The Perils of Transparency in Bureaucracies

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Many countries have recently enacted or proposed reforms aimed at increasing citizens' information on the quality of some public sector services. Disclosure of schools' and teachers' quality is the case that has generated the biggest public debate. In the US, the No Child Left Behind Act (NCLB) requires learning progress to be measured for every child and results from students' tests be made available in annual report cards, so that parents can evaluate schools' performances. Similar reforms have also been proposed for many other public services. In the UK, legislation introduced in the year 2000 now requires that the performance of each Local Government is reviewed and made public with regards to provision of services such as fire, police, housing, social services and education, but also like the condition of roads, the average time taken to remove fly-tips and the amount of household waste recycled.[1]

By and large, most of these reforms have been opposed by the public sector employees affected. In the US, the largest teachers union - the National Education Association - spent more than $8 million in an effort to derail NCLB. In the UK, public service unions greeted reforms with increased scepticism and ultimately hostility. More generally, it is difficult to find groups of public sector workers or trade unions lobbying the government to disclose *more* information about quality. Moreover, in contrast with the private sector, it is much less common to see even the highest quality providers (hospitals, schools, ...) trying to

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[1] See http://www.bvpi.gov.uk/pages/index.asp.

distinguish themselves and offer information about their quality to the public. This may be puzzling, especially in light of the fact that some of the information is verifiable.

In this paper, we discuss one specific aspect of this problem: government services are typically not allocated through prices. We show that the absence of prices reduces (or potentially reverses) the incentives for the high quality providers to reveal themselves. Moreover, increasing the availability of information on quality leads to increased demand for the services of the high quality providers, and in some cases this might lead to rationing. Thus, our model highlights that the optimal disclosure of public services' quality has more delicate consequences than what many proponents simply envision. In particular, our analysis highlights that, in order to avoid perverse effects of improved transparency, all such reforms must carefully consider how the allocation of services from best providers is affected if the public becomes more informed about their identities.

We provide two simple models that starkly capture these considerations. In the most basic model (the Department of Motor Vehicle DMV model), several public offices that differ in efficiency provide services to homogenous citizens. When efficiency is exogenous, under no disclosure delays are lower in more efficient offices, while under disclosure delays are equalized among all offices. Thus, citizens are better off under the policy that disclose the efficiency of the different offices. When efficiency is endogenous, citizens might instead be better off under the no disclosure policy, since the incentives to invest in efficiency are lower when delays are revealed.

In the second model, the public offices have the features of the school system: schools differ in qualities, students differ in abilities and students' payoffs exhibit complementarity between their ability and their school' quality. When each school has a fixed capacity and an oversubscribed school must allocate slots through lotteries, the allocation is more efficient when information on school quality is not revealed. Moreover, again the incentives to invest in quality may be reduced by disclosure of information.

We believe the forces highlighted by our models do not apply to the public sector only, but more generally might shed some light to several instances in which prices do not fully adjust. For example, it is interesting to note that the theoretical literature on voluntary quality disclosure (Grossman (1981) and Jovanovic (1982)) predicts that all high quality firms should reveal their private information about quality. However, in contrast to this "unraveling" prediction, several empirical studies (Jin (2005) and Xiao (2006)) have found that voluntary disclosure is incomplete in reality. This might seem puzzling at first sight, but if prices cannot fully adjust in response to quality differences, our model suggests one reason for why such non-disclosure might persist in a market equilibrium.

Moreover, allocations are not driven by prices also within organizations, or in markets such as some health-care services, where insurers bargaining power effectively limits the prices that doctors charge to their patients. Our analysis calls for further research to fully understand how provision of quality and disclosure of information interact in these contexts. For instance, an extension of our analysis suggests that voluntary disclosure of high quality should be more prevalent for health specialties whose services are generally not covered by insurers and whose prices can thus adjust more rapidly to increases in demand, i.e. plastic surgeons more than pediatricians.

1 A Model of Delays in Public Services

1.1 Exogenous Efficiency

Consider an environment in which there several offices that provide a service. For concreteness, we will talk about the motor vehicle services. However, other examples in which waiting times are important considerations (various document offices, emergency rooms, ...) can also be sensibly though of this way.

Consumers dislike waiting but otherwise have homogeneous preferences across offices. There is a mass M of consumers and there are N offices numbered $1, ..., N$ with $M > N$. Workers in office i can process each 'problem' in t_i time units. Without loss of generality, we assume that $t_1 < \cdots < t_N$: lower indexed offices are more efficient. In order to get served, consumers must line up when the office opens and the order of service is randomly determined. Thus, If M_i consumers show up in office i, the average waiting time for a consumer is $\frac{t_i M_i}{2}$.

Absent any information about the efficiency of the different offices, consumers are allocated randomly. Thus, each office receives $\frac{M}{N}$ consumers and the average waiting time in office i is $\frac{t_i M}{2N}$, and more efficient offices have shorter waits. The average waiting time across all offices is then given by

$$t^{ND} = \frac{1}{N}\sum_{i=1}^{N}\frac{t_i M}{2N} \tag{1}$$

Assume now that information about the efficiency of the different offices is revealed to everyone. In equilibrium, waiting times must be equated across offices otherwise some consumers would prefer changing office. Thus, M_i must be such that $\frac{t_i M_i}{2} = k$ or $M_i = \frac{2k}{t_i}$. Since $\sum_{i=1}^{N} M_i = M$, we must have:

$$2k\sum_{i=1}^{N}\frac{1}{t_i} = M$$

which implies that $k = \frac{M}{2\sum_{i=1}^{N}\frac{1}{t_i}}$. We can thus conclude that

$$M_j = \frac{M}{t_j \sum_{i=1}^{N}\frac{1}{t_i}}. \tag{2}$$

Since M_j is decreasing in t_j, more efficient offices receive more consumers but all consumers wait the same amount in every office. The average waiting time in every office is given by

$$t^{D} = \frac{M}{2\sum_{i=1}^{N}\frac{1}{t_i}} \tag{3}$$

Proposition 1 *(i) The number of visitors is increasing in the efficiency of the locations when information about waiting times is public, while the number of visitors is independent* *of location when information is not revealed.*

(ii) Average waiting times are shorter when information is revealed.

Proof. Part (i) is an immediate consequence of equation (2) and of the fact that allocations have to be independent of locations in the absence of any information. For part (ii), comparing equations (1) and (3), $t^D < t^{ND}$ holds if and only if $\frac{1}{\frac{1}{N}\sum_{i=1}^{N}\frac{1}{t_i}} < \frac{1}{N}\sum_{i=1}^{N} t_i$. This is true since the left-hand is the harmonic mean of efficiencies, while the right-hand side is the arithmetic mean of efficiencies. ■

The intuition is straight-forward: when information is revealed the most efficient offices process more consumers. Thus, average waiting times decrease.

In this model, the most efficient offices receive more visitors when information about waiting times is public. Since there is no reward for processing more visitors, it is then plausible that preferences for disclosure of quality are inversely related to quality. The most efficient offices are the most averse to disclosure.

1.2 Endogenous Efficiency

An important consequence of the model in which efficiency is exogenous is that efficiency is 'rewarded' when information is not public because the most efficient employees on average work less. Instead, payoffs for office employees may be decreasing in efficiency when information is disclosed. This perverse force might reduce the incentives to invest in efficiency when efficiency is endogenous, and lower investment might lead to overall higher waiting times when information in revealed.

To understand these effects, consider now an extension of the previous model where, in a prior stage, each office makes a decision that affects its efficiency. For instance, assume that in the second stage payoffs for employees of office i are given by $T - (t_i - x_i) M_i$, where T is the available time common to all offices, t_i is the skill level of office i absent any investment and $x_i \geq 0$ is the investment. The interpretation is that each employee enjoys free time left over after all customers are served. Assume that all employees within the same office are identical and that, in the first stage, employees invest in choosing x_i. Assume that the cost of investment is given by $c(x, t_i)$ with $\frac{\partial c}{\partial x} > 0$, i.e., investment is costly, and $\frac{\partial^2 c}{\partial x \partial t_i} > 0$: lowered indexed managers have lower marginal cost. For simplicity, assume the following functional form: $c(x, t_i) = \frac{\gamma t_i x^2}{2}$, where $\gamma > 0$ is a parameter.

Thus, when information is not revealed, payoff from investment is

$$\pi_i^{NR} \equiv T - (t_i - x_i) \frac{M}{N} - \frac{\gamma t_i x_i^2}{2}.$$

When information is revealed, by a simple modification of equation (2), payoff is

$$\pi_i^R \equiv T - \frac{M}{\sum_{i=1}^N \frac{1}{t_i - x_i}} - \frac{\gamma t_i x_i^2}{2}.$$

When information is not revealed, the first order condition for x_i implies

$$\frac{M}{N} = \gamma x_i t_i. \tag{4}$$

When information is revealed, the first order condition for x_i implies

$$\frac{M}{\left((t_i - x_i) \sum_{j \neq i} \frac{1}{t_j - x_j} + 1\right)^2} = \gamma t_i x_i. \tag{5}$$

In many cases, the system of first order conditions (5) are not sufficient for a maximum of the payoff function. In particular, often the optimal x_i is at the boundary, i.e. $x_i = 0$.

In any case, it is clear that the incentives to invest in productivity are lower when waiting times are revealed. To illustrate the point, consider the following numeric example. Assuming $N = 2$, $t_1 = 3$, $t_2 = 4$, $M = 10$ and $\gamma = 2$, we obtain that when information is revealed the optimal x_1 and x_2 are interior and by equation (5) are $x_1 = 0.635$ and $x_2 = 0.182$. When information is not revealed, we can use equation (4) to obtain $x_1 = 0.833$ and $x_2 = 0.625$.

We can also compute waiting times in the two scenarios. When information is not revealed, we have that $t_1 - x_1 = 1.9 - .833$ and $t_2 - x_2 = 1.8 - .625$, so that average waiting time is

$$t^{ND} = \frac{1}{N} \sum_i (t_i - x_i) \frac{M}{2N} = 2.802$$

Under revelation, we have instead $t_1 - x_1 = 1.9 - .635$ and $t_2 - x_2 = 1.8 - .182$, so that average waiting time is

$$t^D = \frac{M}{2 \sum_{i=1}^{N} \frac{1}{t_i - x_i}} = 3.549$$

so that citizens are better off when information about quality is not disclosed.

2 A Model of School Choice

Assume that there is a mass M of students and N schools numbered $1, ..., N$. Students differ in ability a with distribution F. Schools differ in quality q with $q_1 > ... > q_N$. If a student of ability a attends a school of quality q, the outcome the student receives (wage, or opportunities) is given by $a \times q$

In contrast with the previous model, we assume that each school has a capacity. For simplicity we assume that capacity is the same for all schools and it is denoted by C. We assume that $NC >> M$ but $C << M$ so that no school can accommodate all the students but the school system is large enough so that all students can find at least one school.

Schools are also differentiated along an additional dimension that is perfectly observed by everyone (e.g., distance). For simplicity we also assume that this dimension is swamped by quality. In other words, if a student has no information on quality, he chooses based on distance. If he has information on quality, he chooses based on quality.

We assume that the environment in which information is not public is more complex than in the previous model. Specifically, we assume that the parents of each of the students receive a signal. With probability $p(a)$ the signal reveals the quality of all the schools, with probability $1 - p(a)$ the signal reveals nothing. We assume that $p(a)$ is increasing so that parents of higher ability students are more likely to be informed about quality. We believe that this assumption is realistic and it is meant to represent the fact that parents who care more about education are both more likely to have high ability students and to acquire information both via word of mouth and because they are better able to process the information obtained via school visits and other informal ways of obtaining information.

2.1 Exogenous School Quality

We assume that everyone is allowed to apply to all schools. We need to specify what happens when a school is oversubscribed. Under both transparency regimes, we distinguish two scenarios. In the first scenario, oversubscribed schools run a lottery and the winners are offered a slot. In the second scenario, each school runs a perfectly informative test and the higher ability applicants are offered slots.

When information is not public, those who have information end up going to the highest quality school to which they are offered a slot. Those who do not have information go to the closest school that offers them a slot.

When information is public, all students go to the best school that offers them a slot.

It is easy to see that in the transparent regime, if oversubscribed schools must allocate slots through lotteries, then the allocation is less efficient than when information is not transparent. On the other hand, if schools can allocate slots through testing, then the most efficient regime is the transparent regime.

We can therefore conclude that there are two dimensions of transparency in this model. There is transparency of school quality and transparency of student quality. If oversubscribed schools must offer slots based on lotteries, this means that they cannot use information on ability. The most efficient system is one in which there is two-sided transparency. The least efficient system is one in which only school quality is transparent.

It is clear that, if principals care about the average quality of the students they receive, when slots are offered through lotteries, principals of high-quality schools prefer the non transparent regime.

When school quality is endogenous, as in the model of delays, when slots are offered through lotteries, the incentives to invest in school quality may very well be reduced by transparency.

3 Related Literature

Several recent papers are concerned with the effects of inferior information on politicians' actions (e.g., Besley and Burgess (2002), Gavazza and Lizzeri (2006a, 2006b)) or politicians' quality (e.g., Mattozzi and Merlo (2006)). Similarly, Levy (2006) analyzes the effect of the transparency of the decision making process in committees on the decisions that are eventually taken. Other papers consider models with an agent of uncertain ability and discuss the effect of imperfect information on the incentives of the agent, and on screening (e.g. Prat, 2005). Strömberg (2004) discusses the role of mass media in informing voters, and shows that more informed voters obtain higher transfers.

Outside the political economy literature, Dranove, et al. (2003), examines the effects of report cards' on health care providers. They show that the additional information has led to worse health outcomes by pushing doctors to select among patients. Bar-Isaac et al. (2006) suggests that, when goods have multiple characteristics, firms might underprovide some characteristics when consumers become more informed about other characteristics, and this might decrease welfare.

4 Concluding Remarks

We have presented two very stark models focusing on some aspects of transparency in bureaucracies. These show that transparency may have some potential perverse effects unless accompanied by reforms of the incentives facing the bureaucrats.

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