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Rent Seeking

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This paper examines the relationship between rent seeking and economic performance when governments cannot enforce property rights. With imperfect credit markets and a fixed cost to rent seeking, only wealthy agents choose to engage in it, as it allows them to protect their wealth from expropriation. Hence, the level of rent seeking and economic performance are determined by the initial distribution of income and wealth. When individuals also differ in their productivity, not all wealthy agents become rent seekers, and the social costs of rent seeking are typically lower. In both cases, multiple equilibria with different levels of rent seeking and production are possible. [JEL D23, D31, D72, O11]

Lack of development, stagnant growth, insecure property rights, income inequality, and widespread rent seeking[1] are common features of many economies. One consequence of such rent seeking is that productive resources are diverted toward appropriative activities, resulting in a misallocation of resources in the economy. Rent-seeking activities, such as corruption and tax farming, can reduce growth by lowering overall incentives and opportunities for production and investment. Cross-country studies find that countries in which corruption and rent seeking are rampant suffer from lower capital accumulation, productivity, and growth (Mauro, 1995; Keefer and Knack, 1997; and Hall and Jones, 1999). Extensive rent seeking and insecure property rights are also associated with substantial inequal-

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[1]Rent seeking refers to largely unproductive, expropriating activities that bring positive returns to the individual but not to society (Krueger, 1974).

ity in income and wealth.[2] Olson (1965) argued that corruption and rent seeking are more likely in unequal societies. Easterly (2002) and Keefer and Knack (2002) show that the adverse effect of inequality on growth operates through weak institutions and lax enforcement of property rights.

While the empirical evidence suggests links among rent seeking, poor economic performance, and income inequality, the persistence of rent seeking in many countries begs the question of what drives entry into such activities. In many developing and transition countries, it is the relatively wealthy who choose rent-seeking activities—such as the government bureaucracy, the army, and the police—rather than engaging in productive and entrepreneurial activities. In other words, the rent seekers are exactly those who might otherwise become the first capitalists.

This paper presents a model that analyzes the relationships among rent-seeking behavior, wealth distribution, and economic performance when the government cannot protect property rights. We show how an individual's initial income (wealth) drives entry into rent seeking and how the size of the rent-seeking sector affects the level of distortion in an economy. In the model, participation in rent seeking is a costly activity. However, rent-seeking institutions provide protection against expropriation by others. With insecure property rights, the incentive to engage in rent seeking is relatively stronger for the wealthy, who have more to lose from expropriation than poorer individuals. In the presence of borrowing constraints and a fixed cost for entry into rent seeking, the size of the rent-seeking sector and corresponding efficiency losses in society depend on the initial distribution of wealth.

The fixed cost for rent seeking can be viewed as analogous to the purchase of weapons used for protection and for offense. In this interpretation, arms enable agents to protect their wealth from expropriation by others but also to extract rents from other agents. Hence, when property rights protection is poor or ineffective, as is the case in many developing and transition countries, the rich have an incentive to buy arms (i.e., enter into rent-seeking activities such as the government bureaucracy). The purchase of these arms, however, enables them to prey on other agents in the economy. Alternatively, one can think of this in terms of the costs of purchasing political power and influence. Political markets in the real world involve significant transaction costs of lobbying, obtaining exemptions, and large fixed costs of political organization (Downs, 1957; and Huntington, 1968). In this interpretation, wealthy agents or the elites can then use their political power to extract rents from the most productive sectors and to influence government decisions that are favorable to their interests.

The assumption of increasing returns in rent seeking or political influence is consistent with historical evidence. In Republican Rome and in 17th century France, an important prerequisite for engaging in tax farming was the availability of sufficient capital that enabled wealthy individuals to advance funds to rulers and to collect taxes (Braudel, 1982; and Levi, 1989). Baumol (1990) notes that in Mandarin China and in medieval Europe, government service—with its potential

[2]See Benabou (1997) for a survey on the inverse relationship between inequality and growth.

for illegal personal enrichment—was the principal career choice for many wealthy individuals. Engerman and Sokoloff (2002) provide numerous historical examples in which a small wealthy class was able to capture the state. Wealth requirements for voting and differences in the distribution of political power in colonial Latin America are widely perceived as affecting access to economic opportunities in ways that, in turn, have influenced long-term institutional development and perpetuated inequality (de Ferranti and others, 2003).

Wade (1985) found that individuals in India paid thousands of dollars for positions with the power to allocate supposedly free water to farmers, since these jobs gave them monopoly rights to charge for water. In many developing countries, civil service positions are purchased at high prices compared with the annual salary for the position. Casual observation suggests that in many countries it is common for government officials and politicians to own businesses run by either themselves or their relatives, and to protect such businesses from corrupt practices and other forms of expropriation by virtue of their positions. The association between wealth and rent seeking in the presence of poor property rights protection is also receiving increasing attention in Eastern Europe's transition to capitalism, particularly in the context of privatization (Sonin, 2003; and Hoff and Stiglitz, 2004).

This paper develops a simple general equilibrium model with imperfect capital markets and a nonconvex rent-seeking technology. Agents in this model have identical preferences and abilities and differ only with respect to their initial income. We assume that agents can operate in one of two sectors in the economy: rent seeking and production. Entry into rent seeking requires the payment of a fixed cost. Payment of this cost allows rent seekers to appropriate some portion of the surplus generated by productive economic activity and to save a desired portion of their initial income (through hoarding), thereby protecting their wealth from expropriation by others. We show that for a certain range of parameter values there is a unique interior equilibrium with rent seeking, which depends on the initial distribution of wealth in society.

In an extension, we introduce heterogeneity in productive ability. This introduces a trade-off, since wealthier agents can choose to become producers even though they can afford the costs of rent seeking. We show that rent seeking in such an economy typically involves lower social costs, but the main implications of our basic model generalize.

This paper is related to several strands of research. The role of investment indivisibilities and credit market imperfections in explaining the relationship between inequality and economic development has been studied by Galor and Zeira (1993) and Banerjee and Newman (1993), among others. Another literature explicitly examines the associations among wealth, political power, and redistribution. Verdier (1996) and Rodriguez (1999) assume fixed costs in political participation to generate increasing returns and the separation of the rich and poor in terms of political influence. Specifically, Verdier shows how the wealthy influence the direction of income transfers in society and highlights the role of the initial distribution of wealth in determining this pattern. In this respect, our analysis of rent seeking by the rich in the presence of insecure property rights can be viewed as complementary to his.

Our paper is closely related to economic models of rent seeking and economic development. In Baumol (1990); Murphy, Shleifer, and Vishny (1993); Acemoglu (1995); Baland and Francois (2000); and Mehlum, Moene, and Torvik (2003), for example, individuals choose between productive and rent-seeking activities by comparing their relative rewards. These rewards are, in turn, determined by the allocation of individuals between the two activities. Our paper extends the literature by providing an explanation for the observed association between wealth and rent seeking.

Finally, this paper is related to the literature on conflict. Grossman (1991, 1994) shows how inequality induces the poor to engage in predatory activities and the rich in investments in defense, diverting resources from productive activities. Skaperdas (1992) argues that the more productive groups of individuals may have a comparative disadvantage in the process of appropriative competition. The view proposed in this paper is that in the absence of adequate property rights protection, it is the rich who are likely to benefit from appropriation. Grossman and Kim (1997) assume that weapons are used either for predation or for defensive fortifications. In contrast, this paper views predation and the deterrence of predation as complementary activities.

I. Model

Environment and Technology

Consider an economy comprised of a continuum of two-period-lived agents distributed over the interval [0,1]. Each agent is endowed with $w > 0$ units of the consumption good when young. The initial distribution of goods endowment in the economy is represented by the cumulative distribution function $\Gamma:[\underline{w}, \bar{w}] \rightarrow [0,1]$. Agents are risk neutral and have identical preferences and abilities. They differ only in initial income. The lifetime expected utility of an agent is given by $U(c_1, c_2) = c_1 + E(\tilde{c}_2)$, where E is the expectations operator and c_1 and $\tilde{c}_2$ denote consumption of the economy's single good in each period of life. Second-period consumption is uncertain, because it depends on the degree of rent seeking in the economy.

Each producer has access to a standard concave production technology that yields $f(i)$ units of the consumption good in period 2 of the producer's life from an investment of i units in period 1, where $f(0) = 0$ and $f'(0) = \infty$. Producers, however, face appropriation of some share of their market production by rent seekers. There is no law enforcement (we briefly discuss law enforcement in Section II) and no government taxation.

Let $0 < \gamma < 1$ denote the exogenously given proportion of market production that can be extracted from each producer. The idea here is that in the absence of adequate enforcement, producers do not possess complete property rights over their output. We can, therefore, think of γ as the profit loss due to taxes, bribes, outright expropriation, or, more generally, as the cost of doing business in a rent-seeking society. In reality, this fraction may be an endogenous function of the level of economic development, the effectiveness of law enforcement, or the efficiency of the institutional background of the economy.

The description of the rent-seeking sector is similar to that in Mehlum, Moene, and Torvik (2003). Let π^P denote the probability of being approached by a rent seeker. The second-period expected return to a producer is then given by $(1 - \pi^P \gamma) f(i)$. Let n denote the mass (fraction) of rent seekers in the economy. Each rent seeker can expropriate a share γ of the production of $\lambda \geq 1$ producers in the economy. This assumption implies that a rent seeker can expropriate from more than one producer. However, each producer is only approached by a single rent seeker.[3] The probability π^P can then be defined as the ratio of the total number of rent-seeking cases in the economy divided by the mass of producers, $(1 - n)$. Assuming full information, π^P can be defined as

$$\pi^P = \min\left\{\frac{\lambda n}{(1-n)}, 1\right\}. \tag{1}$$

Entry into rent seeking requires a fixed cost of θ units of the consumption good when young. Payment of this cost allows rent seekers to tax market production in the second period of their lives. This assumption is vital to the results below and captures increasing returns to rent seeking. Because of capital market imperfections, agents are unable to borrow to finance entry into rent seeking using their future income as collateral. Therefore, in order to belong to the class of rent seekers, an agent must have a starting level of wealth $w \geq \theta$.

Rent seekers save through a simple technology that returns xs units of goods in period 2 of their lives for an investment of s units when young. The inputs of rent seekers are assumed to be unobservable, which implies that one rent seeker cannot expropriate the goods controlled by another. Therefore, one may think of x as the return on hoarding that allows rent seekers protection from theft by others. The net return from hoarding is low but positive, that is, $x > 1$.[4]

The probability π^R that a particular rent seeker is the first to approach a producer is defined by the ratio of the total mass of producers, $(1 - n)$, divided by the total rent-seeking cases in the economy, λn. This probability can be expressed as follows:

$$\pi^R = \min\left\{\frac{(1-n)}{\lambda n}, 1\right\}. \tag{2}$$

The ratio $(1 - n)/\lambda n$ also captures congestion in rent-seeking activity. When $(1 - n) > \lambda n$ (i.e., when the fraction of producers in the economy exceeds total rent-seeking cases), there is no crowding out among rent seekers, with probability 1 each rent seeker can expropriate from a producer ($\pi^R = 1$). When there are fewer

[3]A producer never gets approached by more than one rent seeker here. One interpretation of this assumption is that each rent seeker implicitly provides protection against extortion by others, as in Mehlum, Moene, and Torvik (2003). In our model, each rent seeker can extract rent from more than one producer, but we abstract from the issue of protection.

[4]As we note below, $f'(i) > x$ in a positive rent-seeking equilibrium when γ is high. In this case, rent seeking competes with productive sectors for resources, resulting in further misallocation of resources in the economy.

rent-seeking cases in the economy than there are producers, each rent seeker can capture the full potential rent given by the rent-seeking technology from the λ producers approached. However, when $\lambda n > (1 - n)$, crowding out occurs, since each rent seeker competes with others for rents and the expected rent to each falls.

Let $\tilde{n}$ denote the value of n for which the total fraction of rent-seeking cases in the economy equals the fraction of producers. The probability π^P that a producer is approached by a rent seeker can then be expressed as

$$\pi^P = \begin{cases} \lambda n/(1-n) & \text{for } 0 \le n \le \tilde{n} \\ 1 & \text{for } n \ge \tilde{n} \end{cases}, \tag{3}$$

and the probability π^R that a rent seeker expropriates from a producer as

$$\pi^R = \begin{cases} 1 & \text{for } 0 \le n \le \tilde{n} \\ (1-n)/\lambda n & \text{for } n \le \tilde{n} \end{cases}. \tag{4}$$

Notice that $\tilde{n} = \dfrac{1}{1+\lambda} \le \frac{1}{2}$ for $\lambda \ge 1$.

Occupational Choice

The timing of the model is as follows. In the first period of their lives, individuals choose their occupation (production or rent seeking) and consume. At the beginning of the second period of their lives, there is a matching process between rent seekers and productive agents. Once that process resolves, individuals consume.

First, consider the optimization problem faced by an agent who chooses to become a producer. The budget constraints faced by a producer in each period of life are

$$c_1 = w - i$$

$$\tilde{c}_2 = \begin{cases} (1-\gamma) f(i) & \text{with probability } \pi^P, \\ f(i) & \text{with probability } (1-\pi^P) \end{cases}$$

where π^P is the probability of being approached by a rent seeker from equation (3). The producer maximizes expected utility, given an initial endowment *w:*

$$\underset{i}{Max}(w-i) + \pi^P (1-\gamma) f(i) + (1-\pi^P) f(i).$$

The first-order condition is given by

$$\left(1-\gamma\pi^P\right) f'(i) = 1, \tag{5}$$

where $0 \le \gamma\pi^P < 1$. For a positive probability of theft, the marginal return from investment exceeds 1: $f'(i) = 1/(1 - \gamma\pi^P) > 1$. If γ and π^P are significantly high, the marginal return from production also dominates the marginal return from hoarding, that is, $f'(i) > x$.

Let $i^* = i(\gamma\pi^P)$ denote the optimal investment choice that satisfies equation (5). Differentiating equation (5) with respect to $\gamma\pi^P$ shows that investment is decreasing in rent seeking because it lowers the expected return from investment.[5] Note also that i^* is the same for all producers and is independent of a producer's initial wealth.[6]

The indirect utility from being a producer can then be written as

$$V^P = w + \left[\left(1 - \gamma\pi^P\right) f(i^*) - i^*\right], \tag{6}$$

the last term being positive for optimal investment choice.

We turn next to the rent seeker's problem. Each rent seeker can expropriate a γ fraction of a producer's second-period income. We assume random matching between rent seekers and producers. Since all producers, irrespective of their initial endowment, earn the same income in the second period, the potential rent that can be appropriated from a producer is the same no matter which producer the rent seeker steals from. However, we later allow for heterogeneous income across producers (Section III). To simplify our future analysis, we assume that endowments are not *ex ante* observable; they are observed by rent seekers only when they attempt to expropriate producers' incomes. Hence, decisions about rent seeking are based on the expected rent that can be earned from a successful match with a producer, which is given by

$$R = \frac{\lambda \int_{\underline{w}}^{w^*} \gamma f(i^*) \, d\Gamma(w)}{\int_{\underline{w}}^{w^*} d\Gamma(w)},$$

where w^* (to be endogenously determined) is the cutoff level of wealth, w, for which agents choose to be producers. Since i^* is independent of wealth, this simplifies to

$$R = \lambda\gamma f(i^*). \tag{7}$$

The rent seeker's budget constraints are now given by

$$c_1 = w - \theta - s$$

$$\tilde{c}_2 = \begin{cases} R + xs & \text{with probability } \pi^R \\ xs & \text{with probability } \left(1 - \pi^R\right), \end{cases}$$

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[5]Note that $di^*/d\left(\gamma\pi^P\right) = \dfrac{f'(i^*)}{\left(1 - \gamma\pi^P\right) f''(i^*)} < 0$ for a concave production function.

[6]This follows from our assumption of linear utility. Allowing for risk aversion does not fundamentally alter the insights of this paper but does complicate the analysis, especially for rent seekers' decisions.

where π^R is the probability of being the first to approach a producer (equation (4)), s represents the savings of the rent seeker, θ denotes the up-front fixed cost to rent seeking, and R (given in equation (7)) is the expected amount expropriated from a producer. The rent seeker maximizes expected utility, given an initial endowment w:

$$\underset{s}{Max}(w-\theta-s)+\pi^R(R+xs)+(1+\pi^R)xs.$$

The assumption that the gross return on hoarding exceeds 1 implies that a rent seeker will save the entire first-period income and consume only in the second period, that is,

$$s = w - \theta. \tag{8}$$

The indirect utility from being a rent seeker is then given by

$$V^R = x(w-\theta)+\pi^R R, \tag{9}$$

which, in equilibrium using equation (7), can be rewritten as

$$V^R = x(w-\theta)+\lambda\pi^R\gamma f(i^*). \tag{9$'$}$$

An individual chooses an occupation depending on which one generates higher lifetime utility. Let $\Omega(w)$ denote the difference between lifetime utility of an agent with endowment w if the agent engages in rent seeking and utility upon becoming a producer:

$$\Omega = V^R - V^P = x(w-\theta)+\lambda\pi^R\gamma f(i^*)-\left[(w-i^*)+(1-\gamma\pi^P)f(i^*)\right]. \tag{10}$$

The individual will choose to be a rent seeker if $\Omega > 0$. Differentiating Ω with respect to w and using $x > 1$ shows that the net utility from being a rent seeker is strictly increasing in the agent's wealth (see Figure 1).

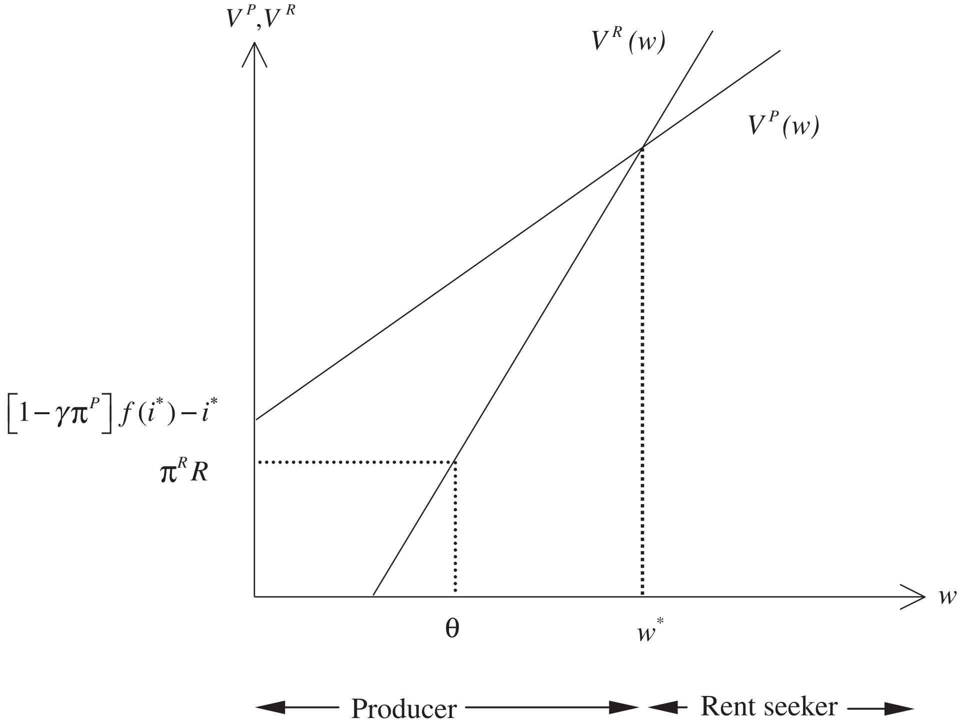
Equilibrium

In this subsection, we show that an individual's initial wealth determines occupational choice between rent seeking and production. Let w^* denote the threshold level of wealth such that $\Omega > 0$ for $w > w^*$, and n^* denote the equilibrium allocation of agents between rent seeking and production, such that

$$n^* = \int_{w^*}^{\bar{w}} d\Gamma(w) = 1-\Gamma(w^*). \tag{11}$$

An equilibrium in this environment is defined by a cutoff wealth level, w^*, and a number of rent seekers, n^*, such that agents with wealth w^* are indifferent between production and rent seeking (i.e., $V^R(w^*, n^*) = V^P(w^*, n^*)$, $i^*(n^*) = i(\gamma\pi^P(n^*))$ from equation (5), and equations (3), (4), and (11) hold.

Figure 1. Occupational Choice



We illustrate the general equilibrium using a diagram in (n*, w*) in Figures 2 and 3. Since an agent with wealth w* is indifferent between the two occupations, the net utility from rent seeking is

$$\Omega(w^*, n^*) = x(w^* - \theta) + \lambda\pi^R(n^*)\gamma f(i^*) \\ - \left[(w^* - i^*) + \left(1 - \gamma\pi^P(n^*)\right) f(i^*)\right] = 0, \qquad (12)$$

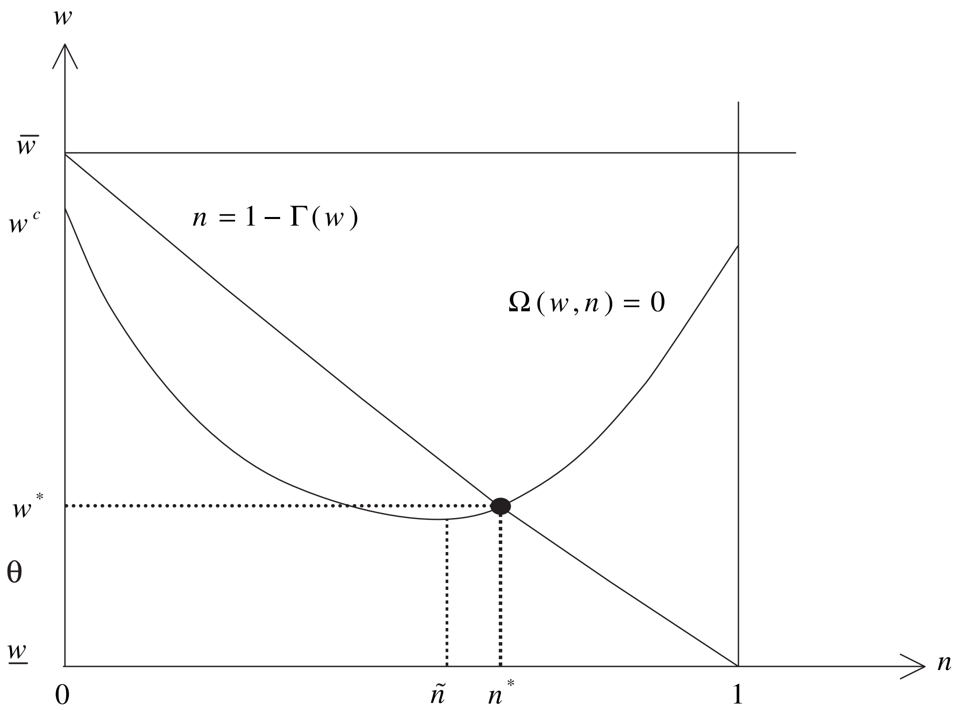
given n*.

Note that as the fraction of producers in the economy decreases and the fraction of rent seekers increases, production declines but rents accruing to each rent seeker depend on whether or not crowding out sets in. For $n < \tilde{n}$, the fraction of producers in the economy exceeds total rent-seeking cases: There is no crowding out among rent seekers ($\pi^R = 1$), but producers face expropriation of their production with increasing probability ($\pi^P = \lambda n/(1 - n)$), thereby decreasing the return to production. Using equations (3) and (4) and simplifying, equation (12) can be written as

$$\Omega(w^*, n^*) = w^*(x-1) - x\theta + i^* - \left[1 - \frac{\gamma\lambda}{1-n^*}\right] f(i^*) = 0. \qquad (13)$$

Ω(w*, n*) is increasing in w* and n*. Hence, as illustrated in Figure 2, the zero net utility curve is downward sloping in (n*, w*) space for the range $n \leq \tilde{n}$.

Figure 2. Unique Rent-Seeking Equilibrium



With $n > \tilde{n}$, the probability of being approached by a rent seeker becomes 1 ($\pi^P = 1$), while the probability that a rent seeker can expropriate from producers starts to decline as rent seekers begin to crowd each other out ($\pi^R = (1 - n)/\lambda n$). Equation (12) now becomes

$$\Omega(w^*, n^*) = w^*(x-1) - x\theta + i^* - \left[1 - \frac{\gamma}{n^*}\right] f(i^*) = 0. \tag{14}$$

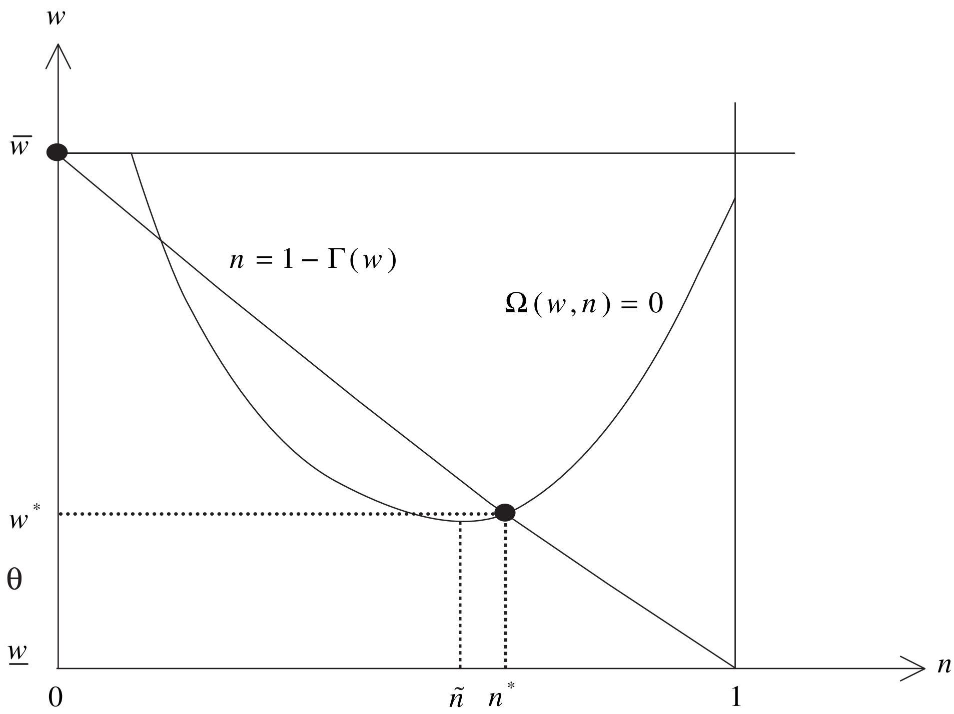
In this case, $\Omega(w^*, n^*)$ is increasing in w^* but decreasing in n^*. This means, for $n > \tilde{n}$, the zero net utility curve is upward sloping as in Figure 2.

Consider now the case where there is no rent seeking ($n = 0$).[7] At $n = 0$, equation (4) suggests that $\pi^R = 1$ and the first rent seeker to approach producers can capture $\lambda\gamma f(i^*)$ in rents, while $\pi^P = 0$. Let w^C denote the value of w that satisfies $\Omega(w, 0) = 0$. We can show that

$$w^C = \frac{1}{x-1}\left[x\theta - i^* + (1-\lambda\gamma) f(i^*)\right].$$

[7]It is easy to see that an equilibrium in which all agents engage in rent seeking does not exist. With $n = 1$, $\pi^R = 0$ as rent seekers crowd each other out, while $\pi^P = 1$. As a result, the rent accruing to each rent seeker is zero. Moreover, marginal returns from production $f'(0)$ will dominate marginal returns from protected investment x.

Figure 3. Multiple Rent-Seeking Equilibria



For $w^C < \overline{w}$, as illustrated in Figure 2, the $\Omega(w, n) = 0$ curve intersects the $n = 1 - \Gamma(w)$ line once at the unique rent-seeking equilibrium with $n^* > 0$.[8] A sufficiently low θ or sufficiently high λ and γ make this equilibrium more likely. Intuitively, when costs of entering into rent seeking are low or the amount that can be expropriated is high, a career in rent seeking will be relatively more attractive compared with production. If λ is sufficiently greater than 1 such that each rent seeker can expropriate from a large number of producers, $\tilde{n}$ and, therefore, n^* would be lower than 0.5. This would correspond to the historical evidence of a small rent-seeking elite expropriating from a large segment of society (see Engerman and Sokoloff, 2002, for examples).

It is also possible that $w^C > \overline{w}$ at $n = 0$. If, for instance, the cost of entering into rent seeking, θ, is high relative to the expected return from expropriation (determined by $\lambda\gamma$), we can get multiple equilibria in rent seeking and production. This case is illustrated in Figure 3, where the $\Omega(w, n) = 0$ curve intersects the $n = 1 - \Gamma(w)$ line twice. One equilibrium corresponds to the case of positive levels of rent seeking with $n^* > \tilde{n}$. A second equilibrium is one with no rent seeking ($n = 0$).

A third equilibrium also exists in Figure 3 with a positive level of rent seeking and production where $\Omega(w^*, n^*) = 0$. But such an equilibrium is unstable,

[8]It is also possible for n^* to be less than $\tilde{n}$ in Figure 2.

since a small change in n and w from their equilibrium values drives the economy to one of the two stable equilibria (with positive or zero rent seeking).

We summarize this discussion in the following two propositions (technical details are provided in the appendix).

Proposition 1. When the cost of rent seeking is low relative to expected returns (that is, $w^C > \bar{w}$), a unique equilibrium exists with a positive measure of agents engaged in rent seeking and production. When costs of rent seeking are relatively high ($w^C < \bar{w}$), a corner equilibrium with zero rent seeking definitely exists. In addition, an interior equilibrium with positive rent seeking may exist.

Now consider an equilibrium with positive rent seeking. As the discussion above makes clear, it is the relatively wealthy who engage in rent-seeking activities in such an equilibrium.

Proposition 2. In equilibrium, the greater the initial wealth of an agent, the more attractive a career in rent seeking relative to production.

Proposition 2 states that the rich become rent seekers. But it is not higher wealth alone that creates incentives for wealthy agents to enter into rent seeking. The ability to protect their wealth from expropriation by others (the slope of V^R is simply x) also plays a key role.[9] In the absence of credit markets, a higher initial wealth is of greater value to rent seekers than to producers, because it allows them to devote a larger amount of their endowment to hoarding once θ is paid. Specifically, the existence of a protection technology against expropriation by others implies that wealthier agents endure a smaller lifetime utility sacrifice in paying the fixed cost for rent seeking and hoarding, and hence are more willing to enter into this occupation. Therefore, in the presence of the rent-seeking fixed cost, θ, and in the absence of credit markets, only relatively wealthy agents choose to become rent seekers.

This result extends to alternative formulations of capital market imperfections or the rent-seeking technology. All that is needed is that the marginal benefit of entering into rent seeking is higher for wealthier individuals. Thus, despite the fact that agents are ex ante identical in terms of preferences and abilities, two classes of agents emerge in equilibrium. It is the initial income (w) of an agent that determines the agent's decision to engage in rent seeking or production, and how much to consume and save. Hence, the initial distribution of endowments determines aggregate output in the economy and the measure of agents engaged in rent seeking.

Note that the weaker property right protection is (that is, the higher γ), the more attractive rent seeking becomes as a profession and the less attractive production becomes. In Figure 3, the effect of a higher γ is to shift down the net utility curve, resulting in more agents switching to rent seeking (lower w^*, higher n^*).

When hoarding has a lower marginal product than marketed production ($x < f'(i^*)$), the greater the proportion of rent seekers, and the smaller the aggregate output. Hence, the total output in the economy is negatively related to the size of the rent-seeking sector. Net output—that is, aggregate output net of rent-seeking costs (deadweight losses)—is even lower.

[9]This slope will also depend on wealth if, for example, rents expropriated depend on the rent seeker's own wealth, as in Sonin (2003).

II. Key Assumptions

Having analyzed the equilibrium of this model, we now briefly discuss the assumptions underlying the model and how changes in parameter values affect equilibrium outcomes. The results of the model are robust to alternative specifications of the rent-seeking technology. In our model, returns to rent seeking, past the fixed cost θ, are not sensitive to the amounts invested. Alternatively, returns to rent seeking could be related to the amounts invested in such activities. Allowing rent seekers to expropriate a fixed proportion of producers' output simplifies our analysis but does not affect any of the major results.

The model also assumes a specific form for the function that relates the amount of rent obtained by each rent seeker from expropriation to the proportion of rent seekers in the economy. This assumption implies that the amount expropriated by each rent seeker is decreasing in n because of increased competition among rent seekers. This extreme form of crowding out, again, is not crucial for the results of this model.

In the model, agents are assumed to be unable to finance their entry into rent seeking through borrowing. Credit markets in many developing countries are typically characterized by high collateral requirements. An agent seeking to obtain a loan to finance the entrance fee into rent seeking would need to have substantial capital to meet the collateral requirements. This suggests that even in the presence of credit markets it is the relatively wealthy who will be able to obtain such loans.

The model also abstracts from law enforcement as the rent seekers' probability of being caught and punished is implicitly set equal to zero. Clearly, effective law enforcement would reduce the attractiveness of rent seeking. Law enforcement can easily be captured in the model by making γ a decreasing function of the economy-wide resources devoted to enforcement. If, for instance, such enforcement is financed through a lump sum tax on producers, the larger the size of the rent-seeking sector, the larger the tax required to finance a given level of enforcement would be. As a result, even with positive law enforcement, the implied trade-off for producers between lower expropriation and higher taxes suggests that rent seeking will not be eliminated in equilibrium.

Our results require two crucial assumptions: (1) that there are indivisibilities in rent seeking and (2) that rent seekers have access to a "protection" technology. The assumption of indivisibilities in rent seeking is vital to the results of the paper, as it captures the increasing returns necessary to generate a split between the poor and rich in terms of rent seeking. These assumptions together ensure that the distribution of initial income determines the choice between rent seeking and production.

III. Extensions

In the environment above, fixed costs of rent seeking confer to wealthier agents a comparative advantage in rent seeking. It is not surprising, then, that wealthier agents substitute away from production in a rent-seeking equilibrium.

But wealth is not the sole determinant of production possibilities in general. In particular, an individual's productivity as a producer could depend on innate abilities that are unrelated to income or wealth. In this section, we consider an extension in which individuals differ in two ways: (1) their initial endowment (wealth) and (2) their ability as producers.[10]

Specifically, suppose an individual of ability a is able to produce $af(i)$ units of the final consumption good from an investment i. We posit that ability is uncorrelated with wealth. As before, the initial endowment is distributed according to the cumulative distribution function $\Gamma(w)$ on the $[\underline{w}, \overline{w}]$. An individual's ability is drawn *independently* from a cumulative distribution function $G(a)$ defined over $[\underline{a}, \overline{a}]$. The absence of correlation between wealth and ability introduces an interesting trade-off in occupational choices. Wealth will no longer be the sole determinant of occupational choice, as wealthier individuals may have a comparative advantage in production.

Consider the optimization problem facing a producer of ability a and wealth w. He chooses investment to maximize expected lifetime utility

$$U^P = w - i + \left(1 - \gamma\pi^P\right) af(i)$$

facing similar budget constraints as before. The first-order condition for investment choice, $1 = (1 - \gamma\pi^P)af'(i)$, gives the investment function

$$i^* = i\left(a, \gamma\pi^P\right), \tag{15}$$

which is increasing in the first argument as expected and decreasing in the second as before. Substituting these into the lifetime utility function gives a producer's indirect utility as

$$V^P = w + \left[\left(1 - \gamma\pi^P\right) af\left(i^*(a)\right) - i^*(a)\right], \tag{16}$$

where the term inside the brackets is positive given optimal investment choice and concavity of the production function.

Nothing changes in the rent seeker's optimization problem. He maximizes expected lifetime utility as before, taking as given the rent R that he expects to get from a successful random match with a producer. The indirect utility function is then

$$V^R = x(w - \theta) + \pi^R R, \tag{17}$$

as before, though rent R will be different in equilibrium.

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[10]One interpretation of the basic model is that differences in endowments are due to differences in first-period abilities as producers. More able agents are wealthier in period 1 as a result. Subsequent to first-period production, agents face an investment choice between a productive asset (which yields $f(i)$ from investment i) and a low-productive one (with a fixed cost θ paid up front but a low return x in period 2, plus, possibly, rent-seeking opportunities). The productivity of this investment does not depend on first-period abilities. In this scenario, more able (and wealthier) individuals will prefer the low-productivity asset, resulting in smaller net output. This interpretation of the model is similar to the result of Murphy, Shleifer, and Vishny (1993) and Acemoglu and Verdier (1998) that rent seeking is particularly costly because talented individuals spend time rent seeking instead of in more productive occupations.

Consider now the occupational choice facing an individual with ability a and wealth $w \geq \theta$. The *net* utility that the individual enjoys from being a rent seeker is

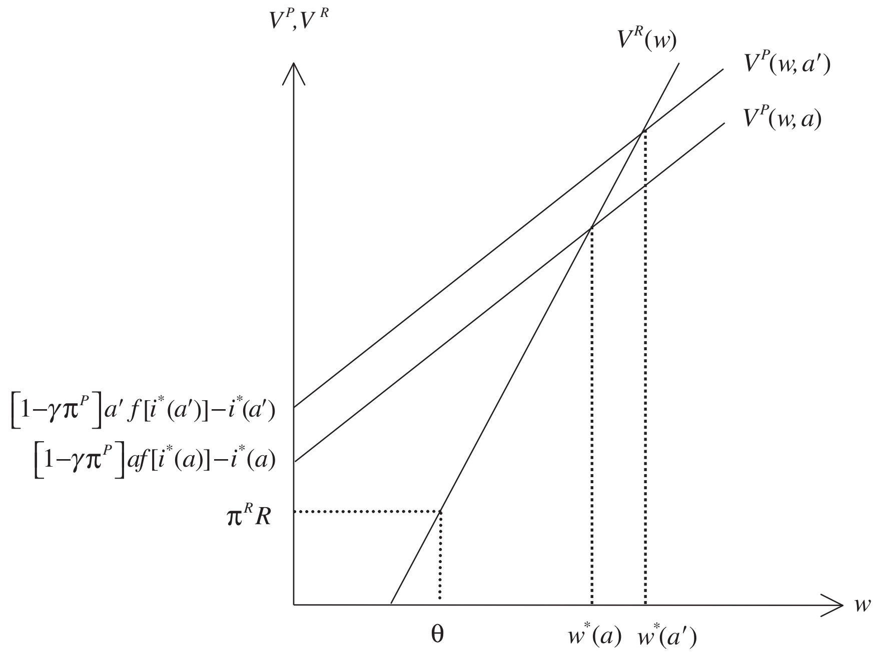
$$\Omega(w,a) = V^R - V^P = (x-1)w - x\theta + \pi^R R - \left[\left(1-\gamma\pi^P\right)af\left(i^*(a)\right) - i^*(a)\right], \tag{18}$$

which is increasing in wealth but decreasing in ability. Intuitively, the higher a person's productive ability, the more income that person can enjoy as a producer; while the higher the wealth, the easier it is to afford the cost of rent seeking.

But a high-wealth individual now finds rent seeking more attractive only if the individual's ability is low enough. To see this, consider Figure 4, which illustrates the indirect utility functions corresponding to ability levels a and $a'(> a)$. Since the higher-ability individual generates higher output, $V^P(w, a')$ lies uniformly above $V^P(w, a)$, the intercept gap capturing the differential productivity effect. As the diagram indicates, the lower-ability individual is willing to switch to rent seeking for a lower wealth level $w^*(a)$ than the higher-ability individual. Intuitively, wealth confers a comparative advantage in rent seeking, while ability confers a comparative advantage in production. Wealthy individuals of low ability, therefore, find rent seeking a more attractive occupation.

To formalize this intuition, note that an individual with wealth $w \geq \theta$ becomes a rent seeker only if $\Omega(w, a) \geq 0$, taking as given rents R and the number of agents in rent seeking n. Since Ω is a continuously differentiable increasing function of wealth and decreasing function of ability, we can rewrite this as $a \leq h(w)$ with $h' > 0$.

Figure 4. Occupational Choice with Differing Abilities ($a' > a$)



This means that the agent chooses to be a rent seeker only if the agent's ability as a producer is "low enough," that is, $a \le h(w)$. This is true of any wealth level exceeding the minimum amount required to finance the rent-seeking operation. Thus, the measure of individuals corresponding to any wealth $w \ge \theta$ who become rent seekers is $\int_{\underline{a}}^{h(w)} dG(a)$.

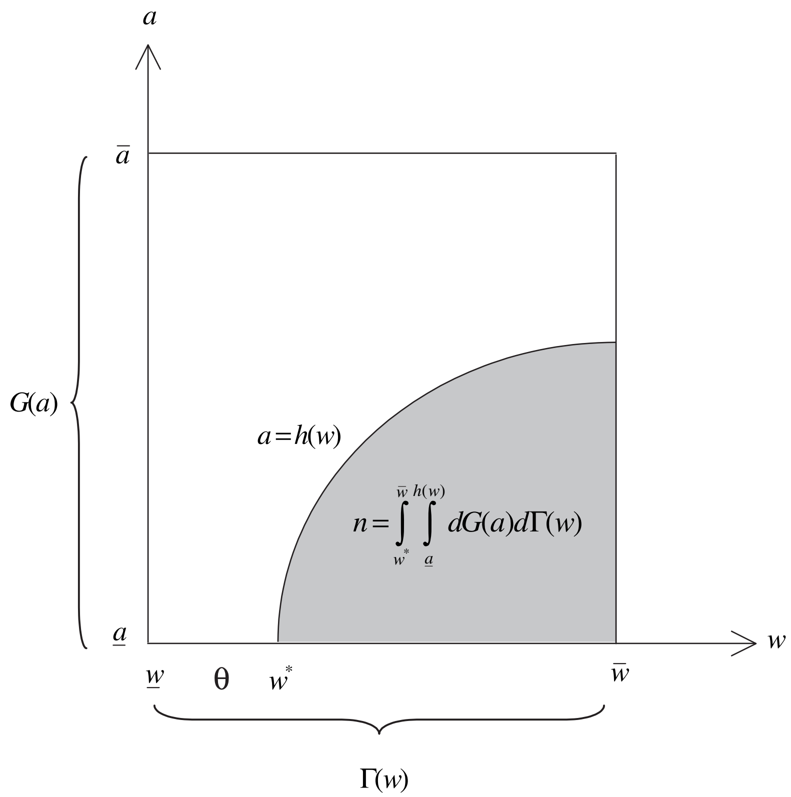
Now consider the lowest ability individual, $\underline{a}$, who has the most incentive to become a rent seeker as long as it is affordable. To do so, wealth has to be high enough relative to ability so that it adequately compensates for the fixed costs of rent seeking, that is,

$$w \ge h^{-1}(\underline{a}) \equiv w^*. \tag{19}$$

Hence, as Figure 5 illustrates, the measure of individuals in the entire population who choose rent seeking over production is simply

$$n = \int_{w^*}^{\bar{w}} \int_{\underline{a}}^{h(w)} dG(a)\, d\Gamma(w). \tag{20}$$

Figure 5. Fraction of Population That Becomes Rent Seekers When Abilities Differ



Finally, consider the rents that a rent seeker can expect to appropriate when successfully (but randomly) matched with a producer. Given the occupational choices above, this is given by

$$R = \frac{\lambda \int_{\underline{w}}^{w^*} \int_{h(w)}^{\bar{a}} \gamma f(i^*(a)) dG(a) d\Gamma(w)}{\int_{\underline{w}}^{w^*} \int_{h(w)}^{\bar{a}} dG(a) d\Gamma(w)}. \tag{21}$$

Since the expression for expected rents does not simplify any further, it is not easy solving for the general equilibrium of this model, even with linear utility and simple distribution functions. The intuition behind an interior rent-seeking equilibrium presented in the previous sections is, however, general. Given the differentiability and continuity of the utility and distribution functions, such an equilibrium will exist in this model. It will be defined by a threshold value w^*, the ability function $h(w)$, number of rent seekers n, and expected rents R that satisfy equations (15), (19), (20), and (21).

Corner equilibrium ($n = 0$, $R = 0$) with no rent seeking is also possible. In such an equilibrium, the net utility for an agent who is considering deviating to rent seeking is

$$\Omega(a, w; n = 0) = (x-1)w - x\theta + \lambda\gamma \int_{\underline{a}}^{\bar{a}} f(i(a,0)) dG(a) - [af(i(a,0)) - i(a,0)],$$

where $i(a, 0)$ denotes optimal investment corresponding to ability a and zero rent seeking. We already know that the individual who faces the highest incentive to be a rent seeker is the one with highest wealth $\bar{w}$ and lowest ability $\underline{a}$. Hence, for no one willing to switch to rent seeking, a sufficient condition is that

$$\Omega(\underline{a}, \bar{w}; n = 0) = (x-1)\bar{w} - x\theta + \lambda\gamma \int_{\underline{a}}^{\bar{a}} f(i(a,0)) dG(a) - [\underline{a} f(i(\underline{a},0)) - i(\underline{a},0)] \le 0$$

or, equivalently,

$$\bar{w} \le \frac{[\underline{a} f(i(\underline{a},0)) - i(\underline{a},0)] + x\theta - \lambda\gamma \int_{\underline{a}}^{\bar{a}} f(i(a,0)) dG(a)}{x-1} \equiv w^c.$$

Given $\bar{w}$, this is more likely the higher the productivity of the lowest ability type ($\underline{a}$), the lower the return from hoarding (x), the higher the costs of becoming a rent seeker (θ), and the lower the productivity of rent seeking (γ, λ). As long as the condition above is satisfied, the economy will admit multiple levels of rent seeking as equilibrium outcomes. Typically, two stable equilibria with zero and positive rent seeking will result, as in Figure 3.

Focusing on the interior equilibrium, one implication of this extended model is obvious: The initial distribution is not the only determinant of rent seeking; it depends also on the productivity of agents and the extent to which wealth and productivity are correlated.

Second, the model implies that costs of rent seeking in the previous model are exaggerated, since it "overstates" the incentives wealthier agents face to become rent seekers. At one extreme, if wealth and ability were perfectly correlated (for instance, because wealthier individuals could afford better education in period 1, which made them more productive in period 2), it is quite possible for rent seeking to disappear, in equilibrium; for example, if the education technology were highly productive.

In general though, innate ability (uncorrelated with wealth) also determines an individual's production possibilities. In the case analyzed above, positive rent seeking occurs in equilibrium. But the social costs of rent seeking are lower than before: First, a smaller fraction of the population with wealth exceeding θ become rent seekers, so the deadweight loss is lower, and second, these low-ability rent seekers do not cost aggregate output as much, since their comparative advantage does not lie in production.

The dynamic implications of our model are interesting. Think of the two-period model as a snapshot of a two-period, overlapping-generations economy in which successive generations are interlinked via wealth transfers (bequests). Assuming that wealthier parents transfer more to their offspring, our basic model with homogeneous abilities implies that persistent dynastic occupational choices are possible, as children of rent-seeking wealthy parents choose their parents' occupations.

If we allow for ability differences, too, and if intergenerational abilities are not (or weakly) correlated, that is no longer the case. Over time, we will observe dynastic mobility between the two occupations: As some producer dynasties become wealthier as a result of high abilities, there will be a tendency for their low-ability wealthy offspring to engage in rent seeking; and vice versa for dynasties that begin as rent seekers.

Finally, consider whether government policies can mitigate the effect of inequality on rent seeking via redistribution (assuming the government can observe endowments even though private agents cannot). Our model, whether ability is homogeneous or heterogeneous, implies that taxing the rich will raise their average cost for rent seeking, shifting them into production. But redistributing these tax revenues to the poor may be counterproductive if posttax endowments exceed θ, since it raises the incentive of the poor to engage in rent seeking. A better policy would be to use the tax revenues to subsidize production directly, which raises the return on investment for all.

Moreover, if the economy admits multiple rent-seeking equilibria (Figure 3), a *temporary* redistributive policy may have permanent effects if it is progressive enough. Taxing wealthier agents at a higher rate can significantly lower their net returns from rent seeking, so that rent seeking disappears in equilibrium. Since multiple equilibria result in this model from a coordination problem,[11] once the

[11]If all agents could coordinate a simultaneous move to production, the threat of expropriation would disappear, since there would be no rent seekers, and production would yield higher utility even to the wealthiest individuals.

economy moves away from rent seeking, lifting the redistributive tax schedule need not push the economy back to rent seeking as long as agents expect zero rent seeking in the future.

IV. Conclusion

This paper presents a simple economic model of rent seeking to examine the relationships among income distribution, rent-seeking behavior, and economic performance when the government cannot enforce property rights. We show that in the absence of credit markets only wealthy agents can overcome the nonconvexity in rent seeking. The wealthy are, therefore, "born into rent seeking." We analyze a model in which rent seeking not only enables agents to extract some portion of the proceeds from market production but also ensures protection of their wealth from appropriation by others. Therefore, wealthy agents avoid the tax from rent seekers by becoming rent seekers themselves, a result that accords well with both historical evidence and casual observation in developing countries.

The model implies that, in the absence of property rights protection, societies that have a more unequal distribution of wealth and are characterized by a small fraction of people who can afford entry into rent seeking will be the societies with greater social polarization and entrenched rent seeking by a few at the expense of the majority. At the other extreme, the model suggests that societies in which property rights are better enforced (for example, if γ is very low) will experience less polarization and higher economic performance.

We extended the model to analyze the robustness of our results when agents also differ in their ability as producers. Heterogeneous ability and wealth introduce a trade-off—agents specialize in rent seeking or production depending on where their comparative advantage lies. Since wealthier, but able, agents can prefer production over rent seeking, the rent-seeking equilibrium now involves lower social costs than when individuals have identical abilities.

Our model also has implications for redistribution and public education policies. Irrespective of whether ability is homogeneous or heterogeneous, our model implies that taxing the rich will raise their average cost for rent seeking, shifting them into production. However, simply redistributing these tax revenues to the poor may be counterproductive if it raises their posttax endowments and their incentive to engage in rent seeking. A better policy would be to use the tax revenues to target education resources to the poor, particularly if wealth and abilities are uncorrelated. If, on the other hand, wealth and abilities are perfectly correlated, it may be possible for the rent-seeking equilibrium to disappear if, for example, the education technology is highly productive. One policy conclusion that naturally arises from this case is that it may be worth targeting higher education to the rich to eliminate rent seeking. However, Dabla-Norris and Gradstein (2004) show that in societies with weak rule of law, the rich are more effective in appropriating a larger share of public education spending, thereby preventing the reduction of inequality. Therefore, overall incentives to engage in rent seeking may not be eliminated as long as the rich can also engage in rent seeking over public education funds. More generally, our model suggests that improving access to high-quality education would raise the returns to production directly for all.

The model presented is essentially static in nature in that it describes the short-run equilibrium effect of the distribution of income on the decision to enter into rent-seeking activities. An important extension would be to consider the dynamics of the relationship between income distribution and rent seeking as an economy develops. Such an extension would allow us to analyze how the distribution of wealth can, in turn, be determined by the size of the rent-seeking sector and to explain the persistence of rent seeking and inequality in societies.

Another extension we plan to pursue in future work is the possibility for producers to invest in defending their output from appropriation. Such investment could be entirely private or, more interestingly, publicly funded out of taxes. This will provide a backdrop to study the endogenous evolution of property rights and how it changes with economic development and wealth accumulation. To do so, we need to move beyond our static framework with risk-neutral agents so that dynamic choices depend more meaningfully on the evolution of wealth and production possibilities.

APPENDIX

Proof of Proposition 1

Rewrite equation (11) as $w = \Gamma^{-1}(1 - n) \equiv \Phi(n)$, where Φ is monotonically decreasing. Similarly, from equations (13) and (14),

$$w = \Psi(n) \equiv \begin{cases} \dfrac{1}{x-1}\left[x\theta + \left(1 - \dfrac{\gamma\lambda}{1-n}\right) f(i^*) - i^*\right] & \text{for } n \le \tilde{n} \\ \dfrac{1}{x-1}\left[x\theta + \left(1 - \dfrac{\gamma}{n}\right) f(i^*) - i^*\right] & \text{for } n > \tilde{n} \end{cases},$$

which is nonmonotonic and, in particular, U-shaped, as shown in the text. The optimal investment level i^* solves $\left(1 - \dfrac{\gamma\lambda n}{1-n}\right) f'(i) = 1$ for $n \le \tilde{n}$, and $(1 - \gamma)f'(i) = 1$ otherwise. Equilibrium level of rent seeking n^* solves $Z(n^*) \equiv \Phi(n^*) - \Psi(n^*) = 0$. Once n^* is known, the equilibrium w^* can be determined via Φ or Ψ.

First, consider the case when $w^C < \overline{w}$. Here $\Phi(0) = \overline{w}$, $\Phi(1) = \underline{w}$, $\Psi(0) = w^C$, $\Psi(1) > \underline{w}$. Hence, $Z(0) > 0$ and $Z(1) < 0$. By the Intermediate Value Theorem (IVT), since $Z(n)$ is continuous on [0, 1] there exists at least one $n^* \in [0, 1]$ such that $Z(n^*) = 0$. In fact, by appealing to the U shape of Ψ, we know this equilibrium is unique.

When $w^C \ge \overline{w}$, on the other hand, let $n^C \ge 0$ such that $\Psi(n^C) = \overline{w}$. Now we have $Z(0) = 0$, $Z(n^C) < 0$, $Z(1) < 0$. Note that, as before, there exists $n^* = 0$ such that $Z(n^*) = 0$. Zero rent seeking is evidently an equilibrium in this case. In addition, other equilibria with positive rent seeking can also exist, since Z is nonmonotonic. For instance, since Ψ is U-shaped, it is possible that $\Psi(\tilde{n}) < \Phi(\tilde{n})$, in which case $Z(\tilde{n}) > 0$. By the IVT, we should have an intermediate $n' \in (0, \tilde{n})$ such that $Z(n') = 0$ and another $n^{**} \in (\tilde{n}, 1)$ such that $Z(n^{**}) = 0$. But only n^{**} is an equilibrium in the model, since n' is unstable (slight deviations in n will cause individuals to move toward zero or n^{**}). In other words, a sufficient condition for the existence of a unique interior rent-seeking equilibrium is $w^C < \overline{w}$.

Proof of Proposition 2

The differential equilibrium utility of any agent with wealth $w \geq w^*$, given equilibrium level of rent seeking n^*, is

$$\Omega(w;n^*) = \begin{cases} w(x-1) - x\theta + i^* - \left(1 - \dfrac{\gamma\lambda}{1-n^*}\right) f(i^*), & \text{for } n \leq n^* \\ w(x-1) - x\theta + i^* - \left(1 - \dfrac{\gamma}{n^*}\right) f(i^*), & \text{for } n > n^* \end{cases}.$$

Evidently, $\partial\Omega/\partial w = x - 1 > 0$. In other words, as long as individuals can afford the fixed cost of rent seeking ($w \geq w^*$), net utility from rent seeking over production increases in initial wealth w.

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