Chapter 14: Economics and Politics

I. Introduction: Politics, Law, and Economics

Chapter 13 demonstrated that the protection of property rights and laws that assured that voluntary exchanges are likely to advance the interests of those engaging in trade can increase the extent of markets for reasons that differ from the core neoclassical models, where such rights and honest shopkeepers are simply assumed rather than consequences of the honest and diligent enforcement of laws (or other customary rules) that (1) characterizes who owns what (what neoclassical models refer to as initial endowments), (2) provide a basis for voluntary exchange, and (3) facilitates exchange by outlawing fraudulent transactions. Such rules may emerge from customs that emerge in communities where voluntary exchange emerges (as discussed in chapter 14) or as the consequence of laws promulgated and enforced by governments—or from various combinations of the two. Similarly, enforcement of a community's laws may emerge as part of a community's customary law or as a consequence of its government.

This chapter explores a subset of policy decisions that governments may make that affect the extent of trade and their growth rates. As in many of the previous chapters, the topics covered are a small subset of ones covered in the broader academic literature on political economy. The topics covered were chosen to illustrate how political actors can be incorporated into rational choice-based models of market activities and the manner in which a government's decisions can increase or decrease economic development according to the decisions reached. For the most part, the analysis limits itself to law enforcement decisions, and leaves the broad field of public economics for other texts, although issues associated with redistribution are analyzed very briefly towards the end of the chapter.

Two extreme forms of government are examined. The first is an extractive regime of the sort first modelled by Mancur Olson (1993). The second is a relatively lean democratic model of policy decision making grounded in the median voter model worked out by Duncan Black (1948), Anthony Downs (1957a, 1957b) and extended by many others in the second half of the twentieth century. The main focus of the analysis in the first half of the chapter is the extent to which such governments will devote resources to law enforcement in a manner that tends to increase the size of markets. The second half of the chapter explores policies that may, in a sense, undermine property

rights by shifting ownership rights from one party to another using the coercive power of the state to do so, rather than by encouraging voluntary exchanges.

Again, more or less standard assumptions about the interests of individuals are made, and all relevant decision makers are assumed to be pragmatists of the usual neoclassical variety. Such assumptions induce a logical consistency in the behaviors modelled and illustrate once again how choice settings tend to affect decisions and market outcomes.

II. Authoritarian Regimes as Stationary Bandits

Perhaps the simplest model of government is that suggested by Mancur Olson in 1993. He suggests that governments emerge through coercion as a "roving bandit" (or team of roving bandits) settles down and is able to exclude other roving bandits from his, her, or their territory. Under roving bandits, societies are perhaps not quite as bad as suggested by Hobbes, but theft is endemic and there is little security in property or in any products that one might produce. In the environment, as demonstrated in chapter 13, economic output tends to be much diminished. A stationary bandit, in contrast, insofar as he or they expect to retain control over "their" territory, has reasons to both conduct "harvests" from the folks living in the territory judiciously and also to provide services to the community ruled that tend to increase future harvests. This is done not because of benevolence, but for reasons similar to those that motivate gardeners to take only ripe vegetables from their gardens, pulls weeds, and add fertilizer. The harvest (takings or taxes) is greater as a consequence.[1]

Government via stationary bandit is an extracting authoritarian regime that attempts to maximize its long-term profits from ruling the territory of interest. What is novel in the Olson theory is that interests in future revenue constrains current taxes, takings, and other extractions and also provides incentives to provide a legal system, roads, and territorial defense among other services that might increase the net income of the ruler or ruling junta. (Here, it should be acknowledged that not all such revenue would be spent on palaces, parades, and parties—there are many entertaining pursuits that a rule may undertake in his, her, or their spare time. Power itself has evidently been

[1] For precursor so the Olson model, see Tullock (1974) or Brennan and Buchanan (1977). For an overview of Tullock's theory of autocracy, see Apolte (2015).

valued by many rulers. Nonetheless, increased control over resources normally allows more such activities (and others) to be undertaken.

Game matrix 14.1 illustrates the basic logic of Olson's argument. It assumes that is the total number of raids increase, the output available for theft tends to diminish for reasons developed in chapter 13—the expected returns from purchasing and producing goods both diminish as thievery increases. And at some point, this leads to fewer raids by thieves, as the pickings diminish. At the Nash equilibrium depicted, each gang of thieves raids the village or community of interest 10 time each in the period of interest (perhaps a month or a week). Underlines are again used to characterize each gang's best reply function. Single underlines trace out the best reply function for gang 1 and double underlines trace out the best reply function for gang 2. Notice that in this case there is not a pure dominant strategy. Although 10 raids are often a good strategy for each gang, it is not always the best one.

Table 14.1 A Game Matrix Characterization of the Olson Stationary Bandit Model

	Revenue for Roving Bandit 2 (Number of Raids)			
Roving Bandit 1	0	5	10	15
0	0, 0	0, 150	0, 135	0, 120
5	150, 0	75, 75	35, 90	25, 75
10	135, 0	90, 35	**50, 50**	30, 45
15	120, 0	75, 25	45, 30	25, 25

Notice also that the total number of raids diminishes is there is only one gang. In that case, the other gang engages in no raids and the stationary or monopoly bandit engages in just 5 raids in the period of interest. This effect by itself tends to increase "law and order" in the community because the probability of theft falls for consumers and firms (as demonstrated in Chapter 13) which tends to make each more profitable for a stationary bandit than for rival gangs in the roving bandit setting.[2]

[2] Olson assumes that stationary bandits use taxes rather than raids, but this form of extraction requires quite a bit of sophistication and new institutions to develop and implement. That raids continue—at least initially—is more plausible. Such raids are similar to taxes although by being

The Leviathan Model

Next, we'll consider a stationary bandit model in which the probability of theft is adjusted by the stationary bandit to maximize net revenues. The net revenue model of a regions ruling organization (government) is sometimes referred to as the leviathan model. We'll begin by assuming that the goods of interest are locally produced by farmers and/or community artisans and that their output of services is partly determined by the rate at which goods are stolen between production and sales, F^F. Equation 13.12, again, can be used as the basis for characterizing how the probability of a raid affects a community's output (or tax base). F^F is now interpreted as the probability that an average firm is raided in the community and M is the number of such producers in the territory ruled by the stationary bandit, who we'll refer to as big Al.

Given this, big Al's revenue is $F^F Ms(P^0, Y, w, F^F)$. The cost of raids and service G is assumed to be simply $C = c(F^F, M)$ + D, where D is the fixed cost of defending the community from external bandits. Thus, big Al's expected net revenue from raids is now:

$$\Pi = F^F Ms(P^0, Y, w, F^F) - [c(F^F, M) + \mathrm{D}] \tag{14.1}$$

The profit maximizing frequency of raids can be characterized by differentiating with respect to F^F and setting the derivatives equal to zero.

$$\Pi_{F^F} = [Ms(P^0, Y, w, F^F) + F^F \mathrm{Ms}_{F^F}] - [\mathrm{c}_{F^F}] = 0 \equiv H \; at \; F^{F*} \tag{14.2}$$

As usual, the first order condition for profit maximization can be thought of as setting marginal revenue (the term in the first pair of brackets) equal to marginal cost (the term in the second pair of brackets). However, in this case, profits are not generated by producing and selling goods, but rather from periodically raiding (stealing) from the firms in a territory governed by a stationary bandit. The implicit function theorem implies that Al's optional frequency of raids can be characterized as:

$$F^{F*} = f(P^0, Y, w, \mathrm{M}, \mathrm{D}) \tag{14.3}$$

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random takings, are likely to reduce purchases and production by more than extortion or tax systems that generate the same net revenues. Such possibilities are likely to lead to the adoption of such systems as the ruling group comes to recognize their usefulness. Innovations are possible for thieves and governments as well as firms and consumers.

This pattern of raiding should be thought of as the steady state level—rather than that associated with a single raid. Our results from chapter 13, imply that as long as the stationary bandit engages in fewer raids that the total when roving bandits routinely raided the territory governed, that the total output of the community would be increased by a stationary bandit—even if it provided no other services than excluding roving bandits.

Comparative statics with respect to the assumed parameters of big A"s choice problem (here, $P^0, Y, w,$ M, and D) can be undertaken in the usual way. Parameter D arguably is not truly a variable that affects the probability of raids, but rather at least partially determines whether it is worth becoming a stationary bandit or not. To be a sensible strategy, the expected increase in profits from raids has to be greater than the cost (D) of excluding others from the territory ruled.

The Richer Olson Model

Olson notes that stationary bandits may also profit from providing services that increase the output of their territories. Olson's model in contrast to the pure leviathan model assumes that the local ruler can pay for or produce services that reduce the typical firm's cost of production. The ruler does this not out of generosity (although he or she may claim so), but because it increases his "harvest." A stationary bandit's motivations are similar to that of gardeners who provide fertilizer and pick weeds out of their gardens, not because they care about adjacent tomato plants, but because they like tomatoes. Such services may include the enforcement of contracts and laws against theft from other local bandits, pathway construction and maintenance, or public education. We'll refer to such services as G and incorporate that variable into the typical firms supply function. An increase in the provision of service G has the opposite effect on a firm's output decision as input prices have, it tends to increase output—holding other factors constant.

Given this, big Al's revenue is $F^F Ms(P^0, Y, w, F^F, G)$. The cost of a raid is assumed to be simply $C = c(F^F, M, G)$ + D, where D is the fixed cost of defending the community from other bandits. Thus, big Al's expected net revenue from raids is:

$$\Pi = F^F Ms(P^0, Y, w, F^F) - [c(F^F, M) + \mathrm{D}] \tag{14.4}$$

The profit maximizing frequency of raids can be characterized by differentiating with respect to F^F and G, then setting the two partial derivatives equal to zero.

$$\Pi_{F^F} = [Ms(P^0, Y, w, F^F) + F^F \mathrm{Ms}_{F^F}] - [\mathrm{c}_{F^F}] = 0 \tag{14.5}$$

$$\Pi_G = [F^F \mathrm{Ms}_G] - \left[\mathrm{c}_{F^G}\right] = 0 \tag{14.5}$$

Both first order conditions have to be satisfied simultaneously. However, both again require setting the expected marginal revenue of raids or government service equal to their respective marginal cost. However, in this case, profits are not generated by producing and selling goods, but rather from periodically raiding (stealing) from the firms in a territory governed by a stationary bandit and by providing services that tend to encourage greater production on the part of the firms being raided.

The multi-equation version of the implicit function theorem implies that Al's optional frequency of raids and extent of production enhancing government services can be characterized as functions of the exogenous parameters of the choice setting:

$$F^{F*} = f(P^0, Y, w, \mathrm{M}, \mathrm{D}) \tag{14.6}$$

And

$$G^* = f(P^0, Y, w, \mathrm{M}, \mathrm{D}) \tag{14.7}$$

Comparative statics, however, require matrix methods that tend to be cumbersome for abstract functions, or the use of the substitution method used in previous cases where the model included two or more control variables. In this case, one could first determine the optimal raiding function is characterized in a manner similar to that used to derive equation 14.3, holding G constant. Then substitute that function into big Al's profit function, differentiate with respect to G, set the result equal to zero, and use the implicit function theorem to characterize G* in a manner that now includes its effects on the optimal frequency of raids. The single equation implicit function differentiation rule could be used to characterize the effects of changes in the stationary bandit's choice setting on its decisions to provide government services and also on the other endogenous variable(s), here the frequency of raids.

The Olson model of authoritarian rule can be generalized in various ways. For example, several types of expenditures that can add to community's economic output could be added to the government's control variables. The authoritarian's planning horizon could be explicitly taken into account by using explicitly using present values for all future revenues and costs associated with ruling. The probability of coup or civil war may be included as a risk factor that affects the stationary bandit's planning horizon.

However, for the purposes of this chapter, the linkage between unlawfulness in a roving bandit environment and a stationary bandit environment is sufficient to demonstrate the even one of the simplest of government policies (excluding roving bandits) has effects on the extent of markets. Thus, even the simplest governments are likely to generate improvements over settings in which thievery or conflict resembles that of the Hobbesian setting, although the degree of improvement would vary with the efficiency of a government's extractive policies and the market enhancing services that it provides.

III. A Rational Choice Model of Public Policy Choice in a Democracy

The authoritarian model can be regarded as the political analogue to a monopoly market in which there are no substitutes for the product produced. Resident mobility is assumed to be limited and the power of the government is assumed to be sufficient to determine the "price" of residence. We now shift to a setting where governmental policies are determined by competitive elections among two candidates or two parties for the authority to govern. Historically, democratic governments have been relatively rare, which suggests that such governments may be difficult to establish and once established may be somewhat fragile. Nonetheless, democracies have been in place in the regions with the most economically developed economies for most of the past century and a half. They are thus of interest for a course on micro-economics because, in some specific and important circumstances, they are correlated with the rate of economic development.

The Median Voter Model

It is fairly easy to illustrate that logic of the median voter model of voting outcomes. The simplest is with a table like the following, which illustrates three friends attempting to choose among restaurants for lunch. Each friend prefers a different quality of restaurant, which is assumed to be characterized by a number, most likely in this case its price. This number or price characterizes the type of menu, service, and ambiance of the restaurant preferred by each. Al prefers a quick and easy lunch, and her preferred restaurant is a 10. Bob prefers a somewhat fancier restaurant, which may be a bit slower, but has a bit better selection of food and a bit more service—a restaurant of type 15. Cathy prefers a slower fancier restaurant with at still wider selection of food, that is generally tastier—a restaurant of type 21. When choosing among the alternatives, each of the friends votes in favor of the restaurant that is closest to his or her ideal type. (This is sometimes referred to as

spatial voting.) The options voted over are listed on the left, each individual's vote is listed in the center, and the outcome (majority preference) is listed on the right.

Table 14.2 Illustration of the Median Voter Properties of Majority Rule Decisions				
Options	Al (10)	Bob (15)	Cathy (21)	Outcome
10 vs 21	10	10	21	10
10 vs 18	10	18	18	18
13 vs 18	13	13	18	13
12 vs 13	12	13	13	13
13 vs 15	13	15	15	15
15 vs 17	15	15	17	15
15 vs 15.5	15	15	15.5	15
14.5 vs 15	14.5	15	15	15

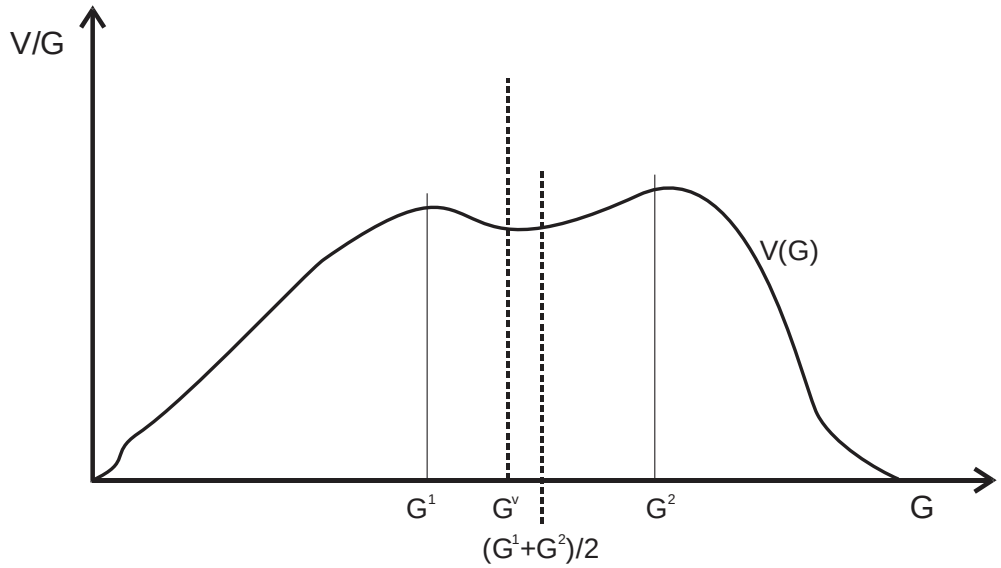
The first four options illustrate what I refer to as the weak form of the median voter theorem: the median voter always votes with the majority. Notice that the outcome column and Bob's column are identical. Bob is the median voter because his ideal point is exactly in the middle (is the median) of the distribution of ideal points. The last four options illustrate what I refer to as the strong form of the median voter theorem. In those cases, the median voter gets exactly what he or she wants, because his or her ideal point is majority preferred to every other alternative. Notice that as long as the three voters vote honestly (and spatially), even restaurants that are just a little more expensive or a little less expensive will be majority dominate by Bob's ideal restaurant.

The Downsian Model of Competition Among Pragmatic Candidates

For elections to generate the strong form of the median voter theorem, some institutional support is necessary. In the above table, it was assumed that the winner in the previous vote (the status quo or incumbent) was a candidate in the next round. In that case, once the median voter's ideal is on the ballot, will remain the policy until the median voter changes his or her mind about what his or her ideal policy (or restaurant) is. Another type of institution that tends to support the strong form of the median voter theorem is competition between two pragmatic candidates or two pragmatic parties for positions of government authority. By "pragmatic," it is simply meant that a candidate is more committed to winning to particular policies and will adopt whatever policies he, she, or they believe will command majority support.

Figure 14.1 illustrates the process through which competition between such candidates tends to generate convergence in their position that advance median voter preferences over the policy of interest.

Figure 14.1 The Downsian Median Voter Model



V(G) is the distribution of voter preferences over ideal levels of government service G. In a rational voter model, the ideal quantity that which maximizes a voter's utility given his or her cost and assessment of its benefits.[3] The area under the curve between any two levels of G is the number of voters (or percentage of voters) with ideal points between those two ideal points. The median voter has the ideal point (preferred level of G) that is exactly in the middle of the distribution of voter ideal points (at the median). In the case depicted, that is the voter whose ideal point, G^V, is such that the area under the V(G) curve to the left of G^V is exactly the same as the area under the V(G) curve to the right of G^V. (Keep in mind that the mean, mode, and median of a distribution may be different points unless the distribution is symmetrically distributed about the mean and unimodal.)

To illustrate how such a diagram can be used to illustrate an election between two candidates, we need to assume that we know what the candidate positions are in the relevant policy

[3] It turns out that a utility maximizing voter is not always a spatial voter—although the special voting model is a reasonable "first approximation" of how such a voter will vote. Spatial voters have linear marginal utility (or benefit) and marginal opportunity cost curves. With strict concavity, there will be a bit of asymmetry in the voting pattern, the extent of which varies with the asymmetry. Also, although we have assumed pragmatic preferences to this, keep in mind that normative ideas or ideology may also a voter's utility level, and therefore his or her voting behavior.)

domain, here the government service level of interest. G_1 denotes the stated policy preference of candidate 1 and G^2 denotes the stated policy position of candidate 2. Exactly halfway between these two levels of service (at $G^{ind}=(G^1+G^2)/2$) are the "indifferent voters." Every voter to the left of the indifferent voters' ideal point (to the left of G^{ind}) votes for candidate 1, and everyone to the left of that ideal point votes for candidate 2. Why? Because their own ideal points are closer to that of their preferred candidate than to the other.

The winner of an election is the candidate that gets the most votes. Given a diagram such as 14.1, one can often determine this by inspection. One can look at the candidate positions, determine their vote shares (shade the relevant areas in, mentally or with a market) and observe whether the area to the left or right of the indifferent voters is largest. As drawn, the area to the right of the indifferent voter's ideal point is larger than the area to the left of that government service level and so candidate 1 wins. If you think a bit about the geometry of the diagram, however, you'll soon realize that there is that another way to determine who wins. On can simply determine which candidate (or party) is closer to the median voter. The one that is closest wins, because that candidate (or party) always gets half the vote, plus a bit more. Thus, the weak form of the median voter theorem always holds in this type of election (e.g., in a single-dimensional policy space, with two candidates and honest spatial voting).

Given that property, it turns out that if polls are suggesting that a candidate will lose in an upcoming election, he or she should move closer to the median voter if he or she wants to increase his or her likelihood of winning. As such adjustments are undertaken by both candidates, their stated policy positions tend to converge toward the median voter's ideal point. At the Nash equilibrium of the electoral contest, both candidates adopt identical positions at the median voter's ideal, and the strong form of the median voter theorem will hold (if the candidates are honest and can effectively press for their stated policies after elected). Another implication of the Nash equilibrium is that the electoral outcome tends be close—in fact a statistical tie.[4]

[4] Indeed, if they have converged entirely, every voter will mentally "toss a coin" to determine which candidate to vote for. If the candidates stay just a bit a part and on either side of the median voter, only the indifferent voters toss coins (who may be the median voters in this case), and the final vote tally would again be close, and also be a random event, because of the mental coin tossing of indifferent voters and/or their turnout decisions.

One test of the extent of convergence is whether you can imagine each candidate reading the other's speeches on the policy of interest. If you can (or nearly so) then convergence has taken place. If not, then full are nearly full convergence has not occurred. The latter can happen for various reasons including that neither candidate is a pragmatist.

It bears noting that to apply the logic of the Downsian model, one often has to take electoral institutions into account. For example, presidents in the United States are not directly elected, but indirectly elected by electors. The winner is not the candidate with the most votes, but the one with the most electoral votes. Were voter preferences in every state the same, this institution would not matter much. But since they are not, it turns out that some states are more likely to ultimately determine the election than others. When applied to that electoral system, the Downsian model implies that elections in pivotal states will be close rather than the national vote tabulations.

Similarly in proportional representation systems, a single party rarely wins a majority of the votes and has to form a majority coalition to take control of the executive branch. In that case, because coalitions of parties that are ideologically closest to one another are most commonplace, it turns out that the median voter is very likely to have voted for one of the parties that make up the coalition government. In the case where a center left or center right party is the party tasked with forming the government, it is often (but not always) the case that the median voter has voted for the party asked to do so. Notice that in none of these cases is the median voter a "representative" agent as is often assumed in microeconomic and macroeconomic models, rather he or she is the pivotal voter in all close elections—where closeness is partly determined by votes and partly by a polity's electoral institutions.

IV. Using the Strong Form of the Median Voter Theorem to Model Policy Choices

If we adopt the strong form of the median voter theorem (e.g., property of majority rule with spatial voters and essentially uni-dimensional policy spaces), then we can model the policies adopted in democracies as those which maximize the utility or expected utility of the median voter. We'll do that first for a general policy and then for crime in order to follow up on the policy focused on above and in chapter 13. The simplest model of such a decision is a two good model analogous to that used to model a consumer's choice of an ideal combination of two goods given his or her budget constraint.

An Illustrating Example of the Median Voter's Demand for a Government Service

Suppose that Bobby is the median voter and has a strictly concave twice differentiable utility function defined over his or her private consumption (X) and the public good (G) of interest. U=u(X, G). U is, as usual, assumed to be monotonically increasing in the two good (X and G) and subject to diminishing returns (e.g., the utility generated by both goods exhibits diminishing marginal utility). Suppose that Bobby's income is Y, that the price of private consumption and that Bobby's cost share for the public service is C=c(G,Y). In that case, Bobby's budget constraint is Y=PX + c(G). Notice that the budget constraint implies that we can characterize X as X = (Y-c(G))/P, which allows us to use the substitution method to characterize Bobby's utility (along his or her budget constraint) as:

$$U = u(^{[Y - c(G)]}/_{P}\ , G) \tag{14.8}$$

Differentiating with respect to G and setting the result equal to zero is sufficient to characterize Bobby's ideal level of G (his or her ideal point).

$$U_G = u_X\left(-\frac{C_G}{P}\right) + u_G = 0 \ \equiv H \ \ at\ G^* \tag{14.9}$$

Applying the implicit function theorem to equation 14.9 implies that Bobby's ideal level of the government service of interest is:

$$G^* = g(Y, P) \tag{14.10}$$

The effect of changes in personal income (Y) and the cost of private consumption can be characterized (qualitatively) using the implicit function differentiation rule.

$$G_Y^* = \frac{H_Y}{-H_G} = \frac{u_{XX}\left(\frac{1}{P}\right)\left(-\frac{C_G}{P}\right)+u_X\left(-\frac{C_{GY}}{P}\right)+u_{GX}\left(\frac{1}{P}\right)+u_{GG}\left(-\frac{C_Y}{P}\right)}{-U_{GG}} > 0 \ \ (\text{if } C_Y \ and \ C_{GY} \ are \ "small") \tag{14.11}$$

If the cost share Bobby has for the service of interest is not affected by his or her income, then $C_Y \ = 0 \ and \ C_{GY} = 0)$ and the only terms remaining are greater than zero. Given that the denominator is positive (the second derivative of U with respect to G is negative and that term is pre-multiplied by a negative sign), this implies that when the effects of increased income have only minor or no effects on one's cost share, that the demand for a government service tends to rise with income. If the cost effects of higher income are significant, the cost effects may dominate the

marginal benefit effects of increased government service; in which case, demand would fall as income increased. The latter may occur not because G is an inferior good, but because its price (Bobby's marginal cost for the service) rises with income because of the method used to assign cost shares to voters for the service of interest.

In cases in which voters have similar utility functions and vary chiefly because of differences in income, cases in which the demand for a government service is monotone increasing in one's personal income (the case illustrated, with small income effects on cost shares) or monotone decreasing (the case where income effects on costs are relatively large), the median over is the voter with median income.

The Median Voter's Demand for Theft Prevention

In addition to government services that are demanded because they are elements in one's utility function, there are also services demanded because they reduce risks and/or uncertainty. For example, most governments provide a variety of insurance like products that reduce the variability of income (as with, for example, unemployment insurance and tax-financed retirement pensions), or particular types of personal expenses (as with tax-financed health insurance or flood insurance). Other services attempt to directly alter risks as with criminal-justice systems and national defense. Such services require somewhat more complex models of voter choice because demands for such services are indirect rather than direct. They are based on the desirable effects of such services rather than personal use or consumption. Many of these services and the methods used to finance them have direct effects on markets—albeit not always ones that increase their efficiency as a method of producing useful or desirable goods and services.

Examples of services that generally extends markets and increases rates of capital accumulation and innovation include various efforts to reduce extent of activities that tend reduce the extent of markets as with efforts to reduce theft and fraud. Although both consumers and firm owners are affected by such crimes, we'll focus on consumers because they are more likely to be the median voter than owners of firms.

A Model of Median Voter Choice Extending Results from Chapter 13

Recall the model towards the end of chapter 13 that modelled the effect of theft on a purchaser of goods that were profitable for criminals to steal. Equation 13.14 characterized the

expected utility of a consumer whose purchases of good 1 might be stolen before he or she made full use of them.

$$U^e = (1 - F^C)U\left(Q_1, \frac{W - P_1Q_1}{P_2}\right) + F^C U(0, \frac{W - P_1Q_1}{P_2}) \quad (13.14)$$

To adapt this model for use in a median voter model, we need to explicitly include both the ability of governments to reduce crime rates through expenditures on police and courts and the manner in which the cost of criminal-justice systems is divided up among taxpayers.

Chapter 13 also included a model of rational criminals that implied that the number of crimes they engage in fell as the probability of being caught and punished increased.

$$N_i^* = n_i(w_i^0, G) \quad (13.7)$$

Where G was the extent of resources devoted to the criminal justice system and w_i^0 was the opportunity cost of crime and the extent of punishment (if incarceration is used as a punishment).

As the number of thefts per criminal diminishes and the number of criminals diminishes, the probability that any given individual is the victim of a crime also diminishes. Recall that it was the incentive effect of expected punishments that we attributed most of the effect of expenditures on the criminal justice system, rather than the incarcerations or other punishments themselves. These affected all criminals, not just those caught and punished. With these effects in mind, equation 13.14 can be revised for use in a median voter model as written below:

$$U^e = (1 - F^C(G))U\left(Q_1, \frac{W - c(G) - P_1Q_1}{P_2}\right) + F^C(G)U(0, \frac{W - c(G) - P_1Q_1}{P_2}) \quad (14.12)$$

Where c(G) is the median voter's cost share for expenditures on law enforcement (G) and the probability of being subject to a crime is $F^C(G)$, which is a monotone decreasing function of G, but subject to diminishing returns. (We'll neglect the effect of the opportunity cost of crime in this model, although it can be easily added as a parameter of the probability of being a victim function.)

The median voter has two control variables in this model (e.g., in equation 14.12), namely expenditures on law enforcement and purchases of good 1. These two choices indirectly determine the quantity of good 2 (the good not worth stealing) that is purchased and the probability of being subject to a theft (through effects on the incentives confronting the average thief in the community of interest (town, county, state, or nation). The simplest way to characterize the median voter's preferred expenditure on crime discouragement is to develop two first order conditions, one with

respect to G and the other with respect to Q_1. To simplify the notation the Utility associated with theft is denoted U^0.

$$U_G^e = (-F_G^C U) + (1 - F^C)U_{Q_2}\left(-\frac{C_G}{P_2}\right) + F_G^C U^0 + F^C U_{Q_2}^0\left(-\frac{C_G}{P_2}\right) = 0 \; at \; G^* \tag{14.13}$$

and

$$U_{Q_1}^e = (1 - F^C)\left[U_{Q_1} + U_{Q_2}\left(-\frac{P_1}{P_2}\right)\right] + F^C[U_{Q_1}^0 + U_{Q_2}^0\left(-\frac{P_1}{P_2}\right) = at \; Q_1^* \tag{14.14}$$

Both equations have to be simultaneously satisfied at the utility maximizing combination of G and Q_1. Geometrically this occurs where the two equations intersect in the GxQ_1 space.

Three other variables are co-determined by choices with respect to these two variables. Given the utility maximizing combination of those variables, $F^C = \mathrm{f}(\mathrm{G}^*)$, $Q^* = \frac{W - c(G) - P_1 Q_1}{P_2}$. and the median voter's tax burden (for this service) is $C = c(G^*)$. Altogether, the model characterizes equilibrium values for 5 variables; all of which the model implies are codetermined.

The multi-equation version of the implicit function theorem implies that both G* and Q_1* are determined by the same variables—e.g., the same "exogenous" parameters of the expected utility function.

$$G^* = g(P_1, P_2, W) \tag{14.15}$$

$$Q_1^* = q_1(P_1, P_2, W) \tag{14.16}$$

A voter's interest in law enforcement of this type (e.g., anti-theft laws) is motivated by their effects on his or her expected net gains generated by reductions in the risks associated with a subset of market transactions—specifically those associated with purchases of goods that attract the interest of thieves. These, in turn, determine three others through the various constraints. So, they too are characterized by the same exogenous variables.

Similar personal interests in reducing risks would also be associated with a number of other areas of policy as well as the one focused on in this model.

A general implication of the model is that rational voters favor expenditures that reduce all of the risks that government actions can reduce at a "reasonable" cost, but only up to the point where the expected marginal gains (from reductions in risk) equal the expected marginal cost of expenditures on law enforcement. Thus, some risk (here some crime) normally remains at the

median voter's vector of optimal policies—and these are the ones that tend to emerge from election-based political equilibria.

The greater the marginal harm associated with a given type of risk, the more voters are willing to spend (in this case through government taxes) to have such risks reduced. Many risk-reducing government policies, perhaps most, affect the extent and rates at which markets emerge, extend, and flourish.

V. Some Discussion—Governance, Law Enforcement, and the Extent of Markets

The analysis towards the end of chapter 13 showed why crime rates affect the extent of markets. By increasing the risks for consumers and firms, purchases of goods that are often stolen fall and the production of goods prone to pilfering also fall. As a consequence, markets are smaller and few gains from trade are realized. The same sorts of effects were associated with fraud. Insofar as governments devote resources to reducing market-relevant crime rates and succeed at reducing the risk of losses from those crimes, markets tend to expand. Insofar as they do not, markets tend to contract—other things being equal.

The analysis of this chapter suggests that governments of all sorts tend to reduce crime rates, and thus have at least some beneficial effects on markets—whenever the alternative is an onslaught of roving bandits. However, it does not imply that governments will be equally interested in pursuing criminals.

The leviathan model suggests that little or no effort may be invested in curtailing local crimes—although roving bandits would be excluded, and crime rates would fall as a consequence. The Olson model of a more sophisticated autocrat suggests that market-relevant local crimes will be curtailed to up to the point where the marginal increase in tax revenues equals the marginal cost of crime reduction—which is the level that maximizes expected profits for the ruler or ruling group. The manner in which stationary bandits collect their revenue may well resemble theft—particularly in times when taxes were difficult to collect from unwilling taxpayers. However, other illegal thievery would be reduced but normally not to zero. Indeed, one can imagine cases in which an authoritarian, allows local organized crime to continue almost unabated, if the criminal organizations share their profits with the rulers.

Regular tax schedules, as they emerge and replace government confiscation, would further reduce risks for firms (and consumers) and therefore expand markets and potential revenues for the government. (This may account for the existence of standing tax laws and tax schedules.)

The interests of pivotal voters in decreasing crime rates are likely to be more personal than community wide, but insofar as the typical consumer is more risk averse than the average stationary bandit, they are likely to favor greater efforts to curtail crime than an autocrat would in similar circumstances. Their chief interest is personal safety and the protection of their property rather than the government's net revenues.

Differences between the interests of autocrats and median voters also suggest that the pattern of government services tends to differ under the two systems of governance. Voters support the government provision risk reducing services and also of goods and services that they directly consume, with little attention paid to their effects on government net revenues. Stationary bandits, in contrast, provide only services that add to their expected net revenues. Thus, there are many services that are provided in democracies that would not be provided by an Olsonian type of authoritarian regime (or would be provided at far lower rates). Many government services increase voter utility, without increasing their nation's tax base—as might be said of parks and social safety nets.

VI. The Democratic Poverty Trap

There are, consequently, cases in which a well-functioning democracy may adopt policies that reduces the extant and growth rates of markets. For example, a population of pragmatic voters tends to have incentives to transfer resources from the "rich" to the "poor" in a manner than can undermine incentives to work, invest, innovate and produce. This section provides an illustrating model of "over" redistribution or overly generous social insurance systems—where "over" in this case simply means at levels that tend to reduce the size of markets and their associated goods and services.

In a population of pragmatic voters, redistribution may take the form of broad policies or narrow policies with targeted sources and beneficiaries of the redistributive programs. We'll focus on a broad demogrant or universal income program. That "over" redistributive is possible within democracies—even ones constrained to pass only general laws that do not target specific groups—

can be illustrated with a few equations and two diagrams based on the influential Meltzer and Richard (1981) model.

Suppose that a 'demogrant' or guaranteed income level (G) is to be financed with a uniform proportional tax on income of *t* percent. The revenues from that tax are to be devoted solely to providing equal lump-sum payments (demogrants) to each person in society. Voter "i" would have after-demogrant income $X_i = (1-t)Y_i + G$, where Y^i is voter i's pretax income, *t* is the tax rate, and G is the universal demogrant.[5] Because all of the demogrants are the same and financed with the same proportional tax, total outlays (NG) must equal tax revenues ($\sum_{i=1}^{N} tY_i$) which can be written as $NG = \sum_{i=1}^{N} tY_i$. If one divides both sides by N, the balanced budget assumption also implies that the demogrant is simply *t* times average income, or $G = tY^A$, where $Y^A = (\sum_{i=1}^{N} Y_i)/N$ is average income.

If voters are pragmatic income maximizers, each voter will favor the tax and grant combination that maximizes his or her own after-tax income. Given the assumptions above, this normally occurs when the tax rate satisfies the following first-order condition for a voter i's optimal tax:

$$[-Yi + (1-t)Y_{it}] + [Y^A + tY^A{}_t] = 0, \qquad (14.17)$$

where subscript *i* denotes a particular voter's income and the other subscript (t) denotes partial derivatives of voter income and average income with respect to the tax rate. The latter is a measure of the overall impact of the tax system on decisions to seek employment and/or to produce goods and services for sale in markets. The first term in brackets is voter i's marginal tax cost for the demogrant system and the last bracketed term is his or her marginal benefit from the demogrant.

The ideal tax rate from the perspective of voter i sets the marginal benefits from the demogrant equal to i's marginal tax cost. The associated ideal demogrant is $G^* = t^*Y^A(t^*)$. This is the outcome focused on in the Meltzer-Richard paper and others based on their results.

[5] Support for such demogrant programs comes and goes in the West. Such programs—sometimes termed negative income taxes—were favored by both mainstream candidates in the 1972 US presidential election and have returned to prominence as proposals for universal basic income in the past decade.

However, the equality condition of equation 1, perhaps surprisingly, may never materialize—which is to say that corner solutions are possible. In cases in which the tax system has only modest incentive effects and median income is less than average income (the latter being the usual case), moderate pragmatic voters will prefer radical redistribution funded by 100% tax rates. That possibility is neglected in the Meltzer and Richard paper.

Figure 14.2 illustrates both possible equilibria. When the tax has effect on employment or output, and median income is below average income, full income equalization takes place if the median voter's income is below average. In that case, the two terms with t subscripts disappear from equation 1 (they have the value 0), the median voter's marginal cost is his or her own income, and his or her marginal benefit is the average income in the polity of interest. In that and other cases in which the excess burden is "small", the median voter's marginal benefits always are larger than his or her marginal cost; in which case, even moderate voters prefer $t^* = 100\%$ and $G = Y^A$, because those values maximize their net of tax and demogrant incomes.[6]

[6] The model easily can be generalized to account for life cycles and economic growth. In a generalized model, pragmatists would maximize the present value of their lifetime incomes, where economic growth would be affected by the size of the demogrant program. The first-order conditions for ideal tax rates and demogrants conceptually would be very similar to those developed above, although the mathematical characterizations would be somewhat more complex and include new terms for time horizons, discount rates, and growth rates. The steady state model examined thus is sufficient for the purposes of this paper.

Figure 14.2 Excessive Redistribution

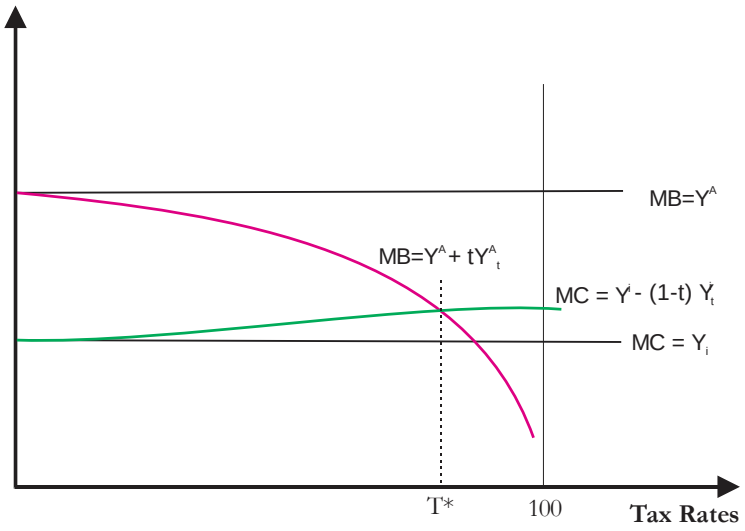


Figure 14.2 also illustrates two cases: the case where taxes have no significant effects on work effort and market output and the case in which tax rates have significant effects on work effort and output for sale in markets. Again, the median income is assumed to be below average income and to take account of the effects of higher tax rates on personal income and market output. In the case where taxes have minimal effects on markets, a pragmatic voter prefers maximal redistrution, because this maximizes his or her net income. Taxes will be 100% and all incomes are equalized. In the case in which market output falls (and thus real income falls), the extent to which median income is below average income influences the result. If median income is just a bit below average income, the median voter's own benefits from redistribution are modest and the demogrant program will tend to be relatively small, especially when employment and output full rapidly as the tax rate increases. However, if the median voter's income is well below average, the gains from redistribution in this case remain significant, even though employment and output fall.

In the latter case, the median voter's assessment of his or her marginal costs and benefits leads to less redistribution than in the first case (when the demogrant program has no effect on market output), but nonetheless, the median voter's preferred tax and demogrant combinations may significantly reduce economic activity. This is the majoritarian poverty trap.

Avoiding that problem, requires institutions—as with a takings provision, or rules that limit redistributive programs to various forms of social insurance, or internalized norms that inhibit redistribution. In effect, this model suggests that democracies may also act as stationary bandits. In this case, as with cases in which stationary bandits have short planning horizons, the resulting

redistributional policies may significantly reduce both the extent of commerce and its growth rate. Democracy, by itself, does not assure prosperity.

VII. Theoretical Limitations of the Median Voter Model

At this point it is should be acknowledged that the median voter model is not entirely robust. It has institutional prerequisites, and it is most suited for analysis of elections in which issues and candidates that can be mapped into a single dimension. More than one issue can matter to voters in a given contest, but a median voter is likely to exist only if their ideals are correlated with one another, as with a left-right ideological spectrum. This normally requires that voters not all be pragmatists—those whose interests are personal and so relatively narrow—as we imagine shoppers in a grocery store or profit maximizing firms. Rational choice models of persons influenced by norms or ideologies are are taken up in the next chapter.

The most important of its theoretical limitations is that there are significant policy issues over which the natural pattern of pragmatic interests will not produce a median voter. For example, imagine votes over divisions of a cake among three cake lovers. Each prefers a larger slice to a smaller one. Let (.33, .33, .34) characterize a division between Al, Bob, and Cathy with their respective proportions listed as (A, B, C). Notice that (.4, .4. .2) is majority preferred to the first division, because Al and Bob both get a larger slice. Note that (.50, .25, .25) is majority preferred to the second division, because both Al and Cathy get larger slice. Note, however, that the first division is majority preferred to the third, because Bob and Cathy both get a larger share. Majority preferences may generate intransitive orderings and never settle down to clear equilibrium when voting over such policies is unconstrained.

Pragmatic voting over distributive issues tends to generate inconsistent, intransitive, inconclusive results, because no median over outcome exists for pragmatic voters with respect to such issues. Stable outcomes in such issue spaces require either strong ideological or normative interests that override a voter's narrower pragmatic interests or an institutional design that somehow limits proposals for new divisions. (Indeed, in the indecision associated with cycles may provide opportunities for authoritarian takeovers, which may be one of the reasons that democracies are historically so rare.)

The stability of most Western democracies implies that one or the other of these solutions is commonplace in those democracies—but also imply that models based on the narrow interests

assumed in neoclassical models of the firm and consumer behavior are less robust in political circumstances.

The median voter model also assume that individual voters have sufficient information that they can make decisions about public policies in the usual manner of rational choice models—rather than being ones in which Knightian uncertainty loom large. Unfortunately, many governmental issues are sufficiently complex and not always sufficiently routine that such an assumption is not likely to be true about all such issues. A significant dose of Knightian uncertainty would imply that mistakes may well be fairly common in the voting booth or in the councils of authoritarians, than in grocery stores (although it should be acknowledged that Knightian uncertainty also affects authoritarians).

VIII. A Few Conclusions

This chapter shows how the rational choice models used to generate the core neoclassical models of price determination can be used to develop internally consistent, plausible, models of authoritarian and democratic governments. This not done in order to demonstrate that this can be done, but rather, it was undertaken here to shed lights on how one can take account of governmental choices that have economic consequences. Taking such consequences into account provides a more complete micro economic model of the extent of markets and their prices.

Many other examples could have been developed because so many political choices affect markets. However, the purpose of this chapter is not to survey the entire political economy and public economics literature but to demonstrate why politics is relevant for microeconomics, and to show that microeconomics can be used to shed useful if not complete light on the interdependencies between market and political systems.

The models developed also partially explain where laws come from and what "crimes" are. Formal laws are adopted by government and enforced by them. Crimes are behaviors that violate those laws. In the case of authoritarian regimes, laws are adopted, and enforcement efforts attempt to advance the interests of the rulers (as they themselves understand their interests). In the case of well-functioning democracies, laws are adopted and enforced because they advance the interest of a majority (or super majority) of voters. When laws are controversial, rather than supported by a broad consensus, they tend to advance the interest of the pivotal (median) voters in the relevant electorates.

Laws and other public policies do not come from Mars (e.g., from exogenous processes that are beyond the scope of economic analysis), but are consequences of the same kinds of considerations that affect choices in markets. The same sorts of individuals are making decision in each setting—so this should not be surprising. The institutional settings in which economic and political choices are made, however, are sufficiently different that the choices need to be modelled in somewhat different ways. Governments can use coercion and coercive threats to change the rules under which market activities take place.

In neither case does the microeconomic approach explain everything, but in both cases the results are sufficiently clear and logically based that they can be used as points of departure for a more complete analysis.

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