Managerial Discretion in LPHL-Agencies

Paper submitted EPCS Conference 2006

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March 13, 2006

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Abstract

Due to the public good character of protective measures against events with a low probability of occurrence but high losses (LPHL-events) such as natural disasters or terrorist attacks, their allocation is very often in the realm of bureaucratic and expert agencies. Based on the economic theory of bureaucracy the behavior of a bureau providing the good "protection against low-probability-high-loss events" is analysed. The existing model is extended by further institutional constraints accounting for societal control mechanisms. The main proposition is that the allocation of protective measures through LPHL-agencies does also result in cost and allocative inefficiencies, however, the amount of allocative inefficiencies is relatively higher as compared to a normal bureau. This is mainly due to the potential of blame-shifting from politicians to bureaucrats. The purpose of this paper is twofold: First, the economic theory of bureaucracy is extended by a focus on particular agencies, namely agencies or bureaus responsible for the provision of protective goods against LPHL-events and the relevant control mechanisms. Second, propositions are formulated to provide the foundation for empirical testing of this issue. This paper has work-in-progress-character.

Keywords: theory of bureaucracy, low-probability-high-loss-events, blame-shifting

JEL classification: D72, D73, D81, Q54
1 Introduction

Extreme events such as natural hazards (e.g., flooding, earthquakes, landslides), environmental disasters (e.g., oil spills, nuclear fall-outs) or other man-made disasters (e.g., terrorist attacks) share the characteristics of a relatively low probability of occurrence, but the potential to create high losses (LPHL-events). Up to a certain degree, protection against LPHL-events is possible. Structural measures such as dikes or avalanche barriers physically reduce the impact of natural hazards. Hazard-zone mapping identifies areas that are potentially affected by flooding or landslides. Such maps can be used to prevent people from settling down in hazard-prone areas or induce them to build safer houses. Early warning systems in combination with proper information channels can identify upcoming hazards and organizational measures such as evacuations can at least reduce or prevent human losses (e.g., Tsunami warning system). Insurances provide a possibility to transfer, at least, the financial risks of extreme events. Intelligence activities might identify terrorist cells and potential targets. Standards and regular inspections can reduce the risk of industry accidents. All these services and goods provide protection against LPHL-events. Although a certain demand for the good “protection against low-probability-high-risk-events” exists, it is very often not sufficiently provided or sometimes oversupplied. The reason for these inefficiencies is that markets fail to emerge or work imperfectly in this area. Kunreuther (2000) and Jaffee & Russell (2003) provide a profound analysis of the imperfections on the market for extreme event insurances. Willhelm (1997) puts the market failure in the provision of avalanche barriers back to the public good features of these protective measures. Although the analysis for the reasons of market failures in this area is far from satisfying, the public good characteristics of the good ”protection against LPHL-events” can be seen as an explanation for state intervention in this area Coughlin, Cohen & Khan (2002). Due the complexity and the riskiness of the task, decision-making power over the allocation of these protective goods and services is very often delegated from politicians to bureaucrats or agencies. Such a delegation could provide the ground for inefficiencies through organizational slack and over-supply of protection against LPHL-events. This paper tries to shed some light on the behavior of agencies providing protective measures against LPHL-events.

Section 2 provides a short introduction to the economic theory of bureaucracy and an overview of the relevant literature. In section 3, this theory is enlarged by a focus on agencies responsible for the provision of the good ”protection against LPHL-events”. Based on this, a formal model is developed in
2 Discretionary behavior of bureaus

The economic theory of bureaucracy goes back to the work by Cyert & March (1963), who describes the phenomenon of organizational slack as rents that are generated through discretion by managers of a firm. Niskanen (1971), Migué & Bélanger (1971) and Breton & Wintrobe (1975) applied this idea to bureaus. Beside the task to provide the public good or service an agency was created for, bureaucrats have certain freedom to acquire rents in the form of discretionary profits. These undesired expenses could include additional equipment, employees or the discretion to award supplier contracts to companies with the best informal relations rather than the company with the most competitive offer.

According to Migué & Bélanger (1971) the bureaucrats will choose that point on their budget line where the marginal rate of substitution between formal output and other expenses equals the slope of their budget line. In opposition to the conclusions by Niskanen (1971) the bureaucrat will produce a level of output somewhere between profit maximization and output maximization. This means, that if the bureaucrats receives any utility from other expenses, they will never produce maximum output. The authors further conclude that the inefficiency of bureaus does not necessarily stem from oversupply, but from bureaucrats enjoying rents. Duizendstraal & Nentjes (1994a) add two points of critique to Migué & Bélanger (1971)’s model. Firstly, the conclusion that an increase in demand for the public service will increase the relative expenses does not hold under the assumption made in the model. Secondly, one drawback of the model by Migué & Bélanger (1971) is that they should have added assumptions concerning the institutional framework the bureau is embedded in. In a further paper Duizendstraal & Nentjes (1994b) incorporated this second point of critique in their model of non-profit organisations by analysing the manager’s behavior under four different subsidy regimes. The organization either receives a lump sum, an input, an output or a revenue subsidy. In the following section the focus shifts from the general model of bureaus and non-profit-organizations on the the particular case of LPHL-agencies.
3 LPHL-agencies

Agencies or bureaus responsible for the provision of the good and service protection against LPHL-events such as an avalanche and torrent commission, the FEMA or the CIA in the US feature similar characteristics as a normal bureau. The notation "formal output" and "informal output" by Duizendstraal & Nentjes (1994b) also apply to LPHL-agencies. The formal output is basically the good or service "protection against LPHL-events" e.g. dikes, hazard zone maps, surveillance activity. Informal output or organizational slack is similar to other bureaus. There is no doubt, that it demands experts to identify the level of risk e.g. identification of hazardous areas, surveillance activity. These are tasks that can hardly be accomplished by politicians or citizens. However, this paper is concerned with allocation of goods and services through an agency (instead of politicians or directly by citizens) that goes beyond the sole provision of information. As Duizendstraal & Nentjes (1994a) point out the importance of the institutional constraints. This paper tries to extend the model of Duizendstraal & Nentjes (1994b) by control mechanisms an agency faces.

The first kind of control mechanism is an audit from another governmental agency, mainly checking for organizational slack. The second control mechanism originates from the design of the societal decision making process, in particular regarding protective measures against LPHL-risks. In a recent paper Alesina & Tabellini (2004) investigate the allocation of policy tasks within society. They identify the socially optimal allocation of tasks between politicians and bureaucrats that would be chosen by all individuals behind a veil of ignorance. After this normative analysis, a positive analysis examines how tasks are actually allocated within political reality. Regarding uncertain tasks their normative analysis concludes that the delegation of uncertain tasks to politicians is more efficient for society as a whole than transferring the task to a bureaucrat. However, the positive analysis suggests that the politicians tend to delegate the more risky tasks to the bureaucrats and keeps the "safer" tasks. They leave the risk of being punished for "bad luck" to the bureaucrat. Through this process of blame shifting the bureaucrat ends up as the scapegoat. The issue of shifting blame for threatening events has so far only been a minor topic within political sciences and political economy Alesina & Tabellini (2004) and has received some attention within psychology Tennen & Affleck (1990).

Alesina & Tabellini (2004) also point out two opposite considerations to blame-shifting: First, more risky tasks are also linked to greater rents. Second, shifting blame of "unpopular" but more efficient (but hard to communicate within day-to-day-politics) tasks could also be welfare improving.
Regarding the issue of LPHL-events politicians very often keep the post-event part of risk-management (e.g. federal compensation of losses) under their control. Although post-event compensation of losses induces costs on society it is also a mean to win elections (see Schwarze & Wagner (2004) for an analysis of the events after the flooding in Germany in 2002). In opposite, unpopular preventive measures (e.g. structural measures at rivers that have negative impact on the river’s eco-system or increased security measures at airports) are very often transferred to bureaucrats. Stricter building norms or security laws for industries are rather accounted to the agency responsible for checking the compliance than to politicians who issued the law. The observations reported so far are now transferred into a simple formal model for LPHL-agencies in order to receive testable hypothesis.

4 The model

The purpose of this model is twofold: In the first step the model by Duizendstraal & Nentjes (1994b) will be extended by an institutional variable accounting for a probable control through an auditing board, that might reveal organizational slack. This analyses the behavior of a “normal” agency or non-profit organization, for example an infrastructure agency that provides street lighting.

In a second step, the model will be extended to analyse the behavior of a LPHL-agency. Here we can assume an agency responsible for natural hazard management including hazard zone mapping and the installation of avalanche and torrent barriers or an intelligence agency. Regarding the subsidy framework, the model assumes a lump-sum regime. Infrastructure agencies in general, and LPHL-agencies in particular mainly act under a lump-sum subsidy regime.

4.1 The behavior of a normal agency

The agency’s utility function is given by:

\[ U = U(x_1, x_2) \] (1)

Where \( x_1 \) accounts for the amount of formal infrastructure output, in our case street lighting and \( x_2 \) describes the amount of fringe benefits, such as expensive office equipment or the placing of the contract to “related” companies that deliver input factors at higher prices.

The agency’s cost function is

\[ C = C_1(x_1) + C_2(x_2) + \theta(Z(x_2)). \] (2)
The term $\theta(Z(x_2))$ reflects the institutional constraint of an auditing processes that the agency might be subject to, with $Z'_x < 0$, $Z''_x = 0$ and $0 < \theta < 1$. Depending on the general institutional design, such an audit takes place in a constant manner e.g. yearly or by random testing. Depending on the design, the $\theta$ can be considered as the probability that the auditing court reveals the extend of the organizational slack within the agency or the probability that a random auditing, with the certain outcome that slack is revealed, takes place. $Z(x_2)$ describes the extent of disciplinary measures depending on the amount of organizational slack. This could be for example the introduction of more formalized control measures resulting in a loss of discretionary freedom and additional work or even the lay-off of employees or the management.

The total revenue $R$ from selling $x_1$ is

$$R = p(x_1) \times x_1,$$

where $p' < 0$ and $R' < 0$.

The agency maximizes its utility (1) under the constraint

$$S + R = C_1 + C_2 + \theta(Z_2),$$

and under the constraints (2), (3). $S$ accounts for the lump sum subsidy from the government. Under these constraints the agency’s budget constraint is

$$x_2 = \frac{S + R - C_1}{c_2 + \theta(z_2)},$$

where $c_2$ and $\theta(z_2)$ account for the average costs of informal expenses described by the average cost of $x_2$ and the average expected costs of a potential audit $z_2$. The agency’s budget constraint is represented by function $E^n$ and the point of zero profit is at a formal output level $x^n_1$ in figure 1. The infrastructure agency’s budget constraint is set in comparison to the budget constraint derived by Duizendstraal & Nentjes (1994b), $E$. In their model the agency’s indifference curve touches the budget constraint at point $A$ and an amount $x_1$ of the formal output and an amount $x_2$ of other discretionary output are made. The obvious effect of the introduction of the term $\theta(z_2)$ is an increase in the costs for other discretionary output relatively to formal output and a substitution effect towards more formal output. The infrastructure agency in this model, thus produces at point $B$ an amount $x^n_1$ of street lighting and $x^n_2$ of other discretionary output.
The Lagrangian function for the normal agency’s problem is:

\[
L(x_1, x_2) = U(x_1, x_2) \\
+ \lambda [S + R(x_1) - (C_1(x_1) + C_2(x_2) + \theta(Z(x_2)))]
\] (6)

The first order conditions are:

\[
U_{x_1} + \lambda [R_{x_1} - C'_1] = 0 \quad (7)
\]

\[
U_{x_2} + \lambda [- (C'_2 + \theta(Z_{x_2}))] = 0 \quad (8)
\]

Combining (7) and (8) results in the marginal rate of substitution between formal output \(x_1\) and other expenses \(x_2\).

\[
\frac{-U_{x_1}}{U_{x_2}} = \frac{R_{x_1} - C'_1}{C'_2 + \theta(Z_{x_2})}
\] (9)

Figure 1. Infrastructure agency
4.2 The behavior of a LPHL-agency

The LPHL-agency faces the same utility function as the normal agency. However, here $x_1$ describes the amount of protective measures e.g. hazard zone maps in municipalities, avalanche barriers or surveillance activities. The LPHL-agency faces the following revenue function:

$$R = p(x_1) \times x_1 - \pi(m(x_1)).$$  \hspace{1cm} (10)

The agency’s again receives a revenue $p(x_1) \times x_1$ from selling protective measures. Structural measures against natural hazards receive up to a 75 % federal grant in Austria. The other 25 % are partly paid by the states and at least 10 % are paid by the beneficiaries. In contrast to a normal infrastructure agency, its revenue also depends on the occurrence of an LPHL event. Such an event might happen with a probability $\pi$, where $0 < \pi < 1$, and results in negative consequences from shifted responsibility and blame by politicians. After e.g. a natural disaster took place the affected citizens and, depending on the media coverage, the public as a whole make politicians responsible for this event. Due to the delegation of the task, the politician has the possibility to shift a certain amount or all of the blame to the agency. Therefore, the bureaucrats incorporate this blame-game-premium in their revenue function in order to "shield" themselves against this additional risk. One could also assume that $m$ reflects the amount of responsibility, the agency can be made liable for e.g. the introduction of a law that makes an avalanche and torrent commission eligible for the hazard zone maps. This blame-game premium is reflected by $m(x_1)$, where $m' < 0$ and $p' < m'$. The function $m(x_1)$ also assumes that the impact on the agency depends on the amount of protective measures installed. One could also assume that the frequency of LPHL-events $\pi$ is a function the formal output $x_1$. Although a legitimate proposition, this assumption would cancel out certain protective measures such as risk transfer through insurance. If the agency proposes insurance cover against an LPHL-event, this would have no direct effect on the probability of occurrence, but on the actual impact on citizens and as a result on the amount of blame-shifting and the negative consequences for the agency.

This revenue function flattens the LPHL’s agency’s budget constraint and, after repeating the maximization steps, also changes the marginal rate of substitution. The graphical interpretation of the model is represented in figure 2. $E^t$ is the LPHL-agency’s budget constraint. Due to the assumption of potential blame shifting, a further substitution effect towards formal output, protection against LPHL-events, takes place. The LPHL-agency produces at point $C$ an amount $x_1^t$ of formal output and an amount of $x_2^t$ of informal output.
Proposition 1 An agency or bureau responsible for the provision of the good “protection against LPHL-events” produces relatively higher allocative inefficiencies, but relatively lower cost inefficiencies as a normal bureau.

4.3 Changes in demand, budget and responsibility

After LPHL-events occurred individuals are more sensibilised politicians tend to provide bureaucrats with additional funds and responsibilities. Kahneman, Slovic & Tversky (1982) described this phenomenon as “availability bias”, where individuals put relative greater attention to certain risks with a rather low probability of occurrence, but for example big media-attention or as it happens in their close environment. Figure 3 demonstrates the impact of an increase in the agency’s lump sum subsidy. Function $E'$ presents the initial LPHL-agency’s budget constraint. First, it is assumed that citizens’ demand for protective measures increases, $p^* < 0$ and $p^* < p'$ and that the government is increasing the lump-sum subsidy for the agency, $S > S$. The increase in demand has got effects on the $p(x_1) \times x_1$ part of the agency’s
revenue function, but no effects on the $\pi (m(x_1))$ part, the expected penalty from blame shifting. The effects are represented by function $E^{ls}$ in Figure 3. The agency now produces in point $D$, a combination $x_1^*, x_2^*$. This leads to an increase in cost inefficiencies and allocative inefficiencies. Depending on the relative increase of lump-sum subsidy, the allocative and the cost efficiencies might increase at the same level. An overreaction by the government and a relatively high increase of subsidies, could also result in a relatively higher increase of the cost-inefficiencies.

However, the shift of additional funds is very often related to the delegation of additional responsibilities and thus, a higher load of blame to be loaded on the agency if something bad happens. This would mean that the agency’s blame-game premium would not only depend on the amount of protective measures installed, but also on the amount of subsidies received, $\pi (m(x_1, S))$. The agency’s budget constraint ($E^{ls*}$) would be flatter. The agency now produces a combination $x_1^{ls*}, x_2^{ls*}$ in point $E$. The income effect would again increase both, cost and allocative inefficiencies, but the increase of allocative inefficiencies is relatively higher, as $x_1^{ls*} - x_1 > x_2^{ls*} - x_2$.

**Proposition 2** An increase in lump-sum subsidies by the government and increased demand for protective measures, combined with an additional shift of responsibilities leads to a relatively higher increase of allocative inefficiencies.

If the LPHL-agency observes an increase in the frequency of LPHL-events (e.g. a rise in extreme weather events through climate change) the probability $\pi$ will also rise. Keeping the demand and lump-sum subsidy constant, allocative inefficiencies will also be increased.

**Proposition 3** An increase in the frequency of LPHL-events results in additional allocative inefficiencies in the provision of protective measures by LPHL-agencies.
4.4 Results and implications

The results of this model show the effects of changes in the institutional environment on bureaus or agencies and in particular of an agency providing protection against LPHL-events. The introduction of an institutional variable accounting for a potential penalty related to the extend of organizational slack \( Z(x_2) \) triggers a substitutional as well as an income effect and increases the production of formal output \( x_1 \).

The results of the model suggest that in comparison to a normal agency, LPHL-agencies tend to produce relatively more formal output and thus, induce relatively higher allocative inefficiencies on society. This might be due to the issue, that LPHL-agencies are more likely to become the subject of blame-shifting from politicians. Another issue is related to a change in the occurrence probability of LPHL-events, \( \pi \) (e.g. an increase in extreme weather events due to climate change could result in a rise in natural hazards or the decision by a country (government) to take part in the "War on Terror").
In most economies the majority of these goods and services are sovereign duty as they impact individual liberties. Up to a certain amount (even higher than the amount demanded by society) “protection against LPHL-events” may cause similar inefficiencies than high amounts of other infrastructure. After the installation of protective measures has reached a certain threshold, additional costs on society could arise, mainly induced by the limitations of individual liberties (e.g. an increase of security checks on airports lead to longer latencies, the effects of a shoot-to-kill-policy after the bomb attacks on the London underground in 2005).

The question that arises is how to reduce the cost and in particular the allocative inefficiencies. Basically, the public and politicians demand the expert knowledge of the agency. Therefore it might be necessary to limit the responsibilities of the agency to the provision of expert information about the frequency and spatial appearance of LPHL-events. Then a number of alternative decision mechanisms could result in a more efficient allocation of protective measures:

First, the actual provision of protective measures could then be delegated to competitive administrative units. Second, another possibility is to put the decision on the allocation of protective measures into the hands of the citizens via direct democracy. Third, the installation of an ombudsman could also reduce, at least non-budgetary costs, but only for single cases, as the abilities of an ombudsman are limited. Fourth, the allocation of protective measures could be regulated by an alternative allocation mechanism, such as a voucher system (Raschky 2005).

5 Conclusion & Suggestions

This paper analyses the behavior of LPHL-agencies and developed an number of propositions mainly suggesting that the provision of protective measures through bureaus results in relative higher inefficient oversupply as normal bureaus and that additional governmental funds and responsibilities for the agency increase these allocative inefficiencies even at a bigger extend. The explanation for such a development is the phenomenon of blame-shifting from politicians to bureaus. Possible alternative decision mechanisms that could reduce these inefficiencies are presented as well. The next step of this analysis should consist of empirical tests of the hypothesis presented in this paper. Either by experiments or by an econometric analysis of different institutional settings using secondary data.
Another interesting theoretical question that arises is of normative nature: Which are the optimal societal decision mechanisms for the allocation of the good "protection against LPHL-events"? Further analysis needs to be done concerning the issue how members of society, will decide about the decision mechanisms for protection against LPHL-events at the constitutional table (behind a veil of insignificance). The paper by Alesina & Tabellini (2004) has also asked this general question but only analysed two decision mechanisms: representative democracy and bureaucracy. The allocation through representative politician is possibly subject of a time inconsistency problem due to re-election concerns. As this paper has suggested, the allocation through bureaucratic structures could result in an inefficient oversupply of protection. Other alternative mechanisms have been faded out so far.

The analysis of this mechanism could be of particular interest regarding the aspect of blame-shifting. Shifting the decision power for allocating the good "protection against LPHL-events" to a direct democratic process would also shift the responsibility to the voters. This would mean that if their decision was "wrong" e.g. a flood damaged an unprotected area, there is no identity that can be made responsible for. According to the propositions made in a recent paper by Buchanan (2005), "people are afraid to be free". He suggests, that individuals transfer tasks to others (or the state) in order to deny personal responsibilities. Taking this thought into account, a normative analysis of the optimal decision mechanism for the allocation of protection that would be chosen behind a veil of insignificance would be very fruitful.

References


Raschky, P. A. (2005), An alternative allocation mechanism for public funds in natural hazard management, alps working paper series no. 5, alpS - Centre for Natural Hazard Management.

