Discussion Paper No. 9307 December 1993

Rent Intensity and Economic Performance

by

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Abstract

Using the share society as a metaphor for the economic system, we construct a microfoundation for stylized observations about rent seeking and economic performance. We introduce the concept of rent intensity and show that at symmetric Cournot-Nash equilibrium it falls as value-adding productivity rises, rises with rent seeking reward and with number of participants. A rudimentary dynamic counterpart is constructed which delivers progressive impoverishment as population grows.

I. Introduction

Reckoning the social cost of rent-seeking is among the favored fascinations of public choice literature in the 80's. (Tullock, 1981; Hillman and Katz, 1984; Fabella, 1989; Hillman and Riley, 1990; Hillman, 1990). The preferred analytic vehicle seems to be the Tullock dissipation rate d which is the ratio of total spending to total rent. In a good deal of this literature, total rent is fixed and the analysis is focused on a single market. This together with other assumptions such as Cournot-Nash behavior, symmetry and risk neutrality, allows an explicit solution for d. Various influences on d in this paradigm have been identified (Fabella, 1992). If one's concern is the impact of rent seeking on the total economic performance, however, the dissipation rate may not be much help because rent size may depend on economic performance itself. It is true that under a fixed rent assumption, the dissipation rate can give some idea of the impact on the whole economy of rent seeking. A d equal to one, say, means that the cost to society is equal to the rent itself but it fails to indicate how badly off society is in consequence. When the rent is somehow dependent on economic performance, a rise in d does not necessarily imply higher spending on rent seeking.

There is a long and lively economic current relating inferior economic performance with rent-seeking (Myrdal, 1970; Krueger, 1973; Olson, 1984; Brock, Magee and Young, 1989; Baumol, 1990; Murphy, Schleifer and Vishny, 1990). This public-choice theoretic view of economic performance transcends the narrow single market arena lorded over by the Tullock dissipation rate. Economic agents are confronted with two competing opportunities for wealth acquisition: on the one hand, there is the universe of value-adding (also productive) activities where the agent lays claim to value-added not accounted for by the cost of materials of production. On the other there is the universe of rent-seeking (also unproductive or redistributive) where the object is to snag a prize (rents) available in the economy largely as a result of the state-related activities. Agents allocate resources to these competing activities. The purpose of this paper is two-fold: (i) To provide a simple microeconomic foundation for some of the accepted and intuitive propositions in the marriage of public choice and economic performance using the machinery underlying the dissipation rate studies, (ii) To provide a rudimentary growth model that nevertheless dynamically predicts progressive impoverishment. The first is of interest because most analysis in this literature tend to gloss over the microeconomic underpinning of aggregate or economy-wide claims. Brock, Magee and Young, op. cit, is one exception. In their comprehensive inquiry into endogenous protection, they include three models of resource allocation in a rent-friendly economy. The first one has a fraction of capital stock redistributed each period which quickens the pulse of rent prospectors. The second has an agent's income dependent on his own (positive) and his rivals (negative) lobbying effort. The third is a neo-classical optimal growth model without technical change, where an agent's share in output is once again subject to lobbying. On the whole Brock, Magee and Young's results are rather counter-intuitive: (a) it is possible for GNP growth to rise with rent-seeking early in the game (contra Baumol) (b) negative association between growth of GNP and rent-seeking more likely among young nations (contra Olson of secure and stable borders) and (c) from the dynamic growth model, no long-run association between rent seeking and economic variables, e.g. GNP growth (contra casual observation). The latter is a malaise of most neoclassical growth model which cannot relate a change in the savings rate or other economic parameters with steady state growth rate. Curiously, Brock, Magee and Young candidly state that "these theoretical results notwithstanding, the final section of the chapter reports some empirical results showing GNP growth across 34 countries in the period 1960-1980 is negatively correlated with the ratio of lawyers to physicians" (i.e., the Magee effect). Murphy, Schleifer and Vishny (op. cit.) is another exception that chooses the talent allocation of individuals as an explanation for weak long-run growth performance of many nations. Clever as the model is, its peculiarities are pronounced. For example, if the productive sector is more income elastic than the rent-seeking sector, even fairly large changes in the incentive structure does not change the long-run growth picture. The second purpose of the paper is of interest because Murphy, Schleifer and Vishny as well as a whole gamut of the new endogenous growth models seem to ignore an interesting phenomenon in the last 25 years: negative growth. Summers (1992) has documented the experiences of countries that went the opposite direction. The simple dynamic counterpart of this model in contrast, tries to relate progressive impoverishment with rent-seeking.

From the global viewpoint, the source of rent must itself be the value generated in the productive sector of economy - the economic pie. Thus, there is a natural connection between the productive and the unproductive sectors which is bound to affect individual agents' decisions to allocate resources. In a stylized feudal society, for example, the levies on the produce of the various feudal estates also form the spoils of feudal warfare. Peasants in a limited way and feudal lords decide the allocation of resources either to production or to the bearing of arms in pursuit of spoils. To the victors go the spoils - land and the corresponding rent. The picture was certainly more confused in historical feudal societies but ample traces of this dilemma surface (cf. Sansom, 1958, on feudal Japan). In G. Myrdal's "soft states" (1970), the state functions as a conduit for rents which engage legions of rent-seekers. In many LDCs, state-sponsored rent cows are the biggest, if not the only, game in town and they engage the best minds and considerable resources. While more pronounced in LDCs, this is true as well of developed countries (Vishny, Schleifer, Murphy, 1990; Baumol, 1990; Olson, 1984). In pre-1989 Eastern Europe, the avowed allocation principle was "to each according to his work," but the economic system retreated in time to the principle "to each according to his party connections" with the nomenklatura system being the incarnation of this allocation principle (Haitani, 1986). Eventually the system failed to carry its own weight and collapsed in 1989.

There are three stylized views concerning the relation between rent-seeking and economic performance in most of the literature. First and more in currency, rent-seeking results in inferior economic performance. One can view the Philippines, Latin America and a lot of Africa through this lens. Second and less articulated is the idea that inferior economic performance itself intensifies rent-seeking. Prolonged economic stagnation becomes self-perpetuating. This second view is also inherent in the claim that Japan has avoided many developed country problems and conflicts by growing so fast. With slower growth, social conflicts will intensify which will make faster growth more difficult. Third, larger institutions tend to exhibit more rent-seeking and thus slower growth. To cover this ground, we introduce the idea of rent intensity which seems more appropriate than dissipation rate for endogenous rents models.

In this paper, we will use the share society as a metaphor of the economic system. Bigman (1991) has also suggested the metaphorical usefulness of the share society. At the enterprise level, the share society has a lot in common with cooperative teams (Holmstrom, 1982; Fabella, 1988) or with cooperative labor enterprise (Guttman and Schnytzer, 1989; Sen, 1966). First, everyone is in fact at once an agent and a principal. There is no one pure principal. Although enterprises in the economy may operate as so many manifestations of the principal-agent contract, the whole economy itself which operates perhaps by a constitution and a system of laws promulgated by persons elected by the general public is harder to characterize as such. People in this ideal setting have the capacity to affect the rules under which they operate. This is the ideal of the democratic slogan of "government of the people, by the people and for the people." It is this abstract liberal democratic system for which the share society is being proposed as a metaphor. The gut of the share society as is well-known is a sharing rule which is exhaustive, (no residual claimant) makes it apt as a parable of this economic system.

In II, we focus on formal structure of the share society incorporating rent seeking as a metaphor for liberal democratic systems. Assuming symmetry and Cournot-Nash agents, we generate the Nash equilibrium intensity of rent seeking and generate the stylized observations. The dynamics counterpart of the model and its predictions are then discussed in III.

II. The Share Society: A Metaphor

Let me begin by saying that the "share society" in focus here is not M. Weitzman's "share economy," where profit sharing is the dominant labor contract among productive enterprises (1982). The share society applies to the whole economy rather than to firms and assumes that society produces a single aggregate good x using an aggregate input I, the relation being given by F(I). There are nmembers of society and $I = \sum^{n} I_i$, where I_i is the ith member contribution. F(I) is nondecreasing, twice differentiable and homogeneous of degree h. Each member i is entitled to a share s_i of F and $\sum^{n} s_i = 1$. Thus, in the share society there is no room for a residual claimant or capitalist. This feature it has in common with teams and cooperative labor enterprises (Sen, 1966; Holmstrom, 1982; Fabella, 1988). The problem in this latter literature is the attainment of Pareto efficiency under either moral hazard (nonobervable effort) or adverse selection (observable effort but nonobservable capacities). In the latter, the interplay of scale economies and the design of the effort-based allocation plays a crucial role (Fabella, 1991). Our concern here in common with a lot of the rent-seeking literature (Tullock, 1980; Fabella, 1992) is the relative level of resources marshalled for redistributive activity. In contrast to the prevalent literature, however, the rent is not some fixed value distinct from the aggregate output. Members of the share society are each confronted with the choice of using their initial resources S_i either as I_i or R_i, and $S_i = I_i + R_i$. We call I_i the ith member's "value-adding investment" and R_i his "value-redistributing investment." Both I_i and R_i are costly observable. The share of i, s_i, in total output F(I) is partly defined by the R_i's and partly by the I_i's, namely, Farrel and Lander (1989) used a similar sharing scheme in a slightly different context. The rent

$$s_i = \alpha\left(\frac{R_i}{\sum R_j}\right) + (1-\alpha)\left(\frac{I_i}{\sum^n I_j}\right), \quad 0<\alpha<1. \tag{1}$$

structure constant α gives the conduciveness of the share society to rent-seeking. As $\alpha \to 1$, only value-redistributing investment matters in the allocation. This is the pure connections defined allocation. As $\alpha \to 0$, the share society reduces to a cooperative team with natural team sharing (Fabella, 1989). Pie share equals effort share and the rent-seeking problem is nonexistent. α can also be endogenous but we don't treat this here. Note that

$$\sum_{i=1}^n s_i = \alpha\left(\frac{\sum^n R_i}{\sum^n R_j}\right) + (1-\alpha)\left(\frac{\sum^n I_i}{\sum^n I_j}\right) = 1. \tag{2}$$

Thus, exhaustiveness is assured. Substituting $(S_i - R_i) = I_i$ for all i, the problem of member i is

$$\max_{R_i}\left[\alpha\left(\frac{R_i}{\sum^n R_j}\right) + (1-\alpha)\left(\frac{S_i - R_i}{\sum^n S_j - R_j}\right)\right] F\left(\sum^n (S_j - R_j)\right) \tag{3}$$

Notice that nowhere in (3) does the rent figures as a fixed quantity. $\alpha(R_i/\sum^n R_j)F(\cdot)$ is the expected rent for i but its size depends on $\{R_i\}$ and $\{I_i\}$. Thus rent is endogenous and the dissipation rate d is not very meaningful. We propose a simple analytic tool.

<u>Definition 1</u>: We call the "rent intensity" of rent seeking the ratio of $\sum^n R_i$ to $\sum^n S_i$, i.e., $\sum R_i/S_i$). When $R_i = R$ and $S_i = S$, $\forall i = 1,2,\ldots,n$ then rent intensity is (R/S).

Its advantage over the dissipation rate lies in the denominator being clearly exogenous and the share in total budget being a more common instrument in economics. The first order condition assuming that $i = 1,2,\ldots n$ is a Cournot-Nash behaving agent is:

$$\left\{ \alpha\left(\frac{\sum_{j\neq i}^{n-1} R_j}{\left(\sum^n R_j\right)^2}\right) - (1-\alpha)\ \frac{\sum_{j\neq i}^{n-1}(S_j-R_j)}{\left[\sum(S_j-R_j)\right]^2} \right\} F + S_i F'(-1) = 0, \tag{4}$$

$$i = 1, 2,\ldots n.$$

These can be solved for $\{R_i^*\}$, $i = 1,2,\ldots,n$. Let us assume symmetry, or that all numbers are identical, i.e., $S_i = S_j = S$ and $R^*_i = R^*_j = R^*$, $\forall i,j = 1, 2, \ldots n$. Then (4) simplifies into

$$\left\{ \alpha\left(\frac{(n-1)}{n^2 R^*}\right) - (1-\alpha)\left(\frac{(n-1)}{n^2(S-R^*)}\right) \right\} F - \frac{F'}{n} = 0 \tag{5}$$

which can be solved for lone R^*. Simplifying (5), we get

$$\left(\frac{(n-1)}{n^2}\right)\frac{\left[\alpha(S-R^*)-(1-\alpha)R^*\right]}{R(S-R)} = \frac{F'}{nF} \tag{6}$$

or

$$\frac{(n-1)}{n}\,\frac{\left[\alpha(S-R^*)-(1-\alpha)R^*\right]}{R^*} = \frac{F'n(S-R^*)}{nF} \tag{7}$$

Note that by the homogeneity of F, we have hF = F'n(S-R). Thus, F'n(S-R)/F = h. We also have $[\alpha(S-R) - (1-\alpha)R]/R = \alpha(S/R) - 1 = nh/(n-1)$. Thus, $(S/R) = (nh/(n-1)\alpha) + (1/\alpha) = [nh + (n-1)]/(n-1)\alpha$. The 1° condition (5), can be written as

$$\frac{S}{R^*} = \frac{[h + (n-1)]}{(n-1)\alpha}. \tag{8}$$

and the second derivative is clearly negative. Finally, we have

$$\left(\frac{R^*}{S}\right) = \frac{(n-1)\alpha}{[nh + (n-1)]} \tag{9}$$

(R^*/S) is the optimal individual rent intensity at the symmetric Cournot-Nash equilibrium. The following properties of (R^*/S) are of interest and obvious:

Proposition 1: At symmetric Cournot-Nash equilibrium, (R^*/S) (i) falls as h rises, (ii) rises as n rises and (iii) rises as α rises.

The more society rewards rent-seeking (the higher is α), the more resources will deployed in that sector and the less will be available for value-adding activities (P1.iii). Economic performance is therefore inferior. (P1.ii) says that the larger the societies that have the features of a share society with rent seeking (α>0), the more prone they are to the rent malaise and the worse is economic performance. Free riding rises with larger membership and hamstrings performance. This may help explain why the four Asian dragons are relatively small. Both (P1.ii) and (P1.iii) are similar to Farrel and Lander's results (op. cit.). Finally, the more productive is the society (h high), the less temptation there is for rent-seeking among its members (less R^*/S) and the larger is the total output (P1.iii). Thus, we have stylized observations well covered. To get at the impact on economic performance, we have the following:

<u>Proposition 2</u>: Let $h = 1 + e$, $e \geq 0$. Then, there exists and $e^* > 0$ such that for every $e < e^*$, $[F/n]$ falls as n rises.

<u>Proof</u>: From (9), we know that $(S-R^*)/S = [h + (n-1)(1-\alpha)]/nh + (n-1)] = H$. Thus, $nI^* = nSH$. Differentiating with respect to n gives $[nS(\partial H/\partial n)] + SH$. But $(\partial H/\partial n) = -\alpha[h + (n-1)]^2 < 0$. Thus, we have $\partial(nI^*)/\partial n$ being

$$\left[\frac{S}{nh + (n-1)}\right]\left[\frac{-n\alpha h}{[nh + (n-1)]} + nh + (n-1)(1-\alpha)\right] =$$

$$\left[\frac{S}{nh + (n-1)}\right]\left[\left(\frac{\alpha}{nh + (n-1)}\right) + (n-1)(1-\alpha)\right].$$

Since F is homogeneous of degree h, we have at Cournot-Nash equilibrium $hF = nSHF'$ and $[F/n] = SHF'/h$. $\partial[F/n]\partial n$ gives

$$\left[\frac{SF'\left(\frac{\partial H}{\partial n}\right) + SHF''\left(\frac{\partial(nSH)}{\partial n}\right)}{h}\right]$$

But $nHSF'' = (h-1)F'$ since F' is homogeneous of degree $(h-1)$. Thus $HSF'' = (h-1)F'/n$, so we get

$$[\cdot]\, F'\left\{-\frac{\alpha}{h + (n-1)}\left(1 + \frac{(h-1)}{n}\right) + \frac{(h-1)}{n}\left(h+(n-1)(1-\alpha)\right)\right\} \qquad (10)$$

where $[\cdot] = [SF/[nh + n-1]nh] > 0$. Now $h = 1 + e$, $e \geq 0$. For $e = 0$, $\{\cdot\} < 0$ in (10).

There is thus a small enough $e = e^* > 0$ so that $\{\cdot\}$ in (10) remains negative.

Q.E.D.

P.2 says that where there is rent-seeking ($\alpha > 0$), there is always a small enough increasing returns to scale in F so that the average output falls with population growth. Note that this cannot happen with $\alpha = 0$. If $\alpha = 0$, (10) is always nonnegative if $h = 1 + e$, $e > 0$. Thus, average output always increases with population without rent-seeking. Increasing returns can be nullified by rent-seeking. The higher is α, is the larger the scale economies it nullifies. The following gives the limiting values of (R^*/S) and are obvious:

Proposition 3: (i) $(R^*/S) \to 0$ as $\alpha \to 0$; (ii) $(R^*/S) \to (n-1)/[nh + (n-1)]$ as $\alpha \to 1$; (iii) $(R^*/S) \to \alpha$ as $n \to \infty$.

If no influence is allowed distributional effort ($\alpha \to 0$), the latter will be zero. If distributional effort alone determines allocation ($\alpha \to 1$), allocation for this activity still falls short of S as long as value-adding investment is productive ($F' > 0$ or $h > 0$). As n rises without limit, distributional effort will approximate α of total resources.

If $h=1$, $\alpha \neq 0$ or $h = 1 + e$, $e < e^*$, people become poorer and poorer as n rises. Yet the share society is unable to stop the slide. Everyone knows the situation is remarkably silly with everyone scrambling ever harder for a bigger slice of a slow growing pie. But nobody stops because if one stops, he/she falls behind the others and the added misery is not shared. This is the special feature of Cournot-Nash equilibrium. The downward spiral should settle at a point where n no longer rises because of absolute poverty. The share society will stay there and in poverty, indefinitely.

Output Loss

The total product in the share society at symmetric Cournot-Nash equilibrium is $F(nSH)$, $H<1$. Had α been zero, then the total product is $F(nS)$ since $\partial(s_iF)/\partial I_i > 0$ where $s_i = (I_i/\sum^{n} I_j)$.

Therefore the total output foregone (or the cost of allowing rent-seeking for some reason or other) is

$$\ell^* = F(nS) - F(nSH) \tag{11}$$

The following follows readily from previous discussion.

Proposition 4: ℓ^*(i) rises with a rise in α, (ii) falls with a rise in h and (iii) rises with a rise in n if $h \geq 1$.

As we would expect the output loss behaves very much like rent intensity itself, i.e., rising rent intensity leads to rising output loss. Output loss and rent intensity are two sides of same coin which recommends rent intensity ahead of the dissipation rate for this type of models.

Affluence and Performance: A Parable

Let there be two societies sharing the same technology (h same) and exactly the same number of members n. Let the initial individual endowment in society 1, S_1, be larger than that of society 2, S_2. Let $S_2 = \lambda S_1$ $0<\lambda<1$. Let α_1 be the rent-seeking

conduciveness of society 1. Total output in society 1 at symmetric Cournot-Nash equilibrium is $F(nS1H)$. Society 2 has a choice of α. What should α_2 be for society 2 to outperform society 1. Total value-adding investment in two should equal or exceed that in 1, i.e.,

$$\frac{n\lambda S_1(h + (n-1)(1-\alpha_2))}{[h + (n-1)]} \geq \frac{nS_1(h + (n-1)(1-\alpha_1))}{[h + (n-1)]}$$

which collapses into

$$\alpha_1 - \lambda\alpha_2 \geq (1-\lambda)\left[\frac{h + n-1}{n-1}\right]$$

Thus we have:

<u>Proposition 5</u>: With identical technology and population size, initially poorer S_2 outperforms S_1 if and only if

$$\alpha_2 \leq \frac{\alpha_1}{\lambda} - \frac{(1-\lambda)}{\lambda}\left(\frac{h + n-1}{n-1}\right) \tag{12}$$

(12) gives the range of α_2 for 2's output to equal or exceed S_1's. If simple equality obtains, α_2 rises with λ, increases with h and falls with n. More productive deployment of smaller resources allows initially poorer society two to match or outperform more the initially affluent one.

The share society is extreme in its assumption of there being no possibility of isolating individual output and thus avoiding shirking via adverse selection (in the case of complete observability). The other extreme is the atomistic society where individual output is perfectly observable. Then rent is financed through an imposition on individual value-adding income which the state enforces as say a tax. Here no adverse selection nor moral hazard is possible. This is treated somewhere else (Fabella, 1993).

Rudimentary Dynamics of Progressive Impoverishment

Although the results of the previous section are static, one can construct a dynamic (if decidedly degenerate) model which replicates the static result. Time enters the usual growth models in two ways: through the capital stock which is carried over from period to period and through the growth of labor. In this model which is motivated by simplicity rather than realism, and in common with Murphy, Schleifer and Vishny, (op. cit.), there is no fixed capital accumulation and so no asset bequest from one period to the next degenerate. The economy may be using capital services but not owning the fixed capital that renders them. Thus time enters only via the growth of membership which is assumed exogenous. At the beginning of period t_0, n_0 identical and Cournot-Nash agents with objective defined by (3) have in the aggregate n_0S of investible resources of which $(n_0(S-R_0))$ goes to the productive and n_0R_0 to the unproductive activity with R_0 being the Cournot-Nash equilibrium rent spending. At the end of t_0, $F(n_0(S-R_0))$ is total Cournot-Nash equilibrium output while n_0R_0 is assumed either consumed, extinguished without cost or joins capital flight. Total output is now proportionally distributed among the n_0 agents. Of each agent's share, he reserves $S(1/n)F(n_0(S-R_0) - C_1$, as investible fund for period t_1 and C_1 funds his consumption in period t_1. Thus, absolute savings S is constant instead of the usual savings rate. The latter will be rising or falling depending on income growth. In the beginning of t_1 new entrants join the ranks of the membership at rate $[(n_1-n_0)n_0]$. Each t_1 entrant is a clone of previous members and has identical endowment $F(n_0(S-R_0))/n$ as the rest of the membership. The cycle repeats itself with the aggregate investible fund n_1S in the beginning of t_1 and aggregate output $F(n_1(S_1-R_1))$ at the end of t_1. Again each agent reserves S to finance investment in t_2 and new entrants join up. And so on. This economy has a potential steady state (F/n constant) at $\alpha = 0$, $h = 1$.

Proposition 6: Suppose that the share economy with rent seeking ($\alpha>0$) exhibits increasing returns to the extent of $h = 1 + e$, $e \leq e^*$ defined in Proposition 2. Then over time as population grows, average output falls and progressive impoverishment results.

In effect, the time horizon is chopped into periods which are all identical except for the number of participants. Thus static optimization is itself dynamically optimal. The price of this convenience is the constancy of absolute savings, the identical endowment of each entrant and the no-bequest condition. Very heroic aggregative assumptions are usually called for by microeconomically specified growth models. All these, of course, could be relaxed at the expense of a more complicated model or one that lacks complete microeconomic specification.

With rent-seeking ($\alpha>0$), society becomes poorer as population grows despite productivity in the value-adding sector ($h>1$) and despite (implied) rising savings rate (constant absolute savings and falling income) if increasing returns in F is circumscribed ($e \leq e^*$). One can also view Proposition 6 in reverse: For any $\alpha < 1$, there is an $h > 1$ so that average output rises as population rises.

Conclusion

In this paper, we have attempted to provide a microfoundation for many aggregate observations in the growth-rent seeking nexus. We also provide model that predicts negative growth - a phenomenon hardly explained even in the astronomically expanding endogenous growth literature. In the global setting, the idea of endogenous rent comes naturally and makes the Tullock dissipation rate unworkable. We, therefore, introduce and use the idea of "rent-intensity" for our analysis. "Rent intensity" is the ratio of rent spending to initial resources. At the symmetric Cournot-Nash equilibrium of the share society (used here as a metaphor), rent intensity rises with rent reward, falls with productive sector's efficiency and rises with population (P.1). More importantly, output per output per person falls with population growth if increasing returns is small or nonexistent. Falling output per head does not occur under these circumstances without rent-seeking.

We then constructed a rudimentary dynamic counterpart for our static model. Since the model is fully specified micro-economically, it requires some strong aggregate assumption. There is no fixed capital accumulation so time enters only through its exogenous effect on population. Agents live forever and at every period a symmetric Cournot-Nash equilibrium is reached. Of every agent's share at each period's end the same absolute S is set aside and the rest is used to finance consumption in the next period. The agent's total investment S in the next period is divided between productive and unproductive investments. The aggregate productive investment generates the aggregate value-added of the period. Now members are clones of their predecessors. In this model, where increasing returns is small enough, the average productivity falls in time and so does average consumption. The economy's steady state at $h = 1$ collapses with rent seeking.

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