

LOCAL AGENCY COSTS OF POLITICAL CENTRALIZATION*

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Abstract. We analyze a model of moral hazard in local public services which could be efficiently managed by officials under local democratic accountability, but not by officials who are appointed by the ruler of a centralized autocracy. The ruler might retain an official who diverted resources from public services but contributed part to benefit the ruler. The autocratic ruler would value better public services only when residents reduce taxable investments which become unprofitable without good public services. For local government to benefit local residents, they must have some decentralized power to punish an official who serves them badly even while serving the ruler well. We also consider a model of a unitary democratic state where informed voters would prefer a leader who promised decentralized accountability, but elected national leaders keep inefficient centralized control of many local offices as patronage rewards for campaign contributors.

"Why is the government response so poor? The major problem is that responding to villages is at the bottom of everyone's priorities, for the simple reason that literally no one is accountable to villagers. Villagers hire, evaluate, promote, and fire no one. Failure to submit a plan, attend a meeting, write a report, or meet a Minister's plane can have a negative effect on an officer's career. Failure to respond to a village cannot."

Louise Fortmann, *Report to the Botswana Ministry of Local Government* (1983, p 67).

1. Introduction

This paper develops basic models to show how political centralization of government can raise the economic costs of moral hazard in public spending. We consider models of moral hazard in local governments where the quality of public services is observed only by local residents. Our main result is that these agency problems have efficient solutions that require some constitutional decentralization of power. When power to appoint and dismiss local government officials is centralized in the hands of a national leader, national political concerns can interfere with the process of holding these officials accountable for local public services. In communities where public services are not reliable, private investment also may be discouraged.

Many have argued that political decentralization and community empowerment may be essential for successful economic development. Banfield's (1958) classic study of the *Moral*

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Basis of a Backward Society ultimately concluded (in chapter 9) that local development was inhibited by an extreme centralization of power to national ministries and an appointed local prefect. Fortmann (1983) studied how development in poor rural communities can be frustrated by a lack of local political accountability for those with power to spend public funds. Ostrom (1990) examined the vital importance of organizations with locally accountable leadership for the efficient management of common-pool resources. Sawyer (2005) argued that decentralization can be essential for building a strong democratic state, where empowered local leaders get a stake in the national political system (see also Myerson 2011) and successful local leaders can become competitive candidates for higher office (Myerson 2006).

Martinez-Bravo, Padro i Miquel, Qian, and Yao (2014) have found that the introduction of local elections in rural China significantly increased villages' expenditures on public goods. Their results suggest that local officials can be better controlled by local elections than by central monitoring. Mansuri and Rao (2013) provide a detailed overview of theory and evidence for development strategies that are based on community empowerment (see also Myerson 2014).

Some comparative political studies have found beneficial effects of autonomous local government, particularly in countries which have strong competitive political parties at the national level (see Crook and Manor 1998, Fisman and Gatti 2002, Enikolopov and Zhuravskaya 2007, Faguet 2012, Lessmann and Markwardt 2012, and Ponce-Rodriguez et al. 2012).¹ But there have not been enough cross-national comparative studies of political decentralization, partly because it has been difficult to obtain comprehensive global data on subnational political institutions. (One good resource is United Cities and Local Governments 2007; see also Rodden 2004.) Broad perspectives on political decentralization and economic development can be found in Bardhan (2002), Bardhan and Mookherjee (2006a,2006b), Faguet (2014), and Faguet and Pöschl (2015).

Some important advantages and disadvantages of decentralization have been analyzed in the literature on fiscal federalism (see an insightful summary by Oates 2005, and a thoughtful critique by Triesman 2007). Decentralized governments can have advantages for flexibly providing local public goods that vary across regions, in response to different local conditions. If a centralized government had no constraints or norms against offering different public services in

¹ Lessmann and Markwardt (2012) are concerned that foreign aid seems less effective in decentralized countries, but this result is consistent with their finding that decentralization is good for growth, once we recognize that effective decentralization may be weakened when the national government receives substantial foreign aid.

different regions, then a geographically-based governing coalition could use such flexibility to concentrate public spending in the regions where it gets its political support, neglecting people elsewhere. On the other hand, a centralized government may be better able to take account of externalities that local public goods in one region may have for people in other regions. With decentralization, a possibility of subsidies across regions could generate soft local budget constraints that encourage people to exaggerate their demand for local public goods. (Besley and Coate 2003 find this effect in a model of centralized government under locally-elected legislators, and then decentralization can help if it hardens local budget constraints.)

Consideration of moral-hazard agency problems in government (Besley 2007) may be essential for a deeper understanding of political decentralization and its effects. Even without interregional externalities or heterogeneous local preferences for local public goods, federal decentralization can improve accountability in the provision of local public goods. Cremer, Estache, and Seabright (1994) have argued that even the informational advantages of decentralization could be based on moral hazard, as local governments might have better information about local conditions because locally elected officials have stronger incentives to get such local information when it is costly to gather. Seabright (1996) has argued that a national official has less incentive to exert costly efforts to improve the quality of local public goods in a region where the votes of local residents are unlikely to determine whether the official is re-elected or not. Tommasi and Weinschelbaum (2007) have shown that citizens may find advantages in distributing local public-service responsibilities to different agents when agents are risk averse and their efforts to improve local public goods can be measured only with noise.

This paper extends this literature on the agency benefits of decentralization by examining an essential moral-hazard agency problem at the center of a centralized government: When a national leader can distribute local offices as patronage rewards to political supporters, the leader might not want to discipline local officials who provide poor public services.

When the quality of local public services can be observed only by local residents, national leaders cannot hold the responsible officials accountable for this quality without giving local residents some effective power over these officials. Political decentralization means guaranteeing that local residents have power to punish responsible local officials. Without such guarantees, local officials' careers may depend more on their relationships with national political leaders than on local residents' evaluations of their public services. In a centralized government,

a national leader may prefer to ignore complaints from residents of remote towns against local officials whom the leader appointed for political contributions to his regime. This failure to ensure that responsible officials will be held accountable for the quality of public services can discourage people from making productive private investments whose profitability would depend on reliable public services. Thus, in a centralized regime, communities can be impoverished by public agency costs when national leaders fail to supervise local officials appropriately.

To focus here on this central moral-hazard problem, we consider simple models that exclude other factors which have been analyzed elsewhere. We consider local public services that are essential for profitable private investments in the local region but have no externalities elsewhere, and we assume that local investors' expected benefits from these public services are known and identical in each region. We assume that, regardless of whether the government is politically centralized or decentralized, local public services in each town or region must be managed by one local official, who will have a moral-hazard temptation to divert resources from local public services to the official's own personal consumption. But we will assume that the local residents jointly have enough information about the quality of local public services to perfectly monitor the local official's actual public spending, and we will allow that the national leader can freely collect this information from local residents. The key moral-hazard problem under centralization is that the national leader cannot commit to use this information appropriately in deciding whether to dismiss a local official who diverts public funds.

The plan of this paper is as follows. Section 2 introduces our basic model of moral hazard in local public services. Section 3 shows that this model has incentive-efficient solutions that are feasible when the responsible official is accountable to the residents in autonomous local politics. In sections 4 and 5, we imbed this model in the context of an autocratic national regime. Section 4 analyzes efficient solutions that would be feasible if the ruler could make a binding constitutional promise to permit local democratic accountability of local government officials, in exchange for higher taxes from local residents. Then section 5 considers a centralized autocratic regime where the ruler holds the power to appoint and dismiss local officials, but still can ask local residents to report their views of the officials' performance, without any cost of getting this information. Our main result here is that such a ruler cannot credibly commit himself to hold local officials accountable for efficient local public services, because he would have no incentive to punish officials who divert resources from public services to political contributions that

benefit the ruler. Then section 6 considers a centralized democratic regime, to show why a competitively elected leader might not promise local accountability for many appointed local officials, even when such local accountability is essential for public services that voters would value. Some conclusions from this analysis are summarized in section 7.

2. A simple model of moral hazard in local public services

Imagine a remote town or district that has thousands of residents but is far from the capital of the much larger nation in which this town is located. Each resident in the town has a small enterprise that depends on a private investment k that the resident must make at the beginning of each year. If this investment k is made then, later in the year, the enterprise may yield a return worth either $S > 0$, if the enterprise is successful this year, or 0 otherwise. These returns are independent across residents and years, but the probability of success for each resident's enterprise each year depends on some local public services that must be administered by a local public official or magistrate. We may think of these public services as the administration of a local justice system that adjudicates disputes and protects property rights for residents, or as the maintenance of a local transportation network that is used only by the residents. The more that the local official spends on these local public services, the greater is the fraction of residents whose enterprises will succeed. Specifically, suppose that, in any year when the spending on local public services is g per resident, the fraction of enterprises that succeed will be $\pi(g)$. Assuming symmetry among the residents, the probability of success will be $\pi(g)$ for any resident who makes the investment k .

We are considering public expenses in per-resident units so as to abstract from the number of residents in the town. Given any finite number n of residents, we should say more precisely that the fraction of successes $\pi(g)$ should be rounded down to the closest multiple of $1/n$. But it will be more convenient to think of n as large, so that the fraction $\pi(g)$ can be considered as a variable that can take any value between 0 and 1. As the town become large, a model where each resident's enterprise succeeds independently with probability $\pi(g)$ would yield a fraction of successes that is unlikely to differ significantly from $\pi(g)$. So any equilibrium in our model here can be understood as a limit, when the number of residents becomes large, of approximate equilibria (where officials have no deviation that would improve their expected payoff-per-resident by more than some arbitrarily small amount) in a similar model where each

resident's enterprise would have an independent $\pi(g)$ probability of success.

Everyone here is risk neutral and discounts future income with an annual discount factor β . We assume that $0 < \beta < 1$, $S > k > 0$, and $\pi(g)$ is an increasing, strictly concave, and differentiable function of $g \geq 0$, with $\pi(0) = 0$ and $0 \leq \pi(g) < 1$ for all g .

The basic moral-hazard problem here is that the local official cannot be prevented from stealing any funds for local public services and fleeing abroad (where the former official would be immune from prosecution). Thus, when the per-capita investment level is g , the official's expected discounted value of all rewards from office cannot be less than g per resident. That is, the official must expect that, by good behavior, she can earn moral-hazard rents that have an expected present discounted value of g per resident. With the annual discount factor β , this promise can be achieved by paying the official an annual salary of $r(g)$ per resident where

$$r(g) = (1-\beta)g.$$

If the residents of the town hire the local official to administer their local public services with a public-services budget of g per resident plus an annual official salary of $r(g)$ per resident, then the average resident's expected annual net benefit from local government will be

$$U(g) = \pi(g)S - k - g - r(g).$$

This benefit $U(g)$ is maximized by per-capita public spending g_1 such that

$$\pi'(g_1) = (2-\beta)/S.$$

To avoid a trivial no-investment solution, let us assume that local public services at this efficient level would be worth more than the total cost to the residents, that is

$$\pi(g_1)S > k + g_1 + (1-\beta)g_1.$$

Let us assume, however, that the official's actual expenditure on these public services cannot be directly observed or monitored by anyone else. That is, when the official is given any per-capita budget b to spend on local public services, the official could actually choose any per-capita public spending g between 0 and b , and the official could secretly divert the remainder $b-g$ (per resident) to personal consumption. Then the successes and failures of residents' private enterprises in the town provide the only evidence for the actual public investment g . The fraction of successes among any small group of residents can provide a noisy estimate of the public spending g , but the actual public spending can be measured accurately only by polling all residents to find the overall fraction of successes in the town, which would be $\pi(g)$.

3. Efficient provision of local public services with decentralized democracy

In our simple model, incentive-efficient provision of local public services can be straightforwardly achieved by a system of local democratic accountability. Each year, the local official is given the per-resident budget $b = g_1$ to invest in local public services. At the end of the year, the residents will vote to evaluate the official's performance based on whether their enterprises succeed or not. If the fraction of residents who report that their enterprises succeed is at least the threshold $\pi(g_1)$, then the official will be paid the additional salary $r(g_1)$ per resident and will be retained in office to serve again next year. Otherwise, if the fraction of successes is less than $\pi(g_1)$, then the official will be dismissed without further pay, and the town will get a new local official to serve on the same terms next year.² In any case, let us assume that the end-of-year salary $r(g_1)$ will be paid to the official who is to serve next year, so that residents should have no incentive to replace an official just to save a year's salary.

Under such a plan, it is incentive-compatible for the official to spend the entire budget g_1 on local public services, so as to be always retained with a long-term consumption stream that has present-discounted value $r(g_1)/(1-\beta) = g_1$. The official's incentive to serve correctly here, rather than misappropriate the g_1 budget, could be made strict by offering any salary that is slightly larger than $r(g_1)$. In this equilibrium with local democratic accountability, the residents are willing to vote sincerely on their local official's renewal, as their future expected payoffs are the same either way.

We can easily construct a slightly perturbed version of this game in which each resident would have a strict preference for voting to retain the official after a success and to replace the official after a failure. For such a perturbation, let us introduce in each year a small independent probability $\varepsilon > 0$ that, if the official is retained, then next year the official will be unable to change from this year's local public spending, and the outcome for each resident (success or failure) will be the same as this year. So if the incumbent official is retained, then a resident who had a success this year would expect next year's net payoff to be

$$[(1-\varepsilon)\pi(g_1)+\varepsilon]S-k-g_1-r(g_1) > U(g_1),$$

² Although the efficient threshold $\pi(g_1)$ for re-electing an official here may be different from 1/2, approximately efficient equilibria could be also achieved with majority voting in a large town, but voters on the expected long side would have to randomly abstain with some probability, as in the equilibria of Feddersen and Pesendorfer 1996. The noise introduced by random voting behavior would then require a slightly higher salary, to compensate for the small risk of dismissal even when the official serves correctly.

but a resident who had a failure this year would expect next year's net payoff to be

$$(1-\varepsilon)\pi(g_1)S-k-g_1-r(g_1) < U(g_1).$$

Any resident could always expect $U(g_1)$ from a new official if the incumbent were dismissed, and so each resident would strictly prefer to retain the official after a success but to dismiss the official after a failure. This ε -perturbation of the game effectively gives residents an incentive to vote retrospectively, for or against the official's retention based on their own recent outcomes, even as the residents are motivated by expectation of future payoffs.

The residents' strategies here are stationary, in that each resident's vote depends on the outcome of the resident's enterprise in the same way each year. Thus, in this model, incentive-efficient public spending can be sustained in a stationary equilibrium, with rational behavior by officials and voters, under a system of democratic local government.

Proposition 1: Incentive-efficient provision of local public services can be achieved in a stationary equilibrium under a decentralized political system where the official is accountable to local residents, when each year the official gets the per-capita budget g_1 and then is retained and paid $r(g_1) = (1-\beta)g_1$ per resident iff the fraction of residents who report success is at least $\pi(g_1)$.

However, the equilibrium that is considered in Proposition 1 is not the only possible equilibrium of this game with local accountability of officials. This good equilibrium, where the official appropriately invests all budgeted public funds and where the residents privately invest in their enterprises and vote to retain the official when they succeed, represents a relationship of trust between the responsible official and the local voters. The behavior that this trust entails is rational when everyone understands that everyone else will act according to this relationship. But there are other possible equilibria in which this trust does not exist. Publicly trusted leadership depends on mutual expectations of both the leader and the community.

In a distrustful equilibrium of this local political game, the residents would not vote to retain the incumbent official even when their private enterprises have succeeded, and so the incumbent official, expecting to be dismissed in any case, would have no incentive to spend anything on local public services. When residents understand that the incumbent would corruptly divert any public funds to personal consumption, they would prefer to replace the incumbent by anyone else whom they could trust to act according to the good equilibrium. We are assuming here that only a resident can directly observe whether his or her private enterprise

has succeeded or not in any given year. Thus, a resident can vote to dismiss an official who is distrusted for any reason, even when the resident's own enterprise has been successful.

In other dynamic equilibria, the relationship between an official and the voting residents could switch from trust to distrust as a result of some random event that does not directly affect anyone's payoff but is publicly observable. Such a loss of trust could occur, for example, as result of an embarrassing accident that is publicly interpreted as a scandal for the official. The likelihood of such events would depend on the local political culture. But any event that causes residents to doubt whether they should trust the official can become a self-fulfilling prophecy, causing each side to react in a way that confirms the other's loss of trust.

If such random scandals in local politics generated some probability q of the incumbent local official being voted out of office in any year even with good performance, then the official could be trusted to make a per-capita public investment g only if the office's annual per-capita salary r satisfied $r/(1-\beta(1-q)) \geq g$. So the official salary expense per resident would have to be at least

$$\hat{r}(g,q) = (1-\beta(1-q))g.$$

Then the residents' net benefit $\hat{U}(g,q) = \pi(g)S - k - g - \hat{r}(g,q)$ would be maximized by a per-capita public investment $\hat{g}(q)$ such that $\pi'(\hat{g}(q)) = (2-\beta(1-q))/S$. As π is concave and $\beta > 0$, the residents' optimal per-capita public investment $\hat{g}(q)$ is a decreasing function of the exogenous political-instability factor q , and $\hat{g}(q) < g_1 = \hat{g}(0)$ for any $q > 0$. The residents could still expect to benefit from local government as long as $\hat{U}(\hat{g}(q),q) > 0$.

4. Efficient local public services under autocracy with decentralized accountability

Now suppose instead that an autocratic national ruler has power over local governments in towns like the one that we have been considering. If the national ruler could make a binding commitment to let the town elect an autonomous local government in exchange for a tax to the national treasury, then the residents of the town would each be willing to pay annually up to $\max_{g \geq 0} U(g) = U(g_1)$ for this privilege. But the autocrat might hope to gain even more by naming the first local official for the town.

As we have seen, the official who controls the budget for local public services must get substantial moral-hazard rents. These rents make the official's position a valuable prize for which candidates should be willing to pay. A political leader who has the power to appoint such

officials could potentially benefit by selling the offices for cash contributions or for valuable political support. So when the national leader can appoint officials who manage local public spending, these offices may be distributed as rewards for key political supporters. Under any political system, a successful leader's ability to mobilize support against challengers may depend on a reputation for reliably rewarding loyal service by such patronage. (See Myerson 2008.)

With annual public spending g per resident in the town, the local office could be sold to a supporter for prior political service worth g per resident, which is the present discounted value of the official's $r(g)$ per-capita salary. So by devolving power to an autonomous local government after appointing a supporter as its first responsible official, the national ruler could potentially get political support and tax revenues that have a per-resident present discounted value

$$g + U(g)/(1-\beta) = (\pi(g)S - k - g)/(1-\beta).$$

This benefit for the ruler is maximized by the level of public spending g_2 that satisfies

$$\pi'(g_2) = 1/S < (2-\beta)/S = \pi'(g_1), \text{ and so } g_2 > g_1.$$

Proposition 2: If an autocratic ruler could credibly decentralize accountability of local officials (in exchange for special local taxes), after appointing a supporter to be the first local official (in exchange for prior political service worth the office's moral-hazard rents), then the ruler would prefer a level of per-capita local public spending g_2 which is higher than the level g_1 that would be preferred by the residents under local democracy. However, all the benefits from this local public spending would be taken in taxes for the ruling elite.

Such autocratic decentralization would still require that local official must be politically accountable to the residents of the town. We are assuming here that only a resident can directly observe whether his or her private enterprise has succeeded or not in any given year. Under this basic assumption, the evidence for the official's public-service spending is dispersed among the residents of the town. If the official's future rewards were not dependent on residents' testimony as to whether they have benefitted from local public services, then the official would have no incentive to spend anything on public services, given the official's alternative option of diverting the budgeted funds to personal consumption. But if such misbehavior were anticipated, the residents would have no incentive to invest in the town or approve any taxes for the official.

One may question, however, whether an autocratic ruler could or would make a credible promise to so decentralize power over local government, because such decentralization has

implications that would be against the ruler's interests ex post. There is a fundamental political tension between the ruler's incentive to centralize the value of moral-hazard rents from local government and the necessity (for efficient provision of local public goods) of making local officials' careers dependent on local residents' approval. With local accountability, the ruler cannot use local offices as rewards without making his reputation for rewarding supporters dependent on local voters' approval and thus vulnerable to their distrust. An autocrat is unlikely to tolerate any possibility that his distribution of patronage positions to vital supporters could be undermined by local political agitation that creates distrust between local residents and his appointed officials. Furthermore, politically autonomous local governments enable successful local leaders to build their own reputations for public service and patronage, which could make them strong contenders for power at the national level (as in Myerson 2006). Thus, a fiscally beneficial decentralization may be politically too costly for an autocratic national ruler to accept.

5. Inefficient failures of local accountability under centralized autocratic rule

In this section, we consider an autocratic government which does not decentralize any power over local government, and so the power to appoint and dismiss local officials is always held directly by the national ruler. We develop a simple model of centralized autocracy to show how the ruler's unconstrained power in such a regime can create central moral-hazard constraints that reduce national welfare. In our model, the "ruler" could be interpreted as a ruling party which generally acts to maximize the resources that it has available for paying its members who are active in national politics. Under this principle, the party would prefer local agents who provide more tax revenue and political contributions to the center, less the cost of local public spending.

In a centralized autocracy, local residents have no political power to elect any local or national officials, but the residents still have some economic power in deciding whether to make private investments that enlarge the tax base. However, autocratic rulers have power to regulate or suppress public political expression, and a ruler would generally prefer to use this power to block any unfavorable public communication that might reduce people's investments in the ruler's tax base. Furthermore, the autocrat's power to appoint local officials may also include the power to make misleading public statements about such appointments, and so we should not assume that residents can get any credible information about the ruler's decisions to retain or

replace local officials. Thus, in our model of centralized autocracy, we should assume that each resident's decision to invest can depend only on the resident's individual history of successes or failures, which in any year is only a noisy indicator of actual public spending g (through the individual's success probability $\pi(g)$).

Let τ denote the tax that the national government can collect each year from each resident who invests k in a private enterprise. For simplicity, let us take this annual investment tax $\tau > 0$ as a fixed parameter in our analysis here. We are assuming here that the actual success or failure of a resident's enterprise is privately observable only by the resident, and so the government cannot directly tax the income from success. Only the resident's investment in a private enterprise is publicly observable and taxable.

The ruler can solicit information from residents about the success or failure of their enterprises. Given the potential political sensitivity of this information, the ruler might choose to gather it by a network of secret informants; but we should not deny the ruler's ability to get such local information. Indeed, let us assume here that residents will provide such information honestly to the ruler's informants, as long as the residents' individual tax payments do not depend on their responses, and there is no cost for the ruler to collect this information. For simplicity, let us also assume that a resident who does not invest in an enterprise will still learn, at the end of the year, whether his enterprise would have been a success, so that the ruler can still get accurate information about the fraction of potential successes $\pi(g)$ even if some residents do not invest. However, the autocratic ruler cannot make any strategic commitment to use this information in deciding whether to retain or dismiss a local official. In particular, the ruler might prefer retain an official who diverted funds from local public spending to some other activity that benefitted the ruler. This is the central moral-hazard problem of a centralized autocracy.

Let b denote the per-capita budget that the local official will get at the beginning of each year, and let ρ denote the additional per-capita salary that will be paid at the end of the year to the official who will serve next year. (That is, ρ will be paid to this year's incumbent, if retained, or else to the newly appointed replacement.) Let us take these quantities as fixed parameters in our analysis here, and let us assume that the prospect of getting the salary ρ forever would be sufficient to motivate the official to spend all the budget b instead of stealing it, that is,

$$\rho / (1 - \beta) \geq b.$$

In any given year, a local official can actually use the budgeted money b in three different

ways: The official can spend it any part of it on local public services, or on personal consumption, or on other political activities that contribute some benefit for the ruler. Let g denote the amount that the official chooses to spend on local public services, and let h denote the amount that the official chooses to spend on political contributions that benefit the ruler, where g and h are both in units of value per resident in the town. So we must have

$$g \geq 0, \quad h \geq 0, \quad \text{and} \quad g+h \leq b.$$

Each year, the official can choose g and h subject to these constraints. Then the official's personal consumption this year will be $(b-g-h)+\rho$ per resident if the official is retained, but the official will get only $b-g-h$ per resident this year and 0 thereafter if the official is dismissed at the end of this year. Each resident must decide whether to invest or not at the start of the year, without knowing g . Then a resident who invests either will get payoff $S-k-\tau$ from success with probability $\pi(g)$, or else will get payoff $0-k-\tau$ from failure. A resident who does not invest will get payoff 0 for sure this year. Letting ϕ denote the fraction of the residents who chose to make the taxable investments at the beginning of this year, the ruler's net payoff from the town will be $\phi\tau+h-b-\rho$ per resident (with b and ρ being fixed constants here). We continue to assume that everyone is risk neutral and discounts future payments by the annual discount factor β .

In such a repeated game, we could construct perverse equilibria in which the ruler might dismiss an official after a high contribution h , if a high contribution would induce a distrustful expectation that the official would not provide any further services or contributions to the ruler. But it would seem strange to suggest that a ruler who sells offices for contributions could then distrust an official for contributing more than expected. So, as in Section 3 above, let us perturb the game slightly to build in at least some small possibility of a positive linkage between an official's decisions in one year and the next. Let us assume that, in any year when the official has been retained from the previous year, there is a small probability $\varepsilon > 0$ that the official will be unable to change from last year's g and h choices and will yield for each resident the same success or failure as last year.

In this perturbed game, let us consider stationary equilibria where the ruler, the residents, and the local official (when free to make new choices) are expected to use constant strategies every year. Stationarity of local political behavior seems reasonable in a model of centralized autocracy, because the autocrat's ability to focus everyone on a preferred feasible equilibrium at the start of any year, regardless of past history, could imply stationary strategic behavior.

For any h between 0 and b , there is a stationary equilibrium in which the official always contributes h in political service for the ruler, spends nothing ($g=0$) on local public services, diverts all other resources $\rho+b-h$ to personal consumption, and is always retained by the ruler; but the ruler would dismiss the official if the official's political contribution was ever smaller than this h . In such equilibria, residents should not invest, because $\pi(0)S-k-\tau < 0$.

In some parametric cases, the centralized autocracy may have other stationary equilibria in which spending on local public services g can be positive. But in any such equilibrium, spending on local public services must be strictly less than the efficient level g_1 that could be achieved with decentralized democracy, residents' expected gains from investments must be small or zero, and a strictly positive fraction of residents must be choosing not to invest.

Proposition 3: In any stationary equilibrium of the centralized autocracy, we must have $\pi(g)S-k-\tau \leq \varepsilon\pi(g)S$. A stationary equilibrium can have positive local public spending $g>0$ only if $[(1-\varepsilon)\pi(g)+\varepsilon]S-k \geq \tau \geq 1/(\beta\pi'(g))$, and in such an equilibrium the expected fraction ϕ of residents who invest must satisfy $1-\phi \geq (1-\pi(g))/(\beta\pi'(g)\tau) > 0$. Such a feasible g must be strictly less than the residents' ideal g_1 .

Proof of Proposition 3: Notice first that, if there is no local public spending ($g=0$), then $\pi(g) = 0$, which implies $\pi(g)S-k-\tau < 0 \leq \varepsilon\pi(g)S$. So we only need to consider here how positive local public spending ($g>0$) could be sustained in a stationary equilibrium.

If there were no reaction by the residents to a decrease of local public spending g , then the ruler could strictly benefit by transferring funds from local public spending g to national political contributions h , even if the official's personal consumption was also increased by taking part of the transfer from g . The ruler would prefer to retain an official who deviated in this way, for the ε chance that the deviation would be repeated, as stationary strategic expectations would make the retain/replace decision irrelevant otherwise. So the official could strictly benefit from such a deviation, unless the residents would react in a way that could harm the ruler.

In a centralized autocracy, the local residents have no political power. They only have a dispersed economic power to disinvest from the tax base, which is a credible threat only for individuals whose expected profit would be 0. If good public services made all residents strictly prefer to invest, then a small reduction of local public spending would not affect the tax base,

and so the ruler would have no incentive to punish officials who diverted some resources from local public services to national political contributions. Thus, to sustain $g > 0$ in equilibrium, residents' taxable investments next year must be expected to strictly decrease if the fraction of current successes $\pi(g)$ were decreased by a decrease in g . But individual residents do not observe $\pi(g)$; they know only their own success or failure. So for taxable investment to be appropriately elastic with respect to local public spending, residents must be willing to invest after a success in the previous year, but they must also be willing to not invest after a failure in the previous year. That is, the residents' expected profits from investing must satisfy

$$[(1-\varepsilon)+\varepsilon]\pi(g)S-k-\tau \geq 0 \quad \text{and} \quad (1-\varepsilon)\pi(g)S-k-\tau \leq 0.$$

A small transfer from local public spending to national political contributions (decreasing g and increasing h by the same amount relative to what is expected in the stationary equilibrium) would make the ruler strictly prefer to retain the official unless the ruler's expected marginal loss from next year's tax revenue is greater than or equal to the ruler's marginal gain in current contributions. Thus, when σ_0 is the probability of investment by a resident after a failure, positive local public spending $g > 0$ is possible in equilibrium only if

$$\pi'(g)(1-\sigma_0)\beta\tau \geq 1.$$

In any year, the residents who do not invest must include all those who do not invest after failure, and so $1-\varphi \geq (1-\pi(g))(1-\sigma_0)$. Then with $\sigma_0 \geq 0$, we get

$$1 \geq 1-\sigma_0 \geq 1/(\beta\pi'(g)\tau) \quad \text{and} \quad 1-\varphi \geq (1-\pi(g))/(\beta\pi'(g)\tau).$$

Then also $\pi'(g) \geq 1/(\beta\tau) > 1/(\beta S) > (2-\beta)/S = \pi'(g_1)$, and so $g < g_1$. ***Q.E.D.***

The key point in this proof is that, because the local residents have no political power in the centralized autocracy, the only way that they can punish the government for bad public services is by reducing their economic investments in the tax base. But the residents' investments are elastic with respect to the quality of public services only when residents' expected profits from these investments are zero. Thus, in the centralized autocracy, at least some residents must be willing to not invest, and so all residents' expected profits from their private investments must be small, as the differences in among residents' expected profits (depending on their success or failure in the previous year) are never more than εS here. That is, the residents cannot substantially benefit from local public services if their only power to motivate these services is their willingness to disinvest from the local economy. In the

framework of our model, Proposition 3 implies that, even after a success in the previous year, a resident's expected profits from local private investment cannot be greater than εS .

The necessity of a positive strategic probability of noninvestment among residents who had a failure last year implies, in Proposition 3, that a strictly positive fraction of residents $1-\varphi$ must not be investing each year. Such local disinvestment must be economically inefficient. We are assuming here that local public services are non-rivalrous public goods, in the sense that each resident's investment can benefit from local public spending independently of how many other residents are investing. (The success probability $\pi(g)$ depends on local public spending *per resident*, not "per investing resident.") So if a positive social value could be created by any one resident's investment then it should be socially beneficial for them all to invest.

[Insert Figure 1 about here]

Figure 1 shows results for a numerical example with $\pi(g) = 1-e^{-g}$, $S=7$, $k=1$, $\beta=0.95$, and $\varepsilon=0$. Under local democratic accountability, the residents' optimal public spending would be $g_1=1.90$, which would yield expected annual benefits $U(g_1)=2.96$ for residents and $r(g_1)=0.09$ for the local official, with total per-capita benefits plus taxes $U(g_1)+r(g_1)+g_1 = \pi(g_1)S-k = 4.95$. Under centralized autocracy, however, equilibria with positive public spending $g>0$ are possible only for g in an interval from 0.49 to 1.40, with investment taxes $\tau = \pi(g)S-k$ between 1.72 and 4.28. In these equilibria, the fraction φ of residents who invest is between 0.39 and 0.75, and the investing residents' expected profits are completely taxed away.³ The best of these autocratic equilibria has $g=1.40$ and $\tau=4.28$, with an investing fraction $\varphi=0.75$ which consists of just the residents who had a success in the previous year. So in the best equilibrium under centralized autocracy, the annual per-resident benefits for the ruler and official sum to only $\tau\varphi-g = 1.82$, even though the residents would be willing to pay strictly more for local democratic accountability ($U(g_1)+r(g_1) = 3.05$). Besides these equilibria with $g>0$, there is also a distrustful equilibrium with $g=0$, $\tau=0$, and $\varphi=0$. If we reduced the returns from successful investments to $S=6$, holding fixed all other parameters of this numerical example, then this distrustful equilibrium would be the only possible equilibrium under centralized autocracy, as the

³ For any g in the interior of this interval, the investing fraction φ can take a range of values, because the ruler's incentive to promote local public spending requires only that the difference between the probabilities of investing for previously successful and unsuccessful residents must be $1/(\beta\pi'(g)\tau)$. The maximal φ is where successful residents invest with probability 1. At the minimal φ , unsuccessful residents have probability 0 of investing.

conditions of Proposition 3 then could not be satisfied with any $g > 0$.

These results depend on the assumption that the government can tax only the residents' investments, not the income that is randomly generated by these investments. If tax revenue could depend directly on the fraction of successes $\pi(g)$ (rather than on taxable investments which successes may indirectly encourage) then the ruler could be motivated to increase g without anyone disinvesting.

These results also depend on the assumption that the local residents cannot share information about the successes and failures of their enterprises. If residents could freely share information, then they all could learn the exact fraction of successes $\pi(g)$, and they could motivate the government to efficiently spend g_1 by threatening that nobody would invest if the fraction of successes was less than $\pi(g_1)$ in the previous year. As long as the local official never cut local public spending below g_1 , this threat would never need to be carried out, and so everybody could always efficiently invest. But without freedom of speech, such a collective threat cannot be credible. If the fraction of successes ever were less than $\pi(g_1)$, the autocratic ruler would use his power over political communication to prevent the residents from learning any bad news that would reduce their taxable investments. So the residents can incentivize better public spending only by threats that are based only their individual outcomes, which are a noisy measure of actual public spending. Such threats based on noisy information must be carried out at an inefficiently positive rate even when the local official does not deviate from equilibrium.

Thus, a ruler could avoid the local agency costs in Proposition 3 and increase the government's expected revenue by making a commitment to let residents share information about local public services, even when they have bad news. That is, the inefficiency found in Proposition 3 shows why a ruling elite could actually gain by allowing its subjects to publicly express complaints about government services, to reduce the costs of moral hazard in a centralized autocratic regime. In the terms of our model, freedom of speech could make $\pi(g)$ common knowledge among the residents, and then the essential political motivation for good public services could be based on accurate information, which would reduce the agency costs of government. For a powerful ruler to make a credible commitment to permit the communication of bad news that would directly harm the ruler's short-term interests, however, someone else must have power to punish the ruler if this commitment were violated.

Of course even a nominally absolute monarch is always subject to some political

constraints. Under any political system, any political leader must be able to recruit active supporters against potential challengers for power, and so the leader must maintain a reputation for reliably rewarding loyal supporters. But promises of rewards for past service become a debt that the ruler might prefer to deny *ex post*, and so any contender for power has a moral-hazard problem of credibly constraining himself to long-term delivery of promised rewards. A leader can recruit more support with credible promises of future rewards when some key supporters monitor how he treats the others, so that not rewarding one supporter could cause distrust by all. In the model of Myerson (2008), if any contenders for power are able to organize their supporters into such a court, then no contender could recruit any supporters without instituting the same political constraints on himself.

From this perspective, we should expect that even an autocratic ruler must be subject to a personal constitutional constraint to maintain his reputation, at least within an elite circle of supporters, for reliably rewarding their service. To this court, the ruler must regularly justify his allocation of major patronage rewards and his decisions to punish or promote key supporters. Indeed, one might define an autocracy as a regime in which the ruler is politically accountable only to such courtiers. (For broader views, see Svobik 2012.)

In our model of centralized autocracy, local offices with a promise of long-term moral-hazard rents are being offered as rewards for past political service to the ruler. But the ruler's ability to re-sell vacant offices for new political services can create an incentive for the ruler to dismiss local officials even when they have behaved appropriately. This incentive must be countered by courtiers' defense of elite privileges. That is, the courtiers' ability to impose political costs on the ruler should generally be used to make it more costly for the ruler to dismiss a local official, so as to deter the ruler from dismissing local officials too frequently. But these political costs of dismissals will exacerbate the central moral-hazard problem of Proposition 3, which was that the ruler had insufficient incentive to dismiss officials who transfer resources from public spending. The cost of justifying any official's dismissal to the politically vital autocratic elite gives the ruler even more reason to tolerate an official's diversion of resources from local public services.

So we should look outside the autocratic elite for political constraints that can reduce the costs of central moral hazard in Proposition 3. As we have seen, the agency costs in our model can indeed be reduced by allowing residents a general freedom to communicate complaints about

local public services. Such a right of political expression could be supported by expectation of an adverse public reaction if government officials ever acted to restrict public political expression. In terms of our model, we might assume that manifest government interference in free public communication could switch all residents from a good high-investment equilibrium to a bad equilibrium where everyone expect bad public services, so that nobody would then make any taxable private investments. Thus, on the equilibrium path, the residents could communicate to make the fraction of successes $\pi(g)$ public knowledge each year.

When $\pi(g)$ becomes public information every year, there can be many non-stationary equilibria, including some equilibria where residents can get positive expected profits from investment. Indeed, an efficient equilibrium comparable to Proposition 1 above can be sustained with budget $b=g_1$ if the tax rate satisfies

$$(1-\varepsilon)\pi(g_1)S-k > \tau > g_1+\rho \geq g_1+r(g_1).$$

Then all residents could rationally invest, knowing that the ruler would dismiss the local official if the fraction of reported successes ever went below $\pi(g_1)$, which the ruler would do if the residents would switch to distrustful non-investment in the year after such an event.

But such threats of adverse public reaction against violations of expected observable behavior by government officials could be interpreted as constitutional constraints on the ruler. Constitutional rules are generally enforced by expectations that, if a government official were ever observed to violate these rules, then public behavior would change adversely against the official, in a non-stationary equilibrium (Myerson 2008). So when we introduce rich public information and non-stationary equilibria into our analysis here, we may no longer be considering a pure autocracy but may instead be considering a form of constitutional government.

6. Inefficient centralization under a democratic government

In the previous section we considered the difficulty of overseeing local public services for a centralized national government that is headed by an autocratic ruler. Now let us consider the case where the government is similarly centralized but the national leader is democratically elected. At least two of the fundamental assumptions about centralized autocracy that we used in Proposition 3 must be dropped now, as we consider centralized democracy:

First, democratic elections give citizens political power to influence their leaders, and so the motivations for better local public services do not have to depend only on residents' economic power. Thus, democracy relaxes the political constraint which, in Proposition 3, implied that powerless residents could not expect substantial benefits from local investments.

Second, democratic rights of freedom of speech and freedom of the press guarantee people's ability to publicly express complaints about the performance of their local officials. So under democracy, individuals' decisions about private investments can be based on broader public information about government performance, and so local residents can better coordinate their economic power for motivating government leaders to improve public services. Thus, democracy can relax the informational constraint which, in Proposition 3, implied that the residents' economic power could not be applied without some positive fraction of them inefficiently disinvesting from the local economy.

However, the democratic requirement for a national leader to face regular electoral challenges only increases the vital importance of a national leader's ability to mobilize many active supporters in contests for power. Thus a democratic national leader, no less than an autocrat, needs a reputation for reliably rewarding past supporters with the greatest possible fund of patronage benefits. The ability to promise moral-hazard rents from the management of public spending can be a valuable asset for the leader to recruit key supporters in an election campaign. But the moral-hazard rents can accomplish their public agency function only if the national leader still commits to make an appointed official's continuation in office conditional on the appropriate management of the office's resources. The central question now is whether democratic national leaders will commit to such local accountability more than autocrats.

We should note that, even if the current national leader made such a commitment for his time in office, democratic competition would subject a local official's future retention to national political risks that are independent of the official's performance and thus must increase the cost of required moral-hazard rents. Democracy generates a positive probability of a transfer of national power at the next scheduled election, in which event the next national leader would replace all patronage appointees. In our model, if there were a probability q of such national political change in any given year, then a local official's annual moral-hazard rents for spending g per resident would have to be $\hat{r}(g,q) = (1-\beta(1-q))g$, which is an increasing function of q .

Under democracy we also find that successful leaders of autonomous local governments

can become strong candidates for national leadership, which is against the interests of the incumbent national leader. This basic point can create a powerful bias against reforms for political decentralization in any centralized government, autocratic or democratic. But there are some noteworthy differences between these two kinds of regimes. On the one hand, compared to an autocrat who has never won a competitive election, a democratic national leader who has previously won with endorsement from a majority of voters might feel somewhat less vulnerable to competition from popularly trusted local leaders. But on the other hand, a national autocrat might have less fear of future competition from locally elected officials in very small districts, whose responsibilities cannot be compared to the vastly larger responsibilities of national leadership. In a constitutional democracy, the ruling national coalition includes members of the legislature who may view elected mayors of even small towns as potential competitors for power. So in some cases, a democratic national government may resist reforms to decentralize power more than an autocratic government would. In Pakistan, for example, democratic local governments have been established three times under military rule, and each time these local governments were dissolved when democracy was restored at the national level (Cheema, Khan, and Myerson 2015).

The most fundamental implication of democracy is that an elected national leader actually needs to earn the trust and approval of a large subset of the voters in the nation. Such democratic accountability could provide some incentive for a national leader to make local officials' positions dependent on their providing a quality of public services that can earn local residents' approval. So we might hope that, even in a unitary state that has no constitutional requirement for local officials to be held accountable to local voters, candidates for national leadership in a democratic election might promise such local accountability as part of a competitive strategy to win more voters' approval.

In a democratic election, however, the success of a campaign may depend both on promises of government policies that can benefit large groups of voters and on active support from a smaller number of wealthy and influential individuals. Candidates' competitive decisions about whether to promise local accountability of local officials or to use local offices as patronage prizes may depend on the relative importance of these factors in election campaigns. Campaign strategies in equilibrium could also depend on other details of the constitutional democratic system, but it may be instructive here to consider a general analytical model, to get a

basic framework for thinking about these factors.

Let us consider a competition between two candidates for national leadership, in a nation that is administratively divided into many local districts of equal size. To focus on the problem of supervising local administration in a centralized state, suppose that the national leader's principal power is the power to appoint and dismiss the local officials or magistrates who control public spending in each district, and the candidates have no significant differences on other questions of national policy.

In our analysis of autocracy, we found that the autocratic tax rate τ would necessarily extract virtually all of the powerless residents' expected gains from local public services, because otherwise the autocrat had no incentive to insist on the provision of these public services. But we would hope that a democratic government should offer public services that actually benefit the voters. So in our analysis of centralized democracy, let us assume that the government has other revenues, and that promises of local public services should be motivated primarily by candidates' hope of winning votes rather than by their hope of increasing revenues after election.

We might assume that the two candidates compete by promising to each district j the per-capita level of public spending g_j that they would direct for their appointed local officials, subject to some overall public budget constraint. (Any unspent slack in this constraint could be profit for the ruling party.) Rational informed voters should then vote for the candidate who has offered more public spending in their district. For any given vector of offers from one candidate, the other candidate could win within the same overall budget by offering no public spending in at least one district where his opponent has offered the most, and then by promising to spend slightly more than his opponent in other districts that have a majority of voters. Thus, in a centralized national government without any constitutional protection for local public budgets, democratic competition can naturally create incentives for candidates to utterly neglect some regions of the country. Furthermore, this best-response dynamic (offering only slightly more than one's opponent in a majority of districts while offering nothing to the district where the opponent has offered the most) could ultimately lead, as in the model of Kramer (1977), to candidates offering very little even to their most favored districts. In effect, when a candidate can win without offering any local public services for the people outside of his base of political support, voters may ultimately give their support for almost nothing, rather than be left out of the winning coalition altogether. (Ferejohn 1986 reached a similar conclusion in his Proposition 6.)

To avoid such a result of candidates bidding in a continuous scale, let us instead consider a model where each district has a legally fixed public budget $G > 0$, funded out of national revenues. Then each candidate for national leadership can only decide, for each district, whether or not to guarantee good local government by promising that their local magistrate will be held accountable to local public opinion. In effect, a candidate can promise to delegate his power over a local official to the local voters. In any district where the candidate does not promise such local accountability, the local voters will expect the candidate to sell the office to a rich donor, who then will steal their entire local public budget if the candidate is elected. Each candidate can make this decision independently for each district. So in each district, informed voters will expect their level of local public services to be either high (G) or low (0), depending on whether the elected national leader has promised to make their local magistrate accountable to local politics or not. But suppose also (following Baron 1994, and Grossman and Helpman 1996) that the funds which are raised by corruptly selling local offices will be spent in the campaign on advertisements that will influence the votes of other voters who are uninformed or impressionable. When donors view the two candidates as equally likely to win the election, the campaign funds that each candidate can raise by selling offices will be proportional to the number of districts where the candidate has not promised good accountable local government.

Let α denote the fraction of the national electorate who are uninformed voters. For simplicity let us assume that, among these uninformed voters, the fraction who vote for candidate i will be equal to the amount spent by candidate i in the campaign divided by the total campaign spending of both candidates. The remaining $1 - \alpha$ fraction of the electorate are rational informed voters who will vote for the candidate who promises better government in their district. The informed voters will split equally in any district where the two candidates have promised the same local public spending (both G or both 0). In this game, let x_i denote the fraction of districts which candidate i sells to a donor, so that $1 - x_i$ is the fraction of districts in which candidate i is promising local political accountability for good local government. Then the net difference of total votes for candidate 1 minus total votes for candidate 2, will be

$$V_1 - V_2 = \alpha(x_1 - x_2)/(x_1 + x_2) + (1 - \alpha)[(1 - x_1) - (1 - x_2)].$$

Candidate 1 chooses x_1 to maximize this difference, and candidate 2 chooses x_2 to minimize it.

By analyzing first-order conditions for each candidate i 's best response x_i to the other's x_{-i} ($0 = \partial(V_1 - V_2)/\partial x_i = 2\alpha x_{-i}/(x_1 + x_2)^2 - (1 - \alpha)$) we can derive the unique symmetric equilibrium

of this two-person zero-sum game.

Proposition 4: In the absence of any constitutional requirement to devolve local public services to autonomous local governments, the two-candidate electoral contest for national leadership has an equilibrium in which each candidate would maintain inefficient centralized control of local public services in a fraction $x_1 = x_2 = \min\{0.5\alpha/(1-\alpha), 1\}$ of all districts.

For example, when a 60% majority of the electorate are rational informed voters but the other $\alpha=40\%$ are uninformed voters who respond to campaign spending, then there is an equilibrium in which each candidate sells 1/3 of the districts to rich donors instead of providing good local government there. Thus, under the assumptions of this model, competitive democratic national politics in a unitary state can yield large regions where no informed residents expect any benefits from their government.

The possibility of such politically neglected regions should be considered extremely dangerous for a nation's territorial integrity, if there is any outside option for disaffected regions to secede. Of course this result depends on an assumption that candidates for national leadership are competing only on their promises for local public services which can differ across regions. But under the constitution of Ukraine, for example, the popularly elected President has primary responsibility for appointing the local administrative heads in the regions and districts of Ukraine, while national government policy is primarily directed by a prime minister who is responsible to the national assembly. So the extreme regional polarization of presidential politics in Ukraine may be at least partly explained by the strategic incentives that are exhibited by this simple model of political competition in a centralized democratic government.

In the above model, the funds that a candidate could raise in a campaign by selling the promise of an office should actually be equal to the value of the office to the donor (here G) multiplied by the probability that the candidate will win the election. Thus, our above assumption, that the candidates can raise campaign funds that are equally proportional to their numbers of corruptly sold offices, may depend on a basic assumption that donors would perceive each candidate as equally likely to win independently of how many offices each sells. (This could be true, for example, if the donors pay the candidates for their promised offices before learning how many other offices are being sold.) This game could have other equilibria, however, if a candidate's unilateral deviation from some predicted scenario would make donors

perceive him as a likely loser. Once a candidate is perceived as likely to lose, nobody would pay anything for the candidate's promises of appointments, and so (against any $x_{-i} \leq \alpha/(1-\alpha)$) the candidate would lose the election with no campaign funds and no uninformed votes, thus justifying the donors' perception. (Morton and Myerson 2012 showed that such discontinuous equilibria can be pervasive in games with impressionable voters.)

For example, this game could have an equilibrium where any candidate's decision to sell any office to a donor would be considered so scandalous that the candidate would be considered a likely loser, who then could not raise any funds from such promises. But the forces in this alternative equilibrium may be considered as effectively equivalent to having a constitutional prohibition against selling offices. As noted above, any constitutional rule can be enforced by such self-justifying adverse expectations against a leader who was seen to violate it.

7. Conclusions

When the quality of local public investments can be evaluated only by local residents, a local official who manages such investments can be held accountable only giving local residents some effective power over the official's career. Political decentralization means guaranteeing that local voters have such power over their local governments. In a centralized political system, the power to appoint and dismiss local officials is held by a national leader, who is not obligated to apply the same standards as would apply under decentralized democratic accountability. Even when the leader can get full information about residents' evaluations of their local officials, the national leader might not want to dismiss a local official who spent less than expected on local public goods but contributed more than expected to political activities that benefit the ruler. Centralization thus introduces an element of moral hazard in the mechanism of political accountability, which can increase agency costs in the provision of local public goods.

We analyzed a simple model of moral hazard in local public services which could be efficiently managed by local officials who are accountable in autonomous local politics, but which could not be managed without substantial inefficiency by a centralized autocratic regime. Under autocracy, residents cannot punish government officials for bad public services by voting, only by disinvesting from the tax base, and the threat of such disinvestment would not be credible if investments were profitable for all residents. Thus, in our model, the autocratic regime would have no incentive to provide any public services unless it was also taxing away

most of the residents' gains from local investments. Furthermore, a positive fraction of residents must inefficiently disinvest from the local economy, because autocratic control of political communication prevents residents from sharing information that would allow them to exercise their economic power more efficiently. This result suggests that a beneficial first step away from a pure autocratic regime should be to allow people full freedom to communicate publicly about the quality of government services, even though their complaints might seem to be against the government's interests *ex post*.

We also considered a model of elections in a centralized democratic state, to examine whether democratic competition could induce candidates for national leadership to promise local accountability of local officials when it is essential for the public services that voters want. We found, however, that competitively elected national leaders might still choose to keep inefficient centralized control of many local offices, as patronage rewards for contributors.

National leaders may have compelling political reasons for wanting to maintain centralized control of local public services, even when this centralization harms national economic development. One reason is that the leader's power is increased by the ability to allocate valuable offices of local government as rewards for loyal service and support. Another reason is that autonomous local government can become a source of popularly trusted competitors for national power, which is against the interests of incumbent national leaders.

However, a constitutional system with autonomous local governments can become politically stable once it is established. When governors and mayors have been locally elected, they become local power-brokers from whom competitive candidates for national leadership must regularly seek support. Then it would be very costly for any national leader to threaten the constitutional powers of these elected local officials. In such a federal democracy with constitutionally protected powers for local governments, the efficient solution to the moral hazard problem that we considered here can be straightforwardly implemented.

The founding leaders of the United States of America had no choice but to accept substantial decentralization of power in their new nation, because autonomous local governments in America had been established over a century before the first national elections (Myerson 2015). Since then, democratic local governments in America have had their share of problems and corruption, but they have overseen local public investments that provided the basic framework for building the richest nation on earth.

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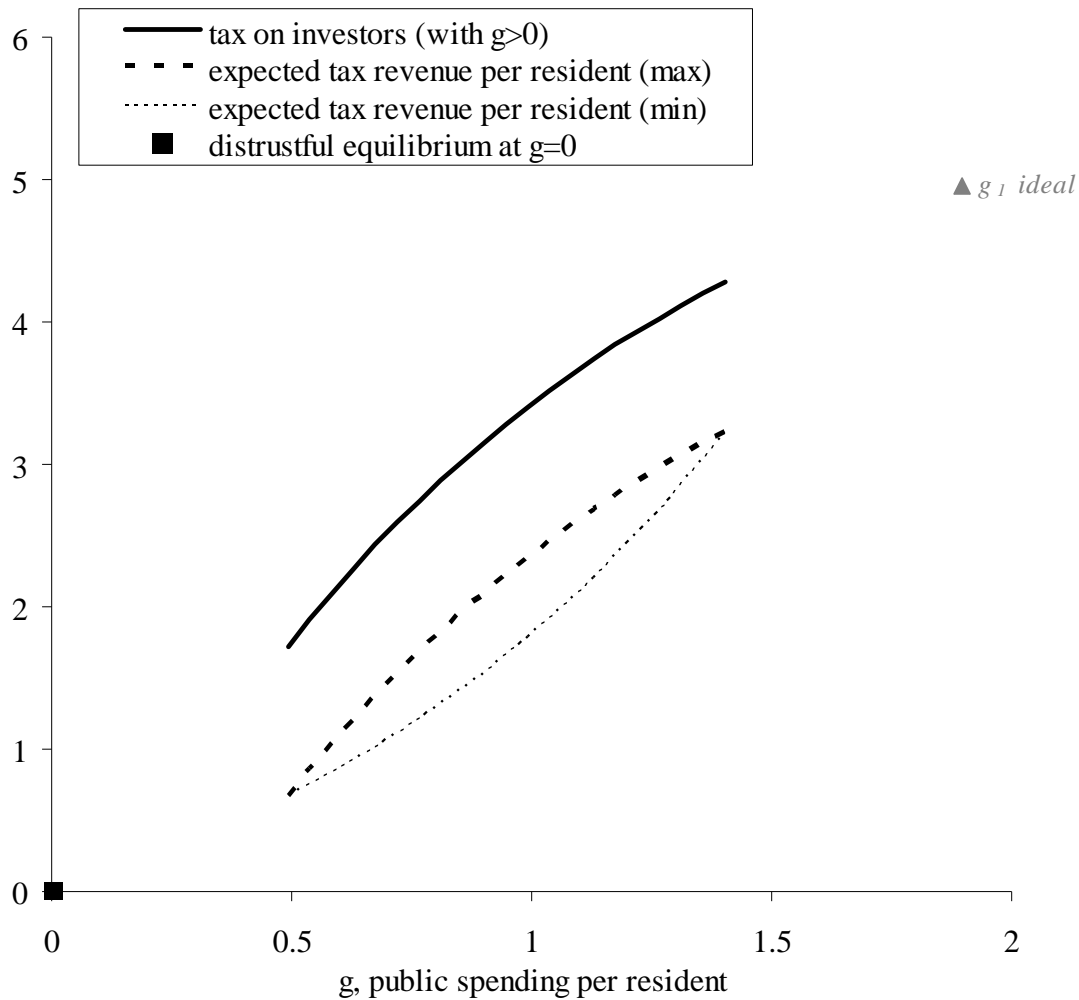


Figure 1. Possible equilibrium levels of public spending g , with the corresponding tax τ on investors, and the potential expected tax revenue $\tau\phi$ per resident, in centralized autocracy, for an example with $\pi(g)=1-e^{-g}$, $S=7$, $k=1$, $\beta=0.95$, $\varepsilon=0$; compared to the ideal g_1 in local democracy.

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