TI 2004-060/1

Tinbergen Institute Discussion Paper

Incentives and Workers' Motivation in the Public Sector

Josse Delfgaauw

Robert Dur

Faculty of Economics, Erasmus Universiteit Rotterdam, and Tinbergen Institute.

Tinbergen Institute
The Tinbergen Institute is the institute for economic research of the Erasmus Universiteit Rotterdam, Universiteit van Amsterdam, and Vrije Universiteit Amsterdam.

Tinbergen Institute Amsterdam
Roetersstraat 31
1018 WB Amsterdam
The Netherlands
Tel.: +31(0)20 551 3500
Fax: +31(0)20 551 3555

Tinbergen Institute Rotterdam
Burg. Oudlaan 50
3062 PA Rotterdam
The Netherlands
Tel.: +31(0)10 408 8900
Fax: +31(0)10 408 9031

Please send questions and/or remarks of non-scientific nature to driessen@tinbergen.nl.
Most TI discussion papers can be downloaded at http://www.tinbergen.nl.

Incentives and Workers' Motivation in the Public Sector*

Josse Delfgaauw† and Robert Dur‡

March 1, 2005

Abstract

Civil servants have a bad reputation of being lazy. However, citizens' personal experiences with civil servants appear to be significantly better. We develop a model of an economy in which workers differ in laziness and in public service motivation, and characterise optimal incentive contracts for public sector workers under different informational assumptions. When civil servants' effort is unverifiable, lazy workers find working in the public sector highly attractive and may crowd out workers with a public service motivation. When effort is verifiable, the government optimally attracts motivated workers as well as the economy's laziest workers by offering separating contracts, which are both distorted. Even though contract distortions reduce aggregate welfare, a majority of society may be better off as public goods come at a lower cost.

JEL codes: H1, J3, J4, L3, M5

Keywords: Public Sector Labour Markets, Incentive Contracts, Work Ethics, Public Service Motivation.

*We thank Klaas Beniers, Laurent Franckx, Amihai Glazer, Pierre Koning, David Martimort, Efraim Sadka, Alois Stutzer, Otto Swank, and conference and seminar participants in Berlin (EPCS 2004), Munich (CESifo Area Conference on Public Sector Economics 2004), at the CPB Netherlands Bureau for Economic Policy Analysis, The Hague, at the University of California, Irvine, at the University of Bergen, Norway, at WZB Berlin, at the University of Amsterdam (AIAS and CREED), and at Erasmus University Rotterdam for useful comments. We also thank André Dickmann and Steven van der Walle for providing data. We gratefully acknowledge financial support from NWO, KNAW, and VSNU through a Vernieuwingsimpuls grant.

†Corresponding author: Tinbergen Institute, Erasmus University Rotterdam, P.O. Box 1738, 3000 DR Rotterdam, The Netherlands. Tel: +31-10-4088953. E-mail: delfgaauw@few.eur.nl.

‡Tinbergen Institute, Erasmus University Rotterdam, and CESifo, Munich.

"*Citizens and taxpayers have their own global view of bureaucracy. To them, bureaucrats are lethargic, incompetent hacks who spend their days spinning out reels of red tape and reams of paperwork, all the while going to great lengths to avoid doing the job they were hired to do.*" James Q. Wilson (1989), p. x.

1 Introduction

Bureaucrats have a bad reputation. Jokes about bureaucrats' laziness and stories on bureaucratic errors abound. The lack of monetary incentives at public organisations is supposed to attract workers who are most averse to exerting effort. This pessimistic view is also prominent in the economics literature. For several decades, the literature has identified bureaucrats as pursuing their narrow self-interest, usually being at odds with the interest of society (see Tullock, 1965, Downs, 1967, Niskanen, 1971, and Buchanan, 1978).

However, when citizens are asked for their personal experience with public agencies, many tend to be satisfied with the performance of the agency. Customers' evaluation of a specific agency or civil servant is significantly better than their evaluation of the government or bureaucrats in general (Katz et al., 1975, Goodsell, 1985). Hence, as Wilson (1989) phrases it: "*...those lazy, incompetent bureaucrats must work for some other agency...*" (p. x). This suggests that at least some civil servants do not fit the stereotype. It is also in line with a number of recent papers stressing the importance of 'public service motivation' for incentive schemes and workers' effort in the public sector (Francois, 2000, Dixit, 2002, Delfgaauw and Dur, 2002b, Prendergast, 2003, Glazer, 2004, Besley and Ghatak, 2004).

How to reconcile these seemingly opposing points of view? This paper develops a model with three types of workers: regular, motivated, and lazy workers. Compared to regular workers, lazy workers have higher cost of effort in both the private and the public sector. Motivated workers, to some extent, enjoy exerting effort in a public sector job, but are otherwise identical to regular workers. This public service motivation gives monopsony power to the government. We show that it is in the interest of a cost-minimising government to attract, besides motivated workers, lazy workers rather than regular workers.

Whereas we model the private sector as a competitive market in which workers are paid their full marginal product, the public sector is assumed to be a single organisation whose objective is to produce a certain amount of public goods at minimum cost. This organisation, which we refer to as the public firm, attracts workers by offering one or more contracts specifying the wage and, if verifiable, required effort. The public firm can not observe the workers' type and, hence, can not make the contracts contingent on worker type. Workers choose the contract that yields them the highest utility, provided that the private sector is not a better option.

We consider two cases: verifiable and unverifiable effort. When effort is unverifiable, the public firm prefers to attract either motivated or lazy workers. We show that it may occur that the public firm prefers to attract only motivated workers, but that it can not avoid hiring lazy workers as well. However, if desired public production is sufficiently large, the public firm wants to attract both motivated and lazy workers, implying that the problem of nonexcludability of lazy workers is less severe.

When effort is verifiable and desired production in the public sector is sufficiently small, the public firm attracts only motivated workers, and extracts all motivational rents from these workers. This full rent extraction may not be possible if a second worker type is needed. Any rents motivated workers obtain when they would choose the other type's contract can not be extracted by the public firm. Since a contract satisfying a lazy worker's participation constraint has lower wage and lower required effort than a regular worker's contract, a lazy worker's contract is less appealing to the motivated workers. Therefore, the public firm can extract more motivational rents, and hence attracts motivated workers at lower cost, if it attracts lazy workers rather than regular workers.

The public firm distorts both contracts in order to extract even more motivational rents. It offers lower-powered incentives to lazy workers than do private firms. This way, the lazy worker's contract becomes even less appealing to the motivated workers. However, to keep production at the desired level, this implies that the public firm has to hire additional lazy workers, which is costly. These costs can be reduced by giving motivated workers higher-powered incentives, above the level private firms would offer.

These contract distortions are cost-efficient, but reduce social welfare. If we impose that the public firm maximises social welfare rather than min-

imises cost, it does not distort the contracts of the workers. Still, the public firm prefers to attract motivated workers, but if a second worker type is needed, it is indifferent between lazy and regular workers. Compared to a cost-minimising public firm, social welfare is higher. However, total cost of public goods production and, hence, taxes are also higher when the public firm maximises social welfare. Only motivated workers benefit, whereas the utility of lazy and regular workers decreases as a result of higher taxes. When motivated workers are a minority in society, politicians are likely to strive for cost-minimisation rather than for social welfare maximisation, so as to please the public at large.

While there has been quite some empirical research showing that a significant part of the civil work force has a public service motivation,[1] there exists little evidence confirming the stereotype view that civil servants are more averse to exerting effort than workers in the private sector. Our model implies that for lazy workers, the attractive feature of working in the public sector is that the workload is relatively low, either because effort is unverifiable, or because weak incentives are provided. In 2002, the Dutch Ministry of the Interior and Kingdom Relations undertook a survey of workers who had recently entered or left the public sector. In Table 1, we list the percentage of workers moving between the private and the public sector who mentioned workload as one of the three most important reasons to leave their job. Workers who moved from the private sector to the public sector mention workload more often than workers who moved in the opposite direction. The difference is most pronounced for central government and local governments. Education is the main exception. This may be due to the shortage of teachers in The Netherlands, or it may indicate that our model does not apply to all jobs in the public sector. If we restrict our sample to people who worked full-time at both jobs, the results provide even stronger support for our predictions, at the expense of a smaller number of observations.

The paper is organised as follows. The next section discusses how the paper relates to the literature. Section 3 describes the model. Section 4

[1] Recent studies include Antonazzo et al. (2003) on nursing workers, Edmonds et al. (2002) on teachers, and Frank and Lewis (2004) on employees in these and several other areas of the public sector. These studies also indicate that there exists substantial variation in occupational preferences among workers (see also Daymont and Andrisani, 1984, and Harper and Haq, 2001)

Table 1: Percentage of workers moving from the private sector to the public sector and vice versa who mention workload as one of the three most important reasons to leave their job (The Netherlands, 2002).

	Workload		**Respondents**	
Sector	Inflow	Outflow	Inflow	Outflow
Central	15.8	1.5	329	134
Local	16.3	7.4	681	267
Police	9.1	2.0	444	95
Research[1]	12.7	9.3	128	31
Hospitals[2]	11.0	12.9	40	46
Defence	3.2	4.6	159	107
Education	14.5	35.0	432	145

Data source: BZK, Mobiliteitsonderzoek 2002.

[1] Research consists of universities and research institutes.

[2] Only university hospitals are surveyed.

analyses the case where effort in the public sector is unverifiable. In Section 5, effort is verifiable in both sectors of the economy. Section 6 compares our results with the case where the public firm maximises social welfare rather than minimises costs. Section 7 concludes.

2 Related Literature

Our model is related to the literature on screening of workers' ability following the seminal papers by Spence (1973) and Rothschild and Stiglitz (1976) (for an overview, see Riley, 2001). In a standard adverse selection model (see e.g. Laffont and Martimort, 2002), a firm induces the 'low' type to exert a suboptimally low level of effort, so as to extract more of the rents from the 'high' type. The contract of the 'high' type is efficient. In contrast, in our model the contracts of both types are distorted. Whereas in the standard model a firm designs contracts for a fixed number of workers, our model describes the behaviour of a firm which has to meet a production requirement.[2]

[2]It is easy to extend our model to allow for price-elastic demand for the public good. Then, as in the case of a production requirement, both contracts are distorted.

Heterogeneity in laziness may stem from differences in people's physical fitness or ability, as in the standard adverse selection model, but may also stem from heterogeneity in general work ethic or morale. Differences in work ethic have been associated with, for instance, personality traits (Furnham, 1992) and cultural factors (Hofstede, 1991). Caplan (2003) surveys the modern personality psychology literature and concludes that: "Some people are much more eager to shirk than others by showing up late, spending their effort on non-work projects, taking their time, stealing office supplies and so on. Preferences for these sorts of behavior throughout the population markedly differ, holding constraints constant." (p. 398).

A new strand in the economics literature emphasises that workers in public organisations (or, more generally, in non-profit organisations) may be intrinsically motivated to work. For instance, Dixit (2002) argues that organisations that have an idealistic or ethical purpose may be attractive to workers who share these goals. Besley and Ghatak (2004) show that, when workers are protected by limited liability, a good match between an organisation's and a worker's mission may reduce monetary incentives. Francois (2000) and Glazer (2004) develop models where workers intrinsically value the output of the public organisation, see also Preston (1989). In Benabou and Tirole (2003) and Delfgaauw and Dur (2002a), workers may enjoy exerting effort at work or intrinsically value their contribution to output ('warm-glow'). The main difference between our paper and earlier work is that we relax the assumption that types of agents are fully observed by the principal.[3]

Most related to our work is a recent paper by Prendergast (2003). He assumes that workers differ in altruism for clients. The government prefers to attract different worker types for different agencies. For agencies where the preferences of the government and clients are aligned, as in health care, the government prefers the most altruistic bureaucrats. However, when the preferences of the government and clients are not aligned, as with (suspected) criminals, bureaucrats should be biased against their clients. Prendergast

[3]This paper builds on previous work. In Delfgaauw and Dur (2002a), we examine the implications of workers' intrinsic motivation for optimal monetary incentive schemes and show that posting a higher wage increases the probability of filling the vacancy, but decreases the expected quality of the hiree as less motivated workers are induced to apply. In Delfgaauw and Dur (2002b), we analyse the consequences of deregulation of a sector previously dominated by a public firm in a model where workers differ in their intrinsic motivation to work in the sector.

shows that, when agents' types are unobservable, agencies are likely to attract both the most preferred and the least preferred workers. The latter enter the agency because they benefit most from diverting from the government's most preferred policy.

Our work also relates to Lazear (1986). He argues that firms can use their wage policy so as to attract certain types of workers, just like the public firm in our model does. Strong monetary incentives induce highly productive workers to apply at a firm, whereas less productive workers prefer a high base salary and weak incentives (see also Lazear, 1995, and Prendergast, 1999, for surveys). Moen and Rosen (2004) have recently built on this and argue that, when there is a multi-tasking problem, competition between firms for highly productive workers may result in too high-powered incentives from a social welfare perspective. Burgess and Metcalfe (1999) show empirically that private companies make far more use of incentive wages than public organisations. Moreover, they argue that there are insufficient grounds to justify the low incentivisation of the public sector. Our model implies that lazy workers get indeed weaker monetary incentives at the public firm compared to the private sector, and suggests that this may be cost-efficient. On the other hand, motivated workers get stronger incentives.

A few papers consider heterogeneity in ability among government workers in the context of downsizing the government (Jeon and Laffont, 1999, and Rama, 1999). Jeon and Laffont (1999) show that the optimal voluntary downsizing mechanism consists of a menu of public wages, severance pay, and probabilities of dismissal. The government's choice which workers to retain closely resembles our results in Section 6, where we impose that the government maximises social welfare. When workers differ in a sector-specific trait, the government prefers the workers that have a comparative advantage in the public sector, whereas when workers differ in a general trait, the government is indifferent. Our paper differs in three important aspects. First, we consider a model in which workers are heterogeneous both in general and in sector-specific productivity, whereas Jeon and Laffont study heterogeneity in general and in sector-specific productivity separately. We show that heterogeneity in sector-specific motivation implies that a cost-minimising government is not indifferent between workers who differ in general work ethic. Second, in their model, effort is fixed, implying that they do not consider optimal incentive schemes. Third, most of our analysis focuses

on a cost-minimising government rather than a social welfare maximising government.

3 The Model

There are two sectors in the economy, a private and a public sector. The private sector is a fully competitive market where workers receive their full marginal product. The public sector is run by a single entity, which can be thought of as the government. This single organisation will be referred to as the public firm. Both sectors have the same linear production function:

$$q(e) = e \tag{1}$$

where q is production and e is effort. Each unit of production of the private sector can be sold on the world market for the exogenous price p. The public firm produces public goods, which are therefore not priced. The desired amount of public production is given by Q.[4] First, we assume that the public firm minimises cost of production. Next, we compare the results with a social welfare-maximising public firm. We abstract from principal-agent problems between voters, politicians, and managers of the public firm, which implies that the objective of the public firm is in line with the interest of (a majority of) the voters.

Three types of workers exist in the economy: regular workers r, motivated workers m, and lazy workers l. The number of workers of each type in the economy is given by N_i, $i \in \{r, m, l\}$. Lazy workers incur a greater disutility from working than the other worker types. Motivated workers derive intrinsic utility from exerting effort in the public sector, but are otherwise identical to regular workers.[5] Workers know their own type, but neither private firms nor the public firm can observe worker types.

The utility of a worker of type i from working in the private sector is given by:

$$U_i = w - \theta_i C(e) \tag{2}$$

[4] Price-elastic demand for public goods would not alter any of the results qualitatively. By varying the level of Q, our analysis yields the supply function for public goods. Together, demand and supply then determine the optimal level of Q.

[5] Allowing for worker types with private sector motivation does not change the results, as these workers would seek employment in the public sector only when wages in the public sector are very high.

where w is the wage, $C(e)$ describes the cost of effort, with properties $C(0) = 0$, $C'(\cdot) > 0$, and $C''(\cdot) > 0$, and θ_i measures the degree of laziness. We assume that $0 < \theta_r = \theta_m < \theta_l$.

The utility of a worker of type i from working in the public sector is given by:[6]

$$U_i = w + \gamma_i V(e) - \theta_i C(e) \tag{3}$$

where $V(e)$ is a concave function with properties $V(0) = 0$, $V'(\cdot) > 0$ and $V''(\cdot) < 0$, and γ_i measures the public service motivation of a worker. We assume that $\gamma_m > \gamma_r = \gamma_l = 0$. Hence, only motivated workers derive utility from exerting effort in the public sector. Motivated workers have an action-oriented motivation, as in Benabou and Tirole (2003) and Delfgaauw and Dur (2002a, 2002b). Since $q = e$, results are the same if we assume that motivated workers intrinsically value their contribution to output ('warm-glow'), as in Besley and Ghatak (2004) and Glazer (2004).[7] As motivated workers derive motivational utility only at the public firm, the firm has monopsony power over these workers.[8]

Competition in the private sector ensures that workers in the private sector receive their full marginal product. Hence, total wage of a worker of type i employed in the private sector is given by pe_i. It follows from (1) and (2) that the optimal level of effort e_i^* of a worker of type i in the private sector is implicitly given by:

$$C'(e_i^*) = \frac{p}{\theta_i} \tag{4}$$

The resulting level of utility is:

$$U_i^* = pe_i^* - \theta_i C(e_i^*) \tag{5}$$

[6] We assume that workers are employed either in the private or in the public sector. Allowing for part-time jobs in the private sector increases the distortions in the optimal contracts when worker types are unobservable. We also abstract from subcontracting, thereby ruling out that a motivated worker takes over the contracts of two or more lazy workers at the public firm.

[7] In contrast, Francois (2000) and Prendergast (2003) assume that workers have an altruistic motivation, that is, workers care about the provision of public services, but do not derive utility from their personal involvement in production.

[8] Allowing for a fourth type of worker, who derives motivational utility from working in the public sector, but is lazy as well ($\gamma = \gamma_m$, $\theta = \theta_l$) does not affect the results, unless there are much more lazy motivated workers than regular motivated workers and γ_m is very low compared to $\theta_l - \theta_r$.

Note that U_i^* is decreasing in θ_i.

For future reference, we derive the level of effort motivated workers would exert in the private sector *if* they would have intrinsic motivation to work in the private sector. This level of effort, denoted by e_m^x, is implicitly given by:

$$C'(e_m^x) = \frac{p + \gamma_m V'(e_m^x)}{\theta_m} \tag{6}$$

In the public sector, we distinguish two cases, verifiable effort and unverifiable effort. If effort is verifiable, the public firm offers one or more contracts in which both the level of effort and the wage are specified. In the second case, effort (and output) is unverifiable above a certain level of e, $\bar{e}$.[9] We assume that $\bar{e}$ is sufficiently small such that it is a binding restriction for lazy and regular workers. This requires that $\bar{e} < e_l^*$. Then, the public firm can only offer a contract in which a wage level is specified, along with the threat not to pay the wage if effort is below $\bar{e}$.

Wages in the public sector are financed through a lump-sum (non-distortionary) tax, uniformly levied on all workers in the economy. This implies that we can ignore taxation when deriving the optimal occupational and effort choice of the workers.

4 Unverifiable Effort in the Public Sector

We first consider the case where in the public sector effort levels above $\bar{e}$ are unverifiable. Hence, the best the public firm can do is to offer a contract consisting of a wage which is only paid if the worker exerts at least effort level $\bar{e}$. Clearly, lazy and regular workers never exert more effort than $\bar{e}$. Motivated workers may decide to exert more effort, which occurs when the level of effort e_m implicitly defined by first-order condition

$$C'(e_m) = \frac{\gamma_m V'(e_m)}{\theta_m}$$

[9] $\bar{e}$ reflects that workers who do not show up at work or remain idle behind their desk all day can be detected and are fired. When $\bar{e} = 0$, no extrinsic incentives can be provided, implying that public goods production has to rely completely on intrinsic motivation.

is greater than $\bar{e}$. The minimum wage w_i at which the public firm can attract a worker of type i is given by the participation constraint:

$$w_i = U_i^* + \theta_i C(e_i) - \gamma_i V(e_i) \tag{7}$$

where $e_i = \bar{e}$ for lazy and regular workers. Using (5), we find that for non-motivated workers:

$$\frac{\partial w_i}{\partial \theta_i} = [p - \theta_i C'(e_i^*)]\frac{\partial e_i^*}{\partial \theta_i} - C(e_i^*) + C(\bar{e}) = -C(e_i^*) + C(\bar{e}) < 0$$

where the first term drops out using first-order condition (4). The inequality follows from the restriction $\bar{e} < e_i^*$. Hence, the public firm prefers lazy workers to regular workers. Lazy workers value the relatively low level of effort in the public sector more than regular workers and, hence, demand a lower wage. The same holds for motivated workers, but for a different reason: They require a lower wage than regular workers, as they derive motivational utility from working in the public sector. Moreover, motivated workers may exert more effort than regular workers, $e_m \geq \bar{e}$.

Whether the public firm prefers motivated workers to lazy workers is ambiguous. Motivated workers may exert more effort and need less monetary compensation for their effort, but have higher opportunity cost of working in the public sector than lazy workers. However, it is possible that the firm prefers to attract only motivated workers, but that at the wage it has to offer to attract them, lazy workers apply as well. In other words, lazy workers may crowd out motivated workers in the public sector. This occurs when $w_l/\bar{e} > w_m/e_m$ and $w_l < w_m$, where w_i is defined by participation constraint (7).[10] Then, setting w_m rather than w_l is optimal if:

$$w_l/\bar{e} > w_m \frac{N_l + N_m}{N_l\bar{e} + N_m e_m}$$

where we assume that, when setting w_m, the public firm randomly attracts workers from the groups of motivated and lazy workers, and that utility from public goods is linear. Hence, for a larger range of parameter values, it is optimal to attract lazy workers only. With concave utility from public goods, the condition becomes even more stringent as total public output

[10] If the public firm could distinguish between worker types, this crowding out of motivated workers would not occur, as contracts could be made contingent on type.

becomes uncertain when the firm sets w_m.

Crowding out of motivated workers may also happen when Q is sufficiently large, such that the public firm would like to attract all of the motivated workers in the economy and a limited number of lazy workers. Then, as the public firm can not distinguish between lazy and motivated workers, some of the motivated workers may not obtain a public sector job.[11]

5 Verifiable Effort

When effort is verifiable, the public firm optimally offers one or more contracts specifying a wage and a required level of effort. Consider first the case where Q is sufficiently small, such that the firm needs only one worker type. Given the type of worker, the optimal contract then minimises

$$Z = \sum_i w_i n_i \tag{8}$$

with respect to e_i, subject to the participation constraint (7) and the production constraint $Q = e_i n_i$. This gives first-order condition:

$$\left[\theta_i C'(e_i) - \gamma_i V'(e_i)\right] - \left[\frac{U_i^* + \theta_i C(e_i) - \gamma_i V(e_i)}{e_i}\right] = 0 \tag{9}$$

In the optimum, the marginal cost of effort by the employed workers (the first term) is equal to the marginal cost of effort by hiring an additional worker (the second term). Using (4) and (5), it is easy to verify that condition (9) is satisfied for lazy workers and for regular workers if $e_i = e_i^*$. Hence, if the public firm chooses to hire lazy or regular workers, it induces them to exert as much effort as they do in the private sector. By (7), this implies that the public firm has to pay them the same wage as they earn in the private sector, pe_i^*. When we substitute $e_m = e_m^*$ into equation (9) for $i = m$, we find, by using (4) and (5), that condition (9) is not satisfied, since:

$$-e_m^* \gamma_m V'(e_m^*) + \gamma_m V(e_m^*) > 0$$

[11] In Appendix A1 we prove that for each case considered in the main text, there exists a level of Q for which it is optimal for the public firm to attract two worker types instead of one. When effort is unverifiable, the supply function of public goods displays a discontinuous jump at this level of Q. When effort is verifiable, the supply function is continuous but displays a kink at this level of Q.

where the inequality follows from the concavity of $V(e)$. Hence, motivated workers are induced to exert *less* effort than in the private sector, even though their intrinsic motivation makes them willing to exert more effort at the same wage than in the private sector. The intuition is straightforward. As the marginal rents from motivation of a single worker decrease in e_m, it is optimal for the public firm to set e_m relatively low and attract additional motivated workers. Thereby, the public firm increases the total rents from motivation generated in the public sector, resulting in lower costs of public goods production.[12]

Comparing the cost per unit of effort for each worker type, it follows that the public firm prefers to hire motivated workers. It has to pay lazy and regular workers as much for their effort as the private sector does, which implies that total cost would be pQ. Even if the public firm would let motivated workers work as hard as they do in the private sector, total cost would be lower than pQ, namely $pQ - n_m\gamma_m V(e_m^*)$, as the firm can fully extract the rents from motivation. Since the firm optimally sets $e_m < e_m^*$, it follows that total cost are even lower. Clearly, when the public firm offers the optimal contract to attract motivated workers, lazy and regular workers have no incentive to opt for a public sector job.

Next, consider the case where Q is sufficiently large, such that two worker types are needed. Still, the firm prefers to hire all of the motivated workers as they are the only workers who are willing to work for less than p per unit of effort. The interesting question is which worker type the public firm prefers to hire in addition to the motivated workers. Total cost Z is given by:

$$Z = w_m N_m + w_k n_k \tag{10}$$

and the production constraint is given by:

$$e_m N_m + e_k n_k = Q \tag{11}$$

where $k \in \{r, l\}$. To attract and separate the two types, the firm creates two contracts that meet the following conditions. First, the contracts must meet the participation constraint of both types:

$IR_k \quad w_k - \theta_k C(e_k) \geq U_k^*$

[12] It is easy to verify that if $V(e)$ would be a linear function, the public firm optimally sets $e_m = e_m^*$.

$$IR_m \qquad w_m + \gamma_m V(e_m) - \theta_m C(e_m) \geq U_m^*$$

Second, the contracts must meet the revelation constraints, that is, each worker must prefer the contract designed for his type to the other contract:[13]

$$IC_k \qquad w_k - \theta_k C(e_k) \geq w_m - \theta_k C(e_m)$$

$$IC_m \qquad w_m + \gamma_m V(e_m) - \theta_m C(e_m) \geq w_k + \gamma_m V(e_k) - \theta_m C(e_k)$$

Consider first the case where the public firm decides to attract motivated and regular workers, $k = r$. This resembles a standard adverse selection problem, where workers differ in their productivity inside the firm, but have the same outside option (since $\theta_r = \theta_m$). As in the standard model, the participation (or Individual Rationality) constraint of the 'low' type and the revelation (or Incentive Compatibility) constraint of the 'high' type are binding, while the other two constraints are non-binding (see e.g. Laffont and Martimort, 2002, chapter 2). The optimisation problem of the public firm is to minimise cost (10) with respect to e_m and e_r, subject to IR_r, IC_m, and the production constraint (11). This gives the following two first-order conditions for e_m and e_r, respectively:

$$-\frac{N_m}{e_r}\left[U_r + \theta_r C(e_r)\right] + N_m\left[\theta_m C'(e_m) - \gamma_m V'(e_m)\right] = 0 \tag{12}$$

$$\left[e_r\theta_r C'(e_r) - U_r^* - \theta_r C(e_r)\right]\left[\frac{Q - e_m N_m}{e_r^2}\right] + N_m\left[\gamma_m V'(e_r) + C'(e_r)(\theta_r - \theta_m)\right] = 0 \tag{13}$$

By substituting $e_r = e_r^*$ into first-order condition (13) and using (4) and (5), the first term drops out. Since the second term is positive, it follows that the public firm induces the regular workers to exert less effort than they do in the private sector, $e_r < e_r^*$. Substituting this result into equation (12), we find that the contract for the motivated workers is also distorted. The public firm induces the motivated workers to exert more effort than they

[13] We assume that workers choose which contract to sign after applying. If a worker had to choose for which contract to apply, motivated workers would have to take into account that not all workers applying for the contract designed for the other type may get a job, as the number of applications may exceed the number of jobs. This would weaken IC_m, and hence further reduce the rents that motivated workers obtain. Further, we also assume that the public firm can commit not to renegotiate the contracts after the types have been revealed, such that the ratchet effect has no bite.

would do in the private sector *if* they would be motivated to work in the private sector, $e_m > e_m^x$.

Intuitively, as in the standard adverse selection model, the public firm makes the contract of the regular workers less attractive to motivated workers by decreasing the level of effort in that contract. Thereby, it can extract a greater part of the rents from motivation from the motivated workers. However, this decrease in effort implies that the public firm needs to hire more regular workers to meet the production constraint, which is costly. It can decrease these costs by increasing the effort of motivated workers. In the optimum, the cost of an additional unit of effort by giving stronger incentives to the motivated workers is equal to the cost of an additional unit of effort by hiring an additional regular worker.[14]

Next, consider the case where the public firm decides to attract motivated and lazy workers, $k = l$. If the revelation constraint of motivated workers IC_m is binding, the optimisation problem of the public firm is similar to that above, leading to first-order conditions (12) and (13) with $r = l$. Hence, the public firm distorts both contracts by giving lazy workers weaker incentives than private firms do, and motivated workers stronger incentives than private firms would.

Interestingly, however, when the public firm attracts lazy workers, it is also possible that the revelation constraint does not bind, i.e. that the contract for lazy workers is less appealing to motivated workers than working in the private sector.[15] In this case, IR_m and IR_l are binding, while IC_m and IC_l are non-binding. Then, the optimisation problem of the public firm is to minimise cost (10) with respect to e_m and e_l, subject to IR_l, IR_m, and the production constraint (11). This gives the following two first-order conditions for e_m and e_l, respectively:

$$-\frac{N_m}{e_l}\left[U_l^* + \theta_l C(e_l)\right] + N_m\left[\theta_m C'(e_m) - \gamma_m V'(e_m)\right] = 0 \qquad (14)$$

[14] Allowing for part-time jobs in the private sector makes contract distortions less costly. Regular workers would take a part-time job in the private sector alongside their public sector job, thereby increasing their utility. Hence, the cost of the downward distortion for the public firm is lower, implying that the firm can extract more rents from the motivated workers.

[15] Note that this can never happen when the public firm hires regular workers rather than lazy workers, since regular and motivated workers have the same outside option.

$$\left[e_l\theta_l C'(e_l) - U_l^* - \theta_l C(e_l)\right]\left[\frac{Q - e_m N_m}{e_l^2}\right] = 0 \tag{15}$$

By substituting $e_l = e_l^*$ and using (4) and (5), we find that the first term between brackets of first-order condition (15) is zero. Hence, the public firm sets the level of effort for the lazy workers equal to their optimal level of effort in the private sector. Obviously, their wage must also be at the same level as in the private sector. Substituting this result into first-order condition (14) gives $e_m = e_m^x$. Hence, neither contract is distorted and the contract offered to motivated workers extracts all of their rents (as IR_m is binding).[16]

The final step is to show which type of workers the public firm optimally attracts in addition to the motivated workers. Let us start with the case we just discussed, where the participation constraint of motivated workers IR_m is binding if the firm attracts lazy workers. The public firm pays p per unit of effort to lazy workers and extracts all of the motivational rents from motivated workers. When, instead, the public firm attracts regular workers, the revelation constraint of the motivated workers is always binding. Therefore, the public firm can not extract all of the rents from motivation. Moreover, it distorts the contract of the regular workers, implying that the cost per unit of effort of regular workers is greater than p. Hence, total cost are lower if the public firm attracts lazy rather than regular workers.

Next, consider the case where the revelation constraint of motivated workers IC_m is binding if the public firm attracts lazy workers. In Appendix A2, we prove that total cost Z decrease in the general work ethic of the non-motivated worker type θ_k, $\partial Z/\partial\theta_k < 0$. Hence, besides motivated workers, the public firm prefers to attract the economy's laziest workers. The intuition is straightforward. The extraction of motivational rents from motivated workers by the public firm is hampered by the revelation constraint for motivated workers IC_m. To induce motivated workers to choose the proper contract, they must receive all rents they would obtain by choosing the other type's contract. A contract satisfying a lazy worker's participation constraint has lower wage and lower required effort than a contract satisfying a regular worker's participation constraint. Therefore, a lazy worker's

[16] If the public firm could distinguish between worker types, contracts would not be distorted, as only the participation constraints of the attracted worker types bind. The public firm would then prefer to attract motivated workers, and would be indifferent between lazy and regular workers.

contract is less appealing to a motivated worker than a regular worker's contract, implying that the public firm can extract more rents, and hence attracts motivated workers at lower cost, if it attracts lazy workers rather than regular workers.[17]

It follows that the public firm can produce the same output at lower cost by attracting lazy rather than regular workers. Moreover, the public firm may deliberately provide weak incentives to lazy workers, implying that lazy workers in the public sector exert less effort than lazy workers who are employed in the private sector. The laziness of civil servants may thus be a sign of cost-efficient government!

6 Social Welfare

In this section, we impose that the public firm maximises social welfare, which we define as the sum of utilities of all workers in the economy. Recall that, so far, we ignored taxation as our assumption of lump-sum taxes implies that none of the decisions by the workers or the cost-minimising public firm are affected by taxation. However, taxes do affect workers' utility and, hence, social welfare. The total amount of taxes is simply the sum of the wages of the public sector workers (Z). Since utility is linear in income, social welfare can be written as:[18]

$$\Psi = \sum_i \left[(N_i - n_i)U_i^* + n_i U_i\right] - Z \tag{16}$$

Recall that n_i denotes the number of workers of type $i \in \{r, m, l\}$ hired by the public firm. By using (3), the above expression can be rewritten to:

$$\Psi = \sum_i \left\{(N_i - n_i)U_i^* + n_i \left[-\theta_i C(e_i) + \gamma_i V(e_i)\right]\right\} \tag{17}$$

Hence, the public firm maximises total utility in the private sector minus the net cost of effort in the public sector.

[17] Without motivated workers, $N_m = 0$, it follows from first-order condition (13) that the government does not distort the contract of regular or lazy workers. Then, the government is indifferent between lazy and regular workers, as both are willing to work in the public sector for p per unit of effort. Hence, the contract distortions and the preference for lazy workers stem from the presence of motivated workers.

[18] Since the public firm's output Q is fixed, we can safely ignore the utility from public goods in the optimisation problem.

In Appendices A3 and A4, we prove that the optimal choice of the social planner is identical to that of a cost-minimising public firm when effort is unverifiable, and when effort is verifiable and Q is sufficiently small, respectively. Thus, when effort is unverifiable, regular workers are least attractive to the public firm, and lazy and motivated workers may both be the best choice. When effort is verifiable and Q is sufficiently small, the public firm attracts motivated workers, and induces them to exert a level of effort smaller than private firms do, $e_m < e_m^*$.

When effort is verifiable and Q is sufficiently large, social welfare (17) can be rewritten as:

$$\Psi = \sum_i (N_i U_i^*) - n_k \left[U_k^* + \theta_k C(e_k)\right] - N_m \left[U_m^* + \theta_m C(e_m) - \gamma_m V(e_m)\right] \tag{18}$$

where subscript $k \in \{r, l\}$ denotes the non-motivated worker type the firm hires. Maximising (18) with respect to e_m and e_k, subject to production constraint (11), yields the following first-order conditions:

$$\frac{N_m}{e_k}\left[U_k^* + \theta_k C(e_k)\right] - N_m\left[\theta_m C'(e_m) - \gamma_m V'(e_m)\right] = 0 \tag{19}$$

$$\frac{Q - N_m e_m}{e_k^2}\left[U_k^* + \theta_k C(e_k) - e_k \theta_k C'(e_k)\right] = 0 \tag{20}$$

Using (4) and (5), it follows that first-order condition (20) is zero for $e_k = e_k^*$. Hence, the non-motivated worker type is induced to exert the same level of effort as in the private sector. This implies that the public firm is indifferent between hiring lazy and regular workers, as both types need to be paid p per unit of effort. Substituting this result into first-order condition (19), it follows that the effort of motivated workers is (implicitly) given by (6), the level of effort motivated workers would exert in the private sector *if* they would derive utility from working there, $e_m = e_m^x$. Hence, a social planner does not distort the contracts of its employees. Wages are set such that the participation constraints IR_k and IR_m and the revelation constraints IC_k and IC_m are all satisfied.[19]

[19] Because utility is linear in income, the distribution of income does not affect social welfare. When the social welfare function is extended to allow for distributional concerns, as in e.g. Boyer and Laffont (2003, Section 6), the public firm may distort contracts. Then, rent extraction from motivated workers may be considered optimal for distributive reasons. Rent extraction may also be optimal when taxes are distortionary, as in e.g.

The social welfare maximising contracts differ from those offered by the cost-minimising public firm. This implies that, when the public firm maximises social welfare, social welfare is higher, but also that total cost and, hence, taxes are higher. Apart from the difference in taxes, lazy and regular workers attain the same level of utility, U_i^*, in both cases. Hence, as taxes are higher, social welfare maximisation makes lazy and regular workers worse off. It follows that only motivated workers benefit from having a social welfare maximising government. When motivated workers constitute a minority in society, politicians are likely to act in the interest of lazy and regular workers and strive for minimum cost of public goods production.

7 Concluding Remarks

This paper has shown that, in addition to workers with a public service motivation, the public sector may prefer to hire the economy's laziest workers and provide them with weaker incentives than the market sector does. Even though this reduces aggregate welfare, a majority of society may be better off, as motivated workers can be hired at lower wage, and hence public goods are produced at lower cost. When effort is to a large extent unverifiable in the public sector, the public sector may hire too many lazy workers as they crowd out motivated workers.

We have restricted Q such that two worker types are sufficient. It is a straightforward repetition of the analyses to allow for values of Q such that the public firm needs all three worker types. When the difference in general work ethic θ between lazy and regular workers is sufficiently large, the contract for lazy workers is not distorted, whereas the public firm distorts the contracts for motivated and regular workers. Otherwise, the contract for lazy workers will be distorted as well. In the limit, when $Q \to \infty$, the public firm does not distort any contract, as can be seen from first-order condition (13). When the firm needs a great number of non-motivated workers, the costs of distorting the contract for non-motivated workers are large compared to the benefits of rent extraction from the motivated workers.

We have abstracted from interactions between the workers. Work morale, however, may be affected by the behaviour of one's colleagues. The enthu-

Laffont and Tirole (1993). Then, the social planner trades off the inefficiencies arising from taxation against the inefficiency of distorting the contracts of the workers in the public sector.

siasm of coworkers may be stimulating, whereas shirking colleagues may reduce the incentive to work (Stowe, 2002). Likewise, motivated workers may consider the wage paid to lazy workers to be unfair given the difference in effort. Then, attracting lazy workers may be detrimental to the effort of motivated workers. Further, if the pace of production depends on the 'weakest link', it may not be optimal to hire lazy workers.

A Appendices

A.1 Conditions under which hiring two types of workers is optimal

Unverifiable effort

Because the public firm can not induce workers to exert a certain level of effort, it is necessary to attract a second worker type as soon as $Q > N_i e_i$, where i is the worker type the firm prefers to employ when Q is sufficiently low. As argued in the main text, it might happen that the public firm can not single out its most preferred type. Then, the public firm always employs two worker types.

Verifiable effort, cost-minimisation

First, consider the case where the participation constraint of motivated workers IR_m binds when the public firm attracts lazy workers, while the revelation constraint IC_m is non-binding. Marginal cost of effort when hiring a lazy worker is p. This implies that the public firm hires lazy workers as soon as the marginal cost of effort of motivated workers exceeds p. Differentiating the participation constraint (7) of motivated workers with respect to e_m gives:

$$\frac{\partial w_m}{\partial e_m} = \theta_m C'(e_m) - \gamma_m V'(e_m) \tag{A1}$$

Hence, the public firm attracts a second worker type when $Q > N_m e_m^{\xi}$, where e_m^{ξ} is defined by:

$$\theta_m C'(e_m^{\xi}) - \gamma_m V'(e_m^{\xi}) = p \tag{A2}$$

Note that (A2) is identical to (6). Hence, $e_m^{\xi} = e_m^x$, which is the optimal level of effort motivated workers would exert in the private sector *if* they would derive utility from working in the private sector.

Next, consider the case where the revelation constraint of motivated workers IC_m binds when the public firm attracts lazy workers, while the participation constraint IR_m is non-binding. It is obvious that the public firm attracts only motivated workers when $Q \leq N_m e_m^{\xi}$. Now consider higher levels of Q. When the firm does not attract lazy workers, total cost can be found by substituting the production constraint $Q = N_m e_m$ and the participation constraint (7) of motivated workers into total cost $Z_1 = N_m w_m$:

$$Z_1 = N_m \left[U_m^* + \theta_m C(\frac{Q}{N_m}) - \gamma_m V(\frac{Q}{N_m}) \right] \tag{A3}$$

It is easy to verify that Z_1 is a continuous and convex function of Q. When, instead, the public firm attracts both motivated and lazy workers, total cost discontinuously increase, as the public firm can no longer extract all motivational rents from the motivated workers. Suppose the public firm would not distort the contracts of its workers, $e_l = e_l^*$ and $e_m = e_m^{\xi}$ $(= e_m^x)$. Then, total cost when the public firm attracts both lazy and motivated workers, Z_2, is a linear function of Q , as the marginal cost of effort equals p. Hence, Z_1 and Z_2 intersect at some level of $Q > N_m e_m^{\xi}$. Since the public firm optimally distorts the contracts of its workers when it attracts both lazy and motivated workers so as to decrease cost, the minimum level of Q at which it is optimal to attract lazy workers is smaller than the level at which Z_1 and Z_2 intersect.

Verifiable effort, social planner

As the social planner induces lazy and regular workers to exert the same level of effort as in the private sector, this case is similar to the case where the participation constraint of motivated workers IR_m binds when the cost-minimising public firm attracts lazy workers.

A.2 Proof that $\frac{\partial Z}{\partial \theta_k} < 0$

By substituting the production constraint (11), IR_k, IC_m, and (5) into total cost (10), we find:

$$\begin{aligned} Z \;=\; & \{p e_k^* - \theta_k [C(e_k^*) - C(e_k)]\} \left(\frac{Q - e_m N_m}{e_k} + N_m \right) + \\ & N_m \{\theta_m [C(e_m) - C(e_k)] - \gamma_m [V(e_m) - V(e_k)]\} \end{aligned}$$

A marginal increase in θ_k leads to a decrease in Z:

$$\frac{\partial Z}{\partial \theta_k} = -[C(e_k^*) - C(e_k)] \left(\frac{Q - e_m N_m}{e_k} + N_m \right) < 0$$

where, by the envelop theorem, all effects through e_k^*, e_k, and e_m are zero, and the sign follows from $e_k < e_k^*$ (see first-order condition (13)).

A.3 Proof that cost-minimisation and welfare-maximisation yield identical results when effort is unverifiable

A cost-minimising public firm attracts the worker type that minimises $Z = n_i w_i$. After substituting the production constraint $n_i = Q/e_i$ and (7), we find that:

$$Z = \frac{Q}{e_i} \left[U_i^* + \theta_i C(e_i) - \gamma_i V(e_i) \right]$$

A welfare-maximising public firm attracts the worker type that maximises (17). After substituting the production constraint $n_i = Q/e_i$, we find that:

$$\Psi = \frac{Q}{e_i} \left[-U_i^* - \theta_i C(e_i) + \gamma_i V(e_i) \right]$$

Obviously, these two optimisation problems yield the same results.

A.4 Proof that cost-minimisation and welfare-maximisation yield identical results when effort is verifiable and Q is sufficiently small

A welfare-maximising public firm maximises (17) with respect to e_i, subject to the production constraint $n_i = Q/e_i$. This gives first-order condition:

$$-\left[\theta_i C'(e_i) - \gamma_i V'(e_i) \right] + \left[\frac{U_i^* + \theta_i C(e_i) - \gamma_i V(e_i)}{e_i} \right] = 0$$

which is, except for opposite signs, identical to first-order condition (9) derived in Section 5. Hence, the optimal contract of a welfare-maximising public firm is identical to that of a cost-minimising public firm.

References

[1] Antonazzo, Emanuela, Scott, Anthony, Skatun, Diane, and Elliot, Robert F. (2003), The Labour Market for Nursing: A Review of the Labour Supply Literature, *Health Economics*, vol. 12 (6), pp. 465-478.

[2] Benabou, Roland, and Tirole, Jean (2003), Intrinsic and Extrinsic Motivation, *Review of Economic Studies,* vol. 70 (3), pp. 489-520.

[3] Besley, Timothy and Ghatak, Maitreesh (2004), Competition and Incentives with Motivated Agents, *American Economic Review*, forthcoming.

[4] Boyer, Marcel, and Laffont, Jean-Jacques (2003), Competition and the Reform of Incentive Schemes in the Regulated Sector, *Journal of Public Economics,* vol. 87 (9-10), pp. 2369-2396.

[5] Buchanan, James M. (1978), *The Economics of Politics,* London: Institute of Economic Affairs.

[6] Burgess, Simon, and Metcalfe, Paul (1999), The Use of Incentive Schemes in the Public and Private Sectors: Evidence from British Establishments, CMPO Working Paper 99/015.

[7] Caplan, Bryan (2003), Stigler-Becker versus Myers-Briggs: why preference-based explanations are scientifically meaningful and empirically important, *Journal of Economic Behavior and Organization*, vol. 50 (4), pp. 391-405.

[8] Daymont, Thomas N., and Andrisani, Paul J. (1984), Job Preferences, College Major, and the Gender Gap in Earnings, *Journal of Human Resources,* vol. 19 (3), pp. 408-428.

[9] Delfgaauw, Josse, and Dur, Robert (2002a), Signaling and Screening of Workers' Motivation, Tinbergen Institute Discussion Paper 02-050/03.

[10] Delfgaauw, Josse and Dur, Robert (2002b), From Public Monopsony to Competitive Market: More Efficiency but Higher Prices, Tinbergen Institute Discussion Paper 02-118/1.

[11] Dixit, Avinash (2002), Incentives and Organizations in the Public Sector: An Interpretative Review, *Journal of Human Resources*, vol. 37 (4), pp. 696-727.

[12] Downs, Anthony (1967), *Inside Bureaucracy,* Boston: Little, Brown.

[13] Edmonds, Suzanne, Sharp, Caroline, and Benefield, Pauline (2002), Recruitment to and Retention on Initial Teacher Training – A Systematic Review, Slough: National Foundation for Educational Research.

[14] Francois, Patrick (2000), 'Public Service Motivation' as an Argument for Government Provision, *Journal of Public Economics*, vol. 78 (3), pp. 275-299.

[15] Frank, Sue A., and Lewis, Gregory B. (2004), Government Employees: Working Hard or Hardly Working?, *American Review of Public Administration*, vol. 34 (1), pp. 36-51.

[16] Furnham, A. (1992), *Personality at Work*, London: Routledge.

[17] Glazer, Amihai (2004), Motivating Devoted Workers, *International Journal of Industrial Organization*, vol. 22 (3), pp. 427-440.

[18] Goodsell, Charless T. (1985), *The Case for Bureaucracy: A Public Administration Polemic,* 2nd ed. Chatham: Chatham House.

[19] Harper, Barry, and Haq, Mohammad (2001), Ambition, Discrimination, and Occupational Attainment: A Study of a British Cohort, *Oxford Economic Papers*, vol. 53 (4), pp. 695-720.

[20] Hofstede, Geert (1991), *Cultures and Organisations: Software of the Mind,* Berkshire: McGraw-Hill Book Company.

[21] Jeon, Doh-Shin, and Laffont, Jean-Jacques (1999), The Efficient Mechanism for Downsizing the Public Sector, *World Bank Economic Review,* vol. 13 (1), pp. 67-88.

[22] Katz, Daniel, Gutek, Barbara A., Kahn, Robert L., and Barton, Eugenia (1975), *Bureaucratic Encounters: A Pilot Study in the Evaluation of Government Services,* Ann Arbor: Survey Research Centre, Institute for Social Research, University of Michigan.

[23] Laffont, Jean-Jacques and Martimort, David (2002), *The Theory of Incentives,* Princeton: Princeton University Press.

[24] Laffont, Jean-Jacques, and Tirole, Jean (1993), *A Theory of Incentives in Procurement and Regulation*, Cambridge, MA: MIT Press.

[25] Lazear, Edward P. (1986), Salaries and Piece Rates, *Journal of Business,* vol. 59 (3), pp. 405-431.

[26] Lazear, Edward P. (1995), *Personnel Economics*, Cambridge, MA: MIT Press.

[27] Moen, Espen R., and Rosen, Åsa (2004), Performance Pay and Adverse Selection, *Scandinavian Journal of Economics*, forthcoming.

[28] Niskanen, William A. (1971), *Bureaucracy and Representative Government,* Chicago: Aldine-Atherton.

[29] Prendergast, Canice (1999), The Provision of Incentives in Firms, *Journal of Economic Literature*, vol. 37 (1), pp. 7-63.

[30] Prendergast, Canice (2003), The Motivation and Bias of Bureaucrats, mimeo, University of Chicago.

[31] Preston, Anne E. (1989), The Nonprofit Worker in a For-Profit World, *Journal of Labor Economics*, vol. 7 (4), pp. 438-463.

[32] Rama, Martin (1999), Public Sector Downsizing: An Introduction, *World Bank Economic Review,* vol. 13 (1), pp. 1-22.

[33] Riley, John G. (2001), Silver Signals: Twenty-Five Years of Screening and Signaling, *Journal of Economic Literature*, vol. 39 (2), pp. 432-478.

[34] Rothschild, Micheal, and Stiglitz, Joseph (1976), Equilibrium in Competitive Insurance Markets: An Essay on the Economics of Imperfect Information, *Quarterly Journal of Economics,* vol. 90 (4), pp. 629-649.

[35] Spence, A.M. (1973), Job Market Signaling, *Quarterly Journal of Economics*, vol. 90 (3), pp. 355-374.

[36] Stowe, Jill (2002), Incorporating Morale into a Classical Agency Model: The Effect of Morale on Incentives and Effort, mimeo, Duke University.

[37] Tullock, Gordon (1965), *The Politics of Bureaucracy,* Washington: Public Affairs Press.

[38] Wilson, James Q. (1989), *Bureaucracy: What Government Agencies Do and Why They Do It,* New York: Basic Books.