# LOCAL AGENCY COSTS OF POLITICAL CENTRALIZATION[*]

by Roger Myerson, August 2020

http://home.uchicago.edu/~rmyerson/research/localagency.pdf

**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 prefer to 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.

"*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 investments 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 Basis of a Backward Society* ultimately concluded (in chapter 9) that local development was

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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 (2017) 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. 2018).[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 Treisman 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 different regions, then a geographically-based governing coalition could use such flexibility to

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[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.

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 misrepresent 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 (see also Gehlbach 2006). 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. Martinez-Bravo, Padro i Miquel, Qian, and Yao (2017) offer a model where the central government faces fundamental trade-offs in the question of whether to delegate selection and retention of local officials to local residents, as the residents have better information about officials' abilities but might also have different preferences over public policies.

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 but make valuable contributions to the national leader.

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 who have made valuable 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 generate highly accurate estimates of the local official's actual public spending, and we will allow that a 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 outcomes close to the residents' ideal are feasible when the responsible official is accountable to the residents in autonomous local politics. Then section 4 adapts the model to the case of towns that are governed by a centralized autocratic regime. We assume that the autocratic 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 an autocratic 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.  In section 5, we consider various modifications of our assumptions from section 4, many of which can be interpreted as allowing various constitutional constraints on the national ruler.  Conclusions are summarized in section 6.

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

Imagine a remote town or district in a large nation.  Let n denote the number of residents who live in this town, far from the nation's capital.  Each resident in the town has a small enterprise which requires the resident to make a private investment k 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.  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 total spent on the town's local public services is ng (so that g is the local public spending per resident), each resident's enterprise will have an independent probability $\pi(g)$ of success.  Everyone is risk neutral and discounts future income with an annual discount factor $\beta$.  Here $n > 0,\ 0 < \beta < 1,\ S > k > 0,$ and $\pi(g)$ is an increasing, concave, and differentiable function of $g \geq 0$, with $0 \leq \pi(g) < 1$ for all g and $\pi(0)S < k$ (so that nobody would invest when g=0).

The basic moral-hazard problem here is that the local official cannot be prevented from stealing the 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 $\beta$, 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

$$\pi(g_1)S > k + g_1 + r(g_1).$$

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.

When local public spending is g per resident, the number of successful enterprises in the town will be a Binomial random variable with parameters n and $\pi(g)$. So when the town's population n is large, the fraction $\omega$ of successful enterprises in the town will be an approximately Normal random variable with mean $\pi(g)$ and standard deviation

$$\sigma_n(g) = [\pi(g)(1-\pi(g))/n]^{0.5}.$$

For any g, this standard deviation $\sigma_n(g)$ is less than $0.5/n^{0.5}$, which goes to 0 as n becomes large, and so the residents of a large town can together generate a good statistical estimate of what their official has actually spent on public services. So we can now show how a threat to dismiss the official if this estimate is low can motivate the official to choose a level of public spending that is close to the efficient amount $g_1$.

## 3. Efficient provision of local public services with decentralized democracy

In our simple model, let us consider games of the following form for holding the local official democratically accountable to the residents of the town. Each year, the local official is

given some per-resident budget b 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 succeeded meets or exceeds some given threshold $\theta$, then the official will be paid the additional salary $\rho$ per resident and will be retained in office to serve again next year. Otherwise, if the fraction who report successes is less than $\theta$, 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. In any case, let us assume that the end-of-year salary $\rho$ 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. The total cost of local government per resident, which the residents must pay in taxes, is then $\tau = b+\rho$.

(To see how a retention threshold $\theta$ that is different from 1/2 could be implemented with familiar institutions of local democracy, we may suppose that the local official is a town manager who is appointed to one-year terms by an elected town council. At the end of each year, before renewing the official's contract, the council is expected to poll all the residents and then renew the official's contract if and only if at least a $\theta$ fraction of the residents express approval of the official's performance. Council elections may be held at a different time, but there can be an equilibrium in which council members expect to be re-elected if and only if they have always faithfully implemented the appropriate $\theta$-retention rule.[2])

Now let us consider a version of this game where the threshold fraction of residents' votes that an official needs for retention is $\theta = \pi(g_1)$, the expected fraction of successes with efficient public spending $g_1$. Suppose that official will get a per-capita budget b that is slightly larger than $g_1$, and, if retained, the official will get a per-capita salary $\rho$ that is slightly larger than $r(b) = (1-\beta)b$. The following proposition asserts that, when the local population n is large enough, the local-accountability game has a stationary equilibrium in which the local official always spends at least $g_1$ on public services, and residents always make the private investment k.

***Proposition 1.*** Consider a local-accountability system where the required fraction of successes for retaining the official is $\theta=\pi(g_1)$. Suppose that the official's per-capita budget b and

salary $\rho$ satisfy $b > g_1$, $\rho > r(b)$, and $k+b+\rho < \pi(g_1)S$. Then, when the local population n is sufficiently large, there exists a stationary equilibrium in which the official chooses per-capita public spending g to satisfy $g>g_1$, and all residents make the private investment k.

*Proof of Proposition 1.*  The value to the local official of being retained must be at least $\rho+\beta b$, because after retention the official would be able to collect this period's salary $\rho$ and then steal next period's budget b.  But $\rho+\beta b > r(b)+\beta b = (1-\beta)b+\beta b = b$, and so the local official's value of being retained must be at least b.

Let $Q_n(g)$ denote the probability of passing the retention threshold $\pi(g_1)$ when the number of residents is n and the official chooses to spend g per resident on local public services.  Let $\omega$ denote the random fraction of residents who will have successes, so that the official passes the retention threshold when $\omega \geq \pi(g_1)$.  But $(\omega - \pi(g))/\sigma_n(g)$ approaches a standard normal random variable as $n \to \infty$, where $\sigma_n(g)$ goes to 0 uniformly in n.  Now select any small $\varepsilon$ such that $\varepsilon > 0$, $g_1 + \varepsilon < b$, and $\varepsilon < b/4$.  Then we have

$$\lim_{n \to \infty} \max\{Q_n(g)| \ g \leq g_1\} \leq 0.5,$$

$$\lim_{n \to \infty} \max\{Q_n(g)| \ g \leq g_1 - \varepsilon\} = 0,$$

$$\lim_{n \to \infty} \min\{Q_n(g)| \ g \geq g_1 + \varepsilon\} = 1.$$

If the local official chooses any per-capita public spending level g that satisfies $g \geq g_1 + \varepsilon$ then, with large n, the probability of retention $Q_n(g)$ gets arbitrarily close to 1, and so the local official can get a level of total expected per-capita payoff that is greater than b (where this total includes $b-g>0$ now, plus an expected continuation value that is arbitrarily close to b).  But if the local official chose any per-capita public spending level g that satisfied $g \leq g_1 - \varepsilon$ then, as n gets large, the probability of retention $Q_n(g)$ would get arbitrarily close to 0, and so the local official 's expected total per-capita payoff would be arbitrarily close to $b-g \leq b$, which cannot be optimal.  And for all sufficiently large n, it also cannot be optimal for the local official to choose any per-capita public spending level g that satisfies $g_1 - \varepsilon \leq g \leq g_1$, because increasing the per-capita spending to $g_1 + \varepsilon$ would cost the official at most $2\varepsilon$ now and would increase the probability of retention by at least 0.5, and so the expected future benefit of at least 0.5b is greater than the current cost of $2\varepsilon$ (with $\varepsilon < b/4$).

Then with local public spending greater than $g_1$ per capita, a resident's expected after-tax gain from investing k is at least $\pi(g_1)S{-}k{-}b{-}\rho > 0$ by assumption, because $b{+}\rho$ is close enough to $g_1{+}r(g_1)$ to keep this expected gain positive. Thus, all residents are willing to maker their private investment k in this equilibrium. ***Q.E.D.***

In this equilibrium, expected official behavior is the same each year, and the residents' voting strategies are stationary, in that each resident's vote depends on the outcome of the resident's enterprise in the same way each year. Each resident is assumed to vote sincerely on their local official's retention each year, voting for retention if and only if resident's enterprise has been successful this year. Here the residents are willing to vote sincerely on their local official's renewal because their future expected payoffs would be 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 this perturbation, let us introduce in each year a small independent probability $\delta>0$ 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. In a stationary scenario where local public spending each year is expected to be g per resident and where the official is expect to get $\rho$ per resident in salary, a new official would offer each resident an expected payoff of $\pi(g)S{-}k{-}g{-}\rho$ next year. But if the current official is retained then a resident who had a success this year would expect next year's net payoff to be $[(1{-}\delta)\pi(g){+}\delta]S{-}k{-}g{-}\rho$, while a resident who had a failure this year would expect next year's net payoff to be $(1{-}\delta)\pi(g)S{-}k{-}g{-}\rho$. Notice that

$$[(1{-}\delta)\pi(g){+}\delta]S{-}k{-}g{-}\rho > \pi(g)S{-}k{-}g{-}\rho > (1{-}\delta)\pi(g)S{-}k{-}g{-}\rho,$$

and so each resident would strictly prefer to retain the official after a success but to dismiss the official after a failure. This $\delta$-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. Proposition 1 still holds with the tightened condition $k{+}b{+}\rho < (1{-}\delta)\pi(g_1)S,$ so that residents who had a failure last year will still want to invest in the $\delta$-perturbed game.

Applying Proposition 1 with b and $\rho$ very close to $g_1$ and $r(g_1)$, we find that public spending that is arbitrarily close to the optimum for the residents can be sustained in a stationary equilibrium with rational behavior by officials and voters in a large town, in this simple game

model where officials are democratically accountable to the local residents.  This equilibrium would still hold even if the residents who chose not to invest k could avoid the tax $\tau = b + \rho$, because they get a positive expected gain from investing even after paying the tax, as $\pi(g)S - k - \tau > 0$.  Notice also that, in this equilibrium, each resident's vote on the retention question depends only on the resident's private information about the success or failure of his own enterprise, and so there is no need for any communication among the residents before they vote.

The equilibrium that is considered in Proposition 1 is not the only possible equilibrium of this game with local accountability of officials, however.  This good equilibrium, where the official appropriately invests most of the 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 official 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.  So a resident may 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.

In our analysis, the moral-hazard rent $r(g)$ that a local official must expect each year to spend g on local public services implies that this office has a substantial expected value that

candidates should be willing to pay to get it. The ex-ante present discounted value of these moral-hazard rents is $r(g)/(1-\beta) = g$, and so a candidate with sufficient liquid assets should be willing to pay up to $g$ per resident for the right to manage an annual budget of $g$ per resident in this local office. This prepayment could be distributed as a one-time payment of $g$ to each resident, which would allow them to capture the anticipated value of the official's moral-hazard rents. When the local official is hired with such a prepayment, the present discounted value of benefits for each resident is

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

This value is maximized by setting $g$ equal to $g_2$ such that

$$\pi'(g_2) = 1/S.$$

Notice that $\pi'(g_2) = 1/S < (2-\beta)/S = \pi'(g_1)$ and so $g_2 > g_1$. Thus, when the residents can get a prepayment that lets them capture the expected value of the official's moral-hazard rents, then they would prefer this strictly larger level of per-capita public spending $g_2$. It is straightforward to prove a modified version of Proposition 1 in which $g_2$ replaces $g_1$.

However, the residents would only prefer the higher level of spending $g_2$ ex ante, before they receive the candidate's prepayment to become their local official. Once the prepayment is in their hands, the residents' future annual expected benefits will be $U(g_2)$ under this scheme, and $U(g_2) < U(g_1)$. (The official's prepayment $g_2$ could not be converted into a series of annual installments $(1-\beta)g_2$, because the obligation to pay such annual installments would cancel out the official's anticipated benefit of future moral-hazard rents $r(g_2)$, which provide the essential motivation for not stealing the budgeted funds $g_2$ in any given year.)

The practice of requiring a prepayment from a new local official may help the residents to capture the cost of moral-hazard here, but it also creates a new kind of moral-hazard problem. The prospect of getting such a prepayment whenever a new local official is appointed would create a substantial temptation to dismiss the incumbent official regardless of the quality of official's recent performance. But for a local official who expects to be dismissed just so that her office can be re-sold, there would be no incentive to spend anything on local public services. Thus, a recurrent practice of charging prepayments for appointment to office here could simply induce a distrustful equilibrium, and so the town could be better off banning any payments to the voters from candidates for local office.

**4. Inefficient failures of local accountability under centralized autocratic rule**

Now let us suppose instead that an autocratic national ruler has power over local governments in towns like the one that we described in section 2. That is, we assume in this section that the power to appoint and dismiss local officials is held by the national ruler. We allow here that the ruler can ask residents to express their views about the quality of the public services that the local official has provided. But the assumption of autocratic rule implies that the ruler's ultimate control over decisions to appoint and dismiss local officials cannot be constrained by anybody else. Our analysis of centralized autocracy here will show how the ruler's unconstrained power in such a regime can create central moral-hazard constraints that reduce national welfare strictly below what an autonomous local democracy could achieve in section 3.

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 high-ranking members who are active in national politics. Under this principle, decisions about retention and dismissal of local officials should be guided by a preference for local agents who are expected to provide more tax revenue and political contributions to the center. We are assuming here that there is no constitutional mechanism to prevent the autocratic ruler from accepting valuable contributions from appointed officials.

This assumption deserves some discussion. Under any political system, a national leader must occasionally face rivals for power, and success in these contests will depend on the leader's ability to mobilize active support from many individuals. Then expectations of future rewards will be essential for motivating supporters' costly political efforts, and so any successful leader needs a reputation for reliably distributing patronage benefits to those who have contributed vital support in national politics. Thus, a successful ruler with power to appoint local officials should be expected to distribute these offices with their moral-hazard rents as valuable rewards for past political service and contributions. That is, to succeed in national political competition, the ruler should be expected to use local offices as patronage rewards for active supporters. Indeed, I have argued elsewhere (Myerson 2008, 2015) that even an autocratic ruler must establish institutions to guarantee that his national political supporters can expect to get and keep valuable

patronage appointments as rewards for their past contributions.[3] From this perspective, a norm against national political contributions from officials who got their offices by such political contributions would seem quite implausible.

Under autocratic rule, the local residents have no political power to elect any local or national officials. But we assume here that the residents still have the economic power of deciding whether to make private investments that enlarge the tax base. That is, we assume that residents can make their own decisions each year about whether to make the investment k in their private enterprise. The ruler can impose taxes on these enterprises, but a resident who does not invest can avoid these taxes. So in our model, the act of "investing" could be interpreted as a decision to open a business in the formal sector which can be taxed by the government, as opposed to operating less productively in an untaxable informal sector.

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 the actual public spending g (through the individual's success probability $\pi(g)$).

Let $\tau$ denote the tax that the national government can collect each year from each resident who invests k in a private enterprise. 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 act of investing in a formal enterprise is publicly observable and taxable. Any nonnegative tax $\tau$ in some feasible set T may be specified by the ruler at the beginning of each year, but the residents' ability to avoid taxation by not investing implies that the ruler cannot collect any tax larger than S−k. ($\tau \geq$ S−k would

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[3] Myerson (2008, 2015) argued that an institution like the autocrat's princely court can function as a deterrent against the ruler's temptation to dismiss an official prematurely so as to re-sell the office to a new contributor. A national ruler could credibly require pre-payments to capture the value of ex-post moral-hazard rents, where dispersed residents could not in our model of section 3, as long as any conditions under which the ruler should be expected to dismiss an official can be monitored and verified by senior courtiers, who indeed are regularly responsible for conveying such information to the ruler.

imply that $\pi(g)S-k-\tau < 0$ for all g, as $0 \le \pi(g) < .1$) Thus, we can assume that the ruler will choose a tax $\tau$ such that

$$0 < \tau < S-k.$$

The ruler or the local official can solicit information from residents about the success or failure of their enterprises. Given the potential political sensitivity of this information, the ruler or a local official might gather such information by a network of secret informants. Indeed, let us assume here that residents will provide this information honestly to such informants, as long as the residents' individual tax payments do not depend on their responses. For simplicity, let us also assume that a resident who does not invest in an enterprise can still learn, at the end of the year, whether his enterprise would have been a success, as if the outcome of his enterprise would have depended on a binary random quality of local public services at his individual location.[4] 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 to retain an official who diverted funds from local public spending to other activities that benefit the ruler. This is the central moral-hazard problem of a centralized autocracy.

As before, let b denote the per-capita budget that the local official will get at the beginning of each year. We take b as a fixed parameter here, as it may consist of local resources that the official can extract from the town even if nobody invests in a formal enterprise. Then let $\rho$ 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, $\rho$ will be paid to this year's incumbent, if retained, or else to the newly appointed replacement.) We may assume that, at the beginning of each year, the ruler can specify the salary $\rho$ in some range of feasible values that satisfy $\rho \ge b(1-\beta)$ (so that retaining the salary $\rho$ forever would be better than stealing one year's budget b).

In any given year, a local official can actually use the locally available budget 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

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[4] This assumption means that an increase of local public spending this year can increase the probability of any resident becoming more inclined to invest next year. We make this assumption because it actually strengthens our main result, given that the main result here is to derive a severe upper bound on the amount of local public spending that a centralized autocracy can motivate. The incentive for officials to spend on local public services is greater under this assumption than under the alternative assumption that non-investors would get no information about the quality of local public goods at their location (so that this year's local public spending would not affect the current non-investors' probability of investing next year). The derivation of any upper bound on public spending becomes a stronger result when we make assumptions that tend to increase incentives for such spending.

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. We allow that the official can make the contributions to the ruler after collecting information about how many residents would have successes this year, and so we may write $h = h(\omega)$, where $\omega$ denotes the fraction of residents who had successful enterprises this year (or would have had successful enterprises if they invested).

Each year, the official can choose $g \geq 0$ and then $h(\omega)$ subject to $b-g \geq h(\omega) \geq 0$. The official's personal consumption this year will then be $\rho+b-g-h(\omega)$ per resident if the official is retained, but the official will get only $b-g-h(\omega)$ per resident this year and 0 thereafter if the official is dismissed at the end of this year. Each resident must decide independently whether to invest or not at the start of the year, knowing $\tau$ but not knowing $\rho$ or g. Then a resident who invests will either 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, because residents cannot be compelled to pay the tax $\tau$ unless they invest. Let $\phi$ denote the fraction of the residents who chose to make the taxable investments at the beginning of this year. Then the ruler's net payoff from the town will be $\phi\tau+h(\omega)-\rho$ per resident. We continue to assume that everyone is risk neutral and discounts future payments by the annual discount factor $\beta$.

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 $\delta>0$ 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, where each resident's investment decision depends only on the resident's success or

failure in the previous year (which can affect current-year payoffs when $\delta > 0$). 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, would imply stationary strategic behavior.[5]

For any h between 0 and $\beta b$, there is a stationary equilibrium in which the official always contributes h to the ruler, spends nothing on local public services (g=0), diverts all other resources 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, the spending on local public services g 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. For a tighter bound on g, let us define $g_0$ so that $\pi'(g_0) = 1/(\beta(S-k))$.

*Proposition 2:* In any stationary equilibrium of the centralized autocracy, we must have $\pi(g)S-k-\tau \leq \delta\pi(g)S$. A stationary equilibrium can have positive local public spending g>0 only if $[(1-\delta)\pi(g)+\delta]S-k \geq \tau \geq 1/(\beta\pi'(g))$, and in such an equilibrium the expected fraction $\varphi$ of residents who invest much satisfy $1-\varphi \geq (1-\pi(g))/(\beta\pi'(g)\tau) > 0$. Such a feasible g must satisfy $g < g_0 < g_1$, where $g_1$ is the residents' ideal.

*Proof of Proposition 2:* If there is no local public spending in equilibrium (g=0), then we would get $\pi(g) = 0$, which implies $\pi(g)S-k-\tau < 0 \leq \delta\pi(g)S$. So we only need to consider here how positive local public spending (g>0) could be sustained in a stationary equilibrium.

The fraction of residents $\varphi$ who will invest next year is determined by the residents' strategies and the success-or-failure outcomes that they observed this year. By stationarity, the incumbent official or a replacement would be expected to behave the same next year except in the $\delta$-probability event that the retained incumbent would repeat this year's performance. In this

δ-probability event, next year's local public spending g, success-fraction ω, and contribution h(ω) would be the same as this year, and the investing fraction φ two years from now would be the same as next year. Let g*, h*, φ* denote the expected values of these quantities in the stationary equilibrium, which the ruler could get by replacing the local official. Then the ruler would prefer to replace the incumbent official if this year's h and next year's φ satisfy $h+\beta\tau\phi < h*+\beta\tau\phi*$, whereas the ruler would prefer to retain the incumbent official if $h+\beta\tau\phi > h*+\beta\tau\phi*$. So the minimal contribution per resident h from the local official to the ruler that would induce the ruler to retain the official is $h*+\beta\tau\phi*-\beta\tau\phi$.

In the residents' stationary strategies, let $\nu_1$ denote the probability that a resident would invest after success in the previous year, and let $\nu_0$ denote the probability that the resident would invest after failure in the previous year. Then the expected fraction who will invest next year is $\phi = \omega\nu_1+(1-\omega)\nu_0$. Thus, the minimal contribution (per resident) to the ruler that the local official would have to provide in order to earn retention is

$$H(\omega) = h* + \beta\tau\phi* - \beta\tau(\omega\nu_1+(1-\omega)\nu_0) = h* + \beta\tau(\phi*-\nu_0) - \beta\tau(\nu_1-\nu_0)\omega.$$

Notice that $H(\omega)$ is a decreasing function of ω. Depending on the success-fraction ω, there are three possibilities to consider. First, when ω is very high, we could have $H(\omega)<0$, but then the local official should choose $h(\omega)=0$ as retention can be expected without any positive contribution to the ruler this year. Second, when ω is very low, the required contribution $H(\omega)$ may be so large that it would cancel out all expected gains from retention, and so the local official should instead contribute $h(\omega)=0$ and accept payoff 0 from dismissal thereafter. In the intermediate third case which remains, the official should make a contribution of $h(\omega) = H(\omega)$ per resident to the ruler, who will then re-appoint the official.[6]

As ω varies across these three cases, the expected discounted future payoffs for the official vary continuously in ω. The official's present discounted value of anticipated consumption is independent of ω when the first or second case applies, and in the third case the official's discounted value depends on $H(\omega)$ with slope $\beta\tau(\nu_1-\nu_0)$. This slope is the rate at which the required contribution to the ruler decreases as the fraction of successes in the town increases, because of the increase in expected tax revenue next year.

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[6] Of course the ruler would be equally willing to dismiss the official after this minimal $H(\omega)$ contribution, but the official could eliminate any risk of dismissal by contributing any amount infinitesimally more than $H(\omega)$.

Now suppose that we have a stationary equilibrium where the official chooses a strictly positive local public spending g>0. In any given year, if the local official slightly decreased public spending by some small amount $\Delta$, the direct effect would be to increase the official's consumption that year by this amount $\Delta$. The only deterrent against the diversion of $\Delta$ from public spending is that this decrease in public spending will tend to decrease the stochastic fraction of successes $\omega$ for residents this year. Specifically, an infinitesimal diversion $\Delta$ from public spending g will decrease the expected value of $\omega$ by $\pi'(g)\Delta$. But a decrease in $\omega$ will decrease the official's expected discounted value only in the third case described above, and then at the linear rate of $\beta\tau(v_1-v_0)$. So the expected decrease in the official's expected value at the end of the year is bounded above by $\beta\tau(v_1-v_0)\pi'(g)\Delta$. Thus, to deter the official from diverting a small positive $\Delta$ from public spending to consumption, we need

$$\beta\tau(v_1-v_0)\pi'(g)\Delta \geq \Delta.$$

So a stationary equilibrium with strictly positive local public spending g>0 must satisfy

$$\beta\tau(v_1-v_0)\pi'(g) \geq 1.$$

With $\pi'(g)>0$, this inequality implies $v_1 > v_0$. As the investment probabilities $v_1$ and $v_0$ must both be between 0 and 1, the difference $v_1-v_0$ cannot be more than 1, and so we must have

$$\tau \geq \tau(v_1-v_0) \geq 1/(\beta\pi'(g)).$$

Then also $\pi'(g) \geq 1/(\beta\tau) > 1/(\beta(S-k)) = \pi'(g_0) > (2-\beta)/S = \pi'(g_1)$, and so $g < g_0 < g_1$.

The inequality $v_1 > v_0$ also implies that the investment probabilities satisfy $v_1 > 0$ and $1-v_0 > 0$. In equilibrium, these strictly positive probabilities require that residents who have had a success last year must be willing to invest this year, and residents who have had a failure last year must be willing to not invest this year. That is, the expected payoffs from investing for each type of resident must satisfy

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

In any year, the residents who do not invest include those who do not invest after failure, and so

$$1-\varphi \geq (1-\pi(g))(1-v_0) \geq (1-\pi(g))(v_1-v_0) \geq (1-\pi(g))/(\beta\pi'(g)\tau).$$

Thus we have derived all the inequalities in the proposition. ***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 $\delta S$ here.  That is, the residents cannot substantially benefit from local public services when their only power to motivate these services is their willingness to disinvest from the local economy.  In the framework of our model, Proposition 2 implies that, even after a success in the previous year, a resident's expected profit from local private investment cannot be greater than $\delta S$.

The necessity of a positive strategic probability of noninvestment among residents who had a failure last year implies here 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.

An equilibrium with positive public spending g must satisfy the key inequality $\beta\tau\pi'(g)\geq1$.  Otherwise a small diversion of funds from public spending could decrease the ruler's expected discounted value of tax revenue next year by less than the diversion itself, so that, even after fully compensating the ruler for the expected revenue loss, a positive fraction of the diverted funds would remain for increasing the local official's own consumption.  This inequality implies $g < g_0$ because  $\beta(S-k)\pi'(g_0) = 1$,  $\tau < S-k$,  and $\pi$ is concave.

[*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 $\delta$=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 $U(g_1)+r(g_1)+g_1 = \pi(g_1)S-k = 4.95$.  The bound from Proposition 2 here is $g_0$=1.74.  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 $\varphi$ of residents who invest is between 0.39 and 0.75, and the investing residents' expected profits are completely taxed away.[7] 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 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 conditions of Proposition 2 then could not be satisfied with any g>0.

## 5. Alternative assumptions

The essential difference between models of Proposition 1 and Proposition 2 is that the functional dependence of the official's retention on the residents' votes is guaranteed in the models of Proposition 1, but the retention is subject to the ruler's discretion in the models of Proposition 2. We could take any instance of Proposition 1 (where b and $\rho$ are taken as given), with the assumptions that residents vote without any other communication and that residents who do not invest can avoid the tax $\tau$=b+$\rho$, and we could convert it into a game covered by Proposition 2 by just making the following changes: First the residents' votes for or against the local official are observed only by the ruler and the official, after which the official can make a contribution to the ruler, and then the ruler can make the decision about whether to retain the official or not, unconstrained by the residents' votes.

The results in Proposition 2 depend on the assumption that the government can tax only the residents' investments, not the income that is randomly generated by these investments. Our model is intended as an approximation of less-developed countries where governments lack the ability to audit many transactions in the largely-informal economy, so that individuals' tax

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[7] For any g in the interior of this interval, the investing fraction $\varphi$ 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 $\varphi$ is where successful residents invest with probability 1. At the minimal $\varphi$, unsuccessful residents have probability 0 of investing.

liabilities could depend primarily on their decisions about whether to undertake a taxable formal enterprise at all. But if the government could directly observe and tax the income of individual enterprises, then an increase in this year's local public spending could increase the ruler's revenue directly through the increase in current productivity, not just indirectly through the stimulation of future investment (which depends on the residents' elasticity of demand for investment). One extreme plan would be for the ruler to essentially take ownership of these enterprises by subsidizing the investment ($\tau = -k$) and then taxing 100% of the successful returns S, so that the ruler would then have a direct incentive to insist that local officials should spend at least $g_1$ for local public services. However, any positive tax $\lambda$ on the returns to successful enterprises could create other costly moral-hazard problems in a slightly more complicated model where the amount that an individual invests is a decision variable. (Imagine that investing residents could unobservably choose their level of private investment k in some positive interval $[k_1, k_2]$, and suppose that their probability of success $\pi(g,k)$ would depend on both the public services g and their unobservable private investment k. Then a resident's choice of k to maximize $\pi(g,k)(S-\lambda)-k-\tau$ could be inefficiently reduced by any $\lambda > 0$.)

Our 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 overall fraction of successes $\omega$ in the town; and so they could motivate government officials to spend close to the efficient amount $g_1$ (as in Proposition 1) by threatening that nobody would invest if the fraction of successes was less than $\pi(g_1)$ in the previous year. But without freedom of speech, such a collective threat cannot be credible. If the fraction of successes were less than $\pi(g_1)$, the autocratic ruler would prefer to use his power over political communication to prevent the residents from learning the bad news that would reduce their taxable investments next year. 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 2 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, our analysis suggests how a ruling elite could actually gain by allowing its subjects to publicly express complaints about local

government services, to reduce the costs of moral hazard in a centralized autocratic regime. (See Lorentzen 2013.) 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 must have some power to punish the ruler in the longer term if this commitment were violated. Then, however, we would no longer be considering a pure autocracy but instead a form of constitutional government.

The enforcement of constitutional constraints can generally be modeled by non-stationary equilibria of a larger political game, where leaders who have been seen to violate any of these constraints would lose their supporters' trust and thus forfeit their privileged status as political leaders. For our analytical model of pure autocracy here, we have focused on stationary equilibria so as to avoid the introduction of any implicit constitutional constraints. Of course pure autocracy is just a theoretical abstraction, and now we should consider how various constitutional constraints on the national ruler might mitigate or exacerbate the impossibility results of Proposition 2.

There are many possible norms or constraints on political leaders that could become effective constitutional constraints, once people have some basic constitutional protection for freedom of speech so that they can share information about their leaders' violations of these norms. Let us discuss here three such norms that can mitigate the conditions of Proposition 2: a norm against national leaders accepting political contributions from local officials, a norm against national leaders retaining any appointed officials whose local public services have dissatisfied too many residents, and a democratic norm that requires national leaders to leave office when they lose a competitive election.

The basic problem here is that a ruler might not want to punish a centrally-appointed official who diverts resources from local public services to national political contributions which the ruler values more. This problem could obviously be solved if the acceptance of such contributions from local officials would be generally seen as a scandal that could undermine the ruler's legitimacy and cause his downfall. But as we have seen, such a norm would be inconsistent with the fundamental imperative (analyzed by Myerson 2008, 2015) for a leader to use patronage appointments as rewards for political support.

The basic problem here could also be solved by a constitutional norm stipulating that the ruler must not retain any local officials who do not have sufficient popular approval from the

communities that they serve. Such a norm could be sustained if there were a general understanding that the ruler's legitimacy depends on his never retaining a local official whose public service is not viewed favorably by some at least minimal fraction of the community. But of course such a norm would be essentially equivalent to a constitutional decentralization of power over these local offices.

We might imagine a mixed system where communities have the power to dismiss their local officials, while the national ruler holds the power to appoint a new local official whenever an office becomes vacant. Such a system would enable the ruler to capture the value of the local offices' moral-hazard rents, by distributing these offices as rewards for national political service, while maintaining the local accountability for local public services that can give people confidence to invest in the tax base. But with local accountability, the ruler cannot use local offices as rewards without making his reputation for reliably rewarding supporters dependent on local voters' approval and thus vulnerable to their distrust, which might be fomented by hostile political agitators. Conversely, if the ruler has enough autocratic control to prevent any possibility of hostile agitation, then it could be difficult for the ruler to assure his active supporters that a decentralized vote to dismiss a local official was not caused by the ruler himself secretly encouraging residents to vote against retention so that he can re-sell the office for new contributions. Each of these effects could undermine the ruler's reputation for reliably distributing patronage benefits to supporters, on which his power ultimately depends (see Myerson 2008). We should not expect an autocratic ruler to voluntarily adopt a system that could raise such perilous doubts about the essential reliability of his patronage.

Furthermore, autonomous local governments can 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). This possibility of creating new rivals for national political power is another reason why incumbent national leaders may be reluctant to promise political autonomy for local governments, even when such autonomy could encourage private investments in the tax base. This effect can be exacerbated when democracy is introduced at the national level, as a popular local mayor could then become a strong candidate for national leadership in the next regularly-scheduled election. (In Pakistan before 2013, for example, democratic local governments were established three times under military rule, and each time these local democratic institutions were dissolved when democracy was restored at the

national level; see Cheema, Khan, and Myerson, 2015.)

Democratic accountability of the national government clearly has potential to improve residents' welfare, relative to the stark results of Proposition 2, which depended on the assumption that local residents could affect their national leader only by their economic power to disinvest from the tax base. National democracy gives the residents a political power to replace their national leadership, which can certainly motivate the incumbent leader to ensure that a majority of voters should get public services that are at least as good as they would expect from a rival candidate. Thus, national democracy can relax the conditions which, in Proposition 2, implied that powerless residents could not expect substantial benefits from local investments.

We might hope that, if people understand that local accountability is essential for better local public services, then candidates for national leadership should feel some competitive pressure to promise that they will make local officials accountable to local voters. Such promises could effectively create local popular accountability, as in Proposition 1, even when democracy has been formally instituted at only the national level. However it is hard to find evidence of such spontaneous decentralization in centralized democracies. All the reasons why autocratic national leaders may prefer to keep control of local offices can apply also to democratically elected national leaders. In particular, when a candidate's electoral success depends on having money for campaign spending (as well as policy positions that are attractive to voters), then democratic candidates for national leadership may feel a competitive imperative to use at least some local offices as patronage prizes for campaign contributors.[8]

## 6. 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 by giving local

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[8] Here is a simple model. Consider a nation that is divided into many equal-sized districts, each of which is administered by a local official. Suppose candidates 1 and 2 are competing democratically for national leadership, and each candidate can decide, for each district separately, whether to (1) let local residents fill the local office by popular election or (2) sell the local office to an active supporter for some fixed campaign contribution h. Suppose some given $\alpha$ fraction of the voters are uninformed impressionable voters whose votes will split between the two candidates in proportion to their campaign spending, which will be financed by the sale of local offices. The remaining $1-\alpha$ fraction of the voters will rationally vote for the candidate who promises them control of their local official, if only one does so, and otherwise will split their votes symmetrically between the two candidates. Let $x_i$ denote the fraction of districts where candidate i chooses to sell the local office. Then, the expected vote difference $\alpha(x_1-x_2)/(x_1+x_2)+(1-\alpha)(x_2-x_1)$ should be maximized over $x_1$ and minimized over $x_2$. In equilibrium, the fraction of districts that each candidate will choose to keep as centrally controlled patronage prizes will be $x_1 = x_2 = \min\{0.5\alpha/(1-\alpha), 1\}$.

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. That is, centralization raises the possibility that a local official could neglect local public services in a way that seriously reduces the local tax base but then could mollify national leader and avoid dismissal by offering greater contributions to the center. 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, when 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 local public services, even though their complaints would seem ex post to be against the government's interests.

We discussed how other constitutional constraints on the leaders of the national government can help to build people's confidence in the provision of local public services that they will need in a prosperous community. A system of democratic competition for national power can obviously generate more incentives for a national leader to insist on local public services that provide positive benefits for a large fraction of the population, relative to the lack of

such incentives that we found in our model of centralized autocracy. But we could not argue that national democratic competition would necessarily motivate candidates to promise local popular accountability of local government officials everywhere, because the ability to promise valuable local offices as patronage appointments may be an effective way for a candidate to raise national political contributions that are also essential for a successful campaign for national power.

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.

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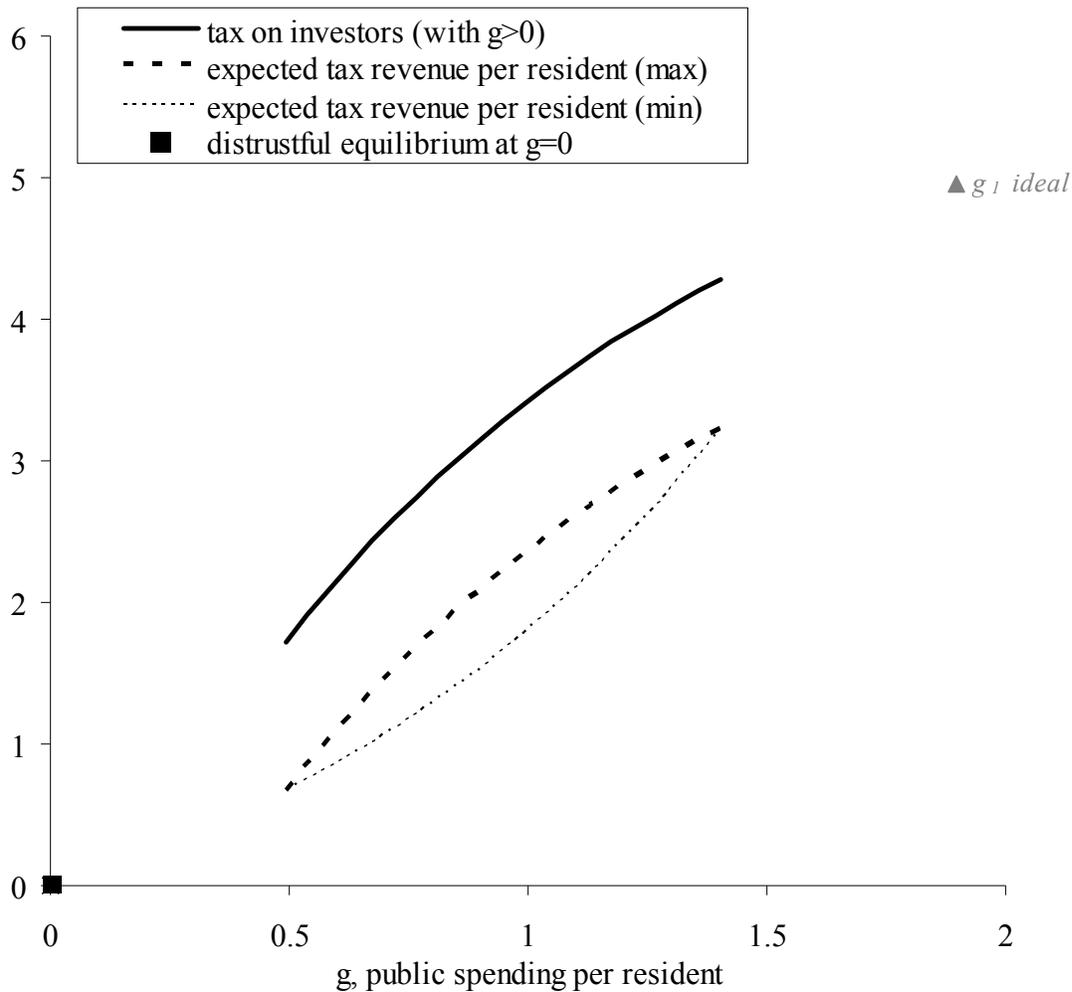http://www.cities-localgovernments.org/gold/upload/pocketbook_complete.pdf

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

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