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*Towards a Theory of Adjudicatory Decisions in Public Administrations —
with applications to decisions on political asylum and construction permits*

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Towards a Theory of Adjudicatory Decisions in Public Administrations — with applications to decisions on political asylum and construction permits

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In many countries administrative procedures have been identified as a major obstacle to private investments and economic growth. Without overtly questioning the substantive aspects of government regulations critics of the current state of administrative procedure challenge its complicated details and the time applications and their decisions consume. Some aspects of administrative procedure have been dealt with in the economic literature. In particular, parts of the literature dealing with the administration as the agent of politics pick up the question how public administrations and administered individuals interact strategically in the administrative process. Most often this line of research concentrates on regulated utilities and government procurement. However, there is hardly any theoretical economic basis for the study of one of the most important, if not the most important, aspects of administrative procedure: adjudication in bulk of applications for permissions or similar (very often dichotomous) government decisions. Such decisions *en masse* very often are not made within strategic settings as is usually—and quite appropriately—assumed in the literature on government regulation of public utilities etc.

Instead, with masses of applicants filing applications and many administrators deciding upon them strategic interaction is unlikely to occur: no single applicant expects to be able to influence the investigative behavior of the administrators, no single administrator expects to influence the behavior of the average applicant. Thus, adaptive behavior prevails on both sides of the interaction. All individuals will adapt to the expected, viz. average behavior of their counterparts. A model for this side of administrative procedure is missing. It is the goal of this paper to develop a first step in this direction.

So far, mass adjudication by public authorities has been dealt with by the tools of economics only with respect to tax evasion. There, the interaction between the taxpayers filing their returns

more or less honestly and the tax officials is also characterized by masses of applicants and many administrators. But the enforcement of taxation is just one particular case of mass adjudication by public authorities and the procedures and even more the incentive structures faced by applicants may substantially differ in other fields of public administration from those of tax enforcement..

As in tax enforcement, strategic interaction may enter the scene of most fields of public administration only when applicants send (costly) signals with their application. I will, however, abstract from this possibility in this paper and concentrate on the adaptive part of the interaction. Although strategic interaction is probably a very important phenomenon in all administrative procedure, it is the adaptive part of the interaction which distinguishes mass adjudication from regulating public utilities or other large entities. In addition, I want to avoid the substantial complication resulting from its inclusion in the model of this paper.

Examples of the type of mass adjudication by public authorities as I will discuss them in this paper range from applications for welfare allowances to applications for licences to sell liquor and from applications for building permits to applications for political asylum. Some aspects of the latter example will be dealt with briefly in this paper. In this field, the German legislator has changed the costs of filing an application in recent years: applications of refugees for political asylum became more expensive (social aid during the procedure has been reduced and is given only in kind except for a very small amount of cash per month).

The paper is organized as follows: after a brief overview over the tax evasion literature and the few other papers dealing with non-strategic decision of public officials, I will generalize and combine the models of public administrators of that literature to develop the first step to a general model of mass adjudication in public administrations. Section 3 will combine this model with the demand for permissions by two groups of applicants: those who are legally eligible for the permission and those who are not. Before concluding in section 4, I will discuss the examples of applications for political asylum and building permits.

1. Literature on Non-Strategic Interaction

in Administrative Procedure

Within the principal-agent literature on public administration, two branches have to be distinguished. The less formal one which is more closely connected to political science mainly deals with the question by what institutional means the political branches of government can best control agencies and bureaucracies. This branch mainly deals with rule making by the administration and is thus only of limited relevance for the problem discussed here (for an overview of that literature see von Wangenheim (1999).) The formal principal-agent approach had originally been developed for studying hierarchies within bureaucracies (e.g. Tirole (1986)). However, the focus of the interest in this line of research has soon moved to studying optimal incentive mechanisms for government agencies (as unitary actors, e.g. Laffont and Tirole (1990)) or by agencies (again as unitary actors) for regulated firms (Laffont and Tirole (1993)). Only lately has this branch of study returned to questions related to internal hierarchies (Tirole (1994)). Particularly relevant for questions related to mass adjudication by public authorities are the papers on agency relationships in which the agent has to perform multiple tasks for which control is incomplete and some tasks are easier to control than others (Holmstrom and Milgrom (1991), Gabel and Sinclair-Desgagné (1993) and Itoh (1994)). The agents' production functions on which these studies rely are standard production functions but their shape is not explained. Though not determining optimal incentive mechanisms for administrators, the present paper contributes to this branch of literature by providing the production functions: if the tasks of the agents are handing down good (and not only many) decisions on applications of citizens, then their production function can only be found in the interaction with the application behavior of the citizens. In addition, the paper develops a framework within which one can easily investigate incentive mechanisms.

The combination of principal-agent approaches with non-strategic interaction as it is proposed here has been utilized in the literature on tax evasion and tax auditing (Graetz, Reinganum and Wilde (1986) laid grounds, further developments of the approach can be found e.g. in Cremer, Marchand and Pestieau (1990) and in Erard and Feinstein (1994).) The basic idea of these approaches with respect to the interaction between tax payers and tax authorities is the following: tax authorities audit only some fraction of all tax returns, the remainder is accepted as filed. The authorities can decide on the size of the fraction (the selection of individual files is

of course done on a random basis), in some cases differentiating according to the stated income of the tax payers. If auditing is performed, it is perfect and costs a constant per-unit amount. Tax authorities are typically assumed to maximize tax revenue. These models differ from the one presented here in three respects: first, the fixed revelation probability of 1 after auditing does not allow for some phenomena discussed in here. Administrators decisions on how to spend effort are richer than just investigating a single case or not. Second, they do not take errors of both types into account: no honest tax payer can be found evading taxes. Third, the tax returns necessarily include a signal: the amount of stated income. Such a signal is not always available and is not included in the model here, but will be in future extensions of it.

Similar to the tax evasion and auditing models, Holler (1993) develops a model of incomplete surveillance of potential delinquent. In his model, the agent of the state (here: the policeman) has to decide whether to monitor a potential offender or not. The potential offender has to decide whether to commit a crime or not. As the tax game, this game does not have a Nash equilibrium in pure strategies. The only Nash equilibrium is in mixed strategies. In this case, this is best interpreted by looking at one population of policemen and one population of potential delinquents. Some but not all policemen will monitor¹, some but not all potential offenders will transgress the law. For this rather simple game Holler discusses which effects variations of the payoffs have on the equilibrium. Holler's theoretical starting point is thus similar to our's. However, alternative procedural rules cannot all be captured by different payoff matrices. I will thus refer to Holler's model further only when showing that his model is a special case of what is introduced here. As the literature on tax evasion and auditing, Holler is too restrictive on the states of information: the controlling agent either has to rely completely on his knowledge of average behavior or he is completely informed. Again, errors are restricted to overlooking violations of the law.

Finally, a hint has to be dropped on the market for lemons (path breaking: Akerlof (1970)) and the further development of this theory by e.g. Chan and Leland (1982) and Cooper and Ross (1984) There individuals have to decide on the claims of others about the quality of goods based on costless information on average qualities and on additional information on individual

¹ Here, an individual interpretation of mixed strategies may also be at place: leaving aside cost constraints, policemen can monitor any percentage of potential delinquents.

qualities which may be acquired at positive cost. The interaction between supply and of those models is structurally very similar to the interaction between applicants and administrators. However, there is no overarching principal-agent relationship as in the administration case.

2. A Model of Mass Adjudication

In this section, we will develop a model describing how the individual administrator reacts to different numbers of applications he has to decide upon. The basic ideas of the model are the following: administrators have to decide on applications of a particular, rather narrowly defined kind. They have incentives to make legally correct decisions, but they are incompletely informed about the content of the application and thus whether it conforms with the law or not. In order to make good decisions, they can improve their information by spending effort in investigative activities. Doing so, they can search for reasons making the application violating the law (so they try to avoid errors of type 1) or for reasons making the application conforming with the law (so they try to avoid errors of type 2). Administrators thus have to decide how to allocate their effort to the applications and to the two types of errors. In this section we will further develop these basic ideas and derive a propositions describing the optimizing behavior of administrators.

In order to set the stage for bureaucratic mass adjudication, we have to make some assumptions on their environment: the behavior of applicants and the incentive structure they face. Further assumptions have to deal with the knowledge and the abilities of administrators and with their utility function. Let us start with the environment:

Assumption **Apl 1**: Applicants are in a situation to file an application for a permission at specific points in time which are randomly distributed.

With many (potential) applicants, and this is the case we are dealing with, this assumption results in a steady flow of applications coming to the desk of every administrator. As long as we concentrate on a (comparative) static equilibrium analysis, we can thus restrict the analysis to one standard time period (e.g. a month or a week): all decisions of an administrator on his effort are based on the notion of a steady flow of new applications. Even with temporary increases of the numbers of incoming applications, the administrator will not change his behavior, but wait

for the numbers to level out over time.^{2,3}

Assumption **Ap1 2**: Being in a situation described in assumption Ap 1, an applicant can either file for an application and be legally eligible for the permission (as a shorthand, I will call this a “legal” application), or she can file for an application and fail to be legally eligible for the permission (I will call this a “illegal” application), or she can abstain from filing an application at all.

As a consequence, administrators deciding on applications may face different numbers of legal and illegal applications. At this point of the exposition, we can leave it open whether applicants can choose between filing a legal or illegal application (as it is true for the building permits case) or whether their ability to file either a legal or an illegal application is determined by external factors (as it is true for the political asylum case). What is important here is that the numbers may vary.

To complete the environment in which the administrators act, we have to make an assumption on the incentive structure they face:

Assumption **Adm 1**: The incentive structure of the administrator is not perverted: If an administrator grants a legal request, his expected payoffs are higher than if he denies a legal request; if an administrator denies an illegal request, his expected payoffs are higher than if he grants an illegal request. The conditional expected payoffs are the same for all applications.

² If we expand our study from the effects of parameter or institutional variations on the equilibrium to the effects on the transition process from the old equilibrium to the (or a) new one, this assumption also means that administrators slowly adapt to the applicants' average behavior. The resulting dynamics are likely to be interesting, but are not the subject of this paper.

³ This will yield varying waiting times for the applicants for a decision on their application. The details of these waiting times are dealt with in the theory of queues. It has to be taken into consideration if we look at speeding up procedures by giving administrators incentives to work faster and the consequential effects on the quality of their decisions.

This distribution of the time period between those points in time when an applicant has to decide on his application may be an exponential distribution, i.e. the probability to be in a situation to file an application within the next time period of length Δt is independent of the history of having been in such a situation. An exponential distribution will facilitate some aspects when it comes to waiting queues.

We define v_{lg} and v_{ld} as the expected payoffs of the administrator for granting and denying, respectively, a legal petition and v_{ig} and v_{id} as the respective expected payoffs for an illegal petition. Then we can restate assumption **Adm 1** formally: $\Delta_l \equiv v_{lg} - v_{ld} > 0$ and $\Delta_i \equiv v_{id} - v_{ig} > 0$. These expected payoffs are inclusive. They include all possible consequences ranging from no reaction at all to the harassment of being involved in a law suit and sometimes even to liability for damages. All consequences are, of course, weighted by the probabilities that they occur. The last part of this assumption (subjective homogeneity of applications) is restrictive: administrators cannot distinguish between the stakes applicants have in their applications. To justify this assumption, we have to emphasize that the pool of applications we are looking at is rather homogenous. For example, we are only looking at building permits for middle class single family housing. Or, we are looking at refugees applying for political asylum all coming from one country or countries with similar political situations. Note that an administrator who has to deal with applications coming from different homogenous pools may expect different payoffs for different pools. This complicates his decision problem: he also has to allocate his effort among pools. However, in this paper we concentrate on one pool and assume that the effort spent on other application pools is fixed.

Let us now come to assumptions on the knowledge and abilities of administrators.

Assumption Adm 2: Administrators know the expected numbers of legal (q_l) and illegal (q_i) applications per time period and take them as given. There is no strategic activity of administrators to influence the behavior of applicants.

Administrators know these numbers from own experience or from their older colleagues. Obviously, administrators thus know the expected total number of applications $q = q_l + q_i$ and the expected proportion $\varrho = \frac{q_l}{q_l + q_i}$ of legal applications.

Assumption Adm 3: a) Administrators lack any prior information on single applications. Handing down a decision on an application

without investigating the application requires effort $\epsilon > 0$ and, leaving aside the prior information on q such a decision is wrong with probability one half. b) The administrator can improve his decisions by spending effort e on investigating the application. If he spends the proportion η of his effort e on avoiding false permissions (errors of type 1) and the proportion $1 - \eta$ of his effort to avoid false denials of permission (error of type 2), then he gets the information that an application is legal with probability $p_l((a_l - b_l \eta) \cdot e)$ if it is actually legal and with probability $p_i((a_i - b_i \eta) \cdot e)$ if it is illegal. For $j \in \{l, i\}$, a_j and b_j are constants with $b_j > a_j > 0$, and $0 \leq p_j(\cdot) \leq 1$ are non-decreasing piecewise continuous and differentiable functions with $x \cdot p_j''(x) \leq 0 \forall x \neq 0$.

Part a) of this assumption is obvious: if administrators do not have any information on an application, not even on the proportion of legal applications in the pool where the application comes from, then all he can do is toss a coin to “decide” the case. Even then, he has some paperwork to perform to hand down this “decision”.

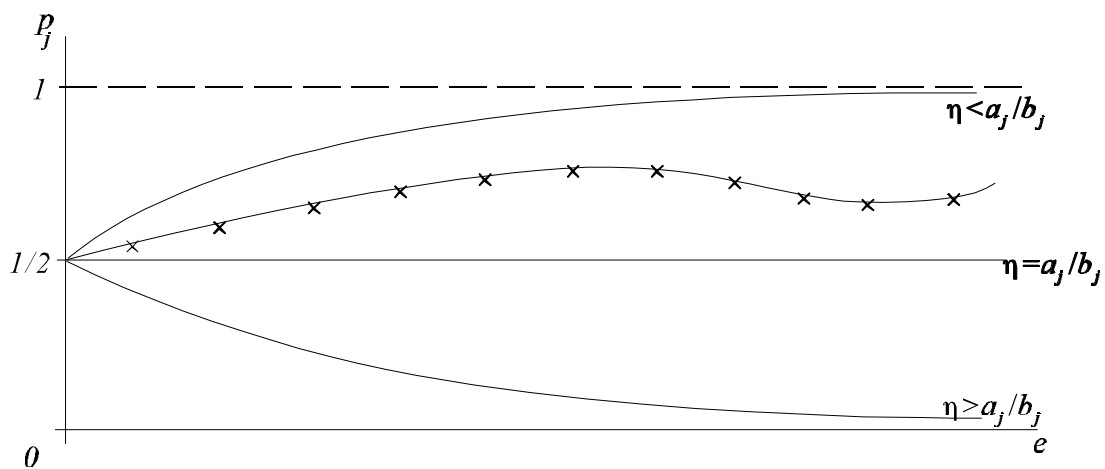


Figure 1: General shape of the probability that the administrator gets the information that the application is legal. The crossed line violates the assumptions.

Part b) is crucial and deserves some discussion. The functions chosen for the probabilities that the administrator gathers the information that the application is legal determine the error probabilities: the probability of committing an error of type 1 is given by $p_l((c-d\eta)\cdot e)$ while the probability of committing an error of type two is given by $1-p_l((a-b\eta)\cdot e)$. The functions exhibit the following properties: the probabilities of getting the information that the application is legal increase when η decreases for both legal and illegal applications. In other words: when the administrator concentrates more on avoiding false denials he will get positive information more likely than when he concentrates on avoiding false permissions. For both types of applications, the probability of a positive information may increase or decrease, when the administrator increases his effort spent on investigating the single application without changing the relative distribution of his effort on the two types. For legal applications, this probability increases (decreases) with additional total effort for all levels of effort, if $\eta > a_l/b_l$ ($\eta < a_l/b_l$), but the increase (decrease) becomes less for larger effort levels. The same is true for illegal applications with the critical value of η being a_i/b_i . Figure 1 shows an example. Note that in that figure the crossed line violates the assumptions: increasing the effort may lead first to an increasing and then to a decreasing probability of positive information. For large e , this probability does not have to approach zero or one asymptotically: for example, the probability of a legal application rendering the information that it is legal could always stay above 20%, no matter how much the administrator concentrates on avoiding false permissions. It seems to be natural to assume that $p_l > p_i$. If the contrary were true, the administrator would better use the information he gathered by acting against the information, thereby again returning to the assumed relationship. However, this assumption is not necessary, it follows easily as a result from the administrator's optimization.

Although this function is not as general as one might wish (in particular one might want to relax the linear relationship between e and η) it covers all functions used in the related literature mentioned in section 1 of this paper. Specifically, the assumption often made in this literature that information costs a fixed amount but once these costs are incurred, information is perfect is but a special case of the functions described in our assumption **Adm 3**. When using graphical expositions, we will rely on the following specific case:

$$p_j = \frac{1}{1 + \exp(-(a_j - b_j \eta)e)} = \frac{\beta_j^{e(1-\eta)}}{\alpha_j^{e\eta} + \beta_j^{e(1-\eta)}} \quad \text{with } j \in \{l, i\}, \beta_j = \exp(a_j), \text{ and } \alpha_j = \exp(b_j - a_j) \quad (1)$$

Finally, let us state

Assumption Adm 4: The administrator's disutility of effort $\Psi(E)$ (where E is the total effort spent on adjudication) has positive first and second derivatives. The administrator is risk neutral with respect to the payoffs he receive for the single adjudication.

The first part of this assumption just states that additional effort becomes more cumbersome, the more effort the administrator already spends on adjudication. At this point we have to remember that we are only looking at one pool of applicants. If the administrator has to handle more than one pools, the disutility of effort, in particular the marginal disutility of effort is also determined by the effort spent on other pools. So administrators will substitute effort between the pools so that he equates marginal disutilities of effort weighted by the payoffs over all pools. However, this does not change the shape of the disutility function. So we will abstract from this caveat in the remainder of this paper.

The second part is mainly due to computational ease. Assuming risk aversion and explicitly modeling it with many decisions to be made requires reliance on multinomial distributions and results in complicated derivatives.⁴ However, without risk aversion, this model is not able to explain why incentives are so weak in public administrations. In line with standard principal-agent theory, this model would rather suggest that the differences of payoffs for correct and false decisions be very large; the only constraint would be the “individual rationality constraint”: administrators must not be induced to levels of effort which make them quit their job. This constraint, however, is unlikely to be the reason for limited outcome dependent incentives in

⁴ In addition, standard concepts of riskaversion exhibit one property, which makes them at least problematic for the model developed here: they are timeless concepts. Increasing the time span under investigation and thereby increasing the number of risks would reduce the degree of risk aversion due to the law of large numbers. Hence studying time periods of a year would reduce the degree of risk aversion compared to studying time periods of a month. This problem will become particularly relevant in expansions of this paper towards the dynamics of adaptation to institutional changes.

public administrations. There is, however, an admittedly crude way to reintroduce the problem of risk aversion as a limit to strong incentives into the model: one could assume that spreading the differences between expected payoffs for correct and false permissions is costly with increasing marginal cost. The effects of this assumption would be similar to the assumption of risk aversion but it could be handled far easier.

As the administrator cannot distinguish between different applications from the pool he is working on, one might now be tempted assume that the administrator would not differentiate between applications and choose the same—optimized—amount of effort for all applications he has to adjudicate. This would however neglect the following problem: spending equal amounts of effort on all applications may result in rather low effort levels for all applications due to increasing marginal disutility of effort. Then the information derived from this effort may be less reliable than the prior information on overall percentages of how many applications are legal. Take the following example: the incentive structure of the administrator gives equal incentives to avoid errors of type 1 and type 2. Expected payoffs from making a correct decision are ten Dollars higher than expected payoffs from making a wrong decision. The information gained from the optimized investigation is yet so poor that both error probabilities are at 40%. Prior information of the administrator tells him that only 30% of all applications are legal. If he relies on the information he gathered in his investigations, he will lose four Dollars per decision compared to the ideal perfect adjudicator. If he discards that information and relies solely on his prior information by just denying the permission to all applicants, he only loses three Dollars per decision. Of course, under these circumstances, no administrator would gather information at all. The same problem arises even if the information gathered from the investigations is slightly more reliable than the prior information, but the gain from making better decisions is not enough to cover the costs of effort. Again, if administrators treat all applications equally, they will not investigate at all.

Obviously, this cannot be the end of the story. An administrator who does not investigate at all has a lower expected payoff than his colleague next door, if the latter relies on prior information for all applications but one per week. This one case he investigates not ad infinitum but only for ten minutes decreasing his utility by the equivalent of 50 cent. His investigation increases the precision of his decision to 80%. On this one case, he expects a loss of two Dollars compared to the perfect adjudicator which is a gain of one Dollar compared to his colleague. As this gain of

one Dollar costs only 50 cents this administrator gets better off by randomly selecting one case for investigation and handing down decisions based on prior information only for all the other applications. Administrators will thus choose a the proportion of applications they randomly select for investigation so that the gains from using the better information just equal the disutility accruing from the additional effort necessary for the last additional application selected for investigation. This result can be restated more carefully in the following proposition after defining the proportion of applications administrators decide upon only relying on prior information as $\tau \in [0,1]$.

Proposition 1: Represent all possible states of applicants' behavior in the q_i - q_i -space (cf. figure 2). Then there always exists a region of small $\rho(1-\rho)$ and large q where $\tau=1$. If a region with $\tau=0$ exists, it is in the neighborhood of $\rho = \Delta_i / (\Delta_i + \Delta_l)$ and includes the segment of this line defined by $0 < q < q_o$. A region with $0 < \tau < 1$ exists if and only if a region with $\tau=0$ exists. It separates the two other regions from each other. If $\tau > 0$, then the optimal values of e and η are independent of q .

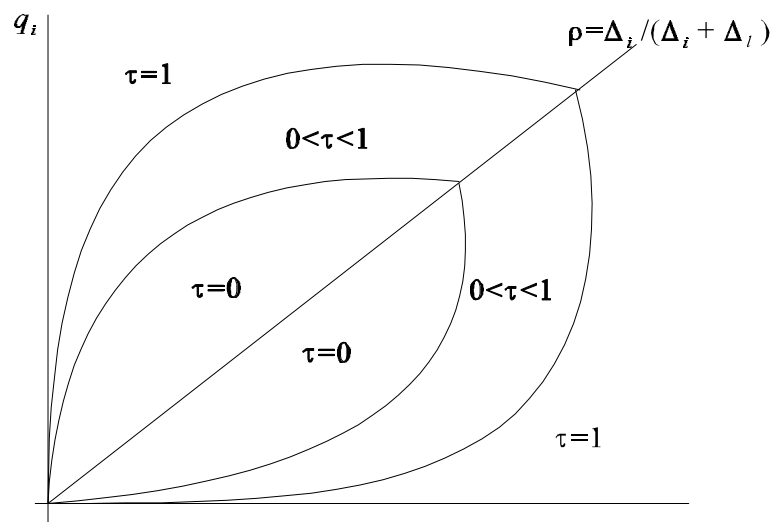


Figure 2: Regions of different τ

The first part of the proposition is a direct consequence of $\varepsilon > 0$. Hence, if q is sufficiently large, the effort needed just to hand down uninformed decisions results in a marginal disutility of effort which makes any further effort to reduce the error probabilities of at least a single one decision not worthwhile. In such a situation, administrators may be called overloaded with work relative to their incentives. Note, however, that this region also does come very close to the origin: if prior information is very strong, gathering information is usually worth nothing similar to the example above: investigating applications, even if this investigation is restricted to one single application per time period, cannot yield better information than the prior information.

Let us now sketch a formal proof of the remainder of the proposition. The administrator maximizes his utility over four variables: the effort e , the distribution η of the effort on the avoidance of the two types of error, the proportion τ of applications for which he relies on his prior information, and a dichotomous variable θ which takes the value 1 if he grants permission based on the prior information and the value 0 if he does not. The maximization problem of the administrator is thus given by the following equation:

$$\begin{aligned} \max_{e, \eta, \tau, \theta} EV &= q\rho \left[\tau\theta + (1-\tau)p_l((a_l - b_l\eta)e) \right] v_{lg} + \left[(1-\tau\theta) - (1-\tau)p_l((a_l - b_l\eta)e) \right] v_{ld} \\ &\quad + q(1-\rho) \left[\tau\theta + (1-\tau)p_i((a_i - b_i\eta)e) \right] v_{ig} + \left[(1-\tau\theta) - (1-\tau)p_i((a_i - b_i\eta)e) \right] v_{id} \\ &\quad - \Psi(q(\varepsilon + (1-\tau)e)) \\ &= q \left[\rho \left(\tau\theta + (1-\tau)p_l((a_l - b_l\eta)e) \right) \Delta_l - (1-\rho) \left(\tau\theta + (1-\tau)p_i((a_i - b_i\eta)e) \right) \Delta_i \right] \\ &\quad + q(\rho v_{ld} + (1-\rho)v_{id}) - \Psi(q(\varepsilon + (1-\tau)e)) \end{aligned}$$

In the first notation of the expected utility, the first and the second line represent the expected payoffs resulting from one legal or illegal application, both multiplied with the frequency of their occurrence. The third line is the disutility of effort where the effort is given by the unavoidable minimum effort to hand down a decision plus the effort spent on the average application both multiplied by the total number of applications the administrator has to deal with.

The optimal behavior is determined by the first derivatives of this equation. It is straight forward to see that:

$$\theta = \begin{cases} 1 & \text{if } \rho > \frac{\Delta_i}{\Delta_i + \Delta_l} \\ 0 & \text{if } \rho < \frac{\Delta_i}{\Delta_i + \Delta_l} \end{cases}$$

Taking the total differential of the first derivatives to determine the influence which the variables exogenous to the administrator's decision exert on the optimal behavior of the administrator yields the following results: τ is getting steadily smaller the closer ρ comes to $\frac{\Delta_i}{\Delta_i + \Delta_l}$. If we disregard the definition interval of τ for a moment, this would even hold for $\tau < 0$.

This explains why the region with $0 < \tau < 1$ lies between the regions of $\tau = 1$ and $\tau = 0$ and why the latter one lies in the center around $\rho = \frac{\Delta_i}{\Delta_i + \Delta_l}$. Table 1 shows the marginal effects of the four

exogenous variables q , ρ , $\delta = \frac{\Delta_i}{\Delta_i + \Delta_l}$, and $\Lambda = \Delta_i + \Delta_l$ exert on the endogenous variables τ , e , and

η as well as on the permission probabilities $g_i = \tau\theta + (1-\tau)p_i$ and $g_l = \tau\theta + (1-\tau)p_l$ as well as on their difference $\Delta g = g_l - g_i$. The four entries in each field of the table refer to the following situations: the first entry gives the sign for $\tau > 0$ and $\rho > \Delta_i / (\Delta_i + \Delta_l)$, the second for $\tau = 0$ and $\rho > \Delta_i / (\Delta_i + \Delta_l)$, the third for $\tau = 0$ and $\rho < \Delta_i / (\Delta_i + \Delta_l)$, and the fourth for $\tau > 0$ and $\rho < \Delta_i / (\Delta_i + \Delta_l)$. If two signs are in one entry, the upper one is more likely. The reason is that for some fields, the critical value of ρ deviates from $\Delta_i / (\Delta_i + \Delta_l)$. An x as entry stands for non-applicable.

	endogenous variables and functions of them					
exogenous variables	τ	e	η	g_l	g_i	Δg
q	+/x/x/+	0/-/-/0	0/ \pm / \mp /0	+/ \mp / \mp /-	+/ \pm / \pm /-	-/-/-/-
ρ	+/x/x/-	+/ \pm / \mp /-	?/-/-/?	+/ $+$ / $+$ / $+$	+/ $+$ / $+$ / $+$	+/ \pm / \mp /-
δ	+/x/x/-	+/ \pm / \mp /-	?/-/-/?	+/ $+$ / $+$ / $+$	+/ $+$ / $+$ / $+$	+/ \pm / \mp /-
Λ	-/x/x/-	0/ $+$ / $+$ /0	0/ \mp / \pm /0	+/ \pm / \pm /-	+/ \mp / \mp /-	+/ $+$ / $+$ / $+$

Table 1

all signs are as one would expect them, except for, perhaps, the zeroes for the influence of the total quantity of applications on the effort spend on those applications which are investigated and the distribution of these efforts.

As we have now seen how the average behavior of the applicants influences the decisions of the administrators, we will study in the next section, how applicants in turn react to the average behavior of administrators.

3. Feedback with Behavior of Applicants

In the remainder of this paper, we will show how this theory of mass adjudication by public administrations can be combined with the demand for the permissions the administrators decide on. We will do this by reference to the example of refugees applying for political asylum in Germany. The idea of the German procedure is the following: there are two types of applicants, those who really suffer from political prosecution and those only pretending to be prosecuted for political reasons but mainly come for economic reasons. Let us assume that the individuals in both groups value the status of political refugee differently and order them according to this evaluation. We then get nicely downward sloping demand functions for the status of a political refugee. It seems plausible, that those who are severely prosecuted for political reasons value the status of political refugee very high, but that the group of eligible people is rather small so that

their aggregated demand function is rather steep. On the other hand, those requesting the status of political refugee for other reasons do not have so high an evaluation of the status, but are a very large group so that their aggregate demand function starts at a lower point but is then flatter and eventually intersects the demand function of the “real” political refugees. Choosing linear functions for simplicity, the two demand functions are then given by

$$\bar{\pi}_i = u_i - c_i q_i \quad \wedge \quad \bar{\pi}_l = u_l - c_l q_l$$

where $\bar{\pi}_j$ is the valuation of the political refugee status, $u_l > u_i > 0$ are the highest evaluations in the respective groups and $c_l > c_i > 0$ are the slopes of the demand functions. Taking into account that all applicants know that their chances of being recognized as political refugee depends on their real eligibility, legitimate applicants will apply as long as

$$\pi_l = (u_l - c_l q_l) g_l - k > 0$$

where k are the costs of applying. Similarly, more illegitimate applicants will apply as long as

$$\pi_i = (u_i - c_i q_i) g_i - k > 0$$

Note that the costs of filing an application seem to be substantial: refugees can typically only file once they arrive at Germany. However, once they are there, they receive some benefits which used to be social aid in cash form but has been replaced by in kind subsidies some years ago.

Given these two equations and the g_l and g_i as functions of q_i and q_l as the result of the administrators' optimization, we can determine the equilibrium levels of legal and illegal applications. A graphical exposition will facilitate the argument. Let us start with a simplified version of the p_j -functions: assume that an administrator can either invest a fixed amount of effort into the single case or not. If he does, he gets some information so that he grants the status of a political refugee to the applicants of both groups with the fixed probabilities $0 < p_i < p_l < 1$. If he does not invest effort, he decides on the basis of his prior information. It can be shown that the proportion of applications he investigates depends in exactly the same way as described above on the numbers of applications. Note that due to the simplification applicants now face three regions with fixed probabilities of getting the status of political refugee granted: the outer

regions where these probabilities are $g_i=g_i=1$ and $g_i=g_i=0$, respectively. The lines where $\pi_j=0$ obviously cannot reach the region where $g_i=g_i=0$. In the two other regions just mentioned, the $\pi_i=0$ -line is parallel to the q_i -axis while the $\pi_i=0$ -line is parallel to the q_i -axis. In the two regions with $0<\tau<1$, the lines have approximately the form depicted in figure 3.

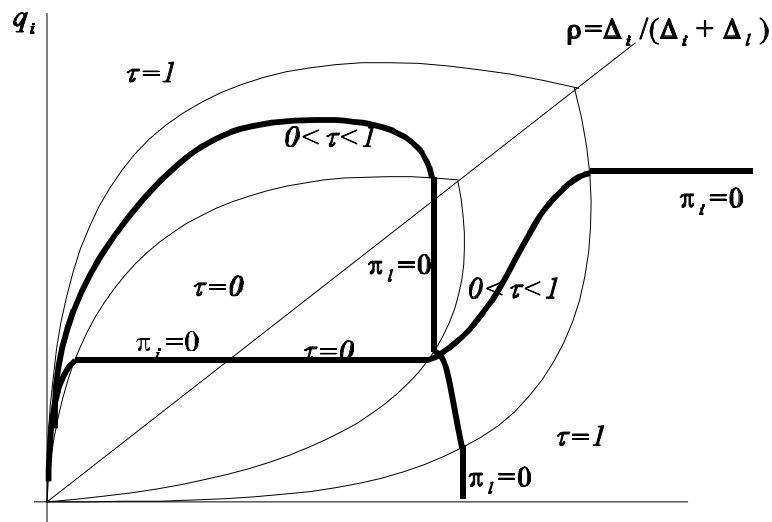


Figure 3: Loci of $\pi_i = \pi_i = 0$

We can determine the equilibria by finding the intersections of these lines. If we take into account that the expected net payoffs of the illegitimate applicants are negative above the $\pi_i=0$ -line and positive below, while the expected net payoffs of the legitimate applicants are negative to the right of that line and positive to the left of it, we can make stability argument on the equilibria, which may be more than one: one equilibrium is always at the origin. It is typically not stable. The second equilibrium in figure 3, however, is stable. So the system will eventually approach this point.

Now let us take a brief look at the consequences of a change in the cost of applications. As has been mentioned earlier, the subsidies paid to refugees in the administrative process of being recognized as political refugee or not have been reduced substantially and changed to in-kind allowances some years ago. This equaled a substantial increase in costs of the application procedures which could and still can last for more than a year. Obviously, critics of that change

argued that this effectively damages the constitutional rights of political refugees to find shelter in Germany. So let us investigate, whether the effect is unambiguous in all cases.

Take the example drawn in figure 3. Note that functions defining the lines of $\pi_i=0$ and $\pi_l=0$

can be rewritten as $q_j = \frac{u_j}{c_j} - \frac{k}{c_j g_j}$. Remember that we assumed $u_l > u_i > 0$ and $c_l > c_i > 0$. If u_l and

c_l are substantially larger than the respective values of illegitimate applicants, then the effect of a change of k is very small with respect to the locus of $\pi_l=0$ while it is large with respect to the locus of $\pi_i=0$. Due to increased costs both lines will move to the left and downwards, respectively. As the $\pi_l=0$ -line hardly moves at all, the equilibrium point may move down nearly on this line and therefore to the right. Though the critics of the cost increase were right with respect to the illegitimate applicants (the number of their applications goes down necessarily) they were not with respect to the legitimate applicants: due to the feedback with the behavior of the administrators who have to decide on the asylum applications, their equilibrium number of applications may even increase.

One might argue that the result is due to the simplification in the probability functions. If we dropped that simplification, the range where $0 < \tau < 1$ holds would be smaller and the intersection of the two lines defining the equilibrium might well be in the innermost part of the graph. However, it is rather easy to find parameters for which the intersection of the two lines would still exhibit the same characteristics; an increase in costs may still result in an increase of applications by legitimate refugees.

4. Conclusion

In this paper we developed a model of administrative mass adjudication. We contrasted this behavior with a very simple model of applicants' reaction to the actions of the administration. Choosing a very simple example, we could show that leaving the interaction between applicants and the administration aside can result in severe misconceptions of the effects of political

measures.

Further research will apply the model to different kinds of applications. In particular, building permits and similar permissions are good candidates for further research. The model can still be refined. If the duration of administrative procedure is at discussion, this duration and related incentives have to enter the administrators' utility function and the costs function of applicants explicitly.

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