I. Introduction: Rent Seeking and Rent Extraction as Models of Competition and Politics

1. Last semester we spent some time developing the basic geometry and mathematics of election-driven models of public policy.

   A. We demonstrated that if 2 candidates attempt to maximize their votes and voters cast their votes based on candidate policy positions, there is a unique Nash equilibrium in which candidates converge to, namely the median voter's ideal point.

      i. This result allowed election-driven public policy to be modeled as the outcome of a single person's optimization problem--namely the median voter.'s--even if there are millions of voters.

      - We demonstrated that the median voter's preferred policy was partly a consequence of the tax system, her preferences, income, and ideology.
      - We also demonstrated that her ideal policy is not necessarily Pareto efficient.

      ii. Although less than ideal, it was often the case that the median voter's ideal point was "closer" to the Pareto efficient level than the initial private provision of public goods or externalities.

      iii. We also explored the effects of information costs on electoral outcomes.

      - Voters may suffer from rational ignorance and, therefore, fiscal illusion.
      - The effects of voter ignorance are offset partly by the "jury theorem" and by electoral competition.
      - However, when voters are not perfectly informed, interest groups may induce politicians to adopt policies that diverge from the median voter's ideal point.

      iv. In settings in which voters are imperfectly informed (rationally ignorant), politicians may trade off interest group support for campaign resources.

      v. Interest groups may also affect public policies through informational campaigns that attempt to persuade voters of the merits of policies that advance interest group goals (policies or profits).

      - (This might, for example, be said about a broad range of environmental policies, defense policies, and price supports for agricultural products, etc..)

2. This semester, we have spent more time on non-electoral models of public policy, especially regulations--what might be called the dark side of public policy.
   - Our initial focus was on the regulation literature, because that is where many of the original models were developed.
   - Those models were often of the "inter-election" variety, where politicians were assumed to be free from electoral constraints, or such constraints were represented indirectly through "consumer interests" or a welfare function of some kind.

3. The next block of this course focuses on rent-seeking and rent-extraction models of human behavior and politics.

   A. Its purpose is partly to develop some better models of interest group models and partly to explore some very general implications of rent-seeking and rent-extraction models that have implications that go well beyond interest group politics in democracies.

   B. The rent-seeking literature originated as a normative literature, because many of the ideas were developed with estimating the deadweight losses of monopoly in mind, but it has both normative and positive implications that are quite general and important.

   C. We will be generalizing and integrating a series of ideas developed by Tullock (1967, 1980), Olson (1965, 2000), Congleton (1980), and McChesney (1987, 1997).

4. To get a sense of some of these more general implications, consider Tullocks 1967 paper.

   A. Tullock's 1967 paper, on what was later to be called "rent seeking," characterized (dynamic) deadweight losses from interest group competition for privileges (monopolies and tariffs) and other activities (theft) that generate policy outcomes that reduce social welfare.

      i. There were several new ideas in his analysis, which can be generalized--although this was not really done by Tullock, and is not often done in the literature.

      ii. First, Tullock notes that obtaining monopoly privileges requires the use of resources.

      - That is to say, public policies do not arise costlessly. In many cases, firms and other interest groups have invested considerable time and effort to get a policy adopted.
      - In some cases this may entail illegal methods such as bribery, but in other cases it involves perfectly legal (and necessary) campaigns to persuade voters, candidates, and/or the bureaucracy of the merits of particular policies.

      iii. Second, Tullock notes that obtaining such privileges is often a competitive activity.

      - And in this context, he demonstrates (intuitively) that competition tends to increase the investment in rent-seeking activities.

      iv. Third, he argues that all of the resource devoted to political contests that produce deadweight losses should be considered a deadweight loss.

      - The resources used to alter public policies have an opportunity cost.

      v. Fifth, he suggests firms (and others) will invest resources in such political contests until the expected rates of return from "rent seeking" (an expression coined 7 years later by Ann Krueger) are approximately the same as in other activities. He argues that this implies that an amount approximately equal to the "rents" at state will be invested.

      - If those activities are wasteful, competition in this case reduces welfare!
      - **Competition is not always good**--as often argued by economists, biologists, and social Darwinians.

B. Anne Krueger (1974, AER) independently reinvented the idea and named the phenomena rent-seeking in a paper that estimates the deadweight losses from foreign trade preferences.
   - Richard Posner (1975, JPE) provides an empirical analysis of the dead-weight loss from rent-seeking by would-be monopolists in the US.
   - Both the Krueger and Posner estimates suggest losses that are far greater than those associated with the Harberger DWL triangles.
   - (Hilman and Katz [1984] provide the math behind Tullock's intuitive argument that the extent of the resources invested in rent-seeking contests for winner take all games. They characterize a mixed strategy equilibrium for such winner take all games.

C. In 1980, RD Tollison (with JM Buchanan and G Tullock) assembled a collection of papers on rent-seeking that included both "classics" and new research.

D. In that volume, Tullock (1980) suggests that the "full dissipation" model is really a special case of a range of possible rent-seeking contests, that may vary with number of participants and may use a variety of technologies.
   - He explores a lottery version of rent-seeking games, which has become known as the Tullock Contest Success Function (or simply as the Tullock payoff function.)
   - He also explores the effects of economies of scale and diseconomies of scale in rent-seeking technology--given that payoff function.
   - [The "lottery-like" character of this function and some of its basic properties were breifly coverred last semester and are developed below in somewhat greater detail.]

5. Congleton (1980, my first solo publication) suggests that ideas from rent-seeking can be generalized to examine whether and the extent to which losses are generated from competitive processes.

   i. In what may be counter intuitive for economist and biologists, competition is not always a good thing, but rather depends on the rules (institutions) that frame the game.
   - Market competition is "efficient" because it is induced by "good" rules.
   - Note that competition in this sense is quite different that competition in the usual economic or biological sense.
   - [Explain why.]

   ii. This section of the course can be thought of as a generalization and extention of that old paper.

II. The Essential Mathematics of the Tullock "Contest Success Function"

1. The most widely used model of rent seeking activity represents the process as one analogous to a lottery.

   A. That is to say, the process through which government prizes are awarded is considered to be so complex, that it is best to think of it as a stochastic rather than a deterministic process.
      - A wide variety of unpredictable personalities and events may ultimately determine who gets which prize.

- Efforts to secure the favor of voters, politicians and bureaucrats often fail, but one expects greater efforts to improve one's odds of success in a manner analogous to the purchase of lottery tickets.
- [In political settings, the size of the prize may also be determined through a similarly complex process, but we'll ignore that at first.]
- [Note that there are lots of nonpolitical settings in which people use resources to attempt to win some prize, as with patent competition among scientists, civil law suits, and training to win sports events and/or college scholarships.]

B. Lottery games have three nice properties as a model of interest group activities and other competitive arenas in which resources are used by the competitors.

i. The more resources player I invests, the greater are his chances of winning.

ii. The more resources his opponents invest, the smaller is his chance of winning.

iii. There is a clear, computable, Nash equilibrium in pure strategies that can be calculated.

- That equilibrium allows comparative statics to be undertaken and also serves as a "mechanism" for exploring the effects of changes in the rules of the game.
- In general the model is compatible with the intuition that it is the better prepared and more widely heard arguments that win the debate.
- However, there are exceptions.

iv. As a first approximation, investments in a political influence game, investments in the political influence can be modeled as if they were purchases of lottery tickets.

- [Real world lottery games are often profitable for their sponsors. What, if anything, do such contests imply about investments in rent-seeking contests?]

v. The profits (rents) which may be obtained through governmental privileges or favors--tax breaks, protection from foreign competition, contracts at above market rates etc.-- are the prize allocated through the lottery mechanism (lobbying).

2. An Illustrative Rent-Seeking Contest

A. Suppose that N risk neutral competitors participate in a rent seeking game with a fixed prize, Π.

i. Each player may invest as much as he wishes in the political contest.

ii. The prize is awarded to the player whose name is "drawn from a barrel" containing all of the political lottery "tickets." So, the expected prize for player i is

iii. $\Pi[R_i / (R_i + R_o)]$,

iv. where R is the value of the prize, R_i is the investment in rent seeking by player I and t_o is the investment by all other players.

v. If the rent seeking resource, R, cost C dollars each, player 1's *expected reward* for a given purchase by all other players can be determined by:

- $\Pi_i^e = \Pi[R_i / (R_i + R_O)] - CR_i$

vi. Differentiating with respect to Ri and setting the result equal to zero allows the number of tickets that maximizes expected income to be characterized:

- $\Pi [1 / (R_i + R_O) - R_i / (R_i + R_O)^2] - C = 0$

vii. This implies that: $\Pi [R_O / (R_i + R_O)^2] - C = 0$ or

$$\Pi R_O / C = (R_i + R_O)^2$$

- Applying the quadratic formula implies that Player 1's best reply function is

$$Ri^* = -Ro \pm \sqrt{(\Pi R_O / C)}$$

- (Only the positive root will be relevant in cases where Ri has to be greater than zero.)

viii. In a symmetric game, each player's best reply function will be similar, and at least one equilibrium will exist where each player engages in the same strategy.

B. One can easily extend this model to contests with more than 2 players.

i. In the **more general case**, with more than 2 players,

$$\Pi_i^e = [(Ri)/\Sigma R_j] [\Pi] - R_i C$$

ii. A first order condition similar to the above can be derived for a typical player in the contest, say player "i", where R_0 is interpreted as the efforts of all other players.

- $Ri^* = -Ro \pm \sqrt{(\Pi R_O / C)}$

iii. If there are N-1 other players than "i,"

- at the symmetric Nash equilibrium, $R_i^{**} = R_j^{**}$ for all "i" and "j."
- which implies that $Ri^{**} = -(N-1)R_i^{**} \pm \sqrt{(\Pi (N-1)R_i^{**}/C)}$.
- which implies that $NRi^{**} = \sqrt{(\Pi (N-1)R_i^{**}/C)}$

iv. or squaring both sides, dividing by Ri^{**} and N^2 and gathering terms, that:

- $Ri^{**} = [(N-1)/N^2] [\Pi/C] = [(1/N) - (1/N^2)] [\Pi/C]$
-
- For example if N = 2 and C = 1, $Ri^{**} = (\Pi/4)$, as above.

v. Total rent seeking effort is N times the amount that each player invests

- Thus in the two person unit cost case, total investments equal: **R** = $\Pi/2$.

- In the 2 person case, half of the value of the prize is consumed by the process of rent seeking.
- However, in the N person case, as N approaches infinity, the total investments approach the value of the prize. (If these efforts are socially wasteful, then the entire prize is "dissipated" b the competition.
- [Draw an illustrating figure of the two person equilibrium.]

vi. The effect of entry on individual and total rent seeking expenditures can be determined by inspection or by differentiation the results above above with respect to N.

- Note that the later is analogous to the usual result in a Cournot representation of competition in imperfect markets. In that game there is also a prize--industry profits--although it is shared rather than won by a single player in a lottery. And competitive efforts (price and output competition) are assumed to be costless, but the end result is very similar. Profits from participating in the game approach zero in the limit.

C. It is clear that individual contributions fall as the number of rent seekers increase, but also clear that the total amount of rent seeking "dissipation" increases.

i. In the limit, as $N \Rightarrow \infty$ the total rent seeking investment approaches the level where the value of those resources, RC, equals to the entire value of the prize,

$$\mathbf{R}^{**} C = [\Pi/C] C = \Pi.$$

ii. The effect of increases in the cost of participating in the political influence game and/or changes in the value of the regulation to the rent-seeker can also be readily determined in this game.

3. This basic model can be generalized to cover cases where the prize is endogenous and where the probability of securing the prize varies, and to cases where the prize is shared rather than awarded to a single "winner take all" winner.

A. For example, $R_i^e = P(R_1, R_2, ...R_N)\Pi_i(\mathbf{R})$ encompasses many of these features.

B. The affects of economies of scale may also be examined in this general framework and in the earlier explicit one.

C. The rules of the game can be varied to produce different kinds of investments and levels of investments (as with sharing rules rather than winner take all contests).

4. Note that the basis logic of consuming resources in competitive contests applies to a wide variety of settings, including many in which the lottery "winner take all" model is not the best one to apply.

A. Analysis of rent-seeking contests does not require the game to be a one-stage lottery contest.

B. A wide variety of contest success functions can be analyzed.

C. Moreover, the logic of the model applies to a wide range contests, not simply political contests for favor.

5. As a consequence, models of rent-seeking contests can be used to analyze **a very broad range** of competitive environments and competitive processes.

   i. Among these as mentioned briefly above are arms races, patent races, competition in the Olympics, status games, political contests, civil court contests, the Hobbesian Jungle, etc. etc.

   ii. Surprisingly little empirical work in labs or in the real world has been undertaken with rent-seeking in mind.

   - A few lab experiments are included in the Congleton, Hillman, and Konrad collection (2008).
   - Laband and Sophocleus (QJE 1992) estimates the extent of resources used in conflict (to obtain or avoid transfers) accounted for about 25% of GNP.
   - Although, some indirect evidence of the effects of rent-seeking on international growth are indicated by corruption literature, which is more or less based on rent-seeking models. (That is to say, corruption is the illegal portion of rent seeking.)

   iii. Essentially, any time claims over a resource, policy, or prize are "contestable," conflict of the sort analyzed by Tullock's contest success function is likely.

   - This includes conflict within and among organizations.
   - (Of course, this particular function is not the only one that can be used, but it helps to identify the characteristics of games in which resources are used in settings of conflict.)

III. Rent Seeking and Interest Group Politics

1. The rent-seeking literature really took off in the 1980s after an edited volume on the Economics of the Rent Seeking Society by Buchanan, Tollison, and Tullock.
   - That volume essentially defined the economics literature on rent seeking.
   - It included Tullock's efficient rent-seeking paper where the mathematics above was first worked out.
   - It included pieces on economic history that argued that rent-seeking activities are long standing parts of European and other societies--not a post world war II invention.
   - The book also included methodological pieces that attempt to define what is and what is not rent seeking.
   - (Your professor's first solo published piece of research was also published in that book.)
   - That book helped focus attention on a wide variety of issues associated with rent seeking and so helped accelerate its development.
2. With respect to politics, the rent-seeking approach implies that essentially any change in policy may involve dead weight costs, because such changes take time and effort.

   A. Any time the result is a policy with deadweight losses of the static Harberger variety, rent-seeking efforts should be added to the deadweight cost of those policies.

   i. Most of this literature and essentially all of the "pop" literature on rent seeking focuses on interest group politics.

ii. It argues that all interest group investments should be counted as a dead weight cost along with the ordinary (Harberger) dead weight losses from the policies adopted.

iii. When politics is about redistsribution (as claimed in the Peltzman model) politics, from this point of view, becomes a great black hole sucking up societies resources in unproductive games of conflict.

- There are many cases in which such a model may be reasonable: for example in contests over tax preferences, farm subsidies, many urban subsidies, even subsidized college education (surprisingly).
- A good deal of public policy seems to favor the rich and "well connected," which suggests that rent-seeking is an important aspect of public policy formation.
-
- I suspect that this perspective is partly a consequence of an ideological bias, although it could be simply a "rule of thumb."

B. Some competitive settings, as in markets and in productive areas of politics, actually produce benefits for outsiders--consumers and voters.

i. The "all interest group activities are instances of rent seeking" case is only correct if policies can be argued to have changed for the worse, because of interest group activities.

ii. When a policy is improved by interest group activities, however, the costs of rent-seeking activities should be subtracted from the benefits to assess whether SNB have actually increased or not.

iii. (Note that this "political transactions cost" implies that a "sub-optimal" policy may actually be optimal, in terms of SNB, given the cost of actually inducing the improvement.)

C. In addition, the method of rent-seeking matters.

- It makes a difference whether the resources are truly consumed or not by the contest--as with time and energy.
- If no resources are "consumed" by the process of competition, or the process generates benefits, then rent-seeking losses are smaller than the amount invested in the contest.
- On the other hand, time and energy are often consumed in lobbying contests, while producing little of value.
- In warfare, perhaps the most destructuve rent-seeking contest, enormous quantities of resources are consumed in conflicts over more or less fixed resources (land and sea).

D. Note that simply auctioning off a "privilege" tends to capture revenues for the government, which can be used to fund other programs or reduce taxes--and would have relatively little rent-seeking costs associated with them.

i. This idea, although usually not linked to the rent-seeking literature, helped to generate a long series of papers.

ii. Some theorists regards the classic rent-seeking game as an "all pay" auction, although this is not what most "auction" models assume.

iii. Normally, in an auction, only the high bidder pays.

- Here, one should note that a series of papers were inspired by Grossman and Helpman (1994, AER, "Protection for Sale"), which uses an menu-auction model of interest group politics.
  - The model is many ways similar in spirit to the Peltzman model discussed earlier in that policy makers are presumed to trade off an ideal policy (utilitarian SW max) for money.
  - In a typical Helpman-Grossman paper, "rent seekers" offer bid schedules of money (or political support) to obtain distorting favors on one kind or another (trade protection).
  - The high bidder wins.
  - The mathematics of bidding "functions" rather than "amounts" is somewhat complicated and most of this literature relies on the menu auction equilibria analyzed by Bernheim and Whinston (QJE 1986).

iv. Hillman and Katz (EJ, 1984) had previously analyzed equilibrium in "high bidder wins" winner-take-all rent-seeking contests.

- They demonstrate that a mixed-strategy equilibrium exists in which full dissipation (on average) occurs if contestants are risk neutral. (Somewhat less dissipation occurs if contestants are risk averse.)

v. If rival groups simply bid for trade protection of one kind or another, and the bids are the main costs, then there are essentially no deadweight losses--although contestants still dissipate much of the prize through their efforts, the dissipation is captured by other persons.

- (Note, however, that there are rarely any open auctions for public policies, although in some regimes [especially authoritarian ones] there may be "private" auctions, in which well-connected elites compete for government contracts, partly through bribes and the like.)

vi. Similarly, if the lobbyists and those lobbied gain some benefits from the lobbying process (nice lunches etc) than those benefits should be subtracted from the amounts invested to get a measure of the net costs of rent-seeeking (Congleton, 1988).

- Sobel and Garrett (2002) suggests that restaurant businesses in capital cities tend to be larger than they would other wise have been, because of the "rent-seeking" industry.
- [To what extent can this "distortion" be regarded as a rent-seeking cost?]
- [Should the entire increase in the size of the restaurant businesses etc be counted as a loss?]
- [If interest group activity always favors "privileges" and "redistribution," but much of it is invisible, the Sobel and Garrett paper may be used to get a sense of the size of the rent-seeeking industry and of the transfers of wealth (or CS) involved--even if relatively little of the expansion of the restaurant-entertainment industry is a true waste.

vii. Tullock (1985) suggests that many of the models of rent-seeking must be wrong because the industry is far smaller than it predicted and rates of return from rent-seeking far higher than it should be.

IV. Competitive Process, Institutions, and Competitive Waste

1. **Summary:** losses from rent-seeking activities arise for four reasons:
   - (1) the process used to influence one's probability of winning a prize (or share of a prize) is costly.
   - (2) The process used to increase one's probability of success does not itself not generate value. [Much of the rent-seeking literature stresses the redistributive consequences of such political games.]
   - (3) Investments in such contests tend to diminish the effectiveness of other contestant efforts. [There are negative externalities among competitors.]
   - (4) The prize itself generates losses for those outside the contest.
2. Notice that assumptions (2) and (4) are critical to the conclusion that rent-seeking always generate deadweight losses.
   - **i.** If true, a 90% reduction in each player's efforts will reduce the extent of resources consumed by the contest, without affecting anyone's expected net benefits, and freeing those resources for other uses.
     - Note that this implies that GNP measures are incorrect whenever they include deadweight losses from rent-seeking.
     - GNP would be higher (eg more value would be added) if those resources were released for other purposes--even if the number itself does not change.
     - [Note that including rent-seeking expenditures in GNP tends to make gross national product higher than it really is.]
   - **ii.** If assumptions 2 and 4 are not true, then the benefits generated by the contest have to be taken into account.
     - For example, in the case of markets, competition produces benefits for consumers equal to or greater than the competitive losses of firms.
     - If productive forms of competition are induced, competition can be good--indeed very good. (as in competitive markets)
     - If unproductive forms of competition (or destructive ones are generated), then competition can be bad--indeed very bad. (as in the Hobbesian jungle, or nuclear arms race)
   - **iii.** Nonetheless, even if assumptions 2 and 4 do not hold, **the merits competition can not be taken for granted** but have to be analyzed on a case by case basis.
     - The "naive" hypothesis that competition is always good--requires assumptions about the institutional setting that competition takes place in.

iv. Whether competition is good or bad, depends on the particular rules of the game, because those rules determine the extent and kind of conflict that takes place.

3. The rules of many rent-seeking contests are often very stable and can be regarded as institutions.

   A. The rules of the game: including the rules that determine the kinds of efforts required to influence policy, the number of persons or groups eligible for such contests, the distributional rules through which rents (privileges) are to be distributed, and whether the contest takes place in one or more rounds.

   B. Such rules indirectly determine the rates of return among alternative activities by rewarding particular activities undertaken by potential rent-seekers.

      - In sports, the rewards go to persons who can jump the highest or run the fastest, and competitors invest large parts of their lives in learning and training to run faster or jump higher.
      - In most political environments, building well connected networks generate privileges, and so competitors invest in the skills of network building and in building the networks themselves.
      - Note both sorts of contests consume a good deal of resources, and by rewarding some activities more than others induce competitors to make particular investments.
      - Note that both sorts of contests may also produce spill-over benefits (or costs) for those outside the game--and it is possible that players enjoy the game itself--at least to some extent..

4. The rent-seeking literature sheds (indirect) light on the effects institutions by making different assumptions about the rules of rent-seeking contests: winner take all, prize sharing games, multiple stage games, asymmetric games, etc.
      - [See the Congleton, Hillman, and Konrad collection for a broad range of results for a very broad range of rent-seeking contests.]

   A. Generally speaking, the losses from games where the rents are shared are below those in games where the rents all go to a single victorious group or individual.
      - The losses from political rent-seeking games can be considered **special cases** of the "waste" generated by the use of resources in *nonbeneficial competitive processes.*
      - See Congleton (1980) for an early analysis of how losses from rent-seeking contests in which rents are shared by the contestants.

   B. The rules of the game can also encourage the use of rent-seeking technologies which minimize their cost, or cause the process of rent-seeking to confer benefits of some sort on other parties.
      - If the rules, eligibility criteria, discourage opposing efforts from potential losers or from potential beneficiaries of similar policies (others who might also secure monopoly power), resources invested in the political influence game tend to decrease.
      - [See Congleton 1980 for a few fairly straightforward illustration of how the rules affect the extent and kind of rent-seeking that takes place.]

5. The basic structure of rent-seeking political influence games applies to a wide range of competitive contest, including, for example:

   i. attempts to maximize personal status. See various works by Robert Frank, including his book (1995) on positional and relative income games and winner take all games (2010). Also see my JEBO (1989) piece on status seeking as a comment on some of Frank's earlier work.

   ii. Advertising campaigns in the private and public sectors.

   iii. Contests within courts.

   iv. Many forms of terrorism and anti-terrorism.

   v. Nuclear arms races.

   vi. the Hobbesian jungle.

   - Do all the resources invested in such nongovernmental contests generate rent-seeking losses? Why or why not?

V. Rent Extraction: Creating and Designing Rent-Seeking Contests

A. Most of the rent-seeking literature takes the "rules of the game" as "given," and analyzes the implications of those rules.
   - The rules are exogenous in most rent-seeking papers.
   - The prizes are exogenous in most rent-seeking papers.
   - The players are also exogenous in most rent-seeking papers.

B. A much smaller series of papers on rent-extraction inspired by McChesney (1987) analyzes the kinds of rules that persons with the ability to create such contests would create.

   i. For example, McChesney argues that politicians actively develop rent-seeking games as a method of "extracting" rents from firms and other interest groups.

   ii. One of the main contributions of the rent-extraction literature is where rent-seeking contests come from?
   - It suggests that they are not simply accidents of government policies--as often assumed by the rent-seeking literature.
   - Rather the rent-extraction literature suggests that they (most?) are designed by governments, firms, etc. for some purpose, e.g. to extract rents from the rent seekers.
   - If so, the rent-seeking contests that we observe should share a number of properties.
   - (If only a subset of such contests are designed and the others are accidents, then there should be systematic difference among games that are only partly explainble by the interests and constraints of game designers.)

   iii.

iv. If rent-seeking contests are desiged, then they should be relatively efficient ways of "extracting" services, gifts, and case from those in the contest, or from society at large.

- (Awarding the king's daughter to the Knight who wins a jousting tournament will call forth more effort among the jousters and may make the tournament more interesting.)
- A contest for monopoly privileges will induce a good deal of effort from those who want to gain the monopoly and also from those who do not want to lose their businesses by being excluded from the market.

♦ Rent extraction in such cases provides a source of government revenues, which substitute for or complement ordinary taxation (Congleton and Lee 2009).

C. Methods through which governments may extract rents include the creation of all kinds of barriers to entry and also simple extortion.

i. Politicians who need resources to conduct their reelection campaigns may threaten firms or unions with unfavorable legislation and agree to forgo such legislation in exchange for political support or campaign contributions.

- The maximal extent of such efforts depends on political feedback loops, which in turn depend on the extent to which "the public" knows of such activities.

ii. Note that this argument is the **opposite of the Stigler argument** that suggests that firms manipulate the state to obtain policies that generate rents for them (eg. entry barriers of various kinds).

- Here it is the state that is the beneficiary of the rents and the first mover.
- Firms in the McChesney world are exploited rather than the expoiters.

D. Again, rent-extraction seems more likely in authoritarian states, than in democratic ones. Authoritarians confront fewer constitutional constraints than elected officials do. In addition, the median voter rarely benefits from rent extraction and there are generally fewer secret transactions in democratic states.

♦

♦ Rent extraction may be regarded as a form of corruption and/or agency problem.

♦ Indeed, **corruption can be defined as the illegal forms of rent** seeking and rent extraction.

♦

E. Again, it bears noting that other persons and organizations also create and design rent-seeking contests that they expect to profit from.

i. For example, an organization that gives away a prize based on particular criteria is trying to induce investments into a particular contest.

- Firms often create competition within their organizations for a prize.
- The aim of the latter is often to increase productivity and/or extract "rents" from their labor force.
- Criminal gangs often extort payments from potential victims.
- [Which, if any, of the above are likely to be cases in which the games generate a DWL?]

VI. Some Models of Rent Extraction: Net Income Maximization as the Motivation for the Policies of a Secure Dictatorship (Buchanan and Brennan 1980; Olson 1993, 1996, 2000)

1. The coercive theory of the state is the most straightforward, and surprisingly is the more recent of the two theories of the state to be studied by public choice theorists.

   A. Secure dictators can be thought of as **rent-extracting or profit maximizing regimes**, insofar as dictators attempt to maximize their wealth or maximize their resources available for resisting revolutions.

      -
      - The effects of systematic rent-extraction through the creation of rent-seeking contests has only begun to be addressed.
      - See Congleton and Lee (2009) for analysis of how a rent-extracting regime would create rent-seeking contests.
      - (We will work through some of the mathematics of such regimes in a future lecture.)
      - North, Wallis, and Weingast (2009) call such states: "natural states."
      -

2. Dictatorships have, until recently been the most common form of government.

   A. Conversely, democracies have historically been a very small minority of the governments in existence.

   B. Thus dictatorships are an important type of government to analyze and also, as it turns out a fairly easy one to examine.

      - In spite of this, surprisingly little work has been done on dictatorship.
      - Tullock (1974, 1987) may be said to have initiated this literature.
      - Buchanan and Brennan (1977) discuss how one might attempt to constrain a tax revenue maximizing state using models that look like dictatorship models--although they intend ths to reflect any government that attempts to maximize tax revenue.
      - Wintrobe (1998), and Olson (1993, 1996, 2002) are the usual Public Choice references on the dictatorship literature.
      - As noted above, North, Wallis, and Weingast (2009) provide a more textured analysis of dictatorial societies in which a dictator and elite supporters extract societie's rents (although they do not use the rent-extraction vocabulary).
      - See also Bueno de Mesquita, Smith, Siverson, and Morrow (2005) for a game theoretic analysis of "riding the tiger" eg staying in authority.

3. The Buchanan-Brennan-Olson-McGuire model of dicatorship simply assumes that a dictator exists and models the fiscal policies that a profit maximizing dictator would adopt.

   A. The assumed behavior of a secure dictator is analogous to that of a slave holder in the old south, except that the plantation can not be sold.

   B. It turns out, however, that a revenue maximizing dictator's interest in tax revenue leads him to provide public goods that increase national wealth (taxable wealth) and to tax at less than 100%.

   C. The latter implies that his subjects share in any prosperity induced by the dictator's public policies.

   D. And, moreover, insofar as the dictator can not fully capture the fruits of his subjects' labor, the "ruled" are made better off by the dictator, at least relative to what they would have realized under Hobbesian anarchy. That is to say, the conquered parties realize greater net of tax income than required for subsistence. (Of course, their alternative state might not have been the Hobbesian jungle.)

4. (Note that security interests may make a dictator less interested in the interests of groups whose support is difficult to obtain at the margin or if he has a short time horizon.)

5. The simplest model is one where the dictator acts as an income maximizing Leviathan (as assumed in Brennen and Buchanan, and in Olson and McGuire).

   A. A secure dictator, whose rule is unchallenged by potential rivals or invaders, will select tax and expenditure policies to maximize his income:

      - $Y = t\,Ny(G,t) - c(G)$
      - where y a function representing *average* or per capita national income and N is the number of subjects within the kingdom. Average income rises as G increases and falls as t increases. t is the tax rate and G is a national service that costs c(G) to provide.

   i. First order conditions of ii characterize t* and G* for the dictator.

      - $Y_t = t + tN\,y_t = 0$ at t* e. g. given G* set t to maximize tax receipts
      - $Y_G = tNy_G - c_G = 0$ at G* e. g. given t* set G to maximize tax receipts

   ii. Because the tax base can be increased by services, and the dictator has an interest in the tax base, he can be said to have an encompassing interest in the wealth of his subjects. After all that is where his taxes come from.

   B. On the other hand, this is not a complete encompassing interest.

   i. Note that *G tends to be underprovided* by the dictator insofar as he receives less than the complete marginal benefit from the service.

   ii. The national income maximizing level of government services requires

      - $Ny_G - c_G = 0$ not $\mathbf{t}Ny_G - c_G = 0$
      - the marginal benefits from government programs should be set equal to the marginal cost of G.

6. **Practice Problems**

   i. It bears noting that two dictators can be worse than one.

   ii. To see this consider the case of two toll collectors on the Rhine.

   iii. Each knows that the shipping along the river increases as public services are provided and falls as tax rates (tolls) increase other things being equal.

   iv. Let shipping be simply $S = K - b(t_1+t_2) + c(G_1 + G_2)$ and net tax revenue be $T_i = t_iS - c(G_i)$

   v. Holding public services constant ($Gi = k$) determine each river baron's optimal tariff rate. (Assume that neither river baron knows what the other is doing.)

   vi. Compare this rate with that under a single ruler.

   vii. Now, hold taxes constant, and determine the public service levels that will be forthcoming under the two vs. single river baron cases.

VII. On the Rent Extraction by Well-Run Authoritarian States: Rent Extraction as a source of Revenue (from Congleton and Lee 2009)

1. Consider the case in which national government is independent of its citizens--as in a pure authoritarian regime--and interested in maximizing long term revenue from "its" country.

   A. Suppose that it can tax its people and/or sell off monopoly privileges.

   B. The latter can be done explicitly and also implicitly, by determining the general extent of monopoly power, M, through broad polices such as anti-trust enforcement.

   C. A government's net revenues, N, in this case can be characterized as:

$$N = y(G, M, t, L, R)\, t - c(G) + \alpha r(M) \qquad (1)$$

   D. Where y is the national production function, G is the government service level, M is the degree of monopolization encouraged, L is the exogenous labor stock, R is the exogenous natural resource base, t is the proportional sales or income tax, c(G) is the cost of government services, and $\alpha r(M)$ is the revenue generated from would be monopolists. N is assumed to be strictly concave.

   E. Differentiating with respect to government service level G, t, and M, allows us to characterize the net revenue maximizing combination of government services, tax rates *and monopoly policies*.

$$tYt + Y = 0 \qquad (2.1)$$

$$tYG - CG = 0 \qquad (2.2)$$

$$tYM + \alpha rM = 0 \qquad (2.3)$$

   F. Subscripts denote partial derivatives of the variables subscripted.

2. The revenue maximizing government selects its policies over government services, tax rates, and monopolization policies to satisfy the three first order conditions simultaneously.

   A. Equation 2.1 implies, as in the Buchanan-Brennan model, that tax rates will be set to maximize tax receipts (with ideal government service levels and monopolization throughout the economy).

   B. Equation 2.2 implies, as in the Olson-McGuire model, that productive government services will be provided by a revenue maximizing dictatorship up to the point where marginal tax revenues equal the marginal cost of those services.

   C. It bears noting that Leviathan produces *fewer* government services than required to maximize national income when optimal marginal tax rates are less than one hundred percent.
      - (The later reinforces the Buchanan-Brennan argument favoring progressive income taxation under Leviathan.)

   D. Equation 2.3 implies that *monopolization will be encouraged* up to the point where the marginal loss of tax receipts equal the marginal gains from rent-seeking receipts induced by those policies.

      i. A net revenue-maximizing Fisc has a direct interest in the industrial organization of its domain that is not entirely benevolent.
      - The marginal increase in revenues generated by increased monopolization, αrM , varies with the institutional setting, characterized by α, and with the extent to which increased monopolization induces rent-seeking by would be monopolists, rM.
      - The marginal cost of inducing rent-seeking revenues varies with effectiveness of the tax system, tYM , and the rate at which national income is reduced by the monopoly grants conferred, YM.[1]

      ii. Given optimal government service levels, G*, and tax rates, t*, equation 2.3 implies that the larger is the marginal increase in rent seeking revenues received by those with policy making power and the smaller the marginal tax loss, the greater is the government's ideal extent of monopolization.

   E. It bears noting that the inequality forms of equation 2.3 allow the possibility of two corner solutions.[2]

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[1] We interpret t as the effective tax rate, which may differ from both the statutory tax rate and the marginal tax burden. Opportunities to avoid paying taxes vary with the ability of the Fisc to police the tax law and opportunities to legally avoid paying taxes. It also bears noting that in some tax systems, tax revenues may actually increase as monopoly profits increase. For example, sales, value added, and profits tax revenues tend to increase as prices and monopoly profits increase. In such cases, rent-seeking possibilities may be expected to affect the choice of tax system as well as the degree of monopolization. We leave consideration of Leviathan's preferred tax *system* for future analysis. The income-based tax used in our analysis has been widely used in previous Leviathan models.

[2] We assume that the Fisc's objective function is strictly concave and that his constraint set is convex; consequently the Arrow Enthoven sufficiency conditions are satisfied. These imply that the corner solutions to the optimization problem with inequality constraints can be completely characterized using the Kuhn-Tucker first order

F. First, there is a corner solution where no inefficient monopolization takes place.

G. National income maximizing monopoly policies are adopted when the marginal tax cost of rent seeking is larger than marginal receipts, $- tYM > \alpha rM$, for all M.

i. In this case, the Fisc's "encompassing interest" in the size of the tax base causes monopoly power to be allowed or promoted only insofar as it adds to national income.

ii. Tradable copyrights, patents and exclusive land grants might be created, but other monopolies would be prevented by state action as with antitrust enforcement.

iii. This is the only case where Leviathan will adopt the policies recommended in textbook discussions of optimal patent, trade and antitrust policies.

H. The other extreme policy analogous to the Ekelund-Tollison interpretation of mercantilism is adopted when the marginal receipts from induced rent seeking exceed tax losses over the entire range of interest, e.g. when $tYM < \alpha rM$ for all M.

i. Complete monopolization of the economy can arise when the tax losses induced by monopolization are relatively small or when tax instruments are relatively ineffective sources of revenue (possibly because of shift of activities into the underground economy as in Marcouiller and Leslie, 1995).

ii. In cases where tax losses are insignificant, the net revenue maximizing state attempts to *maximize* the size of rent seeking expenditures whenever $\alpha > 0$. Olson (1993) and Anderson and Boettke (1997) suggest that a good deal of the industrial policies of the former Soviet Union can be understood as such a corner solution.

I. The intermediate cases between these corner solutions are the focus of the present analysis.

i. In this range, governments use a combination of tax, government services and monopolization policies to maximize net receipts.

ii. Potential rent-seeking revenues lead government to adopt policies that induce *greater* monopolization than is consistent with maximizing national income, $YM < 0$ at M*, but the economy is not completely monopolized.

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conditions. The Kuhn-Tucker first order conditions imply that in cases where the conditions for an internal maximum or tangency condition are not satisfied, e.g. $- tYM \neq \alpha rM$ for $0 \leq M \leq 1$, the maximal values of the objective function lie along the constraints as discussed above.

J. The implicit function theorem allows the relationships describing the Fisc's preferred vector of tax, government service and monopoly policies to be characterized as:

$$G^* = g(L, R, \alpha) \quad (3.1)$$

$$T^* = t(L, R, \alpha) \quad (3.2)$$

$$M^* = m(L, R, \alpha) \quad (3.3)$$

1. **Proposition 1**: *The greater is the possibility of obtaining additional revenues from rent-seekers, the more inclined the Fisc is to adopt policies that promote "inefficient" monopolization, e.g. to use rent-seeking games as a source of government revenue even though such policies reduce national income.*

A. The ideal monopolization policy, as characterized by equations 3.3, is of special relevance for the purposes of this paper.

B. Using the implicit differentiation rule to differentiate M* with respect to α yields:

$$M^*_\alpha = \frac{\begin{vmatrix} tY_{GG} - C_{GG} & tY_{tG} + Y_G & 0 \\ tY_{tG} + Y_G & tY_{tt} + 2Y_t & 0 \\ tY_{MG} & tY_{tM} + Y_M & -t\alpha r_M \end{vmatrix}}{\begin{vmatrix} tY_{GG} - C_{GG} & tY_{tG} + Y_G & tY_{MG} \\ Y_G + tY_{Gt} & tY_{tt} + 2Y_t & tY_{tM} + Y_M \\ tY_{GM} & tY_{tM} + Y_M & tY_{MM} + \alpha r_{MM} \end{vmatrix}} = \frac{[(tY_{GG} - C_{GG})(tY_{tt} + 2Y_t) - (tY_{tG} + Y_G)^2](t\alpha r_M)}{|H|} > 0 \quad (4)$$

C. The derivative (equation 4) is unambiguously greater than zero in the case where the net revenue function is strictly concave.

i. (The second order condition of the original optimization problem requires $|H|<0$ and the bracketed term of the numerator to be greater than zero.)

ii. The last term in the numerator is also negative under the assumption that greater rent's induce greater rent seeking revenues.

iii. Consequently, the leviathan model unambiguously implies that policies oriented toward increasing monopolization expand as the government's ability to profit from induced rent seeking efforts, α, increases.

2. **Proposition 2**: *regulations or monopoly grants that provide protection in output markets are generally more valuable to prospective rent-seekers than are protected production processes (patents) for firms in a given industry.*

A. A monopoly privilege that grants the exclusive right *to sell* a specific product allows a firm to profit from production within its protected sphere, without fear of price competition from close rivals.

B. Grants of patent protection for specific production processes similarly allow firms to realize extra-ordinary returns by ensuring their position as a low cost producer.

i. A patented production process yields a Ricardian rent or inframarginal profits if the patented process is more cost effective than those not protected.

ii. However, the rent associated with a patent is smaller than the profit associated with a monopoly in the same output market(s) insofar as the profitability of any production process clearly increases if one is able to manipulate price as well as output.[3]

C. The most valuable patents are those which generate such dramatic cost savings over other available methods that a monopoly results in the specific output markets, as patents on specific production processes occasionally do.

i. Moreover, output monopolies are more readily enforced than production methods are insofar as sales of outputs usually take place in public whereas production normally takes place in private.[4]

D. **Consequently, a revenue maximizing Fisc will be inclined to grant monopoly protection to output markets rather than production processes, other things being equal.**

3. **Proposition 3**, **Ramsay Monopolization**: *the markets granted the most protection by the Fisc are those in which the demand for goods and services is least price sensitive. Consequently, the revenue maximizing pattern of monopolization tends to resemble a Ramsey tax.*

A. Monopolization of the least price sensitive markets maximizes the level of rent seeking induced because it maximizes the profits generated by a given degree of protection while minimizing the tax revenues lost by reduced output.

B. To see this, we now disaggregate the original model of monopoly power within a market as a whole and focus on individual markets and revenues.

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[3] This can be demonstrated mathematically as follows. Profit is revenue less cost. Consider the maximal profit associated with a given degree of monopoly power, M, and production technology, T. $\Pi^* = R(Q^*, M) - C(Q^*, T)$ Totally differentiating and appealing to the envelope theorem yields: $D\Pi^* = dM\,(\delta R/\delta M) - dT\,(\delta C/\delta T) > 0$ .Maximal profit rises as production technology improves (allowing lower production costs) and as monopoly power increases allowing greater revenues.

[4] A patent for a production process that can be used to produce products for *several* markets can be more valuable than an output market in any *single* market. Thus, to the extent that the Fisc protects production processes, we would expect such *broadly applicable* processes would attract the interest of a revenue maximizing Fisc before narrower markets. Protecting production methods does have the political advantage of being less observable than output protections. Of course, as noted above, this also makes patented production methods more difficult to protect.

C. Suppose there are *n* final goods markets that can potentially be granted a degree of monopoly power.

i. We represent the extent of monopolization generated by government policies in a particular industry as "monopoly mark up," *mi* , while retaining our assumption that government output is a pure public good and that the tax system is a broad based sales or proportional income tax.

ii. We assume that in the absence of monopolizing regulation, the markets in question would be conventional competitive markets with constant marginal and average costs, *Ai = ai(t, G).*

iii. Tax rates and government services affect the average cost of producing output in market *j.*

D. Average cost is increased by tax rates which reduce the effective real return to capital and labor, and is decreased by government services which lower transactions and transport costs.

i. Industry *i*'s output can thus be represented as, *Q*i = qii(Pi,t,G) where Pi = Ai + mi.*

ii. Monopoly profits and total rent-seeking efforts in market *i* are miQ*i. Net revenue for the Fisc is now:

$$R = \Sigma i\ (t\ PiQ^*i + \alpha\ miQ^*i\ ) - c(G) \qquad (5)$$

A. In the case of a sales tax, monopolization can increase nominal tax receipts by increasing the value of output in the affected markets if total revenues or industrial income increases with price. Differentiating with respect to t, G and mi yields the first order conditions that characterizes the government's vector of taxation, services, and monopoly policies.

$$\Sigma i\ (\ PiQ^*i + t\ PiQ^*it\ ) = 0 \qquad (6.1)$$

$$\Sigma i\ (t\ PiQ^*iG\ ) - CG = 0 \qquad (6.2)$$

$$\Sigma i\ [t\ (Q^*i + PiQ^*iPi\ ) + \alpha\ (Q^*i + miQ^*iPi\ )] = 0 \qquad (6.3)$$

B. Given t* and G*, equation 6.3 is satisfied when mi is such that:

$$\alpha m^*i + t^*Pi = (t + \alpha)(Q^*i / - Q^*iPi) \quad \text{for all I} \qquad (7.1)$$

or

$$m^*i/\ Pi = [(t + \alpha)/\alpha\ ]\ [Q^*i / - Pi\ Q^*iPi] - t^*/\alpha \qquad (7.2)$$

C. Given ideal tax and service policies, equation 7.2 indicates that the revenue maximizing vector of monopoly mark ups (as a percentage of the original price) is proportional to the price elasticity of demand in every market.

- (Recall that $\eta i = Q^*i / - Pi\ Q^*iPi$.)

VIII. Other Applications of Rent-Seeking and Rent-Extraction Models

A. Hobbesian Conflict

B. Competition for Patents

C. Advertising Competition

D. Generalized Corruption

E. Market Competition

F. Military Competition

G. Competition in Sporting Events

H. Multi-state Contests

I. Note that the rules of these game determine both the kind of compeitition that takes place, the extent of the competition, and the extent of the DWL--if any.