

LEADERSHIP, TRUST, AND CONSTITUTIONS by Roger B. Myerson

October 2005, <http://home.uchicago.edu/~rmyerson/research/prince.pdf>

...How art thou a king but by fair sequence and succession? Now, afore God... if you do wrongfully seize Hereford's rights... and deny his off'red homage, you pluck a thousand dangers on your head, you lose a thousand well-disposed hearts, and prick my tender patience to those thoughts which honor and allegiance cannot think.

William Shakespeare, Richard II, 1595 CE

Xenophon made the following speech: "I have not come here, Seuthes, with the intention of asking you for anything, but to do my best to make it clear to you that... it was just as much in your interest to pay [the soldiers] as it was in theirs to be paid... The people who have now become your subjects were not induced to accept your government out of any personal affection for you, but did so out of compulsion... Now suppose, first, that they see your relations with our soldiers are so good that the soldiers would stay here if you asked them... and that others, having heard all kinds of good reports of you from our men, would come quickly whenever you wished; or suppose that they get this unfavorable impression of you, that no more Greek troops are likely to come to you, because of their lack of confidence in you... Which of these two alternatives, do you think, is better calculated to make your subjects fear you and look upon your government with a proper feeling of respect?..." When Seuthes had listened to this speech, he cursed the man who was responsible for the money not having been paid long ago. Everyone assumed that by this person he meant Heraclides. "As for me," Seuthes said, "I never meant to deprive your men of their pay and I shall give it to them now."

Xenophon, Anabasis [Persian Expedition], chapter 7, c. 375 BCE.

(This theme of leadership and trust is also pervasive in his Education of Cyrus.)

Hattusili was King, and his sons, brothers, his in-laws, and his other family members and his troops were united. ...he kept the country subdued by his might. When he came back from campaign, each of his sons took control of a province. ...

Who will become king after me in the future, let his brothers, his in-laws, his other family members and his troops be united! ...He must not kill anybody of his family. ... When the King seeks evil for his brother or sister, his Council must tell him straight, "this is a matter of blood." Remember the long history of bloodshed... If any of the king's family does evil and lays eyes on the king's head, the assembly must be summoned, and if his testimony is dismissed then he shall pay with his head. They shall not kill him secretly...

Proclamation of Telepinu, King of the Hittites. c. 1500 BCE.

Introduction.

What are the fundamental forces that sustain the constitution of a political system?

The rules of a constitution can be enforced only by actions of individual people, and these individuals must have a positive motivation to enforce the constitutional rules.

So a constitution can be effective only when there are specific agents who expect to be rewarded as long as they act to enforce constitutional rules, but who would lose these rewards and privileges if they did not fulfill their constitutional responsibilities.

The most important of these agents are the high government officials, including military commanders (captains) and civil administrators (governors).

A political system can survive only if it solves some basic agency problems in motivating such officials, who are subject to moral hazard and imperfect observability. So agency problems are essential to the constitution of any political system.

Here we examine some of these basic agency problems in government by starting with the simplest of all political systems: the absolute monarchy. We show that even an absolute monarch may want to establish institutional structures and constitutional constraints, to solve agency problems of motivating his captains and governors.

High government agents will eschew temptations to abuse their great power only if they expect loyal service to be better rewarded. So the monarch, to be an effective leader, needs a reputation for reliable rewarding those who serve him in high office. Such a relationship of trust with active supporters is a leader's most important asset.

The multiple equilibria of the repeated Prisoners' Dilemma game are the best-known game-theoretic model of good and bad relationships among people.

A good equilibrium, where each player cooperates trusting that the other will reciprocate, is sustained by a threat that defection could shift them to a worse eqm.

But a relationship with a public leader may have some fundamental differences from a relationship with a neighbor, if the public leader can recruit new supporters.

The good equilibria of the repeated PD would fail if a player could always switch partners and restart in a good equilibrium. To sustain a good equilibrium, either (1) a player must be constrained to always play against his original partner, or (2) subsequent partners must be expected to play a bad equilibrium with a player who defected against his original opponent.

Point 2 can be justified either (2a) because only his original partner would focus on a good equilibrium (friendships must start early), or (2b) because his defection would be communicated to all other potential partners (public reputations).

For a political leader, (1) & (2a) tie him to his original supporters (nobility), (2b) requires an independent public monitor of his reputation (constitutionalism).

Model 1: Motivating captains to support the prince's struggle for power

Suppose a principality yields income R that can be consumed or allocated by the ruler. To become ruler, a prince must first defeat a rival army. Then, to stay in power, the prince must defeat similar challenges from invaders that arise at a Poisson rate λ .

To defeat any rival or challenger, the prince needs captains to form his army.

Let $p(n)$ denote the prince's probability of winning when he is supported by n captains, where $0 \leq p(n) \leq 1$, $p(0) = 0$, and $p(n)$ increases as n increases ($p'(n) > 0$).

So with support of n captains, expected duration of the prince's rule is $1/[\lambda(1-p(n))]$.

For each captain, the cost of supporting the prince against a rival or challenger is c .

The prince and the captains are assumed to be risk neutral and have discount rate δ .

The win probability $p(n)$ may also depend on the anticipated size of rivals' armies, which we may denote by M . Then for some function $P(\bullet|\bullet)$, we have $p(n) = P(n|M)$.

For numerical examples here, we use $P(n|M) = n^s/(n^s+M^s)$ where $s=1.5$.

(Particularly interesting equilibria have been found for s between 1 and 2, hence our selection of the midpoint of this range, which yields $P(n|M)=0.739$ when $n=2M$.)

To induce captains to support him, the prince must promise to pay them some part of future revenue from his principality if they win. (Past payments may inspire confidence but cannot be the direct motivation for captains to stay in the battle.)

Consider a captain who expects the prince to grant him some income y as long as the prince rules, provided that the captain supports the prince against every challenger.

When there is no current challenger, a captain's expected discounted payoff is

$$U(n,y) = (y - \lambda c) / [\delta + \lambda(1 - p(n))].$$

When a challenge arises, a captain's expected payoff before the battle is $pU - c$.

So for captains to rationally give support in battle, we need $p(n)U(n,y) - c \geq 0$.

(Normalization: 0 is the best alternative income outside of politics.)

The lowest income y that satisfies this participation constraint is $Y(n) = (\delta + \lambda)c / p(n)$.

This function $Y(n)$ defines an inverse supply curve for captains.

The supply curve slopes down ($Y'(n) < 0$), because captains are willing to accept a lower wage y when the number n is higher.

If the prince has n captains who each get each income y then, when no challenge is impending, the expected discounted value of the prince's payoffs is

$$V(n,y) = [R - ny] / [\delta + \lambda(1 - p(n))].$$

Absolutist systems, with no communication among the prince's supporters

We may say that a leader is absolute if his agents have no communication with each other, only with the leader.

So in absolutism, all relationships between prince and captains are purely bilateral, and captain do not observe anything about how the prince treats other captains.

We may distinguish absolute princes according to the number of individuals whom the prince can be recruit into a bilateral principal-agent relationship with trust.

In total absolutism, the prince has an unbounded supply of individuals who are equally prepared to trust him whenever he invites them to serve as captains.

In tribal absolutism, the only individuals with whom the prince can form such bilateral relationships of trust are the members of some given finite group or tribe.

Consider first a total absolute prince, who has an unbounded supply of potential captains, each of whom is willing to serve as long as he is paid some income y .

With the possibility of recruiting new captains at any time, the prince should consume all R until a challenger comes, and only then should he recruit a new army of captains.

So the total absolute prince should not pay any of the captains who served him in any previous battle, as he can replace them with impunity before the next battle.

Thus, no captain should rationally support a total absolute prince for any $y < \infty$.

Now consider a tribal absolute prince, who is trusted only by n members of his group. Each of these n individuals believes that the prince will pay him y as long as he serves loyally in battle and the prince remains in power.

After winning power, the prince will actually want to pay y to each of his n captains only if (n, y) satisfies the demand constraint $V(n, y) = \max_{k \leq n} V(k, y)$.

So we have a local tribal equilibrium at (n, y) when n satisfies this demand constraint and the supply constraint $y \geq Y(n)$.

We can define the prince's demand curve by $N(y) = \operatorname{argmax}_{n \geq 0} V(n, y)$.

The demand constraint is satisfied on this curve and at some (n, y) such that $n \leq N(y)$.

There always exists a local equilibrium at $n=0, y=\infty$, which represents distrust.

If the prince can do any better, then the best local tribal equilibrium for the prince satisfies $n=N(y)$ and $y=Y(n)$ with the highest possible n .

With a win-probability function $p(n) = P(n|M)$ that depends on the anticipated size of challengers' armies, we may assume that challengers will resemble our prince.

So a local equilibrium is also a global equilibrium $n=M$.

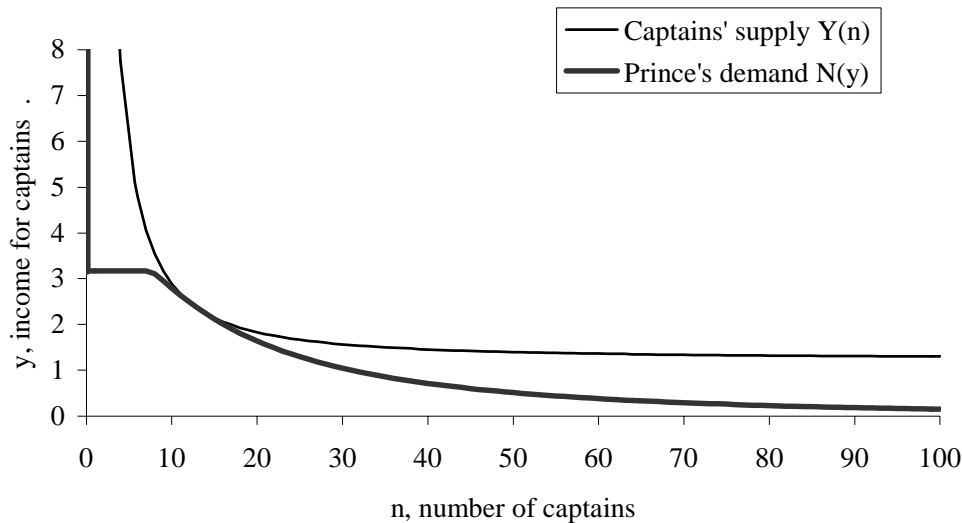
A numerical example

For example, let $R=90$, $\lambda=0.2$, $\delta=0.05$, $c=5$, $p(n) = P(n|M) = n^{1.5}/(n^{1.5}+M^{1.5})$.

Here challenges are expected every $1/\lambda=5$ years on average, a captain's expected cost of service per year is $\lambda c=1$, so not more than $R/(\lambda c)=90$ captains could be supported.

For this example, a global tribal equilibrium can be found with $n=M=12$ and $y=2.5$.

In this equilibrium, the fraction of the principality's income that is used to pay captains is $ny/R = 0.333$, and the prince gets the rest.



Calculations at <http://home.uchicago.edu/~rmyerson/research/prince.xls>

For this example, there are no global equilibria with M greater than 12.

If the anticipated size of challengers' armies were increased to $M=13$, then the captains' supply curve would move up above the demand curve everywhere, so that the only local tribal equilibrium would be at $n=0$, $y=\infty$.

(On the other hand, if the anticipated size of challengers' armies were decreased to $M=10$, then the captains' supply curve would go below the demand curve over the interval from $n=6.3$ to $n=18.9$, which would yield multiple tribal equilibria, including global equilibria (n,y) with $n=M=10=N(3)$ and $Y(10)=2.5 \leq y \leq 3$.)

Introducing the prince's council

In this global tribal equilibrium with $M=12$, an aspiring prince could do much better if he could credibly recruit a larger number of captains.

The tribal equilibrium lets him recruit $n=12$ captains who expect income $y=2.5$, so his expected value is $p(n)V(n,y) = 0.5 \times (90 - 12 \times 2.5) / [0.05 + 0.2 \times (1 - 0.5)] = 0.5 \times 400 = 200$.

But if he could credibly commit to retain $n=30$ captains, they would be willing to serve him in battle for income $Y(n)=1.57$, and his expected value would increase to $p(n)V(n,Y(n)) = 0.8 \times (90 - 30 \times 1.57) / [0.05 + 0.2 \times (1 - 0.8)] = 0.8 \times 476 = 380$.

The prince can make this commitment credible by creating a council where the captains meet regularly and share any complaints that they may have against him.

In a weak council, complaints could shift the expected equilibrium to one where nobody trusts the leader, so that his expected value would drop to $V_0 = R / (\delta + \lambda)$. Captains who have not been cheated by the prince get expected payoff $U(n,y) > 0$ in equilibrium, so they have no incentive to complain unless the prince actually deviated. So with a weak council, a local equilibrium for the prince and his captains can be any (n,y) satisfying $y \geq Y(n)$ and $V(n,Y(n)) \geq V_0$.

It may be strange to assume that challengers only arrive at random rate λ after all the captains in council have learned that nobody can trust the prince.

So we define a strong council to be one where complaints could shift the expected equilibrium to distrust ($n=0, y=\infty$) and a new challenger emerges directly from the council, so that the incumbent's expected value would drop to 0.

With a strong council, a local equilibrium for the prince and his captains can be any (n,y) satisfying $y \geq Y(n)$ and $V(n,Y(n)) \geq 0$.

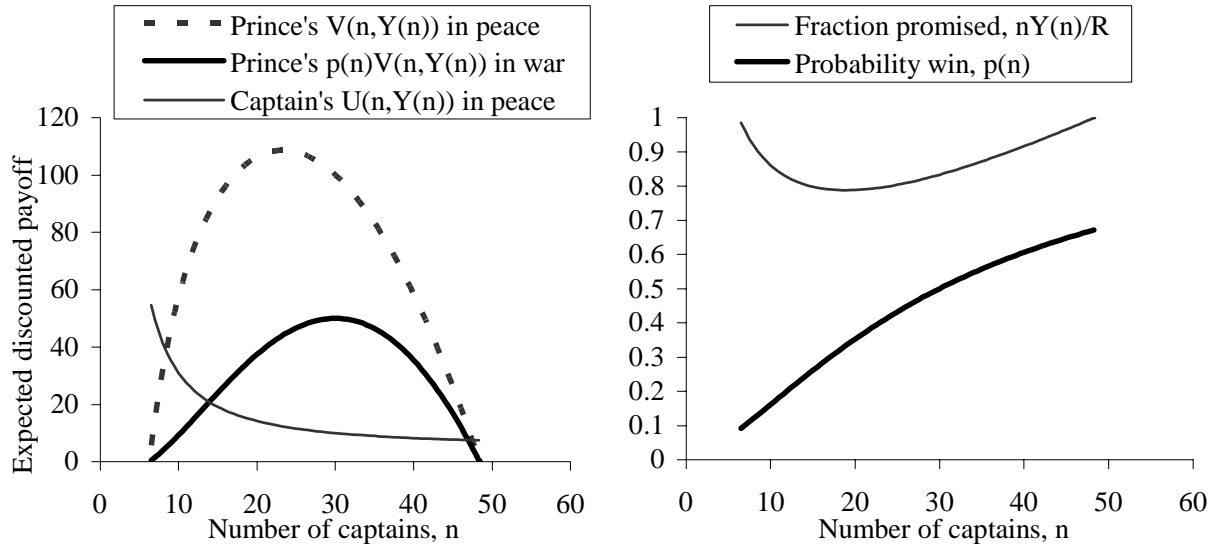
Before battle, the prince would want to negotiate an optimal local equilibrium that maximizes $p(n)V(n,y)$ subject to these constraints.

As before, a local equilibrium is global when $n = M$.

A global equilibrium that is locally optimal for princes with strong councils

In our numerical example with $R=90$, $\delta=0.05$, $c=5$, $s=1.5$, $\lambda=0.2$, a global equilibrium with strong councils exists with $M=30$. In this equilibrium, we have:

$$n=30, y=2.5, V(n,y) = (90-30 \times 2.5) / [0.05+0.2 \times (1-0.5)] = 100, ny/R=0.833.$$



Given $M=30$, $p(n)V(n,Y(n))$ is maximized by $n=30$, so this global equilibrium satisfies the property of being locally optimal for the prince when he faces a challenger.

Thus, a leader can greatly improve his prospects of winning by organizing his captains into a strong council that constraints him. But when all leaders can form such councils, the result is to increase the intensity of competition for power in equilibrium.

Let us examine the alternative local equilibria that are available to challengers in this global equilibrium with $M=30$. As we vary n , the prince's total wage bill $nY(n) = n(\delta+\lambda)c/p(n)$ is u-shaped, and it goes above R when $n \leq 6.24$ or $n \geq 48.4$. For any n between 7 and 48, a challenger with a strong council could have a local equilibrium where he must maintain trust of a given group of n captains, or lose all. Below this interval ($n=6$), the small number of supporters makes the leader's chances of winning small ($p=0.082$), and so the captains would require high promised payments ($Y=15.2$) that exhaust the available revenues of the principality.

So a captain cannot be motivated to support a leader who is considered unlikely to get support from many other captains. The captains are playing a coordination game with many equilibria, where nobody wants to support a leader whom nobody else supports.

Xenophon's Cyrus the Great implemented an equilibrium at the high end ($n \approx 48, V \approx 0$), invoking the possibility of a behavioral type (Persian virtue) to make this eqm focal. (Highest global eqm with strong councils has $M=36$, but then $n=26$ max's $p(n)V(n,y)$.)

Multiplicity of equilibria as the basis for constitutions

Like all game-models of relationships, this dynamic game has multiple equilibria. In a good equilibrium, good behavior is motivated by threat of a bad equilibrium.

We have found two reasons why captains might not support a prince in equilibrium:

Unreliability A captain should not support when he fears that he would not be rewarded; and not rewarding him would be rational for the prince if it would not adversely affect the prince's ability to recruit other supporters in the future.

So for any given group of people, there is always a possible equilibrium where they do not trust the prince's promises and so would never actively support him.

Weakness A captain should not support when he fears that other captains are also unlikely to support the prince, making prince's probability of success so small that even credible promises to share all revenue R could not motivate the cost of support c . So this coordination game always has equilibria where the prince gets no support.

Weakness explains why most of us cannot recruit an army to pursue national power!

A reliable reputation with many active supporters is the rare asset that defines a leader.

The charisma (gods' blessing) to gather a confident army of supporters may indeed be bestowed on individuals only by exogenous random events that are Poisson rate λ .

The need for supporters' trust is recognized as a critical constraint on new challengers in the selectorate model of Bueno de Mesquita, Smith, Siverson, Morrow (2003).

To maintain reliability, we have seen that a prince's supporters need a council or forum to communicate grievances, and they need a shared sense of group identity so that they will all react to a breach of trust against any one captain.

There can be recruitment, but any new captain must be accepted into this group, to be assured that his mistreatment by the prince would cause them all to distrust the prince.

Active participation in the prince's council can be motivated by including it as a requirement for a good relationship with the prince (feudal oath of service & counsel).

A switch from good to bad equilibrium could be caused by other events.

When a political leader has a reputation for adhering to some set of behavioral norms, he may fear that his violating these norms could destroy his supporters' trust.

A political leader may fear to violate an established constitution when his relationships with his active supporters were developed in the context of this constitution, so that his violating the constitution would seem to his supporters like cheating one of them.

Thus constitutional democracy may be based on captains' fragile trust of their leader.

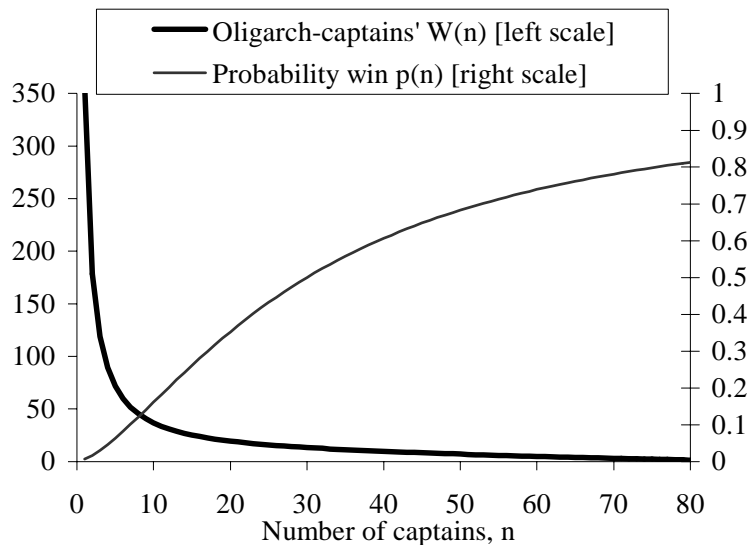
Prince's violating norms of legitimacy could also increase the entry rate of challengers.

(On multiple equilibria as basis of constitutions, see Hardin 1989, Myerson 2004.)

Monarchy and oligarchy.

Starting with an assumption of absolute monarchy, we have shown that, to credibly motivate his captains into battle, a prince can gain by establishing a council where his captains can collectively remove him from power if he breaks promises to them. But the prince's council can yield other equilibria that are worse for the prince.

When succession disputes are resolved in such a council, rival heirs may compete by promising more than the minimal $y = (\delta + \lambda)c/p(n)$ that motivates captains into battle. With Bertrand price-competition among heirs, the council could eventually convert the monarchy into an oligarchy where each of n captains gets income $Y = R/n$. Each captain's utility is then $W(n) = (R/n - \lambda c)/[\delta + \lambda(1 - p(n))]$. In our example with $R=90$, $\delta=0.05$, $c=5$, $\lambda=0.2$, $s=1.5$ and $M=30$, this $W(n)$ is a monotone decreasing function of n .



So the oligarchs would always prefer to reduce the size n of their oligarchy, even though $p(n) \rightarrow 0$ as $n \rightarrow 0$, shortening the expected lifetime of the regime.

In the oligarchy, any captain must become an equal partner who gets R/n ; but a monarch can hire captains at the wage $Y(n)$ that motivates them in battle.

Transformation of monarchies to contracting oligarchies may explain dynastic decline.

From captains to governors

An organized state relies on the efforts of many kinds of agents, and different kinds of agents may have different kinds of incentive problems.

A primary distinction may be made between military captains who help the prince get power, and administrative governors who help the prince use power profitably.

Separating captains from the sources of revenue by an exchequer in the palace can help reduce any one agent's expected profits from rebelling. But we should also recognize basic differences in the agency problems of captains and governors.

Captains work to win power for the prince, but then the prince in power may be tempted by the short-term benefits of not rewarding the captains' efforts.

The prince delegates power to governors, who then may be tempted to use their power for private benefits that would harm the greater interests of the prince and the state.

A captain's most serious temptation is to avoid danger in battles that occur as rare discrete events, but administrative governors may have continuous temptations to divert revenues and wealth from provinces that are hard for the prince to monitor.

We ignored problems of monitoring in our simple model of the captains, but imperfect monitoring is essential to the agency problems of governors, because the prince's power to replace governors would enable him to costlessly control them if he could perfectly observe their costs and their actions.

The different problems of motivating governors may further explain why a prince might recruit his high officials only from some small subset of society, the "nobility".

Model 1 has equilibria in which only "nobles" trust that the prince would reward them, and so the prince always looks only to these nobles for support against challenges.

But Model 1 also admits equivalent equilibria in which the prince would recruit a whole new set of captains at each challenge, paying them with the promise of incomes y during the interval between this challenge and the next one.

The prince could completely change his captains when new challenges arise, because captains' expected payoffs go to 0 on the eve of battle. The right to fight in future battles is not part of the captains' rewards, and so they can be retired.

It is only necessary that new captains should know about the prince's past history so that the new captains' trust of the prince can be conditioned on his having paid all promised incomes to past supporters.

But the continuous problem of controlling powerful hard-to-monitor governors forces the prince to allow them valuable privileges on a continuous basis.

These privileges are too valuable to be just given away to newcomers, although they may be used to pay retiring captains. The result may create to a nobility.

Model 2: Incentives for governors whom the prince needs to control provinces

Suppose a governor always has three options: to be a good governor, or to be corrupt, or to openly rebel against the prince (flee abroad with local treasures).

Let D denote the expected payoff to a governor when he rebels.

A governor's substantial local authority may make D quite large.

The prince cannot directly observe whether a governor is good or corrupt, but he can observe any costly governmental crises that may occur under a governor's rule.

When the governor is good, crises will occur in his province at a Poisson rate α .

When the governor is corrupt, crises will occur at a Poisson rate β , where $\beta > \alpha$.

A corrupt governor also gains an additional secret income worth γ per unit time.

The governor observes any crisis in his province shortly before the prince does.

These crises are very costly for the prince (they may yield challengers of model 1), so he wants to induce his governors to be good (as well as nonrebellious themselves).

But even a good governor could incur an unusually large number of crises, in which case the prince might replace him and offer the job to someone else.

The position of governor may be quite valuable, but candidates have only some limited wealth K , and so they cannot pay more than K for the job. Suppose $K < D$.

Again, we assume that each individual is risk neutral and has discount rate δ .

The prince's policy towards his governors can be characterized by the expected income y that a governor is paid (not counting any income from corruption) and the probability q that a governor is dismissed when a crisis occurs in his province.

Then the expected discounted value of payoffs for a good governor is $U = y/(\delta + \alpha q)$.

The expected discounted value of payoffs for a corrupt governor is $(y + \gamma)/(\delta + \beta q)$.

Deterring corruption requires that $y/(\delta + \alpha q) \geq (y + \gamma)/(\delta + \beta q)$.

When a crisis occurs, the governor's expected value will decrease to $(1 - q)U$.

Then the danger of rebellion is greatest, until his case is decided at the palace.

Deterring rebellion requires $(1 - q)U \geq D$.

As $0 \leq q \leq 1$, this implies $U \geq D$. So candidates are willing to pay K [$< D$] for a governorship when a vacancy occurs, which happens at Poisson rate αq .

Then the prince's expected net cost rate from the governorship is $Z = y - \alpha q K$.

The prince wants to choose y and q to minimize Z subject to these constraints.

With $y = (\delta + \alpha q)U$, this problem is equivalent to choosing (U, q) to minimize $Z = \delta U + \alpha q(U - K)$ subject to $U - D \geq qU \geq \gamma/(\beta - \alpha)$.

The unique optimal solution is $U = D + \gamma/(\beta - \alpha)$ and $q = \gamma/[(\beta - \alpha)U]$.

(Increasing K only reduces Z , without affecting q , U , or y .)

Full derivation of optimal policy in Model 2

We have the definition $U = y/(\delta + \alpha q)$, and so $y = (\delta + \alpha q)U$.

The incentive constraint against corruption is $U \geq ((\delta + \alpha q)U + \gamma)/(\delta + \beta q)$, which can be simplified to the equivalent inequality $qU \geq \gamma/(\beta - \alpha)$.

The incentive constraint against rebellion can be written $U - D \geq qU$.

So the two incentive constraints are satisfied iff $U - D \geq qU \geq \gamma/(\beta - \alpha)$.

This implies $U \geq D + \gamma/(\beta - \alpha)$.

The prince's expected cost rate is $Z = y - \alpha qK = (\delta + \alpha q)U - \alpha qK = \delta U + \alpha q(U - K)$.

So with any feasible value of U (satisfying $U \geq D > K$), the prince would prefer the smallest feasible q , which is achieved by letting $q = \gamma/[(\beta - \alpha)U]$.

Then the prince's expected cost rate is

$$Z = \delta U + \alpha(U - K)\gamma/[(\beta - \alpha)U] = \delta U + \alpha\gamma/(\beta - \alpha) - \alpha K\gamma/[(\beta - \alpha)U].$$

But this formula for Z is an increasing function of U , because $\beta > \alpha$.

So the prince's optimal policy should minimize U .

With our incentive constraints, the lowest possible U is $U = D + \gamma/(\beta - \alpha)$.

Thus, the optimal policy has $U = D + \gamma/(\beta - \alpha)$,

$$q = \gamma/[(\beta - \alpha)U] = (U - D)/U = \gamma/[(\beta - \alpha)D + \gamma],$$

$$y = (\delta + \alpha q)U = \delta D + (\delta + \alpha)\gamma/(\beta - \alpha),$$

$$Z = y - \alpha qK = \delta D + (\delta + \alpha)\gamma/(\beta - \alpha) - \alpha K\gamma/[(\beta - \alpha)D + \gamma].$$

The prospect of charging K for offices does not affect the optimal policy (y, q) , but it reduces the prince's expected net cost rate.

The risk of dismissal q here makes the governor's expected loss from a crisis $\gamma/(\beta - \alpha)$, which exactly deters the governor from increasing the crisis rate $\beta - \alpha$ for the γ profits.

Numerical example: With $\delta = 0.05$, $\alpha = 0.2$, $\beta = 0.4$, $\gamma = 1$, and $D = 5$, we get $U = 5 + 1/(0.4 - 0.2) = 10$, $q = (10 - 5)/10 = 0.5$, $y = 10 \times (0.05 + 0.2 \times 0.5) = 1.5$.

Extension:

Suppose the governor can pay a penalty $t \leq \tau$ when a crisis occurs, given the bound τ .

The prince's problem is: choose (U, y, q, t) to minimize $Z = y - \alpha t - \alpha qK$ subject to

$$U = (y - \alpha t)/(\delta + \alpha q) \geq (y + \gamma - \beta t)/(\delta + \beta q), \quad (1 - q)U - t \geq D, \quad 0 \leq q \leq 1, \quad t \leq \tau.$$

With $y = \delta U + \alpha(qU + t)$, this problem is equivalent to: choose (U, q, t) to

$$\text{minimize } Z = \delta U + \alpha q(U - K) \text{ subject to } U - D \geq qU + t \geq \gamma/(\beta - \alpha), \quad 0 \leq q \leq 1, \quad t \leq \tau.$$

The optimal solution has $U = D + \gamma/(\beta - \alpha)$, $qU + t = \gamma/(\beta - \alpha)$, $y = \delta U + \alpha\gamma/(\beta - \alpha)$,

$$q = [\gamma/(\beta - \alpha) - t]/U, \quad t = \min\{\tau, \gamma/(\beta - \alpha)\}, \quad Z = \delta U + \alpha[\gamma/(\beta - \alpha) - t](1 - K/U).$$

The penalty t reduces q and Z , but not U or y . When governor is bankrupt, $t = \tau = 0$.

$$U = D + \gamma/(\beta - \alpha), \quad Z = y - \alpha t - \alpha qK = \delta U + \alpha[\gamma/(\beta - \alpha) - t](1 - K/U).$$

Selling offices and guaranteeing fair trials of officials

Governors' moral hazard compels the prince to allow them high expected payoffs, as a Shapiro-Stiglitz (1984) efficiency wage, so that dismissal is costly for governors.

But the threat of dismissal must be moderated by randomization, or else it would incite a governor to rebel when he sees a crisis coming in his province.

Such randomization can be achieved by a "fair trial" in the prince's council or court.

The prospect of high payoffs makes the governor's office a valuable asset that a prince should not waste, especially when he needs resources to motivate supporters.

So unless there are big inequalities among people's ability, the prince should not give the office to the most talented person if he cannot pay anything for the office.

The prince's ideal would be to sell the office for $K=U$, so that capital from new governors would cover the entire expected discounted cost of paying them.

But when $D + \gamma/(\beta - \alpha)$ is large, there may not exist candidates who can pay so much.

Candidates for governor must pay in assets that the prince could not take otherwise.

Candidates may pay in protected private wealth (timocracy), or by service in lower offices (bureaucracy), or by credit for past support of the dynasty (aristocracy).

In some societies, people without political connections may be unable to protect large private wealth, but any prince needs a reputation for protecting his supporters' assets.

So the prince's supporters may tend to become a self-perpetuating aristocracy.

There is a fundamental tension between selling office and randomizing dismissal.

When $K > 0$, the prince would always prefer to dismiss a governor after a crisis ($q=1$).

As in Model 1, prince needs a council to guarantee his promises to major supporters.

So for credibility, "fair" trials of governors must be monitored by the prince's council, because the correct outcome cannot simply predicted from the facts of the case.

Example: Septimus Severus began recruiting generals from talented common soldiers, but previous emperors recruited generals exclusively from the senatorial class.

The Senate could help guarantee fair trials only for members of their class.

Rebellions by generals plagued the Roman Empire after Septimus Severus.

Prince could gain by making punishment more productive (fine instead of dismissal), but not more severe. Torturing ex-governors would not reduce prince's cost, because governor's expected payoff after a crisis is bounded below by D (option to rebel).

If a dynastic principle (grant of office binding on heirs of governor and prince) could reduce the effective δ for governors, then it would decrease the prince's costs Z .

Perspectives on constitutional government

We have examined the need for trust between a political leader and his supporters.

Many of our insights about a monarch and his active supporters can be extended to the politicians and high officials in more complex constitutional governments.

A game theorist in political economics often looks at a constitution as the rules of the game the politicians must play to achieve power and govern the nation.

But rules of the constitution can be enforced only by actions of individual people, and these individuals must have a positive motivation to enforce the constitutional rules.

So a constitution can be effective only when there are specific agents who expect to be highly rewarded as long as they act according to constitutional rules, but who would lose these privileges if they did not fulfill their constitutional responsibilities.

These agents are government officials, like the prince and his captains and governors.

A constitution specifies (1) a set of political offices, (2) powers and responsibilities of these offices, and (3) the procedures for selecting future holders of these offices.

But to understand a constitution as a self-enforcing dynamic system, we should extend our definition of a constitution to include also a specification of (4) the privileged individual agents who actually hold these offices at the initial point in time.

Under any political system, a leader can win power and hold power only with the help of active supporters who trust that he will reward them after his victory.

The rules which define what a leader must do to maintain his supporters' trust may be considered as a kind of personal constitution for the leader.

The first officials of a new constitution need supporters to win this privilege.

In negotiating a new political system, established leaders cannot begin by abandoning the source of their power: those who supported them in expectation of future rewards.

So the fate of a new constitution may depend critically on the pre-existing personal constitutions that bind its first political leaders with their primary supporters.

We should not assume that the rules of a new regime are written on a blank slate.

Provisions of the new constitution may be unenforceable when they ask these leaders to violate their pre-existing personal constitutions with their supporters.

A democratic constitution would be imperiled if its most powerful office were won by a politician who could be confident that his active supporters would still trust him after he openly violated the constraints of the constitution.

(See also my paper on "Federalism and incentives for success of democracy.")

Conclusions

We have applied basic models of agency theory to probe the essential problems of rewarding the agents who maintain a political leader in power.

Under any system, a political leader can win and hold power against challengers only with the costly efforts of many supporters who must expect rewards from his success. Powerful officials who cannot be perfectly monitored must also expect great rewards, so that threat of dismissal can deter them from abuse of office or open rebellion.

Costs of rewarding high officials can be recouped by selling offices (for money or service), but then the leader gets a positive incentive to dismiss and resell an office.

So a successful leader always needs to credibly reassure his supporters and agents that rewards will be allocated according to some mutually understood rules.

These rules, which define what a leader must do to maintain his supporters' trust, may be considered as a kind of personal constitution for the leader, even if he is a monarch who is not formally constrained by any other constitution.

In this personal constitution, the leader is constrained to share the benefits of his power with a privileged group of loyal agents and supporters, and new recruiting into this group may be restricted to protect the privileges of its current members.

There must be some council or forum where the leader's compliance with these rules can be monitored by his supporters. To them at least he must give a kind of justice.

We have not asked why he should give justice to others who are not active supporters. But his personal constitution could also commit the leader to comply with other norms and promises, if his violation of them would be treated like his cheating a supporter.

In democracy, leaders should extend their base of support to include voting masses. But a core of active supporters, small enough to monitor, is essential for any leader. So the performance of democracy may depend critically on the personal constitutions that bind its political leaders with their active supporters.

A challenger with a reputation for rewarding support still needs to attract enough active supporters so that his promises can have a high expected value (probability of winning an office multiplied by the value of resources it controls).

That is, potential supporters of challengers have a coordination game: they do not want to support someone whom nobody else is supporting.

Factors that focus eqm-coordination on one leader may be called legitimacy or charisma ("charisma" if intrinsic to the leader, "legitimacy" if extrinsic).

To maintain his perceived legitimacy, a leader's behavior is constrained by social norms, which may be culturally defined or articulated in a written constitution.

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