Corruption, Accountability, and Decentralization:
Theory and Evidence from Mexico

Timothy J. Goodspeed[*]
Hunter College and Graduate Center - CUNY
timothy.goodspeed@hunter.cuny.edu

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Abstract: One of the fundamental tenets of fiscal federalism is that, absent various sorts of externalities, decentralized governments that rely on own-source revenues should be more fiscally efficient than decentralized governments that rely on grant financing. The argument relies in part on the idea that sub-national governments, being closer to the people, are more accountable to its citizens. Accountability to citizens is also important in understanding the presence of corruption in government. This suggests that the financial structure and institutions of decentralized governments can potentially influence the degree and extent of corrupt activity. Financial structures that make governments more accountable should be associated with less corruption (other things equal), while financial structures with less accountability should be associated with more corrupt activities. We develop a simple model in which the use of grants rather than locally raised taxes increases corruption. We then use a panel data set of Mexican states to study the relationship between funding sources for Mexican states and the level of corruption in those states. We find that greater use of own tax revenues lowers corruption while greater use of grants increases corruption. This suggests that expenditure decentralization that is accompanied by revenue decentralization is likely to discourage corruption while expenditure decentralization that is funded by grants tends to encourage corruption. We also find that poverty, a measure of uninformed citizens, leads to greater corruption.

Mailing Address: Hunter College, Department of Economics, 695 Park Avenue, NY, NY, 10021 USA

1. Introduction

One of the fundamental tenets of fiscal federalism is that, absent various sorts of externalities, decentralized governments that rely on own-source revenues should be more fiscally efficient than decentralized governments that rely on grant financing.[1] This can happen for a number of reasons. First, better information by sub-national voters may allow these voters to better monitor decisions by sub-national politicians. The argument is often not formalized,[2] but relies on the idea that sub-national governments, being closer to the people, are more accountable to its citizens.

Second, even when central governments have perfect information, Goodspeed (2002) shows that important incentive problems can arise when expenditure decentralization is not accompanied by revenue autonomy. Political forces lead the central government to create a soft budget constraint by increasing grants when sub-national governments borrow in his model. This leads to irresponsible behavior on the part of regional governments who borrow too much. A number of case studies in Rodden, Eskeland, and Litvack (2003) suggest that this is an important element in practice.

Accountability to citizens is also important in understanding the presence of corruption in government. This suggests that the financial structure and institutions of decentralized governments can potentially influence the degree and extent of corrupt activity. Financial structures that make governments more accountable should be associated with less corruption

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[1] Grants of course also have their place in sub-national finance. There is a large literature that develops the reasons for and efficiency of grant finance. Sub-national governments may provide goods that have external benefits or use taxes that have external costs. Grants that equalize tax bases between jurisdictions can also be justified on efficiency grounds. See for instance Oates (1972) and Boadway and Flatters (1982).
[2] See Seabright (1996) for an exception.

(other things equal), while financial structures with less accountability should be associated with more corrupt activities.

The relationship between decentralization and corruption is particularly important in developing countries, where corruption is a known problem. Yet the relationship between decentralized government and corruption remains murky even though the potential advantages of decentralization are well known (for example, better tailoring of public expenditures to diverse preferences as discussed in Oates, 1972). The literature to date is divided on the relationship between decentralization and corruption from both a theoretical and empirical perspective.

On the theoretical side, Schleifer and Vishny (1993) point out that centralized corruption has certain advantages with respect to economic efficiency because a central government official is able to internalize externalities. Decentralized corruption, on the other hand, may lead to greater overall corruption as decentralized authorities do no internalize the external costs of corruption.

In a similar argument, Mancur Olson and Martin McGuire (1996) also suggest that centralized corruption has certain advantages for the economy as a whole. They argue that a centralized thief will have an incentive to limit his theft relative to a "roving bandit". The roving bandit has an incentive to set up a monopoly, limit his theft and "make himself a public-good-providing king." Other arguments that suggest decentralization will lead to greater corruption have also been put forward. For instance, some argue that decentralized governments may attract less qualified bureaucrats (Tanzi, 1996, and Prud'homme, 1995).

In contrast to the above arguments suggesting that corruption is likely to be greater at decentralized levels of government, the primary argument for lower corruption at decentralized

levels is the ability of decentralized governments to be more accountable to its citizens. The most formal development of this argument is Seabright (1996).

Bardhan and Mookherjee (2000) and also in a series of other papers suggest 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. They are thus not very sanguine about the consequences of decentralization, at least in certain circumstances – under decentralization the poor may be both more likely to be subject to bribes and less likely to obtain the public goods that they want. 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. In addition, an interesting implication is that the level of corruption is likely to vary across regions depending in the degree to which voters are informed.

A further issue that influences both accountability and corruption in decentralized governments is the question of a soft budget constraint. This occurs when decentralized governments are financed by grants and the central government is unable to commit to not increase grants in the face of sub-national profligacy, as suggested in Wildasin (1997), Inman (2003) and Goodspeed (2002). For instance, Goodspeed shows that a politically aware central government will find it difficult to resist increasing grants when the political gains of doing so outweigh the political costs. The central government may thus find itself politically trapped.

Regional governments that predict this will have incentives to overspend for two reasons: (i) a common property problem in financing additional grants, and (ii) a direct reduction in the opportunity cost of spending.

The soft budget constraint literature is instructive because it shows that it is not just centralization or decentralization per se that matters. It is the institutions of federalism, and in this case the structure of the financing of sub-national governments that matter greatly. Viewed in this way, the soft budget constraint becomes another way in which accountability can be lost under decentralization when sub-national governments are financed by grants. A number of case studies in Rodden, Eskeland, and Litvack (2003) suggest that this is an important element in practice.

On the empirical side, some papers use fiscal measures of decentralization, such as the ratio of decentralized expenditures to total government expenditures across countries. These papers, such as the careful study of Fisman and Gatti (2001), generally find that countries with a greater fiscal measure of decentralization are associated with less corruption. (See also Huther and Shah, 1999.) Other authors, such as Triesman (2000), use a binary variable of whether a country is federal or not – defined mainly in political terms – and find a positive association with corruption. More recently, Fan, Lin, and Treisman (2009), again using cross-country data, find that countries with a greater number of government tiers or a greater number of public employees are associated with more corruption, although countries with governments that constitute a larger share of GDP are associated with less corruption.

These empirical studies suffer from certain deficiencies. First, almost all are studies to date are cross-sectional country studies. It is difficult to control for all the factors other than

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decentralization that affect corruption across countries. The danger is that such studies may attribute to decentralization a causal effect when it is really a third factor that is correlated with decentralization that is the true causal effect. Secondly, these studies do not study how the funding source for decentralized governments may influence corruption.

Bardhan (2006) surveys some within-country studies of particular aspects of accountability that add evidence to the debate. I will not survey these studies here, but suffice it to say that none deals directly with the issue of the method of finance of sub-national governments. They do however shed light on accountability and decentralized public service delivery, literacy rates, political competition, monitoring, media access, and unfunded mandates.

This paper develops a simple model of the connection between sub-national funding sources and corruption, and tests the implications of the model using data on sub-national states in Mexico. The model relies on information asymmetries between different levels of government. The main implications are that greater use of own-taxes reduces sub-national corruption, greater use of grants increases sub-national corruption, and more uniformed voters increases corruption.

The study takes advantage of data from a project of the Mexican government to develop a National Index of Corruption and Good Governance. This index is available for 2001, 2003, 2005, and 2007. Thus, a panel data set is constructed for Mexican sub-national states over these years.

The paper is most closely related to the cross-country analysis in Fisman and Gatti (2001). However, Fisman and Gatti's measure of decentralization is a simple ratio of decentralized expenditures to total government expenditures. While this is a common measure,

as noted above it has been argued that the fiscal set up of a federal system may affect the relationship between corruption and decentralization, however. We therefore examine whether the source of funding for Mexican states is related to corruption.

The main findings are that greater use of own tax revenues lowers corruption while greater use of grants increases corruption. This suggests that expenditure decentralization that is accompanied by revenue decentralization is likely to discourage corruption while expenditure decentralization that is funded by grants tends to encourage corruption. We also find that sub-national poverty, a measure of the uninformed citizens of a region, leads to greater corruption as suggested by the model.

2. A Model of Corruption and the Structure of Sub-national Government Finance

To understand the relationship between corruption and the structure of sub-national government finance, we begin with the simplest type of moral hazard model that builds on the work of Barro (1973) and Ferejohn (1986) in which all politicians are assumed to be corrupt. This simplifies the problem as there is therefore no selection problem of good and bad politicians. Politicians are however constrained in their corruption activities by the possibility of re-election. The model can be extended to include both adverse selection and moral hazard, along the lines of Besley (2006), Besley and Smart (2007), and Hindriks and Lockwood (2009) but the simpler model suffices for our purposes here.

There are two periods, and in each period the cost of the public good, θ, is either high, H, with probability q or low, L, with probability $(1 - q)$. θ is independently and identically distributed in each period. Knowledge about θ varies for the economic actors in the model, however, as in Bardhan and Mookherjee (2000). We consider three types of economic actors -

regional governments, regional voters, and the central government. The regional government's corrupt politicians know θ perfectly. The central government cannot observe the true cost of the regional public good. To make the contrast between the central government and regional governments as stark as possible, we assume that regional voters know the true cost of the public good.[3] Corruption comes about in the model by corrupt regional politicians diverting tax revenue for their own use. The difficulty is that when regional spending is high, the central government does not know whether this is because of truly high costs, or whether a region that experiences low costs is pretending to be a high-cost region with corrupt politicians taking the excess revenues.

We are interested in exploring the implications of sub-national tax versus grant finance when corruption of this sort (diversion of public funds for private use by regional politicians) is possible. The interesting result is that it turns out that the structure of sub-national finance influences the level of corruption. This happens because of the differences in information at the different levels of government.

We consider as our objective function the maximization of expected utility. Utility is assumed to be a function of private consumption in periods 1 and 2, $C_{\theta 1}$ and $C_{\theta 2}$, and public consumption in periods 1 and 2, $G_{\theta 1}$ and $G_{\theta 2}$. The regional government budget constraints in periods 1 and 2 are:

$$\theta_1 G_{\theta 1} + s_{\theta 1} = g_{\theta 1} + t_{\theta 1} Y_1 + b_{G\theta}$$
$$\theta_2 G_{\theta 2} + s_{\theta 2} = g_{\theta 2} + t_{\theta 2} Y_2 - b_{G\theta}(1+r)$$

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[3] Results become more complicated, but the basic message is the same if regional voters are less informed than the regional politicians, but more informed than the central government.

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for θ = L, H where s denotes the excess revenues taken by politicians, G_θ is true public spending (G_H for a high cost region and G_L for a low cost region), g is grants, t is the tax rate and Y is the tax base (income for instance). The budget constraint also allows for public borrowing, b_θ in period 1 which must be paid back in period 2. Grants are assumed to be financed by the central government; to simplify we assume this is a lump sum tax, equal across regions. The central government budget constraints in periods 1 and 2 are:

$$t_1^c N = \sum_i (g_{1Hi} + g_{1Li})$$
$$t_2^c N = \sum_i (g_{2Hi} + g_{2Li})$$

where the sum is over regions. Since regional public consumption is financed by regional taxes, private budget constraints in periods 1 and 2 are:

$$C_{\theta 1} = Y(1 - t_{\theta 1}) - t_1^c + b_C$$
$$C_{\theta 2} = Y(1 - t_{\theta 2}) - t_2^c - b_C(1 + r)$$

for θ = L, H, where we also allow for private borrowing.

In addition to the constraints on public and private consumption, there are two additional constraints. First, we want to rule out the case where the politician simply takes all tax revenues and does not stand for re-election. We therefore need to impose a participation constraint that requires that the politician is at least as well off standing for re-election as not. This constraint is easiest to develop by realizing that in period 2 all politicians will abscond with maximum tax revenues, T. This implies that to get the politician to run for re-election, we will have to allow the diversion of public funds in period 1 for a high cost region to be greater than or equal to maximum period 1 revenues less the discounted present value of maximum period 2 revenues: s_H

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$\geq (1-\beta)T$. Since grants constitutes another revenue source and borrowing is also possible, we need to add to this period 1 grants, the maximum period 1 borrowing, and the discounted present value of borrowing that must be paid back in period 2. We also need to subtract the discounted present value of period 2 grants. To simplify, we assume that period 1 and period 2 grants are the same:

$$(PC_H) \quad s_{1H} = t_{1H}Y + b_{GH} + g_{1H} - HG_{1H} \geq (1-\beta)T + (1-\beta)g_{GH} + \bar{b}_G + \beta b_{G\theta}(1+r)$$

The central government suffers from imperfect information about the cost of the regional public good. Thus, for the central government, we also want to insure that a low cost region prefers to truthfully implement the low cost spending and tax levels rather than implement the high cost spending and tax levels and pocket the cost difference. This defines the incentive compatibility constraint:

$$(IC_L) \quad s_{1L} \geq t_{1H}Y + b_{GH} + g_{1H} - LG_{1H} = s_{1H} + (H-L)G_{1H}$$

Note that the incentive compatibility constraint is irrelevant for regional voters since they have perfect information concerning costs.

Solving the problem by backwards induction, regional politicians will take the money and run in period 2 as there is no re-election possibility. Thus, the behavior of politicians in period 2 cannot be influenced, and the interesting part of the problem therefore deals with the optimal period 1 policies.

We consider separately the problems faced by regional voters, who will vote on regional taxes and borrowing, and the central government, which will decide on grant levels. Consider first the problem of regional voters. Optimal period 1 regional policies can be derived by

maximizing the decisive voter's expected utility subject to the above constraints on public and

private spending, and the participation constraint. The decisive regional voter's problem is thus:

$$\underset{b_{iG\theta},t_{i1\theta}}{Max}\ q[u(G_{i1H})+v(G_{i2H})+w(C_{i1H})+z(C_{i2H})]+(1-q)[u(G_{i1L})+v(G_{i2L})+w(C_{i1L})+z(C_{i2L})]$$

$$s.t.\quad C_{i1\theta}=Y(1-t_{i1\theta})-t_1^c+b_{iC},\quad \theta=L,H$$

$$t_{i1\theta}Y=\theta G_{i1\theta}+s_{i1\theta}-b_{iG\theta}-g_{i1\theta},\quad \theta=L,H$$

$$C_{i2\theta}=Y(1-t_{i2\theta})-t_2^c-b_{iC}(1+r),\quad \theta=L,H$$

$$t_{i2\theta}Y=\theta G_{i2\theta}+s_{i2\theta}+b_{iG\theta}(1+r)-g_{i2\theta},\quad \theta=L,H$$

$$t_1^c N=\sum_i(g_{i1H}+g_{i1L})$$

$$t_2^c N=\sum_i(g_{i2H}+g_{i2L})$$

$$(PC_H)\quad s_{1H}=t_{1H}Y+b_{GH}+g_{1H}-HG_{1H}\geq(1-\beta)T+(1-\beta)g_{GH}+\overline{b}_G+\beta b_{G\theta}(1+r)$$

The first order conditions for t_{i1L}, t_{i1H}, b_{iGH}, and b_{iGL} are:

$$(1-q)[\frac{\partial u_i}{\partial G_{i1L}}\frac{Y}{L}-Y\frac{\partial w_i}{\partial C_{i1L}}]=0$$

$$q[\frac{\partial u_i}{\partial G_{i1H}}\frac{Y}{H}-Y\frac{\partial w_i}{\partial C_{i1H}}]=0$$

$$q[\frac{\partial u_i}{\partial G_{i1H}}\frac{1}{H}-\frac{\partial u_i}{\partial G_{i2H}}\frac{(1+r)}{H}]=0$$

$$(1-q)[\frac{\partial u_i}{\partial G_{i1L}}\frac{1}{L}-\frac{\partial u_i}{\partial G_{i2L}}\frac{(1+r)}{L}]=0$$

Re-writing the first order conditions yields:

$$\frac{\partial u_i/\partial G_{i1L}}{\partial w_i/\partial C_{i1L}}=L$$

$$\frac{\partial u_i/\partial G_{i1H}}{\partial w_i/\partial C_{i1H}}=H$$

$$\frac{\partial u_i/\partial G_{i1H}}{\partial u_i/\partial G_{i2H}}=\frac{\partial u_i/\partial G_{i1L}}{\partial u_i/\partial G_{i2L}}=(1+r)$$

Regional politicians set the marginal benefit of public spending equal to the true marginal cost, and hence follow efficient spending patterns on the margin in period 1. The participation constraint allows them a certain amount of rents to insure that they will not take all public funds in period 1, but does not change their marginal incentives. Hence, corrupt politicians that face knowledgeable voters set marginal benefit equal to marginal cost in period 1 in order to be re-elected in period 2. Such politicians also use borrowing efficiently on the margin, equating marginal benefit and marginal cost. This is because we have assumed no information problems of regional voters, and we have not included any soft budget constraint problems (such as modeled in Goodspeed, 2002, when there is perfect information) in which regional governments correctly predict that the central government will increase second period grants in response to first period regional borrowing. Such an analysis would be in interesting extension of the current model, however.

Next consider the central government's problem. The central government would like to optimally distribute grants to regional governments. However, the central government suffers from an information problem: it does not observe the true cost of the regional public good, θ. Hence, when it observes a high cost regional government, it does not know whether that government is really low cost with corrupt politicians taking the difference between high and low cost spending, or is truly a high cost region. Thus, for the central government, we want to impose an additional incentive compatibility constraint to insure that a low cost region prefers to truthfully implement the low cost spending and tax levels.

The central government's optimal selection of grants can be derived by maximizing the sum of expected utility over regions subject to the above constraints on public and private spending, the participation constraint, and the incentive compatibility constraint:

$$Max_{g_{i1\theta}} \sum_i q[u(G_{i1H}) + v(G_{i2H}) + w(C_{i1H}) + z(C_{i2H})] + (1-q)[u(G_{i1L}) + v(G_{i2L}) + w(C_{i1L}) + z(C_{i2L})]$$

$$s.t. \quad C_{i1\theta} = Y(1-t_{i1\theta}) - t_1^c + b_{iC}, \quad \theta = L, H$$

$$t_{i1\theta}Y = \theta G_{i1\theta} + s_{i1\theta} - b_{iG\theta} - g_{i1\theta}, \quad \theta = L, H$$

$$C_{i2\theta} = Y(1-t_{i2\theta}) - t_2^c - b_{iC}(1+r), \quad \theta = L, H$$

$$t_{i2\theta}Y = \theta G_{i2\theta} + s_{i2\theta} + b_{iG\theta}(1+r) - g_{i2\theta}, \quad \theta = L, H$$

$$t_1^c N = \sum_i (g_{i1H} + g_{i1L})$$

$$t_2^c N = \sum_i (g_{i2H} + g_{i2L})$$

$$(PC_H) \quad s_{i1H} \geq (1-\beta)T + \bar{b}_G + (1-\beta)g_{i\theta} + \beta b_{iG\theta}(1+r)$$

$$(IC_L) \quad s_{i1L} \geq t_{i1H}Y + b_{iGH} + g_{i1H} - LG_{i1H} = s_{i1H} + (H-L)G_{i1H}$$

The first order conditions for g$_{i1H}$ and g$_{i1L}$ are:

$$q[\frac{\partial u_i}{\partial G_{i1H}} \frac{1}{H} - \sum_i \frac{\partial w_i}{\partial C_{i1H}} \frac{1}{N}] + (1-q)[\frac{\partial u_i}{\partial G_{i1L}} \frac{\partial G_{i1L}}{\partial s_{i1L}} \frac{\partial s_{i1L}}{\partial g_{i1H}}] = 0$$

$$(1-q)[\frac{\partial u_i}{\partial G_{i1L}} \frac{1}{L} - \sum_i \frac{\partial w_i}{\partial C_{i1L}} \frac{1}{N}] = 0$$

Re-writing the first order conditions yields:

$$\frac{\partial u_i / \partial G_{i1H}}{\partial w_i / \partial C_{i1H}} = H + \frac{(1-q)}{q} \frac{\partial u_i / \partial G_{i1L}}{\partial w_i / \partial C_{i1H}} \frac{H}{L}(1 + \frac{H-L}{H})$$

$$\frac{\partial u_i / \partial G_{i1L}}{\partial w_i / \partial C_{i1L}} = L$$

With respect to low cost regions, the optimal central government grant policy mimics the optimal tax policy of regional voters: grants should be used to set marginal benefit of public spending in period 1 equal to the marginal cost.

The result with respect to high cost regions requires some explanation. For high cost 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 costs. This implies that grants and hence public spending are optimally lower than the first-best for high cost regions. It is also evident that the larger the difference between the high- and low-cost cases, the lower should be grants and spending for high-cost regions. In addition, the greater is the probability of low-costs relative to high costs, the lower should be grants and spending for high cost regions.

It is also important to note that corruption is higher in the case in which regional spending is financed by grants. This is clear from the incentive compatibility constraint. A low cost region that pretends to be a high cost region will obtain additional rents (relative to the a truly high cost region) of $(H-L)G_{1H}$. The intuition of the first order condition is that the central government can limit the damage by reducing G_{1H} relative to the first-best. Although there are losses because the high cost region has to suffer lower than first-best spending, the gain is that corruption is limited and low-cost regions can maintain their relatively high spending levels.

Bringing together the results yields the following testable hypotheses.

Proposition 1: The more regional governments rely on own-taxes, the lower is regional corruption.

Proposition 2: The more regional governments rely on grants, the higher is regional corruption.

Proposition 3: The less informed are regional voters, the greater is regional corruption.

3. Decentralized Finance in Mexico

Mexico is a country with 32 state governments and over 2000 municipalities. Government expenditures such as health and education are decentralized, making Mexico about average with respect to expenditure decentralization in the OECD. (OECD 2003).

Mexico has a relatively high level of corruption among OECD countries. As shown in Table 1, Mexico has the unfortunate distinction of ranking last among OECD countries in Transparency International's Corruption Perception Index. Moreover, there is substantial variation across Mexican states. For the measure that we use in this study (the INBCG, described further below), the least corrupt state in 2007 was Colimas at 3.1 and the most corrupt was the State of Mexico at 18.8. (The index range is 0 to 100.)

The funding of expenditures is not very decentralized in Mexico. Mexican state governments finance their expenditures mainly through grants from the central government. Approximately 90 percent of funding is through grants while only about 10 percent comes from local sources; this makes Mexico highly centralized among OECD countries with respect to revenue decentralization. (OECD, 2003)

Hence, Mexican states rely primarily on grants from the federal government. These grants are generally of two sorts, a large unconditional grant (termed Ramo 28) and a set of conditional grants (termed Ramo 33). The unconditional grant comprises about 38 percent of revenues and the conditional grants about 47 percent.

The unconditional grant is primarily composed of the General Participation Fund (and hence is sometimes called *participaciones*). The conditional grants (termed *aportaciones*) consist primarily of grants for education (FAEB) and health (FASSA). The education grants

constitute about two-thirds of unconditional grants and health grants about 12 percent. (OECD 2003).

The conditional grants of Ramo 33 are not designed with any formula; the criteria seem to be somewhat arbitrary and mainly related to the amount spent previously in the given category. (OECD 2003) Moreover, the conditional grants are comprised of many different grants with no obvious coordination. These problems with the conditional grants suggest that they may be ripe for manipulation and corruption.

The unconditional Ramo 28 transfers have a formula, although the formula has been criticized for lacking much of a rationale. For instance, the General Participation Fund seems to give wealthier states more unconditional grants per-capita than poorer ones. This runs counter to the usual idea that unconditional grants should equalize resources as in Canada for instance. The reason for this is historical: the General Participation Fund allowed the federal government to convince the states to voluntarily give up their own tax systems in exchange for central government transfers. As a practical matter, states received about what they had previously collected. A formula is used for the distribution of this fund to the states which involves a weight of about 45 percent on historic quantities of tax collections, a weight of about 45 percent on a state's population and a weight of about 10 percent on an equalizing component.

4. Data and econometric model

The data for the study are taken from a few Mexican sources. The main objective is to determine how decentralization of different varieties impacts corruption. Corruption is difficult to measure, but fortunately the Mexican government and Transparencia Mexicana have been involved in the past decade in a project to develop a National Index of Corruption and Good

Governance (INBCG). This index is now available for 2001, 2003, 2005, and 2007. Thus a panel data set can be constructed for these years.

The INBCG is designed to measure corruption in government. It is constructed using a survey of households. In 2007, 14,836 households were surveyed, with between 237 and 501 questionnaires per state. The survey asks whether a household has had to make an under the table payment in obtaining a public service for 35 public services (the same as in the 2005 survey). The index measures the percent of times a bribe has had to be made to obtain a public service, and so its range is 0 to 100.

Based on the survey, it is estimated that 198 million acts of corruption occurred in obtaining public services in 2007, with total payments of 27 billion pesos. The average payment was thus 137 pesos or about 8 percent of the income of Mexican households.

As mentioned above, one important variable in theory is the degree to which the population is informed. Uninformed populations are less aware of political maneuvering and thus less able to distinguish whether a high-cost government actually has low costs and is taking the difference in costs as rent. We use a measure of poverty to proxy for the uninformed population. A poverty index which gives the percent of the population in food poverty is available for Mexican States from CONEVAL, the National Council of Evaluation of Social Development Policy. Unfortunately this data is available at the state level only for the years 2000 and 2005. For the intervening years, we interpolate to get the data points for 2001 and 2003 to match to the INBCG index.

The main policy variables that we are interested in are the financial statistics of the Mexican states. Hence another important set of data are the budgets of the Mexican states. This

data was obtained from the National Statistics Institute of Mexico (INEGI), and includes the sources of revenue of each Mexican state. For each state, we calculated per-capita own-tax revenues, unconditional grant revenues, conditional grant revenues, and total grant revenues from these statistics for 2001, 2003, 2005, and 2007. Nominal values were converted to real 2005 pesos using the Mexican Consumer Price Index.

Previous cross-national studies such as Fisman and Gatti (2001) use the ratio of sub-national government expenditures to total government expenditures as a measure of decentralization. While this is a reasonable measure that has been used extensively in the literature, it is a rather blunt measure. In particular, it takes no account of how those expenditures are financed. Moreover, as mentioned above, while Mexico is an average OECD country in terms of expenditure decentralization, it is one of the most centralized OECD countries when it comes to the source of funding. Our measure thus improves on previous decentralization measures and seems particularly important for the case of Mexico.

Among our controls are the following. We include a measure of government size because larger governments could be more susceptible to corruption both because such governments may be less transparent and because citizens may be more tempted to use bribes to cut through queues or red tape. We measure government size as total state government expenditures. We also include a measure of the size of the state's economy, real GDP per capita, and its population to capture the effect of size in the private sector. Since foreign investment may be more subject to bribes, we include as a control foreign investment in a state. We also include density since large cities may result in greater corruption than rural areas.

Since as suggested above, greater reliance on grant funding can make sub-national governments less accountable to its citizens and increase the possibilities for corruption, we will use various measures of grant and own-tax financing as our measure of decentralization. We begin by using own-tax revenue per capita. The expectation is that the more own-tax revenue a state has, the more accountable it is, and hence the lower is corruption. We then add measures of grant financing. We use an aggregate measure of grant financing, conditional (aportaciones) plus unconditional (participaciones) grants per capita and we also disaggregate this measure, looking at conditional and unconditional grants per capita separately. Our basic econometric specification is thus:

$$Corruption_{it} = \alpha_0 + \alpha_1 GDP_{it} + \alpha_2 Pop_{it} + \alpha_3 Govsize_{it} + \alpha_4 FInvest_{it}$$
$$+ \alpha_5 Poverty_{it} + \alpha_6 Own\text{-}Source_{it} + \alpha_7 Cond\_Grant_{it} + \alpha_8 Uncond\_Grant_{it} + u_{it}$$

where GDP_{it} is state real GDP per capita, Pop_{it} is population, $Govsize_{it}$ is measured as total revenue, $FInvest_{it}$ is foreign investment, $Poverty_{it}$ is the poverty index, $Own\text{-}Source_{it}$ is own-source revenues per capita, $Cond\_Grant_{it}$ conditional grants per-capita, and $Uncond\_Grant_{it}$ is unconditional grants per-capita. Pesos are converted to real 2005 values using the Mexican Consumer Price Index. All the results we present will include fixed state effects.

5. A First Look at the Data

Before turning to the regression results, it is useful to first examine the raw relationship between the variables of interest more informally. Table 2 shows the average values across the states for each year of per-capita own-tax revenues, unconditional, conditional, and total grant revenues, the poverty index, and corruption. As indicated, the average level of corruption fell from 2001 to 2003, and then rose again in 2005. The poverty measure follows a similar pattern

(its value being unavailable for 2007). The financial variables all rose over time on average in real terms. The greatest percentage increase over time was in own-tax revenues, followed by conditional and then unconditional grants. However, some states experienced larger increases in per-capita own-tax revenues than others. What we want to know is whether the states that experienced larger than average increases in own-tax revenues performed better on the corruption survey than those states that experienced smaller than average increases in own-tax revenue. We also want to know the same for the other policy variables. Did states that experienced larger increases in poverty do worse on the corruption survey than states that experienced smaller increases in poverty? Did states that experienced larger increases in conditional grants do worse on the corruption survey than states that experienced smaller increases in poverty? Did states that experienced larger increases in unconditional grants do worse on the corruption survey than states that experienced smaller increases in poverty?

Tables 3 and 4 illustrate the main results. For each of four main variables (poverty, per-capita own-tax revenues, per-capita conditional grants, and per-capita unconditional grants) plus the corruption index, we took the difference between the 2005 value of the variable and the 2001 value. (2005 is used rather than 2007 because the poverty index is not available in 2007.) We then computed the average change across states of each of the four main policy variables. We then divided the Mexican states into those that were above the average change and those that were below. Again this was done for each of the four main variables. We then computed the average change in the corruption index over the period for the two categories (above the average and below the average) for each of the four policy variables. Tables 3 and 4 plot the results in bar charts.

Table 3 plots the results for poverty and own-tax revenues. The first bar chart is that for the fall in poverty between 2001 and 2005. The first bar in this chart shows the average change in corruption for states in which poverty fell by more than the average. The second bar in this chart shows the change in corruption for states in which poverty fell by less than the average. As is evident from the chart, states where poverty fell the most experienced a smaller increase in corruption. States where poverty fell the least (or increased) experienced a greater increase in corruption. Thus, lower poverty is associated with relatively lower corruption.

The second bar chart in Table 3 is that for the increase in own-tax revenue between 2001 and 2005. The first bar in this chart shows the average change in corruption for states in which own-tax revenue rose by more than the average. The second bar in this chart shows the change in corruption for states in which own-tax revenue rose by less than the average. As is evident from the chart, states where own tax revenue rose the most experienced a smaller increase in corruption. States where own-tax revenue rose the least experienced a greater increase in corruption. Thus, higher own-tax revenue is associated with lower corruption.

Table 4 plots the results for unconditional and conditional grants per-capita. The first bar chart is that for the increase in unconditional grants between 2001 and 2005. The first bar in this chart shows the average change in corruption for states in which unconditional grants rose by more than the average. The second bar in this chart shows the change in corruption for states in which unconditional grants rose by less than the average. As is evident from the chart, states where unconditional grants rose the most experienced a greater increase in corruption. States where unconditional grants rose the least experienced a smaller increase in corruption. Thus, higher unconditional grants are associated with higher corruption.

The second bar chart in Table 4 is that for the increase in conditional grants per-capita between 2001 and 2005. The first bar in this chart shows the average change in corruption for states in which conditional grants rose by more than the average. The second bar in this chart shows the change in corruption for states in which conditional grants rose by less than the average. As is evident from the chart, states where conditional grants rose the most experienced a greater increase in corruption. States where conditional grants rose the least experienced a smaller increase in corruption. Thus, higher conditional grants are associated with higher corruption.

6. Regression results

The regression results are presented in Table 5. All regressions in Table 5 include fixed state effects. The first column presents just the control variables, including poverty as a measure of the uniformed citizenry. While these generally have the expected signs, only foreign investment and poverty are significant. Greater poverty is associated with greater corruption, which is consistent with the interpretation that poverty reflects a less informed citizenry and hence more scope for corruption. Higher foreign investment is found to lead to higher corruption, perhaps because as investment of any sort occurs only with bribes and foreigners are easy targets or perhaps perceive corruption more intensely. The other variables are insignificant, but most have sensible signs. Higher density and higher populations increase corruption. Larger governments also are associated with higher corruption, though insignificantly. The negative sign of real GDP per capita is somewhat unexpected, though it is insignificant and becomes positive in the other columns.

The second column adds own tax revenue per capita. This has a significant negative sign, consistent with the hypothesis that greater own tax revenue leads to greater accountability

and less corruption. The other variables are unaffected except that the poverty measure becomes insignificant.

The third, fourth, and fifth columns add grant measures to the specification. The third column adds unconditional grants (Ramo 28, *participaciones*). This variable is positive and significant while the own tax revenue variable remains negative and significant. This suggests that grants lead to less accountability and more corruption, while own taxes have the opposite effect. Government size becomes negative but insignificant while the other variables are unchanged in sign and significance.

The fourth column adds conditional grants (Ramo 33, *aportaciones*) instead of unconditional grants. This grant variable is also positive and significant while the own tax variable again remains negative and significant. This again supports the hypothesis that grants lead to less accountability and more corruption while own taxes lead to more accountability and less corruption. Population maintains its positive sign and becomes significant suggesting that larger states tend to encourage corruption. The government size variable, which is negative, becomes significant in column four. This is intriguing and suggests that larger governments that are more accountable may actually decrease corruption.

The fifth column uses total grants – conditional plus unconditional. The coefficient on this measure of grants is also positive and significant while own tax revenue remains negative and significant. The poverty measure maintains its positive sign and again becomes significant (as in column one), suggesting a less informed public increases corruption. Population maintains its positive and significant sign while density is positive, though its significance lies just below 90 percent. Foreign investment maintains its positive and significant sign.

6. Conclusion

Corruption and the accountability of politicians to the citizenry is an important issue, especially in developing countries. A decentralized form of government can potentially influence accountability but whether it increases or decreases accountability has been debated. A main argument in the early development of fiscal federalism was that decentralization brings decisions closer to the people and leads to greater accountability. This is also the implication of arguments that suggest that competition between subnational governments constrains bad politicians. On the other hand, some have argued that capture by special interests may be greater at the local level and subnational bureaucrats may be less well trained. These arguments suggest that decentralization may lead to less accountability.

A more nuanced argument is that the type of decentralization matters. In particular, the fiscal set up of a federal system of government, possibly also including the political system, is important for understanding the advantages and disadvantages of decentralized government. For instance, some authors such as Rodden, Eskeland, and Litvack (2003) and Goodspeed, (2002), have stressed the important incentive differences that exist when expenditure decentralization is not accompanied by revenue decentralization. This suggests that the relationship between corruption and decentralization may be affected by the type of decentralization. It suggests, for instance, that accountability is lower when expenditure but not revenue is decentralized, leading to more corruption in this type of decentralized setting.

This paper examines data on corruption and the structure of government in Mexican States from 2001 to 2007 to analyze whether and how the structure of decentralized government promotes or inhibits good governance. The study takes advantage of data from a project of the

Mexican government to develop a National Index of Corruption and Good Governance. This index is available for 2001, 2003, 2005, and 2007.

Our evidence supports the idea that better informed citizens and more reliance on own source revenue reduces corruption. We find that poverty, which we interpret as measuring uninformed citizens, leads to greater corruption as suggested by political agency models. We also find that greater use of own tax revenues lowers corruption while greater use of grants increases corruption. This suggests that expenditure decentralization that is accompanied by revenue decentralization is likely to discourage corruption while expenditure decentralization that is funded by grants tends to encourage corruption.

Table 1: Transparency International Corruption Perception Index for OECD Countries, 2010

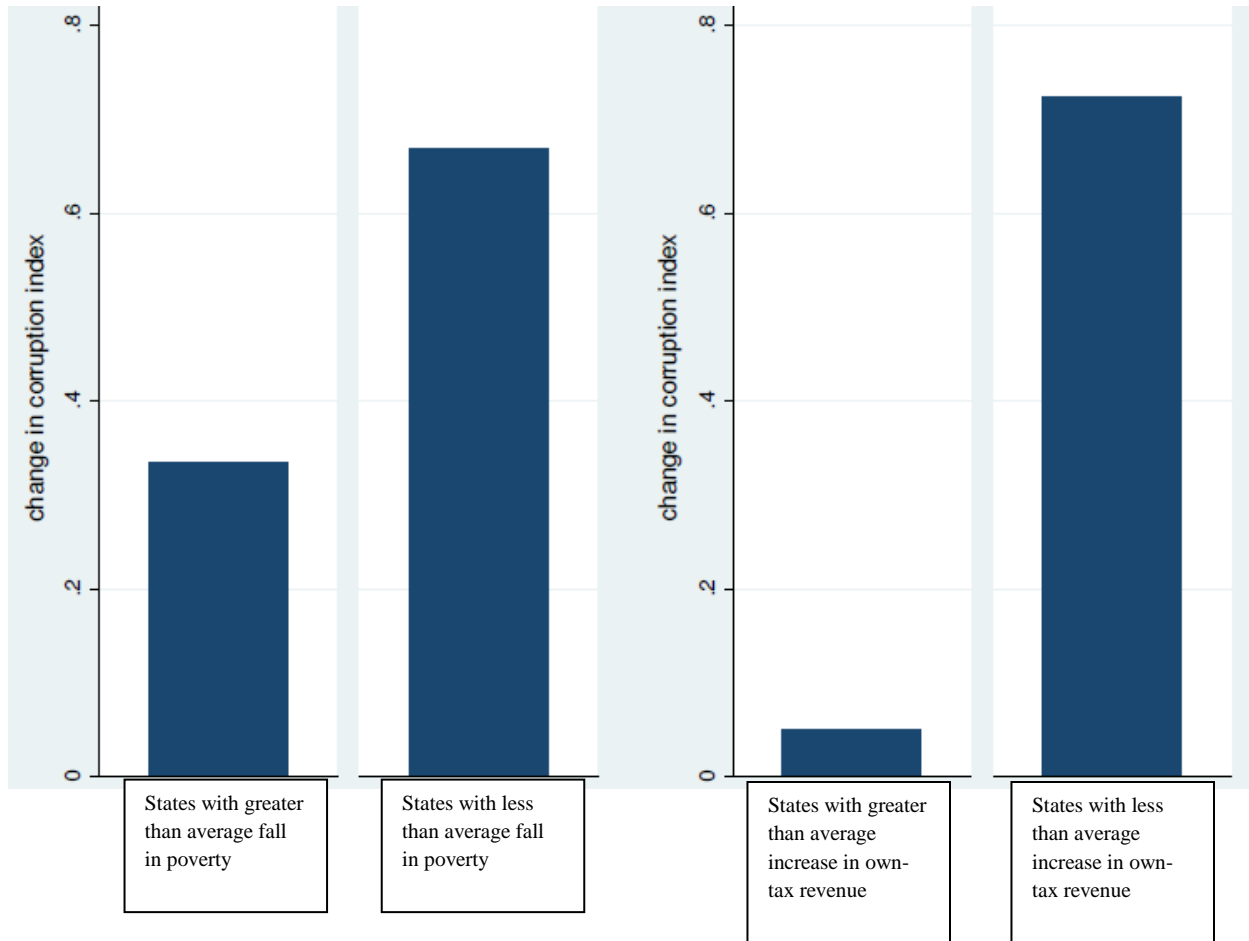| TI rank	Country	TI Corruption Perception Index, 2010
1	Denmark	9.3
1	New Zealand	9.3
4	Finland	9.2
4	Sweden	9.2
6	Canada	8.9
7	Netherlands	8.8
8	Australia	8.7
8	Switzerland	8.7
10	Norway	8.6
11	Iceland	8.5
11	Luxembourg	8.5
13	Hong Kong	8.4
14	Ireland	8.0
15	Austria	7.9
15	Germany	7.9
17	Japan	7.8
20	United Kingdom	7.6
21	Chile	7.2
22	Belgium	7.1
22	United States	7.1
25	France	6.8
26	Estonia	6.5
27	Slovenia	6.4
30	Spain	6.1
32	Portugal	6.0
39	Korea (South)	5.4
41	Poland	5.3
53	Czech Republic	4.6
56	Turkey	4.4
59	Slovakia	4.3
67	Italy	3.9
78	Greece	3.5
98	Mexico	3.1

Source: Transparency International
http://www.transparency.org/policy_research/surveys_indices/cpi/2010/in_detail

Table 2
Grants, Taxes, and Corruption in Sub-National States in Mexico: 2001-2007
(Per-capita averages, real 2005 pesos)

Year	Average INBCG Corruption Index	Average Poverty Level	Average Own-Tax Revenue Per-Capita	Average Unconditional Grants Per-Capita	Average Conditional Grants per-Capita	Average Total Grants Per-Capita
2001	7.47	21	145	2510	3528	6038
2003	6.86	18	161	2634	3890	6524
2005	7.98	23	200	2854	4354	7209
2007	7.82	-	262	3062	4864	7926

Source: Author's Calculations.
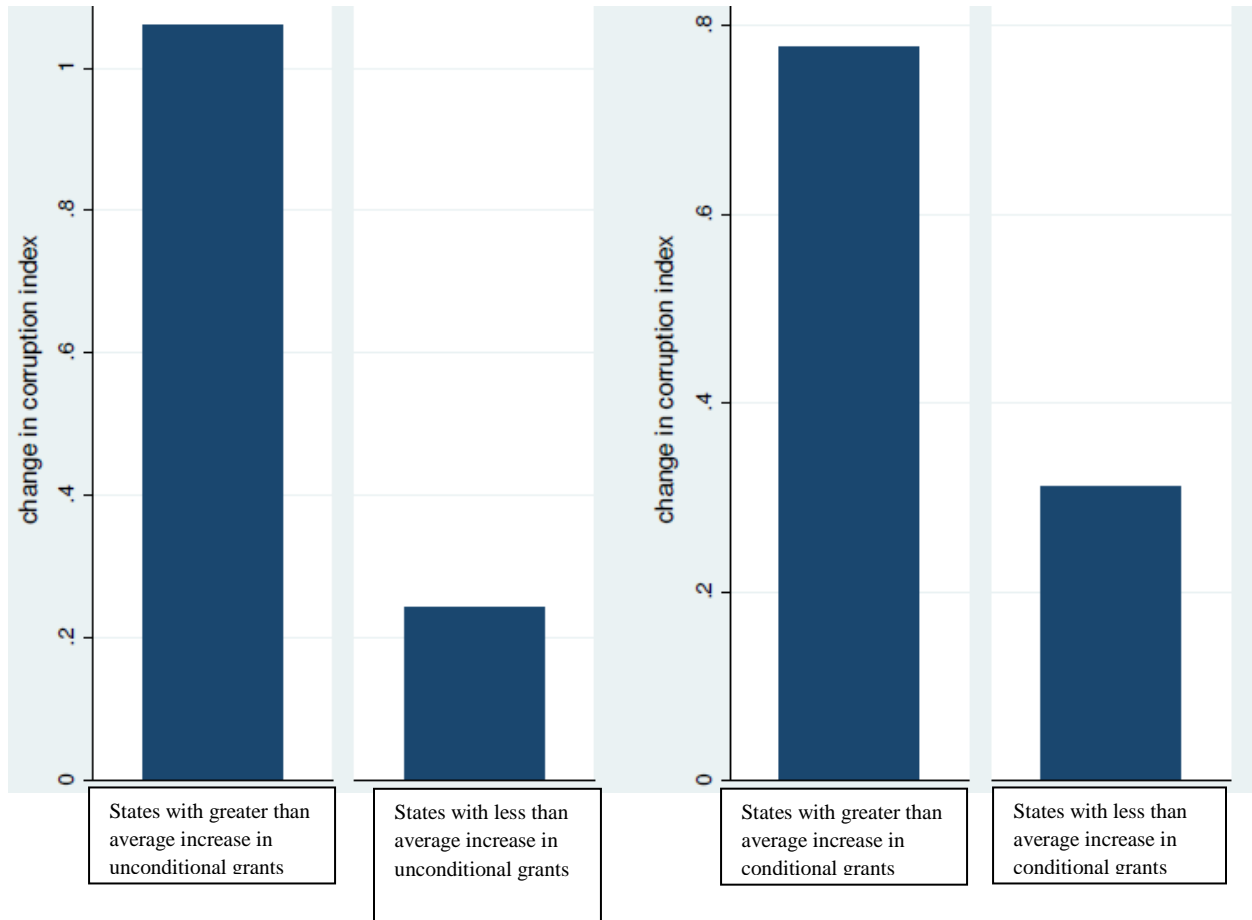
Table 3
Change in corruption index (2001-2005) given
a high/low change in poverty and a high/low change in own-tax revenues

| States with greater than average fall in poverty | States with less than average fall in poverty | States with greater than average increase in own-tax revenue | States with less than average increase in own-tax revenue |

Source: Author's calculations.

Table 4
Change in corruption index (2001-2005) given
a high/low change in unconditional and conditional grants

States with greater than average increase in unconditional grants

States with less than average increase in unconditional grants

States with greater than average increase in conditional grants

States with less than average increase in conditional grants

Source: Author's calculations.

Table 5

Corruption and Decentralization

Dependent Variable: Corruption Index	(1)	(2)	(3)	(4)	(5)
Real GDP per capita	-2.05e-05	1.58e-05	1.58e-05	5.11e-05	3.86e-05
	(2.50e-05)	(3.38e-05)	(3.42e-05)	(3.50e-05)	(3.39e-05)
Population	6.38e-07	2.57e-07	7.57e-07	9.24e-07*	1.12e-06**
	(3.92e-07)	(4.59e-07)	(5.23e-07)	(4.98e-07)	(5.25e-07)
Foreign Investment	0.000577***	0.000597***	0.000585***	0.000506***	0.000527***
	(0.000208)	(0.000204)	(0.000198)	(0.000195)	(0.000193)
Density	0.000972	0.00153	0.00151	0.00170	0.00160
	(0.000963)	(0.00104)	(0.00107)	(0.00104)	(0.00104)
Government Size	2.22e-08	2.47e-08	-6.33e-08	-1.54e-07*	-1.67e-07**
	(6.17e-08)	(6.09e-08)	(7.34e-08)	(8.19e-08)	(8.36e-08)
Poverty	0.0544*	0.0411	0.0538	0.0545	0.0622*
	(0.0325)	(0.0339)	(0.0355)	(0.0341)	(0.0346)
Own tax revenue per capita		-49.43*	-49.39*	-61.75**	-56.54*
		(29.84)	(29.83)	(29.17)	(28.97)
Unconditional grants per capita			1.004**		
			(0.494)		
Conditional grants per capita				1.303***	
				(0.424)	
Total grants per capita					0.855***
					(0.271)
Constant	4.548***	5.651***	2.942	0.664	0.0182
	(0.969)	(1.181)	(1.837)	(2.033)	(2.165)
Observations	96	96	96	96	96
Fixed Effects	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

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