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Problems in the Provision of Public Goods

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COMMENT
PROBLEMS IN THE PROVISION OF PUBLIC GOODS

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I. Comments on *Tie-ins and the Market Provision of Collective Goods*

My comments on Daniel Klein's article[1] are divided into two sections. The first discusses whether there is any important difference between providing a local public good, such as a patrol service, by means of a tie-in contract and providing it by means of a government. The second discusses difficulties with Mr. Klein's private solutions to the problem of providing pure public goods—and similar difficulties with governmental solutions to the same problem.

A. *When is a Government not a Government?*

A developer buys a large area of land, builds houses, streets, and sewers, and converts several acres into a small private park. Before selling the houses, he draws up a contract by which the purchasers agree to pay an annual fee for maintenance of the common facilities, patrol services, and the like.

Because the developer cannot be sure of the future cost of gardening, road repair, or patrol services, he is unwilling to guarantee to provide them for a fixed price. The purchasers are equally unwilling to give him a blank check to spend as much as he wants at their expense. The obvious solution is to set up a residents' association, empowered to raise and lower membership dues and to decide how that money is to be spent. Everyone who purchases a house agrees to join the association and to be bound by its decisions. The charter of the association specifies the voting rules by which it will make its decisions.

This is a common solution to the problem of providing local public goods, and it may well be a satisfactory one, but in what sense is it a private solution? One of the main points of Mr.

Klein's article is that tie-ins provide a non-governmental way of producing collective goods. Is not the residents' association, with compulsory membership, compulsory dues, and democratic voting rules, simply a local government under a different name? Will it not face exactly the same sorts of problems in running its community—bureaucracy, rational ignorance, corruption, rent-seeking—that make government seem, to many of us, an unattractive and inefficient mechanism for producing goods and services?

The moral philosopher, or at least the libertarian moral philosopher, might reply that the essential difference is an ethical one. Governments come into existence by something very much short of unanimous consent, and impose their rules and their taxes on everyone living in the area they claim, whether or not he has agreed to accept them. The members of the residents' association all voluntarily agreed to join it and abide by its rules when they purchased houses in the development. If the association is equivalent to a government, it is equivalent to the only kind of government with any real claim to moral authority—one established by unanimous consent.

The economist is likely to give a somewhat different answer. The residents' association, once established, is exactly like a government. The one essential difference is that the process by which it was established will tend to create an efficient government, insofar as that is possible.

Consider all of the forms of government that the development could have, each defined by its constitution—voting rules, organizational structure, bylaws, and the like. Typically, different constitutions will produce different outcomes. The developer, in choosing a constitution for the residents' association, will look for the set of rules that maximizes the total value for which he can sell the houses he has built. If—and this an important qualification—the purchasers are able to evaluate the effect on them of alternative constitutions, the one that maximizes the developer's profit will also be the one that maximizes the net benefit to the purchasers.

What each consumer is buying is a package containing both a piece of property and the benefits and liabilities of membership in the residents' association. The price he is willing to pay will be the amount that he believes the bundle is worth. A change in the proposed constitution that produces net benefits—for in-

stance, by changing the expected outcome in a way that makes the owner of house A $2000 better off and the owner of house B $1000 worse off—will also produce a gain for the developer. After changing the proposed constitution, he can raise his price for A by $2000, lower his price for B by $1000, and be better off by the difference. The developer will try to construct an optimal constitution for the same reason that he will try to construct optimal houses—any net improvement will raise the price for which he can sell his goods by more than it raises his costs, hence will increase his profits.

That conclusion depends on the assumption that the consumers know what they are buying. The more ignorant they are, the greater the difference between the house or constitution that maximizes the developer's profits and the one that maximizes net benefits to the purchasers. As in the case of ordinary private goods, consumers can help solve their information problem by listening to a range of producers and, perhaps more important, examining a range of products.[2]

So one argument in favor of the "private" solution to the problem of producing local public goods is that, though it does indeed produce a government, the government it produces is one that has been designed by someone in whose private interest it is to produce the best possible government. How much of an advantage this is over the "public" solution to the same problem depends on how well ordinary governments are designed. The public choice literature suggests that one can expect government to have an efficient constitution only if (1) transactions are costless[3] or (2) the constitution is adopted unanimously.[4] Satisfying either of those conditions is unrealistic. In sum, though both the private and the public solution re-

2. Note that similar problems face a voter trying to decide what constitution to vote for; he, however, has much less reason to try to solve them. One voter's correct decision increases the vote for the correct constitution by one. Unless the community is very small, the result is only a very slight increase in the chance that the correct constitution will win. On the other hand, a consumer choosing among communities knows that his choice will determine which community he will live in, hence which constitution he will live under.

3. Assuming zero transaction costs, residents will bargain among themselves to reach an efficient constitution. *See* Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1 (1960).

4. Under most circumstances, for reasons similar to those discussed in my comments on David Schmidtz's article *Contracts and Public Goods*, 10 HARV. J.L. & PUB. POL'Y 475 (1987), a requirement of unanimous assent to the constitution will result in no constitution at all, unless transaction costs are zero or at least very low.

quire unrealistic assumptions to work perfectly, the public solution requires much more unrealistic assumptions and so seems likely to produce a worse approximation to the ideal outcome.

So far, we have been talking about the constitution for a community. Very much the same analysis applies to a similar case with which many readers may be more familiar—the rules of a corporation. A corporation, like a government or a residents' association, requires a set of decision-making rules for decisions made by and on behalf of its members.

Under current law, some of the rules binding corporations are produced by the courts and the legal system, and some are produced by the corporations themselves at the time of incorporation.[5] With regard to the latter set of rules, the newly formed corporation is in the same position as the yet unsold development. It has no stockholders (residents) to exploit. Before investing their money, both stockholders and residents have an opportunity to evaluate the effect on themselves of the decision rules to which they are agreeing. Corporations with rules of which potential stockholders approve will be able to sell their stock at a higher price, just as developments with rules of which potential residents approve will be able to sell houses at a higher price. Hence existing corporations are, at least in part, designed for efficiency in the same way as the communities that Mr. Klein discusses. In both cases, the outcome can be expected to be efficient in the sense of solving the organizational problems at least as well as any alternative arrangement. It may be argued that this is one of the reasons that even very large corporations seem to produce output at a much lower cost than do governments.[6]

B.   *Can Tie-ins Solve the Hard Problems?*

In Parts I to V of his article, Mr. Klein shows how tie-in sales can be, and are, used to produce a wide variety of public goods.

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5. Since partnerships with many partners existed before corporate law, the privately generated rules must have been at least sufficient for a workable organization, although not necessarily either optimal or identical to the rules of modern corporations.

6. A second reason has been pointed out by Judge Winter. Our present corporate law is the outcome of a competitive legal process; states, led by Delaware, compete to design corporate codes that corporations will choose to be chartered under. This is an example of how something we usually think of as a public good—a set of legal rules—can be converted into a private good and sold. *See* Winter, *Private Goals and Competition Among State Legal Systems,* HARV. J.L. & PUB. POL'Y., Special Issue 1982, at 127.

In Part VI of the article, he argues that the same solution may solve the hard problem of how to produce a pure public good with a large public.[7] The example he gives is national defense, which many would regard as the most fundamental responsibility of government, and the one most difficult to provide privately.

His first suggestion is that communities—presumably proprietary communities—may require, as part of the purchase agreement, that residents agree to contribute to defense if necessary. The difficulty, as he notes, is that communities that do not have such requirements will free ride on those that do.[8] He suggests, and very briefly describes, ways in which social sanctions might deal with such problems.

Suppose that, for whatever reason, there are no pre-existing defense contracts. Mr. Klein suggests that defense may then be funded by individuals, motivated by the threat of sanctions. Thus, for example, all grocery stores might refuse to deal with customers who had not made their "voluntary" contribution to the defense funds.[9]

There are some serious difficulties with that solution. It will have no effect unless enough stores join so that the cost imposed on customers—travelling to a "scab" store, getting fake evidence of having made defense payment, or the like—is at least as great as the amount each customer is expected to contribute for defense.[10] Suppose that is the case, and further suppose the sum of those expected contributions to equal a thousand dollars per capita.

A store that chooses to break the boycott—to agree to sell to customers whether or not they have contributed to defense—will find that it can raise its prices by the equivalent of almost a thousand dollars per customer and still get lots of (non-contributing) customers. Hence a store that adheres to the boycott is, in effect, reducing its profits by about a thousand dollars per customer times the number of customers it can serve. Added up over all stores, that means that the grocery stores are reducing their profits (relative to what each could get by violating the

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7. *See* Klein, *supra* note 1, at 471-73.

8. *See id.* at 472.

9. *See id.* at 472-73.

10. Strictly speaking, the limit will be the amount required for defense minus the value to the customer of the additional defense provided by his contribution.

boycott, not necessarily relative to what each got before the problem of defense arose) by an amount roughly equal to the full defense expenditure of the society. That may, if the grocers are sufficiently patriotic, be a satisfactory way of defending the society, but it is not an example of the production of a public good via a tie-in sale.

Mr. Klein's answer, if I understand it, is that a store that breaks the boycott may itself be the object of sanctions— "blacklisting and boycotts."[11] The most obvious objection is that the store in question is selling only to those who have not paid for defense—and they are hardly likely to boycott it for doing so. More generally, here as earlier, Mr. Klein is falling back on the assumption that an unexplained and unanalyzed set of social sanctions will somehow solve the public good problem for him. He may perhaps be right, but the claim is outside of his analysis—which, unfortunately, does not provide us with any solution to the sort of pure public good problem exemplified by (non-local) national defense.

C. *Public Provision of Public Goods: The Unsatisfactory Alternative*

Mere powder, guns, and bullets,
We scarce can get at all;
Their price was spent in merriment
And revel at Whitehall,
. . . .
Our King and Court for their disport
Do sell the very Thames![12]
                    The Dutch in the Medway, Rudyard Kipling

One point that Mr. Klein might have made is that the inability to solve such problems privately does not imply that they can be dealt with any better publicly. Public provision of national defense solves one problem—free riding by those who would not pay contributions but are compelled to pay taxes— but it replaces it with another.

In order for public provision of the public good of national defense to work, the money must not only be collected, it must be spent—on defense. More generally, once one has an organization—the government—that is empowered to compel people

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11. *See* Klein, *supra* note 1, at 473.
12. R. KIPLING, *The Dutch in the Medway*, in RUDYARD KIPLING'S VERSE: DEFINITIVE EDITION 727-28 (1940).

to pay for something whether or not they want to buy it, one has the problem of how to control that organization. Not only must it be controlled in order to make it use its power to produce public goods, but it must also be controlled in order to keep it from using its power to enrich itself, or those controlling it, at the expense of the rest of us. That appears, from both historical evidence and theoretical analysis, to be a nontrivial problem.

From the standpoint of public choice theory, the problem is simply another version of the public good problem. Controlling the government—making it do the right things—is a public good. If I spend my resources, whether of time or money, inducing the government to do good, most of the benefit will go to other people. If I spend the same resources inducing the government to steal from my neighbor and give the loot to me, any resulting benefit goes entirely to me. That is true whether the resources are spent on planning coups under a dictatorship or on becoming a well-informed voter under a democracy. In each case, the benefits produced by political action for the general good are very widely dispersed, so it is unlikely to be in any individual's interest to take such action.

We started with the pure public good problem of getting the entire population to contribute money (or time) to produce the public good of national defense. We "solved" it by establishing a government authorized to collect taxes and spend the money on defense. We are left with the pure public good problem of getting the entire population to contribute time (or money) to produce the public good of making the government do those things, and only those things, for which it was established.

We are better off to the extent that the cost of our new public good is less than that of the old. The per capita expenditure in time necessary for voters to become sufficiently well informed to make a democractic society work well enough to defend itself may well be less than the per capita expenditure necessary to produce national defense. We are worse off to the extent that in creating a government that can do one desirable thing— defend its society—we have also created a government that can, and (judging by the historical record) will, do many undesirable things—the prevention of which is also a public good.

It follows that the public good problem is not only a powerful argument against a society in which all goods, including those normally produced by government, are produced privately. It is also a powerful argument against all of the obvious alternative societies, including the one in which we live. It is interesting to imagine, in an alternate history in which North America had developed into the sort of society that Mr. Klein describes, an alternate Professor Samuelson developing the theory of public goods in order to demonstrate the complete unworkability of any proposal for governmental solutions to the society's problems.

II.   Comments on *Contracts and Public Goods*

The heart of David Schmidtz's argument, and the part that I find most interesting and most in need of criticism, is his discussion of five different sorts of public good problems, and possible private solutions to each. My comments are organized accordingly.

A.   *Cases One and Two*

Of the five cases that Mr. Schmidtz discusses, the first two, as he makes clear, do not involve the full public good problem, because individuals either do not want to free-ride or cannot. In case one,[13] every member of the public is assumed to receive a net private benefit from contributing: The sum of his direct benefit from his contribution to the good plus "fringe benefits" (such as the knowledge that he is being a good citizen) is larger than the cost of his contribution. Hence it is in each person's interest to contribute, no matter what anyone else does.[14] The good is public, but the problem has been assumed away.

In case two,[15] the good is excludable, so there is no public good problem. The good could be produced, as Mr. Schmidtz suggests, via a conditional contract (or "CBAC"—"conditionally binding assurance contract"), but there seems no good reason why it should be. The usual way of producing such a good

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13. Schmidtz, *supra* note 4, at 486-88.
14. The conditional contract is necessary only because the author also assumes that the individuals concerned will not get the benefit of feeling like good citizens unless their fellow citizens are all good citizens too. Without this assumption, FB would appear in the bottom left-hand corner of Figure 5, as well as in the two right-hand corners, and contribution would be the dominant solution. *See id.* at 487.
15. *Id.* at 488-90.

is for an entrepreneur to raise the necessary money, produce the good, and sell it.[16]

B. *Cases Three and Four*

Case three[17] involves a real public good problem and a real solution—a unanimous conditional contract.[18] Unfortunately, though that solution may work for producing some public goods, it has serious difficulties for many others.

One source of problems is imperfect information. As Mr. Schmidtz points out, a unanimous contract conditional on every member of the public's making the same contribution will fail if, for some members, the value of the good is less than its per capita cost. If everyone's value for the good were public knowledge, the entrepreneur drawing up the unanimous contract could simply allocate contributions to members of the public in proportion to how much each valued the good. As long as the total value of the good was greater than its total cost, it would be possible to raise enough money to pay for the good without charging anyone more than he was willing to pay.

In most real-world cases, however, my value for the good is known only to me. The entrepreneur can, of course, ask me. But if I know that my contribution will be proportional to my stated value, I have an incentive to lie. If I persuade the entrepreneur that the public good is worth nothing to me, he will leave me off his list, and I can free ride on everyone else's contributions.

That is but one example of a difficulty that Mr. Schmidtz

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16. Because the cost of producing the good (a vaccine) is the same regardless of how many people consume the good (get vaccinated), the good is a natural monopoly. That introduces another efficiency problem, which the author does not discuss. If different consumers have different values for the good, the total value may be greater than the total cost, but there may be no price at which the producer can cover his costs. At a low price everyone buys the good, but some people pay much less than it is worth to them; at a high price, those who have only a low value for the good drop out of the market. In this situation, unless the producer can recognize the high and low value consumers and sell the good to them at different prices, the good will not get produced. This point is discussed at considerable length in D. FRIEDMAN, PRICE THEORY: AN INTERMEDIATE TEXT 375-83 (1986).

17. Schmidtz, *supra* note 4 at 491-93.

18. This solution is discussed at some length in D. FRIEDMAN, THE MACHINERY OF FREEDOM: GUIDE TO A RADICAL CAPITALISM 185-97 (1978) (chapter 34) and D. FRIEDMAN, *supra* note 16, at 417-19. For an Eighteenth Century example of a conditional contract for the production of a public good, see B. FRANKLIN, *The Autobiography of Benjamin Franklin*, in 1 THE WRITINGS OF BENJAMIN FRANKLIN 376-79 (A. Smyth ed. 1907). It appears that in addition to inventing the Franklin stove and demonstrating that lightning is electricity, Benjamin Franklin also invented the matching grant.

does not consider—strategic behavior. There are others that come to mind. Consider again his case three, where the public good is medical research and everyone is known to value it equally. Suppose that I am both stingy and stubborn. As soon as I learn that a conditional unanimous contract is being considered, I go to the entrepreneur drawing it up and tell him to leave me off the list of contributors. If he does not, I will refuse to sign and the contract will fail.

I would be better off signing the contract, paying my share of the public good, and getting the good than I would be refusing to sign, not paying, and not getting the good—but those are not the only two alternatives. If I persuade the entrepreneur that I am unwilling to sign, he will leave me off of his list and collect the necessary funds from less unreasonable members of the public. I will then get the public good without having to pay for it.

In this case, the crucial question is who is more stubborn—or, in the more usual language of such analysis, who can better commit himself to future action. If the entrepreneur can somehow commit himself not to produce the good unless everyone pays, I will find it in my interest to back down. If I can somehow commit myself not to pay, it is in the entrepreneur's interest to back down and arrange to produce the good without me.

In more realistic cases, the problems of imperfect information and strategic behavior reinforce each other. Individuals who want to get out of paying will claim a low value for the good. The entrepreneur may suspect that some or all of them are lying, but have no way of knowing which. If even one person whom he insists on putting on the list for his conditional unanimous contract really does not want the good, the contract will fail. Even if he guesses correctly, some who want the good may still refuse to sign, in the hope that a second and successful attempt to produce the good will be made—with their names left off the list of contributors.

Whether such problems prevent the good from being produced will depend on the size of the group and on how much information is available about the value of the good to each member. It will also depend on the difference between the total value of the good and the total cost. If the good is worth $1 million and costs only $1000 to produce, the entrepreneur may be able to limit his list to those he is sure want the good, charge

each of them only a tenth of his estimated value for it, and still collect more than enough to produce the good. If, on the other hand, the good is worth $1 million and costs $900,000 to produce, the entrepreneur will succeed in producing the good only if he does a very good job indeed of drawing up the contract and bargaining with members of the public who are trying not to pay their share.[19]

That is true not only for the simple public good of cases three and four, but also for the compound public good that is Mr. Schmidtz's solution to case four.[20] Even if one can put together a package of public goods that everyone values at about the same amount, doing so will not eliminate strategic behavior. Each person, after all, will prefer a different package—one containing more of the public goods he values and less of those he does not. Because many different packages are possible, each person has an incentive to refuse to contribute to the particular one proposed, pressuring whoever is assembling the package to assemble a package more to his liking. If even one member of the public uses that strategy, the contract fails.

C. *Case Five*

In dealing with case five,[21] Mr. Schmidtz combines two different arguments. The first involves comparing alternatives X, Y, and Z in Figure 12.[22] The second adds an element of time to the problem, allowing the individual to wait until he sees what others have agreed to contribute before he decides, at the last instant, to either contribute or withhold. I will try to show why I find both arguments unsatisfactory.

1. *X, Y, Z: All Alternatives Are Not Created Equal*

In choosing whether or not to contribute, the individual in case five faces a problem of decision under uncertainty. He does not know whether he is in situation X, Y, or Z, yet which situation he is in will determine the costs and benefits of contributing. He is thus in the same situation as a gambler choosing a strategy based on his estimate of the probability of

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19. The relation between size of the public, value and cost of the good, and probability of producing the good is discussed in more detail in D. FRIEDMAN, *supra* note 18, at 185-97 (chapter 34) and D. FRIEDMAN, *supra* note 16, at 417-19.

20. Schmidtz, *supra* note 4, at 493-95.

21. *Id.* at 495-99.

22. *Id.* at 496.

different outcomes—which card will be dealt next, or what the next roll of the dice will be. Like such a gambler, he will try to maximize his expected return—to get the best outcome "on average," where the average is weighted by the probabilities of the different alternatives.[23] Hence his decision will depend on the respective probabilities of the alternative situations (X, Y, and Z) and on the associated gains or losses from contribution.

In situation X (others fail to contribute) the decision to contribute has no effect, in situation Y (the individual's contribution makes the difference between success and failure) contribution produces a benefit for the individual, and in situation Z (the good will be produced even if the individual fails to contribute) the individual's contribution is unnecessary, so he is worse off by the amount of his contribution (C) minus any marginal increase in the value of the good due to the additional money he is providing (P). It follows that the desirability of contributing, from the standpoint of the individual, depends on the relative probabilities of situations Y and Z and the relative size of the associated gains (benefits minus contribution, or T - C) and losses (C - P).

Unfortunately, in almost all public good problems except those involving very small publics, situation Y is enormously less probable than situation Z, so it almost never pays to contribute. To see why that is the case, consider national defense for a small country. There are a million and one citizens; the cost of national defense is $100 million per year. To allow for a certain percentage of the citizenry who will refuse to pay, each citizen is asked to contribute $150. The contributions will be returned if the total is less than $100 million.

The outcome is described by a probability distribution. For the sake of simplicity, assume that the average contribution of the population (not including me) is uniformly distributed between $99 and $101.[24] In other words, the total amount offered has an equal chance of being anything between $99 million and $101 million. Situation Z occurs if the total contribution of everyone else is at least $100 million; the probability of that is .5. Situation Y occurs if the total contribution of everyone else is

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23. For the sake of simplicity, I assume the individual is risk-neutral and is therefore concerned only with maximizing the average of the monetary value of the different payoffs. More complicated assumptions are possible, but add little to the analysis.

24. Consider the analogous case of predicting the outcome of a presidential election. A polling service accurate to within ± 1% would be doing quite well.

less than $100 million and at least $99,999,850; only in that situation will my $150 contribution make the difference between failure and success. The probability of that is 150/2,000,000 = .000075.

I will take the gamble of contributing only if the probability of situation Y times the net benefit to me of contributing in situation Y (my gain if I contribute in the hope that situation Y holds and win my bet) is at least equal to the probability of situation Z times the net cost of contributing in situation Z (my loss if I contribute and lose). In other words, in order for it to be worth betting (contributing), the gain if I win my bet times the probability of winning must be at least as great as the loss from betting times the probability of losing. In this particular case, that requires that the benefit to me of being defended be equal to about $1 million per year.

The problem here is that situation Y, in which contribution pays, only occurs if the outcome is exactly on the knife-edge between success and failure. It is analogous to an election's being decided by a single vote. Except in very small elections, that is phenomenally unlikely. In my example, the population is relatively small, defense is considerably cheaper (per capita) than it is for the United States at present, and the assumed probability distribution is a very tight one. In other words, the assumptions have been chosen to favor the outcome that Mr. Schmidtz wants. Nonetheless, defense will not be produced. One can imagine situations—with a much smaller public, very predictable behavior, or a public good worth enormously more than it costs—in which the opposite conclusion would hold, but it is hard to believe that they represent a significant part of the government activities commonly defended as producing public goods.

In trying to argue that the individual who believes but does not know that he is in situation X will choose to contribute, even though he may turn out to be in situation Z, Mr. Schmidtz says: "*[A]lthough his investment may have been unnecessary, the CBAC's success still yields him a very nice profit of T - C. He cannot lose by contributing.*"[25] That last sentence is wrong. If the investment was unnecessary, he would have gotten T without making it, so he is losing C, the amount of the contribution (minus any im-

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25. Schmidtz, *supra* note 4, at 499 (emphasis added).

provement in the public good due to the extra money spent on it). Mr. Schmidtz is confusing the gain from having the public good produced (T, which is positive) with the gain from contributing to a public good that would be produced anyway (P - C, which is negative).

Readers who find Mr. Schmidtz's argument convincing may want to consider the following analogous situation. After an extensive search, you find an automobile dealer who has the model you want. The salesman offers, in exchange for a $100 bribe, to make sure that the car is not sold while you arrange for a bank loan. You want the car and do not want to have to search for another seller, so you are about to agree—until you notice that there are six more of exactly the same model in the showroom.

By Mr. Schmidtz's argument, you should still pay. If, by some very unlikely chance, seven customers for that model walk in while you are at the bank, your $100 will have been well spent. If not, you still get the car you want with no more searching, yielding you "a very nice profit." You "cannot lose by" bribing the salesman.

The argument is wrong because it confuses the gain from the whole transaction (buying plus bribing) with the gain from bribing. Unless seven customers walk in, you can get exactly the same benefit without paying the bribe, so the $100 is a net loss. Similarly, if you are in situation Z, you can get the gain (the public good) for free (because others are already contributing enough to pay for it), so your contribution is a net loss.

2. *Introducing Time*

In trying to solve the problem presented by case five, Mr. Schmidtz introduces time into the analysis. Instead of having everyone make his decision at once, the individual is permitted to wait until the last minute in order to see what everyone else is doing. If enough has been contributed by then, he withholds his contribution and the public good is produced anyway. If enough has not been contributed, he concludes that his contribution is needed to produce the public good. At the last minute, all of the non-contributors chip in their share, and the good is produced.

Unfortunately, that does not work. We are all in the same situation, and we cannot all move last. The argument for wait-

ing until the last possible moment applies with equal force to all of the players. Everyone waits, so the fact that nobody has contributed yet provides no information about how much will be contributed. We all make our decisions just before the deadline, each in ignorance of what the rest are doing. We are back in the simultaneous game.

Ultimately, both of Mr. Schmidtz's approaches to case five suffer from the same sort of problem. The first approach implicitly introduces decision-making under uncertainty, because it places the individual in a situation where the question of which action (contribute or not) is correct depends on whether he is in situation Y or situation Z. It then tries to analyze the situation as if no probabilities were involved ("if the individual thinks he is in situation Y . . . ."). The second approach, by introducing time, converts the problem from one of choosing between two strategies (contribute or not contribute) to one of choosing among an infinite number of strategies (contribute at time t, contribute when other people's contributions reach an amount M, contribute at time t_1 if other people's contributions are more than N and less than P, and so on), but fails to redo the analysis to deal with that immensely more complicated game.[26]

D. *Conclusion*

I have gone into such detail in criticizing Mr. Schmidtz's suggested private solutions to the public good problem for two reasons. The first is that the private production of public goods is an important issue, and the second is that I believe that an important part of his conclusion is wrong.

That is not to say that public goods cannot be produced privately. They can be and are—in many different ways, some of which were described by Daniel Klein in his article. Nor is it to say that public goods can never be produced by the sort of conditional contracts that Mr. Schmidtz suggests. Under some circumstances—especially where the public for a particular good consists of only a few people—such contracts may indeed be

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26. Note that in my critique, I also have not dealt with the full game implied by introducing time into the problem. All I have done is show that Mr. Schmidtz's analysis is inconsistent—if the optimal strategy is to wait until the last minute, as his analysis implies, then waiting until the last minute does no good. A full analysis would be very much more difficult, and might turn up solutions in which the public good is produced, although I know of no reason to expect that it would do so.

the best solution to the problem. Mr. Schmidtz's article serves a useful function in pointing out that solution and, more generally, in reminding readers that the voluntary production of public goods involves a problem, but not necessarily an insoluble one.

Where I believe Mr. Schmidtz is wrong is in suggesting that public good problems with large publics, specifically the problem of producing national defense, may well be soluble by such contracts. In such situations, for reasons that I have tried to explain, both the unanimous conditional contract and the contract conditional on a sufficient amount being raised can be expected to fail. The unanimous contract fails by the defection of one member, whether pacifist, strategic cheapskate, or enemy agent. The CBAC fails because each citizen calculates, correctly, that he gains by contributing only if the outcome sits exactly on the knife-edge between success and failure, and the chance of that being the case is very nearly zero.

It may be that at some time in the future we shall succeed in creating a society that does not depend on a coercive government to defend us from other coercive governments. In a book written many years ago, I discussed a variety of ways in which that might be done.[27] My conclusion then was that the unanimous conditional contract was not a very strong candidate. After reading Mr. Schmidtz's article, I see no reason to revise it.

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27. *See* D. FRIEDMAN, *supra* note 18, at ch. 185-97.