Political Decentralization and Economic Reform: A Game-Theoretic Analysis

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How does the degree of political decentralization in a state affect the outcomes of economic reform programs? Economic and political theories—from Tiebout to Weingast—emphasize advantages of decentralization. Yet, recent experience—from Yugoslavia and Russia to Argentina and Brazil—suggests that decentralization may at times interact with economic liberalization to exacerbate fiscal, macroeconomic, or even territorial instability. This paper suggests a logic that can account for such cases. A simple, game-theoretic model is used to analyze interactions between central and local officials in a two-level state with significant cultural divisions. It finds that decentralization or local democratization increases the level of central redistribution required to prevent spirals of regional revolt. Consequences of economic reforms that have characteristics of public goods depend critically on the initial levels of cultural division and decentralization. In relatively centralized or homogeneous states, such reforms lead to virtuous cycles of growth and increased revenues and state capacity. In decentralized and deeply divided ones, the same reforms can lead to vicious cycles of higher redistribution, economic inefficiency, and political instability.

1. Introduction

In countries around the world, governments have recently enacted economic reforms to stabilize currencies, liberalize markets, and increase provision of growth-promoting public goods. The results have varied dramatically. Essentially similar packages of measures have prompted virtuous cycles of growth, rising tax revenues, and macroeconomic balance in some countries, while in other countries setting off spirals of fiscal and political instability. To explain such variation, scholars have begun to examine how particular economic reforms interact with different political institutions—the political regime (democratic or authoritarian), constitutional structure (parliamentary or presidential), or party system (fragmented or cohesive).

An important institutional difference that has so far received little attention is the degree of centralization or decentralization within the state—the extent to which subnational officials have autonomous bases of power or depend on central politicians. How might outcomes of the same economic reform package differ if implemented in, say, a decentralized federation like Brazil or a tight, unitary state such as Singapore? On this question, theory is at odds with recent experience.

Dominant theoretical approaches within economics and political science emphasize decentralization's benefits. Competition between subnational governments to attract residents or investors should motivate them to provide public services cost-effectively (Tiebout 1956). For instance, the mobility of firms in the US has limited the rents state governments can extract through illiberal corporation codes (Romano 1993). Where economies of scale are not overwhelming, decentralization can enhance allocative efficiency by matching public goods provided more closely to community preferences (Oates 1972). It may also increase opportunity for policy innovation (Kollman et al. 1996). At the same time, federal institutions can create checks against illiberal central government interventions (Weingast 1995, Montinola et al. 1995) or help to shield central banks from pressures to inflate (Lohmann 1998).

Given all these advantages, recent experience in many decentralized countries, especially developing ones and those attempting economic reform, has been disappointing. Among developing countries, federal states had higher inflation in the 1970s and 1980s (Treisman 1998), and more fiscally decentralized ones may have grown more slowly (Davoodi and Zou 1997). Controlling for economic development, federal states are perceived by businessmen and experts to be more corrupt (Treisman 1997). Reforms to devolve power to regional governments have exacerbated macroeconomic pressures in South Africa, Argentina, and other countries (World Bank 1997). Among post-communist and post-authoritarian countries, those that inherited more decentralized structures (Yugoslavia, Russia, Brazil) have often encountered greater political obstacles to implementing economic reform packages than centralized, unitary states (Poland, Chile). In some, economic reform even contributed to sequences of events that ended in territorial disintegration.

Why might economic reforms have different, and often less successful, outcomes in more decentralized states? I suggest a logic that can account for this experience. Using a simple, game-theoretic model of interlevel politics in a two-level state, I show how, given weak central bureaucracies or deep cultural divisions, decentralization can complicate attempts at macroeconomic stabilization and other economic reforms.[1] From a few assumptions—central politicians care about raising revenue and/or avoiding national

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[1]The two-level framework means the model is applicable both to federal and nonfederal states in which local officials enjoy at least some degree of autonomy. In fact, the model treats the degree of political decentralization not as a dichotomous variable (federal vs. unitary) but as a continuum, captured by values of a certain parameter, P. High P implies a high central capacity to exert leverage over regional officials, low P a low capacity to do so. Constitutional autonomy for regions (as in a federal constitution) and local election of regional officials rather than central appointment would reduce the value of P. In almost all empirical cases, region-level officials (whether elected governors or centrally appointed prefects) are somewhat but not infinitely vulnerable to central government sanctions.

disintegration; regional leaders care about revenue and/or local support; regional communities differ in their cultural cohesion and predisposition to blame the center for their misfortunes; and one region's rebellion reduces the risk for others to join in—I derive the following implications:

(1) Decentralization of political power, including the replacement of appointed officials with elected local or regional officials, will worsen the central government's fiscal balance. It will tend to increase central redistribution from regions culturally close to the center to those more culturally distinct.

(2) As the center's leverage falls, however, it may switch at a certain threshold to using force on the most credible separatist region and easing taxation of the others. Central *weakness* can provoke the use of force against regional challenges.

(3) Increasing central provision of public goods, e.g., a stable currency, efficient commercial code, has different consequences depending on the state's level of cultural division and political decentralization.

(a) In more culturally divided and decentralized states, increased central provision of public goods will often worsen central fiscal balance (beyond the cost of the public goods) and increase pressure on the center to redistribute in favor of more culturally distinct regions. Attempts to reduce such redistribution in the interest of macroeconomic stabilization will provoke separatist crises and maybe state disintegration.

(b) In more culturally united and centralized states, increasing central public-good provision will increase the center's ability to tax the regions, and create room for subsequent political decentralization.

(4) In both cases, increasing the share of the marginal tax dollar spent by the central government on public goods (rather than particularistic benefits) will increase the equilibrium size of the central budget. Small, public-good-providing states will be rare.

(5) For states with cultural divisions, the order of political and economic reforms can drastically affect the outcomes. In the same state, increasing public-good provision followed by political decentralization can lead to a fiscally stable, high public-good equilibrium, where the same reforms in the reverse order would have provoked increased interregional redistribution and fiscal instability.

The model differs from other recent formalizations of the politics of economic reform or of center-region interactions in several ways. First, it attempts to model both at once. Most existing models of the politics of economic reform assume a unitary state (Przeworski 1991; Alesina and Drazen 1991; Fernandez and Rodrik 1991); most models of federal states do not focus on economic reform (Chen and Ordeshook 1994; Buchanan and Faith 1987; Weingast 1997). Second, most existing models of federal states assume a framework in which sovereign regions voluntarily contract to provide certain public goods collectively. They focus on how the ability of re-

gions or individuals to move, vote, or secede enhances efficiency (Buchanan and Faith 1987, Casella and Feinstein 1990, Alesina and Spolaore 1995, Berkowitz 1995). Missing from this is a concept of the central leadership as a strategic actor, with objectives other than efficiency and with a capacity to use force to achieve its own ends.[2] While in the consolidated democracies such a cooperative image is quite realistic, in many other cases constitutional arrangements seem to emerge not so much from efficiency-oriented choices of free regions as from a self-interested struggle between central and regional actors. Incorporating a strategic, self-interested center with a capacity for force into the model produces implications that better match the apparently inefficient and sometimes violent outcomes observable in various actual multilevel states.

The next section presents the basic model and solves for equilibria. Section 3 models political decentralization and various economic reforms as shifts in the game's parameters and shows how these affect the location of equilibria. Section 4 shows how differences in the sequencing of otherwise similar reform measures can lead to radically different results. Section 5 concludes.

2. POLITICS IN A TWO-LEVEL STATE: THE MODEL

2.1 Structure of the game

I model the relationship between a central government and provincial governments in a two-level state as a two-stage, noncooperative game. A central government sets separate net tax levels for two provinces, whose leaders then decide whether to pay them or to refuse and risk costly punishment. The order of moves is as follows:

1. The central government, C, sets a fixed amount of net tax, T_{Ci}, for each of the two provinces, subscripted i. Since this measures the net result of both tax payments and central transfers, T_{Ci} may be either positive or negative: for i = 1,2: $T_{Ci} \in (-\infty, \infty)$. Each province is informed of its value of T_{Ci}.

2. Each provincial leader then chooses a response $x_i \in \{A, R\}$, where A is to recognize the center's authority and accept to pay the tax, and R is to reject the center's authority and refuse to pay the tax. The two leaders must decide simultaneously.

3. If a provincial leader chooses R, he is sanctioned by a central enforcement agency. The agency, which has a fixed stock of punishment

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[2]For a useful review, see Bolton, Roland, and Spolaore (1996). Two exceptions which do model such possibilities are Weingast (1995) and Chen and Ordeshook (1994). The latter shows how two regions could coordinate via a constitution to punish a third region that tried to secede. (Thus, sanctions against secession are considered, though no central actor is explicitly included.) The former models how two regions might respond to incursions of a predatory central state. A partial parallel with this model is pointed out following (fn.9).

resources, is irrevocably and incorruptibly committed to punish all tax-refusers equally to the limit of its resources.[3] The extent of the punishment for a given tax-refuser, therefore, depends upon (a) the agency's preexisting stock of punishment capital and (b) whether or not the other region also refuses. The "pain" imposed by the punishment agency on a refusing provincial leader is given by: P/N_R, where P denotes the total amount of "pain" the enforcement agency can create with its initial endowment of punishment resources, and N_R is the number of provinces that chose R.[4]

2.2 The provincial leaders' choice of strategy

What terms would the utility functions of provincial leaders contain? Two alternative assumptions are common in modeling the choices of politicians. One is that politicians seek to maximize the net monetary surplus extracted via use of their office (Olson 1993; North 1981). This surplus can then be used to pursue whatever concrete aims the politician has, whether political or private. The second assumption is that politicians maximize not surplus but support (Ames 1987; Geddes 1994). In order to extract revenue and pursue other goals, they need to remain in power. To increase the generality of the model, I assume that regional politicians maximize either net extracted revenue or local political support or some combination of the two.

Local political support for the regional leader depends on two types of factors. First, constituents support a leader who provides greater levels of material benefits. Support increases with the level of public spending in the region and decreases with increases in the total level of tax that the regional population must pay (to both regional and central governments). In the model, constituents are assumed to hold their governors responsible both for providing regional expenditures efficiently and for negotiating favorable revenue-sharing arrangements with the center.

But second, constituents may support a regional leader not because of the material benefits he is able to provide but because the particular actions he takes coincide with their normative commitments, psychological responses, or sociological predispositions, regardless of the instrumental efficacy of such actions. Constituents may derive psychological satisfaction from the act itself of opposing or supporting the center. Different communi-

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[3]The rationality of such a commitment could be motivated by the center's knowledge that it is engaged in an infinite or indefinitely repeated game. Within this simple, nonrepeated game, however, it is just assumed. The equal division of punishment between defiant regions is an important assumption, which I discuss in the Conclusion.

[4]For simplicity, each regional governor is assumed to be equally sensitive to the "pain" of punishment, but the results are not changed substantively if different sensitivities are assumed. The assumption that enforcement resources are fixed in advance rather than dependent on incoming tax revenues is meant to capture the short-run logic within a one-shot game, representing one relatively brief set of interactions. In the medium-run, enforcement resources would clearly depend on past tax collections, and this would have to be modeled explicitly in a repeated game.

ties will be more prone to rally round or desert a leader who assertively challenges the center's authority. Such predispositions will depend on the history of relations between center and region, ethnic or cultural factors, and the relative organization of separatist and pro-center groups in the province. Like the organizers of social movements, regional leaders will often be able to exploit the "mobilizational potential" of mass protest actions and manufactured confrontations to attract new supporters and energize their old ones (see Tarrow 1991, Chapter 1; Przeworski et al. 1995, 21–22).

The predisposition of constituents in region i to support acts of anti-center activism *because of the act itself, regardless of instrumental calculations*, is denoted σ_i. This measures the "rallying-round" factor. A high value of σ_i suggests that a provincial leader can earn a high support premium just by opposing the center. It captures both domestic political and normative factors particular to the region. I assume that for all i, $\sigma_i > 0$. If there were no danger of punishment, and no material benefits from retaining greater tax, all regional leaders would gain more support by protesting against the center than by expressing loyalty to it. Regional leaders would be able to mobilize local support by manufacturing an artificial conflict of interest between the region and the center.[5]

The utility for the leader of region i of choosing to accept the center's authority can be written:

$$U_i(A) = -\alpha_i T_{Ci} \qquad (1)$$

where α_i measures the rate at which changes in central net taxes inversely change the regional leader's utility. (He is assumed to choose a level of local tax and provision of local public services that maximizes his utility from local support and from retained revenues. Local support for the regional leader is assumed to decrease with increases in the total tax burden on local constituents, i.e., central plus local taxes, and to increase with the level of provision of local public services. Thus, the higher is T_{Ci}, the lower will be the amount of net revenue he can extract from the local population for a given level of local support.)

If he chooses R, the region will pay no tax to the center and receive no subsidy. The leader will derive a certain increase in local political support, σ_i, as constituents rally behind him in the confrontation with the center. But he will derive negative utility from the punishment he suffers.

$$U_i(R) = \sigma_i - P/N_R \qquad (2)$$

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[5]While in the short run σ_i is assumed exogenously fixed, in the longer run its value may in fact change, as a region's cultural predispositions change.

The "pain" imposed on regional leaders, P, may derive from direct steps the center takes against a given leader as an individual. Or it may derive indirectly from loss of constituents' support for the provincial leader when the center imposes costs on *them*, in the hope that this will undermine their loyalty to their regional leader. Usually it will consist of a combination of the two.

$$\text{Assume that: } P > 0; \text{ for } i = 1,2: \alpha_i > 0; \text{ and } N_R \in \{0,1,2\} \qquad (3)$$

Each provincial leader chooses a strategy, regional spending level, and regional tax rate, in such a way as to maximize her utility, given her beliefs about how the other region will act, and given the center's prior assignment of net central tax obligations, T_{Ci}.

2.3 The center's choice of strategy

The center sets the initial tax assignments, T_{Ci}'s, so as to maximize its utility, given its beliefs about the two regional leaders' responses. Its utility is positively related to the total net revenue actually extracted from the two regions and negatively related to the number of regions that reject its authority.
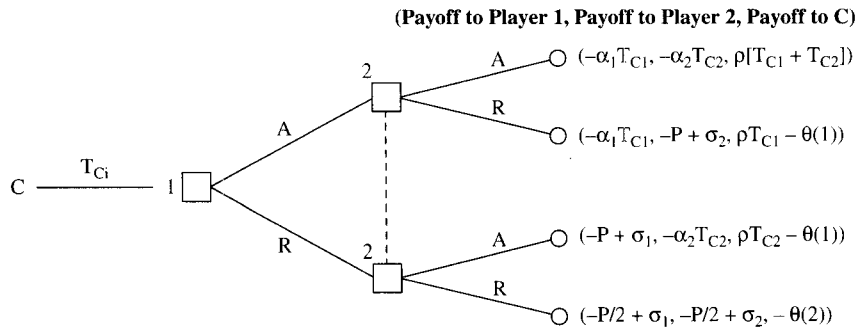
$$U_C = \rho \sum T_{Ci}^{a} - \theta(N_R) \qquad (4)$$

where ρ is a positive parameter measuring the center's taste for retained revenue; $\theta(\cdot)$ is a monotonically increasing function with $\theta(0) = 0$, measuring the disutility to the center of regional revolt; and

$$T_{Ci}^{a} = T_{Ci} \text{ if } x_i = A; \\ \qquad 0 \text{ if } x_i = R \qquad (5)$$

(Thus, the center dislikes regional revolts both because of the loss of revenue they entail and in their own right. One might understand the function $\theta(\cdot)$ as including the utility costs to the center of replenishing the enforcement agency's resources, as well as the unpleasant personal consequences a leader is likely to suffer if he lets one part of the state defy central rule.) For simplicity, I assume utility is linear in actual retained revenue.[6]

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[6]Note that the model does not assume that $\sum T_{Ci^a}$ (i.e., the total of taxes actually collected and subsidies paid out) is positive, but admits the possibility that the center pays net subsidies out of capital. The case in which the center must balance its current budget with taxes collected can be captured by the model with the restriction $\sum T_{Ci^a} \geq 0$ added.

Figure 1. Extensive Form

(Payoff to Player 1, Payoff to Player 2, Payoff to C)

$(-\alpha_1 T_{C1}, -\alpha_2 T_{C2}, \rho[T_{C1} + T_{C2}])$

$(-\alpha_1 T_{C1}, -P + \sigma_2, \rho T_{C1} - \theta(1))$

$(-P + \sigma_1, -\alpha_2 T_{C2}, \rho T_{C2} - \theta(1))$

$(-P/2 + \sigma_1, -P/2 + \sigma_2, -\theta(2))$

2.4 Solving for equilibria

The game is shown in extensive form in Figure 1. Assume that all information about the payoffs and structure of the game are common knowledge. However, players 1 and 2 must choose their strategies simultaneously. Thus, player 2 is uncertain about whether he is at the upper or lower node (both lie within the same information set, denoted by the dotted line).[7]

Solving by backward induction, we can consider the subgame between the two provincial leaders first. Depending on the values of the T_{Ci}'s, σ_i's, α_i's, and P, there may be one or two Nash equilibria in pure strategies. First, each of the four outcomes can be sustained as an equilibrium in pure strategies given certain values of the parameters. Below, I write strategy combinations using the notation: $(x_1; x_2)$. The conditions are derived from the game tree and have been solved in terms of T_{C1} and T_{C2}.

(A; R)—the case in which player 1 chooses to accept the center's authority while player 2 chooses to reject it—will be an equilibrium if:

$$T_{C1} \leq \left(P - 2\sigma_1\right) / \left(2\alpha_1\right) \text{ and } T_{C2} \geq \left(P - \sigma_2\right) / \alpha_2 \qquad (6)$$

[7]The simultaneity of the moves is intended to capture the coordination problem faced in reality by potentially rebellious provinces that do not know whether or not their neighbors will join them in an anticenter protest. If I assumed that one province moved first, the other second, and only then could punishment be inflicted, there would be no coordination problem for regions. (As will become clear later, at points within the central rectangle in Figure 2, (R; R) would be the only equilibrium, and so the center would set tax assignments at ϕ.) All the results discussed below would be unchanged, though the location of equilibrium would no longer depend on beliefs.

(R; A)—the opposite case, in which player 2 chooses to accept the center's authority while player 1 chooses to reject it—will be an equilibrium if:

$$T_{C1} \geq \left(P - \sigma_1\right) / \alpha_1 \text{ and } T_{C2} \leq \left(P - 2\sigma_2\right) / \left(2\alpha_2\right) \tag{7}$$

(A; A)—in which both players accept—will be an equilibrium if:

$$T_{C1} \leq \left(P - \sigma_1\right) / \alpha_1 \text{ and } T_{C2} \leq \left(P - \sigma_2\right) / \alpha_2 \tag{8}$$

and, finally, (R; R)—in which both refuse to pay taxes—will be an equilibrium if:

$$T_{C1} \geq \left(P - 2\sigma_1\right) / \left(2\alpha_1\right) \text{ and } T_{C2} \geq \left(P - 2\sigma_2\right) / \left(2\alpha_2\right) \tag{9}$$

From these conditions, it follows that if the weak inequalities given in Equations 6–9 hold *strictly*, then if either of the first two equilibria are possible, none of the other three is.[8] However, the other two equilibria (A; A) and (R; R) may (but need not) be possible for the same values of the tax assessments and parameters. In this case, the beliefs of the players will determine which equilibrium is reached. In the case where one or both of the T_{Ci}'s *equals* the expression on the right-hand side, several of the strategy combinations simultaneously constitute equilibria. The possibilities are graphed in Figure 2.

Note that within the central rectangle, shaded in grey and with vertical lines, both (A; A) and (R; R) are possible. In essence, the two provincial leaders are playing a game of "assurance" with each other. If one player believes the other will refuse, he would rather also refuse, accept the small punishment (P/2), and not pay the tax. But if he believes the other will accept, he will prefer also to accept and pay the tax rather than to bear the full pain of being punished alone (P).[9] At each point within the central rectangle, a different mixed strategy Nash equilibrium is also possible.

Given this definition of possible equilibria in the subgame between the two provincial leaders, how would the center set the T_{Ci}'s to maximize its utility? This depends upon two things: first, the beliefs of the center and provincial leaders about what strategies the provincial leaders would play at

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[8]For instance, if the first part of 6 is true, the first part of 7 cannot be (given that P and all σ_i's are positive), nor can the first part of 9 be if the strict inequalities hold. If the second part of 6 is true, the second part of 8 cannot be if the strict inequalities hold.

[9]In this region, the logic of the game is similar to that in Weingast (1995).

Figure 2. Subgame Equilibrium Possibilities
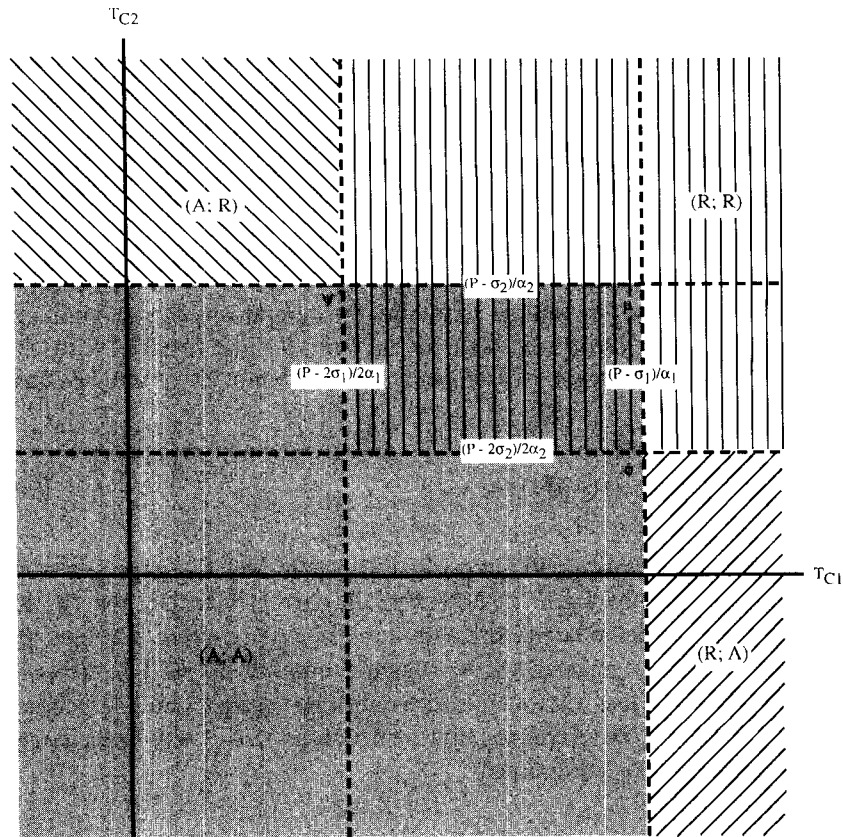
points within the central rectangle; and second, how the center values avoiding provincial revolts relative to retained revenue. The values of $\theta(N_R)$ and ρ define additional bounds within which each of the equilibria from the two-player subgame is also a Nash equilibrium in the full game. Two extreme cases are of particular interest. If $\theta(1) = \infty$, the center will be willing to do all it can to prevent a single defection, whatever the cost in subsidies and foregone revenue: compliance is prioritized over revenue. (This might be the case if the central leader was sure to be killed in any provincial revolt.) Second, if $\theta(1) = \theta(2) = Q$, where the constant $Q > 0$ represents the (fixed) cost of replenishing the resources used if the punishment P must be applied to one or both regions, the center simply maximizes retained revenue minus Q if punishment occurs, regardless of how many defections this

implies. In this case, the center suffers no disutility from regional defiance beyond the cost of the punishment this triggers. Below, I work out the implications first for a compliance-prioritizing and then for a net revenue-maximizing center.

Prioritizing Compliance

A central government unwilling to tolerate any refusals (i.e., for which $\theta(1) = \infty$) will choose the (T_{C1}, T_{C2}) pair which yields the highest total $T_{C1} + T_{C2}$ within the space where (A; A) is the only equilibrium of the two-player subgame. At equilibrium, by definition, all players correctly anticipate each other's strategies. If all correctly expect (A; A) to be the subgame equilibrium at points within the rectangle, the central-revenue-maximizing (A; A) subgame equilibrium will be at point μ, just southwest of the rectangle's top right corner. Algebraically, the maximum $\Sigma T_{Ci}{}^*$ will be equal to:

$$(P - \sigma_1) / \alpha_1 + (P - \sigma_2) / \alpha_2 - e \tag{10}$$

where e is an infinitely small but positive constant, and $T_{Ci}{}^*$ represents the equilibrium value of T_{Ci}.[10] If, however, all correctly expect the (R; R) subgame equilibrium to be reached at points within the central rectangle, the central-revenue-maximizing (A; A) subgame equilibrium will be either at point ϕ. or point ψ, just southwest of either the bottom right or top left corner of the central rectangle. Algebraically, the maximum $\Sigma T_{Ci}{}^*$ will be the larger of the following two expressions:

$$(P - \sigma_1) / \alpha_1 + (P - 2\sigma_2) / 2\alpha_2 - e \tag{11}$$

$$(P - 2\sigma_1) / 2\alpha_1 + (P - \sigma_2) / \alpha_2 - e \tag{12}$$

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[10]Point μ will also be chosen at equilibrium by the center if it (correctly) believes that at points within the rectangle the mixed strategy equilibrium consistent with the given central tax assessment will be reached. This is because the expected value of net central revenue extracted under a mixed strategy equilibrium is maximized at μ. By definition, at a mixed strategy equilibrium each player must be indifferent between playing A and R. Setting the expected utility of A equal to the expected utility of R for player 1 yields an equation that can be solved for π_{2A}, the probability that 2 will choose A: $\pi_{2A} = (2\alpha_1 T_{C1} + 2\sigma_1) / P - 1$. It can be seen that the probability that 2 will choose A increases with T_{C1}, and similarly it can be shown that the probability that 1 will choose A increases with T_{C2}. It can also be shown that the expected value of the total tax collected will be highest at the maximum T_{C1} and T_{C2} within the central rectangle, i.e., at point μ. Note also that the center will only choose to set the T_{Ci}'s within the central rectangle if by doing so it expects to increase its total tax take above the level at ϕ: the regions could not hope to lower their equilibrium taxes by playing a mixed strategy. Full details are available from the author upon request.

It can be shown that the expression in 11 will be greater than the expression in 12 if and only if $\alpha_2 > \alpha_1$. Graphically, the total tax take will be maximized just southwest of the rectangle's lower right corner, at ϕ, if $\alpha_2 > \alpha_1$ and just southwest of the upper left corner, at ψ, if $\alpha_2 < \alpha_1$. If $\alpha_2 = \alpha_1$, the two maximum points will yield the same total tax take. Since the results are fully parallel, to simplify the exposition I assume below that $\alpha_2 > \alpha_1$ and that in this case the center seeks to maximize the net tax take by setting the T_{Ci}'s at point ϕ rather than point ψ. But exactly parallel results could be derived if I assumed, on the contrary, that $\alpha_2 < \alpha_1$.

Thus, which of the two points—μ or ϕ—represents the equilibrium actually achieved given a compliance-prioritizing center depends on the beliefs of the players. The important point for present purposes, however, is that this does not affect the results presented below. All central governments, whatever their equilibrium beliefs, will be affected by parameter shifts in the same way.[11] For simplicity, I will assume that all expect that the two provincial leaders would choose R at points within the rectangle, and therefore ϕ indicates the equilibrium actually achieved. Below, I will refer to the coordinates of point ϕ simply as $(T_{C1}{}^\phi, T_{C2}{}^\phi)$.

It can now be seen that whether at the center's most preferred tax assessment $(T_{C1}{}^\phi, T_{C2}{}^\phi)$ it uses fiscal policy to *extract net tax* from both regions, to *allocate net subsidies* to both, or to *redistribute revenue* from one to the other depends only on the values of P and the σ_i's—i.e., the amount of pain imposed on the regional leader if punished and his constituents' exogenous, noninstrumental predisposition to rally behind a leader who rejects central demands. As Figure 2 shows, $T_{C1}{}^\phi = (P - \sigma_1) / \alpha_1 - e$, while $T_{C2}{}^\phi = (P - 2\sigma_2) / 2\alpha_2 - e$. Since, from Equation 3, for both $i, \alpha_i > 0$, and e—an infinitely small positive constant—can be neglected, whether $T_{C1}{}^\phi$ and $T_{C2}{}^\phi$ are greater than, equal to, or less than zero depends only on the values of P and the σ_i's. Graphically, the values of P and the σ_i's will determine which of the four quadrants contains point ϕ.

Those regions with a higher value of σ_i, i.e., those in which the rallying round of local support for opposing the center is high, will be treated to higher subsidies or lower taxes. *The more anti-center nationalist or regionalist is a provincial leader's local support base, the greater will be the redistributive benefits he can extract.* It will be rational for the center to appease those most predisposed to protest.[12] Furthermore, fiscal stability in a two-

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[11]And since among mixed strategy equilibria the center would choose the one at μ, parameter shifts will have similar effects upon the location of the highest tax-yielding mse.

[12]An interesting exception is the case where the value of σ_1 is virtually infinite—i.e., no amount of central transfers or spending in the region could outweigh the appeal to local politicians of defying the center, regardless how great the punishment to follow. While the rhetoric of nationalist rebellions often includes such absolutist claims, they are far more rarely carried out and are often moderated in the course of negotiation. Such cases of intransigence are, however, quite compatible with the model—and define bounds within which appeasement is a rational strategy.

level state—defined here as the existence, for a given set of parameter values, of an equilibrium (x_1, x_2, T_{Ci}^*) combination for which $\sum T_{Ci}^* \geq 0$— ultimately depends on the balance between the center's ability to inflict "pain" on disobedient regional leaders and the exogenous predisposition of regional constituents to rally behind their leader in a conflict with the center. If the σ_i's are too high relative to P, the center will not have sufficient resources without outside aid to prevent regional revolts undermining its revenue power.

If one assumes that poor regions place a higher value on marginal tax or subsidy dollars than rich regions (i.e., they have a higher value of α_i), the model also reveals how the relative wealth of a region would affect the equilibrium. A center with sufficient enforcement resources to extract positive net tax from a region will nevertheless have to charge a lower tax rate if the region is relatively poorer (i.e., α_i is high), and if α_i gets *too* high the center may simply have to give up on extracting taxes from that region. On the other hand, a center that is forced to offer a region a positive net subsidy at equilibrium will be able to offer a *smaller* subsidy, the poorer is the region. Poorer regions (with higher α_i) can be bought off more cheaply since the utility gain of a marginal dollar to their leader is relatively higher. Graphically, an increase in α_i pushes those sides of the central rectangle in Figure 2 that are perpendicular to the T_{Ci} axis toward the origin.

Maximizing Net Revenue

One complication arises if the center's objective is simply to maximize net revenue regardless of whether this implies regions accepting or rejecting (i.e., $\theta(1) = \theta(2) = Q$, where Q is the utility cost to the center of replenishing the punishment resources if used). Now, in choosing the optimal strategy, the center must compare the maximum values of U_C for each of the four types of subgame equilibrium, each of which implies a different maximum value of $\sum T_{Ci}^a$. It is easy to derive the maximum value of $\sum T_{Ci}^a$ for each type of subgame equilibrium graphically from Figure 2. Substituting these into Equation 4, we get:

$$\text{maximum } U_C \text{ for } (A; A) = \rho\left[(P - \sigma_1) / \alpha_1 + (P - 2\sigma_2) / 2\alpha_2 - e\right] \qquad (13)$$

$$\text{maximum } U_C \text{ for } (A; R) = \rho\left[(P - 2\sigma_1) / 2\alpha_1 - e\right] - Q$$

$$\text{maximum } U_C \text{ for } (R; A) = \rho\left[(P - 2\sigma_2) / 2\alpha_2 - e\right] - Q$$

$$\text{maximum } U_C \text{ for } (R; R) = -Q$$

Which of these four expressions is larger will depend on the values of P, the σ_i's, the α_i's, and Q. If ϕ is in the top right quadrant, (A; A) will always be preferred to any of the other subgame equilibria: since the center can extract positive net tax from both players, it has no incentive to allow one or more to defect. The results are the same as for a compliance-prioritizing center. But if ϕ is in one of the other quadrants, there are bounds below which one of the other subgame equilibria may yield a higher net revenue.

If ϕ is in the bottom left quadrant, (R; R) will always be preferred so long as $-Q > \rho\left(T_{C1}^{\phi} + T_{C2}^{\phi} - e\right)$. Since the center must subsidize both regions at equilibrium in order to prevent them rebelling, it would increase its net revenue by allowing both to do so and punishing them so long as the cost of replenishing punishment resources is less than the cost of the necessary subsidies. If, on the other hand, ϕ is in the top left quadrant, the center will maximize net revenue by choosing (A; A) as long as $\rho T_{C1}^{\phi} > -Q$. (If $\rho T_{C1}^{\phi} < -Q$, the center will prefer to provoke player 1 to revolt by refusing to subsidize him and to extract $\left(P - 2\sigma_2\right) / 2\alpha_2 - e$ from player 2.) If ϕ is in the bottom right quadrant, where redistribution takes place from player 1 to player 2, the center will set the T_{Ci}'s to achieve the (A; A) net-revenue maximizing equilibrium so long as $\rho\left(T_{C1}^{\phi} + T_{C2}^{\phi}\right) > \rho\left(P - 2\sigma_1\right) / 2\alpha_1 - Q$ and $\rho\left(T_{C1}^{\phi} + T_{C2}^{\phi} - e\right) > -Q$.

As before, the center will often redistribute income in order to maximize its net equilibrium revenue. It will do so whenever it is cheaper to buy the compliance of the most separatist region than to let it revolt and ease the tax burden on its less separatist counterpart. Redistribution, as before, will favor the regions that are the most culturally anti-center—those with higher values of σ_i. But regions whose value of σ_i is *too* high will simply be written off by the center. Above a certain threshold, avoiding the cost of inflicting the punishment plus preserving the full deterrent power against the other region are no longer worth the subsidy required. Instead of redistributing to buy acquiescence, the center will find it more cost-effective to let one or both regions choose R and be punished by the enforcement agency.

2.5 An extension: incorporating public goods

So far the central state has been presented as exclusively predatory, setting tax rates in order to maximize the resources extracted from the regions, sometimes subject to the constraint that neither region is tipped into revolt. The center can seek the support of regions only by redistributing resources between them. But what if the center can also provide public goods to the regional populations? Various scholars have seen such provision as an alternative strategy by which rulers can gain support of their subjects.

This possibility can be incorporated into the model with a simple extension.[13]

Assume now that the center spends a fraction, b, of each dollar collected in net taxes on providing a public good to the provinces. Assume also, for simplicity, that there are constant returns to scale in public-good provision. The amount of public good supplied, G, increases linearly with the total central tax actually collected so long as this total is positive. If the total net tax collected is negative or zero, no public good is provided:

$$
G = kb \sum T_{Ci}^a \text{ if } \sum T_{Ci}^a > 0
$$
$$
0 \text{ if } \sum T_{Ci}^a \leq 0 \quad \text{where } b \in [0,1], k \in (0, \infty) \tag{14}
$$

Assume also that the utility derived by regional leaders from public goods (either directly, or via the increased support of constituents, or both) is linear and positive. This implies that the utility function for each regional leader can be rewritten:

$$
U_i(A) = -\alpha_i T_{Ci} + \varpi_i b \sum T_{Ci}^a \qquad \text{if } \sum T_{Ci}^a > 0 \tag{1'}
$$
$$
-\alpha_i T_{Ci} \qquad \text{if } \sum T_{Ci}^a \leq 0
$$

$$
U_i(R) = \sigma_i - P / N_R + \varpi_i b \sum T_{Ci}^a \qquad \text{if } \sum T_{Ci}^a > 0 \tag{2'}
$$
$$
\sigma_i - P / N_R \qquad \text{if } \sum T_{Ci}^a \leq 0
$$

where $\varpi_i \in (0, \infty)$ represents k times a constant measuring the leader of region i's utility increment per unit of public good supplied.[14] Finally, the cost of supplying the public goods would alter the center's utility function to the following:

$$
U_C = \rho(1 - b) \sum T_{Ci}^a - \theta(N_R) \tag{4'}
$$

[13]A pure public good is defined by two characteristics—jointness of supply ("each individual's consumption leads to no subtraction from any other individual's consumption of that good;" Samuelson 1954, 386) and nonexcludability (it is not feasible or economical to deny provision to others if it is provided to anyone; see Mueller 1989, 10–11).

[14]While the amount of additional public good provided is the same for each region (nonexcludability), each leader may derive different increments of utility from the same increase in public good supplied.

This changes the payoffs for the different outcomes in Figure 1 somewhat.[15] Solving the new game tree by backward induction now yields different equilibrium conditions depending on the values of T_{C1} and T_{C2}. If $T_{C1} \leq 0$ and $T_{C2} \leq 0$, i.e., the tax assessments imply a position in or on the borders of the bottom left quadrant, no public good would be provided and the analysis would be exactly as before. If, on the other hand, both $T_{C1} > 0$ and $T_{C2} > 0$, i.e., the tax assessments are in the top right quadrant, the conditions are slightly changed. If we assume that for $i = 1,2: \alpha_i > \omega_i b$, then it can be shown that the boundaries for the different subgame equilibrium possibilities are as given later in the top right quadrant of Figure 4. They form a central rectangle analogous to that in Figure 2, but with the denominator of each intercept changed to include terms related to public-good provision. The maximum stable tax extracted in the (A; A)-only space (still assuming that $\alpha_2 > \alpha_1$) now occurs at the point where $T_{C1} = (P - \sigma_1) / (\alpha_1 - \omega_1 b) - e$, and $T_{C2} = (P - 2\sigma_2) / [2(\alpha_2 - \omega_2 b)] - e$.

The condition that $\alpha_i > \omega_i b$ states that the utility each regional leader can derive from spending an additional ruble either on buying local support or on his private wants is greater than the utility he would derive if the center spent an additional ruble on provision of public goods. If this condition were not met, regional leaders would voluntarily pay taxes to the center to provide public goods, even under no threat of punishment and lacking any guarantee that other regions would also contribute. In Olsonian terms, this might occur in very small groups, where one player has an "encompassing interest" in the provision of public goods. But it is very unlikely in most two-level states.

A slightly more complicated set of possibilities arises if the tax assessment for one province is positive and for the other negative. I consider in particular the case where the center is assessing 1 a positive tax and 2 a positive subsidy (the bottom right quadrant). In this quadrant, the analysis changes slightly depending on whether or not $T_{C1} + T_{C2} > 0$—i.e., whether the tax assessments fall above or below a 45 degree line passing through the origin. If $T_{C1} + T_{C2} > 0$, the central shape formed by a plot of the conditions for different equilibria now has an upward sloping right side.[16] If, by contrast, $T_{C1} + T_{C2} \leq 0$, the right side remains vertical but the top line slopes downward.

3. DECENTRALIZATION, ECONOMIC REFORMS, AND CONSTITUTIONAL STABILITY

Now the effect of different kinds of central reforms on the state's stability can be assessed. I examine below how changes in certain parameters

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[15] To save space, the new game tree is omitted. It is available from the author upon request.
[16] Graph available from the author upon request.

Daniel Treisman

would affect the location of equilibrium. I demonstrate the implications of each change first for the case of a compliance-prioritizing center, and second, where the results are different, for one that prioritizes acquiring revenue.[17] For simplicity, I use the basic model without public goods except where I demonstrate the impact of changing levels of public-good provision.

3.1 Decentralization or central decay—a decrease in P

Various changes—some desirable, some less so—may lead to a decrease in the center's leverage over regional officials. First, a constitutional reform may devolve power in important areas to regional officials. A formerly centralized state may move in the direction of a federation—as in Czechoslovakia after 1968 or the Soviet Union in 1990–1991. This will reduce the number of issue areas that the center will control in practice for the regions and thus reduce its repertoire of measures for inflicting pain on a recalcitrant regional leader. Second, if local elections replace central appointment as the means of selecting regional officials, this will obviously reduce the center's ability to threaten a regional official with dismissal. Third, decay of the central state's administrative capacity may quite unintendedly lessen its leverage over its regional prefects.

All these changes can be modeled as a reduction in the value of P—the amount of "pain" the center can inflict on recalcitrant regional leaders.[18] It can be shown (by taking partial derivatives with respect to P of the expressions for $T_{C1}{}^{\phi}, T_{C2}{}^{\phi}$, and $\sum T_{Ci}{}^{\phi}$) that a drop in P would reduce the maximum tax a compliance-prioritizing center could extract at equilibrium from each of the regions, worsening its fiscal position. Graphically, when P drops, the rectangle moves toward the bottom left (Figure 3[F3]). Furthermore, a drop in P may force a state which previously had been able to extract net taxes from both regions to redistribute to one province (or distribute assets to both) in order to secure compliance. Decentralization of power often *increases* the need for a central government to engage in interregional redistribution if it is to avoid fiscal crisis and state disintegration.[19]

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[17]I continue to assume for simplicity, and without any loss of generality, that all players believe that at tax assessments inside the central rectangle, the (R; R) subgame equilibrium will be reached.

[18]Of course, losses of direct central leverage over regional politicians may be replaced with *indirect* leverage. If the regional population holds its regional leader responsible for the province's general well-being, it may reduce support for him if the center imposes costly sanctions. The center may still be able to punish the leader *through his electorate*, and if central administrative discipline is replaced with local electoral discipline, this lever may become even more effective. So a drop in P implies not only a drop in the center's ability to impose direct costs on a regional leader, but also the absence of a corresponding increase in the capacity or propensity of regional electorates to punish regional leaders for centrally-induced hardship.

[19]If P falls too far, not even redistribution will be an option, and the state will only be able to avoid revolt by distributing external or saved resources to both regions.

Figure 3. Decentralization or Central Decay—A Drop in P
$$P_2 < P_1 < P_0$$
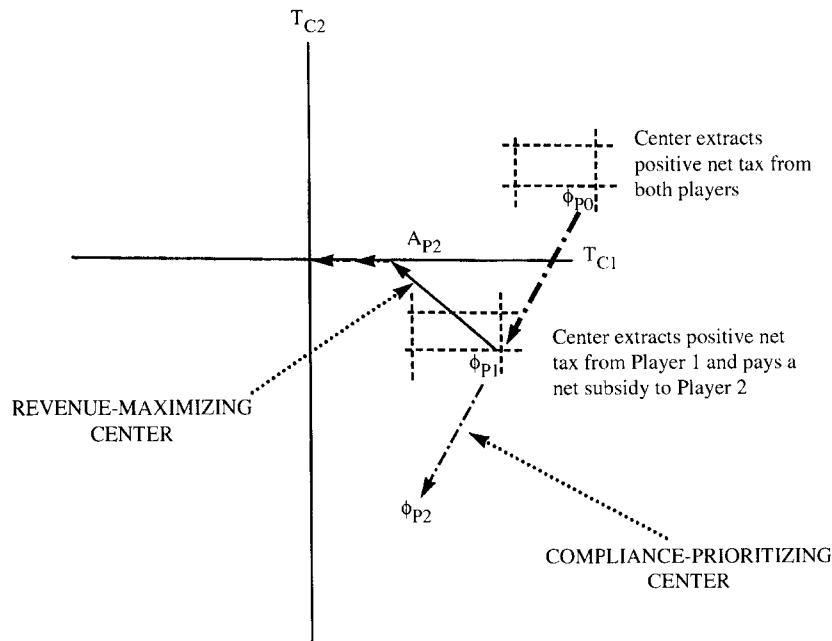
Since state collapse leads to zero revenue, such *increases* in redistribution may paradoxically be necessary in order to sustain the level of net tax extraction by the center. Predators may need to "throw back" some of their catch in order not to sink the boat. So, at times, reducing central redistribution in a politically reforming regime may not help but *exacerbate* fiscal problems of the state. If a state taxing at point ϕ_{P0} decentralizes power to the regions, lowering P such that the assured-compliance maximum-net-tax assessment shifts down to ϕ_{P1}, a refusal to start using some of the revenue extracted from 1 to pay a net transfer to 2 will lead to a challenge from 2, perhaps accompanied by a challenge from 1, necessitating the expenditure of enforcement resources and worsening the state's fiscal position.

If the priority of the center is maximizing revenue, then the result above will hold only so long as $\rho\left(T_{C1}{}^{\phi} + T_{C2}{}^{\phi}\right) > \rho\left(P - 2\sigma_1\right) / 2\alpha_1 - Q$ and $\rho\left(T_{C1}{}^{\phi} + T_{C2}{}^{\phi}\right) > -Q$. If central capacity to sanction falls beyond a certain point, the center will shift from a strategy of redistribution to one of punishment (of either one or both regions). Thus, oddly enough, central governments may at times shift to a strategy of letting recalcitrant regions protest

and be punished precisely *because* the central enforcement agency's capacity to punish has fallen so far. Despite the dwindling efficacy of the central deterrent, the center may choose to rely on it rather than pay the large subsidies necessary for appeasement. The center's choice of tax assessments as P falls is shown in Figure 3. As P falls, the center will reduce tax assessments and begin to redistribute to the most separatist region (with the higher σ_i); but if P drops still further, the center will suddenly stop redistributing, continue to collect tax from the less separatist region and punish the separatist (player 2). Further drops in P will lower the tax that the center can extract even from the relatively loyal region towards zero.[20]

Thus, decentralization or local democratization, by increasing the legitimacy of local leaders and reducing their dependence on the center, will make it harder for the center to pressure them into remitting high rates of tax.[21] In general, *political decentralization will increase fiscal strains on the central government.*[22] And the more democratic are local institutions in regions where the electorate is more culturally or ideologically hostile to the center, the greater will be the required level of subsidies that the center must redistribute. Among nationalist and separatist regions, more authoritarian and corrupt local regimes may actually be more compliant tax-payers than democratically responsive and noncorrupt ones. An authoritarian, corrupt system—such as that of the Brezhnev-era Soviet Union, in which regional governments had considerable strategic instrumental reasons to resist central demands, but were subject to no local electoral control—may have less fiscal difficulty in this regard than a democratizing one.

3.2 Economic Reforms

Most of the economic reforms recommended to democratizing regimes are of two types. Stabilization measures aim to restore the state's financial solvency by reducing central subsidies and increasing tax rates. Liberaliza-

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[20]Note also that the more costly to implement is the punishment that the center has threatened in the event of a regional revolt (the higher is Q), the longer will the center go on appeasing before opting to use the deterrent.

[21]This, of course, may be a desirable change if it limits central exploitation. Still, insofar as it increases central redistribution, it may create incentives harmful to growth. Note also that while the introduction of elections at the regional level may increase centrifugal pressures, *other* aspects of democratization implemented at the central level might create offsetting mechanisms of integration that are not captured by the model. This is an intriguing question, which I leave to future work to explore more fully.

[22]This logic might help explain recent developments in Belgium, where constitutional federalization since 1970 has been followed by a dramatic increase in central budget allocations to the subnational governments (Murphy 1995, 86). Similar logic might also cast light on the pressures for cross-subsidization within the European Union, an organization with weak powers to sanction the leaders of member nations.

tion and structural reforms aim to enhance the efficiency of the economy by establishing more efficient systems of property rights, building market infrastructure, and reducing politicized state interventions. Many of these elements constitute increases in the central provision of public goods, or reductions in the supply of "public bads." Consider how these two types of reform will affect equilibrium tax and transfer rates in a two-level state.

Macroeconomic stabilization—reducing subsidies, increasing tax rates

The consequences of stabilization policies in a two-level state previously at equilibrium are likely to be politically destabilizing. If existing central subsidies are issued for reasons *other* than to forestall regional revolts, then reducing them can be done without prompting disintegration. But if the center is redistributing because to do so is optimal from the point of view of ensuring compliance or maximizing revenue, to reduce subsidies will lead to fiscal and political crisis. Imagine the equilibrium tax assessment is at ϕ in Figure 2. Increasing the tax on player 2 will move the center's tax assessment into the range where he will prefer to choose R, and player 1 will anticipate this and prefer to join him. Since, as assumed, player 1 believes that player 2 will choose R at points within the central rectangle, he too will choose R. Both regions revolt against central authority and pay no tax. A similar collapse of central authority occurs if a center which starts out paying a positive net subsidy to one region reduces that subsidy beyond the defined threshold.

Increased central provision of public goods—or reduction in "public bads"

Even in market economies, the central state plays an essential role as definer of property rights, enforcer of contracts, commercial arbitrator, supplier of market infrastructure and stable money, and coordinator of standard weights and measures. Many of these aspects of market systems have characteristics of public goods. Since the work of Olson (1965), scholars have accepted that in most circumstances public goods will be underprovided by markets. Economic reform, therefore, aims not just to make the state solvent but to increase its supply of efficiency-enhancing public goods and reduce its efficiency-depleting public "bads" (e.g., the enforcement of inefficient property rights).

How might central provision of public goods in a two-level state affect its stability? Various economists have explored pathways by which this might increase the center's support. Buchanan and Faith (1987) model how provision of public goods by the center might reduce the incentive for regions to secede. More generally, various public goods enhance economic growth and that growth tends to legitimize existing institutions (Przeworski et al. 1995, 89). Transferring central resources from redistribution to public-good provision, thus, should arguably increase stability.

And yet, self-interested central politicians often reject such apparent op-
portunities to invest in higher growth and stability. Reforms often bog down
as central politicians return to politicized redistribution. Is such backtracking
always irrational? The model outlined in this paper actually shows that in-
creasing provision of central public goods in a state that is culturally divided
(regions with high σ) or decentralized (low P) can actually exacerbate the
need to redistribute and worsen the center's fiscal position.

Consider the public-goods model presented in Section 2.5 and graphed
in Figure 4. Increases in the share of central revenues assigned to providing
public goods can be modeled as an increase in the value of b. The impact of
a change in b on the location of equilibrium will depend on the center's start-
ing point. If (at b = 0) the center has sufficient enforcement resources (P)
given the regions' anti-center predispositions (σ_i's) that it can extract posi-
tive net tax from both (the top example in Figure 4), then increasing b will
increase the amount of tax the center can extract from each region without
provoking revolt. The rectangle at the top of Figure 4 shifts up and to the
right. Increasing supply of public goods will increase central tax revenues. If
the additional tax extracted exceeds the cost of providing the additional pub-
lic goods, it will be rational even for a predatory state to provide public
goods (this corresponds to the argument in Olson 1993). And one might ex-
pect to see a process in which the central state gradually increases its level of
provision of public goods *and* increases tax rates at the same time. It can in-
vest its surplus from additional public-good provision in supplying even
more public goods, or in increasing its enforcement capacity, both of which
should increase its future revenue. This suggests the virtuous cycle of devel-
opment in some capitalist democracies, where during some periods tax lev-
els, public spending, and economic growth have all increased in parallel
(Britain in the eighteenth century, most OECD countries in the early post-
war period).[23]

But increased provision of public goods is only fiscally expedient for
states that already face no fiscal strain and have sufficient enforcement re-
sources. For those states obliged to redistribute revenue to maintain support,
increasing public-good provision may increase the scale of necessary redis-
tribution and will eventually reduce net tax revenues. The impact of different
rates of public-good provision for a center which must redistribute from
one region to another varies depending on whether or not (at b = 0)
$T_{C1}^{\phi} + T_{C2}^{\phi} > 0$. If at b = 0, $T_{C1}^{\phi} + T_{C2}^{\phi} > 0$ (i.e., ϕ lies in the upper seg-
ment of the bottom right quadrant in Figure 4), an increase in b would shift

---

[23]Note that among fiscally sound states (in the top right quadrant), increasing the rate of provi-
sion of efficiency-enhancing public goods will increase the equilibrium size of the state. A more ef-
ficient central state will not usually be a smaller one.

Figure 4. Increase in Central Rate of Public Good Provision (Rise in b)
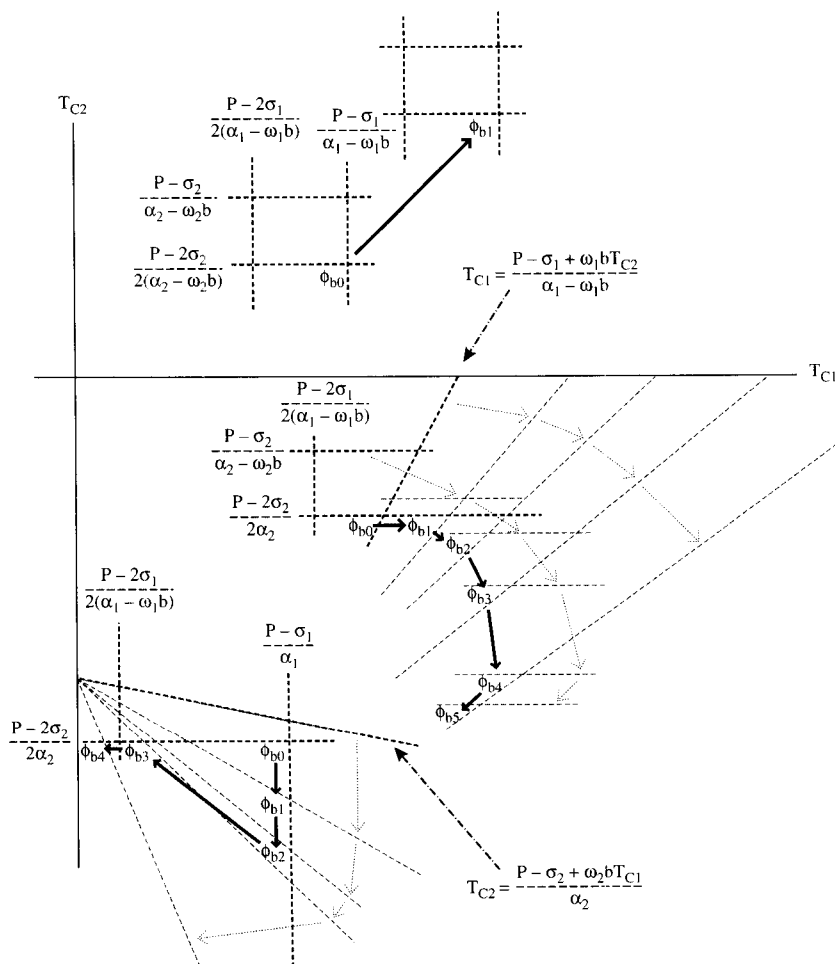
the position of all but the lower horizontal side of the central trapezoid. It would shift the left vertical side to the right[24], the top horizontal side down, and it would both shift the intercept of the slanting line toward the right and flatten its slope. The cumulative impact of these changes on the location of ϕ would be as shown in Figure 4. At first, the intercept shift of the slanting constraint would permit the center to demand a slightly higher $T_{C1}{}^\phi$, while

---

[24]Strictly speaking, so long as $P > 2\sigma_1$.

leaving T_{C2}^{ϕ} unchanged. But after the top horizontal side drops beneath the bottom horizontal side, this becomes the binding constraint, forcing the center to redistribute more revenue from player 1 to player 2. After a certain point, increases in b will require reductions in both T_{C1}^{ϕ} and T_{C2}^{ϕ}.[25]

If, on the other hand, at b = 0, $T_{C1}^{\phi} + T_{C2}^{\phi} < 0$ but $T_{C1}^{\phi} > 0$, an increase in b will swivel the slanted line downward, without changing its intercept.[26] This will not have any impact on the location of ϕ until the slanted line crosses ϕ, after which point increases in b will force the center to lower T_{C2}^{ϕ} while leaving T_{C1}^{ϕ} fixed. At a certain point, however, when the slanted line reaches a 45-degree angle, the highest-net-revenue point for which (A; A) is the only subgame equilibrium will jump to a point just to the lower left of the intersection of the slanted line with the stationary line at $T_{C2} = (P - 2\sigma_2)\,/\,2\alpha_2$. Subsequent increases in b will force reductions in T_{C1}, while leaving T_{C2} fixed (see Figure 4). In each of these three cases, the reformulation of the center's utility function as in (4') increases the likelihood that it will prioritize compliance over revenue-maximization, since the marginal increment to its utility of an additional dollar of revenue (in ranges where it is providing the public good) is now reduced by a factor of $1 - b$.

The impact of a change in the center's rate of provision of public goods will, thus, depend on the starting conditions. For a relatively centralized state without serious cultural divisions, increasing the rate of public-good provision will increase the amount of tax the center can extract from each province, at low levels of b perhaps making up for the cost of provision. If, on the other hand, the center starts out obliged to redistribute to preserve stability, it cannot provide more public goods as a substitute for redistribution. In fact, increasing the rate of provision of public goods may actually require it simultaneously to *increase* the rate of redistribution, and large increases in the rate of public-good provision will *reduce* the amount of tax it can collect from both of the regions. In other words, a state forced to redistribute its citizens' income and wealth in order to maintain power *cannot* grow *its way out of the need for redistribution through provision of growth-enhancing public goods.* It will eventually make its redistribution needs *worse* through growth-oriented public-good-provision strategies. This may explain the reluctance of states at times to implement what appear to be Pareto-improving reforms. Such reforms, even if they do enhance economic efficiency and growth, may worsen the central state's fiscal position and threaten its cohesion.

The intuitive logic behind this result is as follows. Regional leaders can choose between alternative support strategies—mobilizing local constituents

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[25] It can be shown, by partially differentiating the expression for T_{C1}^{ϕ} with respect to b and examining when the partial derivative would be positive, that this point lies at $T_{C2}^{\phi} = -(P - \sigma_1)\,/\,\alpha_1$.

[26] It will also shift the left vertical side to the right, but this does not constrain the location of ϕ.

behind them through confrontation with the center or buying constituents' support with public spending. Larger subsidies from the center are useful for the strategy of buying support. But if the center would otherwise be using part of the money paid out as subsidies to fund provision of public goods, the net increase in a regional leader's utility derived from an additional dollar of subsidy will be less (since it will entail slightly lower public-good supply.) Because subsidies now are less efficient at raising the regional leader's utility, larger subsidies will be needed to offset the appeal of the mobilizational confrontation support strategy and to ensure compliance.

Paradoxically, because even defiant free-riders have an interest in the supply of public goods (since they cannot be excluded from consuming them), they have an interest in increasing public-good supply (by reducing subsidies) and using political drama rather than patronage to rally their supporters and beat off rival challengers. The problem for the center is that one region engaging in dramatic confrontation reduces the risk for others to follow suit—and so the political cost to the center of permitting such a strategy is large. To prevent multilateral revolt, the center must keep the ratio of patronage-dispensing local leaders to separatist gadflies high. Provision of public goods reduces the leverage that the center can exert through the provision of private redistributive or distributive benefits.

These results are, as before, bounded by certain minimum conditions if the center's priority is not to secure compliance but to maximize net revenue collected. The center would never distribute to both provinces unless its utility loss caused by paying the subsidies was less than Q. In the top left quadrant it will shift from prompting (A; A) to prompting (R; A) if $T_{C1}{}^\phi$ falls below $-Q / \rho$. If ϕ is in the bottom right quadrant, the center will set the T_{Ci}'s to achieve the (A; A)-only net-revenue maximizing equilibrium so long as $\rho\left(T_{C1}{}^\phi + T_{C2}{}^\phi\right) > \rho\left(P - 2\sigma_1\right) / 2\left(\alpha_1 - \varpi_1 b\right) - Q$ and $\rho\left(T_{C1}{}^\phi + T_{C2}{}^\phi\right) > -Q$. In addition, if the more separatist player, 2, has a greater taste for public goods than player 1 $\left(\varpi_2 > \varpi_1\right)$, there may come a point as the rate of public-good provision rises where it suddenly becomes optimal for the center to let player 2 refuse, stop subsidizing him, and let him be punished instead. The greater is player 2's relative taste for public goods, the more will he be tempted to substitute mobilizational support strategies for patronage-based strategies (which involve shifting central resources from public-good provision to subsidies), and the more will he consequently have to be bribed to refrain from conflict with the center. At a certain point, paying the bribes will no longer be economical for the center.

4. THE SEQUENCE OF REFORMS: PATH-DEPENDENT TRAJECTORIES

This analysis has surprising implications for the choice of economic reform strategies in transitional states. The model suggests why similar reform strategies could have radically different results in countries which start from

slightly different levels of centralization or cultural division. In those which start out with sufficient central enforcement resources, extensive marketization may have exactly the results its advocates hope for. In states which begin from a situation of politicized redistribution, rapid reforms will either increase risks of state disintegration (as in Yugoslavia and Czechoslovakia) or central politicians will realize that it is not in their political interest to implement them fully (as in Russia in the early 1990s). This suggests one reason why countries' institutional histories should appear so "path-dependent" (David 1985; North 1990). The analysis also implies that the *order* of different types of economic and political reforms can make a great difference to their success and to the types of regimes and economic performance that result. In states already forced to redistribute to survive, the center's leverage must be increased *before or simultaneously as* the supply of central public goods is increased.

Figure 5 demonstrates the likely outcomes of two different economic and political reform strategies, comprising the same measures but in the opposite order. Consider a state starting from point ϕ_{b0}. Reform strategy A begins with an increase in public-good provision (resulting in a shift to ϕ_{b1}), followed by decentralization (P falls to P_1). At the new equilibrium (labeled

Figure 5: Comparing Two Reform Strategies
A: Economic Reform, then Decentralization
B: Decentralization, then Economic Reform
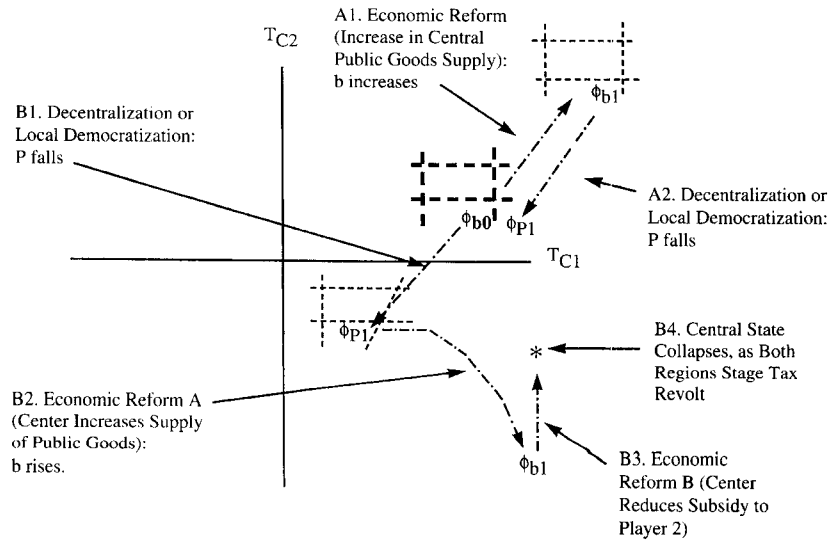
ϕ_{P1}), public-good provision has been increased and politics have been decentralized, yet the center retains a net fiscal surplus roughly equal to the one it started with. By contrast, reform strategy B reverses the order of reforms, starting with decentralization (P falls to P_1), and then proceeding to the increase in public-good provision (shift to ϕ_{b1}). At this equilibrium, the central government must redistribute heavily from player 1 to player 2. If it tries to reduce the subsidy to 2 (as in step B3), it moves the tax assignments into the region where the only equilibrium strategy for both 1 and 2 is to stage a simultaneous tax revolt.

5. CONCLUSION

Economists since Tiebout have suggested ways in which political decentralization can enhance economic efficiency. Their models provide valuable insight into developed federal states such as the US, Canada, or Germany. However, other cases exist in which decentralized political structures seem to have complicated efforts at economic reform, depressing growth, stimulating inflation, or even exacerbating territorial instability (Prud'homme 1995). This paper suggested an alternative logic which can account for such cases.

From a few assumptions—central politicians care about revenue and/or avoiding regional revolt; regional leaders care about revenue and/or local support; regional communities differ in their cultural cohesion and animus toward central authorities; and one region's rebellion reduces the risk for others to join—a logic of center-region interactions is derived which resembles some of the messy politics of many existing decentralized states. In more culturally divided states, decentralized political structures lead either to more central redistribution in favor of the more culturally remote regions, worsening central fiscal balance, or to more regional revolt. At a certain point, a weakening central government may be prompted by its weakness to switch, quite rationally, from appeasement to the use of force. In more decentralized states, even reforms to enhance central provision of public goods, such as a stable currency, can have perverse consequences, *increasing* the required amount of redistribution to minority regions. And the size of the central budget will tend to grow as states become more efficient and devoted to providing public goods: whether centralized or decentralized, small, public-good-providing states will be rare.[27]

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[27] Thus, the model might help to explain the prevalence of large, public-good-providing states in Western Europe today and the smaller states in federal North America. "Small" central governments occur in two contexts, according to the model. First, they may result from political decentralization of large, efficient, culturally more homogeneous states. Second, "small" central governments can occur in somewhat (but not extremely) divided countries with centralized states that devote small shares of revenue to producing public goods—a description that would seem to fit many of the surviving weak states of the Third World.

Advocates of neoliberal reforms tend to assume that the same package of stabilization, liberalization, and privatization measures will lead to efficiency and growth in any political institutional setting. Though the law of one price and the quantity theory of money hold equally in Nigeria and Hong Kong, the model suggests how political obstacles to achieving macroeconomic stabilization in them might differ. In federally structured states such as Argentina or Russia, reducing transfers and subsidies to the regions may have greater political costs than in more centralized states such as Chile or Poland.[28] At times, continued politicized central redistribution may be necessary in order to sustain a regime able to implement even moderate economic reforms.[29]

Central governments in developing countries are often advised to depoliticize transfers to regions and make them more predictable (e.g., World Bank 1997). Asymmetric arrangements are often thought to be both economically inefficient and politically destabilizing. This model suggests a different possibility—that asymmetric central transfers are responses to rather than causes of interregional tensions, and responses that help to forestall overt tax revolts or other acts of defiance. From a second- or third-best perspective, preserving integration via inequitable transfers may be more economically desirable than attempting to maximize allocative efficiency in politically self-defeating ways.

If decentralization can have both positive and negative consequences, what determines in a given case which will predominate? This remains the key question for future study. The costs of decentralization depend in this model on the intensity of anti-center sentiment in specific regions and the level of central enforcement resources. But the model itself gives little guidance on the exact thresholds at which the logic of reform switches. It remains difficult to identify in a given country whether the ratio of central leverage to anti-center sentiment is sufficient to render reforms to increase public-good provision fiscally stabilizing rather than politically or economically destabilizing.

Another question for further examination is how changes in the structure of the game would affect the outcomes. For instance, the model assumes that if both regions simultaneously rebel, the center is committed to divide

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[28]Of course, if state integrity is not the priority of central officials, both decentralization and stabilization can be pursued simultaneously—the Klaus strategy in Czechoslovakia. See, for instance, Cox and Frankland (1995, especially 82–86). But in other cases, the costs of territorial disintegration may far outweigh any prospective gain from rapid reforms (as in most of the former Yugoslavia).

[29]A similar paradox has been noted by Levi: "government policies that appear to promote rent seeking and social waste are often policies that reduce political unrest and promote (or at least are meant to promote) long-term economic growth" (Levi 1988, 180).

the punishment equally between them. The dependence of each region's potential punishment on the action of the other is an essential element of the safety in numbers phenomenon that the game sets out to model. Such interdependence seems intuitively plausible—resources used to punish one region cannot be used to threaten another. But what if the center could commit to a different punishment schedule under which player 1's punishment did not depend on the action of 2? For instance, the center could commit to punish either region if it rebelled alone, but just to punish player 1 with all the resources if both rebelled. It turns out that this would eliminate the coordination game in the central rectangle of Figure 2 and render μ an (A; A)-only equilibrium.[30] Thus, if the center could commit itself to a punishment strategy of favoritism, it could eliminate its vulnerability to a coordinated response on the part of the two regions. The outcome would no longer depend on which of two possible sets of beliefs the actors held.

Fuller examination of the implications of this is left for future work, as is the question how central democratization might affect the game's logic. The center in the model cares only about net revenue and/or avoiding regional revolts; nothing was said about sustaining a nationwide electoral majority. If one of the two regions contains a majority of the voters (assuming an odd number of voters, this is guaranteed in a two-region state), the center might simplify the task by prioritizing the acquiescence of that region. A more complex, and realistic, way of building an electoral majority would be to seek a subset of supporters from both regions. To examine the implications of this would substantially complicate the model—just as it complicates the actual political tasks of Yeltsin, Menem, Cardoso, and the like.

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[30]Player 1 would now never choose R unless the benefit outweighed the full punishment P. At μ, this is not the case. Knowing that 1 will choose A, 2 will only choose R if this outweighs the full punishment P, which at μ is not the case

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