Summary of Olson on Collective Action

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Below I've tried to clarify what we mean by the variables in $A_i = V_i - C$ and give some intuition behind the main findings in Olson (1965) that we discussed in class. You *do not* need to know this level of detail when it comes to sections (3) and (4). I've also attached part of Olson's Chapter 1 at the end. If you're having trouble understanding the concepts from Olson, I'd recommend that you first read pages 33-36 from the chapters, where he gives a good non-technical summary of his model and then read section 2. If you've taken an intermediate micro course and want a more technical and less wordy summary of the models, see pages 22-33 of the attached chapter.

1 Context/Background

Olson was dealing with an interesting question: why do actors form interest groups, and when do they form them? Lobbying is expensive, but if it is successful in the passage of a beneficial law, the benefits will be available to all firms in the industry. So, one would think that each firm would leave the responsibility of setting up the interest group to others and then "free-ride." Around the time when Olson wrote *The Logic of Collective Action*, a common theory was that humans have an instinct to form groups, and that this instinct is the primary driver of group formation (Bentley 1908). Olson found this explanation unconvincing. Those who formally mapped out the logic of this argument, he wrote, are "no doubt aware that no explanation whatever is offered when the membership of associations or groups is said to be due to an "instinct" to belong; this merely adds a word, not an explanation. Any human action can be ascribed to an instinct or propensity for that kind of action, but this adds nothing to our knowledge." So, he aims to demonstrate that

i) it is possible for the benefit who benefits the most from the common good to provide it, even if others free-ride;
ii) Organized lobbying is more likely to occur when benefits are restricted to a small set of members

2 What do the variables mean?

Olson views lobbying as a transaction, where a group collectively "purchases" a bill that provides political benefits at some rate T. For instance, if the group owns land, we can imagine a bill providing T in subsidies per acre owned or reducing land taxes by T percent;

or if the group needs to purchase an input to make one unit of product, the bill may reduce the price per unit of input by T.[1] If the sum of the group's property/sales is S_g, then the total value to the group of passing a bill with benefits at rate T is $V_g = S_g T$. The benefit accruing to each individual, of course, depends on their "fraction" F_i of the group gain they get. We would expect F_i to be high for firms with high sales or homeowners with valuable properties, and vice-versa. So, the absolute benefits accrued to a member of the group are $V_i = V_g F_i$.

The variable C is the total cost of lobbying. We can break down the costs of lobbing into a fixed cost and variable costs. The fixed cost describes expenses just to set up the interest group. For a large interest group, this may include costs of hiring an attorney to fill out paperwork and an executive team to manage the organization. For a homeowner's association trying to prevent the construction of a major road running through their, this may describe the time necessary to get a basic understanding of local laws regarding property taxes, figuring out who sits on the city council, etc. Variable costs, on the other hand, depend on T. Clearly, increasing T will require expenditures, such as campaign donations, public opinion campaigns, etc. Moreover, the cost for obtaining every additional increase in T will also increase. For instance, the National Corn Grower's Association may find it easy to sell the idea of corn subsidies to representatives from Illinois and Nebraska, who may slip in an earmark for them in a stimulus package. But to get more substantive change, they may eventually need to get political buy-in from politicians who may be less interested.

3 Group formation

So, although we now hopefully understand the components of the equation, what does it really mean? If you're a free-rider, your payoff would just be V_i. What this equation describes is an individual's advantage from being a dues-paying member of the group — holding T and F_i constant — as compared to not having an interest group at all. The simplest way to see that a group will form if at least one individual will benefit from it is by recognizing that $F_i V_g - C$, meaning that an individual prefers the formation of an interest group compared to nothing at all if

$$F_i = V_i / V_g > C / V_g. \tag{1}$$

While this equation shows that individual firms or people who accrue the greater proportion of benefits from the common good are most likely to provide it, recall that the value of the right side also depends on T.

So to figure out how a firm would choose T, Olson first considers another scenario. Suppose you're a member of the group and were given the opportunity to choose T. What would you choose? Essentially, you would keep increasing T as long as the increase in your individual benefit dV_i/dT exceeded the change in your dues dC/dT and would eventually would stop

[1] If we're willing to accept some imprecision, we can also imagine an initiative to fill potholes, where T is the average reduction in drivers' vehicular and psychic damage per filled pothole.

once the change in C and change V_i netted each other out.[2] This is the same as saying that T must satisfy $dC/dT = dV_i/dT$ which we can write as

$$dV_g/dT = (1/F_i)dC/dT. \tag{2}$$

If someone is thinking of starting an interest group and engaging in lobbying by themselves, they will increase T as long group benefits from their incremental change are greater than their private marginal costs, multiplied by a factor of $1/F_i$ to account for their inability to benefit from their entire contribution.

3.1 Example

Suppose there is a homeowners' association whose members want to reduce their property taxes. There are 100 acres of property in the subdivision and suppose that the cost of a change of T in the property tax rate is $C = a + bT^2$. Someone who owns F_i of the property is deciding whether to lobby for a decrease in the tax. The benefits of reduction T on the entire subdivision are $S_gT = 100T$, of which the individual gets $100F_iT$. The individual will choose to lobby until her benefit from incrementally changing the tax, i.e., $100F_i$ equals its marginal cost $2bT^*$ and so $T^* = 50F_i/b$. Having determined her optimal rate of political benefits, lobbing is better than doing nothing only when $F_i > \sqrt{ab}/50$. We see that a homeowner will be incentivized to create an organization when the marginal cost of lobbying rises slowly, when lobbing is efficient (V_g/C is high) and when she can capture a high proportion of the benefits. A wealthy homeowner living in a modest neighborhood (F_i is high) whose city council races are underfunded and so council-members appreciate even small donations (dC/dT is low) may be willing to set up their own organization.

4 Group size

Earlier, we saw that when one member was choosing how much of the common good to provide, she provided it until $dV_g/dT = (1/F_i)dC/dT$ where $1/F_i$ decreases in the fraction of group gains that go to the funder. Unless the person setting up the group obtains all the benefits, i.e., $F_i = 1$, the amount they provide independently will always be Pareto inefficient. By this, I mean that the individual will "inflate" her cost by a factor of $1/F_i = V_g/V_i$ to account for the fact that she must pay $1/F_i$ times the cost of each additional T to obtain the benefits that each incremental T *actually* produces for the group. If some benevolent planner were choosing T to maximize the benefits of the entire group, they would increase T as long as the marginal cost of an increase was outweighed by the marginal benefits it produced for the entire subdivision, i.e., $dV_g/dT = dC/dT$. Because the sole funder was not actually being able to capture the benefit dV_g/dT but rather only F_i of it, they would "under-invest"

[2]How do we know that someone would eventually stop increasing T? Because the cost function is convex, the cost of each change in T becomes more and more expensive. The change in an individual's benefit depends on F_i, which is held as constant, and the change in V_g which, in this case, is just S_g. Consequently, the change in costs eventually catches up with and overtakes the change in benefits (this is equivalent to the second order conditions $d^2/dA_i/dT^2 < 0$.). An optimal choice of T could exist even if we allow for changes in F_i and S_g. See Olson (1965, p. 23)

in T. But why wouldn't others contribute after that? Because once the individual with the highest F_i has contributed toward the good, the cost of any incremental good dC/dT is already equal to $F_i dV_g/dT$. For other members j for whom $F_j < F_i$ and since they get even a smaller fraction of the group benefits than the first contributor, they will be unwilling to contribute. So, even when the person who most values the good actually contributes toward it (and others don't), the outcome would still be Pareto efficient. But, since the group benefits from at least some of the common good purchased (albeit at inefficiently low levels) by the person who wants it the most, it is not as bad as alternative situations when nobody contributes to the common good. This occurs when the person with the highest F_i — the one most likely to contribute to the public good — doesn't. When the highest F_i is still low, then (1) is unlikely to be met. The possibility that the highest F_i is low is much more likely to occur in large rather than small groups. Moreover, when a group is made up of people with similarly sized holdings S_i, it is more likely to have suboptimal outcomes where the common good simply isn't provided.

References

[1] Arthur F Bentley. *The process of government: A study of social pressures*. Principia Press, 1908.

[2] Mancur Olson. *The logic of collective action*. Vol. 124. Harvard University Press, 1965.

THE LOGIC OF COLLECTIVE ACTION

PUBLIC GOODS AND THE THEORY OF GROUPS

MANCUR OLSON

moreover, refer to oligopolistic groups in the marketplace, and the references to oligopoly may interest only the economist. Accordingly, some of the highlights of the following section are explained in an intuitively plausible, though loose and imprecise, way in the "nontechnical summary" of section D, for the convenience of those who might wish to skip the bulk of the following section.

D. SMALL GROUPS

The difficulty of analyzing the relationship between group size and the behavior of the individual in the group is due partly to the fact that each individual in a group may place a different value upon the collective good wanted by his group. Each group wanting a collective good, moreover, faces a different cost function. One thing that will hold true in every case, however, is that the total cost function will be rising, for collective goods are surely like noncollective goods in that the more of the good taken, the higher total costs will be. It will, no doubt, also be true in virtually all cases that there will be significant initial or fixed costs. Sometimes a group must set up a formal organization before it can obtain a collective good, and the cost of establishing an organization entails that the first unit of a collective good obtained will be relatively expensive. And even when no organization or coordination is required, the lumpiness or other technical characteristics of the public goods themselves will ensure that the first unit of a collective good will be disproportionately expensive. Any organization will surely also find that as its demands increase beyond a certain point, and come to be regarded as "excessive," the resistance and the cost of additional units of the collective good rise disproportionately. In short, cost (C) will be a function of the rate or level (T) at which the collective good is obtained ($C = f(T)$), and the average cost curves will have the conventional U shape.

One point is immediately evident. If there is some quantity of a collective good that can be obtained at a cost sufficiently low in relation to its benefit that some one person in the relevant group would gain from providing that good all by himself, then there is some presumption that the collective good will be provided. The total gain would then be so large in relation to the total cost that some one individual's share would exceed the total cost.

An individual will get some share of the total gain to the group,

a share that depends upon the number in the group and upon how much the individual will benefit from that good in relation to the others in the group. The total gain to the group will depend upon the rate or level at which the collective good is obtained (T), and the "size" of the group (S_g), which depends not only upon the number of individuals in the group, but also on the value of a unit of the collective good to each individual in the group. This could be illustrated most simply by considering a group of property owners lobbying for a property tax rebate. The total gain to the group would depend upon the "size" (S_g) of the group, that is, the total assessed valuation of all the group property, and the rate or level (T) of tax rebate per dollar of assessed valuation of property. The gain to an individual member of the group would depend upon the "fraction" (F_i) of the group gain he got.

The group gain (S_gT) could also be called V_g, for "value" to the group, and the gain to the individual V_i, for "value" to the individual. The "fraction" (F_i) would then equal V_i/V_g, and the gain to the individual would be F_iS_gT. The advantage (A_i) that any individual i would get from obtaining any amount of the collective or group good would be the gain to the individual (V_i) minus the cost (C).

What a group does will depend on what the individuals in that group do, and what the individuals do depends on the relative advantages to them of alternative courses of action. So the first thing to do, now that the relevant variables have been isolated, is to consider the individual gain or loss from buying different amounts of the collective good. This will depend on the way the advantage to the individual ($A_i = V_i - C$) changes with changes in T, that is, on

$$dA_i/dT = dV_i/dT - dC/dT.$$

For a maximum, $dA_i/dT = 0$.[40] Since $V_i = F_iS_gT$, and F_i and S_g are, for now, assumed constant,[41]

$$d(F_iS_gT)/dT - dC/dT = 0$$
$$F_iS_g - dC/dT = 0.$$

40. The second-order conditions for a maximum must also be satisfied; that is, $d^2A_i/dT^2 < 0$.

41. In cases where F_i and S_g are not constant, the maximum is given when:

$$d(F_iS_gT)/dT - dC/dT = 0$$
$$F_iS_g + F_iT(dS_g/dT) + S_gT(dF_i/dT) - dC/dT = 0.$$

This indicates the amount of the collective good that an individual acting independently would buy, if he were to buy any. This result can be given a general, common-sense meaning. Since the optimum point is found when

$$dA_i/dT = dV_i/dT - dC/dT = 0$$

and since $dV_i/dT = F_i(dV_g/dT)$

$$F_i(dV_g/dT) - dC/dT = 0$$
$$F_i(dV_g/dT) = dC/dT.$$

This means that the optimal amount of a collective good for an individual to obtain, if he should obtain any, is found when the rate of gain to the group, multiplied by the fraction of the group gain the individual gets, equals the rate of increase of the total cost of the collective good. In other words, the rate of gain to the group (dV_g/dT) must exceed the rate of increase in cost (dC/dT) by the same multiple that the group gain exceeds the gain to the individual concerned $(1/F_i = V_g/V_i)$.[42]

But what matters most is *not* how much of the collective good will be provided if some is provided, but rather whether *any* of the collective good will be provided. And it is clear that, at the optimum point for the individual acting independently, the collective or group good will presumably be provided if $F_i > C/V_g$.

For if

$$F_i > C/V_g$$
$$V_i/V_g > C/V_g$$

then

$$V_i > C.$$

Thus, if $F_i > C/V_g$, the gain to an individual from seeing that the collective good is provided will exceed the cost. This means there is a presumption that the collective good will be provided if the cost of the collective good is, at the optimal point for any individual in the group, so small in relation to the gain of the group as a whole

42. The same point could be made by focusing attention on the individual's cost and benefit functions alone, and neglecting the gains to the group. But this would divert attention from the main purpose of the analysis, which is studying the relation between the size of the group and the likelihood that it will be provided with a collective good.

from that collective good, that the total gain exceeds the total cost by as much as or more than the gain to the group exceeds the gain to the individual.

In summary, then, the rule is that there is a presumption that a collective good will be provided if, when the gains to the group from the collective good are *increasing* at $1/F_i$ times the *rate* of increase in the total cost of providing that good (that is, when $dV_g/dT = 1/F_i(dC/dT)$, the total benefit to the group is a larger multiple of the cost of that good than the gains to the group are of the gains to the individual in question (that is, $V_g/C > V_g/V_i$).

The degree of generality of the basic idea in the foregoing model can be illustrated by applying it to a group of firms in a market. Consider an industry producing a homogeneous product, and assume that the firms in the industry *independently* seek to maximize profits. For simplicity, suppose also that marginal costs of production are zero. In order to avoid adding any new notational symbols, and to bring out the applicability of the foregoing analysis, assume that T now stands for price, that S_g now stands for the physical volume of the group's or industry's sales, and S_i for the size or physical volume of the sales of firm i. F_i still indicates the "fraction" of the total accounted for by the individual firm or member of the group. It indicates now the fraction of the total group or industry sales going to firm i at any given moment: $F_i = S_i/S_g$. The price, T, will affect the amount sold by the industry to an extent given by the elasticity of demand, E. The elasticity $E = -T/S_g(dS_g/dT)$, and from this a convenient expression for the slope of the demand curve, dS_g/dT, follows: $dS_g/dT = -ES_g/T$. With no production costs, the optimum output for a firm will be given when:

$$dA_i/dT = d(S_iT)/dT = 0$$
$$S_i + T(dS_i/dT) = 0$$
$$F_iS_g + T(dS_i/dT) = 0.$$

Here, where it is assumed that the firm acts independently, i.e., expects no reaction from other firms, $dS_i = dS_g$, so

$$F_iS_g + T(dS_g/dT) = 0$$

and since $dS_g/dT = -ES_g/T$,

$$F_iS_g - T(ES_g/T) = 0$$
$$S_g(F_i - E) = 0.$$

This can happen only when $F_i = E$. Only when the elasticity of demand for the industry is less than or equal to the fraction of the industry's output supplied by a particular firm will that firm have any incentive to restrict its output. A firm that is deciding whether or not to restrict its output in order to bring about a higher price will measure the cost or loss of the foregone output against the gains it gets from the "collective good"—the higher price. The elasticity of demand is a measure of this. If F_i is equal to E it means that the elasticity of demand for the industry is the same as the proportion of the output of the industry shared by the firm in question; if the elasticity of demand is, say, 1/4, it means that a 1 per cent reduction in output will bring a 4 per cent increase in price, which makes it obvious that if a given firm has one fourth of the total industry output it should stop increasing, or restrict, its own output. If there were, say, a thousand firms of equal size in an industry, the elasticity of demand for the industry's product would have to be 1/1000 or less before there would be any restriction of output. Thus there are no profits in equilibrium in any industry with a really large number of firms. A profit-maximizing firm will start restricting its output, that is, will start acting in a way consistent with the interests of the industry as a whole, when the rate at which the gain to the group increases, as more T (a higher price) is provided, is $1/F_i$ times as great as the rate at which the total cost of output restriction increases. This is the same criterion for group-oriented behavior used in the more general case explained earlier.

This analysis of a market is identical with that offered by Cournot.[43] This should not be surprising, for Cournot's theory is essentially a special case of a more general theory of the relationship between the interests of the member of a group and of the interests of the group as a whole. The Cournot theory can be regarded as a special case of the analysis developed here. The Cournot solution thus boils down to the common-sense statement that a firm will act to keep up the price of the product its industry sells only when the total cost of keeping up the price is not more than its share of the industry's gain from the higher price. The Cournot theory is, like the analysis of group action outside the market, a theory that asks

43. Augustin Cournot, *Researches into the Mathematical Principles of the Theory of Wealth*, trans. Nathaniel T. Bacon (New York: Macmillan, 1897), especially chap. vii, pp. 79–90.

when it is in the interest of an individual unit in a group to act in the interest of the group as a whole.

The Cournot case is in one respect simpler than the group situation outside the marketplace that is the main concern of this study. When a group seeks an ordinary collective good, rather than a higher price through output restriction, it finds, as the opening paragraph of this section argued, that the first unit of the collective good obtained will be more expensive per unit than some subsequent units of the good. This is because of the lumpiness and other technical characteristics of collective goods, and because it may sometimes be necessary to create an organization to obtain the collective good. This calls to attention the fact that there are two distinct questions that an individual in a nonmarket group must consider. One is whether the total benefit he would get from providing some amount of the collective good would exceed the total cost of that amount of the good. The other question is how much of the collective good he should provide, if some should be provided, and the answer here depends of course on the relationship between marginal, rather than total, costs and benefits.

There are similarly also two distinct questions that must be answered about the group as a whole. It is not enough to know whether a small group will provide itself with a collective good; it is also necessary to determine whether the amount of the collective good that a small group will obtain, if it obtains any, will tend to be Pareto-optimal for the group as a whole. That is, will the group gain be maximized? The optimal amount of a collective good for a group as a whole to obtain, if it should obtain any, would be given when the gain to the group was increasing at the same rate as the cost of the collective good, i.e., when $dV_g/dT = dC/dT$. Since, as shown earlier, each individual in the group would have an incentive to provide more of the collective good until $F_i(dV_g/dT = dC/dT$, and since $\Sigma F_i = 1$, it would at first glance appear that the sum of what the individual members acting independently would provide would add up to the group optimum. It would also seem that each individual in the group would then bear a fraction, F_i, of the total burden or cost, so that the burden of providing the public good would be shared in the "right" way in the sense that the cost would be shared in the same proportion as the benefits.

But this is not so. Normally, the provision of the collective good will be strikingly suboptimal and the distribution of the burden will

be highly arbitrary. This is because the amount of the collective good that the individual obtains for himself will automatically also go to others. It follows from the very definition of a collective good that an individual cannot exclude the others in the group from the benefits of that amount of the public good that he provides for himself.[44] This means that no one in the group will have an incentive independently to provide any of the collective good once the amount that would be purchased by the individual in the group with the largest F_i was available. This suggests that, just as there is a tendency for large groups to fail to provide themselves with any collective good at all, so *there is a tendency in small groups toward a suboptimal provision of collective goods.* The suboptimality will be the more serious the smaller the F_i of the "largest" individual in the group. *Since the larger the number in the group, other things equal, the smaller the F_i's will be, the more individuals in the group, the more serious the suboptimality will be.* Clearly then groups with larger numbers of members will generally perform less efficiently than groups with smaller numbers of members.

It is not, however, sufficient to consider only the number of individuals or units in a group, for the F_i of any member of the group will depend not only on how many members there are in the group, but also on the "size" (S_i) of the individual member, that is, the extent to which he will be benefited by a given level of provision of the collective good. An owner of vast estates will save more from a given reduction in property taxes than the man with only a modest cottage, and other things equal will have a larger F_i.[45] A group com-

44. In the rest of this section it is convenient and helpful to assume that every member of the group receives the same amount of the public good. This is in fact the case whenever the collective good is a "pure public good" in Samuelson's sense. This assumption is, however, more stringent than is usually necessary. A public good may be consumed in unequal amounts by different individuals, yet be a full public good in the sense that one individual's consumption does not in any way diminish that of another. And even when additional consumption by one individual does lead to marginal reductions in the amount available to others, the qualitative conclusions that there will be suboptimality and disproportionate burden sharing still hold.

45. Differences in size can also have some importance in market situations. The large firm in a market will get a larger fraction of the total benefit from any higher price than a small firm, and will therefore have more incentive to restrict output. This suggests that the competition of a few large firms among the many small ones, contrary to some opinions, can lead to a serious misallocation of resources. For a different view on this subject, see Willard D. Arant, "The Competition of the Few among the Many," *Quarterly Journal of Economics*, LXX (August 1956), 327–345.

posed of members of unequal S_i, and, therefore, unequal F_i, will show less of a tendency toward suboptimality (and be more likely to provide itself with some amount of a collective good) than an otherwise identical group composed of members of equal size.

Since no one has an incentive to provide any more of the collective good, once the member with the largest F_i has obtained the amount he wants, it is also true that the distribution of the burden of providing the public good in a small group will *not* be in proportion to the benefits conferred by the collective good. The member with the largest F_i will bear a disproportionate share of the burden.[46] Where small groups with common interests are concerned, then, *there is a systematic tendency for "exploitation"*[47] *of the great by the small!*

The behavior of small groups interested in collective goods can sometimes be quite complex—much more complex than the preceding paragraphs would suggest.[48] There are certain institutional

46. The discussion in the text is much too brief and simple to do full justice even to some of the most common situations. In what is perhaps the most common case, where the collective good is *not* a money payment to each member of some group, and not something that each individual in the group can sell for money, the individuals in the group must compare the additional cost of another unit of the collective good with the additional "utility" they would get from an additional unit of that good. They could not, as the argument in the text assumes, merely compare a money cost with a money return, and indifference curves would accordingly also have to be used in the analysis. The marginal rate of substitution would be affected not only by the fact that the taste for additional units of the collective good would diminish as more of the good was consumed, but also by the income effects. The income effects would lead a group member that had sacrificed a disproportionate amount of his income to obtain the public good to value his income more highly than he would have done had he got the collective good free from others in the group. Conversely, those who had not borne any of the burden of providing the collective good they enjoyed would find their real incomes greater, and unless the collective good were an inferior good, this gain in real income would strengthen their demand for the collective good. These income effects would tend to keep the largest member of the group from bearing *all* of the burden of the collective good (as he would in the much too simple case considered in the text). I am thankful to Richard Zeckhauser for bringing the importance of income effects in this context to my attention.

47. The moral overtones of the word "exploitation" are unfortunate; no general moral conclusions can follow from a purely logical analysis. Since the word "exploitation" is, however, commonly used to describe situations where there is a disproportion between the benefits and sacrifices of different people, it would be pedantic to use a different word here.

48. For one thing, the argument in the text assumes independent behavior, and thus neglects the strategic interaction or bargaining that is possible in small groups. As later parts of this chapter will show, strategic interaction is usually much less important in nonmarket groups seeking collective goods than it is among groups of firms in the marketplace. And even when there is bargaining, it will often be

arrangements and behavioral assumptions that will not always lead to the suboptimality and disproportionality that the preceding paragraphs have described. Any adequate analysis of the tendency toward suboptimal provision of collective goods, and toward disproportionate sharing of the burdens of providing them, would be too long to fit comfortably into this study, which is concerned mainly with large groups, and brings in small groups mainly for purposes of comparison and contrast. The problem of small groups seeking collective goods is of some importance, both theoretically [49] and practically, and has not been adequately treated in the literature. It will accordingly be analyzed in more detail in forthcoming articles. The Nontechnical Summary of this section will list a few of the specific cases that this approach to small groups and organizations can be used to study.

The necessary conditions for the optimal provision of a collective good, through the voluntary and independent action of the members of a group, can, however, be stated very simply. The marginal cost of additional units of the collective good must be shared in exactly the same proportion as the additional benefits. Only if this is done will each member find that his own marginal costs and benefits are

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the case that there will be a disparity of bargaining power that will lead to about the same results as are described in the text. When a group member with a large F_i bargains with a member with a small F_i, all he can do is threaten the smaller member by saying, in effect, "If you do not provide more of the collective good, I will provide less myself, and you will then be worse off than you are now." But when the large member restricts his purchase of the public good, he will suffer *more* than the smaller member, simply because his F_i is greater. The large member's threat is thus not apt to be credible. Another factor that works in the same direction is that the maximum amount of collective good provision that a successful bargain can extract from the small member is less than the amount a successful bargain can bring forth from the large member. This means that the large member may not gain enough even from successful bargaining to justify the risks or other costs of bargaining, while the small member by contrast finds that the gain from a successful bargain is large in relation to his costs of bargaining. The bargaining problem is of course more complex than this, but it is nonetheless clear that bargaining will usually lead toward the same results as the forces explained in the text.

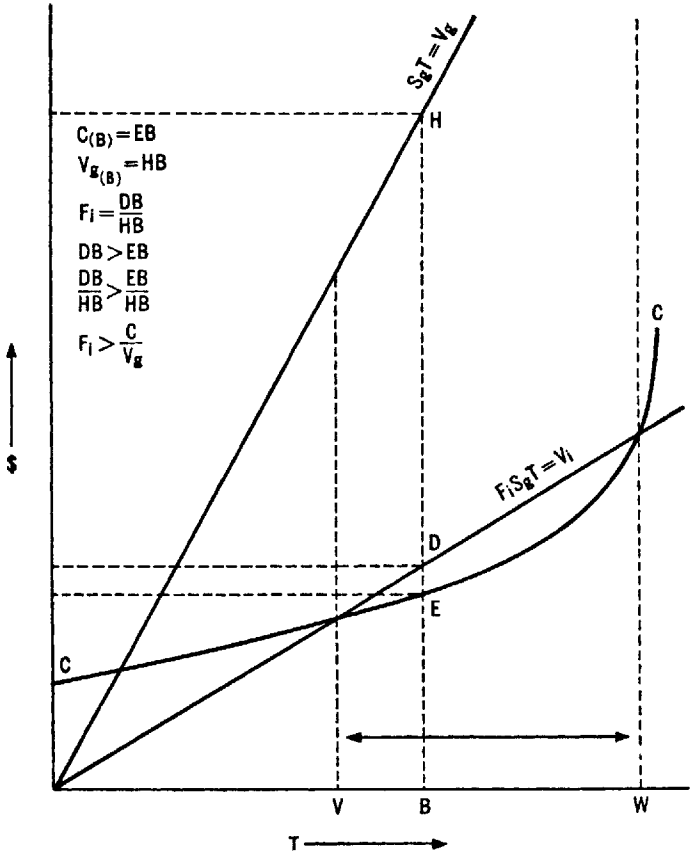
49. Erik Lindahl's famous "voluntary theory of public exchange" can, I believe, usefully be amended and expanded with the aid of the analysis adumbrated in the text. I am thankful to Richard Musgrave for bringing to my attention the fact that Lindahl's theory and the approach used in this study must be closely related. He sees this relationship in a different way, however. For analyses of Lindahl's theory see Richard Musgrave, "The Voluntary Exchange Theory of Public Economy," *Quarterly Journal of Economics*, LIII (February 1939), 213–237; Leif Johansen, "Some Notes on the Lindahl Theory of Determination of Public Expenditures," *International Economic Review*, IV (September 1963), 346–358; John G. Head, "Lindahl's Theory of the Budget," *Finanzarchiv*, XXIII (October 1964), 421–454.

equal at the same time that the total marginal cost equals the total or aggregate marginal benefit. If marginal costs are shared in *any* other way, the amount of collective good provided will be *sub*-optimal.[50] It might seem at first glance that if some cost allocations lead to a suboptimal provision of a collective good, then some other cost allocations would lead to a supraoptimal supply of that good; but this is not so. In any group in which participation is voluntary, the member or members whose shares of the marginal cost exceed their shares of the additional benefits will stop contributing to the achievement of the collective good *before* the group optimum has been reached. And there is no conceivable cost-sharing arrangement in which *some* member does not have a marginal cost greater than his share of the marginal benefit, except the one in which every member of the group shares marginal costs in exactly the same proportion in which he shares incremental benefits.[51]

50. There is an illustration of this point in many farm tenancy agreements, where the landlord and tenant often share the produce of the crop in some prearranged proportion. The farm's output can then be regarded as a public good to the landlord and tenant. Often the tenant will provide *all* of the labor, machinery, and fertilizer, and the landlord will maintain *all* of the buildings, drainage, ditches, etc. As some agricultural economists have rightly pointed out, such arrangements are inefficient, for the tenant will use labor, machinery, and fertilizer only up to the point where the marginal cost of these factors of production equals the marginal return from his *share* of the crop. Similarly, the landlord will provide a suboptimal amount of the factors he provides. The only way in which this suboptimal provision of the factors can be prevented in a share-tenancy is by having the landlord and tenant share the costs of each of the (variable) factors of production in the *same* proportion in which they share the output. Perhaps this built-in inefficiency in most share-tenancy agreements helps account for the observation that in many areas where farmers do not own the land they farm, land reform is necessary to increase agricultural efficiency. See Earl O. Heady and E. W. Kehrberg, *Effect of Share and Cash Renting on Farming Efficiency* (Iowa Agricultural Experiment Station Bulletin 386), and Earl O. Heady, *Economics of Agricultural Production and Resource Use* (New York: Prentice-Hall, 1952), esp. pp. 592 and 620.

51. A similar argument could sometimes be used to help explain the common observation that there is "public squalor" midst "private splendor," that is, a sub-optimal supply of public goods. Such an argument would be relevant at least in those situations where proposed Pareto-optimal public expenditures benefit a group of people smaller than the group that would be taxed to pay for these expenditures. The point that even Pareto-optimal public expenditures usually benefit groups of people smaller than the group taxed to pay for these expenditures was suggested to me by Julius Margolis' useful paper on "The Structure of Government and Public Investment," in *American Economic Review: Papers and Proceedings,* LIV (May 1964), 236–247. See my "Discussion" of Margolis' paper (and others) in the same issue of the *American Economic Review* (pp. 250–251) for a suggestion of a way in which a model of the kind developed in this study can be used to explain private

Though there is a tendency for even the smallest groups to provide suboptimal amounts of a collective good (unless they arrange marginal cost-sharing of the kind just described), the more important point to remember is that some sufficiently small groups can pro-



affluence and public squalor. It is interesting that John Head (*Finanzarchiv*, XXIII, 453–454) and Leif Johansen (*International Economic Review*, IV, 353), though they started out at different points from mine and used instead Lindahl's approach, still had arrived at conclusions on this point that are not altogether different from mine. For interesting arguments that point to forces that could lead to supra-optimal levels of government expenditure, see two other papers in the issue of the *American Economic Review* cited above, namely "Fiscal Institutions and Efficiency in Collective Outlay" (pp. 227–235) by James M. Buchanan, and "Divergencies between Individual and Total Costs within Government" (pp. 243–249) by Roland N. McKean.

vide themselves with some amount of a collective good through the voluntary and rational action of one or more of their members. In this they are distinguished from really large groups. There are two things to determine in finding out whether there is any presumption that a given group will voluntarily provide itself with a collective good. First, the optimal amount of the collective good for each *individual* to buy, if he is to buy any, must be discovered; this is given when $F_i(dV_g/dT) = dC/dT$.[52] Second, it must be determined whether any member or members of the group would find at that individual optimum that the benefit to the group from the collective good exceeded the total cost by more than it exceeded the member's own benefit from that collective good; that is, whether $F_i > C/V_g$. The argument may be stated yet more simply by saying that, *if at any level of purchase of the collective good, the gain to the group exceeds the total cost by more than it exceeds the gain to any individual, then there is a presumption that the collective good will be provided, for then the gain to the individual exceeds the total cost of providing the collective good to the group.* This is illustrated in the accompanying figure, where an individual would presumably be better off for having provided the collective good, whether he provided amount V or amount W or any amount in between. If any amount of the collective good between V and W is obtained, even if it is not the optimal amount for the individual, F_i will exceed C/V_g.

Nontechnical summary of Section D

The technical part of this section has shown that certain small groups can provide themselves with collective goods without relying on coercion or any positive inducements apart from the collective good itself.[53] This is because in some small groups each of the mem-

52. If F_i is not a constant, this individual optimum is given when:
$$F_i(dV_g/dT) + V_g(dF_i/dT) = dC/dT.$$

53. I am indebted to Professor John Rawls of the Department of Philosophy at Harvard University for reminding me of the fact that the philosopher David Hume sensed that small groups could achieve common purposes but large groups could not. Hume's argument is however somewhat different from my own. In *A Treatise of Human Nature,* Everyman edition (London: J. M. Dent, 1952), II, 239, Hume wrote: "There is no quality in human nature which causes more fatal errors in our conduct, than that which leads us to prefer whatever is present to the distant and remote, and makes us desire objects more according to their situation than their intrinsic value. Two neighbours may agree to drain a meadow, which they possess

bers, or at least one of them, will find that his personal gain from having the collective good exceeds the total cost of providing some amount of that collective good; there are members who would be better off if the collective good were provided, even if they had to pay the entire cost of providing it themselves, than they would be if it were not provided. In such situations there is a presumption that the collective good will be provided. Such a situation will exist only when the benefit to the group from having the collective good exceeds the total cost by more than it exceeds the gain to one or more individuals in the group. Thus, in a very small group, where each member gets a substantial proportion of the total gain simply because there are few others in the group, a collective good can often be provided by the voluntary, self-interested action of the members of the group. In smaller groups marked by considerable degrees of inequality—that is, in groups of members of unequal "size" or extent of interest in the collective good—there is the greatest likelihood that a collective good will be provided; for the greater the interest in the collective good of any single member, the greater the likelihood that that member will get such a significant proportion of the total benefit from the collective good that he will gain from seeing that the good is provided, even if he has to pay all of the cost himself.

Even in the smallest groups, however, the collective good will not ordinarily be provided on an optimal scale. That is to say, the members of the group will not provide as much of the good as it would be in their common interest to provide. Only certain special

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in common: because it is easy for them to know each other's mind; and each must perceive, that the immediate consequence of his failing in his part, is the abandoning of the whole project. But it is very difficult, and indeed impossible, that a thousand persons should agree in any such action; it being difficult for them to concert so complicated a design, and still more difficult for them to execute it; while each seeks a pretext to free himself of the trouble and expense, and would lay the whole burden on others. Political society easily remedies both these inconveniences. Magistrates find an immediate interest in the interest of any considerable part of their subjects. They need consult nobody but themselves to form any scheme for promoting that interest. And as the failure of any one piece in the execution is connected, though not immediately, with the failure of the whole, they prevent that failure, because they find no interest in it, either immediate or remote. Thus, bridges are built, harbours opened, ramparts raised, canals formed, fleets equipped, and armies disciplined, everywhere, by the care of government, which, though composed of men subject to all human infirmities, becomes, by one of the finest and most subtile inventions imaginable, a composition which is in some measure exempted from all these infirmities."

institutional arrangements will give the individual members an incentive to purchase the amounts of the collective good that would add up to the amount that would be in the best interest of the group as a whole. This tendency toward suboptimality is due to the fact that a collective good is, by definition, such that other individuals in the group cannot be kept from consuming it once any individual in the group has provided it for himself. Since an individual member thus gets only part of the benefit of any expenditure he makes to obtain more of the collective good, he will discontinue his purchase of the collective good before the optimal amount for the group as a whole has been obtained. In addition, the amounts of the collective good that a member of the group receives free from other members will further reduce his incentive to provide more of that good at his own expense. Accordingly, *the larger the group, the farther it will fall short of providing an optimal amount of a collective good.*

This suboptimality or inefficiency will be somewhat less serious in groups composed of members of greatly different size or interest in the collective good. In such unequal groups, on the other hand, there is a tendency toward an arbitrary sharing of the burden of providing the collective good. The largest member, the member who would on his own provide the largest amount of the collective good, bears a disproportionate share of the burden of providing the collective good. The smaller member by definition gets a smaller fraction of the benefit of any amount of the collective good he provides than a larger member, and therefore has less incentive to provide additional amounts of the collective good. Once a smaller member has the amount of the collective good he gets free from the largest member, he has more than he would have purchased for himself, and has no incentive to obtain any of the collective good at his own expense. In small groups with common interests there is accordingly *a surprising tendency for the "exploitation" of the great by the small.*

The argument that small groups providing themselves with collective goods tend to provide suboptimal quantities of these goods, and that the burdens of providing them are borne in an arbitrary and disproportionate way, does not hold in all logically possible situations. Certain institutional or procedural arrangements can lead to different outcomes. The subject cannot be analyzed adequately in any brief discussion. For this reason, and because the main focus of this book is on large groups, many of the complexities of small-group

behavior have been neglected in this study. An argument of the kind just outlined could, however, fit some important practical situations rather well, and may serve the purpose of suggesting that a more detailed analysis of the kind outlined above could help to explain the apparent tendency for large countries to bear disproportionate shares of the burdens of multinational organizations, like the United Nations and NATO, and could help to explain some of the popularity of neutralism among smaller countries. Such an analysis would also tend to explain the continual complaints that international organizations and alliances are not given adequate (optimal) amounts of resources.[54] It would also suggest that neighboring local governments in metropolitan areas that provide collective goods (like commuter roads and education) that benefit individuals in two or more local government jurisdictions would tend to provide inadequate amounts of these services, and that the largest local government (e.g., the one representing the central city) would bear disproportionate shares of the burdens of providing them.[55] An analysis of the foregoing type might, finally, provide some additional insight into the phenomenon of price leadership, and particularly the possible disadvantages involved in being the largest firm in an industry.

The most important single point about small groups in the present context, however, is that they may very well be able to provide themselves with a collective good simply because of the attraction of the collective good to the individual members. In this, small groups differ from larger ones. The larger a group is, the farther it will fall short of obtaining an optimal supply of any collective good, and the less likely that it will act to obtain even a minimal amount of such a good. In short, the larger the group, the less it will further its common interests.

E. "EXCLUSIVE" AND "INCLUSIVE" GROUPS

The movement in and out of the group must no longer be ignored. This is an important matter; for industries or market groups differ

54. Some of the complexities of behavior in small groups are treated in Mancur Olson, Jr., and Richard Zeckhauser, "An Economic Theory of Alliances," *Review of Economics and Statistics*, XLVIII (August 1966), 266–279, and in "Collective Goods, Comparative Advantage, and Alliance Efficiency," in *Issues of Defense Economics* (A Conference of the Universities-National Bureau-Committee for Economics Research), Roland McKean, ed., (New York: National Bureau of Economic Research, 1967), pp. 25–48. [Footnote added in 1970.]

55. I am indebted to Alan Williams of York University in England, whose study of local government brought the importance of these sorts of spillovers among local govenments to my attention.