Organizing Violence

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In stateless societies, coercion is privately provided; violence is employed to engage in, and to defend against, predation. At best, violence results in mere redistribution; being destructive, it more often results in a loss of social welfare. When organized, however, violence can be socially productive; it can be employed to defend property rights, thereby strengthening the incentives to engage in productive activity. To explore how violence can be rendered a source of welfare, the authors develop a model of a stateless society in which people's rights to the product of their labor are secure only if they possess coercive capabilities. Using case materials and formal logic, the authors then compare this outcome with that obtained when private agents reward specialists in violence for defending property rights. In doing so, we plumb the role of the state.

The premise of this study is that coercion is as normal a part of life as is exchange; what matters is not its presence or magnitude but rather its structure and form.[1] In stateless societies, coercion is privately provided; violence is employed to engage in, and to defend against, predation. At best, it results in mere redistribution; being destructive, it more often results in a loss of social welfare. When organized, however, violence can be socially productive; it can be employed to defend property rights, thereby strengthening the incentives to engage in productive activity.

1. Hirshleifer (1995) and Garfinkel and Skaperdas (2000) elaborate on the need to integrate the analysis of the "dark side" in economics.

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To explore how violence can be organized and rendered a source of welfare, we develop a model of a stateless society, in which people's rights to the product of their labor are secure only if they possess coercive capabilities. We then incorporate into the model a specialist in violence and pose the following questions: Under what conditions will such a specialist utilize her or his coercive power only against those who have inflicted violence on others? Under what conditions can the specialist in violence enhance the welfare of the economic agents by providing protection for property rights? When, in other words, can a specialist in violence render coercion socially productive?

By addressing these questions, we probe the nature of the state. It is important to stress that in doing so, we do not explore the origins of the state. Put another way, we do not advance a model of equilibrium selection. Rather, we seek to characterize equilibria and thus explore the properties of political arrangements.

Most scholars follow Weber (1958) and view the state as a source of political order based on its monopoly over the means of violence. Within this framework, some treat the state as an instrument for enhancing social welfare (see the review in Grindle 1991) whereas others view it as an instrument of involuntary redistribution (Findlay 1991). Some treat it as developmental (e.g., Evans 1995) and others as predatory (e.g., Lal 1984).[2] We, however, depart from the Weberian perspective. In our analysis, order is not a property of the state; rather, it is a characteristic of an equilibrium. The state holds no monopoly of violence; rather, people retain control over the means of coercion, and it is their threat to revert to violence, should others defect, that supports order along the equilibrium path. The nature and role of the state are endogenous; depending on the value of key parameters, the state can be predatory or developmental. The properties of the state are thus explained, rather than assumed; they emerge endogenously from the analysis.[3]

When deploying this mode of reasoning, we depart from those who utilize static, general equilibrium models that highlight the role of technology and in particular the technology of violence. We instead adopt a dynamic framework. Although previous analyses have restricted the choice of actions to production or defense, we allow citizens to engage in both production and military activity. We also endow them with a third alternative: that of leisure. Employing game theory, we uncover a fundamental trade-off in the political economy of stateless societies. In such societies, we find, poverty can be the price of peace. The inverse also holds: violence can be the price of prosperity. An attraction of the state, we argue, is that it offers a means of transcending this trade-off, therefore (as we prove) making possible the attainment of higher levels of welfare.

2. And some as both (e.g., North 1981; Olson 1993; Levi 1988).

3. Other efforts to model the state and the use of coercion would include the sequence of works by Skaperdas (1992) Skaperdas and Syropoulos (1995, 1996), Konrad and Skaperdas (1996), Grossman (1991, 1997), and Grossman and Kim (1995). Moselle and Polak (1999b) and Muthoo (2000) utilize evolutionary and classical game theory, respectively. The latter's model is the closest to ours as further discussed after we introduce the model. Greif (1998) advances a model and historical analysis of a situation in which a state is established when armed clans hire a specialist in violence to contain their own military ability. See also Cohen, Brown, and Organski (1981).

The article divides into four parts. The first is devoted to stateless societies, the second to societies with states, the third to the breakdown of political order and the transition to warlordism, and the last to a discussion of the implications of the analysis. Drawing our theory from the theory of games and our cases from both history and the modern world, the article explores

- the properties and limitations of stateless societies,
- the conditions under which political order can exist,
- the conditions under which states collapse, and
- the conditions under which states advance the welfare of their citizens by rendering coercion economically productive.

STATELESS SOCIETIES

Informing the logic of our model are the political experiences of stateless societies. Consider the following two examples. Separated by centuries, both nonetheless illustrate the interplay between prosperity and violence.

AN EXAMPLE FROM THE 13TH CENTURY

In the late 13th century, towns such as Paris, London, Rouen, Bruges, and Ghent joined the ranks of the Mediterranean city-states as important centers of commerce. Although northern Europe may have experienced prosperity in the 13th century, it did not experience peace. What Wallace MacCaffrey (1961) would write of the 15th century was true of the 13th as well: in "the absence of a strong royal personality," the political world turned into "an arena where no prizes . . . were out of reach, but where there was no security for the life, liberty, or property of the contestants" (p. 96).

The prosperity of the 13th century was marked by the rise of the textile industry. In northern Europe, investors began draining deltas and swamplands, diverting rivers, and employing waterpower to drive machines that ground grain, shaped metal, and carded wool. The urban centers of the lowlands, in particular Bruges, became major centers for the production of textiles. And with an increase in the demand for woolens came a rise in the demand for sheep. Whereas cities in the lowlands produced textiles, it was the rural counties of England that provided the wool. Consulting treatises on estate management, abbots and magnates throughout England turned to the raising of sheep. In the words of Eileen Power (1941, 35), the 13th century became "the golden age of English demesne farming."

With the rise in the demand for wool, land rights became more valuable. In seeking to vest their rights in property, rural magnates invested in military power. Tracing the career of William Marshall, perhaps the most famous magnate in the Angevin era, Crouch (1990, 4) notes that Marshall, like others, "attach[ed] independent, influential men into his following." Extracting money from those who held land by right of feudal service, Marshall built a military household that he endowed with his own device and colors. Like Marshall, others converted wealth into political followings. Rural elites

formed liveried companies that provided the muscle to expand their claims to land and defend their property. Rural England may have become wealthy, then. But it also became violent, entering the period McFarlane (1973, 1981) and others (e.g., Hicks 1995) have called the era of "bastard feudalism."

AN EXAMPLE FROM THE 20TH CENTURY

The covariation of wealth and violence reflected in 13th-century England characterizes societies in the contemporary developing world as well. The Kikuyu of Kenya and the Mau Mau rebellion provide an apposite case.

Many of the books written about Mau Mau—and there are scores of them (Clough and Jackson 1975)—emphasize its ideology. For liberals, it sought to overturn colonial rule and the domination of Whites over Blacks in Kenya (Rosberg and Nottingham 1966). For Marxists, it sought to impede the further incursion of global capitalism into developing areas (Barnett and Njama 1966). Increasingly, however, scholars have turned from such macro-level interpretations to micro-level studies of the communities that provided its political base (e.g., Cowen 1978).

The rural wing of the Mau Mau rebellion originated among the Kikuyu communities of central Kenya. The Kikuyu constitute one of the many stateless societies of east Africa (Lambert 1956; Middleton 1953). Rather than kings or chiefs, the Kikuyu were governed by families and land-owning associations that placed representatives on councils that regulated the affairs of the tribe (see also Kenyatta 1953).

In the 20th century, two forces transformed the economic and political lives of the Kikuyu. The first was the arrival of the White settlers, who seized lands that they deemed idle or vacant. Many of these lands were in fact owned but not occupied, as the Kikuyu had temporarily vacated them in the midst of a recent drought and famine (Leakey 1977). Second came a radical expansion of economic opportunities. The low-lying lands of the Kikuyu spread into the suburbs of Nairobi, which was the most rapidly growing city in East Africa. Those lands that lay at higher elevations proved ideally suited for the production of coffee, one of the most valuable products exported to world markets. Just as the lands of the Kikuyu became scarce, then, they also became more valuable.

In response to the increased value of real property, people began to "raid" the holdings of others. Initially, they employed litigation, contesting the land rights of others to expand their own.[4] Aware of the possibility of being subject to suits, families invested in legal defenses and filed countersuits against those who employed the courts to harass them (Cowen 1978; Kershaw 1997; Njonjo 1997). As Kershaw (1997) states in her study of Igi, a Kikuyu community in Kiambu, "If Njoroge brought a case over a small part of Mungai's land, nothing prevented Mungai, perhaps to warn Njoroge against further litigation, from responding by bringing a case over a part of Njoroge's land" (p. 106).

4. Indeed, Kershaw (1997, 106) notes, given the costs of filing cases, recording cases, pursuing appeals, locating and reimbursing witnesses, and spending time away from work attending court, "litigation costs" came to exceed "all other costs of production."

As politicians from the center penetrated the Kikuyu countryside, they played on the tensions within Kikuyu communities. They transformed land cases into political causes to recruit supporters. And as the nationalist movement adopted more militant tactics, litigation gave rise to violence. In the village studied by Kershaw (1997), a group of politically active youth murdered a group of rivals. Seeking to defend himself in court, one of the accused brought to the surface the tensions that underlay the case. He "lies," the accused stated of a witness, "because if I am hanged, he will inherit my land" (p. 254).

The Mau Mau rebellion involved resistance to European occupation and land seizures on one hand; on the other, it involved conflicts over land rights among those seeking to displace the Europeans. Within local Kikuyu communities, an increase in the value of land coincided with the channeling of resources into coercive action: litigation, initially, but later deadly violence.[5] The rise of conflict in 13th-century England and 20th-century Kenya both suggest that when private parties provide their own defenses, wealth and violence go hand in hand. Why? To address this question, we incorporate the salient features of such societies into a formal model.

A MODEL OF PROTECTION AND PRODUCTION IN STATELESS SOCIETIES

In stateless societies, the relevant decision makers are often groups such as lineages and communities. These groups can allocate their resources among economic activities, military activities, and leisure; they are not farmers or warriors at any given time but rather possess the capabilities of both. Conflict appears to be an ongoing, almost permanent feature of many such communities; disputes and potential skirmishes lie under the surface, ready to emerge. These attributes shape the specification of our model.

For simplicity, we introduce but two symmetric players, thus enabling us to abstract from the complications that would arise from the formation of coalitions.[6] These players can be individuals or tribes, clans, or even ethnic groups. A generic player is referred to as player i, where $i = 1, 2$. Each player has a given amount of resources of time and effort, denoted by T_i, that he or she must decide how to allocate each period between work (w_i), military preparedness (m_i), and leisure (l_i). In each period, the two

5. Some have stressed the immiseration of peasant agriculture in Kenya (e.g., Barnett and Njama 1966); and yet empirical investigations highlight the growing earnings of the peasantry in Central Province, including and especially the Kikuyu (e.g., Cowen 1978; Kitching 1980). Nor was Mau Mau a protest against capitalism. Among its leaders were several of the most successful Kikuyu businessmen (Cowen 1978; Njonjo 1997). At the grassroots level, violence grew from a struggle for rights of ownership that would enable Kikuyu farmers to increase their incomes from commercial agriculture. The Mau Mau did, of course, fight for the return of lands seized by white immigrants (Rosberg and Nottingham 1966), but it also fought over land rights within the Kikuyu community. Of the many deaths attributed to the Mau Mau, only 32 white colonists died at the hands of the Mau Mau, but more than 2,000 Kikuyu were killed (Edgerton 1989, 106).

6. To ease exposition, we ignore all issues relating to the internal organization of the actors, including collective action problems, decision-making processes, and free riding. We simplify by assuming two players. As long as the players could not cooperate in the use of violence, adding more players would not weaken our results. Indeed, having more players would make the first best less likely and the noncooperative equilibrium more likely, thus strengthening our argument. An account of the rise of the Mau Mau, based on linking prosperity with violence, appears to accord with the facts at least as well as do interpretations offered by others.

first simultaneously choose how to allocate their limited resource T among the three alternative uses. That is,

$$i \in \{1, 2\} \text{ chooses } w_i, m_i, l_i \geq 0 \text{ s.t. } w_i + m_i + m_i = T. \quad (1)$$

The resources devoted to working, w_i, are socially productive and result in an output of $F(w_i)$ for player i.[7]

After allocating their resources, the players observe the decision of the other player; each then (sequentially) decides whether to raid. To capture this decision, define $r_i = \{0, 1\}$ to equal 1 if player i raids and 0 if she or he does not. Suppose that player 1 can first decide whether to raid. Then in the second and the third stages of the game,

$$i = 1 \text{ chooses } r_i \in \{0, 1\}. \quad (2)$$

$$i = 2 \text{ chooses } r_i \in \{0, 1\}. \quad (3)$$

Raiding is costly, requiring k units of output. The amount one can gain from raiding depends on one's relative strength. Specifically, if player i attacks and player $-i$ defends, then $M(m_i, m_{-i})$ is the share of player $-i$'s wealth that player i is able to expropriate if she or he allocates m_i units of effort to perfecting her or his military capabilities; and the other player, player $-i$, allocates m_{-i} units. Although the exact assumptions regarding $M(\cdot)$ are presented in note 8, the main assumptions are that if one does not invest in military ability, one cannot gain anything from raiding. Furthermore, the more one invests in military capability relative to the other, the higher one's return from raiding. By the same token, the more one is able to engage in defense, the more difficult it is to expropriate one's wealth.[8] $M(\cdot)$ thus captures the correspondence between military capabilities, both offensive and defensive, and redistributive outcomes. This specification implicitly assumes, for simplicity's sake, that the relative military strength of both players is not affected by player 1's decision whether to raid.[9]

7. $F(\cdot)$ is assumed to be a twice continuously differentiable, concave function that maps from player i's effort to her or his income.

8. The following is assumed with respect to the function M: (a) $M \in [0, 1]$. Obviously, no player can expropriate more than what the other possesses. (b) $\partial M/\partial m_i \geq 0$ and $\partial M/\partial m_{-i} \leq 0$; $\partial^2 M/\partial m_i^2 \leq 0$ and $\partial^2 M/\partial m_{-i}^2 \geq 0$. M is nondecreasing in m_i and nonincreasing in m_{-i}. It is a twice continuously differentiable function with decreasing returns, which means that the portion of player $-i$'s wealth that player i can expropriate is concave in m_i and convex in m_{-i}. (c) $M > 0$ if $m_i > 0$. That is, if and only if player i invests in military ability can she or he expropriate part of the other player's income. (d) $\partial^2 M/\partial m_i \partial m_{-i} < 0$. The cross-partial derivative of M with respect to m_i and m_{-i} is negative. That is, the more military ability a person acquires, the more she or he is able to engage in defense and the more difficult it is to expropriate her or his wealth. For a general analysis of such contest functions, see Skarpedas (1996a).

9. More generally, throughout the study, we ignore the possibility that one agent eradicates the other. We maintain this assumption because we want to consider stateless societies in which there are ongoing, possibly violent interactions between groups—be they tribes, communities, lineages, or villages. Similarly, we do not consider a situation in which one gains military resources by raiding the other. When this is the case, one group is likely to come to dominate the other. This is the situation we are not considering here. Alternatively, one can consider our analysis as related to a situation in which property rights are determined endogenously through interactions between the economic agents. The degree to which one can secure

Payoffs therefore reflect the players' investment in working, leisure, and military ability as well as decisions regarding using military power. Specifically, we assume that payoffs are given for each i by $U(I_i, l_i)$, where

$$I_1 = F(w_1) + r_1(F(w_2)M(m_1, m_2) - k) -$$

$$r_2[F(w_1) + r_1(F(w_2)M(m_1, m_2) - k)]M(m_2, m_1)$$

$$I_2 = F(w_2) - r_1(F(w_2)M(m_1, m_2)) +$$

$$r_2([F(w_1) + r_1(F(w_2))M(m_1, m_2) - k)]M(m_2, m_1) - k).$$

Player 1's payoff reflects his or her initial allocation of resources, which determines output, $F(w_1)$, and leisure, l_1. In addition, however, his or her income, I_1, also reflects income from the decision to raid, $r_1(F(w_2)M(m_1, m_2) - k)$ which is 0 if he or she decided to refrain from raiding (i.e., if $r_1 = 0$). Had player 1 decided to raid, his or her income would then reflect player's 2 output, $F(w_2)$; their relative military strength, $M(m_1, m_2)$; and the fixed expense of raiding, k. Player 2's payoff exhibits a similar structure, save that 2's income reflects the sequence of play in which player 1 may capture some of 2's income, whereas 2 may in turn affect the income of 1, either by engaging in production (which 1 then raids) or by herself or himself engaging in raiding.

ANALYSIS

Employing this framework to explore behavior in societies without states, we first explore equilibria in one period and then in an infinitely repeated version of the above game. Doing so highlights several points:

- In societies in which coercion is privately deployed for the raiding and protection of property, the first best allocation of resources between work and leisure is unlikely to prevail. Instead, the behavior in equilibrium is likely to entail wasteful investments in military preparation and raiding. These properties characterize what we call the anarchy equilibrium.

property rights depends on relative coercive capabilities. See, for example, Skaperdas (1992), Grossman and Kim (1995), and Muthoo (2000).

Although the model's formulation is inspired by the historical experience of stateless societies, at the same time it ignores, for simplicity's sake, potentially important aspects of conflict situations of the sort we seek to explore. It puts to the side, for example, evolutionary forces and specialization in the use of violence (as in Moselle and Polak 1999a), asymmetries among the agents (as in, for example, Grossman and Kim 1995; and Muthoo 2000); the impact of past conflicts on one's current military capabilities (discussed in Fearon 1996); uncertainty and loss of potential exchange (discussed in Skarpedas 1996b), and moral hazard issues (explored in Addison, Le Billon, and Murshed 2000).

By the same token, this framework enables us to extend the analysis beyond that possible in other works. Specifically, it allows us to examine the endogenous determination of prosperity and violence. See the studies cited above as well as Usher (1989) and Skaperdas (1992). The model in Muthoo (2000) is closest to ours. Although it explores the impact of asymmetries (which we do not), it does not enable agents to invest in military capabilities (as we do) or explore such issues as deterring raids by consuming leisure or the welfare implications of the endogenous state.

- The higher is the stateless society's potential economic prosperity, and the more the technology of production $F(\cdot)$ improves, the less likely is the first best allocation to prevail without investment in the means of violence.
- In stateless societies, violence is often the price paid for prosperity: an equilibrium with positive investments in military capabilities can Pareto dominate the optimal equilibrium with none.
- By implication: to escape from the trade-off between peace and prosperity, such societies might seek the introduction of a centralized form of political order. They might seek thereby to shed the constraints on their welfare imposed by this trade-off.

A Single-Shot Framework

The first best allocation of resources is (w^*, l^*), which solves

$$\max_{w,\, l \geq 0,\, w + l = T} \quad U\big(F(w), l\big).$$

To compare this allocation with that achieved in equilibrium, we first need to describe subgame perfection (SPE) in this game. To facilitate the exposition, we define r_2 as taking the value 1 when $\{[F(w_1) + r_1(F(w_2)M(m_1, m_2) - k)]M(m_2, m_1) > k\}$ and the value 0 otherwise. Denote the resulting indicator function as $R_2(w_1, w_2, m_1, m_2, r_1)$. Using this expression, we can express I_1 as a function of only w_1, w_2, m_1, m_2, and r_1. Hence, $r_1 = 1\{I_1(w_1, w_2, m_1, m_2, 1) > I_1(w_1, w_2, m_1, m_2, 0)\}$, which we will denote by $R_1(w_1, w_2, m_1, m_2)$. Therefore, given w_2, m_2, l_2, 1 solves optimization problem (1):

$$\begin{aligned} \max_{w,\, m,\, l \geq 0,\, w + m + l = T} \quad & U(F(w) + R1(w, w2, m, m2)\,(F(w2)M(m, m2) - k) - \\ & R2(w, w2, m, m2, R1()[F(w) + R1\,(w, w2, m, m2) \\ & (F(w2)M(m, m2) - k)]M(m2, m), l)\,. \end{aligned}$$

Likewise, given w_1, m_1, l_1, 2 solves optimization problem (2)

$$\begin{aligned} \max_{w,\, m,\, l \geq 0,\, w + m + l = T} \quad & U(F(w) + R_1(w_1, w, m_1, m)\,(F(w)M(m_1, m)) + \\ & R_2(w_1, w, m_1, m, R_1()([F(w_1) + R_1\,(w_1, w, m_1, m) \\ & (F(w)M(m_1, m) - k)]M(m, m_1) - k), l)\,. \end{aligned}$$

A solution to these two equations constitutes an SPE in this game. Under what conditions would it support the first best allocation?[10] That is, under what conditions would $w_i = w^*$, $m_i = 0$, $l_i = l^*$ $\forall I$ prevail as an SPE?

In addressing this question, note that if $m_i = 0$, then $r_i = 0$ is a strictly dominant strategy. If one did not invest any resources in military ability in the first substage, raiding the other would yield no gains. Indeed, the predator would lose at least k, the fixed cost of raiding. In considering the conditions for an SPE in which $w_i = w^*$, $m_i = 0$, $l_i = l^*$, we therefore need to consider only deviations that begin in the first stage of the game.

10. Note that because the objective functions are discontinuous, standard existence results do not apply. We will assume, however, that an equilibrium exists.

Because investment in military ability diverts resources from production and leisure, a deviation would be profitable only if it also involves raiding. This reasoning implies that a necessary and sufficient condition for there to be such an equilibrium is that $\forall i$

$$\max_{w,\, m,\, l \geq 0,\; w+m+l=T} U(F(w) + (F(w^*)M(m, 0) - k, l) \leq U(F(w^*), l^*) .$$

This condition, we contend, is implausible; and the attainment of the first best as an equilibrium is therefore unlikely. Given that the other player has allocated her or his resources optimally and thus devoted nothing to the enhancement of her or his military capabilities, this condition requires that the other player cannot secure a higher payoff by reallocating her or his resources. More specifically, it requires that

$$\max_{w,\, m,\, l \geq 0,\; w+m+l=T} \{(F(w) + (F(w^*)M(m,0) - k\} \leq F(w^*)$$

or, equivalently, $F'(w^*) \geq F(w^*)M_1(0, 0) - k$. That is, for the first best allocation of resources to hold as an SPE, there can be no profitable marginal deviation that shifts resources from production to military preparation and raiding.

Further exploration reemphasizes the implausibility of attaining the first best as an SPE. The condition is fragile. It is less likely to exist the lower is the fixed cost in raiding; the higher is the total product, $F(w^*)$; and the lower is the marginal productivity of working, $\partial F(w^*)/\partial w_i$. If development implies better transportation technology, greater total production, and decreasing marginal returns to labor, then the implication is clear: as development proceeds, the equilibrium will break down.

In what follows, we therefore concentrate on equilibria in which positive amounts of resources are invested in acquiring military capabilities. In particular, we define an anarchy equilibrium[11] (signified by a superscripted a) in which private agents, behaving as rational individuals, devote effort to military preparedness, even though it is costly and entails loss of social welfare. We will employ the anarchy equilibrium in future models to generate payoffs when players deviate from the equilibrium path of play.

Repeated Play

A characteristic of stateless societies is that, because they are based on kinship, they are built on long-term relationships. To deepen our understanding of prosperity and violence in stateless societies, we therefore need to extend our analysis to include the possibility of repeated play. In addition, contemporary scholars (Keohane 1984; Bates 1983; Taylor 1987) often invoke the so-called Folk Theorem (Fudenberg and Maskin 1986) to account for political order at the global level, where there is no government.

11. There may be more than one such equilibrium, and we will always refer to the most efficient one among them.

Because our concern is with violence, we therefore consider the SPE in which no raiding occurs in equilibrium in a multiperiod framework and explore the possibility of securing socially rational outcomes in stateless societies.

No raiding SPE in repeated play. Consider the infinitely repeated version of the one-period game. When can $w_i = w'$, $m_i = m'$, $l_i = l'$, $r_i = r' = 0 \forall i$ be supported on the equilibrium path of play through a threat of reversion to the anarchy equilibrium? Consider the following strategy: each player allocates resources according to $w_i = w'$, $m_i = m'$, $l_i = l'$, and does not raid; that is, $r_i = r' = 0$ as long as the other player has allocated resources in the above manner and never raided before. Otherwise, each player reverts to playing the strategy that supports the anarchy equilibrium.

Denote by $\pi^a{}_i$ the payoff of player i in the anarchy equilibrium that will be used as the punishment. Note that on the path of play, each player's payoff is given by $\pi' = U(F(w'), l')$. To characterize each player's optimal deviation, we observe that for player 1, the best possible deviation involves deviating in the first stage, after which play for the second and third stages of that period is dictated by backwards induction. Hence, $\pi^D{}_1$ is given by solving player 1's optimization problem number (1), presented above, given that $w_2 = w'$, $m_2 = m'$, $l_2 = l'$. Player 2 can deviate not only in this manner but also by maintaining the equilibrium strategy in the first stage, thereby inducing player 1 to follow the equilibrium strategy in the second stage, and deviating in the third stage by raiding. Player 2's best deviation $\pi^D{}_2$ is therefore given by $\max\{\pi, U(F(w') + F(w')M(m', m') - k, l')\}$, where π is the solution to player 2's optimization problem (2), presented above, given that $w_1 = w'$, $m_2 = m'$, $l_1 = l'$.

A necessary and sufficient condition for the above strategy combination to be SPE is that the following condition holds: $\forall I, \pi_i/(1-\delta) \geq \pi^D{}_i + \delta\pi^N{}_i/(1-\delta)$. We refer to this condition as condition 1.

The irrelevance of the Folk Theorem. According to the Folk Theorem, if the private agents' discount factor, δ, is sufficiently close to 1, the first best outcome can be attained in equilibrium in repeated play. But as was the case in a single round of play, the conditions necessary for the attainment of the first best in repeated play are restrictive and demanding. Both players must be sufficiently patient. Indeed, in our case, each must be so patient that even were one to lack means of defense, the other would not raid out of a fear of a future reversion to the anarchy equilibrium. Furthermore, their discount rates and expectations of the discount rate of the other must be common knowledge. Condition 1 suggests an additional reason why the first best is not likely to result as an equilibrium in repeated play: it is fragile. Consider a situation in which the military technology is such that what one gains from raiding sharply falls with the military investment of the other (that is, a situation in which the partial crossed derivative of $M(\cdot)$ is low). Now consider the comparative static of increase in the fixed cost of raiding. In this case, the payoffs on the equilibrium path do not change but the gains from deviation and in the anarchy equilibrium do. The gains from deviation decline because of the increase in the cost of raiding; but the payoff in the anarchy equilibrium increases because a small investment in military ability will be sufficient to deter

raiding. If the former effect is larger than the latter, the first best allocation can no longer be sustained in equilibrium.

As in the case of one-period interaction, in repeated play, an increase in the efficiency of production $F(\cdot)$ and a reduction in the marginal productivity of labor $F'(\cdot)$ can undermine the first best as an equilibrium outcome. To see why this is the case, note that the gain from raiding is fixed whereas the per-period gain from not raiding goes to infinity as the time discount factor goes to 1. As stressed by the Folk Theorem, people will therefore choose not to deviate as the discount factor rises. But just as the Folk Theorem implies that for a given set of payoffs, there exists a discount rate that will support cooperation as an equilibrium strategy, so too does it imply that for a given discount rate, there exists a potential gain from defection that will undermine cooperation as an equilibrium choice of strategies. For a given discount rate, should $F(\cdot)$ shift outward and the marginal productivity of labor $F'(\cdot)$ decline, then the gain from raiding (and therefore the payoffs in the anarchy equilibrium) will increase. Even if a cooperative equilibrium were to prevail that would support the first best level of welfare, it would therefore be transitory. Should technology change and prosperity grow, people would find defection an increasingly attractive alternative. For a given discount factor, there is a limit to the level of prosperity that can be supported as an equilibrium outcome without investment in defensive capabilities.

For these reasons, we therefore join with North (e.g., 1990, 12-16) in doubting the possibility of securing through repeated play the first best as an equilibrium outcome. We therefore turn to the analysis of two alternative equilibira.

Two informative equilibria. Among the possible equilibria that satisfy condition 1, we focus on two: a no military (NM) investment equilibrium in which no one invests in military capabilities, $m'_1 = m'_2 = 0$; and a positive military (PM) investment equilibrium in which $m'_1 = m'_2 > 0$. Note that in the former (in which $m' = 0$, then $M(m', m') = 0$), the payoffs for deviating can be simplified to

$$\pi^{D}_{1} = \max_{w,\, m,\, l \geq 0,\, w+m+l=T} U(F(w) + R_1(w, w', m, 0)\,(F(w')M(m, 0) - k, l),$$

$$\pi^{D}_{1} = \max_{w,\, m,\, l \geq 0,\, w+m+l=T} U(F(w) + R_2(w', w, 0, m', 0)\,(F(w')M(0, m) - k, l).$$

Note that the NM equilibrium is a special case of the PM equilibrium, one in which $w' = 0$. Because the NM investment equilibrium set is a subset of the PM investment equilibrium, the former cannot Pareto dominate the latter. But can the PM investment equilibrium Pareto dominate the NM investment equilibrium? If it can, then we learn that in societies without states, people may chose to live violently to increase their welfare.

Consider first a situation in which the one-time payoffs to defection are sufficiently high and the discount factor sufficiently low that future punishments fail to deter aggression. In such a case, for peace to prevail without investment in military ability, the players' allocation of resources between production and leisure must be such as to

reduce the gains from raiding. The players must choose a level of productive effort, w_i, low enough to forestall raiding. More generally, in the most efficient NM investment equilibrium, each player deters the other from raiding by threatening to revert to the anarchy equilibrium and by making herself or himself poor enough so that raiding is not profitable. The price of peace is poverty.

Now consider an equilibrium in which the agents acquire some military capacity—though less than the levels in the anarchy equilibrium. Might such a PM capacity equilibrium yield higher levels of welfare? In other words, could investment in the capacity to fight lead to greater prosperity?

Our analysis suggests that in societies without states, a seemingly wasteful investment in military ability can lead to an outcome that Pareto dominates the most efficient NM investment equilibrium. In the NM equilibrium, the amount of effort devoted to work is constrained by the need to reduce the productivity of the other player's raids; the parties devote residual resources to leisure rather than to labor. In the PM equilibrium, because they devote more resources to deterring raiding, the players can devote more resources to productive activity as well. The PM investment equilibrium therefore can dominate the NM investment equilibrium when a redistribution of effort in the former equilibrium from leisure to work and military preparedness yields an increase in economic output that compensates for the loss of leisure, while still being low enough to ensure that raiding (which entails a reversion to the anarchy equilibrium) remains unprofitable.

Our inquiry thus highlights that, in general, in societies without states, the price of peace can be prosperity; the most efficient NM equilibrium in repeated play implies that peace can be sustained by consuming large amounts of leisure. We thus also find that the price of prosperity may be investment in the means of violence; the most efficient PM investment equilibrium implies that by acquiring military capabilities, private agents may render it rational to shift more resources from leisure to productive activities.

In a PM investment equilibrium, stateless societies are characterized by constant displays of military ability or skirmishes. The demonstration of force by one player indicates to the other that should she or he think of raiding, the profitability of such raids would be small. Such societies are warlike, but they also are economically more productive than societies whose citizens do not bear arms.

A RETURN TO CASE MATERIALS

A return to the two cases with which we began this analysis—those of medieval England and Kenya—provides two implications of our analysis. By linking wealth and the capacity for violence, the analysis suggests a mechanism that might explain the validity of the famous insight of Moore (1966): that in the course of development, agrarian societies have come to constitute the locus of political violence in the modern world. Moore's insight provided the foundations for subsequent work by Wolf (1969), Skocpol (1979), and others (e.g., Scott 1976; Migdal 1975), who sought to explain why, contrary to Marx's predictions, it was the peasantry, rather than the working class, that constituted the revolutionary political force of modern times. Insofar as

modernization implies the commercialization of agriculture and therefore the accumulation of wealth in rural societies, and insofar as property rights in such societies are defended by family and kin, our analysis helps to provide the link between economic development and the rise of political conflict in the agrarian periphery of the modern world.

A second implication of our analysis is that when development takes place in such societies, there may come a demand for a new source of order. The logic of stateless societies imposes a trade-off between prosperity and violence. It therefore imposes a frontier that limits the level of well-being attainable in such societies. If people could reconfigure their political institutions, they might be able to escape the logic imposed by the system of self-defense and become better off as a result.

It is therefore suggestive that members of such societies have indeed attempted to alter their political institutions. Returning to the case of late medieval Europe, we find that the lords and magnates may have, in MacCaffrey's (1961, 95) words, invested in the "brutal skills of the armed retainer, half soldier, half gangster," but that they also appeared to have been intensely aware of the costs of doing so. By the time of Richard II, notes Hicks (1995, 128), Parliament repeatedly "pressed for restrictions on liveried companies," even though Parliament was dominated by the very magnates who had organized them. Themselves both perpetrators and victims of violence, the lords turned to the Crown and demanded an increased level of law and order. A similar situation appears to have prevailed in France, where local communities called for the "institution of the peace," wherein public officials, rather than private families, would provide political order (Duby 1987, 141). In Genoa, the warring clans joined in contracting for the services of specialists in violence, who would deter domestic conflict and elicit cooperation, the better to secure their fortunes from commerce (Greif 1998). And in what is now Russia, according to a 12th-century chronicler, the Slavs petitioned the Swedes, writing, "Our country is rich and immense, but it is rent by disorder. Come and govern us" (Cohat 1992, 62).

Turning to the modern world, we encounter evidence of similar behavior in Africa. Perhaps most persuasive is the evidence gathered by Colson (1974) from the Plateau Tonga of Northern Rhodesia (now Zambia) at the height of the struggle against colonial rule. Like other African societies, the Tonga strongly backed the nationalist movement; but, Colson makes clear, they did not seek the overthrow of government. Rather, they sought its capture, for they feared a "return to conditions they remembered when they had to defend themselves for ensuring life and property, rather than on the presence of the district administration, and the more remote central government" (p. 67). They feared a return to the decentralized use of coercion, with the insecurity it unleashed and the costs in terms of benefits foregone or life and property destroyed.[12]

Our model shows that decentralized systems can provide security; but in doing so, they impose a trade-off between order and prosperity. These examples suggest that

12. Notable too is Southall's (1956) study of the Alur of northern Uganda, which documents their importation of chiefs in an apparent effort to secure "new technologies of peacekeeping, arbitration, and conflict management" (p. 80). Dike (1956), Northrup (1978), Ottenberg (1958), and Jones (1963) describe how the Aro, specialists in commerce, ritual, and governance, contracted with the decentralized communities of what is now the southeast of Nigeria to provide law and order and protection for trade.

members of such societies have been aware of the limitations imposed upon them and sought an alternative set of political institutions.

SOCIETIES WITH STATES

To explore under what conditions societies may choose to reconfigure their political relationships, we return to the model and introduce a figure, G, who is a specialist in violence. We then explore the interaction between G and private agents and seek to identify and characterize the conditions under which such specialists can be tamed. When G can indeed be induced to refrain from predation and employ her power to penalize those who raid (or fail to pay taxes), we then call G a government. In addition, when people pay taxes and refrain from raiding, we then call the society governed by G a state.

To launch the analysis, consider two examples: one concerning state formation in late medieval Europe and the other concerning state collapse in modern Africa.

AN EXAMPLE FROM HISTORY

Returning to the scholarship on late medieval England, we encounter a society fractured by "confederacies, conspiracies, and lawlessness" (Ormrod 1993, 99); armed with their own retainers, the magnates controlled "large retinues with which they could pursue their private feuds" (Hicks 1995, ix).

As we have seen, even while engaged in such bloodshed, the magnates realized the limits of the private provision of defense for property and viewed it "as a major impediment to the restoration of social and political harmony" (Ormrod 1993, 59) and thus to their own prosperity. Given the limitations inherent in the private provision of property rights, it is therefore informative to find the lords "accept[ing] the legal reforms of Henry II that substituted . . . remedies in royal courts for their own courts and jurisdictions" (Hicks 1995, 113). As scholars such as Hicks (1995) and Hudson (1996) make clear, the first step in this transformation was the creation of criminal law: "Violent revenge and blood feuds," writes Hicks (1995, 113), "were now treated as crimes against the common weal."

One of the first steps in the creation of the English state, then, was the banning of private warfare and the centralization of political order: the defense of private rights in property was now to be provided by a specialist rather than by private parties. Contemporaneous with this transition was the levying of taxes. Until the late medieval period, monarchs themselves financed their activities, raising funds from their farms and forests and from the tenants who leased their lands. When they began to provide public order, however, they gained access to a new set of revenues: those paid by private parties who consumed the judicial services of the king. Fees from the judicial system rapidly became a significant source of public revenues (Prestwich 1980, 235 ff).

It is therefore notable that when Richard I and John Lackland sought increased revenues—the first to continue his crusades and the second to ransom his brother and recover lands lost on the continent—elites who had previously willingly contributed to the costs of government rebelled. Key to the restoration of order were the terms of the

settlement embodied in the *Magna Carta*, which defined rights in property; limited powers of taxation; and granted the insurgent barons four castles, each in a politically strategic location, to ensure adherence to the agreement.

The case of England offers insights into the foundation of states. State-based political order, it suggests, arises in a context of (a) the public enforcement of property rights, (b) the pacification of civic society, and (c) the payment of taxes. Because the maintenance of state-based political order rests on this tripod of taxes, property rights, and the demilitarization of private forces, the analysis suggests that if one property changes without corresponding compensation in the others, then order may collapse.

A MODERN EXAMPLE

Modern examples provide further insight into the pact between specialists in violence and private agents. In particular, they reaffirm the importance of public revenues for keeping the peace.

During the global recession of the late 20th century, the government of Liberia numbered among those hard hit by the crisis in international credit. Given global recession, demand for primary products declined, and Liberia therefore exported lower quantities of iron, rubber, and timber; what it did export, it sold at lower prices. As the majority of the government's revenue derived from trade, the reduction in the value of exports inflicted a major blow to its finances. In the 1980s, when Liberia withdrew its permission for the United States to use its territory for the deployment of military forces, public revenues declined further as the United States terminated its subventions to the government's budget. In an effort to pay its bills, the government of Liberia reverted to printing money. This response amounted to an inflation tax, which private agents resisted by eschewing the use of money and by moving exchange to a barter economy. But those such as public servants (including soldiers) who produced no commodities and were paid in local currency could not shelter their incomes in this way. Thus, those who worked for the government suffered a decline in income and living standards.

As in other countries, Liberia's economic crisis became a political crisis as well. Triggering the political crisis was the response of the military to the decline of the public economy. When revenue declined, the incentives for soldiers to refrain from predation eroded. No longer sufficiently motivated by the value of public revenues to use their coercive capabilities to defend property rights, specialists in violence instead used their coercive capabilities to violate them. They turned predatory (Reno 1998; Ellis 1999).

Without protection of property rights, people withheld resources from productive activities. Private agents shifted resources into the provision of their own defense. In a variety of locations, those who sought to produce for profit began privately to contract for military protection. Some of the larger firms imported security services from abroad. Other, "smaller . . . Americo-Liberian and . . . Lebanese operations" built "personal connections" with military personnel (Reno 1998, 86). Liberia experienced a transition from civilian politics to warlord politics. It became poorer and more violent (see also Ellis 1999).

The flow of revenues to specialists in violence induces them to refrain from predation and protect property rights. When public revenues decline, specialists in violence may revert to predation and private agents to self-defense, accelerating political decline and economic collapse. As did the case of England, the case of Liberia suggests that state-based political order rests on a tripod of demilitarization of kin and community, the protection of property rights, and the payment of taxes.

A RETURN TO THE MODEL

To capture the forces at play in the empirical record, we return to our model and introduce G, a specialist in violence, into a world already inhabited, as it were, by private agents who can chose to work, prepare for battle, or remain idle. We want to establish conditions under which private agents will pay for protection and demilitarize themselves in exchange.

G undertakes no productive labor. Rather, she extracts her income from others; she does so either by raiding the wealth of others or by securing the payment of taxes. After observing the actions taken by private agents, G chooses whether to prey on one or two of the private agents. G's action set, therefore, is $A_G = \{(p_i, p_{-i}): p_i, p_{-i} \in \{0,1\}\}$.

In each period, the private agents play the game described above. What distinguishes this version is that now their choice set includes an additional action: they can elect to pay taxes to a specialist in violence. Define $t_i \in \{0, 1\}$ to equal 1 if player i pays taxes and equal to 0 if she or he does not pay. If a player chooses to pay taxes, she or he transfers a share, τ, of her or his income to G. The sequence of action each period is thus

1. $i \in \{1, 2\}$ chooses $w_i, m_i, l_i \geq 0$ s.t. $w_i + m_i + l_i = T$.
2. $i = 1$ chooses $r_i \in \{0, 1\}$.
3. $i = 2$ chooses $r_i \in \{0, 1\}$.
4. The player chooses $t_i \in \{0, 1\}$.
5. G chooses $p_i \in \{0, 1\}$ for $i \in \{1, 2\}$.

Payoffs for $i \in \{1, 2\}$ differ from those in a stateless society because they now also depend on the actions taken by G. The private agent i's net income, $I_i(\cdot)$, now includes her or his revenue from productive labor and raiding minus taxes, if she or he chooses to pay; minus the expected reduction in her or his income resulting from predation by G, should G decide to expropriate her or his property. Hence, player's 1 payoff is, for example, $U(\tilde{I}_1, l_1)$ where $\tilde{I}_1 = \{F(w) + r_1(F(w_2)M(m_1, m_2) - k) - r_2[F(w) + r_1(F(w_2)M(m_1, m_2) - k)]M(m_1, m_2)\}(1 - \tau t_1)(1 - p_1 q_1)$.

G's objective is to maximize the net present value of her revenues from taxes and expropriation, discounting for time by a factor, δ_G. For simplicity of exposition, we assume that the tax rate is exogenous. Given that private agents are themselves capable of violence, when G preys on the economic output of a player i, G succeeds in capturing her or his wealth only in a probability. This probability, q_i, can reflect player i's ability to evade or to confront G, using her or his military power, m_i. For simplicity's sake, we do not specify q_i as a function of m_i. Furthermore, G's predation is costly, requiring an expense $C_G > 0$ per agent on which G predates.

Payoffs for G are thus given by $\sum\{p_i q_i \tilde{I}_i(1 - \tau t_i) - Cp_i + \tau t_i \tilde{I}_i\}$ (where the summation is greater than $i = 1, 2$). The first term represents G's revenue from expropriating private agents' wealth, if G decides to engage in predation; the second, the costs of predation; and the third, G's income from taxation.

An important feature of this model is that although she is a specialist in violence, G possesses limited power; G holds no monopoly over violence. A second is that it does not take political order for granted; rather, under certain conditions, it allows order to emerge.[13] Within the framework of this model, we can therefore isolate the conditions under which order can prevail or disintegrate. In particular, we seek the conditions under which private agents abide by a self-enforcing contract with a specialist who employs violence to protect productive activity. We call that equilibrium a cooperative governance (CG) equilibrium, one under which the specialist in violence behaves as a government and a state can be said to exist.

ANALYSIS

As in the case of our model of a stateless society, we let the agents choose in a utility maximizing manner and explore the properties of the equilibria that may result. The results capture the interrelationships between taxation, property rights, private demilitarization, and the formation and disintegration of the state observed in the examples above. They suggest the following:

- Public revenues help to harness the specialist in violence, because tax payments induce G to use her coercive capabilities to protect property rights rather than to engage in predation.
- The equilibrium tax rate reflects not only the need to restrain predation by G but also to forestall a return to the private provision of violence. As a result, the equilibrium tax rate is knife-edged; it can be neither too low nor too high.
- The incentives for G to refrain from predation are a function of its prospective payoffs off the equilibrium path. These payoffs help determine whether a tax rate exists that private agents are willing to pay and that G finds sufficiently attractive to induce it to refrain from predation.

Analysis of the comparative statics further suggests that order can collapse following

- a lowering of the government's discount factor and a rise in its insecurity,
- an increase in the prospects of the government off the equilibrium path,

13. These premises lead us to depart from sociological conceptions of the state (e.g., Weber 1958) and to analyze the foundation of the state using game theoretic forms of analysis. Other relevant contributions include Grossman (1997), who utilizes a general equilibrium, static model to explore the technological conditions under which economic agents will "hire" a state to protect them from outside predators although, ex post, the state will tax them to maximizes its benefits. Moselle and Polak (1999b) explore the interrelationships between states and bandits and demonstrate that the state can reduce welfare when economic agents lack military power. Usher (1989) considers economic agents as possessing no military capabilities and examines the welfare effects of dynastic cycles and rebellions. Elbadawi (1999) and Azam (1994) are similarly concerned with the implications of potential rebellion and external threats. See also Konrad and Skaperdas (1996).

- a change in the relative military capabilities of government vis-à-vis private agents, or
- a rise in productivity without an increase in taxation.

We begin by considering the SPE of the one-period game, which we refer to as the warlord (WL) equilibrium. This equilibrium plays a role in our model of state-like societies similar to that played by the anarchy equilibrium in our model of societies without states. In the WL equilibrium, G predates if it is profitable to do so. In addition, the economic agents raid each other, if their wealth and military strength make predation profitable.

Subgame perfection implies that $\forall i p_i = 1\{I_i(1-\tau t_i)q_i > C\}$; that is, $p_i = 1$ if it is profitable for G to predate on agent i. We therefore define functions such that $p_1 = P_1(w_1, w_2, m_1, m_2, r_1, r_2, t_1)$ and $p_2 = P_2(w_1, w_2, m_1, m_2, r_1, r_2, t_2)$. Substituting P_2 into $\tilde{I}_2$, above, we can then express $\tilde{I}_2$ as a function of the parameters $w_1, w_2, m_1, m_2, t_2, r_1, r_2$. Therefore, $r_2 = 1\{\tilde{I}_2(w_1, w_2, m_1, m_2, t_2, r_1, 1) > \tilde{I}_2(w_1, w_2, m_1, m_2, t_2, r_1, 0)\} \equiv R_2(w_1, w_2, m_1, m_2, t_2, r_1)$. Similarly, we can express $\tilde{I}_1$ as a function of $w_1, w_2, m_1, m_2, t_1, t_2, r_1$. It follows that $r_1 = 1\{\tilde{I}_1(w_1, w_2, m_1, m_2, t_1, t_2, 1) > \tilde{I}_1(w_1, w_2, m_1, m_2, t_1, t_2, 0)\}$, which we denote by $R_1(w_1, w_2, m_1, m_2, t_1, t_2)$. Player 2 raids if the conditions are such that $r_2 = 1$; player 1, if $r_1 = 1$. Given w_2, m_2, l_2, t_2, player 1 therefore solves

$$\begin{aligned}\max_{w,\,m,\,l\,\geq 0,\; w+m+l=T,\; t\in\{0,1\}} \; & U([F(w) + R_1(w, w_2, m, m_2, t, t_2)(F(w_2)M(m, m_2) - k) \\ & - R_2(w, w_2, m, m_2, t_2, R_1())[F(w) \\ & + R_1(w, w_2, m, m_2, t, t_2)(F(w_2)M(m, m_2) k)\mathrm{M}(m_2, m)](1-\tau t) \\ & (1-P_1(w, w_2, m, m_2, R_1(), R2(), t)q_1), l).\end{aligned}$$

Likewise, given w_1, m_1, l_1, t_1, player 2 solves

$$\begin{aligned}\max_{w,\,m,\,l\,\geq 0,\; w+m+l=T,\; t\in\{0,1\}} \; & U([F(w) - R_1(w_1, w, m_1, m, t_1, t)(F(w)M(m_1, m)) \\ & + R_2(w_1, w, m_1, m, t, R_1())[F(w_1) \\ & + R_1(w_1, w, m_1, m, t_1, t)(F(w)M(m_1, m) - k)]M(m_1, m) - k)](1-\tau t) \\ & (1-P(w, w_1, m, m_1, R_2(), R_1(), t)q_2), l).\end{aligned}$$

Because of the many discontinuities in the objective functions, we cannot apply standard existence results.

Now consider an infinite version of the above game and denote by δ_G the time discount factor of G. A cooperative governance (CG) calls for each private agent to select $w_i^{CG}, m_i^{CG}, l_i^{CG}$ optimally (given the strategies of other players), not to raid, and to pay taxes to G if the other agent has not raided and G never seized the wealth of a private agent. Otherwise, the private agents "revolt," refuse to pay taxes, and revert to self-defense, playing the WL equilibrium strategy over subsequent periods.

In the CG equilibrium, G refrains from predating as long as neither private agent launches raids or fails to pay taxes. If either agent raids or fails to pay her or his taxes, G then becomes predatory; it begins to behave as a warlord, seizing the wealth of the private agents.[14] Predation and violence are deterred by the threat of permanent reversion

14. Considering a similar equilibrium in which G punishes an agent who raided or failed to pay tax without reverting to the warlord equilibrium does not change the analysis.

to the warlord equilibrium, which is characterized by predation and low levels of output, as private agents seek security by investing in military preparedness or by remaining poor.

Formally, consider the infinitely repeated version of the above game. Under what conditions can $w_i = w^C, m_i = m^C, l_i = l^C, t_i = t^C = 1, r_i = r^C = 0, p_i = p^C = 0 \forall I \in \{1, 2\}$ be sustained on the equilibrium path of play through the threat of a reversion to the WL equilibrium? Denote by $\pi^{WL}{}_i$ the payoff of the punishment (WL) equilibrium for each player $i \in \{1, 2, G\}$. Note that on the equilibrium path of play, players 1 and 2 receive a payoff of $\pi^C{}_1 = \pi^C{}_2 = U(F(w^C)(1-\tau), l^C)$ in each period, whereas G receives a payoff of $\pi^C{}_G = 2\tau F(w^C)$.

The best possible deviation for player 1, $\pi^D{}_1$, is given by solving her or his optimization problem above, given that $w_2 = w^C, m_2 = m^C, l_2 = l^C, t_2 = t^C$. Similar to the case without G, player 2 can raid at stage 3 after choosing her or his equilibrium allocation of resources at stage 1. Hence, for player 2, $\pi^D{}_2$ is given by $\max\{\sim\pi, U((F(w^C) + F(w^C) M(m^C, m^C) - k)(1-\tau)(1 - P(w^C, w^C, m^C, m^C, 1, 0, 1)q_2), l^C)\}$, where $\sim\pi$ is the solution to player 2's optimization problem above, given that $w_1 = w^C, m_1 = m^C, l_1 = l^C, t_1 = t^C$. Finally, G's best deviation is given by $\pi^D{}_G = \pi^C{}_G + \sum 1\{F(w^C)(1-\tau)q_i > C\}(F(w^C)(1-\tau)q_i - C)$.

For this strategy to be an equilibrium strategy, no player should be able to gain from deviating after any history, within a period and across periods. Hence, four conditions must hold:

I. Each economic agent cannot gain by raiding or refusing to pay taxes. That is, $\forall i \in \{1, 2\}$, $\pi^C{}_i/(1-\delta) \geq \pi^D{}_i + \delta\pi^{WL}{}_i/(1-\delta)$. This condition insures that an agent finds it optimal neither to raid nor to renege on tax payments.

II. Each agent cannot gain by altering the allocation of his or her resources while still deterring the other from raiding. That is, for $I = 1,2$ $(w_i^C, m_i^C, l_i^C) \in \text{argmax } U(F(wi)(1-\tau), li)$, subject to $w_i^C + m_i^C + l_i^C = T$ and $\pi^C{}_{-i}/(1-\delta) \geq \pi^D{}_{-i} + \delta\pi^{WL}{}_{-i}/(1-\delta)$.

III. G's threat to predate within the period in which a raid is conducted must be credible. It must be profitable for G, and the cost to G of punishing a player who raids must, in equilibrium, therefore be less than the gains from doing so. Denote by $w^D{}_i$ and $m^D{}_i$ player i's allocation of resources to work and military capacity in its optimal deviation (which takes into account that G will predate in response). G's threat is credible if for all i, $(F(w^D{}_i) + F(w^C)M(m^D{}_i, m^C) - k)q_i > C$.[15]

IV. G finds it optimal not to predate if the economic agents adhered to their strategies. That is, $\pi^C{}_g/(1-\delta) \geq \pi^D{}_g + \delta\pi^{WL}{}_g/(1-\delta)$.

ON THE EQUILIBRIUM PATH

In general, three factors motivate private agents to remain on the equilibrium path. The first is the loss resulting from a transition to the WL equilibrium. The second is G's threat to revert to predatory behavior during the period in which raiding occurs. The third factor is the other agent's military ability. This third factor becomes more important the lower the time discount factor and q, and hence the magnitude and likelihood of future punishments.

15. Note that this assumes that an economic agent's optimal deviation implies not paying tax. This is the case when the tax rate is endogenously determined, as discussed below.

G's incentives to adhere to the equilibrium path derive from the revenues she can secure from taxation. On inspection, the tax levels that support the CG equilibrium are tightly constrained. To induce G to refrain from predation, the tax level, τ, needs to be high enough that G finds it optimal, given the private agents' strategy, to refrain from confiscating the agents' wealth if she pays taxes. On the other hand, the tax level must be sufficiently low to provide private agents the incentive to pay rather than to withhold them, thereby inducing a shift to the WL equilibrium. Although the tax rate must be sufficiently high to induce G to enforce rather than violate property rights, the level is bounded from above by the need to ensure the credibility of G's threat to predate if taxes are not fully paid.

If taxes are not fully paid, G must choose between punishing, and thereby triggering a reversion to the WL equilibrium, or continuing to play the CG equilibrium. If the level of taxes is too high, then the receipt of a portion of what is due might remain preferable to the payoffs under the WL equilibrium. For G's threat to be credible, the tax level must not be too high. It is therefore bounded from above and below.

The highest tax rate τ^C that leaves G's threat credible is the lowest rate that leaves G indifferent between the two equilibria, that is, $\pi^C_g/(1-\delta) = \pi^D_G + \delta\pi^N_G/(1-\delta)$. Rearranging yields the equilibrium level of taxation, τ^{C*}, where $\tau^{C*} = \sum i1\{F(w^C)(1-\tau^C)q_i > C\}(F(w^C)q_i - C) + (\delta\pi^N_G/1 - \delta z)/(2\delta\tau^C F(w^C)/1 - \delta) + \sum(i1\{F(w^C)(1-\tau^C)q_i > C\}(F(w^C)q_i$.[16]

OFF THE EQUILIBRIUM PATH: THE THREAT OF REVERSION TO CHAOS

Whereas the steady flow of tax payments provides a positive check to the predatory behavior of the specialist in violence, the threat of reversion to the chaos of statelessness provides a negative one.

Under the WL equilibrium, each private agent raids if it is profitable to do so; the specialist in violence, G, acting like a warlord, engages in predatory behavior whenever it is profitable; and no taxes are paid. In the WL equilibrium, people devote more resources to military preparedness and leisure, responding to and seeking to deter predation by fellow citizens—and by the specialist in violence, now on the prowl—than they do in the CG equilibrium. Productive efforts decline, resulting in less total output. Should she behave opportunistically, the specialist in violence would therefore trade a steady flow of revenues, paid in the form of taxes, for the short-term benefit of loot—and the long-term prospect of having to seize prizes from a society that is now better armed and less wealthy and, hence, more costly and less rewarding to plunder.

Because the threat of reversion to warlordism helps to keep both the government and citizens on the equilibrium path, G's continuation value, π_G^{WL}, constitutes a critical parameter in the model. If π_G^{WL} is too high, the taxes needed to induce G to behave as a government may also be so high as to make governance unattractive. This would be the case even though the level of tax payments might be too low to make it profitable for G to foreswear arbitrary predation.

16. Given this tax rate, an economic agent's optimal deviation entails not paying tax, as assumed above.

COMPARATIVE STATICS, POLITICAL COLLAPSE, AND THE WL EQUILIBRIUM

Our examination of the CG equilibrium provides several important insights into the nature of political order. Most broadly, it suggests that the prospects of political order are influenced not only by the level of public revenues but also by the government's assessment of its prospects should order break down. G's future prospects off the equilibrium path are determined by (a) δ_G, the extent to which G values future payoffs; and (b) π_G^{WL}, G's continuation value payoff. By affecting the possibility of order, these conditions also affect the likelihood of a transition to the WL equilibrium.

Comparative statics suggest the relationship between these variables and the possibility of political order and, thus, the mechanism that promotes the maintenance of order or a transition to warlordism. Each is derived assuming that the most efficient CG equilibrium prevails. Among the most relevant variables are

G*'s discount factor*, δ_G: Should G's discount factor fall, G would more heavily discount future punishments, rendering more alluring the immediate payoffs from opportunistic defection. With a fall in G's discount factor, if her revenues remain the same, the specialist in violence's best response may be to revert to predatory activity. G's actions would then trigger the breakdown of political order; but it would willingly assume future losses because they are highly discounted. Given a fall in their discount factor, incumbent specialists in violence might therefore be tempted to engage in acts of predation that trigger the breakdown of political order.[17]

G*'s prospects under warlordism*, π_G^{WL}: Performing a comparative statics on τ^{C*}, we see that the more favorable G's prospects as a warlord, π_G^{WL}, the higher is the tax required to keep the amount that has to be paid to keep G from predating. In other words, if G feels less threatened by the breakdown of orderly governance, she would be more willing to engage in predation.[18]

G*'s military advantage,* q: Also influencing the prospects of the government should order break down is (q), the government's relative capacity to fight and thus to seize the citizens' resources. Should G's ability to extract income from private agents rise, her incentives to uphold her end of the governance bargain will fall unless compensated by a higher tax rate.

Production technology, $F(\cdot)$: If the productivity of labor increases in the sense that output increases for each unit of labor input, a smaller rate of taxation would generally be required to maintain a cooperative governance equilibrium.[19]

17. Formally, recall that in cooperative equilibrium, $\pi^C_g/(1-\delta) = \pi^D_G + \delta\pi^{WL}_G/(1-\delta)$. Multiplying this equality by $(1-\delta)$ and differentiating with respect to δ, we find that $\partial\pi^C_G/\partial\delta = \pi^{WL}_G - \pi^D_G + (1-\delta)d\pi^{WL}_G/d\delta$. Because π^{WL}_G is just the payoff from a Nash equilibrium of the static game, it is independent of δ. Therefore, because in a cooperative equilibrium $\pi^{WL}_G < \pi^D_G$, it follows that $\partial\pi^C_G/\partial\delta < 0$. That is, G's equilibrium payoff declines as the discount factor increases. In a similar fashion, we can show that $\partial\pi^C_G/\partial\delta > 0$. In other words, as G values the future more, larger temptations to deviate can be sustained in equilibrium.

18. It should be noted, however, that τ^{C*} is not a globally differential function. Hence, the above comparative statics hold only for the regions of the parameter space defined by the following three strict inequalities: (a) $F(w^C)(1-\tau^C)q_i < C, \forall i$; (b) $F(w^C)(1-\tau^C)q_i > C$ and $F(w^C)(1-\tau^C)q_j < C$; and (c) $F(w^C)(1-\tau^C)q_i > C$, $\forall i$.

19. Because τ^{C*} is not a globally differential function, this result is obtained only within the three regions defined in note 18. In the first case, it is easy to see from the equation for τ^{C*} that $\partial\tau^{C*}/\partial F(w^C) < 0$. In the second case, this is true if and only if $\delta\pi^N_G/1-\delta > C$. Similarly, in the third case, this is true if and only if $\delta\pi^N_G/1-\delta > 2C$.

THE DISCOUNT FACTOR

To explore these implications of our model, we return to case materials and begin with changes in the discount factor.

The Former Soviet Union

When Gorbachev legalized the formation of opposition parties and opened legislative and executive positions to electoral competition, Klebnikov (2000, 57) reports, the specialists in violence—elite officials in the Communist party and the security services—proclaimed a "period of emergency." Because their future in office was no longer assured, they began looting state enterprises, firms that extracted natural resources, and public funds that had been deposited in the banking system. In response, other agents began to withhold resources from the state. By late 1991, Treisman (1999, 2) reports, one-third of the country's regions had stopped paying taxes to the center. Shleifer and Triesman (2000) describe similar levels of nonpayment by firms. "Federal public finances" fell into "crisis," with "tax collections [falling] from about 18 percent of GDP in 1989 to about 11 percent in 1996" (p. 89).

Not only did nongovernmental actors withhold finances from the state; they also began to provide their own defenses. In the spring of 1993, Boris Yeltsin declared that two-thirds of all commercial enterprises in Russia had links to organized crime (Klebnikov 2000, 29). First throughout the USSR and then throughout the Russian Federation, republics began to declare themselves sovereign entities (see Triesman 1999) and, thus, entitled not only to the levying of their own revenues but also to the creation of their own military forces. Society remilitarized, decentralizing control over the means of coercion.

The response to political reform in the former Soviet Union thus provides evidence to suggest that the foreshortening of time horizons can precipitate plunder and official corruption, spurring a fiscal crisis and the breakdown of political order.

Democratization in Africa

By the mid-1980s, a consensus had grown that politics lay at the root of Africa's development problems (see the review in Ndulu and O'Connell 1999). Both international donors (e.g., World Bank 1991) and domestic elites (e.g., Ake 1990) therefore called for political reform. But many have since become disillusioned with the outcome.

Political reforms led to the promotion of party competition and the legalization of challenges to incumbent regimes. Anecdotal evidence suggests that with the increased insecurity of their position, incumbents began to prey upon the assets of their citizens. Tanzania, once a model of political probity, became increasingly corrupt in the late 1980s. Many attribute the change in the behavior of public servants to a change in the "culture" of the Tanganyika African National Union (TANU), the ruling party, which now faced the prospect of the loss of power in competitive multiparty elections (Interviews 1992). Zambia in the late 1980s presents another example: the United National

Independence Party (UNIP), long the official governing party, created a "pension plan," forcing the government to divert funds from projects and public servants to party activists, who, with democratization, now faced the possibility of losing power (see Bates and Collier 1991).

More systematic is the evidence of Block, Ferree, and Singh (2000), who document the existence, significance, and magnitude of "political business cycles" in African politics. They find evidence of the largest cycles in countries that allow electoral competition and therefore possess governments that face the greatest prospects of losing office. Standard explanations of political business cycles emphasize incumbents' desire to win elections, but in Africa, they can also be read as the plundering of private wealth in response to the prospects of losing power.[20]

Those expressing reservations about the impact of democratization also point to the outbreak of violence. "Democratization," Sisk and Reynolds (1998, 29) declare, "more often than not increases ethnic nationalism and generates . . . deadly conflicts." The conviction has grown that electoral competition promotes a " 'winner-take-all' approach to politics," with incumbents using their office to engage in plunder (p. 29). So great are the perceived costs of democratization, they report, that "Western governments [began to pull] back from their . . . pursuit" of political reform in Africa (p. 11).

In the latter decades of the 20th century, scholars and policy makers alike endorsed democratization as a development strategy for Africa. Political reform has disappointed many of its initial champions, however. Although we, too, are disappointed by the outcome, given the logic of our analysis, we are not surprised. In Przeworski's (1991, 11) pithy phrasing, "democracy is a system in which parties lose elections." And our analysis suggests that in the early stages of democratization, an increase in uncertainty for incumbent elites can be expected to bring, ceteris paribus, increased levels of political predation and an increased possibility of violence.

THE CONTINUATION VALUE OF THE GAME

Also affecting the willingness of a government to remain on the equilibrium path is its discount factor (δ_G). Should a specialist in violence be impatient, it may be less constrained in its use of violence by the bleakness of future prospects; all else being equal, it may therefore be more willing to seek short-term gains even at the cost of future losses. The same logic implies that, holding the discount factor (δ_G) constant, specialists in violence who face better prospects in the period of political breakdown (π_G^{WL}) might be more willing to engage in behavior that threatens their pact with private citizens. One factor that could influence the prospects of governments off the equilibrium path (π_G^{WL}) would be independent access to sources of wealth and, thus, their capacity to prosper even when citizens withhold taxes. In exploring the impact of this factor, we therefore turn to the literature on the oil-producing states of the Middle East.

As is notorious, the recent "third wave" (Huntington 1991) of democratization bypassed the Middle East. In doing so, it presented a puzzle for political analysis.

20. Further evidence comes from McMillan and Masters (2000), who in a cross-sectional study of the agricultural policies of African states relate measures of political instability to inefficiently high levels of taxation of export crops.

Seeking an explanation for this seeming regional resistance to political reform, scholars developed the notion of the "rentier state" (e.g., Andersen 1986; Beblawi and Giacomi 1987; Chaudry 1997; Mahdavy 1970).

States that possess access to flows of income from precious resources, these scholars argue, need not raise taxes from their citizens and therefore need not bargain with them. Hence, these governments feel less compelled to surrender to citizens the right to convene legislative assemblies, form opposition parties, or compete for public office. It is therefore noteworthy that Michael Ross (2000), studying the politics and economics of 105 states over the period from 1971 to 1997, finds that those endowed with minerals and oil are more likely to be autocratic and less likely to be democratic than are others. Being less accountable and facing fewer political constraints, Ross argues, rulers in such societies can employ their powers in a more predatory fashion.

Our argument provides an alternative interpretation of these findings. It suggests that because the governments possess independent sources of income in the form of revenues from oil fields and mineral deposits, they fear less the reaction of citizens, were they to behave in predatory fashion. And realizing that they cannot afford to bribe their governments to behave in a more restrained manner, citizens, for their part, have less of an incentive to pay taxes to their governments.

Both our model and the rentier state explanation predict that an abundance of natural resources, low levels of tax payments as a percentage of government revenues, and high levels of authoritarianism would go together. Our model, however, suggests additional relationships that should prevail in the empirical record. The logic of the model suggests that predatory behavior unleashes the private provision of defense; and we should therefore expect that, anticipating this response, resource-rich governments would themselves militarize. We should expect them to spend proportionately more on their security forces. Indeed, Ross (2000) finds that governments in such states do spend a greater percentage of their incomes on weapons.[21]

The logic of our argument also leads us to expect that societies richly endowed with oil and mineral wealth will experience higher levels of domestic violence. It is therefore interesting that Collier and Hoeffler (1998) find that states more abundantly endowed with natural resources experience a significantly higher likelihood of civil war. Last, our logic would imply that with property rights insecure and persons reallocating resources from production to the defense of their incomes and property, the rate of growth would be low, even though the oil-rich economies are richly endowed. Indeed, Sachs and Warner (1995; 1999) have published evidence demonstrating the low rate of economic growth in oil- (and mineral-) rich nations.

Our argument thus provides an alternative explanation of the stylized facts captured in the writings on rentier states. While doing so, it generates additional implications concerning the level of militarization, conflict, and growth—implications that find confirmation in the literature.

21. It is notable that Ross (2000) controls for regions and, in particular, for location in the Middle East, thus eliminating geopolitical considerations as a possible explanation for this relationship.

MILITARY TECHNOLOGIES

Also influencing the properties of a governance pact is the specialist in violence's relative military capabilities vis-à-vis the private agents, captured by the parameter q. Should the offensive capabilities of the government rise relative to the defense of the private agents (that is, should q rise in value), then the level of tax payments necessary to stay the hand of the specialist in violence would rise. Should, however, the defense become advantaged, the equilibrium level of tax payments would decline, because the specialist would perceive less favorable prospects following the collapse of political order.

Reflecting on these implications, we are drawn once again to history and specifically to the rise of the city in medieval Europe. The first wave of urbanization centered in northern Italy. Pioneering new techniques in commerce, banking, and finance, and benefiting from the withdrawal of Muslim and Byzantine navies from the Mediterranean, Venice and the cities of Lombardy formed the core of the most prosperous region in 12th-century Europe. The Holy Roman Empire therefore renewed its claim to what German Bishop Otto of Freising, the chronicler of the Emperor Barbarossa, portrayed as a "very garden of delights" that "surpassed all other states of the world in riches" (Munz 1969, 126). In the Decree of Roncaglia in 1158, Barbarossa assigned a higher tax burden to the prosperous cities of north Italy while pledging to punish cities that attacked other cities or that refused to pay taxes (see Munz 1969; Tabacco 1989; Waley 1988).

Barbarossa's efforts soon came undone, however. Employing their wealth, the cities enhanced their defenses, building walls, moats, and elaborate fortresses. In terms of our model, their actions shifted the parameter q. With the improvement of fortifications, the military balance now favored the defense (see Parker 1991, 7)—something Barbarossa himself learned when forced to spend 2 years in a siege of Milan.

When Barbarossa attempted to reassert his power over the urbanized regions of northern Italy, then, he encountered two forces at play; and these forces worked at cross purposes. One was the rise in urban wealth, which, by our reasoning, would trigger, in equilibrium, a higher level of taxes to deter the specialist in violence from raiding his subjects. The other was a shift in military technology (i.e., a decline in q) that made defense more effective, implying (by the logic of our argument) a lower equilibrium rate of tax payments. Barbarossa acted to secure an amount of tax that he regarded as "rightfully his own," in the words of his biographer (Munz 1969, 8). But he failed to appreciate the magnitude of the forces pushing in the opposite direction. The result was a standoff as Barbarossa sought to extract revenues from northern Italy and the city-states resisted (Munz 1969, 361-62).

The city-states of northern Italy proved too powerful to find the emperor's threats persuasive. But they were also too rich to be both peaceful and stateless. Having successfully rebuffed the emperor's efforts to establish centralized governance, the city-states behaved as productive agents that privately controlled the means of coercion. The region descended into warlordism and anarchy.

CONCLUSION

In this article, we have advanced a line of reasoning that probes the foundations of political order. The logic of the analysis captures the nature of political order in stateless societies. Stateless societies trade off production and protection, we have argued; in societies with states, both are attainable, and people can therefore live at a higher level of welfare. As captured in the conditions of the CG equilibrium, the circumstances under which they can do so are tightly constrained. Our analysis of those circumstances therefore generated insights not only into the possibilities of order but also into the sources of political breakdown.

We fully acknowledge that we have advanced a line of argument and our reasons for finding it persuasive but have not subjected the argument to testing. We have not explored controlled comparisons or generated a sample of cases on which we could conduct statistical analyses. The interplay between formal logic and case materials suggests that the reasoning is insightful, however. It also suggests that the reasoning may be powerful. The model is simple, but its implications range widely over time—from the medieval era to the contemporary period—and space—from England to Russia and to Africa. The arguments are testable; indeed, we have begun preparation for testing.

In closing, we note that the implications of this analysis are normative as well as positive in nature. At first glance, they appear starkly Hobbesian. When security is privately provided, and there is no "Sovereign," people, it suggests, lack the incentives to engage in productive labor. As stated by Hobbes, with the "continuall feare and danger of violent death," then there is "no place for industry . . . no Culture of the Earth; no Navigation, nor use of the commodities that may be imported by Sea; no commodius Building" (Hobbes [1660] 1946, bk. 13, para. 62).

On further reflection, however, it becomes clear that rather than confirming Hobbes's portrayal of life in a society without a state, we, in fact, amend it. Our argument implies that societies in the state of nature can be rich; but for them to be so, citizens must also invest in the capacity for violence.

Even more interesting are the implications for societies with states. Our argument suggests the conditions under which governments will behave in ways that encourage private agents to make the most productive use of their resources. The analysis suggests that when coercion is organized, society (in the limit) can secure as an equilibrium the first best allocation of resources. The organization of violence into a form we call the state, this finding suggests, can render coercion economically productive and an instrument for the enhancement of the social welfare.

Recall that the logic of our analysis highlights two sources of welfare loss. One is the search for protection from violence: private agents shift effort from productive activities to military preparedness or to leisure in an effort to discourage raiding by others and predation by G. The other is taxation: private agents shift effort from productive activities to leisure because they pay tax to G and taxation reduces the private return to labor. The first source of inefficiency occurs in societies both with and without states. The second is unique to societies with states.

The magnitude of the welfare loss in a society with a state depends on the level of taxation necessary to deter G from deviating from the cooperative governance equilibrium, that is, τ^{C*}. The smaller this tax, the smaller is the inefficiency due to taxation. The explicit functional forms for $\tau^{C}*$ presented above implies that $\tau^{C}*$ approaches 0 as G's discount factor, δ, approaches 1 and G's payoff in the WL equilibrium, $\pi_G{}^{WL}$, approaches 0. In other words, as the government's time horizon lengthens and its future prospects, should the state break down, become less appealing, the level of taxation necessary to induce it to provide protection for property rights declines. At the limit, it reaches 0, implying no distortion due to taxation.

In addition, as G becomes better at punishing those who raid, private citizens need less to redeploy their labor into military preparedness or unproductive leisure. Consider what happens as q_1 and q_2 approach 1 along the equilibrium path. Because we have assumed above that $(F(w) + F(w^C)M(m, m^C) - k)q > C$, for a sufficiently large q_1 and q_2, not raiding (that is, $r_1 = 0$ and $r_2 = 0$) remains a strictly dominant strategy. If G is sure to deprive an economic agent of the gains from raiding, raiding does not pay, and no agent need then devote resources to deterring it.

It follows that as δ, q_1, and q_2 approach 1 and $\pi_G{}^{WL}$ approaches 0, $\pi^G{}_1 = \pi^G{}_2$ can approximate the first best. Because by assumption, the payoff to players 1 and 2 in the NM investment equilibrium is less than the first best, it follows that the introduction of a sufficiently patient and sufficiently strong specialist in violence with poor prospects should the state collapse can improve the social welfare.

In the limit, then, societies with states can achieve peace *and* prosperity; those without need to trade the one off to achieve higher levels of the other. The most efficient equilibrium in the game with G supports a higher level of welfare than the most efficient equilibrium in the game without G in which there is no violence. We have thus demonstrated the manner in which coercion, if organized, can be rendered socially productive and a source of increased welfare.

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