Introduction

We consider a model of moral hazard in local public services which has an efficient solution which is feasible only when officials are accountable to local voters. (My QJPS '06: local entry for democracy; Prism '11: local stakes for state-building.)

Many have argued that political decentralization and community empowerment may be essential for successful economic development. (Banfield 1958, Fortmann 1983, Ostrom 1990, Mansuri and Rao 2013, Faguet 2012, 2014, Ponce-Rodriguez et al. 2012, ... UCLG GOLD 2007.) But Triesman (2007) argued that a unitary state could apply different policies in different regions, for regional differences or experimentation.

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 local power to punish local officials. Without such guarantees, local officials' careers may depend more on national political concerns, instead of local residents' evaluations of their public services. Such failure to ensure good public services can deter valuable private investments.
A simple model of moral hazard in local public services

Consider a remote town with n residents.
Each resident initially invests K to start an enterprise in the town.
Each year, each resident's enterprise may return S > 0 (success) or 0.
The probability of success is \( \pi(g) \), independently across residents and years,
in any year when ng is spent on local public services in the town.
Here \( \pi(\bullet) \) is increasing concave differentiable, \( \pi(0)=0 \), and \( 0 \leq \pi(g)<1 \ \forall g \geq 0 \).
Everyone is risk neutral, discounts future with annual discount factor \( \beta \), \( 0<\beta<1 \).

The budget for local public services must be managed by a local official who can
divert any portion to personal consumption, or flee with funds abroad.
The official prefers to retain office with annual salary \( nr \) rather than fleeing with
annual budget \( ng \) iff \( nr/(1−\beta) \geq ng \).

So to manage a budget of k per resident, the official must expect salary
\( r(g) = (1−\beta)g \) per resident per year (moral-hazard rents).

The only evidence of the official's actual spending is the Binomial (n,\( \pi(g) \)) number
of successes among residents' enterprises.
Optimal solution for residents with local accountability

A resident's expected annual benefit is $U(g) = \pi(g)S - (1-\beta)K - g - r(g)$. With $r(g) = (1-\beta)g$, this $U(g)$ is maximized by $g_1$ such that $
abla'(g_1) = (2-\beta)/S$.

To avoid a trivial solution, we assume $\pi(g_1)S > (1-\beta)K + g_1 + (1-\beta)g_1$.

A simple plan: official gets budget $b$, chooses per-capita spending $g \in [0,b]$, then is paid $\rho$ and retained in office if at least $\theta$ fraction of residents report successes. Let $Q(g,\theta,n)$ be the probability that the Binomial-$(n,\pi(g))$ number of successes will be at least $n\theta$: $Q(g,\theta,n) = \sum_{s \geq n\theta} \pi(g)^s (1-\pi(g))^{n-s} n! / ((n-s)!s!)$.

The official's optimal payoff $\bar{W}$ and induced public investment $\bar{g}$ satisfy

$\bar{W} = (b-g) + Q(\bar{g},\theta,n)(\rho + \beta \bar{W}) = \max_{g \in [0,b]} (b-g) + Q(g,\theta,n)(\rho + \beta \bar{W})$.

**Proposition 1.** For any $\varepsilon > 0$, renewal thresholds $\theta(n)$ and official salaries $\rho(n)$ can be set as functions of local population $n$ so that $\lim_{n \to \infty} \rho(n) \leq r(g_1) + \varepsilon$ and, with the efficient investment budget $b=g_1$, the induced public investment levels $\bar{g}(n)$ satisfy $\lim_{n \to \infty} \bar{g}(n) = g_1$ and $\lim_{n \to \infty} Q(\bar{g}(n),\theta(n),n) = 1$.

**Proof.** Use $\theta(n) = \pi(g_1) - \log(n)/n^{0.5}$ and $\rho(n) = (1/Q(g_1,\theta(n),n) - \beta)g_1 + \varepsilon$.

So $\pi(g_1) - \theta(n)$ is small but is a large multiple of $\sigma(g_1) = [\pi(g_1)(1-\pi(g_1))/n]^{0.5}$. This salary $\rho(n)$ makes official strictly prefer spending $g_1$ over stealing $g_1$.

(With $\theta \neq 1/2$, this result could be still achieved with majority voting, if voters on expected long side randomly abstain as in Feddersen-Pesendorfer 1996.)
Other equilibria and cost of political instability in local politics

In the equilibrium of Proposition 1, residents are indifferent how to vote, but their preferences could become strict in a version of the game perturbed as follows: In each of many wards, per-capita public spending may with small probability deviate from the official's chosen $g$, and only the official sees the deviations; each voter may with small probability be a type voting randomly $P(\text{Yes})=\pi(g_1)$. If fraction of Yes votes does not respond to a spending deviation in a ward, the official may expect more random voters there and so may spend less there. Then rational voters would strictly prefer to vote Yes for success, No for failure.

Voters would prefer to replace the official if they expected poor service in future, the official would prefer to steal the budget if she expected voters to replace her. Alternative equilibria could have random public "scandals" switching to such distrust every period with some probability $q$. Then official salary per resident would have to be at least $\hat{r}(g,q) = (1-\beta(1-q))g$.

The residents' net benefit $\hat{U}(g,q) = \pi(g)S - (1-\beta)K - g - \hat{r}(g,q)$ would be maximized by a $\hat{g}(q)$ such that $\pi'(\hat{g}(q)) = (2-\beta(1-q))/S$. Then public investment $\hat{g}(q)$ and residents' benefits $\hat{U}(g,q)$ are decreasing functions of the political instability parameter $q$. Residents could still expect to benefit as long as $\hat{U}(\hat{g}(q),q) > 0$. 
Optimal solution for a local aristocrat

With a local government that is less democratic but still politically autonomous, the town could have more public spending, but less benefits for typical residents. Suppose a local aristocrat can offer to serve as local official on terms that the other residents can only accept or reject, with no local public services if rejected. By offering to administer public services that cost ng, the aristocrat could hope to earn from each resident the amount \( U(g) + r(g) = \pi(g)S - (1-\beta)K - g \).

Aristocrat wants to maximize \( U(g) + r(g) \) subject to \( (\pi(g)S - (1-\beta)K - g)/(1-\beta) \geq g \).

Aristocrat's optimum \( g_2 \) satisfies \( g_2 > g_1 \) (normal case: \( \pi'(g_2) = 1/S \)).

(For any \( \epsilon > 0 \), we can pick \((b, \theta, \rho)\) with \( g_2 \geq b \geq g_2-\epsilon \), \( \pi(b) > \theta \geq \pi(b)-\epsilon \), \( \theta S - (1-\beta)K - b \geq \rho > (1-\beta)b \), such that, with annual per-capita budget \( b \), renewal threshold \( \theta \), and salary \( \rho \), induced levels of public spending \( \bar{g}(n) \) satisfy \( \pi(\bar{g}(n)) \geq \theta \) for all sufficiently large \( n \) and \( \lim_{n \to \infty} Q(\bar{g}(n), \theta, n) = 1 \).)

In all such mechanisms, however, it is essential that the local official must be politically accountable to the residents of the town ex post.

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.

If the official's future rewards were not dependent on residents' approval, then the official would have no incentive to spend anything on public services.
A national ruler's incentive to centralize local moral-hazard rents

Now suppose an autocratic national ruler has full power over local government. If the national ruler could commit to permitting a town to elect an autonomous local government in exchange for a special tax to the national treasury, the town's n residents should be willing to pay annually up to $U(g_1)$. The moral-hazard rents $nr(g)$ of local offices make them valuable prizes for which candidates would pay, whether in cash or in costly political support. Promising offices as patronage prizes can help raise vital support against challenges. If the ruler appointed the first local official, the office could be sold to a supporter for political services worth $ng$, and residents could be taxed $U(g)$ annually, providing up to $U(g_2)+r(g_2)$ value in annual revenue per resident.

But these plans would require the ruler to make a credible commitment to a constitutional division of power, which would be against his interests ex post. With local accountability, the ruler cannot use local offices as rewards without making his reputation for rewarding supporters dependent on voters' approval, vulnerable to their distrust.

With political autonomy, successful local leaders can build reputations for public service and patronage to become serious competitors for national leadership. So a fiscally beneficial decentralization of power may be politically too costly for the incumbent national leader.
Separation of local information from political influence in centralized autocracy

When only residents can observe the quality of local public services, responsible officials can be accountable only if local residents have some power over them. Such local power, if credibly guaranteed, would constitute political decentralization.

Under autocratic control of political expression, residents cannot even communicate their views on local officials' performance, except as the ruler might permit. An autocrat could poll local views, but can he commit to use such information? When would a powerful ruler choose to replace an appointed official?

Any successful leader needs a reputation for reliably rewarding loyal service. A leader can credibly recruit more support when key supporters monitor his treatment of others, so that a failure to reward one would raise distrust of all. My APSR 2008: In a simple model, if any leaders can organize such a court, then challengers cannot recruit any supporters without instituting such constraints. An autocratic ruler is politically accountable only to this elite circle of courtiers. As he can profitably resell vacant offices, courtiers must deter wrongful dismissals.

Autocrats can suppress any expression of public discontent to potential rivals. An autocrat incurs no ex-post costs from disappointing residents' hopes for services, and can censor or suborn residents' testimony about the quality of local services. Courtiers can impose political costs on the ruler, but these costs cannot depend on information (from local residents) that the ruler could manipulate to reduce cost.
Can an autocrat be a neutral judge of local officials' public services?
The courtiers can observe the set D of dismissed officials and can compel the ruler to pay a political penalty $\Phi(D)$ that depends on this set (but not on residents' views). Let $\nu(j)$ be the net service value the ruler could get from replacing official j. [\lambda \leq \text{ng}]
Then the ruler would rationally choose D to maximize $\sum_{j \in D} \nu(j) - \Phi(D)$.
Courtiers should choose $\Phi(\cdot)$ so that the optimal dismissal set D is likely to be empty or a small fraction of all offices. [E.g: $\Phi(D) = \max\{0, (|D|-1)\text{ng}\}$.]

**Neutrality**: If $\nu(\cdot)$ and $\Phi(\cdot)$ treated officials symmetrically, the ruler could be willing to pick D based on his information about local public services.
But might he prefer to dismiss those with best services, as potential popular rivals?
Suppose the $\nu(j)$ are random variables which only the ruler observes, and, given other $\nu$'s, each $\nu(j)$ has a continuous distribution on some interval.
Then for any cost function $\Phi(\cdot)$ that the courtiers could impose, the probability of the ruler being indifferent among two or more dismissal sets would be 0.
Neutrality could also be subverted by influential courtiers raising slightly the ruler's cost of dismissing an official who has better connections with them (as patrons).

**Proposition 2.** In a nation where people have no protected independent channels for expressing political grievances, an autocrat who has unrestricted power to appoint and dismiss local officials cannot be credibly committed to hold them accountable for public services that are observed only by local residents.
But ex ante, residents will not invest if good public services are not credibly assured.
Extensions to the case of centralized democracy

Democratic political leaders also need reputations for reliably distributing patronage rewards that motivate active supporters and contributors in contests for power. National democratic competition raises political risk \((q)\) for retention of appointees. Freedom of speech in democracy has advantages for credible communication of grievances against corrupt local officials to the national political elite. Under democracy, local autonomy also threatens to increase competitive entry into national politics, against the interests of incumbent national officials. (Pakistan)

But if local accountability yields better public services for voters, could national democracy induce leaders to promise it, even with no constitutional requirement?

With sequential bids (Kramer 1977) for local public spending, the challenger can win by offering slightly more than the incumbent in a majority of districts but offering 0 to a district where the incumbent spends the most. But then offers will converge to small offers everywhere (as in Ferejohn 1986).
A model of endogenous decentralization in unitary democracy

Suppose instead local public budgets are legally fixed (G) in every district, but candidates can compete on promises of local accountability for local officials. Where a candidate does not promise local accountability, the candidate can instead sell the office for a campaign contribution (expected value 0.5G). Of voters, a fraction \(1-\alpha\) are informed and vote for the best promise to their district. The other \(\alpha\) fraction are uninformed (impressionable) and vote for candidates in proportion to their campaign spending, which is financed by selling local offices.

Let \(x_i\) denote the fraction of districts that candidate \(i\) sells to a donor. The net difference of votes for candidate 1 minus 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, candidate 2 chooses \(x_2\) to minimize it. (First order conditions: \(0 = \frac{\partial (V_1 - V_2)}{\partial x_i} = 2\alpha x_{-i}/(x_1+x_2)^2 - (1-\alpha).\)

**Proposition 3.** In equilibrium of a two-candidate election for national leadership of a unitary state, each candidate would maintain inefficient centralized management of local public services in \(x_1 = x_2 = \min\{0.5\alpha/(1-\alpha), 1\}\) fraction of all districts.

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. (Ukraine)
Conclusions
We analyzed a model of moral hazard in local public investments which could be efficiently managed by officials who are locally accountable. When local public services can be observed only by local residents, officials can be held accountable only if their careers depend on local residents' approval.

In a centralized state, such local political accountability is not guaranteed and may be incompatible with political use of offices as patronage rewards for supporters. A ruler who can re-sell vacant offices is not a neutral judge of local public services. An autocrat can suppress any expression of local views on public services.

National leaders have strong political reasons to maintain centralized control of local public services, even when it harms national economic development. In a unitary democratic state where informed voters would prefer a candidate who promised decentralized accountability, leaders may keep inefficient centralized control of many local offices, as patronage rewards for campaign contributors.

But federal democracy can become stable once it is established, as elected governors and mayors become vital local power-brokers in national coalition-building. Founders of USA had to accept substantial decentralization of power in their new nation, because autonomous local governments had been established first. Since then, democratic local governments in America have overseen local public investments that provided the basic framework for the richest nation on earth.