

# The Expanding Domain of Economics

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Definitions of economics are legion. Two familiar ones will be particularly appropriate for my purposes:

...ECONOMICS is a study of mankind in the ordinary business of life; it examines that part of individual and social action which is most closely connected with the attainment and with the use of the material requisites of wellbeing.

— Alfred Marshall [1920, p. 1]

Economics is the science which studies human behavior as a relationship between ends and scarce means that have alternative uses.

— Lionel Robbins [1962, p. 16]

As to Marshall, how terribly narrow, dull, bourgeois! Must we economists limit our attention to the ordinary, the crassly material business of life? While equally prosaic, Robbins' "relationship between ends and scarce means" does open the door wider. After all, the ends that men and women seek include not just bread and butter but also reputation, adventure, sex, status, eternal salvation, the meaning of life, and a good night's sleep — the means for achieving any of these being, too often, notably scarce.

In dealing with economics as an expansive imperialist discipline (see Gerard Radnitzky and Peter Bernholz [1985]), a geopolitical metaphor may be illuminating. Our heartland is an intellectual territory carved off by two narrowing conceptions: (1) of *manas* rational, self-interested decisionmaker, and (2) of *social interaction* as typified by market exchange. However, the logic of ideas irresistibly draws economists beyond these core areas. Rational self-interested choice plays a role in many domains of life other than markets, for example in politics, warfare, mate selection, engineering design, and statistical decisions. Conversely, even within the domain of market behavior, economists can hardly deny that what people want to buy and sell is influenced by cultural, ethical, and even "irrational" forces more customarily studied by social psychologists and anthropologists. And how people go about their dealings in the market touches upon issues also involving law and sociology.

Responding to these intellectual attractions, the rhetoric of an economic imperialist like Gary S. Becker is notably more muscular:

The combined assumptions of maximizing behavior, market equilibrium, and stable preferences, used relentlessly and unflinchingly, form the heart of the economic approach. . .

[1976a, p. 4]

It is this approach that has powered the imperialist expansion of economics into the traditional domains of sociology, political science, anthropology, law, and social biology — with more to come.

Space constraints rule out any attempt to review here the detailed intellectual histories of these various imperialist invasions, or to assess their overall success or failure. I will have to omit, apart possibly from occasional remarks, a vast array of important and exciting subjects such as: the substantivist vs. formalist controversy in anthropology; in political science the design of optimal constitutions, the stability of voting equilibria, and the balance of power among pressure groups; crime and its deterrence in sociology and law; and a host of interdisciplinary topics like optimal foraging, the division of labor by sex or age or caste, and patterns of fertility and marriage.<sup>1</sup> Instead, I shall reverse the emphasis to concentrate upon a necessarily idiosyncratic selection of lessons that these imperialist forays have for economists about the validity of our image of economic man and about the relative roles of market vs. non-market interactions.

I will emphasize two central themes. First, that it is ultimately impossible to carve off a distinct territory for economics, bordering upon but separated from other social disciplines. Economics interpenetrates them all, and is reciprocally penetrated by them.<sup>2</sup> *There is only one social science.* What gives economics its imperialist invasive power is that our analytical categories — scarcity, cost, preferences, opportunities, etc. — are truly universal in applicability. Even more important is our structured organization of these concepts into the distinct yet intertwined processes of optimization on the individual decision level and equilibrium on the social level of analysis. Thus economics really does constitute the universal grammar of social science. But there is a flip side to this. While scientific work in anthropology and sociology and political science and the like will become increasingly indistinguishable from economics, economists will reciprocally have to become aware of how constraining has been their tunnel vision about the nature of man and social interactions. Ultimately, good economics will also have to be good anthropology and sociology and political science and psychology.

<sup>1</sup> A few selected references (the products of economic imperialists, or else "native" writings with an explicit or implicit economic orientation) are: on the substantivist vs. formalist controversy, Richard Posner [1980, pp. 2-3]; on optimal constitutions, James M. Buchanan and Gordon Tullock [1962, Ch. 6], on majority-voting equilibrium Dennis C. Mueller [1979], and on pressure-group equilibrium, Gary S. Becker [1983]; on optimal foraging, Eric L. Charnov [1976] and Eric Alden Smith [1983]; on the division of labor in insect societies, E.O. Wilson [1978b]; on monogamous vs. polygamous marriage, Wilson [1975, pp. 327-331] and Amyra Grossbard [1980].

<sup>2</sup> Thus I cannot agree that the other social sciences are, in any useful sense, "contiguous" to economics as contended by Ronald H. Coase [1978].

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The second underlying theme was succinctly expressed by Marshall:

But economics has no near kinship with any physical science. . . . It is a branch of biology broadly interpreted. [1920, p. 772]

That economics is an aspect of a broader biological "economy of nature" would not have seemed strange to Adam Smith who, in the *Moral Sentiments*, sounded a near-Darwinian note:

The economy of nature is in this respect exactly of a piece with what it is upon many other occasions. . . . Thus self-preservation, and the propagation of the species, are the great ends which nature seems to have proposed the formation of all animals. Mankind are endowed with a desire of those ends, and an aversion to the contrary.  
[1976 (1759), p. 152]

It is no new idea that the social sciences (including economics) must rest to some degree upon the biological constitution of the human species. But there is a sense in which, I will argue, economics and biology are uniquely intertwined.

### I. Economic Man

Economic man is characterized by *self-interested goals* and *rational choice of means*. On both scores, this image of the human animal has been the object of grumbles. After all, men and women do sometimes seek the welfare of others, and they are sometimes led astray by thoughtlessness and confusion. How should our profession respond to these complaints? (1) A kind of answer, one with which I have little patience, is to use a verbal trick so as to redefine all goals as self-interested, and all choice of means as rational. (2) More defensibly, our profession might adopt a self-denying ordinance, setting aside non-self-interested goals and non-rational choice of means as "non-economic." Economists could then modestly claim that the hypothesis of rational self-interested man, though admittedly inaccurate, has proved to have great explanatory power *in the areas where we apply it*.

There is always something to be said for modesty. But the scientific enterprise demands more. When the phenomenon of radioactive decay refuted the principle of conservation of mass, it would have been modest but unproductive for physicists to decide henceforth to limit their investigations to those processes for which mass was indeed conserved. And similarly, if the hypothesis of economic man fails in any field of application, the correct scientific response is not modest retreat but an aggressive attempt to produce a better theory.

The history of imperialist economics illustrates that the model of economic man has indeed been productive, but only up to a point. Each of our expansionist invasions has typically encountered an initial phase of

easy successes, where postulating rational self-interested behavior in a new field of application has yielded sudden sharp results. In the field of politics it was like a breath of fresh air when Anthony Downs boldly proposed as "axioms" that men seek office solely for income, prestige, and power and that every political agent acts rationally to achieve goals with minimal use of scarce resources [1957, p. 137]. Or in the field of crime when Gary S. Becker [1968] and Isaac Ehrlich [1973] chose to set aside the possibly "deviant" personalities of criminals and instead treat them as individuals rationally responding to opportunities in the form of punishment and reward. These, and similarly oriented explorations into domains of study such as law, marriage and the family, and war and conflict, have led to a rapid intellectual flowering of exciting results.

But then comes a second phase, when doubts begin to emerge. In the partially conquered new territories some of the evidence persists in remaining intractable, difficult to square with the postulate of rational self-interested behavior. In politics these include the fact of voting, the willingness to provide public goods, the grip of ideology. As to crime, it remains true that faced with the same incentives some people commit offenses while others respect the law. So more than a suspicion remains that, after all, criminals are to a degree "deviant" personalities. In some of the fields of imperialist extension of economics we are still in the first phase, reaping easy results. But my emphasis will be upon the more interesting second stage, and what we can learn from the difficulties encountered.

In what follows I will examine what our imperialist explorations have taught us about the two crucial aspects of economic man — *self-interest* (Sec. II) and *rationality* (Sec. III). I will then take up the topic of *conflict* (Sec. IV) to illustrate what economics can say about this most important of the nonmarket interactions that humans engage in. The final Sec. V analyzes the biological underpinnings of all these patterns.

### II. Self-Interest

Adam Smith, as usual, said it best:

We are not ready to suspect any person of being defective in selfishness.  
[1976 (1759), p. 482]

And of course there are his famous lines:

It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own interest.  
[1937 (1776), p. 14]

From the neoclassical era a characteristically strong statement comes from F.Y. Edgeworth:

The first principle of Economics is that every agent is actuated only by self-interest.  
[1881, p. 16]

And finally, a modern quotation from Richard Posner, the celebrated legal scholar who — like the convert more Catholic than the Pope — has become one of the most outstanding of our economic imperialists:

Economics. . . explores and tests the implications of assuming that man is a rational maximizer of his ends in life, his satisfactions — what we shall call his “self-interest.”

[1977, p. 3]

There is a problem here, which Posner promptly raises. Suppose a person's ends in life include the well-being of others. If so, do *their* interests become his “self-interest”? Posner, like many others, answers in the affirmative — an evasion that robs the concept of self-interest of any distinguishable content. But it is not so easy to separate “self-interested” satisfactions from the psychic sensations generated by the experiences of others.

A distinction proposed by Amartya K. Sen illustrates the nature of the difficulty:

If the knowledge of torture of others makes you sick, it is a case of sympathy; if it does not make you feel personally worse off, but you think it is wrong. . . , it is a case of commitment. . . . [B]ehavior based on sympathy is in an important sense egoistic, for one is oneself pleased at others' pleasure and pained at others' pain, and the pursuit of one's own utility may thus be helped by sympathetic action. It is action based on commitment rather than sympathy which would be non-egoistic in this sense.

[1977, p. 327]

Thus Sen would count the emotion of sympathy as self-interested, leaving only an abstract intellectualized moralism as non-egoistic — which does not seem a very appealing categorization. For present purposes, the following commonsense interpretation (consistent, I believe, with David Collard [1978, p. 7]) will serve: someone is non-self-interested to the extent that he or she attaches utility to the impact of events upon the bodies or psyches of other parties. When my mother says, “Drink your milk,” that is her benevolent concern for my bodily well-being. And if I drink it only to please her, that is my benevolent concern for her psychic comfort. (Ultimately, as will be seen below, the difficulty can be resolved only in the light of bioeconomic considerations which allow us to separate the *motivational* from the *functional* aspects of self-interest.)

It is important to distinguish motivations, aspects of individuals' utility or preference functions, from *actions*. (Even entirely egoistic individuals, we economists know, may be led to engage in mutually helpful actions by an appropriate set of penalties and rewards.) Self-interested or egoistic motivations represent an intermediate point on a spectrum that has benevolence at

one extreme and malevolence at the other.<sup>3</sup>

In what follows I will be showing how imperialist economics has cast light upon the nature and extent of self-interest. In some cases, furthermore, new models and approaches suggested by these explorations promise to be useful even in traditional heartland economics.

### 1. Political behavior and the split-Smith model

Can political behavior be explained solely in terms of self-interest? The issue has been debated from the beginnings of political thought. As Roger Masters describes it:

In ancient Greece, the question was therefore already posed with clarity. The pre-Socratics developed a frankly egoistic or hedonistic theory of human nature. . . . Best known from the speeches of Thrasymachus in Plato's *Republic*, this hedonistic view treats human laws or customs as “restraints” on nature. . . .

Both Plato and Aristotle, following the tradition apparently inaugurated by Socrates, contest this position. For example, when Aristotle asserts that man is by nature a “political animal,” he directly challenges the Sophists' assertion that human society rests on contractual or conventional obligations among calculating individuals. Aristotle's view rests on a developmental or evolutionary account of social cooperation.

[1978, pp. 59-60]

The recent irruption of economists into political science has been almost entirely based upon the postulate of self-interest — the Sophist position. This approach, rigorously and unflinchingly pursued, has had its triumphs. But the analytically uncomfortable (though humanly gratifying) fact remains: from the most primitive to the most advanced societies, a higher degree of cooperation takes place than can be explained as a merely pragmatic strategy for egoistic man. The social contract seems to maintain itself far better than we have any right to expect, given the agency and free-rider problems involved in enforcing the contract against overt or covert violations. Or putting the emphasis the other way, the workings of the social system appear to be lubricated by individuals who are willing to act voluntarily *pro bono publico*.

Consider voting. Explanations in terms of rational self-interest do carry us a certain distance. As one

<sup>3</sup> The term “benevolence” (from the Latin “to wish well”) is less ambiguous than the commonly encountered “altruism”. This latter word has become a source of confusion for the very reason mentioned above: while some authors (like Collard [1978]) carefully use it only in its original and proper motivational sense, others loosely characterize as altruistic any *action* which has beneficial effects on others — even if selfishly motivated. Biologists, for example, use the expression “reciprocal altruism” for what is often a merely self-interested *exchange* of benefits.

instance, a self-interested individual would be more likely to incur the costs of going to the polls in a race expected to be close — since his chance of casting the deciding ballot is greater. And larger turnouts have in fact been observed in close elections.<sup>4</sup> Such evidence is consistent with the self-interest assumption in the *comparative* sense: the behavioral response to variations in self-interest parameters is in the direction anticipated. But in *absolute* terms it remains difficult to rationalize self-interested voting at all, so long as there are costs associated with casting a ballot. The chances of any single voter being decisive are usually far too remote to be worth considering.<sup>5</sup>

An even greater “scandal” is the extent of voluntary private provision of public goods. For concreteness, suppose that individual *i*'s utility function is such that at any income level he would devote, if he were the sole contributor, a fraction *k* of his income to the public good. Then in the specific case where *k* = .1 it turns out that, for a community of *N* individuals like *i*, as *N* rises toward infinity the community in the limit would spend only 10% more *in aggregate* upon the public good than any single member would have spent alone!<sup>6</sup> Evidently, individuals' voluntary provisions for public goods go far beyond what can be satisfactorily explained on the self-interest hypothesis.

Howard Margolis [1982] drives home this point with a thought-experiment, of which a modified version is as follows. In the light of his own circumstances and his beliefs as to what others will contribute, Smith has decided to give exactly \$50 to a public good — specifically, to the annual United Fund charitable campaign. Just as he is about to make out his check he learns that Jones, from whom no contribution had been anticipated, has in fact just given \$50. According to the standard analysis, Smith would now drastically scale back his intended donation. For example, if (as in the example used previously) Smith in isolation would have spent 10% of his income on the public good, he should now reduce his own contribution from \$50 to \$5.<sup>7</sup> Everyday observation tells us that this would not happen, that Smith would scale back his own contribution very little if at all.<sup>8</sup> I will use Margolis' proposed resolution of the paradox as my first illustration of new models or approaches arising from the difficulties encountered in the expanded domains of economics.

Let us suppose that within Smith's breast there are really two personalities, Smith<sub>1</sub> and Smith<sub>2</sub>. Smith<sub>1</sub> has ordinary selfish motivations; he is concerned only for

the well-being of the physical Smith. Smith<sub>2</sub> has broader horizons, but he is not exactly unselfish either: Smith<sub>2</sub> does derive satisfaction from making contributions, but only via his own “participation utility” rather than through any direct gratification from the actual benefits conferred upon others.

If Smith were *truly* benevolent to some degree, his utility function might take a form like:

$$U^S = U^S(x_S; x_A, x_B, \dots) \quad (1)$$

where  $x_S$  is his own consumption vector and  $x_A, x_B, \dots$  are the consumption vectors of other members of the community (all the marginal utilities being positive).<sup>9</sup> But our Smith's preferences have the form:

$$U^S = U^S(x_S, y_S) \quad (2a)$$

where  $y_S$  refers to his own “participation” expenditures. And more specifically, suppose that (2a) can be written:

$$U^S = W u^{S_1}(x_S) + u^{S_2}(y_S) \quad (2b)$$

Here  $u^{S_1}$ , the Smith<sub>1</sub> utility component, is a function of Smith's consumption while  $u^{S_2}$  is a function of Smith's participation expenditures — both components being characterized by positive but diminishing marginal utility. *W* is a weighting factor, which can be taken as a constant parameter<sup>10</sup> describing the “balance of power” at any moment between the two personalities. We would expect that this internal balance of power would generally differ from person to person and possibly change with age and external circumstances.<sup>11</sup>

Using this model, the public-goods paradox — that Jones' donations, being in traditional theory a near-perfect substitute for Smith's contributions, should displace the latter almost one-for-one (but do not) — can be resolved. For, Jones' contributions are no substitute at all for Smith's *participation expenditures*. Furthermore, if we specify that consumption utility is more easily saturated than participation utility — that  $u'_1$  falls faster than  $u'_2$  — we obtain the additional observed consequence that wealthier individuals will spend relatively more upon such contributions. The model also suggests that investigations into how to measure the weighting factor *W*, and the interpersonal and circumstantial determinants thereof, may be fruitful. One other point which will have some bearing upon what follows: our human inconsistencies in decisions or occasional seeming “irrationality” may be due to internal switches of command between our Smith<sub>1</sub> and Smith<sub>2</sub>.<sup>12</sup>

<sup>4</sup> See, for example, Barzel and Silberberg [1973].

<sup>5</sup> Some computations on this score are provided by G. Chamberlain and M. Rothschild [1980], as described in Fred Thompson [1982].

<sup>6</sup> The theorem underlying this remarkable result is apparently due initially to Martin McGuire [1974], but its importance was first recognized by Howard Margolis [1982, p. 21].

<sup>7</sup> Having been in effect enriched by \$50 owing to Jones' contribution, Smith would now like to have \$5 more of the public good than he originally planned, or a total of \$55 worth. But towards this amount Jones has already provided \$50, so Smith need spend only \$5.

<sup>8</sup> But see Russell D. Roberts [1984] for evidence supporting a somewhat opposed view.

<sup>9</sup> Alternatively a benevolent Smith's utility function might take the form:

$$U^S = U^S(x_S; U^A[x_A], U^B[x_B], \dots)$$

Here Smith takes pleasure in others' *utilities* rather than in their *consumptions of goods*. (The difference is that the text formulation (1) would allow Smith to have “meddlesome” preferences as to his beneficiaries' consumptions.) This distinction will not be pursued here; for further discussion see Collard [1978], pp. 7-8.

<sup>10</sup> Margolis makes *W* also a function of the ratio  $x_S/y_S$ , but this seems a needless complication if (as he assumes) each separate utility component is characterized by diminishing marginal utility.

<sup>11</sup> As discussed in detail by Thomas C. Schelling [1980]. Notice also the affinity with the Freudian tripartite division of the personality among id, ego, and superego.

<sup>12</sup> This point is emphasized in Schelling [1980]. For somewhat

## 2. Benevolence in the family and the Rotten-Kid Theorem

In the sphere of politics it may still be possible to argue the thesis of exclusively self-interested motivations. But in the domain of the family no-one can seriously deny that benevolence plays an overwhelming role. Even here, however, economists would expect and have indeed shown that *comparative* predictions can be made on the basis of self-interest. Other things equal, pro-natalist subsidies that reduce parents' cost of child-bearing can be expected to increase the birth rate.<sup>13</sup> And we would expect parents to take children out of school earlier in rural rather than urban environments, since young children can be relatively more helpful on the farm than in the city.

Benevolence among family members thus falls short of complete submergence of the individuals' separate interests. Nevertheless, the family typically displays strong cohesive tendencies, as if the benevolence present had a certain "contagious" property. It is this phenomenon that Gary Becker [1976b] explained in terms of the "Rotten-Kid Theorem" — which will serve as my second example of a new model generated to explain the phenomena in the expanded domains of imperialist economics.

In Figure 1 the Rotten Kid is self-interested; he simply wants to maximize his material income  $x_K$  without regard to Daddy's income  $x_D$ . Daddy, however, has a degree of benevolence leading to a normal-looking

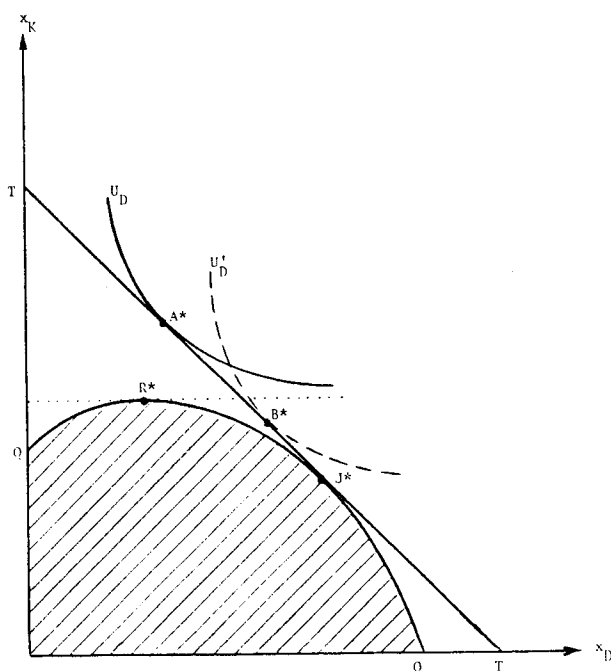


Fig. 1: The Rotten-Kid Theorem

preference map (as represented by the solid indifference curve  $U_D$ ) on  $x_D, x_K$  axes. Let us suppose that Kid chooses the productive solution along a joint productive opportunity locus QQ, after which Daddy may transfer income on a 1:1 basis to Kid along the 135° line TT. If Kid were *shortsightedly* selfish, he would simply maximize his own income at  $R^*$  along QQ. But *enlightened* self-interest would direct Kid to maximize family income at  $J^*$  along QQ. He can count on the fact that, starting from  $J^*$ , Daddy's benevolent motivations would lead to transfers of income along TT up to position  $A^*$  in the diagram. Since  $x_K$  is greater at  $A^*$  than at  $R^*$ , Kid is better off. This alone is not the remarkable result; it has always been known that enlightened self-interest can be more rewarding than shortsighted pig-gishness. The remarkable part of the theorem is that *Daddy* is better off at  $A^*$  than at  $R^*$ , even in terms of sheer material income  $x_D$ . Thus, it seems, Golden-Rule motivations can be functionally profitable!

I will mention here three conditions that have to be met for this result to hold. *First*, Kid's family-income-maximizing productive choice  $J^*$  along QQ must provide Daddy with enough preponderance of income to induce the transfer. *Second*, Daddy's benevolence must surpass a certain threshold. If his benevolence were in fact weaker, as suggested by the dashed indifference curve  $U'_D$  in Figure 1, the transfers he would make from  $J^*$  to  $B^*$  would not suffice to induce Kid's cooperation, and so the parties would end up at  $R^*$ . *Third*, Daddy has to have the "last word." If Daddy's benevolent transfer had to precede Kid's choice along QQ, Kid would assuredly not make the productive decisions that maximize family income.<sup>14</sup>

The Rotten-Kid Theorem, and the limitations thereon, help us understand a wide variety of phenomena within the family, of which I will mention only one. Outside public assistance to some family members, for example to a handicapped child, has less of an effect upon the beneficiary than might at first be anticipated — because benevolent parents, having already been transferring resources to such a child, would now rationally cut back their own transfers.<sup>15</sup> Finally, the "contagious" property of benevolence, when the conditions for the Rotten-Kid Theorem are met, may help explain the extent of non-self-interested behavior even in domains other than the family.<sup>16</sup>

## 3. Gifts, status, and the "rat-race"

The importance of gifts and other "redistribution institutions" in nearly all observed societies may at first suggest widespread benevolence. However, the central tradition of anthropological explanation is in accord with the model of economic man. Gifts among primitive

parallel discussions see Sen [1977] and Albert O. Hirschman [1985].

<sup>13</sup> See Stephen P. Coelen and Robert J. McIntyre [1978].

<sup>14</sup> This discussion and diagrammatic representation are based on Hirshleifer [1977]. See also Gordon Tullock [1977].

<sup>15</sup> See Becker [1981], pp. 124-126.

<sup>16</sup> For a discussion of the extent to which government can serve as a big Daddy to induce cooperation among self-interested citizens, see Bruce R. Bolnick [1979].

peoples are interpreted as really a form of social exchange; if not reciprocated, the gift will be revoked (or even severer penalties applied). What appears to be benevolence is but indirect or disguised self-interest. Thus Marcel Mauss contends that such "prestations" are:

...in theory voluntary, disinterested and spontaneous, but are in fact obligatory and interested.  
[1954 (1925), p. 1]

But this established tradition<sup>17</sup> leaves open the question: Why go to the trouble of disguising what is really exchange as a gift? There is no point to simulation, absent a real thing to be simulated. So we are led to ask: What is being simulated by these pretended gifts? I will anticipate my biological discussion somewhat to respond along the following lines. In very primitive times, voluntary resource transfers took the form only of sharing within a kin-group (as exemplified by Daddy's transfers in the Rotten-Kid model). The biological basis for such benevolence is immediately evident. With widening scope and extent of interactions, actual kinship among transacting parties diminished. But familial sharing remaining the mental image, as a useful fiction one's trading partners became "adopted" as quasi-kin. This fiction became less and less credible as the social distance among transactors increased — so that, in the limit, truly impersonal exchange among strictly self-interested parties was approximated. Still, a residue of quasi-kinship sentiments aids us even in the "ordinary business of life" (Marshall) of modern times. Some willingness to forego selfish advantage, some element of genuine trust between trading partners or among business associates, almost always remains a necessity in the world of affairs.

In contrast with the foregoing, Friedrich A. Hayek [1979, pp. 153-176] rather paradoxically contends that human social organization could not have advanced beyond the small band to settled communities and civilized life until cultural evolution taught men to *overcome* their biological "innate instincts to pursue common perceived goals." (See also E.O. Wilson [1978a].) At times Hayek appears almost to claim, contra Adam Smith, that the natural man is indeed "defective in selfishness".<sup>18</sup> But a fairer interpretation of Hayek's point, I believe, is that the primitive social ethic of kin-

ship sharing had to be replaced by an alternative social ethic — centered upon fair dealing and reciprocity — appropriate to the market order. While Hayek emphasizes that this latter ethic is culturally learned, an ingrained human predisposition may also have evolved to help support reciprocity as a social norm. (I have argued [1980] that social evolution has instilled in man elements of at least three distinct social ethics: one associated with the Golden Rule of sharing, a second with the Silver Rule of private rights and reciprocity, and a third with what might be called the Iron Rule of dominance and subordination.)

Returning to gifts, the economic imperialist Richard Posner [1980] (together with a number of anthropologists) interprets them as essentially a device for mutual insurance. A hunter with a good catch today will help out a less fortunate colleague because he knows that tomorrow the circumstances are likely to be reversed. This explanation cannot be regarded as fully satisfactory, for at least two reasons: (1) Some individuals will be systematically better hunters than others, hence the "insurance" payments and receipts will not balance out over time. (2) In the absence of a formal insurance contract there will be widespread openings for opportunistic behavior: shirking, deferred or slighted repayment, etc.<sup>19</sup>

Nevertheless, to an important extent *reciprocal giving* does approximate self-interested exchange among equals. But what about one-sided or *redistributive giving*? Paradoxically, anthropologists commonly regard the motivation here as not even neutral but often actively hostile — the underlying aim being to enhance or assert status. According to Claude Lévi-Strauss the purpose is:

...to surpass a rival in generosity, to crush him if possible under future obligations which it is hoped he cannot meet, thus taking from him privileges, titles, rank, authority, and prestige.  
[1957 (1964), p. 85]

A very well-known example is the "potlatch" institution of certain Pacific Coast Indian societies, in which (allegedly, at least) resources were consumed or even deliberately destroyed in grand feasts designed to shame less affluent rivals.

Rank-oriented motivations are intrinsically malevolent, since one person's rise is another's fall — the process is a zero-sum game. As the desire for status notoriously pervades all human activities,<sup>20</sup> it is quite remarkable that economists up to quite recently have

<sup>17</sup> See articles in the *International Encyclopedia of the Social Sciences* [1968] under such titles as "Exchange and Display," "Interaction: Social Exchange," and "Trade, Primitive". A somewhat different point of view is that of Marshall D. Sahlins [1972, Ch. 4-5] who emphasizes the pacifying effect of gift exchange upon parties otherwise likely to war for resources.

<sup>18</sup> Starting from a very similar evolutionary orientation, Donald T. Campbell in his Presidential address to the American Psychological Association [1975] argues a position almost the opposite of Hayek's. To wit, that biologically innate selfishness always threatens to subvert the social order, which is defended only by rather fragile culturally evolved moral traditions. Campbell points out that the sins decried by such moral traditions — "selfishness, stinginess, greed, gluttony, envy, theft, lust, and promiscuity" — are in fact behaviors that "come close to biological optimization" [p. 1119].

<sup>19</sup> For evidence on a number of these points see Hillard Kaplan and Kim Hill [1985].

<sup>20</sup> One example is provided by surveys of self-reported "happiness." Reported happiness correlates with higher income at any moment of time, as would be expected, but as income has trended upward *over time* there has been no corresponding upward trend in self-estimates of happiness (see Richard Easterlin [1974]). The most natural explanation is that happiness is more powerfully affected by relative income status than by absolute income; the poor are richer than before, but still at the bottom of the heap.

so signally failed to incorporate this phenomenon into their models.<sup>21</sup>

Rank *may* however be only a proximate and not an ultimate concern — for example, if income is generated by a “contest” process with rank-determined payoffs. In a footrace or a war, even if your goal is only to win a material prize you still have to outmatch your opponent. Income-generating processes with highly progressive rank-determined rewards lead to the “superstar” phenomenon recently noticed in the literature (Sherwin Rosen [1981]). But our interest here is where rank enters into the *utility function*, so that:

$$U_i = U_i(x_i, R_i) \quad (3)$$

where  $x_i$  is individual  $i$ 's income and  $R_i$  may be interpreted as the percent of the comparison group falling below  $i$  on the basis of the status-determining criterion. One interesting implication of (3) is that such a person would be most actively malevolent toward his immediate neighbors along the rank ladder, and be essentially neutral to those far above or below him. Thus, concern for status may be distinguished from sheer *envy* of the well-being of all others.<sup>22</sup>

When status is conferred by conspicuous consumption there is a double payoff to income — greater consumption *plus* higher prestige. From this stems the “rat-race” phenomenon analyzed in the recent book by Robert H. Frank [1985]. As novels about modern suburbia tell us, the rat-race grows ever worse with increasing levels of income. The reason is that as individuals become richer they attempt to purchase both more consumption and more status. Status being socially in absolutely fixed supply, its marginal desirability relative to consumption steadily rises — inducing ever more intense efforts to achieve it, efforts that in aggregate must fail.<sup>23</sup>

If on the other hand the status-determining condition is distinct from income, the latter can often be traded off against rank. What makes some societies successful may be a suitable rank-determining criterion. A tribe facing fierce enemies is more likely to survive if status is earned by bravery in battle. And redistribution institutions, whereby prestige is earned by liberal generosity, tend to moderate rat-race competitions for income. In such societies high income can be used to support consumption or to generate prestige, but not both.

### III. Rationality

When it comes to rationality, economics as an imperialist discipline finds itself in an unwontedly defensive position. Damaging attacks upon rational man

have come from the direction of psychology. But this is all to the good if, as I have maintained, economics must ultimately become coextensive with all of social science. Generalized economics will have to deal with man as he really is — self-interested or not, fully rational or not.

Rationality is an *instrumental* concept. In the light of one's goals (preferences), if the means chosen (actions) are appropriate the individual is rational; if not, irrational. “Appropriate” here refers to *method* rather than *result*. Rational behavior is action calculated on the basis of the rules of logic and other norms of validity. Owing to chance, good method may not always lead to good result.

Few real men and women behave rationally all the time, and many of us scarcely any of the time. How then can economics maintain the postulate of rationality? Several answers can be given, in parallel with the responses offered when the self-interest postulate was challenged: (1) We could redefine all choice as rational. (“If I chose to do X, I must have thought that X was best.”) This gets us nowhere. (2) We could retreat to a fallback position, asserting that the rationality postulate yields useful predictions in the field *where economists customarily apply it* — to wit, in market decisions. Such modesty, as argued above, is an improper evasion of the scientific challenge.<sup>24</sup> Ultimately we must be ready to abandon the rationality paradigm to the extent that it fails to fit the evidence about human behavior.

Rationality may fail in two quite distinct ways. First, individuals often commit errors in logical inference even when doing their best to reason logically. Second, what is quite a different matter, actions are often “unthinking”; when governed by habit or passion, people do not even attempt rational self-control. (I will be suggesting below that such failures of rationality, like violations of the self-interest postulate, may have proved functionally adaptive in the genetic and cultural evolution of the human species.)

#### 1. On lapses of logic

To reason in accordance with the canons of formal logic is no easy task. I will discuss three different categories of logical lapses.

First are straight violations of the laws of inference. In the following example (adapted from Leda Cosmides [1985]), experimental subjects were instructed somewhat as follows:

In a card-sorting task there is one rule: “Every card marked with an ‘A’ on one side should have a ‘1’ on the other.” Indicate whether you need to

<sup>21</sup> The early discussion by Thorstein Veblen [1953 (1899)] is more satiric than analytical. Models incorporating one of more aspects of the drive for status have been offered by Becker [1971], Reuven Brenner [1983], and Robert H. Frank [1985].

<sup>22</sup> On envy see Helmut Schoeck [1969 (1966)] and Becker [1971, pp. 1088-1090].

<sup>23</sup> Time also becomes increasing scarce, relatively speaking, as income rises. Status and time constraints reinforce one another to help produce the phenomenon of the “harried leisure class” (see Becker [1965] and Staffan B. Linder [1970]).

<sup>24</sup> An interesting issue, however, is why the rationality postulate so often remains a useful social predictor despite its lack of validity on the individual level. One reason is *aggregation*: since rational behavior is systematic and purposive, whereas irrational behavior tends to be random and erratic, after aggregation even a limited degree of rationality tends to dominate the social totals. Another reason is *selection via competition*, to be discussed in more detail below.



inspect the reverse side of the following cards to detect violation of the rule: (1) A card showing an 'A'; (2) A card showing a 'B'; (3) A card showing a '1'; (4) A card showing a '2'.

In a large preponderance of cases, while the subjects correctly realized the need to inspect the reverse of card #1, they failed to notice that they should do the same for card #4.

What is instructive, however, is that the results were quite different for a formally identical problem presented as follows:

You are the bouncer in a Boston bar, concerned to enforce the following rule: "Anyone who consumes alcohol on the premises must be at least 20 years old." Indicate whether you need more information about any of the following individuals to detect violation of the rule: (1) An individual drinking whisky; (2) An individual drinking Coke; (3) An individual aged 25; (4) An individual aged 16.

Here almost everyone perceived the need for more information about individual #4 as well as individual #1. The author's suggested explanation is biological: however imperfect our mental capacities are at formal logic, Darwinian natural selection has made us efficient at detecting cheating or violations of social norms — a factor entering into the second but not the first experiment.

More familiar to economists is a relatively large literature, most notably associated with the psychologists Amos Tversky and Daniel Kahneman,<sup>25</sup> on errors people make in probability judgments. Tversky and Kahneman indicate that:

... people rely on a limited number of heuristic principles which reduce the complex tasks of assessing probabilities. . . to simpler judgmental operations. In general, these heuristics are quite useful, but sometimes they lead to severe and systematic errors.

[1974, p. 1124]

Among the many examples of such errors are: (1) a tendency to overestimate on the basis of psychological salience (someone who has seen a house burning down usually assesses a higher probability to such an event than someone who has only read about it), and (2) a tendency to attribute excessive representativeness to small samples (thus, people do not seem to intuitively appreciate that average word lengths in successive lines of a given text vary more than average word lengths in successive pages). As a general conclusion, it appears that the human mind employs rules of thumb that work well most of the time, but which can

lead to certain systematic classes of errors.<sup>26</sup>

What psychologists term "cognitive dissonance" has received some attention from economists (see George Akerlof and William T. Dickens [1982]). This phenomenon is not so much a lapse of logical reasoning as its perversion. Suppose someone has chosen an employment generally regarded as excessively risky. To reduce his mental discomfort, he is likely to revise his beliefs and kid himself into thinking that his job is not so risky after all! What is involved here is known in more old-fashioned terminology as *rationalization*. When a person is made aware of a disharmony between his actions and his preferences and beliefs, the economist would expect him to revise his choice of action — but the cognitive dissonance theorist predicts that he is likely instead to modify his preferences or beliefs.

The basic premise here is that a person always tries to present to the world (and to himself) a picture of his own behavior that fits an integrated rational pattern. Observed discrepancies call for correction, but the correction may take either the *rational* or the *rationalizing* form. An elaboration of this idea distinguishes between "underjustification" and "overjustification." Cognitive dissonance is an example of the former. If a subject is made aware of having done something without adequate *extrinsic* justification in the form of reward or constraint, he rationalizes by manufacturing an intrinsic reason (revising his goals or beliefs). "Overjustification" consists of making the subject aware that there is a strong extrinsic reason for his behavior, from which he is likely to infer an *absence* of intrinsic reason. For example, it has been alleged, if children in a classroom are led to expect that reading achievements will be rewarded by gold stars, they are likely to actually reduce their reading activity afterward, when gold stars are no longer offered.<sup>27</sup>

While these processes of belief revision may not always be totally absurd,<sup>28</sup> they tend to violate the reality principle. Suppose a military commander learns that his left flank is dangerously weak. The economist, expecting a *rational* response, predicts that the general will reinforce his left. The cognitive-dissonance theorist rather expects a *rationalizing* response instead, in which the general chooses to believe that the enemy will not attack him on the left. Environmental selection

<sup>26</sup> For a related analysis, which emphasizes the strengths rather than weaknesses of commonsense inference, see Harold Kelley [1973].

<sup>27</sup> For discussions see Edward L. Deci [1971] and Mark R. Lepper, David Greene, and Richard E. Nisbett [1973]. Notice that "overjustification" is in opposition to the better-known *conditioning* theory, which predicts that patterns of behavior induced by reward (e.g., Pavlov's famous salivating dog) will persist to some extent even after withdrawal of the reward.

<sup>28</sup> A child who observes that a certain activity receives extrinsic social compensation might well infer, for example, that people in general find the activity onerous or distasteful. Since we are all always learning from others, the apparent weight of others' judgments should reasonably have some impact upon our own estimates of what we ought to like or dislike.

<sup>25</sup> A useful collection is the volume edited by Kahneman, Paul Slovic and Tversky [1982].



will always be tending to eliminate such inappropriate responses, as will be discussed further below.

## 2. On non-rational (or "boundedly rational") decision processes

At least as important as failure to reason correctly is the fact that, in some contexts people do not even attempt to think rationally at all (or do so only in a very limited way). *Habit* is surely a way of economizing on scarce reasoning ability. Indeed, in many contexts habit may be faster and more accurate than thinking; no-one can play the piano or drive a car effectively without engaging in a host of complex unthinking actions. But I am not aware of any studies of the psychoeconomics of habit.

Under the heading of "bounded rationality", Herbert A. Simon [1955, 1959] has contended that a person faced with a complex mental task will not attempt to strictly optimize but will be content instead merely to "satisfice". That is, he aims to find not the best but a good solution — one which achieves a given proximate target or aspiration level. Simon argues that:

Models of satisficing behavior are richer than models of maximizing behavior, because they treat not only of equilibrium but of the method of reaching it as well. . . (a) When performance falls short of the level of aspiration, search behavior. . . is induced. (b) At the same time, the level of aspiration begins to adjust itself downward until goals reach levels that are practically attainable. (c) If the two mechanisms just listed operate too slowly to adapt aspiration to performance, emotional behavior — apathy or aggression, for example — will replace rational adaptive behavior. [1959, p. 263]

Simon's steps (a) and (b), it might at least be argued, constitute a valid successive-approximation technique for optimization that economizes on humans' limited information and reasoning ability. Only step (c), the emotional response to frustration, seems clearly dysfunctional in terms of rational adaptation. However, it can be shown, even "irrational" emotions may serve a useful adaptive function.

Specifically, an individual's uncontrollable anger/gratitude response<sup>29</sup> to another's hurtful/helpful activity can induce cooperation in much the same way as the Rotten-Kid Theorem. Figure 2 is similar to Figure 1. But in addition to the "transfer lines"  $T, T', T''$  that describe once again how a grateful Daddy can transfer income to Kid on a 1:1 basis, here there are also "punishment lines"  $D, D', D''$ . These indicate that an angry Daddy can deprive Kid of income, but again only on a 1:1 basis — that is, Daddy loses one unit himself for each unit penalty imposed on Kid. (This assumption reflects the fact that anger, like gratitude, can be expressed only at a

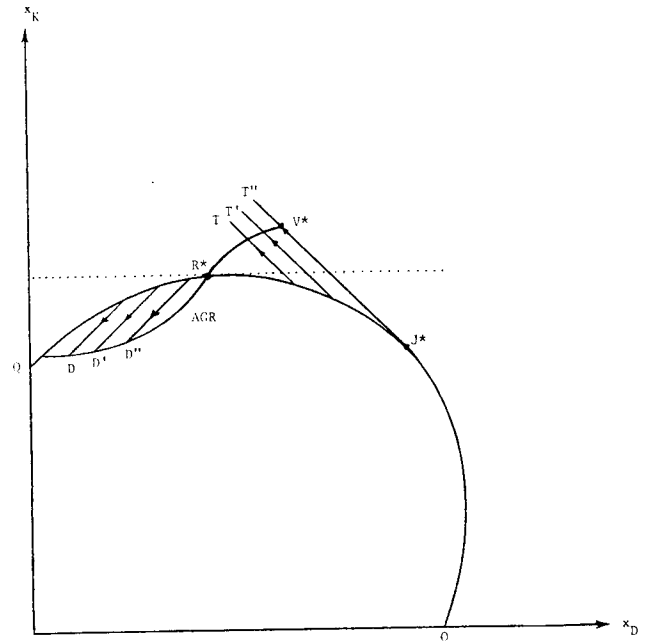


Fig. 2: The Anger/Gratitude Response (AGR) Curve

cost.) Then the rational self-interested first-mover, Kid, in selecting a productive vector along  $QQ$  does so in the light of the final positions attainable along Daddy's Anger/Gratitude Response curve (AGR). The pictured shape of the AGR curve reflects the reasonable assumption that Daddy becomes decreasingly grateful (or increasingly angry) the more selfish is Kid's productive choice along  $QQ$ . The final Figure 2 solution at point  $V^*$  is an efficient outcome, quite analogous to the Figure 1 solution at point  $A^*$ . In Figure 1 it was Daddy's benevolence that guaranteed his implicit promise to reward a self-interested Kid for cooperative behavior; in Figure 2, the same function is served by Daddy's passionate "loss of control" in response to Kid's good or bad behavior.

The possibility of achieving the efficient outcome through the AGR effect is premised upon a number of special assumptions, very much in parallel with those required for the initial Rotten-Kid model. Once again, Daddy must "have the last word" in the interaction. And the overall result is somewhat dependent upon the specific location and shape of the AGR curve. If Daddy is strongly predisposed to be angry (so that the AGR curve lies almost entirely below  $QQ$ ), he may even be able to extort income from Kid — i.e., to achieve a distributive gain at Kid's expense. But Daddy's propensity to anger, if carried too far, may lead Kid to settle for a very inefficient productive outcome: one in which both parties are so impoverished that Daddy cannot (or will not want to) inflict further punishment.

I will conclude this discussion of the psychology of rationality on a properly aggressive imperialist note. Economists, for example Akerlof and Dickens [1982] and David Alhadeff [1982], to my mind have been over-respectful of what psychology is supposedly able to tell us. While rich in data, on the theoretical level psycholo-

<sup>29</sup> This development is based upon Hirshleifer [1984].

gy remains a confusing clamor of competing categories; there is no integrating theoretical structure. I will be so bold as to predict that such a structure, when achieved, will be fundamentally economic — or more specifically bioeconomic — in nature. That is, it will show how mental patterns have evolved as optimizing solutions subject to the constraints of scarcity and competition.<sup>30</sup>

### 3. Environmental selection and “as if” rationality

Even if individuals commit any or all of the reasoning errors discussed above, to some extent decisions will still be disciplined by competitive selection processes in the economy. Armen A. Alchian [1950] argued that even if a business firm's choices were completely random, the environment would select for survival those decisions that were relatively correct in meeting the minimum standard of viability. Expanding on this, Stephen Enke [1951] argued that competition would ensure that all policies save the truly optimal would in time fail the survival test. As those firms pursuing relatively successful policies expand and (owing to imitation) multiply, a higher and higher standard of achievement becomes the minimum criterion. In the long run, viability dictates optimality. Consequently, for long-run predictive purposes, in competitive situations the analyst is entitled to assume that firms behave “as if” they were truly engaged in rational optimization.

This model has to be inaccurate at least in one respect: in describing the *approach to equilibrium*. Actual economies, though falling short perhaps of the rational ideal, surely avoid the profligate waste (abandonments, bankruptcies, and the like) that would ensue from merely random behavior (see Edith Penrose [1952]). Another serious flaw is that, as shown initially by Sidney G. Winter [1964, 1971], the selection-evolutionary process will not necessarily always lead to the same long-run equilibrium outcome “as if” firms actually optimized. In this connection Richard R. Nelson and Winter [1982] have explored the consequences of a process wherein boundedly rational firms choose among “organizational routines” while competitive environmental selection is simultaneously operating to change the representation of these alternative routines in the population. And John Conlisk [1980] has examined a process where, with optimization costly relative to mere *imitation*, in general the ultimate “natural selection” equilibrium will be a mixture of the two types. A somewhat parallel analysis, emphasizing that imitation can be regarded as cultural inheritance, appears in Robert Boyd and Peter J. Richerson [1980].

While economists have been working on the environmental selection of firms and their business routines, evolutionary anthropologists have developed strikingly similar models for the natural selection of cultural practices like group size, birth spacing, and

land tenure arrangements among primitive peoples.<sup>31</sup> What the anthropologists have been doing here is an instance of a more general (and somewhat controversial) quasi-economic evolutionary modelling principle known as *the adaptationist hypothesis* or *the optimization theory*: that morphology and behavior, on both the individual and social levels, can be explained “as if” chosen to maximize the chances of evolutionary success.<sup>32</sup> Especially on the social level, a number of difficulties have been encountered owing mainly to the fact that what is best for the individual may not be best for the group. Economists could make important contributions here, having already systematically explored the bases for such “fallacies of composition” — e.g., divergent interests, differences of beliefs, and externalities. But I would now like to call attention to another, less familiar yet enormously important reason for disparities between private and social adaptation: the role of *conflict* in determining patterns of social organization.

### IV. Conflict

Vilfredo Pareto said:

The efforts of men are utilized in two different ways: they are directed to the production or transformation of economic goods, or else to the appropriation of goods produced by others.

[1971 (1927), p. 341]

Pareto is suggesting, as I believe will be proved to be correct, that aggressive behavior aimed at the appropriation of goods will ultimately provide as rich and fruitful field for the application of economic reasoning as our traditional topics of production and markets. While appropriation can be undertaken to some extent by lawful means, for example via redistributive politics or what has become known as “rent-seeking,”<sup>33</sup> its most dramatic and indeed characteristic form involves conflict. At any moment of time a rational self-interested person will strike an optimal balance between achieving his ends through production and voluntary exchange on the one hand or through force, extortion, and fraud on the other. In fact, even if he has no intention of using the latter techniques himself, he would be well-advised to devote some of his resources to defense against invasions by others. The final social equilibrium will integrate the destructive and invasive as well as the constructive and cooperative efforts of humans in all of their interactions with one another.

I can briefly allude only to three topics under this vast

<sup>31</sup> Surveyed in Eric A. Smith [1985]. The anthropologists are analytically ahead of the economists in tying the environmental selection of institutions to more ultimate evolutionary considerations — the reproductive survival of human beings.

<sup>32</sup> The diverging views of evolutionary theorists on this more general issue are illustrated by John Maynard Smith [1978], Richard C. Lewontin [1979], and Richard Dawkins [1982, Ch. 3].

<sup>33</sup> See Anne O. Krueger [1974].

<sup>30</sup> A psychology text with such an orientation is J.E.R. Staddon [1983].

heading — one concerned with the *causes* of conflict, the second with the *conduct and technology* of conflict, and the last with the social *consequences* of conflict.<sup>34</sup>

### 1. On the causes of conflict

Involved in a rational decision to engage in conflict, economic reasoning suggests, will be the decision-maker's *preferences*, *opportunities*, and *perceptions*. These three elements correspond to traditional issues debated by historians and political scientists about the "causes of war": Is war mainly due to hatred and ingrained pugnacity (hostile preferences)? Or to the prospects for material gain (opportunities)? Or is war mainly due to mistaken perceptions, on one or both sides, of the other's motives or capacities?

In the simplest dyadic situation, and setting aside complications such as those associated with group choices,<sup>35</sup> Figures 3 and 4 are alternative illustrations of how preferences, opportunities, and perceptions jointly influence decisions. In each diagram the curve  $QQ$  bounds the peaceful possibilities or "settlement opportunity set" — drawn on axes representing Blue's income  $I_B$  and Red's income  $I_R$ . Points  $P_B$  and  $P_R$  indicate the parties' respective *perceptions* of the outcome of conflict. And the families of curves labelled  $U_B$  and  $U_R$  are the familiar utility indifference contours.

Figure 3 shows a relatively benign situation: settlement opportunities are complementary, preferences

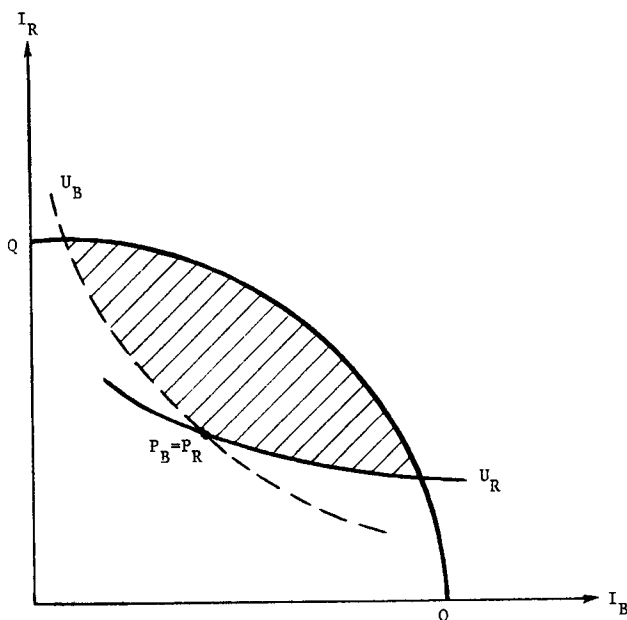


Fig. 3: Statics of Conflict — Large Potential Settlement Region

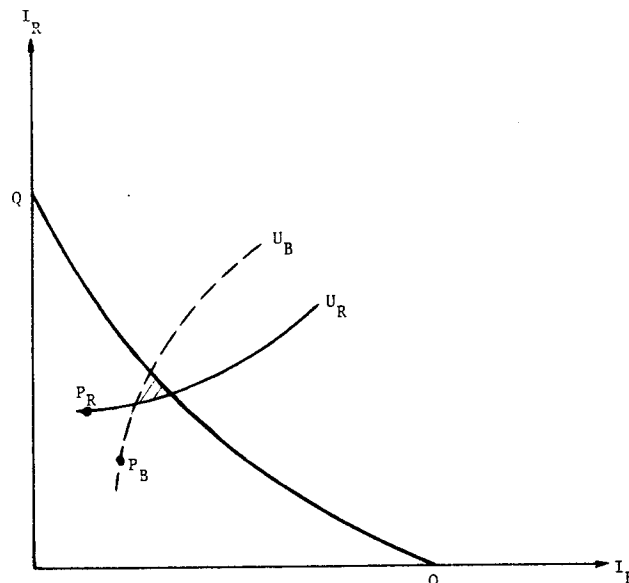


Fig. 4: Statics of Conflict — Small Potential Settlement Region

display benevolence on each side, and perceptions of returns from conflict are conservative and agreed ( $P_B$  and  $P_R$  coincide). The "Potential Settlement Region" PSR (shaded area in the diagram), the set of income partitions such that *both* parties regard themselves as doing better by settling than by fighting, is large — which plausibly implies a high probability of coming to an agreement. Figure 4 shows a less pleasant situation: antithetical opportunities, mutually malevolent preferences, and divergently optimistic estimates of the returns from conflict. The PSR is therefore small, and the prospects for settlement much poorer.

Such a summary presentation is of course little more than a way of organizing ideas, so as to direct attention to the forces underlying and determining the parties' opportunities, preferences, and perceptions. I can only mention a few specifics here. Whether or not peaceful *opportunities* are harmonious may depend upon Malthusian pressures, upon the economics of increasing returns and the division of labor, and upon the possibility of enforcing agreements. *Preferences* (benevolence or malevolence) may be a function of kinship and shared cultural heritage. And *perceptions* will be influenced by communications, including threats and bluffs, and by each party's demonstrated prowess in past and ongoing hostilities.<sup>36</sup>

But even when these static considerations tend to favor peaceful settlement, the dynamics of the negotiation process may prevent the parties from achieving a mutually beneficial accommodation. In the famous Prisoners' Dilemma, for example, inability to make a binding agreement traps the players in a mutually unsatisfactory outcome.

<sup>34</sup> This discussion is based largely upon Hirshleifer [1987 (forthcoming)].

<sup>35</sup> Some of the problems of group organization in a military context are analyzed in Geoffrey Brennan and Gordon Tullock [1982].

<sup>36</sup> Some of the problems involved in the relation between perceptions and conflict are discussed in Donald Wittman [1979].

## 2. On the technology of conflict

Conflict is a kind of "industry" in which different "firms" compete by attempting to disable opponents. Just as the economist without being a manager or engineer can apply certain broad principles to the processes of industrial production, so, without claiming to replace the military commander he can say something about the principles governing how desired results are "produced" through violence.

*Battles* typically proceed to a definitive outcome — victory or defeat. *Wars* may be less conclusive, often ending in compromise. These historical generalizations reflect the intertwined working of increasing versus decreasing returns applied to the production of violence: (1) Within a sufficiently small geographical region such as a battlefield, increasing returns to military strength apply — a small military superiority is typically translated into a disproportionately favorable outcome. The reason is that, at any moment, the stronger side can inflict a more-than-proportionate loss upon the opponent, thus becoming progressively stronger still (Frederick William Lanchester [1976 (1916)]). (2) But there are decreasing returns in projecting military power away from one's base area, so that it is difficult to achieve superiority over an enemy's entire national territory (see Kenneth E. Boulding [1962], pp. 227-233). The increasing-returns factor explains why there is a "natural monopoly" of military force *within* the nation-state. The diminishing-returns factor explains why a multiplicity of nation-states have remained militarily viable to this date. (However, there is some reason to believe, the technology of attack through long-range weapons has now so come to prevail over the defense that a single world-state is indeed impending.)

## 3. Efficiency as consequence of conflict

Struggle and conflict are obviously costly, inefficient processes. Yet might it be the case that struggle masks a deeper harmony of interests? Some observers have professed to see, for example, a profound beneficent wisdom underlying conflict in Nature. Thus the leopard is admired for his helpfulness to prey, in controlling their numbers and eliminating the infirm and unfit. And the head-butting of male rams, fighting for sexual access, is said to improve the breed. These arguments, and their analogs on the human level, are to my mind rather fatuous. Conflict, unlike exchange, can rarely benefit all participants.

Somewhat more defensible is the contention that conflict leads, ultimately at least, to *efficiency*. That is, as a consequence of struggle, resources will end up under the control of those parties able to turn them to best use. Such a model has been offered by economic imperialists to explain the evolution of law.

Imagine a situation where mutually advantageous exchanges of entitlements are partially or wholly unfea-

sible. Then the Coase Theorem (Ronald H. Coase [1960]) does not apply, and the effective assignment of property rights will make a real efficiency difference. The various parties at interest may contend for resources, among other ways, by lawsuits. Then, the proposition is, those individuals and groups for whom a particular entitlement or legal rule is worth more will ultimately win because they can bring more pressure to bear than their opponents. One model of this process, due to Paul H. Rubin [1977], emphasizes *relitigation*. Since precedents are never absolutely binding, attempts will be made repeatedly to overturn an inefficient one. So long as there is a random element in judicial decisions, even apart from any possible learning factor, the efficient rule will eventually be hit upon — and, being efficient, it will be a relatively stable precedent. In an alternative model, those standing to benefit from the more efficient decision can afford to make greater investments (for example, to hire better lawyers) and thus are more likely to win the contest (John C. Goodman [1978]).

Finally, this efficiency-through-strength model is by no means limited to the arena of common-law litigation. With minimal modifications the same logic could be extended to statute law and constitutional interpretation. For that matter, since the process is essentially one of "trial through combat," why not apply it also to civil wars and international conflicts? Clearly the argument that conflict generates efficiency can have only limited validity, but I will have to break off at this interesting point.

## V. Economics and Biology: Competing Imperialisms?

While economics has been expanding *horizontally*, so to speak, a simultaneous invasion has been taking place *vertically* as evolutionary biology has asserted a claim to be the foundation of all the social sciences. As argued by Edward O. Wilson:

For every discipline in its early stages of development there exists an antidiscipline. . . With the word *antidiscipline* I wish to emphasize the special adversary relation that exists initially between the studies of adjacent level of organization. . . [B]iology has now moved close enough to the social sciences to become their antidiscipline. . . Many scholars judge this core [of social theory] to be the deep structure of human nature, an essentially biological phenomenon.  
[1977, p. 127]

This development, though controversial in some respects,<sup>37</sup> should not disturb economists. The influence

<sup>37</sup> Unfortunately, "sociobiology" has become the object of ideological attack on the part of some scientists and publicists concerned to minimize the genetic as opposed to the cultural sources of social behavior and organization. But no-one can seriously deny that mor-

of Malthus and of Adam Smith upon Charles Darwin's thought is well-known.<sup>38</sup> And whereas Alfred Marshall declared that economics is a branch of biology, the biologist Michael Ghiselin [1978] would make *universal economy* the more general discipline. Under this broad heading, biologists can be regarded as studying *natural economy* while the socially regulated behavior of humans constitutes *political economy*.<sup>39</sup> In short, these two colliding imperialisms can say, with the comic-strip character Pogo, "We have met the enemy, and he is us!"

I could defend this assertion by pointing to fundamental common concepts like competition and specialization, or to terminological pairs like species/industry, mutation/innovation, evolution/progress, etc., or most explicitly by setting up parallel systems of equations describing equilibrium states and paths of change. But I must limit myself to a few specific points that bear upon issues discussed above.

1. As to self-interest, a number of paradoxes are resolved when it is appreciated that in biology *there are two levels of self* — the organism and the gene. The gene is a "selfish gene" (Richard Dawkins [1976]). But sometimes it is profitable for a selfish gene to program its carrier organism to be benevolent (or malevolent) to other organisms. Non-self-interested motivations on the level of the organism may therefore be *functionally* self-interested on the level of the gene.

2. Just as firms and other social groupings are alliances of individuals, so the organism is in a sense an alliance of genes. Certain remarkable phenomena, such as functionless or "parasitic" DNA, reveal that free-riding and other alliance problems occur even within organisms. Thus some of the forces that limit the achievement of social efficiency or harmony also impair the optimal adaptation of individual organisms to their environments.

3. In the game of Darwinian natural selection, *reproductive survival* (RS) or *fitness* can be regarded metaphorically as the "goal" of the gene. But since one's kin have calculable chances of carrying the same gene, it is possible to quantify the degree of benevolence an organism should display toward relatives. In particular, what might be called the first law of bioeconomics (due to W.D. Hamilton [1964]) says that an animal will help another without reward if and only if:

$$b/c \geq 1/r \quad (4)$$

Here  $b$  is the benefit to the recipient and  $c$  the cost to the donor, both in RS units, while  $r$  is the degree of relatedness between the parties. An individual should be willing to sacrifice one unit of RS, for example, for

two RS units of benefit to a brother or sister (since  $r = 1/2$  between full siblings). Translating from RS to income units, and assuming the equivalent of diminishing marginal utility, we can obtain a normally curved benevolent-toward-kin preference map (like Daddy's in Figure 1).

4. Of course, Hamilton's formula is valid only in an "other things held equal" sense. As a consequence of generational timing, for example, in RS terms parents are more motivated to help children than children to help parents. More generally, behavior depends not only upon preferences (relatedness) but upon opportunities. In very competitive environments there may be sharp conflict not only between male and female parents but even between parents and offspring, or among siblings competing for parental aid.<sup>40</sup>

5. As Darwin emphasized, natural selection does not choose on the basis of an absolute standard of performance, but rather on how well an organism does in comparison with its closest competitors — for example, in the reproductive competition among males for access to females. This is perhaps the ultimate source of our seemingly ingrained concern for dominance and rank.

6. Darwin argued that, in primitive times, human groups whose members were "courageous, sympathetic, and faithful" would have a selective advantage. But he already appreciated that a free-rider problem would be at work: *individual selection* for effective pursuit of self-interest would tend to subvert *group selection* for benevolent traits. Furthermore, the consensus among biologists has been that individual selection is almost always the more potent. However, many modern biologists follow Darwin in making an exception at least for man. Exceptionally rigorous group selection, especially through conflict and warfare, together with the mental abilities of humans<sup>41</sup> that make it possible to identify and punish subversively selfish behavior, have led to the evolution of a degree of group-oriented benevolence.<sup>42</sup>

7. This development has strongly xenophobic implications. Other things equal an organism would "treat as 'enemies', harming them when he could, all individuals having less than average relationship" to him (W.D. Hamilton [1970, p. 1219]). Thus the impartial or universalistic benevolence of our moral philosophers finds no counterpart in evolutionary biology.

8. Finally, however, the mental hyperdevelopment of mankind has made us the only species able to "rebel against the tyranny of the selfish replicators" — our genes (Dawkins [1976], p. 215). Recognizing our ingrained behavioral drives, we can train ourselves to oppose them — just as we can amend our bodily shape or internal biochemistry through surgical or medical

phology and biochemistry play *some* role in social behavior, just as no "sociobiologist" of repute has ever ruled out the influence of cultural determinants. (Furthermore, the human capacities for culture, of which language is the most notable, are themselves of genetic origin.) While individual sociobiologists may have constructed faulty theories or misread the evidence on particular issues, such errors cannot condemn the entire scientific enterprise of searching for the biological underpinnings of behavior.

<sup>38</sup> On this see especially S.S. Schweber [1978].

<sup>39</sup> I have attempted to develop this distinction in Hirshleifer [1978].

<sup>40</sup> On these issues see Robert L. Trivers [1972, 1974].

<sup>41</sup> These mental qualities themselves very likely evolved by stringent selection of human strains in warfare (Roger Pitt [1978]).

<sup>42</sup> See, for example, Richard D. Alexander [1979], especially Ch.

interventions. While this fact cuts against theories of simplistic genetic determinism, certain ultimate principles like scarcity and opportunity cost, and the universal bioeconomic processes of competition and selection, will always remain valid for analyzing and predicting the course of human behavior and social organization.

I must conclude very briefly. In pursuing their respective imperialist destinies, economics and sociobiology have arrived in different ways at what is ultimately the same master pattern of social theory — one into which the phenomena studied by the various social sciences to some extent already have been, and ultimately will all be, fitted.

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