IDENTITY, INCENTIVES AND THEIR DYNAMICS IN THE PRODUCTION OF PUBLICLY PROVIDED GOODS

PAOLO POLIDORI                 DÉSIRÉE TEOBALDELLI

NOVEMBRE 2011
Identity, incentives and their dynamics in the production of publicly provided goods

Paolo Polidori† Désirée Teobaldelli‡
November 2011

Abstract

An important issue in the literature on the role of government provision of goods and services concerns the understanding of inefficiencies related to the opportunistic behavior of public employees. This paper studies incentives in such contexts and analyzes the consequences of introducing a behavioral component into a model of agency within public organizations. In particular, we argue that employees may be motivated to provide effort in ways that enable them to shape their identity/self image. The term identity describes gains and losses in utility from behavior that conforms or departs from the ideal prescribed for particular social categories, such as being a “good” public employee. We develop a principal-agent model that incorporates identity, in addition to monetary rewards, and we show that when agents are guided by such intrinsic motivations, it may be optimal for the principal to choose a relatively inefficient monitoring technology and reduce monetary incentives. The mechanism leading to this result is related to the general equilibrium effect going through the public administration budget constraint and the composition of workers within the firm. We then analyze a dynamic version of the model and show that a higher political instability may induce the government to adopt inefficient organization schemes that reduce the value of identity and negatively affect future provision of public services.

Keywords: Identity, Incentives, Public Goods Provision, Efficiency Wages, Public Service Motivation.

JEL Classification Numbers: D01, J41, L30, M52, Z13.

*The authors wish to thank participants at the X Milan European Economy Workshop and at the SIEP 2011 annual meeting, as well as seminar participants at Bari University for helpful suggestions and discussions on an earlier version of the paper. Financial support by MIUR (PRIN 2008) is gratefully acknowledged. The usual disclaimer applies.

†Department of Law, University of Urbino. E-mail: paolo.polidori@uniurb.it
‡Department of Law, University of Urbino. E-mail: desiree.teobaldelli@uniurb.it
1 Introduction

The role of government provision of valuable social goods and services is a highly debated subject in the economics literature that throws up competing concerns. It is widely agreed that government intervention in the economy is justified from a welfare economics perspective, even if it may be a source of productive inefficiencies. One significant research topic concerns the understanding of public agencies failures related to the opportunistic behavior of public employees in the delivery of collective goods and services. The public choice approach raises the potential for government agents to exploit the power related to their office for private benefit at public expense, through the diversion of public resources to nonpublic purposes. A public enterprise might result inefficient from a productive point of view as a consequence of the misbehavior of public officials who, either legally, through the deviation from the normal duties and the minimization of the individual effort by slacking on the job, or illegally, through corruption and rent-seeking activities (like for example the appropriation of state property, the granting of favors to personal acquaintances, nepotism), pursue private interests acting against the public interest they should fulfill (Niskanen, 1977; Brennan and Buchanan, 1980; Shleifer and Vishny, 1993; Besley, 2006). This might lead government control and regulation of economic activities to negatively affect economic performance.

This paper intends to analyze the optimal production schemes of public organizations in presence of agency problems when individuals may derive utility from their status. In particular, we evaluate the consequences of introducing a behavioral component into a model of agency within public organizations. We develop a theoretical framework that considers the interaction between monetary and non monetary incentives in motivating civil servants to adequately execute their tasks. We explicitly include in the workers’ utility function sources of motivation that are alternative to monetary compensation and that have usually been considered by sociological and psychological studies. Specifically, we allow agents to be intrinsically motivated to provide effort in ways that enable them to conform to their identity or self-image (Akerlof and Kranton, 2000), in order to shape and reinforce it.

Recent and growing economics literature focuses on the presumption that pecuniary remuneration is not the only kind of reward that individuals pursue. A field of research claims that the internalization of social norms and moral values can act as negative and positive sources of individual utility (Tabellini 2008; Bisin and Verdier, 2008; Kaplow and Shavell, 2007). It has been observed that in many social situations or economic transactions individuals are inclined to behave not just considering the material gains they could obtain through an intertempo-
ral calculation of costs and benefits, but also because they have internalized a norm of good conduct, on the basis of a logic of appropriateness and the adherence to socially prescribed roles. So people can refrain from stealing, cheating or shirking their duties even against their immediate material self-interest, just because of the idea they have about what is wrong or right, and the correspondence to this idea allows utility gain. However, these studies do not deal with the issues related to the public service performance and do not investigate the effects of value sharing among agents on the quality of public organizations.

The idea of a public service ethos as a source of incentive for civil servants has been long explored by the public administration literature which refers to it as public service motivation (PSM) (see Francois, 2000, and Dixit, 2002, for an extensive survey on the topic). Perry and Wise (1990) define PSM as “an individual’s predisposition to respond to motives grounded primarily or uniquely in public institutions”, mainly because they ensure the provision of valuable social goods and services. Whether or not civil servants demonstrate proper ethics or motivation for their job has also been formally considered by economists over the past few years. Recent interesting contributions include Besley and Ghatak (2005), Benabou and Tirole (2006), Prendergast (2007), Delfgaauw and Dur (2010), Banerjee (2007), Frey (2008). These studies commonly consider civil servants as intrinsically motivated agents with a relative preference for working in the public sector, as government agencies are mission-oriented and serve social purposes that may enable their employees to develop a sense of commitment towards the tasks they must perform. As a consequence, individuals derive utility simply from the fact of working in public organizations and providing services to the community. Public workers get intrinsic benefits from the output of such agencies and, more generally, from the idealistic principle served by the agency and that they share. Akerlof and Kranton (2005) claim that when this sense of an employee’s attachment to a specific organization constitutes an intrinsic motivation consistent with positive self-perception, then it may successfully replace or integrate monetary incentives to motivate individual behavior. They use the term identity to describe how people see themselves and state that individuals form their identities by earning a reputation, by acquiring social status, or by developing a self-image. People are endowed with both a personal identity and multiple social identifications because they operate within a plurality of groups and social categories.1 As individuals join an institution, their identity varies accordingly to the ideal behavior associated to it, they identify with it and are motivated to provide effort

---

1Sen (1985, 2002) observes that identity has important effects on the welfare, goals and norms of conduct of individuals. He argues that individuals develop a plurality of identities that are essential for their view of themselves and for their decision-making.
in ways that enable them to conform to this image. As a result, identity-based incentives may be useful supplements to extrinsic/monetary rewards to mitigate agency problems. As long as work is important in determining the well-being of individuals, as a potential source of personal achievement and self-realization, an organization should rely on something other than pay to induce workers to perform well. This is more likely to be relevant for government agencies that are usually budget-constrained and characterized by outcomes or actions not accurately observable. Due to this context, it might be difficult to rely on efficient monitoring technology and the effort of employees turns out to be hard to remunerate. For these reasons, public agencies represent an environment with limited scope for standard monetary incentive schemes, so they could more easily invest in inculcating a sense of identity among workers and persuade them to adopt the purposes of the organization, in order to prevent opportunistic or exploitative behavior.

Our paper is closely related to this field of research. Following Akerlof and Kranton (2000), we build a principal-agent model that incorporates identity as a source of civil servant motivation in the provision of effort, in addition to monetary rewards. We also extend their framework by allowing the organization and quality of public service provision to affect the identity of the agents.

In our model, the agent’s effort is private information and, depending on the (endogenous) monitoring technology, it may be detected by the principal (government agency) with some positive probability. The level of publicly provided goods increases with the effort of the agents. We assume that the government is benevolent and first determine the optimal organization of production, namely the monitoring technology and the effort required to workers, when agents are extrinsically motivated. We then consider the case where agents are heterogeneous in the preference for their identity. Depending on the individual characteristics and the technology employed, agents self-select into one of two different groups, “bad” and “good” workers respectively. Bad workers choose their effort according to monetary incentives only, while the good ones put effort according to the goals of the public organization as they perceive intrinsic benefits from doing so.

We observe that a more efficient monitoring technology (i.e., a higher probability of detecting the agents shirking) increases wages as well as the percentage of civil servants who self-select into the good category.\(^2\) Nevertheless, the principal’s optimal solution involves choosing a relatively inefficient monitoring technology, namely a technology with low levels

\(^2\)This result seems to be at odd with the literature stating that monetary incentives may crowd out intrinsic motivation (e.g., Frey, 1992 and 2008; Bénabou and Tirole, 2006).
of detection probability. This result is due to the fact that a lower probability of detection reduces the effort chosen by bad workers and reduces the amount of public service provision. However, this also allows the principal to pay lower wages and to increase the number of employees hired, which has positive effects on production as a share of the agents hired are good and exert a high level of effort even if the wage (and the required effort) is low. When the monitoring technology is relatively efficient, there are many good civil servants and the latter effect dominates, which makes the adoption of a less efficient technology optimal. When the monitoring technology is relatively inefficient, the former effect dominates and more efficient technologies are optimal. In other words, the optimal technology involves an intermediate level of monitoring and incentives.

We thus conclude that when agents are intrinsically motivated it may be optimal to reduce monetary incentives, as already emphasized by the behavioral economics literature (e.g. Frey, 1997; Benabou and Tirole, 2006). However, the mechanism leading to this result is new and it is related to the general equilibrium effect going through the public administration budget constraint together with the composition of workers within the firm.

We also analyze a dynamic version of the model and characterize the optimal organization of production when the value of identity is partly endogenous and there is political instability in the sense that the principal can be replaced in the future with some probability. The analysis leads to the conclusion that a higher political instability may induce the government to adopt inefficient organization schemes. This may reduce the value of identity from working in the public organization and negatively affect the future provision of public services.

The remainder of the article is organized as follows. Section 2 describes the model, which is then analyzed in Section 3. Section 4 proposes a dynamic version of the baseline model. Section 5 concludes with possible directions for further research.

2 The Model

We present a principal agent model where the principal hires a number of agents to produce social goods. The production function is linear in the effort $e$ of the agent. The output produced by each agent is $\tilde{y}_i = ke_i + \varepsilon_i$, where $k$ is a positive constant and $\varepsilon_i$ is a shock with zero mean and identically independently distributed across agents. As both principal and agents are risk-neutral, we will focus on the expected output of the relationship

$$y_i = ke_i.$$  

(1)
The pecuniary cost of effort of the agent $i$ is quadratic

$$c(e_i) = \frac{c}{2} e_i^2,$$

where $c > 0$ is constant and equal for all individuals. Effort is assumed to be observable and verifiable by the principal with some probability $p \in [\underline{p}, \bar{p}]$, where $\underline{p}$ and $\bar{p}$ will be defined below. The monitoring technology $p$ is endogenous and can be chosen by the principal at zero cost. Individuals have no wealth and a limited-liability constraint operates, so that the agent caught shirking does not receive the wage $w$. To simplify the analysis, we normalize to zero the outside option utility of the agents.

We introduce a behavioral component into the agent’s utility function, such that civil servants are intrinsically motivated to provide effort in ways that enable them to earn self-esteem and to shape and reinforce their self-image/identity. We assume that agents can divide themselves into two role categories, “good” and “bad” civil servants, and they choose consequently the level of effort that allows them to conform to the ideal behavior prescribed by each category. The concept of identity as role category used here follows Akerlof and Kranton (2000, 2002, 2005), who discuss it in detail in their works:

“The term identity is used to describe a person’s social category - a person is a man or a woman, a black or a white, a manager or a worker. The term identity is also used to describe a person’s self-image. It captures how people feel about themselves, as well as how those feeling depend upon their actions. In a model of utility, then, a person’s identity describes gains and losses in utility from behavior that conforms or departs from the norms for particular social categories in particular situations. This concept of utility is a break with traditional economics, where utility functions are not situation-dependent, but fixed. In our conception, utility functions can change, because norms of appropriate and inappropriate behavior differ across space and time. Indeed, norms are taught -by parents, teachers, professors, priests, to name just a few. Psychologists say that people can internalize norms; the norms become their own and guide their behavior (Akerlof and Kranton, 2005).”

In other words, in our framework, the term *identity* describes a civil servant’s role category, such as being a “good” public employee or a “bad” one. Specifically, we assume that good civil servants obtain an identity payoff $I$ and their prescribed effort is the socially optimal level $\hat{e}$, namely the level of effort that would be chosen by the principal in absence of asymmetric information. The identity payoff and the prescribed effort of bad civil servants are both
normalized to zero, so that their utility and behavior correspond to the standard neoclassical ones. Individuals differ in the utility derived from the role status of being good civil servants depending on the match between their individual characteristics and the ideals for each category. Individual characteristics can be view as individual’s prosocial values or an individual’s natural inclination to honesty and civic virtues. We model this individual’s characteristic with the variable $h_i \in [0, 1]$. The prescription of an ideal good civil servant is $h_i = 0$, so that the identity payoff of agent $i$ is $I^g - \gamma h_i$, where $I^g > 0$ and $\gamma$ measures how difficult is for an individual with characteristics different from the ideal civil servant to fit in that group. To simplify the analysis, and without loss of generality, we assume the distribution of $h_i$ in the society is uniform, so that the density function is $s(h_i) = 1$ for all $h_i \in [0, 1]$.

The utility function of a good civil servant is

$$U^g_i = \alpha \left( w - \frac{c}{2} e_i^2 \right) + (1 - \alpha) \left[ w + I^g - \gamma h_i - \frac{c}{2} (e_i - \hat{e})^2 \right], \tag{2}$$

where $\alpha \in [0, 1]$ denotes the weight attached to the pecuniary benefit, and $1 - \alpha$ the weight of the utility from the role status. The latter is given by the sum of the identity payoff, $I^g - \gamma h_i$, and the disutility from effort that is determined by the distance from the prescribed level.$^3$

Similarly, the utility of a bad civil servant can be written as

$$U^b_i = \alpha \left( w - \frac{c}{2} e_i^2 \right) + (1 - \alpha) \left[ w - \frac{c}{2} (e_i - 0)^2 \right] = w - \frac{c}{2} e_i^2, \tag{3}$$

which corresponds to the standard neoclassical utility function.

We assume that the principal maximizes total output $G = \sum_{i=1}^{n} y_i$, where $n$ denotes the number of agents hired, subject to the exogenous amount of resources $T$ available by the principal for production and that are used for the payment of wage bills only. We also assume that all agents have to put some positive level of effort. This may reflect the fact that the production is geographically distributed and it is extremely costly for the principal having locations with no provision of services.$^4$

## 3 Characterization of the equilibrium

We start the analysis with studying the production of public services in the case where individuals do not derive utility from role status and, therefore, they all behave maximizing the

---

$^3$In modeling the agents’ utility function, we follow Akerlof and Kranton (2002). Our formulation differs on theirs only for the presence of the salary $w$ in the social status component of the utility function. While the results are unaffected by this variation, we prefer this formulation because it leads to the neoclassical utility function for the bad civil servants.

$^4$As it will be clear next, this assumption will only ensure that there is no separating equilibrium with bad agents exerting no effort.
standard neoclassical utility function (as the bad agents) reported in (3). This will be useful as a benchmark as well as to define the optimal contract to offer to bad civil servants that will be used next.

The wage that the principal has to pay to the (bad) agent in order to avoid him shirking, for any level of effort, is determined by the following incentive compatibility constraint

\[ w - \frac{c}{2} e^2 \geq (1 - p) w, \tag{4} \]

where the left hand side represents the utility of the agent from not shirking and the right hand side is the payoff from shirking. When shirking, the agent does not put any effort, he is caught with probability \( p \) and does not receive the wage, while with the complementary probability \( 1 - p \) his shirking is not revealed and he gets the wage. This implies that the efficiency wage reads

\[ w^* = \frac{c}{2p} e^2, \tag{5} \]

which is increasing in the required effort and decreasing in the monitoring probability as expected. The normalization to zero of the outside option utility of the individuals implies that the participation constraint is never binding and the wage will be determined by the incentive compatibility constraint.

The optimal level of effort for the principal maximizes net output, i.e., it solves the following maximization problem

\[ \max_e ke - w^* = ke - \frac{c}{2p} e^2, \]

and it is equal to

\[ e^*_b = \frac{k}{p}. \tag{6} \]

This implies that the efficiency wage to be paid is \( w^* = pk^2/2c \), and the utility of the agent in equilibrium is \( U^b = (1 - p) pk^2/2c \).

The total level of public services attainable is \( G = ny = nke \). Taking into account that \( n = T/w^* \), and using (5) and (6), we obtain that \( G = 2T \). This means that in our framework without identity, the amount of public service provision does not depend on the choice of the monitoring technology (represented by the level of \( p \)). These results are summarized in the following lemma.

**Lemma 1** When individuals do not derive utility from the role status (neoclassical benchmark), the total level of public services is independent on the monitoring technology employed \( p \) and it is equal to \( G = 2T \). Each agent exerts an effort \( e^*_b = pk/c \) and is paid an efficiency wage \( w^* = pk^2/2c \).
We now analyze the optimal choice of the principal when individuals also choose their role status. The analysis concerning the efficiency wage and the optimal effort chosen by the agents who select themselves into the bad civil servants is unchanged. This means that the optimal effort level of bad agents is given by (6) and the salary paid by (5).

Before moving to the analysis of the selection of identity, we need to determine the prescribed effort of good civil servants $\hat{e}$, which is assumed to be the optimal effort level under symmetric information. This means that $\hat{e}$ is the effort level maximizing the difference between the output and the cost of effort, $y - c(e)$, and the solution to the following problem

$$\max_e ke - \frac{c}{2}e^2.$$ 

From the first order condition follows that the optimal effort is

$$\hat{e} = \frac{k}{c}, \quad (7)$$

and the corresponding output is $\hat{y} = k^2/c$.

Under asymmetric information, the optimal level of effort of a good civil servant $e_g$ is given by

$$\max_e U^g_i = \alpha \left( w - \frac{c}{2}e^2_i \right) + (1 - \alpha) \left[ w + I^g - \gamma h_i - \frac{c}{2} (e_i - \hat{e})^2 \right], \quad (8)$$

and it is equal to

$$e_g = (1 - \alpha) \hat{e} = (1 - \alpha) \frac{k}{c}, \quad (9)$$

where we have used the fact that $\hat{e}$ is given by (7). The comparison of (6) and (9) shows that the effort level of good civil servants is higher than bad ones ($e_g > e_b$) as long as $p < 1 - \alpha$. In this case, the efficiency wage (5) that is paid to all agents is such that the incentive compatibility constraint (4) for good civil servants is not binding. When $p > 1 - \alpha$, $e_g < e_b$ and the incentive compatibility constraint, which should be rewritten using the utility in (8), could be binding. In this case there would be no distinction between good and bad civil servants (as all agents will exert the same effort), and the influence of role status is irrelevant. For this reason, we will restrict the attention to the (more interesting) case where $p < 1 - \alpha \equiv \bar{p}$.

The optimal selection of individuals into one of the two role categories implies that an individual $i$ will select himself into the good category if

$$\alpha \left( w - \frac{c}{2}e^2_g \right) + (1 - \alpha) \left[ w + I^g - \gamma h_i - \frac{c}{2} (e_g - \hat{e})^2 \right] \geq w - \frac{c}{2}e^2_b, \quad (10)$$

where $e_g$ and $e_b$ are given by (9) and (6) respectively. The left hand side of (10) represents the maximized utility of good civil servants and the right hand side the maximized utility of bad
ones. Note that the maximized utility of good agents is decreasing in $h_i$, which represents the distance of the individual’s characteristics from the ideal one. Using (9) and (6), this condition can be rewritten as

$$h_i \leq \frac{I^g}{\gamma} + \frac{k^2}{2\gamma c (1 - \alpha)} [p^2 - \alpha (1 - \alpha)] \equiv h^*,$$

(11)

which means that all agents with $h_i \leq h^*$ find optimal to select themselves as good civil servants, and those with $h_i > h^*$ will fall into the bad category.

The assumption of a uniform distribution of $h_i \in [0,1]$ in the society imply that $h^*$ also represents the fraction of good agents. The result contained in the following corollary is also worth emphasizing.

**Corollary 1** The fraction of good agents $h^*$ is increasing in $p$.

Corollary 1 comes from the fact that a more efficient monitoring technology (higher $p$) makes it optimal for the principal to require a higher effort to the agent (see (6)) and to pay a higher efficiency wage ($w^* = ce^2/2p = pk^2/2c$). Then, note from (10) that all agents get the higher wage but only the bad ones need to exert higher effort (remind that the incentive compatibility constraint is not binding for good agents, i.e., $e_g > e_b$ for all $p$). This implies that choosing to be a good agent becomes relatively more convenient when $p$ is higher. This result suggests the existence of a complementarity between monetary incentives and intrinsic motivation in our framework.

The total amount of public service provision is now equal to

$$G = n [h^* ke_g + (1 - h^*) ke_b] = nk [h^* e_g + (1 - h^*) e_b].$$

(12)

Substituting $n = T/w^*$, (5), (9) and (6) into (12), and rearranging terms, we obtain that the maximization problem of the principal can be rewritten as

$$\max G = \frac{2T}{p} [h^* (1 - \alpha) + (1 - h^*) p]$$

(13)

where $h^*$ is given by (11).

In the Appendix, we show that the optimal monitoring technology is represented by $p^o = \arg\max \{ G(p), G(p^*) \}$ when $p < (1 - \alpha)/3$, where $p^*$ is implicitly defined by the following equation

$$(1 - \alpha - 2p) p^2 \frac{k^2}{2\gamma c (1 - \alpha)} - (1 - \alpha) \frac{I^g}{\gamma} + \frac{(1 - \alpha) \alpha k^2}{2\gamma c} = 0.$$  

(14)
When $p \geq (1 - \alpha)/3$, the optimal technology is $p^o = p^*$. As explained in the appendix, these results hold when the following condition is satisfied
\[
\frac{(2\alpha - 1) k^2}{2c} < I^o < \frac{(1 + 26c) k^2}{54c},
\]
namely when the utility of the role status takes intermediate values. When the first inequality of (15) is not satisfied because the value from identity $I^o$ is very low, $G(p)$ is monotonically increasing in $p$ for all $p \in [p, \bar{p}]$, and the optimal monitoring technology is $p^o = \bar{p}$. Vice versa, when $I^o$ is so high that the second inequality is violated, $G(p)$ is monotonically decreasing in $p$ and $p^o = p$.

To simplify the analysis, in the remaining part of the paper, we assume that $p \geq (1 - \alpha)/3$ and that condition (15) is always satisfied. This implies that the optimal technology is $p^* \in [(1 - \alpha)/3, (1 - \alpha)]$ implicitly defined by (14). These results are summarized in the following lemma.

**Lemma 2** When $p \in [(1 - \alpha)/3, (1 - \alpha)]$ and condition (15) is satisfied, the optimal monitoring technology is $p^*$ implicitly defined by (14). The effort levels of good and bad civil servants, $e_g$ and $e_b$, and the efficiency wage $w^*$ are given respectively by (9), (6) and (5) with $p = p^*$, i.e., $e_g = (1 - \alpha) k/c$, $e_b = p^* k/c$ and $w^* = p^* k^2 / 2c$. The fraction of good agents is $h^*(p^*)$ as in (11), and the total amount of public services is $G(p^*) > 2T$ defined in (13).

The main result contained in Lemma 2 is that the level of service provision is maximized for intermediate values of the monitoring technology. This is somehow surprising given the result in Corollary 1 that the fraction of good agents $h^*$ is increasing in the efficiency of the monitoring technology $p$. The intuition for this result is the following.

A lower probability $p$ of detection of shirking reduces the level of effort of bad civil servants as well as the share of good agents. Both effects lower the level of production of public services. However, this also reduces the (efficiency) wages and allows the principal to increase the number of agents hired (recall that $n = T/w^*$). A fraction of the additional agents will select into the good category and will then exert an effort higher than required. This effect increase the level of public services provided. When $p$ is high, the fraction of good civil servants $h^*$ is high and the latter effect dominates making optimal for the principal a reduction of monitoring $p$. When $p$ is low, the fraction of good agents $h^*$ is low and the former effects are likely to dominate, which in turn means that an increase in $p$ is optimal. When $p = p^*$ these two effects exactly offset each other.
We thus obtain the result that when agents are intrinsically motivated it may be optimal to reduce monetary incentives, as already emphasized by the behavioral economics literature. However, the mechanism leading to this result is related to a general equilibrium effect going through the public administration budget constraint and not to the reduction of the intrinsic motivations that higher incentives induce. In our framework, we in fact obtain that higher monitoring and wages increase the likelihood that agents behave in a socially desirable way.

4 **An extension: a simple two period model**

We now propose a dynamic extension in two periods \((t = 1, 2)\) of our baseline model where there is political uncertainty and the value from identity is partly endogenous. Our aim is to analyze how the organization of the bureaucracy may be affected by the interaction of the following two distinct features.

We now assume that the value derived by good civil servants from identity \(I^g\) is positively related to the share of good agents \(h^*\) in the previous period. In particular, the value in the second period identity is \(I_2^g(h_1^*)\) where \(\partial I_2^g(h_1^*) / \partial h_1^* > 0\) and \(h_1^*\) is endogenous, while the value from identity in the first period \(I_1^g\) is exogenously given.\(^5\) This assumption may describe two distinct effects. The first one originates inside the organization. The higher is the fraction of agents who self-select into a certain category, and the more accepted and taken into a higher consideration becomes the behavior related to that category. The second effects is external to the organization and is related to the interaction between public institution and society. When society recognizes the high quality of the agency, the image of a good worker linked to the organization may be more valuable.

The other key feature of this model is the uncertainty about the future principal. In other words, we assume that the principal in period 1 will remain the same at time 2 only with some probability \(\lambda < 1\). This may represent the existence of political instability, so that the party in power today may be replaced in the next period, which in turn leads to the change in the directors of the public organizations.

Therefore, the maximization problem of the principal at time \(t = 1\) can now be written as

\[
\max_{\{p_1, w_1, e_1\}} U_1^p = G_1(p_1) + \beta \lambda G_2(p_1, p_2), \tag{16}
\]

where \(\beta < 1\) is the discount factor. The dependency of \(G_2\) on \(p_1\) is due to the effect that \(p_1\) has

\(^5\)The lag in the effect of economic outcomes on the value of identity is justified by the fact that it takes some time for the agents’ beliefs to change.
on the fraction of good agents \( h_1^* \) in the first period, and therefore on the value from identity \( I_2^g (h_1^*) \) in the subsequent period.

The problem faced by the principal at time \( t = 2 \) is instead unchanged with respect to the static model presented in the previous section. This means that the solution to the maximization problem at \( t = 2 \) is described by Lemma 2, with the optimal monitoring technology \( p_2^* \) defined by (14) and the fraction of good agents \( h_2^* (p_2^*) \) given by (11) with \( I_2^g = I_2^g (h_1^*) \).

We are here interested in analyzing how the degree of political instability affects the optimal organization of production in period 1, which means determining the sign of the following derivative \( \partial p_1^*/\partial \lambda \).

The solution to the principal’s maximization problem at \( t = 1 \) involves choosing the monitoring technology \( p = p_1^* \) solving (16), where the (minimum) effort level required to each agent and the efficiency wage are given respectively by (6) and (5) with \( p = p_1^* \).

The first order condition of problem (16) is

\[
\frac{\partial U_1^p}{\partial p_1} = \frac{\partial G_1 (p_1)}{\partial p_1} + \beta \frac{\partial G_2 (p_1, p_2)}{\partial p_2} = 0, \tag{17}
\]

where we now have an additional component, \( \partial G_2/\partial p_1 \), with respect to the static problem. From

\[
G_2 = \frac{2T}{p_2} \left[ h_2^* (1 - \alpha) + (1 - h_2^*) p_2 \right],
\]

the second term in (17) reads

\[
\frac{\partial G_2 (p_1, p_2)}{\partial p_1} = \frac{\partial G_2 (p_1, p_2)}{\partial p_1} + \frac{\partial G_2 (p_1, p_2)}{\partial p_2} \frac{\partial p_2}{\partial p_1} \tag{18}
\]

where we have used the first order condition of the principal maximization problem at time 2 implying that \( \partial G_2/\partial p_2 = 0 \). In other words, by envelope theorem, there is only the direct effect of \( p_1 \) on \( G_2 \) due to the effect of \( p_1 \) on \( I_2^g (h_1^*) \) through \( h_1^* \).

To determine the sign of \( \partial G_2 (p_1, p_2) / \partial p_1 \), note that from

\[
h_2^* = \frac{I_2^g (h_1^*)}{\gamma} + \frac{k^2}{2 \gamma c (1 - \alpha)} \left[ (p_2)^2 - \alpha (1 - \alpha) \right]
\]

and

\[
h_1^* = \frac{I_1^g}{\gamma} + \frac{k^2}{2 \gamma c (1 - \alpha)} \left[ (p_1)^2 - \alpha (1 - \alpha) \right],
\]

we obtain that

\[
\frac{\partial h_2^*}{\partial p_1} = \frac{1}{\gamma} \frac{\partial I_2^g (h_1^*)}{\partial h_1^*} \frac{\partial h_1^*}{\partial p_1}.
\]
which is always positive since $\partial h_1^*/\partial p_1 > 0$, and $\partial I^g_2(h_1^*)/\partial h_1^* > 0$ by assumption. Using the fact that $\partial h_2^*/\partial p_1 > 0$ and $p_2 < 1 - \alpha \equiv \bar{p}$ in (18), implies that $\partial G_2(p_1, p_2)/\partial p_1 > 0$ and allows us to state the following lemma.

Lemma 3  
In the first period of the model, the optimal monitoring technology $p_1^*$ is the solution to equation (17) with $\partial p_1^*/\partial \lambda > 0$. This means that higher political uncertainty (lower $\lambda$) reduces the level of the optimal monitoring at $t = 1$. The minimum effort required to agents $e_b$, the efficiency wage $w^*$ and the fraction of good agents $h_1^*$ are still described by Lemma 2 with $p = p_1^*$ and $I^g = I^g_1$. The equilibrium of the model at time $t = 2$ is still described by Lemma 2 where the optimal technology is $p_2^*$ implicitly defined by (14) with $I^g = I^g_2(h_1^*)$.

As $\partial G_2/\partial p_1 > 0$, $\partial U_1^g/\partial p_1$ in (17) is increasing in $\lambda$, and this implies that the optimal monitoring technology $p_1^*$ in the first period will also be increasing in the probability $\lambda$ that the principal will remain in office in the next period. This result can be explained as follows.  
A more efficient monitoring technology increases the fraction of good civil servants $h_1^*$ (see Corollary 1). This improves the future utility from identity $I^g_2(h_1^*)$ of good agents, so inducing more individuals to select themselves as good in the next period. As good agents exert a higher level of effort, there will be more provision of public services for any given future monitoring technology chosen. This is especially valuable for the principal when there is a high probability he will be in office next period (i.e., when $\lambda$ is high). In other words, the technology chosen today has an externality on future production, and the higher the probability that the principal is not replaced, and the more he will take this effect into account.  

5  Concluding Remarks

In this paper we have investigated the optimal production of public organizations in presence of agency problems when individuals may derive utility from their status. In particular, our approach has critically relied on the idea that agents may be motivated to provide effort in ways that enable them to conform to individual and social values and beliefs attached to the status of civil servant, defined as identity, in addition to monetary rewards.

---

6 A more efficient technology today (i.e., a higher $p_1^*$) translates into a higher future provision of public services (higher $G_2$) through the positive effect it has on the agents’ incentives to behave as a good workers and the level of utility attached to this category.
We have shown that when agents are guided by such intrinsic motivations, it may be optimal for the principal to choose a relatively inefficient monitoring technology and reduce monetary incentives. Moreover, a higher political instability may induce a (non-benevolent) government to adopt inefficient organization schemes that lower the quality of public agencies, reduce the value of identity and negatively affect future provision of public services.

Our analysis is complementary to other works emphasizing the importance of behavioral components for the provision of incentives in public organizations. In the framework proposed, intrinsic motivations and monetary incentives prove to be complements, but there might be general equilibrium effects that make it optimal to reduce monetary incentives as often observed in the public sector.

Finally, it is worth noting that the sense of civic virtue may be imparted by an ad hoc creation of specific institutions aimed at strengthening the identity of the public official, by means of specific learning and training programs. Understanding the conditions under which this is feasible and optimal may also be important.

6 Appendix

The first order condition of maximization problem (13) reads

$$\frac{\partial G}{\partial p} = \frac{2T}{p^2} \left[ (1 - \alpha - 2p) p^2 \frac{k^2}{2\gamma c (1 - \alpha)} - (1 - \alpha) \frac{I^g}{\gamma} + (1 - \alpha) \alpha k^2 \right] = 0. \quad (19)$$

In order to study the behavior of the first order derivative of $G$ with respect to $p$, we define $f(p) \equiv (1 - \alpha - 2p) p^2 k^2 / 2\gamma c (1 - \alpha)$ and $g \equiv (1 - \alpha) I^g / \gamma - (1 - \alpha) \alpha k^2 / 2\gamma c$, so that

$$\frac{\partial G}{\partial p} = \frac{2T}{p^2} \left[ f(p) - g \right].$$

The function $f(p)$ is positive for all $p < (1 - \alpha) / 2$ and negative for $p > (1 - \alpha) / 2$. Moreover, it is strictly increasing for all $p < (1 - \alpha) / 3$ and strictly decreasing for $p > (1 - \alpha) / 3$. Therefore, the function $f(p)$ has its global maximum at $p = (1 - \alpha) / 3$ and takes the minimum value at $p = 1 - \alpha$.

When $f(p)|_{p=(1-\alpha)/3} < g$, which is the case if

$$\frac{(2\alpha - 1) k^2}{2c} > I^g, \quad (20)$$

$\partial G/\partial p < 0$ for all $p$, and the value of $p$ maximizing $G$ is $p = \frac{1}{2}$. When $f(p)|_{p=(1-\alpha)} > g$, i.e.,

$$\frac{(1 + 26c) k^2}{54c} < I^g, \quad (21)$$
\( \partial G / \partial p > 0 \) for all \( p \), and \( G \) is maximized at \( p = \bar{p} \). Therefore, condition (15) ensures that there exists a value of \( p \), \( p^* \in [(1 - \alpha) / 3, (1 - \alpha)] \), such that \( f (p^*) = g \) (and defined by equation (14)). \( f (p) > g \) for \( p < p^* \) and \( f (p) < g \) for \( p > p^* \) imply that \( G \) is maximized at \( p^* \).

There also exits a value of \( p \), \( p' \in (0, (1 - \alpha) / 3) \), such that \( f (p') = g \) so that \( \frac{\partial G}{\partial p} \bigg|_{p=p'} = 0 \). It is immediate to verify that this is a local minimum because \( G \) is decreasing in \( p \) for \( p < p' \) and increasing for \( p > p' \). This implies that the optimal monitoring technology is \( p^o = \arg \max \{ G (p), G (p^* ) \} \) when \( p < (1 - \alpha) / 3 \), and \( p^o = p^* \) when \( p \geq (1 - \alpha) / 3 \).

7 References


