and Arm's length delegation. It leads to full efficiency for principals  $\phi_p \geq \frac{\rho}{2} \frac{1}{\theta}$ . For  $\phi_p > G$ , Arm's length delegation leads to more efficient effort choice than no delegation, for  $\phi_p < G$  the reverse is true.*

Suppose the principal could choose the delegation institution, which one would she choose? It is straightforward that any type of delegation is (weakly) better for the principal than non-delegation: She could choose a type equal to herself, thus mimicking non-delegation. Whenever she does something else, it is because it gives her higher utility. *Partial delegation* is (weakly) better for the principal than either *mandatory inhouse provision* or *mandatory outsourcing*. The comparison between *partial delegation* and *arm's length delegation* is more involved. *Partial delegation* has the advantage that the principal needs not worry that the agent may outsource so she can take full advantage of the *incentive effect*. *Arm's length delegation* has the advantage she can use the *bargaining effect* but she may be forced to limit the use of the *incentive effect*. It is clear from Table 1 that for principals with  $\phi_p > (1 - \frac{\lambda}{2}) \frac{1}{\theta}$  partial delegation is either strictly better or weakly better. Partial delegation allows full efficiency and the principal internalizes all surplus. Principals with  $\phi_p$  in  $[G, (1 - \frac{\lambda}{2}) \frac{1}{\theta}]$  also prefer partial delegation. It would be an option to choose inhouse provision as under Arm's length delegation, and in fact get more out of the incentive effect but these principals use an even better option under partial delegation. For principals with  $\phi_p < G$ , the situation is slightly more complicated. They take advantage of the *incentive effect* under partial delegation but the *bargaining effect* under Arm's length delegation. Which mode is best for the principal depends on the strength of the firms' market power. Comparing the principals' utilities we find that if market power is sufficiently high, i.e. if

$$\gamma > 8 \frac{\frac{1}{2} (1 - \theta \phi_p)^2 - \left( (1 - \theta \phi_p) - \frac{1}{2} (1 - \rho) \frac{4-\lambda}{4-\lambda-\rho} \right) (1 - \rho) \frac{4-\lambda}{4-\lambda-\rho}}{(2(1 - \theta \phi_p) - \lambda)^2} \equiv K,$$

then Arm's length delegation is preferred by the principal. In this case the advantage of the *bargaining effect* exceeds that of the *incentive effect*. For low degrees of market power, the advantages of the incentive effect dominate and the principal prefers partial delegation. We thus have

**Proposition 7** Assume that  $\rho < 1/3$  and market power is non-negligible,  $\gamma > \frac{\rho^2}{2-\lambda} \frac{3-\lambda}{(1-\rho)(4-\lambda-\rho)}$ . For the principal delegation (partial or arm's length) is better than no delegation. For principals with  $\phi_p > G$ , partial delegation is better than arm's length delegation. Principals with  $\phi_p < G$  prefer arm's length delegation if market power  $\gamma$  is sufficiently high (i.e.  $\gamma > K$ ), otherwise they prefer partial delegation.

In principle, the principal can delegate the two tasks, outsourcing and renegotiation to two different agents, the case of *double delegation*. Not surprisingly, this is optimal for the principal. She could mimick *partial delegation* as well as *arm's length delegation* if she wished to. Partial delegation leads to full efficiency for interior solutions. One can show<sup>13</sup> that under *double delegation* the principal therefore delegates the renegotiation decision to the same kind of agent as under *partial delegation* and from an efficiency point of view the two modes are equally good. *Double delegation* gives the principal the advantage, that he can take full advantage of the bargaining effect and the incentive effect at the same time. Thus she obtains first best effort and appropriates all surplus.

## 8 Conclusion

Most public service provision is done in environments where it is difficult to contract upon on all future contingences. This paper has identified two core effects - the *incentive* and the *bargaining* effects - that makes delegation an important feature in public service provision: First by strategically delegating the right to hire and negotiate with a service provider, the principal can manipulate the service provider's incentive. Strategic delegation essentially becomes a substitute for explicit incentive contracts. Second, by delegating the right to outsource to an agent that is indifferent between provision modes, the *bargaining* power of private firms is lowered implying that delegation can reduce the price of private provision of public service.

The analysis gave a number of important results: First, the decision to outsource does not depend on the degree of competition among private service providers. If there is a joint surplus from outsourcing the outsourcing price will be adjusted so that outsourcing takes place. Second, we showed that two empirically relevant ways of delegating the outsourcing decision - *arm's length* and *partial* delegation create more efficient resource allocation than no delegation. Third, *partial* delegation is better than *arm's length* delegation at creating efficiency when the service is produced inhouse.

In representative democracies, most delegation will be *arm's length* where the electorate chooses a politician to be responsible for both the outsourcing decision and the negotiation with a private service provider. The results indicate that representative democracy is a better institution than a very hypothetical direct democracy where voters decide both on outsourcing

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<sup>13</sup>This is done in a previous version of the paper.

and renegotiation. More interestingly *partial delegation* represents a case of direct referendum, where the electorate votes on outsourcing and delegates the implementation of the result to an elected politician. When voters prefer inhouse provision, this institution may be better for them than representative democracy. Our analysis thus shows that the institutions of democracy are important for provision of public services in modern democratic welfare states.

We have considered the case where the overwhelmingly important objective for the service provider is to cut costs. However, often improvement of the quality and development of the service is in focus. For instance in military procurement, it often appears that quality is a more important objective than cost, viz. e.g. the development of the Stealth fighter. An interesting question is what happens when the service provider has two tasks: Cost reductions and improvement of the service. This more general case is a mixture of the two simple cases where only one objective is present and the general results will depend on which objective is dominant. Still the incentive and bargaining effects will be central and govern the choices of the principal. In a previous version of this paper, Bennedsen and Schultz (2008), we considered the more general case for the special parameter values  $\lambda = 1/2$  and  $\rho = 0$  and where cost reductions were the more important of the two tasks. For this case, the results were qualitatively similar to those reported here.

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