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Alan Randall*

The Problem of Market Failure[†]

I

The concept of market failure seems entrenched in the conventional wisdom of the economics discipline, if the conventional wisdom is most clearly revealed by what respected economists tell undergraduate students and government policy makers. The typical treatment proceeds as follows: the concept of Pareto-optimality is explained; the idea that competitive markets tend to allocate resources efficiently is developed; the notion that, under certain conditions prevalent in the real world, markets fail to perform efficiently is introduced; and the search for ameliorative measures, involving government as law-maker, tax collector, and/or regulator, is undertaken. This approach pervades economic discussions of public finance, the provision of collective goods, management of natural resources, and environmental quality.¹

The conventional wisdom, almost by definition, is an amalgam of new ideas from prior seasons and persistent ideas from earlier times. Since 1960, a vocal group (but still perhaps a minority) of economists who reject the market failure approach has arisen.² This group's critique has led the better economists who use the market failure paradigm toward a sharper, more precise and more sophisticated analysis.³ Nevertheless, considerable confusion remains concerning the nature of market failure, its significance in theory and as an observable phenomenon, and the appropriate policy response to it.

Contemporary discussions of market failure usually list four distinct phenomena, although two or more of these may occur together and, if

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1. A few examples from the environmental quality area should suffice: See the editors' introduction to R. DORFMAN & N. DORFMAN, *ECONOMICS OF THE ENVIRONMENT, SELECTED READINGS* (1977); Ruff, *The Economic Common Sense of Pollution*, 19 *PUB. INTEREST* 69 (1970); Davis and Kamien, *Externalities, Information, and Alternative Collective Action*, 1 *THE PPB SYSTEM* 67 (1969); and A. FREEMAN, R. HAVEMAN & A. KNEESE, *THE ECONOMICS OF ENVIRONMENTAL POLICY* (1973).

2. The seminal article is Coase, *The Problem of Social Cost*, 3 *J.L. & ECON.* 1 (1960). However, others make a more vehement attack on the market failure paradigm: for example, Demsetz, *Information and Efficiency: Another Viewpoint*, 12 *J.L. & ECON.* 1 (1969).

3. Including most of those cited, *supra* note 1.

so, their effects are mutually reinforcing. The phenomena are externality, "public goods," "common property resources," and monopoly. To further complicate matters, two kinds of monopoly are recognized: (1) market concentration in the extreme, and (2) "natural monopoly," which is treated as endemic to decreasing-cost industries. This paper focuses on externality, "public goods," "common property resources," and "natural monopoly." A massive literature on market concentration already exists; thus this paper will not explore that topic.

Section II argues that "common property resources" and "public goods" are confusing terms which refer to confused concepts. That section offers an alternative and more precise terminology, based on notions of nonexclusiveness and nonrivalry. Section III discusses externality in a post-Coasian context and examines the "Coase Theorem" in its "weak" and "strong" versions. The discussion shows that the strong version is a useful pedagogical device with little policy relevance, while the weak version is seen as a general theorem on the existence of markets, rather than a theorem central to environmental economics.

The paper goes on to examine the conditions under which an externality may *persist* and finds that, in general, externality cannot persist. Inefficiency, however, may surely persist, but for reasons more closely related to nonexclusiveness and nonrivalry than to externality. Externality is, then, a vacuous and entirely unhelpful term, and can be replaced by the more general term *inefficiency* with no loss of content.

On the other hand, an intrusion or invasion may occur—or, in the terminology this article seeks to eliminate "an externality may *arise*," resulting in (1) a non-consensual change in the product mix of society and (2) a welfare shock for some. Assuming, as most authors (including Coase and Buchanan) do, that citizens may appropriately use the powers of government to deal with these kinds of events, what should be done? In the literature that addresses this question, one can identify two post-Coasian traditions: a Coase–Buchanan tradition and a Coase–Posner tradition. Section IV evaluates these two traditions, develops an argument which finds more merit in the Coase–Buchanan tradition, and sketches some institutional reforms in that tradition.

Section V presents concluding comments that suggest what, if anything, can be salvaged from the "market failure" baggage of the economist's conventional wisdom.

II

For the current generation of economists, Gordon popularized the term "common property resource."⁴ The analysis of Gordon and most sub-

4. Gordon, *The Economic Theory of a Common-Property Resource: The Fishery*, 62 J. POL. ECON. 124 (1954).

sequent authors has focused on the unowned resource, *res nullius*, and is basically correct in that context. The problem is that rights to the resource are *nonexclusive*.

Considerable confusion arises because the now standard "common property resource" analysis is not applicable to *res communis*, property held in common.⁵ While it is unlikely that *res communis* rights will be strictly nonattenuated,⁶ many of the solutions proposed for "common property resources" (*i.e.*, *res nullius*) problems actually fall within the *res communis* classification. Ownership is vested in some kind of collective and rules of access (usually exclusive and enforceable to a considerable degree, and often transferable under stated conditions) are established to minimize abuse of the resource and overinvestment of factors of production in its exploitation.

One may ask why the *res nullius*, or non-exclusiveness, problem is so often handled in basically free enterprise economies by establishing some form of *res communis* rather than nonattenuated property rights. The answer may lie in traditional beliefs that private ownership is inappropriate for certain kinds of resources. However, the author suspects that it lies more often in the high cost of exclusion. For example, for many species of commercial fish, the costs of specifying and enforcing exclusive property rights in individual fish are prohibitive, in that they exceed any possible gains which could arise from the voluntary exchange thus permitted. Similar difficulties may apply to individual units of ambient air and water, and oil and groundwater in large pools.

In these cases, transactions costs (broadly defined)⁷ are not merely so large as to prohibit the kinds of trade which would lead to Pareto-efficiency, but so large as to prohibit the establishment of nonattenuated property rights, a necessary precondition for such trade. Further, it is not "the large numbers problem," the reason usually offered to explain high transactions costs, but some peculiarities in the physical nature of the resource itself that are to blame.⁸ For example, fencing the open sea is technologically more demanding and thus vastly more expensive than fencing the open range.

"Public goods" (or "collective goods") is another term which generates

5. Ciriacy-Wantrup & Bishop, "Common property" as a Concept in Natural Resources Policy, 15 NAT. RES. J. 713 (1975).

6. S. N. S. Cheung defines nonattenuated rights as (1) exclusive, (2) transferable, (3) enforced and (4) in no way inconsistent with the marginal conditions for Pareto optimality. See Cheung, *The Structure of a Contract and the Theory of a Nonexclusive Resource*, 13 J.L. & ECON. 49 (1970).

7. As for example, by Coase, *supra* note 2, at 6; Crocker, *Externalities, Property Rights and Transactions Costs: An Empirical Study*, 14 J.L. & ECON. 451, at 462-4 (1971); and Dahlman, *The Problem of Externality*, 22 J.L. & ECON. 141, 144 (1979).

8. "The Large Numbers Problem," alone, will never cause prohibitive transactions costs. The market for bread, with myriad buyers and sellers, works as well as any, and much better than the market for clear air which has a similar number of potential buyers and sellers.

confusion. In most definitions, at least one of two phenomena is involved: nonexclusiveness, discussed above, and nonrivalry. The latter refers to Samuelson's notion of a good which may be enjoyed ("consumed") by some without diminution of the amount effectively available for others.⁹

Confusion arises as to whether both of these phenomena are necessary to make a good "public" or, if one is enough, which one?¹⁰ However, nonexclusiveness and nonrivalry may occur together or separately, and the economic analyses of the two phenomena are quite different. Accordingly, a focus on questions of exclusiveness and rivalry permits precise analysis, while the term "public good" only introduces confusion. Debate about what is required for a good to be called "public" seems not only unhelpful but misdirected.

The economics profession could abolish the terms "common property resources," and "public goods" with no loss of information and considerable gain in clarity. The terms nonexclusiveness and nonrivalry represent vast improvements, useful in all contexts and relevant for both goods and resources. For the "non-pure public good," the term congestible good is entirely adequate. It describes a good which is nonrival for some number of users, while rivalry sets in as that number is increased and becomes intense as the number of users approaches the capacity constraint. For such goods, initial capital costs tend to be high, while the marginal cost of adding an additional user remains low until the capacity constraint is approached. Thus, average cost per user steadily declines until the capacity constraint is approached. Examples include almost all services provided in a confined space, and all services provided in capital-intensive delivery systems of constrained capacity, *e.g.*, roads, bridges, railbeds, canals, transmission lines and pipelines.

The point of these last observations is that the so-called "natural monopoly" problem can be adequately analyzed under the rubric of congestible goods.

What are the economic consequences of nonrivalry? In principle, the efficient amount of nonrival good may be provided. One may express individual preferences across the range of possible levels of provision and identify individual total and marginal "willingness to pay" (WTP) schedules. These schedules are aggregated vertically, across individuals.

9. Samuelson, *The Pure Theory of Public Expenditure*, 36 REV. ECON. & STAT. 387 (1954).

10. Samuelson, *id.*, focused on nonrivalry, but also made mention of the free-rider problem, a manifestation of nonexclusiveness. Davis & Whinston, *On the Distinction between Private and Public Goods*, 57 AM. ECON. REV. 360 (1967) focused on nonrivalry, and discussed the economic properties of nonexclusive public goods, exclusive public goods, and non-pure (*i.e.* congestible) public goods, both exclusive and nonexclusive. Head, *Public Goods: The Polar Case Reconsidered*, 53 ECON. REC. 227 (1977), argues that a "public good" must have both characteristics, nonexclusiveness and nonrivalry.

TABLE 1
A CLASSIFICATION OF GOODS BASED ON CONCEPTS
OF RIVALRY AND EXCLUSION

	<i>Nonexclusive</i>	<i>Exclusive</i>	<i>Hyperexclusive</i>
Nonrival	1	4	7
Congestible	2	5	8
Rival	3	6	9

The efficient level of provision is identified (in the Samuelson¹¹ solution) as that level at which aggregate marginal WTP just equals the marginal cost of provision, given that aggregate total WTP exceeds total cost. The problem, for efficiency, is that no non-discriminatory pricing scheme can achieve this solution. A price high enough to generate revenue covering costs of provision would inefficiently exclude some potential users who value the good positively and would result in provision of less than the efficient amount of the good. As Davis and Whinston¹² point out, such a solution would not be Pareto-efficient but may be a second-best solution. With an adequate exclusionary device, the private sector could provide nonrival goods in this manner. In the absence of exclusion, the best hope is for public sector provision of the efficient quantity, but financing procedures permitting this outcome would necessarily violate the pricing conditions for Pareto-efficiency.

Discriminatory pricing would permit the Lindahl solution, which provides the efficient quantity (*i.e.*, the same quantity as the Samuelson solution) at Pareto-efficient prices. The Lindahl-price is, in general, different for each individual. Private (or public) sector provision in a Pareto-efficient manner would therefore require not just exclusion of non-payers, but exclusion of each individual who does not pay his individual Lindahl-price. This latter kind of exclusion is much more technologically demanding than the exclusion adequate for ordinary (*i.e.*, rival) goods, and is required only in the case of nonrival goods. For the want of a better name, let us call it hyperexclusion.

Now, a classification system based on concepts of exclusion and rivalry—and designed to replace the confusing and often misleading notions of “common property resources” and “public goods”—can be spelled out.

Conceptually, all of the nine types of goods identified in Table 1 can exist. Examples of types 1 through 6 occur quite frequently. The economic

11. Samuelson, *supra* note 9, at 387, 389.

12. David & Whinston, *supra* note 10, at 363.

characteristics of each type are summarized below. Each of the nine types has characteristics which distinguish it from the others and, in each case, the economic analysis of the possibilities for efficient pricing and the provision of efficient quantities have distinguishing features.

Goods of types 1 through 3 cannot be reliably provided by the private sector, or by the public sector financing them with user charges. Public sector provision, financed from general revenues, is possible. An all-wise public sector could, in concept, provide goods of type 1 in efficient quantities but not, of course, at efficient prices. For types 2 and 3, the lack of exclusion would result in overutilization; thus, both price and quantity aspects of Pareto-efficiency would be violated. There are subtle but important differences in the analyses appropriate for determining the efficient quantity in each case.

Goods of types 4 and 5 could be provided by the private sector, or by the public sector, financing them with user charges. Second-best solutions may be achieved, but Pareto-efficiency is unattainable. Davis and Whinston¹³ speculate on the nature of the second-best solutions for each of these two distinct types of goods.

Type 6, the "private goods" which neoclassical microeconomic theory treats as typical, may be provided by the private sector in a Pareto-efficient manner, if all the conditions for Pareto-efficiency are satisfied.

Type 7 represents nonrival goods provided, by the private or public sector, at Lindahl-prices. Pareto-efficiency is achieved under these conditions.

Goods of types 8 and 9 may, in principle, be provided in efficient quantities by private or public sector. In these cases, hyperexclusion requires, among other things, that the provider enjoy monopoly status. Such a perfectly discriminating monopolist would extract, via Lindahl-pricing, all of the economic surplus which in the case of typical private goods (type 6) is divided among producers and consumers. Pure profits may therefore arise, in violation of the conditions for Pareto-efficiency.

Note that Pareto-efficient provision through the market is conceivable only for goods of types 6 and 7, and that in case 7, hyperexclusion—which remains technologically elusive—is required.

What are the prospects of shifting goods among the categories defined in Table 1? Since the three rivalry-related concepts refer to fundamental physical characteristics of the goods involved, there are very few prospects of shifting goods vertically without transforming the nature of the good itself.

The exclusion-related concepts represent the interaction of institutional and technological factors. To achieve exclusion requires a structure of

13. *Id.* at 363.

laws and institutions to establish and enforce exclusive property rights, but the effectiveness of enforcement—and thus of the rights themselves—depends upon the available technology of exclusion and the costs of implementing that technology relative to the gains from trade thereby permitted. For some goods—*e.g.*, grocery items, consumer durables, residences, and farmland—these costs are tolerably low, and enterprise-oriented societies have generally shifted such goods horizontally from the nonexclusive to the exclusive categories. For other goods—*e.g.*, fish in the ocean and ambient air—strict exclusion is technologically difficult and costly relative to the potential gains. Therefore, one finds, at best, *res communis* types of rules of access which are surely attenuated, but which may permit some improvements over the *res nullius* situation.

For reference, we identify the place of the terms “common property resource” and “public good” in the nine category classification of Table 1. “Common property resource” is usually the misnomer applied to factors of production in category 3, but on occasion has also been applied to items in categories 1 and 2. “Public good” has been applied, by various authors, to commodities in some or all of categories 1, 4, and 7. Similarly, “non-pure public good” has been applied to some or all of categories 2, 5, and 8. Here, we rest our case for substituting the classification of Table 1 for the customary, but imprecise and confusing, terminology of “common property resources” and “public goods.”

What do nonexclusiveness and nonrivalry imply about market failure? First, what does market failure mean? Some have defined it as the failure of markets to exist. However, it has long been clear that the non-existence of certain markets is a rational market response to transactions costs in excess of potential gains from trade.¹⁴ If market failure means inefficiency, it must refer in concept to goods in all categories except 6 and 7, and in practice to all goods. However, such a concept is not helpful, as it identifies market failure in cases where other institutional devices will also predictably fail, to greater or lesser degrees. If market failure means the failure of markets to do as well as some other institutional device(s), the concept comes to grief on the absence of unanimity about what is meant by “to do as well.” Some progress can be made if we confine ourselves to one of the several aspects of efficiency: the provision of goods, services and amenities in efficient quantities. For nonrival goods the possibility exists that government, by direct provision, may outperform the market. Where nonexclusiveness is the problem, citizens working through government may institute changes in property rights which cause the market to provide more nearly the efficient amount. But these improvements are possibilities, not certainties, and their validity must be

14. Demsetz, *The Exchange and Enforcement of Property Rights*, 7 J.L. & ECON. 11 (1964).

demonstrated on a case-by-case basis recognizing all the costs and imperfections of both market and governmental institutions, rather than established by mere appeal to market failure notions. Finally, the focus on quantity provided without reference to pricing and the division of surpluses among producers and between producers and consumers will be unsatisfactory to some.

III

Externality is usually defined as a situation in which the utility of an affected party is influenced by a vector of activities under his control but also by one or more activities under the control of another (or others). Since the writings of Coase¹⁵ and Buchanan and Stubblebine,¹⁶ most authors have focused on Pareto-relevant externalities: those which are inefficient. Many categories of interactions which satisfy the definition of externality are efficiently handled in markets, and no possibility of Pareto-relevance exists for these categories when markets function well. For other kinds of interactions—air and water pollution are commonly cited examples—intense debate has occurred about whether Pareto-relevant externality may persist. It is generally accepted that some externality—e.g., some positive level of air or water pollution may persist even in a Pareto-efficient situation.

The Coase Theorem comes in two versions, a strong and a weak version. The strong version states: given a structure of property rights which is completely specified and exclusive, costlessly transferable, and costlessly enforced, voluntary exchange will eliminate all Pareto-relevant externality, *and* the resultant allocation of resources will be independent of the specific assignment of property rights. This theorem relies upon a number of restrictive assumptions, notably that income effects are zero, nonattenuated property rights may be costlessly established and maintained, and markets in goods and rights are frictionless.¹⁷ For these reasons, the strong theorem must be regarded more as a pedagogical device than a source of policy prescriptions.

The weak version of the Coase Theorem casts much more light on the problem of externality. It states: given a structure of property rights consistent with Pareto-efficiency, voluntary exchange will eliminate Pareto-relevant externality and thereby establish an efficient allocation of resources. The weak version may, of course, be developed from the strong by relaxing the above-mentioned assumptions. Our understanding of the

15. Coase, *supra* note 2.

16. Buchanan & Stubblebine, *Externality*, 29 *ECONOMICA* 371 (1962).

17. Coase, *supra* note 2, recognizes the crucial role of transactions costs in the strong theorem, and devotes considerable space to exploring its implications.

concepts of externality and Pareto-relevance is enhanced by working through this process.

Under the strong theorem assumptions, for any initial assignment of rights, voluntary exchange results in the same equilibrium level of abatement of an annoyance (*i.e.*, external diseconomy). Efficiency is achieved, the allocative dimensions of the efficient solution are unaffected by the specific assignment of rights, and—by definition—the Pareto-relevant externality is eliminated while some Pareto-irrelevant (and therefore efficient) annoyance remains.

Recognizing income effects (and assuming them to be positive), the specific assignment of rights does make a difference. With rights favoring the receptor, the equilibrium solution involves more abatement. In other words, when rights favor the receptor, more of the externality is Pareto-relevant than when rights favor the emitter. Positive transactions costs have a similar effect, and the difference between the equilibrium levels of abatement under opposite assignments of rights grows as the level of transactions costs increases. With transactions costs sufficiently large to preclude trade, the resource allocation implied by the initial rights structure is retained as the equilibrium solution. Under receptor rights, no externality remains; under emitter rights, no abatement occurs. Yet, assuming the transactions industry itself is efficient, each of these solutions is efficient given the assignment of rights which underlie it. This is the import of the weak Coase Theorem. Under receptor rights, the externality is Pareto-relevant in its entirety; under emitter rights, none of it is Pareto-relevant. Given the magnitude of transactions costs (and, usually to a lesser extent, income effects¹⁸), the initial assignment of rights determines what is Pareto-relevant.

What, then, is Pareto-relevance? It is a general term, with no special relevance to externality, meaning the existence of unrealized gains from trade. Similarly, in an economy with a rights structure conducive to trade, Pareto-irrelevance describes any situation—without reference to its desirability, or lack thereof, in normative terms—which cannot be changed through voluntary exchange. In such an economy, the hunger of the undernourished is Pareto-irrelevant.

With respect to an external diseconomy, the specific assignment of rights does two things. First, it determines the directional flow of payments (if any) resulting from trade (if any). In other words, it determines

18. For some formulae permitting rigorous calculation of the size of income effects, see Willig, *Consumer Surplus without Apology*, 66 AM. ECON. REV. 587 (1976); and Randall & Stoll, *Consumer's Surplus in Commodity Space*, 70 AM. ECON. REV. 449 (1980). For many ordinary situations, income effects are quite small. However, where rights involving income-elastic goods and amenities which command a large share of the individual's budget are concerned, income effects are empirically important.

which party faces a "pay or suffer" situation. Second, given the magnitude of transactions costs and income effects, the assignment of rights determines how much of the annoyance persists at the completion of trade, i.e., how much of it is *ipso facto* declared Pareto-irrelevant. Assuming income effects to be small, consider transactions costs. With low transactions costs, the initial assignment of rights has a relatively small influence on how much of the annoyance persists. With high transactions costs the influence is large. With prohibitive transactions costs, rights determine whether the annoyance persists in its entirety or is eliminated completely. Note that, for any initial assignment of rights, both parties, emitter and receptor, would prefer—given a choice—the low transactions costs situation in which some but not all of the annoyance persists.

Under what circumstances, given an externality which results in significant annoyance, would transactions costs be high or prohibitive? Only two possibilities exist. One, institutions are designed to impede trade in rights. The discussion thus far has, through its focus on nonattenuated structures of rights, eliminated this possibility by assumption. Two, exclusion and transfer are expensive for technological reasons. Something about the physical nature of the good itself and/or the technical processes required to delineate and enforce exclusive property rights therein renders exclusion expensive, thus making nonexclusiveness the norm for that kind of good. One particular aspect of the physical nature of some goods is nonrivalry which makes hyperexclusion, not just exclusion, necessary for Pareto-efficiency.

The import of all this is that, in economies which maintain institutions conducive to trade and efficiency, those things called externality cannot persist in inefficient quantities unless accompanied by nonexclusiveness and/or nonrivalry. Externality, by itself, is simply not persistent. In this sense, as Cheung¹⁹ and Dahlman²⁰ have already pointed out, externality is not a useful term. Externality can refer only to temporary disequilibria indistinguishable from any other form of inefficiency which results from failure to realize potential gains from trade.

In the absence of nonexclusiveness and nonrivalry, the specification of rights influences the distribution of income and wealth and (given costs and income effects) resource allocation. This influence is important, but not special to the concept of externality. There are (at least in theory) an infinite number of Pareto-efficient solutions, each differing in its allocative and distributional implications, and each associated with some unique initial distribution of endowments including rights.

Since externality is nothing special, it follows that the weak Coase

19. Cheung, *supra* note 6.

20. Dahlman, *supra* note 7.

Theorem is not specifically about externality. The weak Coase Theorem is a general theorem (or perhaps a tautology as is common with economic "theorems") about the existence of markets. It says: unless trade is impeded, trade will eliminate unrealized gains from trade, ensuring efficiency *by definition*. While this proposition, thus stated, is obvious with the benefit of a generation of post-Coasian hindsight, the Coasian analysis made an extremely valuable contribution to economics. By focusing so mercilessly on the logic of markets, it led economists to look for markets where none had previously been suspected and to ask the right questions about those cases in which no observable markets were found.

The weak Coase Theorem ensures that "externality" will be efficiently abated, but not that nonexclusive and/or nonrival goods will be provided in efficient quantities. Since the major environmental problems—for example, air and water pollution—concern nonexclusive and/or nonrival goods, it follows that the Coase Theorem is not a theorem central to environmental economics, in spite of some early interpretations to that effect.²¹

To summarize, the weak Coase Theorem is seen not as a theorem about externality and environmental quality, but as a general theorem about the existence of markets. It draws attention to the imperatives of trade and the instability of situations characterized by unrealized gains from trade. It performs for economics a service similar to that performed for physics by the dictum: nature abhors a vacuum.

IV

While externality alone cannot persist, events may occur which shock a previously stable system. The invasion of the wheat field by cattle, in Coase's famous example,²² was just such an event. Otherwise, the expectation of trampling damage would have precluded, one way or another, the planting of wheat. The event was (1) unexpected, and (2) an invasion, an attack on the wheat grower's property generically different from, for example, a drastic fall in the world price of wheat.

While the wheat-cattle example involved only exclusive and rival goods, conceivably events may occur to shock a previously stable system that includes some nonexclusive and/or nonrival goods. For both types of events, the specification of property rights will determine whether or not the welfare positions of those who had established themselves in equilibrium positions with respect to the previously stable environment will

21. For example, Bramhall & Mills, *A Note on the Asymmetry Between Fees and Payments*, 2 WATER RESOURCES RESEARCH 615 (1966); Kamien, Schwartz & Dolbear, *Asymmetry between Bribes and Charges*, 2 WATER RESOURCES RESEARCH 147 (1966); and A. KNEESE & B. BOWER, *MANAGING WATER QUALITY: ECONOMICS TECHNOLOGY, INSTITUTIONS* (1968).

22. Coase, *supra* note 2.

be protected. Will they be permitted to choose between maintaining their previous positions and trading to preferred positions, or will they be placed in a "pay or suffer" situation offering at best the hope of trading to a slightly better position in which they pay some and suffer some?

For events which involve only exclusive rival goods, the specification of rights will influence the eventual post-shock resource allocation. Where nonexclusive and/or nonrival goods are involved, the effect on post-shock resource allocation may be quite drastic, and the result may diverge substantially from a Samuelson (i.e., quantity efficient) solution.

The possibility of these kinds of events raises two different questions. First, what protections should be provided for individuals in the face of externally imposed (or threatened) welfare shock? Second, where the post-shock situation is inefficient, what institutional devices should be used to restore a reasonable degree of efficiency in the aggregate product mix and consumption bundle? While much of the existing literature attempts to handle these questions together, some advantages may be gained by considering them sequentially.

The first question is one of security of individual expectations. Non-attenuated property rights encourage (and, in the best of all worlds, guarantee) efficiency, but by what mechanisms do they perform such desirable services? The answer is by encouraging resource reallocation, as needed, in an environment of secure rights.

The individual enjoys protection for his person and his property from physical attack, dispossession, invasion, trespass and nuisance. Anyone who is sure he could use that individual's resources more profitably must buy those resources in voluntary exchange, thereby compensating the individual to the full extent of his perceived loss. The individual, having made prudent investments in securing his property—i.e., bearing his share of the transactions costs in a non-frictionless world—is free to use his resources as he sees best, substantially secure in the expectation that the rewards from so doing will accrue to him.

The individual's welfare position is not guaranteed. Changes in the pattern of relative scarcity and technological innovations may threaten the individual. Successful adjustments are then required of those who seek to maintain their welfare positions, and those who fail will be disadvantaged. In this way incentives for continual adjustment and resource reallocation are maintained in a world where scarcity and technology are dynamic.

The role of technology bears closer examination. New technology may render the individual's skills and resources less valuable in the competitive arena, but may not violate his personal or property rights through attack, invasion or trespass.

One can make a sound case that property rights should be used to

protect individuals from attack and dispossession and their property from invasion, trespass and nuisance, and that this protection should be broad-based and pervasive. The argument is most fully developed in the writings of James M. Buchanan, who took his cue from the emphasis in Coase's seminal article on the importance of secure property rights in providing a basis for conflict-resolving trade.²³

In its most complete elaboration, the Coase-Buchanan tradition proposes a two-stage, constitutional-contractarian, approach. Following initial establishment of rights in an admittedly idealized constitutional stage, all subsequent reassignment would be through voluntary exchange (which implements the *strict* Pareto-improvement criterion). Stage 2 has the decided advantages of providing a secure basis for rights, promoting social stability, and ensuring that those affected by invasive shock events would be protected. Stagnation would not, however, follow, since desirable invasions would proceed, with full compensation of those threatened. Stage 1 is idealized and unrealistic in its "veil of ignorance" aspects, but is included because Stage 2, alone, would enshrine a *status quo* which could not command universal consent.

The idea of once-and-for-all assignment (or reassignment) of rights followed by consensual change thereafter has much to recommend it. However, its application to nonexclusive and/or nonrival goods is limited. In societies which seek to establish and maintain nonattenuated structures of rights, inefficiency persists in cases where it is prohibitively expensive to achieve the necessary exclusion or hyperexclusion at the individual level.

An alternative post-Coasian tradition, here called the Coase-Posner tradition, takes its cue from the discussion (in the later sections of Coase's seminal article) which, recognizing the asymmetry introduced by positive transactions costs, suggests assigning liability so as to minimize total costs or maximize the aggregate net value of product.²⁴ This approach is, presumably, adaptable to situations where nonexclusiveness and/or nonrivalry pose problems for pure Coase-Buchanan approaches.

The Coase-Posner tradition is hospitable to, and in some versions actively promotes, a case by case post-shock determination of property rights on benefit cost grounds. Where nonexclusiveness and/or nonrivalry are involved, the Coase-Posner solution would involve some combination of property rights reassignment and direct government actions, aimed at promoting the result which most nearly satisfies the objectives of providing such goods in Samuelson-efficient amounts while minimizing

23. See J. BUCHANAN, *FREEDOM IN CONSTITUTIONAL CONTRACT* (1977), and BUCHANAN, *THE LIMITS OF LIBERTY: BETWEEN ANARCHY AND LEVIATHAN* (1975).

24. See R. POSNER, *ECONOMIC ANALYSIS OF LAW* (1972), note that Dahlman, *supra* note 7, places himself firmly in the Coase-Posner tradition, in the final two sections of his paper.

transactions costs. One can be sympathetic with the desire to see law promote efficiency, which obviously underlies Coase–Posner thinking. However, the problem is that expectations in a Coase–Posner world are no longer secured by (explicit or implicit) property rights. Implicit property rights—those assumed to exist securely because the threat has yet to be introduced—would be entirely insecure. Explicit property rights would also be insecure, since they could be changed whenever changes in technology and/or relative scarcity tilted the benefit cost ratio in favor of some alternative rights assignment.

This insecurity of property rights is undesirable for several reasons. Security of rights provides a sound basis for economic decisions, especially those with longer time profiles, such as saving and investment. More generally, it is an essential component of the whole legitimizing process. Rights that are “right” (i.e., recognized as legitimate) are not merely easier to enforce; they provide a sound basis for long-term social stability.²⁵ Rights which shift with the benefit cost numbers are unlikely to enjoy the aura of legitimacy. Further, stability of rights discourages self-interested investment in institution-changing behaviors while unstable rights encourage it. Voluntary exchange is an unimpeachable method of conflict resolution. However, for the individual who wants a right he does not have, voluntary exchange is the method of last resort.²⁶ Again, rights which shift with the benefit cost numbers would tend to discourage voluntary exchange, while encouraging efforts to generate and gain recognition for the kind of benefit cost data which would ensure reassignment of rights in a Coase–Posner world.²⁷

These arguments suggest that Coase–Posner solutions are unacceptable in cases where nonattenuated property rights can be maintained. Where nonexclusiveness and nonrivalry persist, Coase–Posner approaches could be accepted only if the Coase–Buchanan tradition is clearly unadaptable to such cases. However, a pragmatic acceptance of the fact that prohibitive costs of exclusion and hyperexclusion will continue to relegate some important resources, goods and amenities to the nonexclusive and nonrival categories does not, *per se*, invalidate the concept that secure rights should provide protection from invasion and attack.

25. The fundamental importance of this point is recognized by writers as diverse as J. BUCHANAN, *FREEDOM IN CONSTITUTIONAL CONTRACT* 93 (1977) and J. COMMONS, *THE LEGAL FOUNDATIONS OF CAPITALISM* 325, 330 (1924).

26. The rational individual who wants a right he does not have may, in an environment of unstable rights, rank his alternatives as follows: (1) ask an executive agency to give the right to him; (2) ask a judge to give it to him; (3) ask a legislature to give it to him; and (4) if all the above fail, attempt to buy it. In an environment of stable and secure rights, the voluntary exchange option becomes immeasurably more attractive.

27. Note Dahlman's *supra* note 7, at 161, argument that benefit cost analysts should regard the Coasian (or, more accurately, the Coase–Posner–Dahlman) argument as entirely encouraging in its implications for their employment prospects.

The concept of *res communis* offers an imperfect but by no means unthinkable solution. Where individualized exclusion is infeasible, why not provide for exclusion at the community level? Surely that would be better than either abandoning the objectives of efficient resource allocation and protection from invasion where nonexclusive and/or nonrival goods are involved, or pursuing efficiency at the cost of Coase-Posner instability of rights.

Proposals in this spirit would involve some form of property rights assigned at the collective rather than at the individual level. Yet, to exploit fully Coase-Buchanan concepts, individuals and small communities of interest would need considerable veto power over the collective decision process in order to protect themselves from majority-imposed welfare shock.

Of course, the current regulatory approach to, for example, air and water pollution control and the mainstream economists' most frequently proposed alternative, the Pigovian tax,²⁸ involve the assertion of rights to nonexclusive and nonrival environmental resources at the collective level. Yet, these approaches have their problems. Vesting of collective rights at the national level provides no guarantee of protection for communities invaded by greater-than-typical pollution loads, and thus violates the Coase-Buchanan spirit. More generally, the prospect that emissions standards or Pigovian tax rates may change, perhaps frequently, as the cognizant administrator's perceptions of the marginal benefits and costs of pollution abatement change, has more in common with the Coase-Posner tradition than the Coase-Buchanan tradition.

A recent proposal for rights in various nonexclusive and nonrival "quality of life" goods, vested at the community level, deserves consideration, since it is firmly in the Coase-Buchanan tradition.²⁹ While recognizing that action (or inaction) must be at the community level, this proposal preserves the Coase-Buchanan notion of secure explicit and implicit property rights and protection from externally-imposed shock invasions. Given the "need" to site a locally obnoxious facility somewhere (or, equally plausibly, the "need" to impose a heavy pollution load somewhere), a compensation auction would be held and the low bidding community would become the fully compensated—and, therefore, happy—host of an invading force which would otherwise be resented.³⁰ If no community

28. Note that this discussion of the Pigovian tax does not resurrect the concept of externality. The state-of-the-art proof of the "optimality" (the Samuelson-efficiency) of such taxes relies not on the concept of externality but on the notion of pollution as a nonrival discommodity. See W. BAUMOL & W. OATES, *THE THEORY OF ENVIRONMENTAL POLICY* 33 (1975).

29. See O'Hare, *Not on My Block, You Don't: Facility Siting and the Strategic Importance of Compensation*, 25 PUB. POL. 407 (1977).

30. Japan has introduced a program in which owners of power plants and some kinds of chemical industries compensate communities disadvantaged by their location. See OECD, *ENVIRONMENTAL POLICIES IN JAPAN* (1977).

submitted a "low enough" bid, the "need" for the facility would be re-evaluated. Thus, a market would be established which would tend to achieve efficiency in determining the total number of such facilities and their locations.

Two crucial details have yet to be worked out: (1) the collective decision process leading to submission of the community bid, and (2) the mechanism for determination of intra-community compensation in cases where various sections of the community were differently impacted. While the vesting of rights at the community, rather than the national, level represents a move which is firmly in the Coase-Buchanan tradition, the proper relationships between the community and its component individuals and groups have yet to be elucidated.

Nevertheless, the idea of rights to protection from externally imposed invasions threatening welfare shock, vested at the community level, has much to recommend it. It seems to have the potential (more so than most of the alternatives) to provide solutions to the two problems identified early in this section: (1) to provide protection for individuals who face externally threatened welfare shock, and (2) to approach a Samuelson solution which provides nonexclusive and nonrival goods in efficient amounts.

V

This article has examined the conventional wisdom notions of market failure, and found them wanting. The idea that individualistic markets do not provide certain kinds of goods efficiently, or even passably well, is not rejected. "So," you might say, "market failure lives." Not so. If the conventional diagnoses and analyses of market failure cannot withstand the rigors of deductive logic, they do disservices of at least two kinds: (1) they provide an inviting target for those who tend to overrate, absolutely and perhaps relatively, the capacities of individualistic markets, giving them an unnecessary advantage in debate, and (2) they tend to misdirect the efforts of those who seek workable solutions to the problems posed by nonexclusive and nonrival goods.

The notions of "common property resources" and "public goods" are rejected as imprecise, confusing and, in some applications, downright misleading. The concepts of nonexclusiveness and nonrivalry, phenomena which may occur separately or together, are precise and lead to correct analyses. Congestible goods, which are nonrival for users fewer than some threshold number but intensely rival as the capacity constraint is approached, are recognized. The congestible goods model may also serve as a means for diagnosing and analyzing problems attributed to "natural monopoly."

Externality is found to be nothing special: merely an inefficient disequilibrium situation which cannot persist alone. The inefficiency can persist if nonexclusiveness and nonrivalry are involved but, in that case, it is attributable to nonexclusiveness and nonrivalry, not to externality.

Nonexclusiveness is attributable to institutional or technological conditions. Where the technology of exclusion is tolerably inexpensive, market logic would suggest that efficiency can be promoted by establishing exclusive institutions. However, the physical properties of some goods are such that exclusion is prohibitively expensive with existing technology. In addition, for nonrival goods simple exclusion is insufficient to ensure efficiency: hyperexclusion, which is by and large technically infeasible, is needed. For these kinds of goods, institutional reforms permitting Pareto-efficient provision via the market are completely elusive. Yet, it is possible that progress toward provision of Samuelson-efficient quantities can be achieved via the establishment of *res communis* rights vested in appropriate collectives. Pareto-efficiency would remain unattainable, but to reject such solutions for that reason would be to fall prey to the "grass is greener" fallacy by comparing imperfect collective solutions with perfect, but unattainable individualistic solutions.³¹

Thus, the only thing which can be salvaged from the conventional wisdom idea of market failure is the possibility that collective institutions might be able to provide nonexclusive and/or nonrival goods in quantities approaching the efficient amount (but probably not at near-efficient prices) while individualistic markets cannot. This possibility is not an especially robust nor attractive survivor, since (1) the collective alternative to individual markets is imperfect, (2) its superior performance, in terms of providing near-efficient quantities, cannot be assumed but must be established on a case by case basis, and (3) its coercive aspects are unlikely to be entirely eliminated. Nevertheless, the collective alternative is too important to be ignored.

Finally, events that threaten attacks on the person, dispossession of property, trespass and nuisance may occur. Such events may impose a welfare shock on affected individuals. Resources may be reallocated, at least to some degree, and where nonexclusive and nonrival goods are involved, the resultant resource allocation may deviate very substantially from the quantity-efficient. Given such possibilities, one may ask (1) what protections should be provided for individuals thus threatened, and (2) what mechanism should be used to restore the aggregate consumption bundle to a reasonably quantity-efficient condition? The post-Coasian literature has produced two distinct approaches, which the author has labelled the Coase-Posner and Coase-Buchanan approaches. For reasons

31 See Demsetz, *supra* note 2.

having to do with the promotion of social stability and the security of individual expectations, as well as the promotion of voluntary exchange as a conflict resolution device, the Coase–Buchanan tradition has more merit. While more customary approaches such as regulation and taxation of discommodities can be explained (and, to a limited degree, justified) as reasonable attempts to solve problems in a fundamentally imperfect world, the search for institutional devices more firmly in the Coase–Buchanan tradition is to be encouraged.