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Economics of Governance

The central government grant allocation problem in the presence of misrepresentation and cheating*

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Abstract. This study deals with the central government grant allocation problem under conditions of asymmetric information. Using a simple model, we examine herein the optimal design of random audit and incentive mechanisms to encourage the grantee (the local government authority) to report truthfully on local parameters required in the granting process. The local government authority must choose between two possibilities: a menu of contracts that could be considered as a matching grant programme with random auditing vs. a lump-sum grant without any audit mechanism. We will show that addressing the optimal grant system problem is similar to comparing slopes on the graph of the indirect local government welfare function at two distinct points.

Key words: Auditing procedures, matching grant, lump-sum grant, public goods, local government

JEL Classification: H21, H23, H71, H77

1. Introduction

Since the early 1960's, the characterisation and design of co-ordination schemes between a central government and local jurisdictions have been fundamental to the economic theory of fiscal federalism. Both of these aspects are clearly informational in nature, as indicated by Stigler (1957) and Oates (1972), and later on in the literature dealing with the Tiebout preference-revealing process. Until recently however, this economic literature has mostly concentrated on the optimal design of

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intergovernmental fiscal relations, under the hypothesis of perfect information. In this paper, we will deal with the central grant allocation problem under conditions of asymmetric information. The main purpose herein is to study the optimal central government use of audits and incentive mechanisms in order to encourage the grantee (the local government authority) to report truthfully on the local parameters required in the granting process.

Curiously, the economic literature has paid only slight attention to the strategic behaviour of local governments trying to increase the amount of grants they receive from grantors. Early exceptions can be found in both Chernick (1979), who studied the "race to the grant" of local governments within a setting of monopolistic competition, and Barrow (1986, 1989), who examined the incentives for game-playing behaviour among local jurisdictions vying for a closed-ended grant. In both cases however, no explicit treatment of informational asymmetries is provided. More recently, several questions related to asymmetric information between upper and lower governmental echelons have been raised, e.g. Levaggi and Smith (1994), Cremer, Marchand and Pestieau (1996), Ogawa (2001), Snoddon and Wen (2003). Yet none of these papers explicitly addresses the issue of an optimal monitoring scheme in the granting process.

Nonetheless, this issue is of broad empirical importance. In most countries, whether they have a federal or unitary form of government, the grants-in-aid received from the central (federal) government represent the main source of local government revenue. In some countries, with the United States being the most prominent case, a large proportion of central government grants are conditional or matching. In this respect, the use of matching formulas may induce local governments to misrepresent their actual situation and to provide misleading information. As a matter of fact, within a context of asymmetric information between grantor and grantee, the latter may adopt a strategy in order to increase the amount of grant monies received. Several recent examples highlight this possibility, along with the high rate of return generated from such fraud. The clearest cases apply to grants-in-aid processes, which have been oriented to assisting regions (e.g. Corsica, in the French case) that suffer from a lack of reliable statistical data and/or widespread corruption. The empirical magnitude of this problem might become even larger in the near future due to the EU context. First, enlargement of the EU to include new members subjected to limited fiscal capacity necessitates strengthening the re-distributive function of grants-in-aid amongst the EU regions. Second, the move away from block grants based on a narrow set of reliable macro-indicators, inexpensive to collect and reasonably well-known to the grantor, in favour of a more sophisticated matching or conditional grants-in-aid could reinforce the incentive to cheat, thereby underscoring the need to implement audit policies.

The responsibility for monitoring the grant process has long been assigned to the central government and/or specialised agencies. These controls more often consist of ex-post investigations over the local budgetary process. As for France, control is exercised by special courts (the *Chambres Régionales des Comptes* and the *Cour des Comptes* for large municipalities, Douat, 2002). Specific investigations are conducted under the responsibility of various administrative units (mainly the supervisory departments of the Ministries of Finance, Interior and Social Affairs).

The EU Commission and EU Financial Court add their own level of controls to those at the national level whenever European money is involved in the granting process. In most cases, these controls consist of audits that can at times lead to official quotations and, if necessary, to refunding grant sums to the EU Commission and/or the national treasury. One important point herein is that these controls do not include any explicit scheme of reward or penalty. The absence of such incentive mechanisms sharply contrasts with those commonly introduced in private contracts or even other domains of the public sector (e.g. taxation). In the latter case, the issue of an optimal sanction regime is considered essential even though no explicit reward is given to the taxpayer whose honesty has been confirmed by an audit.

In this paper, we will make use of a simple Principal-Agent model, in which the players are the local and central governments: the central government is the principal, while the local government is the agent. The agent is assumed to hold private information not available to the central government; this information then allows the agent the possibility of misreporting its situation in order to attain a higher level of grant award. The goal of the principal is to design the optimal granting system. We will characterise a random audit mechanism, based on both penalty and reward, that enables the central government to obtain complete information at minimum cost, along the same lines as the tax evasion theory investigated by Allinghan and Sandmo (1972) and then amply surveyed by Cowell (1990). The central government can implement either a matching grant programme, consisting of a menu of contracts along with a random audit procedure, or a lump-sum grant without such a procedure. We will demonstrate herein that the optimal grant-award system depends on the comparison of slopes on the graph of the indirect local government utility function at two distinct points. Section 2 will present the model. In Sect. 3, we examine the optimal auditing procedures and Sect. 4 discusses the efficiency of using these optimal auditing procedures, followed by the paper's conclusions.

2. The model

We will assume the existence of a local government whose preferences are characterised by a welfare function $w(x, z)$, where x, expressed in monetary terms, represents private consumption and z the local public good, with the marginal cost of production being denoted by m and held constant by assumption. The local GDP y and the grant r received from the central government constitute the local jurisdiction's sole resources. The budget constraint of the local government is then: $r + y = x + mz$. Maximising w subject to the local budgetary constraint yields the local indirect welfare function $u = w[x(r + y, m), z(r + y, m)] = u(r + y, m)$. We next assume u to be increasing and concave in $r + y$. Moreover, $u(0, m) = 0$, $\partial u(0, m)/\partial(r + y) = \infty$ and $\partial u(\infty, m)/\partial(r + y) = 0$.

The purpose of the central government – principal is to persuade local government, i.e. the agent in our model, to reach a minimum welfare level u^* by virtue of awarding a grant $r : u(r + y, m) \geq u^*$. This constraint is known as the individual rationality constraint and can be viewed as a contract between the two levels of government. The central government upholds the commitment to ensure local

government of a minimum welfare level. Transformation of the grant into welfare depends on certain local characteristics, e.g. preferences of local population, marginal cost of production for the local public good, congestion in consumption of the local public good, spillovers,[1] etc. If the central government knows these characteristics perfectly and is seeking to minimise the cost of its grant policy, then the optimal grant level r^* results from resolving the equation: $u^* = u(r^* + y, m)$, with the individual rationality constraint being binding.

Let's now suppose that the information between grantee and grantor is asymmetric. The latter does not know the marginal cost of production m for the local public good, although it is common knowledge that m can take one of the two values $\{\underline{m}, \bar{m}\}$, with $\bar{m} > \underline{m}$. The distribution on the value of m is characterised by $p = \text{Prob}[m = \underline{m}]$, then $(1 - p) = \text{Prob}[m = \bar{m}]$. If the only means available for obtaining information is to ask local government, the latter may use this informational asymmetry to request more than the minimal grant amount required to fulfil the individual rationality constraint. In the case of an $\underline{m}$ type for instance, local welfare is improved if the agent misrepresents its own characteristics by requesting a grant level that corresponds with the $\bar{m}$ type, in other words by cheating. In what follows, in an effort to prevent local government from cheating, the principal will implement a mechanism based on a random audit procedure containing both penalty and reward.

We assume that m can be discovered through a (costly) audit. The central government can choose the value of audit probability π, defined as the probability for local government to be audited. If the agent does not cheat and is not audited, the right level of grant, from the principal's point of view, r^* is then distributed. This level corresponds to the minimum grant amount that fulfils the individual rationality constraint. By assumption, r^* is equal to $\bar{r}$ for an $\bar{m}$ type and to $\underline{r}$ for an $\underline{m}$ type. Should an audit be performed and a bonus mechanism be implemented, the agent would obtain a reward b, thereby increasing the allocation to $(r^* + b)$. If the agent does not truthfully report its own characteristics and is not audited, it receives the requested grant amount. Should the agent be audited, it is penalised for cheating and must pay a fine s. We suppose herein that s is less than or equal to $(r^* + y)$, hence the maximum penalty is such that the locality, after paying its fine, is left with zero resources. Moreover, we are making the assumption that the penalty is independent of the extent of the cheating amount. Lastly, the audit cost is assumed to be constant and equal to c.

We now turn our attention to the menus of contracts being offered to the agent. Two possibilities have to be studied. The first one consists of proposing two different contracts: one is to allocate $\underline{r}$ to the local government without implementing any auditing procedure; and the other is to offer $\bar{r}$ along with the possibility of being audited. In the latter case, the audit procedure must be designed such that an $\underline{m}$-type agent is induced to truthfully reveal its type. If a local government is of type $\underline{m}$ therefore, choosing the $\bar{r}$ contract with auditing does not yield a better result than accepting $\underline{r}$. In the case of an $\bar{m}$ type, the agent will strictly prefer the contract with auditing. Note that this contract menu does not use the bonus mechanism. Indeed,

[1] In the case of spillovers, see Gilbert and Picard (1996).

a jurisdiction declaring a type $\underline{m}$ is not audited and then cannot be rewarded for honesty. In return, the cheating local government $\underline{m}$ is punished. The incentive-compatibility constraint of this problem must ensure that the expected welfare eu of an $\underline{m}$ local government is greater by choosing the contract designed for its type rather than accepting the contract designed for the other type. The incentive compatibility thus amounts to:

$$u(\underline{r}, \underline{m}) \geq eu(\bar{r}, \underline{m}) \tag{1}$$

Assuming that the local government is risk averse, the expected welfare function of the dishonest local government $\underline{m}$, i.e. the local government that asks for a grant amount higher than that required to ensure the minimum welfare level u^*, is given by:

$$eu(\bar{r}, \underline{m}) = \pi.u(\underline{r} + y - s, \underline{m}) + (1 - \pi).u(\bar{r} + y, \underline{m}) \tag{2}$$

Inequality (1) and Eq. (2) allow deriving the incentive-compatibility constraint for the problem:

$$\pi \geq \frac{u(\bar{r} + y, \underline{m}) - u(\underline{r} + y, \underline{m})}{u(\bar{r} + y, \underline{m}) - u(\underline{r} + y - s, \underline{m})} \tag{3}$$

The principal must now satisfy this constraint if it wants the local government to truthfully report its characteristics. As s rises, the value of π drops, ceteris paribus. If the penalty amount were to be raised, the potential gain from cheating would decrease and the audit probability could be reduced.

The second menu of contracts uses the bonus mechanism together with the penalty mechanism. The interest lies in the possibility of rewarding a non-cheating local government of type $\underline{m}$. This contract menu consists of proposing $\bar{r}$ or $\underline{r}$ along with auditing for both types of jurisdictions. In that case, according to the same discussion as above, the incentive compatibility constraint amounts to:

$$eu(\underline{r}, \underline{m}) \geq eu(\bar{r}, \underline{m}) \tag{4}$$

The expected welfare of the non-cheating local government $\underline{m}$ is written as follows:

$$eu(\underline{r}, \underline{m}) = \pi.u(\underline{r} + y + b, \underline{m}) + (1 - \pi).u(\underline{r} + y, \underline{m}) \tag{5}$$

and then the incentive-compatibility constraint:

$$\pi \geq \frac{u(\bar{r} + y, \underline{m}) - u(\underline{r} + y, \underline{m})}{u(\bar{r} + y, \underline{m}) - u(\underline{r} + y, \underline{m}) + u(\underline{r} + y + b, \underline{m}) - u(\underline{r} + y - s, \underline{m})} \tag{6}$$

As above, ceteris paribus, a raise in π results in a decrease in s. Furthermore, as the size of bonus b increases, audit probability drops, ceteris paribus. If the bonus rises, i.e. the opportunity cost of cheating increases, it then becomes feasible to lower audit probability. A clear substitution between the bonus and the penalty mechanism eventually becomes apparent. For a given audit probability, an increase in penalty level can be counterbalanced by a decrease in bonus level.

3. The optimal contract menus

Firstly, we assume herein that the principal may not withdraw its offer once accepted. In any event, such a withdrawal would not be advisable if it wishes to develop a reputation for upholding agreements. The problem facing the central government is to compute the optimal menus of contracts: $\{(\underline{r}),\ (\bar{r},\pi,s)\}$ and $\{(\underline{r},\pi,b,s),\ (\bar{r},\pi,b,s)\}$. In both cases, this problem consists of minimising the expected cost of contract menu ecm subject to the individual rationality constraints and the incentive-compatibility constraint.

More formally, for the menu of contract without bonus, the programme of the central government is:

$$\begin{aligned} &\underset{\{(\underline{r}),(\bar{r},\pi,s)\}}{Minimise}\ ecm_s = p\underline{r} + [1-p][\bar{r}+\pi c] \\ &\text{s.t.} \quad u(\underline{r}+y,\underline{m}) \geq u^* \\ &\qquad u(\bar{r}+y,\bar{m}) \geq u^* \\ &\qquad\qquad \pi \geq \frac{u(\bar{r}+y,\underline{m}) - u(\underline{r}+y,\underline{m})}{u(\bar{r}+y,\underline{m}) - u(\underline{r}+y-s,\underline{m})} \end{aligned} \tag{7}$$

The solution to this problem is straightforward. First, the grant levels allocated to each type of agent are obtained by solving equations: $u(\underline{r}+y,\underline{m}) = u^*$ and $u(\bar{r}+y,\bar{m}) = u^*$. Second, given that audit probability π is a decreasing function of s, and that fining is free whilst auditing is costly, the sanction must be as high as possible. By assumption therefore, $s = \underline{r}+y$, which is the well-known penalty "*à la Becker*".

The optimal menu of contracts $\{(\underline{r}),\ (\bar{r},\pi,s)\}$ can then be summarised as follows:

$$\begin{aligned} &u(\underline{r},\underline{m}) = u^* \\ &u(\bar{r},\bar{m}) = u^* \\ &\qquad \pi = \frac{u(\bar{r}+y,\underline{m}) - u(\underline{r}+y,\underline{m})}{u(\bar{r}+y,\underline{m})} \\ &\text{and:} \quad s = \underline{r}+y \end{aligned} \tag{8}$$

The incentive compatibility constraint and the individual rationality constraints are binding and the minimum expected cost of this contract menu is equal to:

$$ecm_s = p\underline{r} + [1-p][\bar{r} + c\,\frac{u(\bar{r}+y,\underline{m}) - u(\underline{r}+y,\underline{m})}{u(\bar{r}+y,\underline{m})}] \tag{9}$$

As for the menu of contracts including a bonus mechanism, the minimisation programme of the central government can be written as follows:

$$\begin{aligned} &\underset{\{(\underline{r},\pi,b,s),(\bar{r},\pi,b,s)\}}{Minimise}\ ecm_{s,b} = p[\underline{r}+\pi(b+c)]+[1-p][\bar{r}+\pi(b+c)]=E(r)+\pi(b+c) \\ &\text{s.t.} \quad u(\underline{r}+y,\underline{m}) \geq u^* \\ &\qquad u(\bar{r}+y,\bar{m}) \geq u^* \\ &\qquad \pi \geq \frac{u(\bar{r}+y,\underline{m})-u(\underline{r}+y,\underline{m})}{u(\bar{r}+y,\underline{m})-u(\underline{r}+y,\underline{m})+u(\underline{r}+y+b,\underline{m})-u(\underline{r}+y-s,\underline{m})} \end{aligned} \tag{10}$$

The solution to this programme can be found easily. First, as previously, the equations $u(\underline{r}+y,\underline{m})=u^*$ and $u(\bar{r}+y,\bar{m})=u^*$ give the grant levels allocated to each type of agent. Second, the optimal parameters of the auditing procedure are deduced from minimisation of the expected cost of information $eci=\pi\ (b+c)$, subject to the binding incentive-compatibility constraint. The expected cost of information measures the cost of collecting true information by using both a bonus and a penalty mechanism, with c being the cost of conducting an audit. Lastly, as above, the optimal penalty is: $s=\underline{r}+y$.

Taking this into account provides the central government's sub-minimisation programme:

$$\underset{\pi,b}{Minimise}\,\pi(b+c)\quad \text{s.t.}\quad \pi=\frac{u(\bar{r}+y,\underline{m})-u(\underline{r}+y,\underline{m})}{u(\bar{r}+y,\underline{m})-u(\underline{r}+y,\underline{m})+u(\underline{r}+y+b,\underline{m})} \tag{11}$$

After computation, the first-order condition of this programme is written as:

$$b=-c+\frac{u(\bar{r}+y,\underline{m})-u(\underline{r}+y,\underline{m})+u(\underline{r}+y+b,\underline{m})}{u'(\underline{r}+y+b,\underline{m})} \tag{12}$$

It is now easy to show that the optimal bonus is an increasing function of audit cost. Using Eq. (12) and applying the implicit function theorem yields:

$$\frac{\partial b}{\partial c}=-\frac{u''(\underline{r}+y+b,\underline{m})\,[u(\bar{r}+y,\underline{m})-u(\underline{r}+y,\underline{m})+u(\underline{r}+y+b,\underline{m})]}{[u'(\underline{r}+y+b,\underline{m})]^2} \tag{13}$$

The sign of Eq. (13) is clearly positive. When c is high, conducting an audit is very costly and it is in the interest of the central government to apply the bonus mechanism. This optimal solution has been depicted graphically in Fig. 1, where audit probability is measured on the vertical axis and the bonus is represented on the horizontal axis. The graph of the incentive-compatibility constraint may be drawn conditional upon a given set of $\underline{r}$, $\bar{r}$, $\underline{m}$ and y. This graph is decreasing and convex. The expected cost of information is fixed at some arbitrary levels, say eci_1 and eci_2 (with $eci_2>eci_1$). The corresponding $iso-eci$ curves have been shown in this figure and are evidently convex ($\pi=eci/(b+c)$). The optimal choice of the central government is given by point E. If audit cost c were to decrease, the slope of the *iso-eci* curves would become steeper in absolute value terms and the optimal choice of the central government would then lie to the left of point E, i.e. for a smaller optimal bonus level and a corresponding audit probability higher than before. On the contrary, if audit cost increases, the optimal bonus level also increases and the corresponding audit probability decreases. At the limit, for a very small value of c, a corner solution is obtained: $b=0$ and $\pi=1$.

The intuitive reasoning behind this result is as follows. Recall that from the incentive-compatibility constraint, a large reward for telling the truth can be offset by a very small audit probability and will thus lead to audit cost savings. Consequently, if the audit cost is very high, opting to conduct an audit proves very costly and the central government is heavily enticed to utilise the bonus mechanism. In

contrast, should c be low, it would be preferable to audit with a high probability and a small corresponding bonus, rather than awarding a large bonus and auditing with a small probability.

This optimal menu of contracts $\{(\underline{r}, \pi, b, s),(\bar{r}, \pi, b, s)\}$ can be summarised as follows:

$$\begin{aligned} u(\underline{r}, \underline{m}) &= u^* \\ u(\bar{r}, \bar{m}) &= u^* \\ \pi &= \frac{u(\bar{r}+y, \underline{m}) - u(\underline{r}+y, \underline{m})}{u(\bar{r}+y, \underline{m}) - u(\underline{r}+y, \underline{m}) + u(\underline{r}+y+b, \underline{m}))} \\ b &= -c + \frac{u(\bar{r}+y, \underline{m}) - u(\underline{r}+y, \underline{m}) + u(\underline{r}+y+b, \underline{m})}{u'(\underline{r}+y+b, \underline{m})} \\ \text{and:} \quad s &= \underline{r}+y \end{aligned} \tag{14}$$

In observing the contract chosen by the local government, the central government discerns the agent's marginal cost parameter. This optimal contract menu features the following characteristics. First, the individual rationality constraints are not binding. The agent of type $\underline{m}$ receives an expected informational rent of $\pi[u(\underline{r}+y+b, \underline{m}) - u(\underline{r}+y, \underline{m})]$ while the $\bar{m}$ agent receives $\pi[u(\bar{r}+y+b, \bar{m}) - u(\bar{r}+y, \bar{m})]$. Since $u(.)$ is increasing and concave this situation may be problematic in that it forces the central government to rule out larger renting to the less efficient local government, i.e. to the agent with the highest local public good marginal cost of production. This fact may thus induce moral hazard if m turns out to be endogenous. Second, the incentive-compatibility constraint is binding at the optimum.

Replacing the problem variables by their optimal value from (9) yields the minimum expected cost of the contract menu:

$$ecm_{s,b} = E(r) + [\frac{u(\bar{r}+y, \underline{m}) - u(\underline{r}+y, \underline{m})}{u'(\underline{r}+y+b, \underline{m})}] \tag{15}$$

Equation (9) and (15) give the expected cost of the grant policy when the central government is interested in offering a self-selecting contract menu. We have now to see which of these two menus of contract is the least costly. Furthermore, this option may not however prove to be efficient. We would still have to compare it to the situation without any self-selective scheme. In the latter case, the individual rationality constraints are the only problem restrictions.

4. The optimal grant policy

In this section, we raise the issue of the optimal grant policy. First, we compare the expected cost of the contract menu without bonus ecm_s to the expected cost of the menu of contracts including a bonus mechanism $ecm_{s,b}$. Using Eqs. (9) and (15), it is easy to show that the incentive mechanism without bonus is the least costly if: $c \leq 1/[1-p]\ [u(\bar{r}+y, \underline{m})/u(\underline{r}+y+b, \underline{m})]$. This result is due to the possible substitution between the bonus and the audit probability. As mentioned

above, should the audit cost be very low, it is in the interest of the central government to audit with a high probability rather than awarding a bonus.

Otherwise if $c > 1/[1-p]\,[u(\bar{r}+y,\underline{m})/u(\underline{r}+y+b,\underline{m})]$, the central government has the choice between two possibilities: either it provides the locality with the maximum possible grant $\bar{r}$ without searching for the true information on m, thus leaving a rent with the $\underline{m}$ type of local government; or it implements the contract menu that includes an audit procedure, thus forgoing the expected cost of information if the local government is of type $\bar{m}$. According to the first option, $\bar{r}$ is the cost of the grant policy, whereas in the second the grant policy cost is measured using Eq. (15). It is therefore efficient to propose the contract menu with bonus if $ecm_{s,b} \leq \bar{r}$, which can be written as follows:

$$\pi(b+c) \leq p(\bar{r}-\underline{r}) \tag{16}$$

As suggested above, Eq. (16) reveals that this contract menu has got to be implemented if the expected cost of information for an $\underline{m}$-type local government is less than the expected rent left to the local government, with the latter expression reflecting the expected loss from giving $\bar{r}$ to a local government of type $\underline{m}$. Replacing π and $(b+c)$ by their Eq. (14) values and rearranging yields:

$$\frac{u(\underline{r}+y+\Delta r,\underline{m})-u(\underline{r}+y,\underline{m})}{\Delta r} \leq pu'(\underline{r}+y+b,\underline{m}) \quad \text{with:} \quad \Delta r = \bar{r}-\underline{r} \tag{17}$$

Equation (17) suggests that addressing the optimal grant policy problem is similar to comparing slopes on the indirect local government utility function graph at two distinct points (see Fig. 2). The left-hand term of the inequality in (17) is measured graphically by means of slope α, while the right-hand term is a fraction p of slope β. One result, for instance, is that as the probability of having an $\underline{m}$-type local government increases, ceteris paribus, the advantage of proposing a contract menu with bonus becomes more attractive. In Fig. 2, if p is close to 1, α is less than $p\beta$ and the contract menu must be implemented. In the same vein, if audit cost c is reduced, the optimal bonus b decreases and slope β becomes steeper, thereby increasing the advantage of using this contract menu.

5. Conclusion and additional comments

The gaming aspects inherent in the relationships between the fiscal levels of government have been addressed in various ways in the theoretical economic literature. Very little attention however has been paid to the issue of the information needed in the central grant-allocation problem. In this paper, we have examined the optimal use of random audit and incentive mechanisms in order to incite local governments to report truthfully on the local parameters requested during the granting process. We first characterised the optimal audit mechanisms, which consist of computing the audit probability, reward and penalty that serve to minimise the expected cost of collecting accurate information on local parameters. Next, we discussed the efficiency of implementing such optimal auditing procedures. When the audit cost is

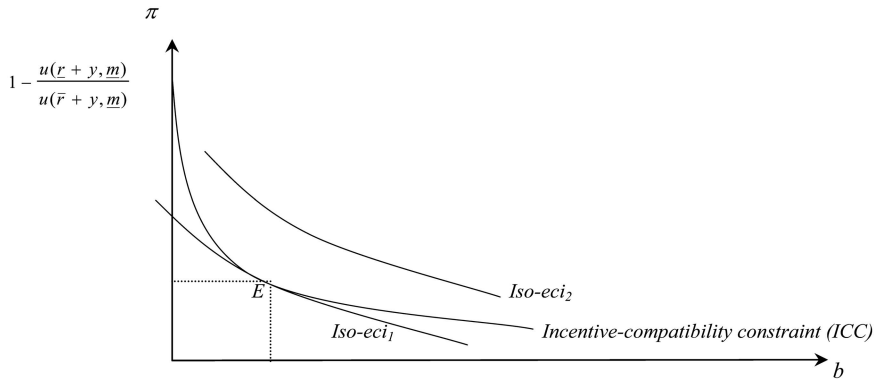

Fig. 1. Graph of the incentive-compatibility constraint and Iso-eci curves

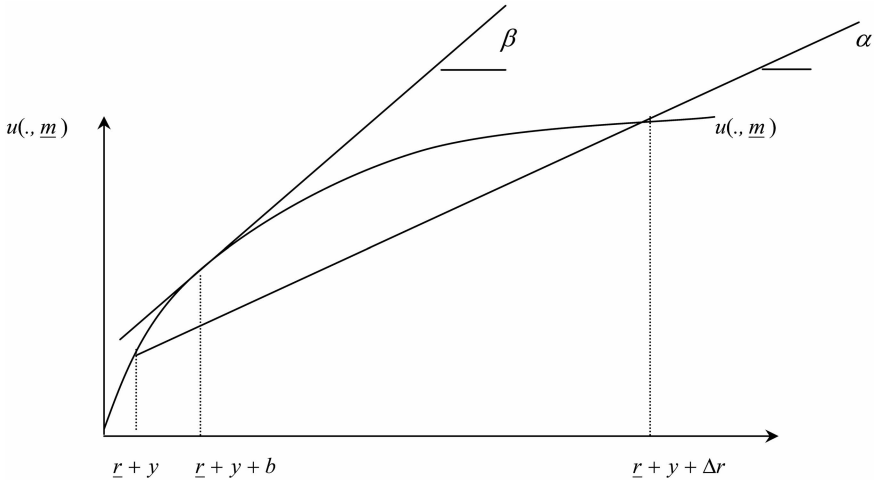

Fig. 2. The optimal grant system problem

low, a contract menu using sanction as the only incentive element may be less costly than the contract menu with both penalty and reward. When the audit cost is larger, the choice between the two remaining possibilities, i.e. the mechanism including bonus and the maximum grant without searching for the true information, can be simplified to comparing slopes on the indirect local government welfare function graph at two distinct points.

This paper may also be viewed as an attempt to provide a rational explanation for the choice between lump-sum and matching grant programmes. When information is asymmetric, a contract menu characterises an optimal matching grant programme. The grant received by the local jurisdiction does depend on a specific local criterion, which in this paper is the price of the public good. As shown above, this matching grant policy may not be efficient, due to the high expected cost of collecting the accurate information underlying this system. Under such conditions, the lump-sum grant programme, i.e. the one that does not depend on local criteria, is better for the

principal. The cost to the central government under the matching grant programme is greater than that under the non-matching programme. This paper thus proposes a comparison of grant systems that differs from what is usually presented in the fiscal federalism literature. From this standpoint, it can be seen as a complement to the traditional approach.

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