Private Solutions to Positive Externalities: Military Expenditures, Insurance, and Call Options[*]

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ABSTRACT

The conventional argument for government provision of defense is that military expenditures exhibit large positive externalities. As the Coase Theorem demonstrates, in a world of zero transactions costs, individuals could sign binding contracts and achieve an efficient level of defense expenditures without coercion. The present paper shows that the institutions of insurance and call options could allow private markets in the real world to approximate the zero transactions cost outcome.

INTRODUCTION

As any student of economics quickly learns, externalities can hinder the spontaneous achievement of efficient outcomes in an unregulated market. The most frequently example of this possibility is the negative externality of pollution. However, positive externalities—cases where the voluntary transactions between two parties involve spillover *benefits* on third parties—also pose a problem for the proponent of laissez-faire: Because the parties to a transaction fail to take into account the full social benefits of their exchanges, an inefficiently low number of units are produced.

A textbook example of this phenomenon is military defense.[1] Left to voluntary provision through markets, so the argument goes, the equilibrium number of tanks, bombers, etc. would be far from optimal. In particular, the standard claim is that everyone in society

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[*] This article is based on an exchange with Paul Birch.

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[1] Block (2003) offers many standard citations for this argument, including Buchanan (1975) and Cornes and Sandler (1986).

would prefer that a government coerce everyone into contributing more for defense spending.

The revolutionary insights of Ronald Coase and his followers complicated the above analysis. In a world of zero transactions costs, private parties could sign contracts (perhaps contingent upon others' signing of the same contracts) and achieve an efficient level of defense spending.[2] Thus, the standard justification for government provision of military services has to be refined; the new argument is that transactions costs are too high in the real world to allow the efficient voluntary provision of defense.

In the present paper I argue that market institutions developed in other contexts could be used to significantly reduce the effective transactions costs in situations characterized by large positive externalities. Specifically, I will illustrate how conventional property insurance, as well as call options on real estate, could allow private parties to achieve an efficient level of defense spending. Naturally, the analysis can easily be extended beyond the case of military defense, to include any cases of large positive externalities.

MILITARY EXPENDITURES: THE BASELINE CASE

It will be easiest to make my point if we have a specific example in mind. To that end, imagine a completely "free" society consisting of 100,000 households, with each plot of property worth $100,000. Further suppose that there is a neighboring State that wishes to conquer the region. The neighboring State is preparing to send bombers (let us suppose 200 for concreteness), each of which (if unchecked) will destroy an average of 100 households.

[2] On this general topic, Richard Epstein (1993) writes: "The hardline libertarian is someone who is worried about a broad class of externalities (the use of force and fraud) but who believes that all holdout problems can be overcome by astute bargaining. If there is a need to organize collective security, the holdout problem can always be finessed by stepwise negotiations. First, form the protective association, and then allow these to negotiate among themselves….In all cases, the basic conviction is that human ingenuity can overcome the obstacles that lie in the path of voluntary exchange without the need for state intervention" (pp. 559-560).

By assumption, there is initially no formal government in the small society, and each household is free to purchase surface-to-air missiles (SAMs) if it so chooses. Suppose that it costs $1 million to buy enough SAMs (with accompanying guidance equipment, etc.) to knock down one incoming bomber.[3]

If the only permissible transactions are simple (and voluntary) purchases, then it is clear that the community will be unable to organize a proper defense. Because each household is worth only $100,000, no one will find it individually advantageous to purchase SAMs; it would cost $1 million in expenditures to prevent (at most) $100,000 in (private) losses.[4] Consequently, no SAMs will be purchased, and the anarchic society will be conquered by the neighboring State.

In addition to being tragic, this outcome is also economically inefficient, and constitutes the justification for the government monopoly of defense. If a central agency were to compel contributions from all households and use the proceeds to finance SAM sites, it would yield a gain in (Kaldor-Hicks) efficiency. For example, by taxing and spending $200 million, all of the incoming bombers could be knocked down, for an avoided loss in property damage of $2 billion (= 200 bombers x 100 households per bomber x $100,000 per household).

Our simple story illustrates the classic problem of positive externalities: Because each household owner cares only about his or her own property, and ignores the 99 other households that would benefit from one's own purchase of a SAM site, the private market would lead to a gross underprovision of SAM sites. Consequently, it seems that government involvement is necessary if we are to have any hope of efficiency in this industry.

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[3] The high expense might be due to sophisticated countermeasures in the bombers, i.e. it may take several SAMs to guarantee a kill.

[4] We are of course ignoring the monetary value each individual would place on his or her life. If it makes the story more compelling, the reader may imagine that the properties are owned by absentee landlords, who care nothing for (and have no legal obligation concerning) the health of those renting the properties.

My argument in this paper is that such a conclusion is premature. The inability of the market to provide adequate military defense is due to the unrealistic simplicity of the type of transactions allowed. Market institutions no more exotic than simple property insurance and call options[5] would allow private individuals to spontaneously "organize" communal defense.

INSURANCE

In this section I make the basic observation that standard property insurance is a simple way to allow some agency to "internalize the externality" of defense spending. Suppose we are initially in the anarchic situation described above, where 200 bombers loom on the horizon and (because of externalities) no households are buying SAMs. This means that 200x100 = 20,000 households (or one-fifth of the total) will be destroyed by the bombers. If the household owners are risk averse, they will seek to buy insurance to cover themselves. In order to break even, the insurance companies will need to charge each of the 100,000 households a premium of $20,000.[6][7]

But this is surely not an equilibrium outcome, if we allow the insurance executives a modicum of ingenuity. For in the case where one insurance company holds the policies for the entire community, then every dollar in property damage avoided represents a dollar in avoided payments by the insurer. Consequently, such an insurance company

[5] I should point out that Epstein's suggestion of private protection agencies would not necessarily solve the externality problem, depending on the precise nature of the membership. For example, suppose every single member of the community joins a giant fraternity, which will compensate anyone for damages due to military attack. The agreement stipulates that all members of the fraternity equally split the total bill. Even under this arrangement, the incentives will still not lead to a single purchase of a SAM site: Yes, if any individual spends $1 million to finance the knocking down of a bomber, he will save the fraternity $10 million in compensation payments ($100,000 for 100 households). But the individual only cares about his *personal* share of this bill. And since he is (by stipulation) only one of 100,000 members, his $1 million expenditure would only save him $100 in fraternity dues. (If the fraternity consists of only a subset of the population, then each member's personal share of the bill is higher. But at the same time, the chance that a given bomber will damage property of fraternity members is reduced.)

[6] At this stage, the inefficient loss of $2 billion from the bombers will still occur, but at least the insurance company distributes the damages in an efficient way.

[7] The reader may wonder why property owners would purchase insurance for property damaged by foreign invaders, since such policies might be worthless in the aftermath of a military conquest. Again, the reader may imagine absentee landlords who are paid off by insurers (also headquartered safely in another country) in the event that the landlords' property is destroyed and/or seized by the neighboring State.

would gladly spend $200 million to knock down all of the incoming bombers, because this preventive move would save $2 billion in claims from its clients. In this situation, defense spending "pays for itself."

CALL OPTIONS ON REAL ESTATE

In this section I demonstrate another simple mechanism by which individuals can profit by moving society away from the inefficient status quo. Return again to our original scenario, where the hapless households can't take advantage of the SAM technology due to their selfishness. Further suppose that, for whatever reason, insurance companies don't see the opportunities described above. Does this doom our community to destruction?

No it doesn't, assuming that there is a healthy derivatives market in real estate. With the impending attack, rational household owners will lower their expectations of the future market value of their property.[8] (With risk neutral homeowners, the present value of their households would fall to $80,000, and with risk averse homeowners, it would fall even further.[9]) In this environment, suppose a tycoon begins buying call options on plots of land, in which the tycoon purchases the right to buy a given household for, say, $90,000 at any time prior to the (expected) date of the attack. Homeowners who are quite convinced of the inevitably of the attack will gladly take up this offer, and sell such options for quite low prices. Without delving into the specifics necessary for an application of the Black-Sholes or other formulas, let us suppose that each option sells for $500. Finally, suppose that the tycoon purchases 25,000 such options, i.e. he buys call options on one-fourth of the property in the community.

[8] That is, rational household owners will lower the expected market value of their households *in the event that no further action is taken*. Of course, if they anticipate precisely the sort of unconventional transactions that allow for private defense provision, then they need not revise their forecasts. This complication is handled briefly in the conclusion.

[9] This is assuming that the incoming bombers are the only such wave. But in reality, if further sorties were expected, then the market value of the households would fall much lower still.

Now let us analyze the incentives our tycoon faces. If he does nothing, the fears of the impending attack will keep the value of the houses well below the strike price, rendering the tycoon's investment in the options a complete loss.

However, suppose the tycoon spends his own money to finance the destruction of all incoming bombers. In that case, the property values would return to their normal levels of $100,000, netting the tycoon a gain of $9,500 for each option purchased, for a total speculative gain of $237.5 million. This gain more than covers the $200 million expenditure on SAM sites, making the purchases in the tycoon's self-interest.

CONCLUSION

The simple story has illustrated two potential mechanisms by which familiar market institutions could be harnessed by clever entrepreneurs to mitigate (if not entirely solve) situations of high positive externalities. Because formal markets in both property insurance and call options have already been developed for other purposes, the transactions costs involved in the "solutions" outlined above would not be nearly as high as those required if, say, each individual had to sign into a web of binding contracts ensuring adequate military expenditures. In short, the obstacles to efficient provision of military defense among a large group of people are not as high as typically supposed.

Of course, purists may object that the analysis offered above conveniently stops short at crucial moments. For example, what would stop a rival insurance company from free riding off of the defense expenditures of the pioneering company, and offer lower premiums (made possible by the free riding company's zero defense spending)? For the call option scenario, if the household owners correctly anticipated the actions of the tycoon, they might insist on such a high price for the options that the entire project became unprofitable.

However, these objections, though important, largely miss the point: The existence of the insurance and call option markets ensure that *the standard zero defense outcome cannot*

be a market equilibrium. As the above analysis demonstrates, pure profit opportunities would exist under those conditions, and thus it cannot be the case that a "free" society would produce zero SAM sites under the above circumstances.

Moreover, as I tried to demonstrate in the case of the real estate speculator, the presence of gross market inefficiencies (in the baseline case) makes their correction all the easier: Recall that our tycoon didn't need to buy options on every single household, but rather only on twenty-five percent of them. Therefore, even if it is true that the mechanisms I have outlined would not literally "solve" the problem of externalities completely, I claim that in the real world they would at least mitigate the problem such that the grossest inefficiencies could be remedied through purely voluntary means.

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