

WP/05/43

IMF Working Paper

Rent Seeking

Shankha Chakraborty and Era Dabla-Norris

IMF Working Paper

IMF Institute

Rent Seeking

Prepared by Shankha Chakraborty and Era Dabla-Norris¹

Authorized for distribution by Eric V. Clifton

March 2005

Abstract

This Working Paper should not be reported as representing the views of the IMF.

The views expressed in this Working Paper are those of the author(s) and do not necessarily represent those of the IMF or IMF policy. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate.

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 of rent seeking, only wealthy agents choose to engage in it, since it enables 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 Classification Numbers: D23; D31; D72; O11

Keywords: Rent seeking; income distribution

Author(s) E-Mail Address: shankhac@uoregon.edu; edablanorris@imf.org

¹ The paper was written when Shankha Chakraborty was visiting the IMF Institute. The authors would like to thank Andrew Feltenstein and Jean-Francois Ruhashyankiko for their valuable comments.

Contents	Page
I. Introduction	3
II. Model	6
A. Environment and Technology	6
B. Occupational Choice	8
C. Equilibrium.....	11
III. Key Assumptions.....	14
IV. Extensions.....	15
V. Conclusion	19
References.....	26
Figures	
1. Occupational Choice.....	21
2. Unique Rent-Seeking Equilibrium.....	22
3. Multiple Rent-Seeking Equilibrium.....	23
4. Occupational Choice When Abilities Differ ($a' > a$)	24
5. Fraction of Population That Becomes Rent Seekers When Abilities Differ	25

I. INTRODUCTION

Lack of development, stagnant growth, insecure property rights, income inequality, and widespread rent seeking 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.² Cross-country studies find that countries where corruption and rent seeking is rampant suffer from lower capital accumulation, productivity, and growth (Mauro, 1995; Keefer and Knack, 1997; and Hall and Jones, 1999).³ Extensive rent seeking and insecure property rights are also associated with substantial income and wealth inequality.⁴ (Olson, 1971) 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 lax enforcement of property rights and weak institutions.

While the empirical evidence suggests a link 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, often it is the relatively wealthy who choose rent-seeking activities such as the government bureaucracy, army, and 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 an economic model of rent seeking that analyzes the relationship among rent-seeking behavior, wealth distribution, and economic performance when the government cannot protect property rights.⁵ 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 distortions 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 stronger for the wealthy, who have more to lose from expropriation than poor individuals. In the presence of

² Rent seeking refers to all largely unproductive, expropriative activities which bring positive returns to the individual but not to society (Krueger, 1974).

³ For historical discussion on the role of rent seeking in explaining the differential economic performance of eighteenth-century France and England, see North and Thomas, 1973; and North, 1981.

⁴ See Benabou, 1996 for a survey on the inverse relationship between inequality and growth.

⁵ This paper extends earlier work by Dabla-Norris and Wade, 2002 by considering the joint determination of occupational choice between rent seeking and production and initial wealth distribution in a richer setting.

borrowing constraints and the payment of fixed costs for entry into rent seeking, increasing returns to rent seeking are generated. Therefore, the size of the rent-seeking sector and the corresponding efficiency losses in society depend on the initial distribution of wealth in society.

The fixed cost for rent seeking can be viewed as analogous to the purchase of weapons used both for protection and offense. In this interpretation, arms enable agents not only 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 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 and obtaining exemptions, and large fixed costs of political organization (Downs, 1957; Huntington, 1976). In this interpretation, wealthy agents or the elites can use their political power to extract rents from the most productive sectors and to induce government decisions most favorable to their interests.

The assumption of increasing returns to rent seeking or political influence is consistent with historical evidence. In republican Rome, as in seventeenth-century France, an important prerequisite for engaging in tax farming was the availability of sufficient capital to enable wealthy individuals to advance funds to rulers and to collect taxes (Levi, 1988; Braudel, 1983). Baumol, 1990 notes that in Mandarin China and in medieval Europe, government service, with its potential for illegal personal enrichment, was the principal career choice for many wealthy individuals. Engerman and Sokoloff, 2002 provide numerous historical examples where 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 having had a feedback effect on access to economic opportunities in ways that, in turn, influenced long-term institutional development and inequality in the region (World Bank, 2003).

More recently, Wade, 1984 finds 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 salaries for the positions (Alfiler, 1986). Casual observation suggests that in many countries, it is common for government officials and politicians to own businesses run either by them 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 the context of the Eastern European transition to capitalism, particularly in the context of privatization (Hoff and Stiglitz, 2002; Sonin, 2003).

This paper develops a simple general-equilibrium model with imperfect capital markets and a non-convex rent-seeking technology. Agents in this model have identical preferences and abilities and differ only with respect to their initial incomes. 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 enables rent seekers to appropriate some portion of the surplus generated by productive economic activity and to save a desired portion of their initial incomes (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 consider agents heterogeneous in their productive abilities. This introduces a trade-off, since wealthier agents can choose to become producers, even though they can afford the costs of rent seeking, simply because that is where their comparative advantage lies. 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; Banerjee and Newman, 1993; and Aghion and Bolton, 1994, among others. Another literature explicitly examines the association 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, 1996 show how the wealthy influence the direction of income transfers in society and highlight 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 theirs.

Our paper is closely related to economic models of rent seeking and economic development. In Baumol, 1990; Murphy, Shleifer, and Vishny, 1993; Acemoglu, 1995; Mehlum, Moene, and Torvik, 2003; and Baland and Francois, 2000, for example, individuals choose between productive and rent-seeking activities by comparing their relative rewards. These rewards are, in turn, determined by the allocations of individuals between the two activities. Our paper shares this feature, but extends this 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, thereby 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 law-enforcement procedures, the rich 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.

The paper proceeds as follows. Section II specifies the basic model and examines the properties of equilibrium. Section III discusses the assumptions of the model, while section IV considers an extension with heterogeneous abilities. We conclude in section V.

II. MODEL

A. 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 $\Gamma : R_{++} \rightarrow [\underline{w}, \bar{w}]$. Agents are risk neutral and are assumed to have identical preferences and abilities and differ only with respect to their 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 two of his life to 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 and no government taxation. Law enforcement is briefly discussed in section III.

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.⁶ The probability π^P can then be defined as the ratio of the total number of

⁶ 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
(continued...)

rent seeking cases in the economy divided by the mass of producers, $(1 - n)$. Assuming full information, π^P can be defined as

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

Entry into rent seeking requires payment of 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 a rent seeker cannot expropriate the goods controlled by another. Therefore, one may think of x as the (gross) return on hoarding which allows rent seekers protection from theft by others. The net return from hoarding is low but positive, that is, $x > 1$.⁷

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

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

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 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 he approaches. However, when $\lambda n > (1 - n)$, crowding out

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.

⁷ As we show below, $f'(i) > x$ in a positive rent seeking equilibrium when γ is high. Rent seeking competes with productive sectors for resources, resulting in a misallocation of resources in the economy.

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 just equals the fraction of producers. The probability π^P that a producer is approached by a rent seeker can then be expressed as

$$\pi^P = \begin{cases} \lambda n / (1 - n) & \text{for } 0 \leq n < \tilde{n} \\ 1 & \text{for } n \geq \tilde{n} \end{cases} \quad (3)$$

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

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

Notice that $\tilde{n} = \frac{1}{1 + \lambda} \leq 1/2$ for $\lambda \geq 1$.

B. Occupational Choice

The timing of the model is as follows. In the first period of their lives, individuals choose their occupation, either production or rent seeking. In the beginning of the second period of their life, there is a matching process between rent seekers and productive agents. Finally, there is consumption.

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 his 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 :

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

The first order condition is given by

$$(1 - \gamma\pi^P)f'(i) = 1 \quad (5)$$

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

Let $i^* = i(\gamma\pi^p)$ denote the optimal investment choice that satisfies (5). Differentiating above with respect to $\gamma\pi^p$ implies that investment is decreasing in the extent of rent seeking because it lowers the expected return from investment.⁸ Note also note that i^* is the same for all producers and independent of a producer's initial wealth.⁹

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

$$V^p = w + [(1 - \gamma\pi^p)f(i^*) - i^*] \quad (6)$$

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 same no matter which producer the rent seeker steals from. However, we later allow for heterogeneous income across producers (section IV below). In order 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, and is given by

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

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

⁸ Notice that $di^*/d(\gamma\pi^p) = \frac{f'(i^*)}{(1 - \gamma\pi^p)f''(i^*)} < 0$ for a concave production function.

⁹ This follows from our assumption of risk neutral agents and linear utility. Allowing for risk aversion does not fundamentally alter the insights of this paper, but does complicate the analysis, especially for rent seekers.

$$R = \lambda \gamma f(i^*) \quad (7)$$

The rent seeker's budget constraints are now given by:

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

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

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 upfront fixed cost to rent seeking, and R (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 one implies that a rent seeker will save his entire first period income and consume only in the second period, that is

$$s = w - \theta \quad (8)$$

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

$$V^R = x(w - \theta) + \pi^R R \quad (9)$$

which can be rewritten as

$$V^R = x(w - \theta) + \lambda \pi^R \gamma f(i^*)$$

in equilibrium, using (7).

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

$$\Omega = V^R - V^P = x(w - \theta) + \lambda \pi^R \gamma f(i^*) - [(w - i^*) + (1 - \gamma \pi^P) f(i^*)] \quad (10)$$

The individual will choose to be a rent seeker if $\Omega > 0$. Moreover, differentiation of above with respect to w , using $x > 1$, implies that the net utility from being a rent seeker is strictly increasing in the agent's wealth (see figure 1).

C. Equilibrium

In this section 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

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

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 (that is, $V^R(w^*, n^*) = V^P(w^*, n^*)$), $i^*(n^*) = i(\gamma\pi^P(n^*))$ from equation (5) and equations (3), (4), and (11) hold.

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

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

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 depends upon 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, (12) can be written as

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

Here $\Omega(w^*, n^*)$ is increasing in w^* and n^* so that the zero net utility curve is downward sloping in (n^*, w^*) space for $n < \tilde{n}$.

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

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

In this case $\Omega(w^*, n^*)$ is increasing in w^* but decreasing in n^* so that the zero net utility curve is upward sloping for $n < \tilde{n}$.

Consider now the case in which there is no rent seeking ($n = 0$).¹⁰ 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

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

For $w^C < \bar{w}$, as illustrated in figure 2, there is a unique rent-seeking equilibrium with $n^* > 0$.¹¹ A sufficiently low θ , and/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 to 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 $\frac{1}{2}$. 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 $w^C > \bar{w}$ 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 $\lambda\gamma$), as illustrated in figure 3, we can get multiple equilibria in rent seeking and production. One corresponds to an equilibrium with positive levels of rent seeking with $n^* > \tilde{n}$.

A second is an equilibrium with no rent seeking ($n = 0$). There is a third equilibrium with a positive level of rent seeking and production where $\Omega(w^*, n^*) = 0$. Such an equilibrium is unstable as a small change in n and w from their equilibrium values drives the economy to one of the two stable equilibria of positive or no rent seeking.

¹⁰ 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 .

¹¹ It is also possible for n^* to be less than \tilde{n} in figure 2.

In what follows, we assume that λ and γ are sufficiently high and/or θ sufficiently low, such that $w^c < \bar{w}$. To sum up,

Proposition 1. Under the assumption that the cost of rent seeking is low relative to expected returns, there is a unique equilibrium with a positive measure of agents engaging in rent seeking and in production.

It can be shown that in an equilibrium with rent seeking, it the relatively wealthy that choose this career path. Differentiating equation (12) while applying the envelope theorem establishes that it monotonically increases in an agent's wealth. This implies that when rent seeking and production offer nearly the same utility, the relative attraction of rent seeking to production increases with an increase in initial wealth (see also figure 1). This result is summarized in Proposition 2.

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

Proposition 2 states that the rich become rent seekers. Note that it is not higher wealth alone that creates incentives for wealthy agents to enter into rent seeking but also the ability to protect their wealth from expropriation by others (the slope of V^R is simply x).¹² 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 fixed cost, θ , in rent seeking and in the absence of credit markets, only relatively wealthy agents will choose to engage in rent seeking.

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 his (or her) decisions whether 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 weaker is property right protection (that is, higher γ), the more attractive does rent-seeking become as a profession and the less attractive does production get. 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^*).

¹² This slope will also depend on wealth if, for example, rents expropriated depends upon the rent seeker's own wealth as in Sonin, 2003.

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

III. 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, however, 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 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 engaging in 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 would be the tax required to finance a given level of enforcement. As a result, even with positive law enforcement, the implied tradeoff for producers between lower expropriation and higher taxes suggests that rent seeking will not be eliminated in equilibrium. However, an increase in γ would lower the attractiveness of entering into rent seeking activities.

Our results require two crucial assumptions, namely that there are indivisibilities in rent seeking and that rent seekers have access to a "protection" technology. This 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.

IV. 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 where individuals differ along two dimensions, their initial endowment (wealth) and ability as producers.¹³

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 $[\underline{w}, \bar{w}]$. An individual's ability is drawn *independently* from a cumulative distribution function $G(a)$ defined over $[\underline{a}, \bar{a}]$. The absence of correlation between wealth and ability introduces an interesting tradeoff 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

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

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

¹³ 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 upfront but a low-return x in period 2 plus, possibly, rent-seeking opportunities). The productivity of this investment does not depend upon 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 Murphy, Shleifer, and Vishny, 1992 and Acemoglu and Verdier's, 1998 result that rent-seeking is particularly costly because talented individuals spend time in rent seeking instead of more productive occupations.

$$i^* = i(a, \gamma\pi^p) \quad (15)$$

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

$$V^p = w + \left[(1 - \gamma\pi^p) af(i^*(a)) - i^*(a) \right] \quad (16)$$

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:

$$V^r = x(w - \theta) + \pi^r R \quad (17)$$

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

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

$$\Omega(w, a) = V^r - V^p = (x - 1)w - x\theta + \pi^r R - \left[(1 - \gamma\pi^p) af(i^*(a)) - i^*(a) \right] \quad (18)$$

which is increasing in wealth but decreasing in ability. Intuitively, the higher a person's productive ability, the more income he can enjoy as a producer while the higher his 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 his 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 clearly 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 a comparative advantage in production. Low ability, but wealthy, individuals 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 $h' > 0$.

This means the agent chooses to be a rent-seeker only if his ability as a producer is “low enough”, that is, $a \leq h(w)$. 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 $w \geq \theta$ 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 he can afford it. In order for him to do so, his wealth has to be high enough relative to ability so that it adequately compensates for the fixed costs of rent seeking, that is,

$$w \geq h^{-1}(\underline{a}) \equiv w^* \quad (19)$$

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

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

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

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

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 net 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) above.

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 for 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 it is sufficient that

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

or equivalently,

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

Given \bar{w} , this is more likely the higher is the productivity of the lowest ability type (\underline{a}), the lower is the return from hoarding (x), the higher the costs of becoming a rent seeker (θ) and 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.

Secondly, 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 afforded 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 was highly productive.

In general though, innate abilities (uncorrelated with wealth) will also determine an individual’s production possibilities. In this case which we analyzed above, positive rent seeking occurs in equilibrium. But the social costs of rent seeking are lower than before: first, a smaller measure of the population (with wealth exceeding θ) become rent seekers so that the deadweight loss is lower, and secondly, because these low-ability rent seekers do not cost aggregate output as much since their comparative advantage does not lie in producing.

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

If we allowed for ability differences too and intergenerational abilities were 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 due to high abilities, there will be a tendency for their low-ability wealthy offspring to engage in rent-seeking, and vice versa for dynasties starting out 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 to rent seeking, shifting them into production. But redistributing these tax revenues to the poor may be counterproductive if post-tax endowments exceed θ , since it raises their incentive to engage in rent seeking. A better policy would be to use the tax-revenues to subsidize production directly since it raises the return to investment for all.

Moreover, if the economy admits multiple rent seeking equilibria (figure 4), 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,¹⁴ once the 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.

V. CONCLUSION

This paper presents a simple economic model of rent seeking to examine the relationship 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 taxes from rent seekers by becoming rent seekers themselves, a result that accords well with both historical evidence and casual observation from developing countries.

¹⁴ If all agents could coordinate a simultaneous move to production, the threat of appropriation would disappear since there would be no rent seekers, and production would yield higher utility even to the wealthiest individuals.

The model implies that in the absence of property-rights protection, societies with a more unequal distribution of wealth and characterized by a small fraction of people who can afford entry into rent seeking will also be ones with greater social polarization and entrenched rent seeking by a few at the expense of the majority. At the other extreme, the model also suggests that societies where 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 involves lower social costs than when individuals have identical abilities.

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 of producers investing in defending their output from appropriation. Such investment could be entirely private or, more interestingly, publicly funded out of taxes. This will provide an interesting backdrop against which to study the endogenous evolution of property rights and how it changes with economic development and wealth accumulation. To do so, we will again need to move beyond our static framework with risk-neutral agents so that dynamic choices will depend more meaningfully on the evolution of wealth and production possibilities.

Figure 1. Occupational Choice

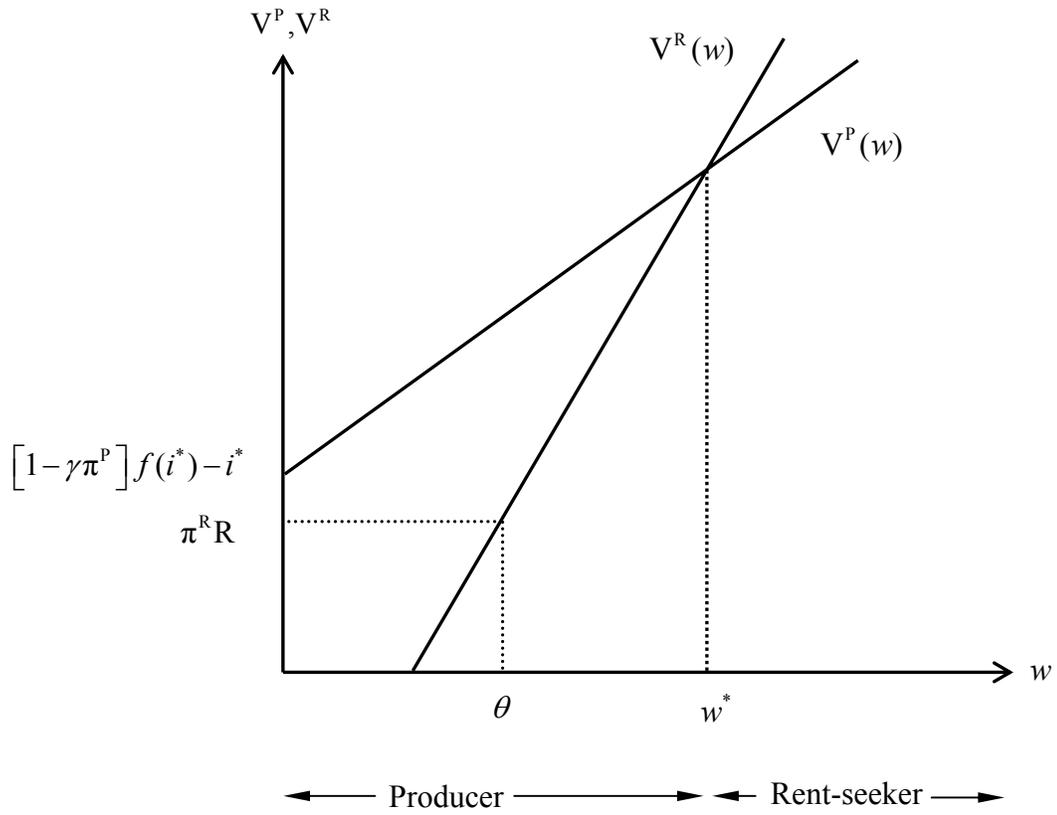


Figure 2. Unique Rent-Seeking Equilibrium

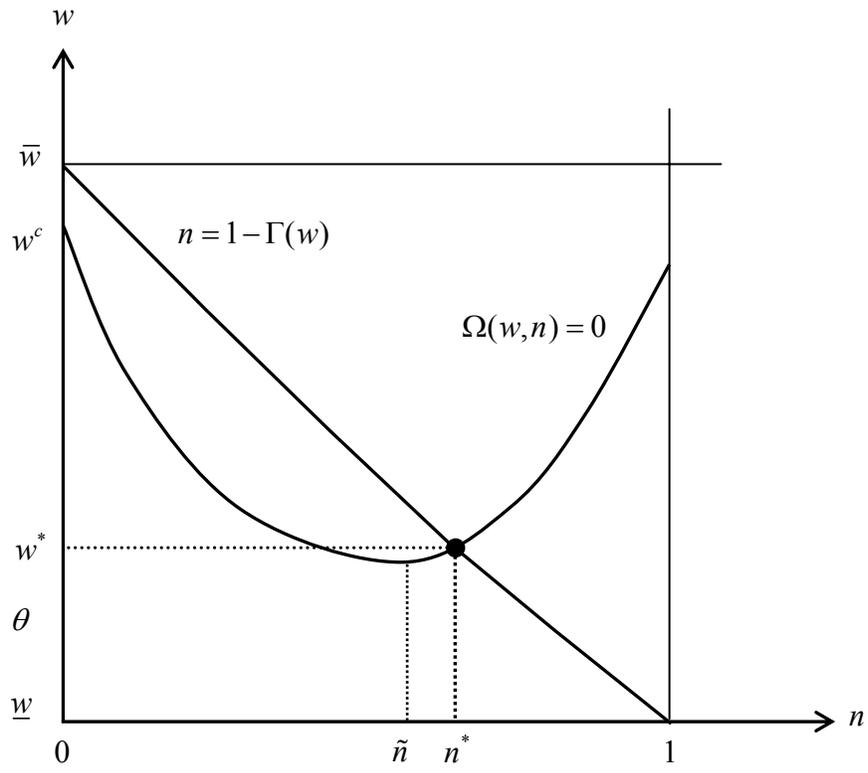


Figure 3. Multiple Rent-Seeking Equilibrium

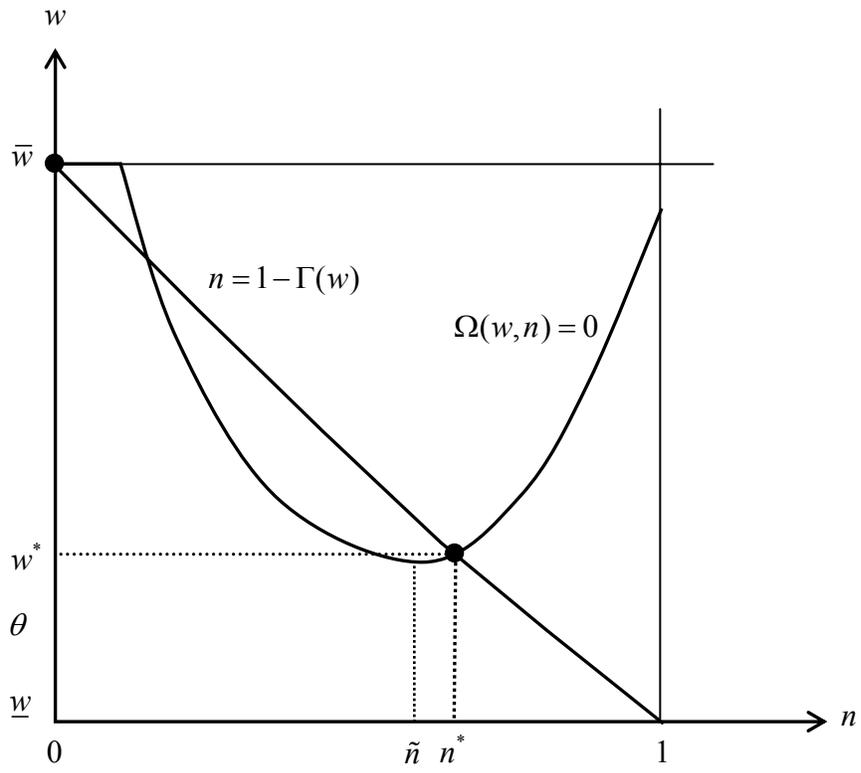


Figure 4. Occupational Choice When Abilities Differ ($a' > a$)

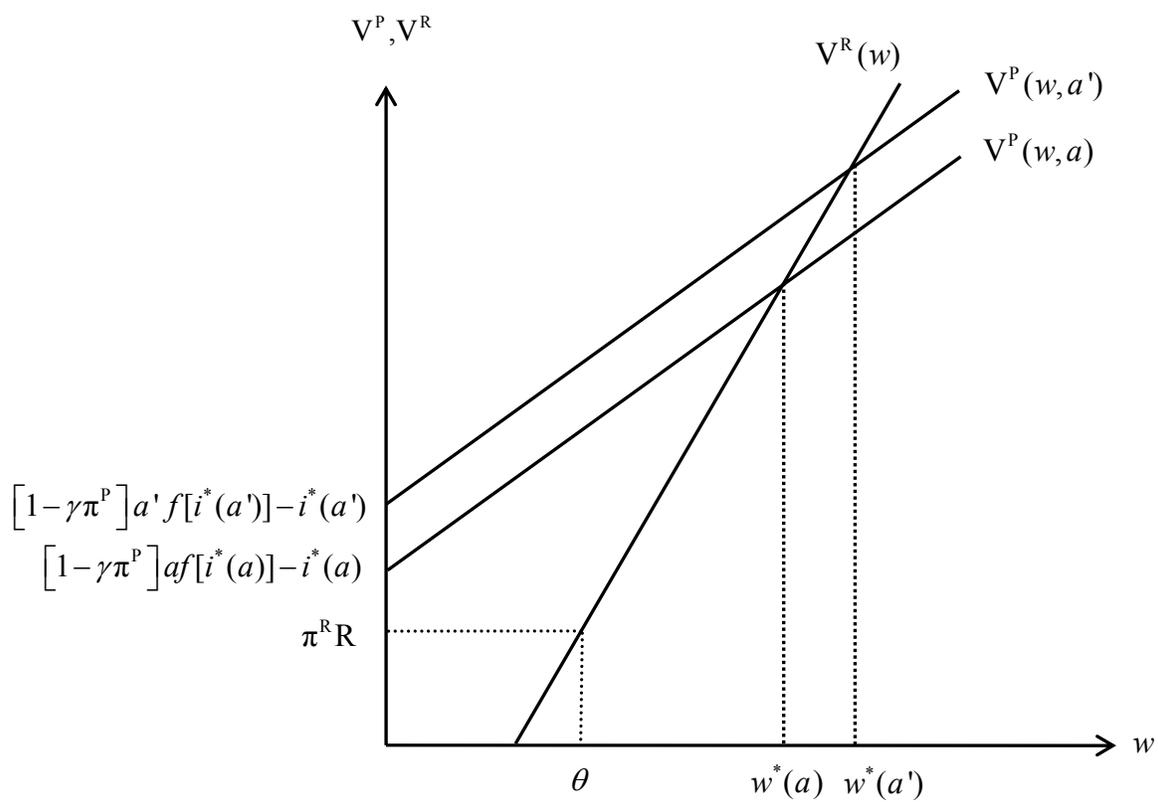
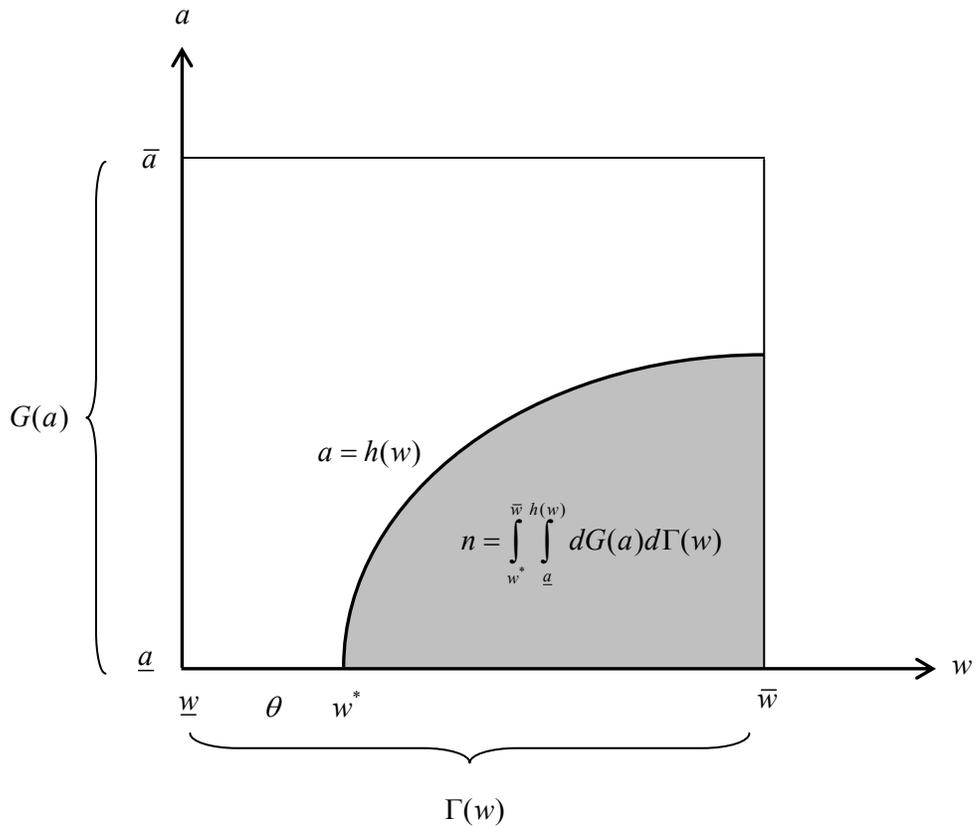


Figure 5. Fraction of Population That Becomes Rent Seekers When Abilities Differ



REFERENCES

- Acemoglu, Daron, 1995, "Reward Structures and the Allocation of Talent," *European Economic Review*, Vol. 39, No. 1, pp. 17–33.
- , and Thierry Verdier, 1998, "Property Rights, Corruption and the Allocation of Talent: A General Equilibrium Approach," *Economic Journal*, Vol. 108 (September), pp. 1381–1403.
- Aghion, Philippe, and Patrick Bolton, 1993, "Theory of Trickle-Down Growth and Development with Debt-Overhang," LSE Financial Markets Group Discussion Paper No. 170 (London, U.K.: London School of Economics and Political Science).
- Alfiler, Ma. Concepcion P., 1986, "The Process of Bureaucratic Corruption in Asia: Emerging Patterns," in *Bureaucratic Corruption in Asia: Causes, Consequences and Controls*, ed. by Ledivina V. Cariño (Quezon City: JMC Press).
- Baland, Jean-Marie, and Patrick Francois, 2000, "Rent-Seeking and Resource Booms," *Journal of Development Economics*, Vol. 61, No. 2, pp. 527–42.
- Banerjee, Abhijit V., and Andrew F. Newman, 1993, "Occupational Choice and the Process of Development," *Journal of Political Economy*, Vol. 101, No. 2, pp. 274–98.
- Baumol, William J., 1990, "Entrepreneurship: Productive, Unproductive, and Destructive," *Journal of Political Economy*, Vol. 98, No. 5, Part 1, pp. 893–921.
- Bénabou, Ronald, 1996, "Inequality and Growth," NBER Working Paper No. 5658 (Cambridge, Massachusetts: National Bureau of Economic Research).
- Braudel, Fernand, 1982, *Civilization and Capitalism 15th–18th Century* (New York: Harper and Row).
- Dabla-Norris, Era, and Paul Wade, 2002, "Production, Rent Seeking, and Wealth Distribution," in *Governance, Corruption, and Economic Performance*, ed. by George T. Abed and Sanjeev Gupta (Washington: International Monetary Fund).
- Downs, Anthony, 1957, *An Economic Theory of Democracy* (New York: Harper).
- Easterly, William, 2002, "Inequality Does Cause Underdevelopment: New Evidence," CGD Working Paper No. 1 (Washington: Center for Global Development).
- Engerman, Stanley L., and Kenneth L. Sokoloff, 2002, "Factor Endowments, Inequality, and Paths of Development Among New World Economies," NBER Working Paper No. 9259 (Cambridge, Massachusetts: National Bureau of Economic Research).
- Galor, Oded, and Joseph Zeira, 1993, "Income Distribution and Macroeconomics," *Review of Economic Studies*, Vol. 60, No. 1, pp. 35–52.

- Grossman, Herschel I., 1991, "A General Equilibrium Model of Insurrections," *American Economic Review*, Vol. 81, No. 4, pp. 912–21.
- , 1994, "Production, Appropriation, and Land Reform," *American Economic Review*, Vol. 84, No. 3, pp. 705–12.
- , and Minseong Kim, 1997, "Predation, Efficiency, and Inequality," NBER Working Paper No. 6301 (Cambridge, Massachusetts: National Bureau of Economic Research).
- Hall, Robert E., and Charles I. Jones, 1999, "Why Do Some Countries Produce So Much More Output Per Worker Than Others?" *Quarterly Journal of Economics*, Vol. 114 (February), pp. 83–116.
- Hoff, Karla Ruth, and Joseph E. Stiglitz, 2004, "After the Big Bang? Obstacles to the Emergence of the Rule of Law in Post-Communist Societies," *American Economic Review*, Vol. 94, No. 3, pp. 753–63.
- Huntington, Samuel P., 1968, *Political Order in Changing Societies* (New Haven: Yale University Press).
- Keefer, Philip, and Stephen Knack, 1997, "Why Don't Poor Countries Catch Up? A Cross-National Test of an Institutional Explanation," *Economic Inquiry*, Vol. 35 (July), pp. 590–602.
- , 2002, "Polarization, Politics, and Property Rights," *Public Choice*, Vol. 111 (March), pp. 127–54.
- Krueger, Anne O., 1974, "The Political Economy of the Rent-Seeking Society," *American Economic Review*, Vol. 64, No. 3, pp. 291–303.
- Levi, Margaret, 1988, *Of Rule and Revenue* (Berkeley: University of California Press).
- Mauro, Paolo, 1995, "Corruption and Growth," *Quarterly Journal of Economics*, Vol. 110 (August), pp. 681–712.
- Mehlum, Halvor, Karl Moene, and Ragnar Torvik, 2003, "Predator or Prey? Parasitic Enterprises in Economic Development," *European Economic Review*, Vol. 47, No. 2, pp. 275–94.
- Mookherjee, Dilip, and Debraj Ray, 2003, "Persistent Inequality," *Review of Economic Studies*, Vol. 70, No. 2, pp. 369–93.
- Murphy, Kevin M., Andrei Shleifer, and Robert W. Vishny, 1993, "Why Is Rent-Seeking So Costly to Growth?" *American Economic Review, Papers and Proceedings*, Vol. 83, No. 2, pp. 409–14.

- North, Douglass Cecil, 1981, *Structure and Change in Economic History* (New York: Norton).
- , and Robert Paul, 1973, *The Rise of the Western World: A New Economic History* (Cambridge: University Press).
- Olson, Mancur, 1971, *The Logic of Collective Action; Public Goods and the Theory of Groups* (Cambridge, Massachusetts: Harvard University Press).
- Rodríguez, C. Francisco, 1999, “Inequality, Redistribution and Rent-Seeking,” Department of Economics Working Paper (College Park, Maryland: University of Maryland).
- Skaperdas, Stergios, 1992, “Cooperation, Conflict, and Power in the Absence of Property Rights,” *American Economic Review*, Vol. 82, No. 4, pp. 720–39.
- Sonin, Konstantin, 2003, “Why the Rich May Favor Poor Protection of Property Rights,” *Journal of Comparative Economics*, Vol. 31 (December), pp. 715–31.
- Verdier, Thierry, 1996, “The Rise and Fall of Elites: A Theory of Economic Development and Social Polarization in Rent-Seeking Societies,” CEPR Discussion Paper No. 1495 (London: Centre for Economic Policy Research).
- Wade, Robert, 1984, “Market for Public Office: Why the Indian State is not Better at Development,” Institute of Development Studies Discussion Paper No. 194 (Brighton: Institute of Development Studies).
- World Bank, 2003, *Inequality in Latin America and the Caribbean: Breaking with History* (Washington: World Bank).