Influencing Corruption through Grants

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Abstract: This paper explores how corruption can be influenced by way of grants in a decentralized setting. If regional governments are benevolent and expenditures are decentralized, a benevolent social planner will give more grants to high cost regions. If regional politicians are corrupt, a benevolent social planner will do just the opposite, giving fewer resources to high cost regions to limit potential corruption. If regional politicians can be either honest or corrupt, giving fewer resources to high cost resources has an ambiguous effect on corruption. It may still limit corruption, but may also increase the probability of election of a corrupt politician.
I. Introduction and Summary

This paper explores a model that connects grant funding for decentralized expenditures and corruption. Grant funding from a higher level of government or outside sources is useful for various purposes, for example to equalize potential spending between regions taking into account differences in costs of providing public services. Grant funding is also used extensively within countries, particularly those that practice administrative federalism, and also among countries of an economic cooperation zone, such as the European Union, so is of practical importance. I examine whether the design of such grants can influence the level of decentralized corruption.

The model considers a situation with decentralized regional expenditures or projects that are financed by an outside actor by way of grants. Since we want to examine the question of how the grants should be designed, we will model the outside actor as a benevolent social planner. A region’s expenditures are characterized by per-unit costs that are inherently either high or low. If regional politicians are benevolent, it is optimal to send more grant revenues to high cost regions thus allowing those regions to provide the same level of services as a low cost region and equating the marginal benefit of spending across regions.

When regional politicians are corrupt, low cost regions may try to mimic high cost regions to gain more funds. This we call the moral hazard problem. When only moral hazard is present a novel implication is that the social planner should send fewer resources to a region that has a higher cost of providing public goods, exactly the opposite of the optimal grant allocation if both levels of government were benevolent. Sending fewer grant resources to those regions lowers corruption.
When regional politicians can be corrupt or honest and informational problems prevent the immediate and certain detection of the corrupt politician, the results are not clear-cut. A second channel of adverse selection will be added to the moral hazard problem. Giving fewer grants to an (apparently) high cost region could encourage the election of a corrupt politician while still limiting the level of corruption. With the addition of adverse selection information no longer plays an unambiguously accountability-improving role, something that has been found in political agency models in other contexts (such as Besley, 2006).

II. Some Previous Literature

Grant finance of decentralized governments has various goals. Oates (1972) suggests matching grants to alter regional relative prices and internalize externalities while Boadway and Flatters (1982) (and a larger literature surveyed by Boadway, 2004) argue for equalizing grants to correct fiscal externalities.

Corruption at decentralized levels is another important area of research. A primary argument for lower corruption at decentralized levels is the ability of decentralized governments (absent externalities) to be more accountable to its citizens through competition between such governments. The most formal development of this argument is Seabright’s (1996) analysis in terms of a model of incomplete contracts, though there are few clear-cut predictions. Another recent model by Albornoz and Cabrales (2013) develops a connection between political competition and corruption and finds that corruption is inversely related to the degree of political competition.
Asymmetric information also plays an important role in a series of papers by Bardhan and Mookherjee (2000). They argue that uninformed voters are more susceptible to corruption. Corruption thus depends on the degree to which voters are informed. Under certain assumptions, decentralized politicians are more likely to bend to the wishes of the rich elite. The basic argument is that uninformed voters are influenced by bribes, so politicians representing rich elites are elected by a combination of rich informed voters, and poor uninformed voters who vote for the rich candidate because of bribes. While the ultimate consequences for decentralization depend on relative parameter values, decentralized governments may end up providing too many services to elites and not enough to the uninformed poor, and may as well be more corrupt than centralized governments.

Recent models of political economy and corruption often build on the work of Barro (1973) and Ferejohn (1986) in which all politicians are assumed to be corrupt but can be constrained in their corruption activities by the possibility of re-election. These models have recently been extended to include both adverse selection and moral hazard, as for instance in the seminal work of Besley (2006) and Besley and Smart (2007). I use these models as a base to examine whether and how grants should be used to limit corruption.

Hindriks and Lockwood (2009) also add to this literature. They focus on the question of whether centralization or decentralization is preferred when voters can hold accountable a possibly corrupt politician.

III. A Model of Funding Sources and Corruption
I first lay out the basic assumptions of the model. A region provides a public good $G$ with per unit costs that are either high (H) or low (L); per unit costs are denoted by $\theta_j$ where $j = (L, H)$. The cost of the public good is high with probability $q$ or low with probability $(1 - q)$. $\theta$ is independently and identically distributed. The regional government’s politicians know $\theta$ perfectly. Regional voters and the social planner cannot observe the true cost of the regional public good.

The model introduces corruption as the diversion of grant revenues by regional politicians for their own use. When regional voters or the social planner observe high regional spending neither knows whether this is because of truly high costs, or whether the region is experiencing low costs and pretending to be a high-cost region with corrupt politicians taking the excess revenues. The model consists of two periods. An election takes place in each period.

I proceed by considering two cases. In the first case, I assume that all regional politicians are corrupt. The second case allows for both honest and corrupt politicians.

Case 1: All regional politicians are corrupt

As a first case, consider the optimal level of grants when all politicians are corrupt. Corrupt politicians choose an amount of rents, $s$, to take each period and public spending $G$. The probability that an incumbent is re-elected in period 2 is denoted $\sigma(G, g)$ and depends on the observed amount of public spending $G$ and grants $g$. Politicians care about being re-elected since they get rents $s_1 + s_2$ if re-elected while only $s_1$ if not. Thus
the regional politician will choose \( s_1 \) and \( s_2 \) to maximize the expected present value of rents:

\[
\max_{s_1, s_2} s_1 + \beta \sigma (G, g = \theta G + s_1) s_2
\]

where \( \beta \) is a discount factor. Rents in period 2 will be chosen to be as large as possible since there is no re-election possibility or other restraint. We denote this amount as \( X \).

Since the politician could forego re-election by choosing \( s_1 = X \), to prevent the politician from doing this, the expected present discounted value of \( s_1 + s_2 \) must be at least \( X \):

\[
s_1(\sigma) + \sigma \beta X = X
\]

It will be best (cheaper) for the social planner to have the politician re-elected so given that \( \sigma = 1 \), the constraint on \( s_1 \) that insures the politician will not just set \( s_1 = X \) and forego re-election (the participation constraint) is:

\[
s_1 \geq (1 - \beta) X
\]

The amount of rents in period one will thus be lower when re-election is possible as well as when politicians are more patient.

Since the social planner does not know the cost of the public good \( \theta \), an additional constraint is that the social planner would like to insure that a low cost region prefers to truthfully implement the low-cost spending level rather than use the grant funds to implement a high-cost spending level and pocket the difference. This defines an incentive compatibility constraint for a low-cost region:

\[
(\text{IC}_L) \quad s_{1L} = \theta L - LG_{1L} \geq g_{1H} - LG_{1H} = s_{1H} + (H - L)G_{1H}
\]
In addition, a high-cost region is prevented from foregoing re-election through the participation constraint which allows the diversion of public funds in period one of a high cost region to be greater than or equal to maximum period one revenue less the discounted present value of maximum period two revenues:

\[
(\text{PC}_n) \quad s_{1H} = g_{H} - HG_{1H} \geq (1-\beta)g_{H}
\]

Since the politician will just abscond with revenues in period two, the interesting part of the problem is the selection of grants in the first period, and so we limit out attention to the selection of first period grants. Grants finance spending in a region, including any rents taken by politicians. The budget for region \( i \) is thus:

\[
g_{\theta i} = \theta_i G_{\theta i} + s_{\theta i}
\]

for \( \theta = L, H \). Grants are assumed to be financed by the social planner; to simplify we assume this is a lump sum tax, equal across regions. The overall resource constraint for grant revenue is thus:

\[
t_1^c N = \sum_i (g_{1H} + g_{1L})
\]

where the sum is over \( N \) regions and the average grant must be subtracted from private spending so the constraint on private spending becomes:

\[
C_{\theta i} = Y_i - t_1^c
\]

for \( \theta = L, H \). The social planner’s objective is to maximize expected utility subject to these constraints:
\[
\text{Max } \sum_{i} q[u(G_{iH}) + w(C_{iH})] + (1-q)[u(G_{iL}) + w(C_{iL})]
\]
\[
s.t. \quad C_{i\theta} = Y_i - t_i^\epsilon, \quad \theta = L, H
\]
\[
g_{i\theta} = \theta g_{i\theta} + s_{i\theta}, \quad \theta = L, H
\]
\[
t_i^e N = \sum_i (g_{iH} + g_{iL})
\]
\[
(\text{PC}_H) \quad s_{iH} \geq (1-\beta) g_{iH}
\]
\[
(\text{IC}_L) \quad s_{iL} \geq g_{iH} - LG_{iH} = s_{iH} + (H - L)G_{iH}
\]

The first order conditions for \(g_{iH}\) and \(g_{iL}\) are:

\[
(1-q)[\frac{\partial u_i}{\partial G_{iH}} \frac{1}{L} - \sum_i \frac{\partial w_i}{\partial C_{iH}} \frac{1}{N}] = 0
\]
\[
q[\frac{\partial u_i}{\partial G_{iH}} \frac{1}{H} - \sum_i \frac{\partial w_i}{\partial C_{iH}} \frac{1}{N}] + (1-q)[\frac{\partial u_i}{\partial G_{iL}} \frac{\partial g_{iL}}{\partial s_{iL}} \frac{\partial s_{iL}}{\partial g_{iH}}] = 0
\]

Re-writing the first order conditions yields:

\[
\frac{\partial u_i}{\partial G_{iL}} \frac{\partial G_{iL}}{\partial w_i} = L
\]
\[
\frac{\partial u_i}{\partial C_{iH}} \frac{\partial C_{iH}}{\partial w_i} = H + \frac{(1-q)\frac{\partial u_i}{\partial G_{iL}} \frac{\partial g_{iL}}{\partial s_{iL}} \frac{\partial s_{iL}}{\partial g_{iH}} H}{L(1+H-L)}
\]

With respect to low spending regions, the first order conditions indicate that grants should be used to set marginal benefit of public spending in period one equal to the true marginal cost, \(L\). For high spending regions, optimal grants are not set equal to true marginal costs, \(H\). This results from the fact that the central government is trying to deter low cost regions from claiming to be high cost. To do this requires that the central government equate marginal benefits to something higher than true marginal costs, \(H\). This implies that grants and hence public spending are optimally lower than the first-best
for high cost regions, and also reduces the rents available for the politician. High cost regions should receive lower grants the larger the difference between the high- and low-marginal-cost and the greater is the probability of low-costs relative to high costs. This can be summarized in the following:

**Proposition 1:** An imperfectly informed social planner that finances regional governments run by corrupt politicians through grants will reduce grants to high cost regions to limit the level of corruption.

**Proof:** Analysis of first order conditions.

**Case 2:** Regional politicians can be honest or corrupt

I next consider the case where regional politicians can be honest or corrupt. This significantly complicates the analysis.

In this scenario, regional politicians who are honest take no rents so \( s = 0 \).

Corrupt politicians are as before and choose rents to take and a level of public spending. The probability that a politician is honest is \( \pi \) and the probability that a politician is corrupt is \( 1 - \pi \). As before in the second period a corrupt politician takes the maximum rents, denoted \( X \); \( s_2 = 0 \) for the honest politician however. Voters will re-elect an incumbent if the probability that the incumbent is honest is greater than \( \pi \), the probability that a challenger is honest.

The probability that an incumbent is honest depends on the equilibrium strategy of the first period incumbent since information is revealed from this strategic choice and
the voter will update his probability assessment using Bayes rule. We will consider three possible spending levels, \( x_H = HG; x_L = LG; \) and \( X \). If the incumbent is truly honest, a spending level \( x_H \) will be chosen with probability \( q \) and \( x_L \) will be chosen with probability \( (1-q) \). A corrupt politician will not choose \( s_1 = 0 \) since \( s_1 = X \) dominates this choice. Hence we can infer that anytime a voter observes \( x_L \), he knows for sure that this is an honest politician and will vote to re-elect, so \( \sigma = 1 \).

A voter observing \( x_H \) is still in a muddle. A corrupt politician in a low cost region may pool with high-cost honest politicians and spend \( x_H < X \) while diverting \( s = (H - L)G \) to himself. The corrupt politician may do this if it allows him to be re-elected, and if so he is practicing restraint since rents are smaller than the maximum. Let \( \lambda \) be the probability of a corrupt politician that observes low costs and spends \( x_H \) and let \( \sigma \) as before be the probability of re-election. Using Bayes rule, we can write the probability that a politician is honest given that we observe \( x_H \) as:

\[
P(\text{honest} \mid x_H) = \frac{P(x_H \mid \text{honest})P(\text{honest})}{P(x_H)} = \frac{q\pi}{q\pi + (1-q)(1-\pi)\lambda}
\]

where we have used the fact that

\[
P(x_H) = P(H)P(\text{honest}) + P(L)P(\text{corrupt})P(L \cap \text{corrupt} \mid x_H)
\]

The voter will re-elect with positive probability (\( \sigma > 0 \)) iff \( P(\text{honest} \mid x_H) > \pi \) or equivalently \( \lambda \leq q/(1-q) \), with \( \sigma = 1 \) if the equality holds. It is also the case that \( \lambda > 0 \) iff \( s + \beta \sigma X \geq X \), with \( \lambda = 1 \) if the equality holds.

As shown in Besley (2006) and Besley and Smart (2007), there are three possible equilibria: a pooling equilibrium, a separating equilibrium, and a hybrid (mixed strategy)
equilibrium. The hybrid equilibrium only holds if \( q < \frac{1}{2} \) however so we can simplify the analysis by assuming that \( q \geq \frac{1}{2} \) which eliminates this possible equilibrium.

In the first case grants were being used to incentivize restraint, that is, to get a corrupt politician with truly low costs to accept smaller than maximal rents, and stand for re-election. In case 2 this is captured in the variable \( \lambda \). Fewer grants will increase \( \lambda \) and create more discipline as before. But an increase in \( \lambda \) also draws in more corrupt politicians, lowers the probability that we observe the actions of an honest politician when we observe \( x_h \), and thus worsens the average quality of office holders. The latter effect is called the selection effect. Thus there are two effects: higher grants exert a disciplining effect on corrupt politicians but at the same time lower the probability that an honest politician stands for re-election.

Additional analysis to come …

IV. Summary

This paper explores a model that connects grant funding for decentralized expenditures and corruption. Grant finance of decentralized governments has various goals. Oates (1972) suggests matching grants to alter regional relative prices and internalize externalities while Boadway and Flatters (1982) (and a larger literature surveyed by Boadway, 2004) argue for equalizing grants to correct fiscal externalities. I offer a potential additional goal: using grants to limit corruption. I examine whether the design of such grants can influence the level of decentralized corruption.
When only moral hazard is present a social planner should send fewer resources to a region that has a higher cost of providing public goods, exactly the opposite of the optimal grant allocation if both levels of government were benevolent. When the model includes both corrupt and honest politicians and informational problems prevent the immediate and certain detection of the corrupt politician, optimal grants may be higher or lower. This is because giving fewer grants to the high cost region may encourage less corruption as before, but may also lead to a higher probability of the re-election of a corrupt politician.

It should also be noted that the model and results have implications beyond federal systems of government. Both international organizations and private donors often give funds to poor countries around the world and some of these countries are ruled by corrupt politicians. Thus the work adds to a broader literature and can be potentially helpful in understanding the effect of donations on corruption.
References


