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Economic man and selfish genes: the implications of group selection for economic valuation and policy

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Abstract

A basic tenet of socio-economics is that economic behavior is shaped by social bonds and cultural context. A relevant controversy in evolutionary biology is group selection and the related issue of altruistic behavior, that is, behavior neutral or detrimental to the individual but positive for the survival of the group. In this paper we examine the parallel controversies surrounding “economic man” and “selfish genes” with particular emphasis on the policy implications of group selection. We argue for the replacement of standard welfare economics with models of human behavior in the spirit of “consilience” between economic theory and the best available science from other relevant disciplines. © 2003 Elsevier Inc. All rights reserved.

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1. Introduction—economics and evolutionary biology

Evolutionary biology and political economy both matured in the cultural milieu of Victorian England with its world view of progress, continuity and gradual change. The explanation of biological evolution (or in Darwin’s words “descent with modification”) through natural selection came to both Charles Darwin and Alfred Russel Wallace through the writings of Thomas Malthus emphasizing population pressure on scarce resources. Darwin’s careful and cautious argument for the mechanism of evolution was recast by Herbert Spencer as

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“survival of the fittest”, an unfortunate simplification which is still the popular interpretation of evolution. The early formulators and synthesizers of modern economic theory—Alfred Marshall in particular—were greatly influenced by the social Darwinism of Spencer and William Graham Sumner (Hodgson, 1993a). Throughout the twentieth century there was a steady exchange of ideas between biologists and economists. In the 1950s and 1960s the use of the metaphor of natural selection was hotly debated among economists (Alchian, 1950; Friedman, 1953; Penrose, 1952) and although this debate raised serious doubts about the relevance of the natural selection metaphor to economics, it is widely still used to justify neoclassical general equilibrium analysis and neoliberal free market ideology. Simplistic biological metaphors continue to play a major role in economic theory and policy recommendations. And going in the other direction, concepts from economics continue to influence theoretical biology. Contemporary biologists have imported economic models of constrained optimization to examine biological phenomena (Ghiselin, 1978).

Economics and biology share a similar subject matter insofar as both fields of inquiry deal with complex, hierarchical, and evolving systems. As many economists and biologists have noted, the controversies in biology and economics are remarkably similar (van den Bergh and Gowdy, 2003; Hodgson, 1993b; Samuelson, 1993) and since biology has gone further in explaining the dynamic behavior of living systems, economists have much to gain from an understanding of current controversies in evolutionary theory. One controversy of particular importance to the notion of economic value and the theory of consumer choice is group selection and the related issue of altruistic behavior. The existence of prosocial (Henrich, 2004) behavior, that is, behavior neutral or detrimental to the individual but positive for the survival of the group, has far-reaching implications not only for biology but also for neoclassical welfare economics and for market-based policies in general.

Economic policy in the US is dominated by The New Welfare Economics (NWE) based on the notions of ordinal utility and the rejection of interpersonal comparisons of well-being. Two broad approaches to this task were the compensation principle of Kaldor and Hicks and the social welfare function approach of Bergson, Samuelson, and others. The compensation principle foundered on the many paradoxes arising from using a partial equilibrium framework to draw general equilibrium conclusions. The social welfare function foundered on the Arrow Impossibility Theorem. Over the past few decades the scientific validity of the assumptions of human behavior underlying the New Welfare Economics has come under sharp attack from within and from without the economic mainstream. Sixty years of theoretical work in mainstream economics has shown convincingly that welfare judgements cannot be made without resorting to interpersonal comparisons of utility (Boadway, 1974; Chipman and Moore, 1978; Little, 1950; Scitovsky, 1941; Suzumura, 1999). Work in behavioral economics and game theory has shown that the axioms of consumer choice offer incomplete descriptions of human choice yielding poor predictions of economic behavior (Bowles and Gintis, 2002; Henrich et al., 2001).²

² Heroic attempts have been made to include endogenous preferences in a general equilibrium framework. A good introduction to the debate is given by Albert and Hahnel (1990, Chapter 4). See also Bowles and Gintis (2002) who reject *Homo economicus* but argue that “. . . economics should become more psychological and more institutional, yet no less dedicated to the construction of mathematical general equilibrium models.

In Section 2, we focus on the links between the NWE concept of economic man and the biological notion of the selfish gene. Section 3 discusses the resurgence of interest in group selection in evolutionary biology and its relevance to economic theory and policy. Section 4 concludes with some policy implications of an evolutionary, prosocial approach to political economy.

2. Economic man and selfish genes

The cornerstone of the NWE is the radical individualism embodied in the notion of the rational economic actor (Feldman, 1987). The axioms of consumer choice underlying economic man insure that he³ is narrowly rational and consistent in his choices, always prefers more to less, and is able to efficiently allocate his limited income among the numerous things he desires so as to achieve a global utility maximum. In the standard welfare model, culture and habits are assumed to be fixed, or at least slowly changing during the time period of reference, so that the cultural context of *Homo economicus* does not enter the analysis. How tastes and preferences are formed is considered to be outside the purview of economics; tastes are not a matter of dispute (Stigler and Becker, 1977). Economic man is a “homogeneous globule of desire” to use Veblen’s (1898) insightful phrase. In theory, self-interest is broadly defined by economists to include “all things intangible and tangible” (Solow, 1993), but in practice the meaning of “utility” is radically narrowed to mean the consumption of market goods. Increases in “welfare” are equated with increases in economic output. Economists are well aware of public goods, Veblen effects, intransitivity and interdependent utilities but these real-world phenomena are extremely difficult to incorporate into the general equilibrium framework currently dominating economic policy recommendations.

The economic man of biology is the “selfish gene”, a concept used to explain the overall selfishness of any living organism and for the direction of evolution itself. Richard Dawkins, who coined this term, links in his controversial book *The Selfish Gene* (Dawkins, 1976) the notions of competition, struggle for existence, natural selection, and survival of the fittest to his idea of genes as replicators. In a deterministic and teleological account, the evolution of biological life is explained as being driven by the replicators (genes). Successful replicators are ruthlessly selfish, otherwise they would not successfully replicate. To protect and preserve their replication, genes create engines of self-preservation—living organisms and their bodies and minds. From this line of reasoning, Dawkins (1976, p. 2) deduces that human nature cannot but be selfish as its very base is composed of selfish units. Dawkins widened biological research and debate by considering genes as self-contained wholes. But, as Maynard Smith notes (Barlow, 1991, p. 195), *The Selfish Gene* does not contain new facts; it offers a new world view. Basic to this world view are the notions of competition and the virtuousness of the selfish behavior of biological units. It is from this perspective that the biologist Ghiselin (1974, p. 247, quoted in Sober and Wilson, 1998, p. 5) writes concerning species and nature:

³ Economic man is always described as being of male gender and it does not seem to us to be appropriate to change this convention.

The economy of nature is competitive from beginning to end The impulses that lead one animal to sacrifice himself for another turn out to have their ultimate rationale in gaining advantage over a third Where it is in his own interest, every organism may reasonably be expected to aid his fellows Yet given a full chance to act in his own interest, nothing but expediency will restrain him from brutalizing, from maiming, from murdering—his brother, his mate, his parent, or his child. Scratch an “altruist”, and watch a “hypocrite” bleed.

This view of the biological world mirrors the economic view of human nature as being transparently self-centered, rational in the narrow sense of being consistent in choices, present-oriented, and characterized by selfishness constrained only by expediency. Strong intellectual currents in both biology and economics see nature and the market economy as being filled with utility-maximizing individuals with no room for cooperation except for one individual to gain an immediate advantage over others.

2.1. *Criticisms of economic man*

Criticisms of the notion that humans are purely selfish go back to the beginnings of modern utility theory. Edgeworth (1881), for example, included a term accounting for pure altruism in his theory of exchange: “we might suppose that the object which X (whose own utility is P), tends—in a calm and reflective moment—to maximize, is not P, but P+; where + is a *coefficient of effective sympathy*” (Edgeworth’s italics, quoted in Collard, 1975). Veblen’s (1898) criticism of the neoclassical concept of humans as coldly calculating and coolly rational is still one of the most insightful in the literature. Another early (and neglected) criticism is that of Georgescu-Roegen (1954) who argued that individual utility depends not only on individual well-being but also the well-being of the community to which the individual belongs. Frank (1988), Hirsch (1976), Kapp (1950), Mishan (1967), Scitovsky (1976), and Sen (1977) have all emphasized the social nature of human decision-making. Indeed, a large number of economic models have been constructed to explain altruism, charity, benevolence, and bequests. In doing so, many economists—and other social scientists—have been ingenious in finding explanations for the motives for such behavior in self-interest. Possible selfish motivations leading to apparently altruistic behavior include enlightened self-interest, pursuit of reputation, anticipation of reciprocity, and fear. Further explanations are that personal utility may be derived from someone else’s satisfaction or the contribution to it, and the benefits the adherence to a social contract may provide (Arrow, 1987).

From a psychological perspective, Bateson (1991, p. 74ff) identifies two egoistic motives for altruistic behavior: the first is based on social learning and enforcement, and the second on arousal reduction. However, in his theoretical and empirical inquiry on the existence of altruism, Bateson (1991, p. 174) argues that altruism may also arise from empathic emotions. In some situations a person takes—without feeling distress—the perspective of another person perceived to be in need and helps to reduce her need. Etzioni (1988, p. 51ff) concludes from numerous examples of altruistic behavior that human behavior is based on both moral commitments and economic factors which partially shape each other and which evolve and change within the social environment and structure. On the formal level

economists have not—despite major efforts—succeeded in incorporating altruism into the standard welfare framework due to the intractable difficulty of multiple equilibria in the presence of interdependent utility functions. The basic motivation of the NWE was to make policy recommendations without making interpersonal comparisons of utility. The goal was to make economics a positive science like physics.

Empirical evidence contradicting the narrowly-rational, individualistic concept of human behavior is coming from such diverse disciplines as anthropology, biology, decision science, and psychology. Simon (1990, 1993) argues that when a mutation enhances teachability, altruism survives because of the extra productivity it allows for the group. Simon's argument is strengthened by the recognition that human groups have elaborate systems of rewards and punishments (Boyd and Richerson, 1992). Numerous surveys demonstrate the prevalence of community standards and norms acting as checks on selfish behavior (Fehr and Schmidt, 1999; Kahneman et al., 1986). Moreover, although the existence of and adherence to social norms may be partially explained by individual interest and by group interest, these explanations are incomplete. Emotions, traditions and the biological requirements for individual existence are the basis for the emergence and maintenance of social norms.

Drawing on experiments in economics and psychology Gintis (2000, Chapter 11) discusses a number of findings by psychologists about how people make decisions (Kahneman et al., 1982; Shafir and Tversky, 1992). For example, it has been shown that people are about twice as adverse to losses as they are to accepting the same amount of gain. This is partly due to the “endowment effect” by which people place higher values on things they already possess than on the same things they do not have. Of potentially great importance to choice theory is the finding from neurological research that decisions are made in the human brain by reconciling various structurally distinct and spatially separated areas that probably evolved at different evolutionary stages (Gintis, 2000). This may be another piece of evidence for hierarchical preference ordering. Empirical findings that human behavior is altruistic and economically “irrational” also support a hierarchical explanation of economic behavior. Hence, economic selection can take place at levels above the individual firm or atomistic consumer. Samuelson (1993, p. 147) is emphatic in his support for pure altruism and group selection: “the dogma that group-selection arguments are somehow unclear evaporates under the light of reason and force of fact.”

2.2. *Criticisms of the selfish gene*

Like its counterpart economic man, the selfish gene has also come under attack from several directions. For one thing, the selfish gene and its extension, the “extended phenotype” (Dawkins, 1982), has been criticized on the grounds that the genotype/phenotype-distinction may not be as clear as Dawkins supposes. According to the extended phenotype idea, changes in genes are reflected in phenotypes and the phenotypical effects determine the selection of the genetic replicators. Thus, the latter preserve (replicate) themselves by the means of their extended phenotypes (Dawkins, 1982, p. 4). Phenotypical effects can be morphological or behavioral, or they can be “artifacts.” For instance, following Dawkins (1982, p. 198ff), a phenotypic expression of the genes of a beaver is the dam it builds. However, phenotypical changes are not exclusively triggered by changes of genetic replicators, but can also result from changes in elements of the environment. Griffiths and Gray (1997,

p. 472f) give examples showing that the evolved phenotype can be a result of the developmental context. For instance, animal behavior may be ascribed to a particular socialization (e.g., adult behavior of primates) or to a particular habitat (e.g., song of a bird). A further example is the fire ant *Solenopsis invicta* (Bernasconi and Strassmann, 1999). The queens of monogynous colonies and those of polygynous colonies are of different sizes but these are not reflected in different genomes. Rather, the size difference is due to different upbringing. Thus, the genetic differences must be responsive to different selection pressures in the two nest types. Another example of the blurring of phenotype and genotype is given by Margulis (1998). If *Paramecium* cilia are surgically removed in clumps and put back in a reversed position, this reversal will be inherited by subsequent generations.

Attempts have been made to explain these examples with the concept of *phenotypical plasticity*, the ability of an organism to modify its morphological, physiological, ecological and/or ethological features to adjust to environmental conditions. Proponents of the gene replicator idea argue that observed phenotypical plasticity is a result of genomes allowing the expression of different traits. However, this argument blurs the distinction between traits resulting from adaptation and history, and thus inheritable, and those that only reflect a particular environment and are not inheritable. Morphological effects, behavioral effects or artifacts must not be the result of positively selected genes which (selfishly) aim at their replication. A phenotypical expression may just not (yet) have been under the pressure of natural selection. This shows that organisms are more than mere carriers of genes submitted to blind and ruthless natural selection and that evolution cannot be explained by “one-gene-one-trait” formulae. Rather, there is interplay upward and downward in the hierarchy of living processes.

Cooperative mechanisms occur quite frequently in both terrestrial and water environments and inside organisms. A further strand of research questioning the selfish gene paradigm concerns mutualism and symbiosis. Organisms in mature ecosystems like old growth forests, undisturbed deserts, and coral reefs are bound together in a complex web of mutually beneficial relationships. Fungi in mature ecosystems such as grasslands act as conduits for nutrients which link diverse species together in one huge symbiotic relationship (van der Heijden et al., 1998). It has been found that trees routinely share water with neighboring plants during the night when transpiration is low (Yoon, 1993). This keeps nearby plants thriving and thus helps hold moisture and soil. It has been discovered that when forests are attacked by insects, trees send out chemical warnings (pheromones) to neighboring trees which then release other chemicals to protect themselves from the impending insect invasion. All these cases could probably be forced into the “selfishness” model but at what intellectual cost? The more the definition of selfishness is stretched, the less useful it is as a universal principle describing either biological or economic agents.

Although the idea is still controversial, it is increasingly accepted that a key process in the evolution of higher organisms is *endosymbiosis*, the creation of new tissues, organs or species through the symbiotic joining of separate organisms. Mitochondria, for example—respiratory organelles ubiquitous in cells—apparently evolved separately then joined eukaryotic cells in a symbiotic relationship (Sapp, 1994). The separate evolutionary origin of mitochondria is confirmed by the fact that they contain bacteria-like DNA distinct from that found in the nuclei of the cells they inhabit. What we consider to be groups of “individuals” are actually groups of organisms symbiotically cooperating. Margulis (1998, p. 11) gives this example:

Ophrydium, a pond water scum that, upon close inspection, seems to be countable green “jelly ball” bodies is an example of emergent individuality that we recently discovered in Massachusetts and redescribed. Our films show these water balls with exquisite clarity. The larger “individual” green jelly ball is composed of smaller cone-shaped actively contractile “individuals.” These in turn are composite: green *Chlorella* dwell inside ciliates, all packed into rows. Inside each upside-down cone are hundreds of spherical symbionts, cells of *Chlorella*. *Chlorella* is a common green alga; the algae of *Ophrydium* are trapped into service for the jelly ball community. Each “individual organism” in this “species” is really a group, a membrane-bounded packet of microbes that looks like and acts as a single individual.

On close examination, the defenders of the selfish gene idea are not so dogmatic as popularly believed. E.O. Wilson wrote in the critical second chapter of *Sociobiology*, “The higher properties of life are emergent” (Wilson, 1975). Wilson is even more emphatic in his recent work *Consilience* (Wilson, 1998, p. 137) “The accepted explanation of causality from genes to culture, as from genes to any other product of life, is not heredity alone. It is not environment alone. It is interaction between the two.” All the possible expressions of phenotype are encoded in genes, but the particular attributes that express themselves depend on triggers from the outside environment. Phenotypic expression may also depend on how the individual fits within a group. Dawkins writes in *The Blind Watchmaker* (Dawkins, 1986, pp. 170–171):

In a sense, the whole process of embryonic development can be looked upon as a cooperative venture, jointly run by thousands of genes together. Embryos are put together by all the workings genes in the developing organism, in collaboration with one another We have a picture of teams of genes all evolving toward cooperative solutions to problems It is the ‘team’ that evolves.

The many biological examples of cooperation do not imply that competition does not exist or that the world is one happy community joined together in an exclusively cooperative arrangement.

The selfish gene controversy is important to economics because it implies that competition is of a much more complicated sort than that assumed by the economic man of the mythical free market economy. Competition is more complicated than isolated individuals transparently competing for immediate gain. It takes place between groups as well as between individuals. Likewise, cooperation is more complicated than a simple tit-for-tat strategy. Not only does the model of economic man fail the test of realism, it also fails to make accurate predictions about human behavior. These failures are illuminated in recent empirical findings and the resulting controversy over group selection.

3. Group selection, game theory and the evolution of cooperation

Group selection refers to a process of natural selection that favors traits that increase the fitness of one group relative to other groups (Wilson, 1997). Group selection implies that every member of the group depends on a group characteristic that is not isolated in a single

individual. As [Corning \(1997\)](#) points out, natural selection above the level of the individual was a quite acceptable idea to Darwin, Wallace, and Spencer, all of whom believed in the differential survival of groups. One of the key founders of the “modern synthesis” of genetic and morphological biology, Sewall Wright, used the term “interdemic selection” to characterize the differential survival of discrete breeding groups or “demes” ([Corning, 1997](#), p. 364). Over the 20th century, however, explanations of evolutionary change became more and more reductionist culminating in Dawkins’ selfish gene discussed above. This trend was to some extent a reaction to metaphysical theories of the evolution of a higher consciousness such as Theilhard de Chardin’s neosphere. Any attempt to stray beyond the straight and narrow path of reductionist explanations in biology ([Hodgson, 1993b](#)) was met with scepticism if not outright hostility.

Group selection was discredited in the 1960s after the publication of [Wynne-Edwards \(1962\)](#) book *Animal Dispersion in Relation to Social Behavior* and the strong adverse reaction to it by [Hamilton \(1964a,b\)](#), [Williams \(1966\)](#), and others ([Corning, 1997](#)). Two theoretical extensions of Dawkin’s selfish gene theory countered Wynne-Edward’s formulation of group selection. One was *kin selection* ([Alexander, 1987](#)); the argument that apparently altruistic behavior is genetically based because altruists are actually protecting their own genes by helping close relatives survive. The other was *reciprocal altruism* ([Trivers, 1971](#)); the view that apparent altruism was based on the expectation that favors would be returned.

The 1980s and 1990s saw a resurgence of interest in group or “multilevel” selection ([Boyd and Richerson, 1985](#); [Sober and Wilson, 1998](#); [Wilson, 1980, 1997](#)). Mounting evidence suggests that groups characterized by non-kin and non-reciprocal altruism may outcompete groups composed of selfish individuals or individuals showing only kin and reciprocal altruism ([Goodnight and Stevens, 1997](#)). The existence of group selection has important implications for the “Ultra-Darwinian” ([Eldredge, 1996](#)) view in biology and in economics that all evolutionary change is driven by individual characteristics alone. [Wilson \(1980\)](#) uses the phrase *trait group selection* to refer to linkages between two or more individuals which themselves become a mechanism of differential survival. [Maynard Smith \(1982\)](#) made a similar case for what he termed *synergistic selection*. Examples of non-kin based cooperation include food sharing among vampire bats ([Wilkinson, 1990](#)), cooperative raising of young among unrelated Florida scrub jays, and group hunting among female African lions ([Scheel and Packer, 1991](#)). Cooperation may also take the form of “superorganisms” including social insects ([Wilson, 1974](#)) and social mammals such as the naked mole rat ([Sherman et al., 1991](#)).

The theoretical basis for the existence of altruism is well-established. In the early 1970s [Price \(1970, 1972\)](#) showed that the effects of natural selection on gene distribution could be partitioned into “group-level” and “individual-level” components.⁴ [Henrich \(2004\)](#) has

⁴ The Price equation decomposes the population effects ($\Delta P = P' - P$) of a gene that is individual negative and group positive into “within group” selection and “between group” selection:

$$\Delta P = P' - P = \sum_{i=1}^n \left((p'_i - p') \left(\frac{q'_i}{\sum_{i=1}^n q'_i} \right) \right) + \frac{\text{cov}(s_i, p_i)}{s}.$$

The first term on the right-hand side of the equation is a weighted average of the change in group gene frequencies ($P'_i - p'$) weighted by the ex post size of the group ($q'_i / \sum_{i=1}^n q'_i$). This term should be negative reflecting the

used a variant of the Price equation to show that cooperation may arise from biased cultural transmission of behavior. Cooperation and selfish behavior can be modeled as the relative frequency of “payoff” based decisions and “conformist” based decisions enforced by rewards and punishments.

Group selection operates by the same rules as individual selection. All that Darwinian evolutionary change requires is for natural selection to operate on statistically reliable patterns or regularities. If altruism can be demonstrated in non-human population (Clutton-Brock, 2002) it can certainly occur in human populations where behavioral norms can be culturally as well as genetically forced. As Boyd and Richerson (1992) put it in the title of an influential article, “punishment allows the evolution of cooperation (or anything else) in sizable groups.”

Within the field of economics, models of group selection and cooperative behavior are receiving support from experimental economics, behavioral economics and game theory, fields once considered a bastion of orthodoxy in economics.⁵ Corning (1997, p. 370) and Gintis (2000) argue that game theory, seen in its proper light, can provide support for a realistic, holistic view of economic evolution. They point out that traditional game theoretic models such as the Prisoner’s Dilemma are in effect rigged to favor selfish behavior. Players are not allowed to communicate, defectors are rewarded for cheating, and cooperators have no power to punish free riders. In nature and in the human economy, none of these assumptions typically hold. In recent applications of game theory these restrictive assumptions are relaxed and, as in the iterative prisoner’s dilemma, cooperation becomes the preferred strategy.

Gintis (2000) makes a case for game theory as a universal language for the life sciences of biology, anthropology, sociology, political science, psychology and economics. Gintis argues that game theory’s bad name comes from its wholesale adoption of *Homo economicus* from traditional economic theory: “*Homo economicus* is great when people are faced with anonymous market-like conditions, but not when engaged in strategic interaction. Laboratory techniques have a lot to teach us about choice and strategic interaction, and it’s up to us to develop rigorous, testable models of real human behavior” (Gintis, 2000, p. xxiv). Bowles and Gintis (1999) use a game theoretic approach to demonstrate the evolutionary feasibility

effect of within group selection. The second term $\text{cov}(s_i, p_i)/s$ is positive reflecting the effect of between group selection. s is a weighted average of the group coefficients, with weights being the initial sizes of the groups:

$$s = \sum_{i=1}^n s_i \left(\frac{q_i}{\sum_{i=1}^n q_i} \right)$$

If the covariance between the group growth coefficients, s , and the initial gene frequency within the group, p_i , is large enough, then the altruistic gene may spread. The Price equations have been called “an exact complete description of evolutionary change under all conditions” (see Field, 2001, pp. 102–106). One could argue that the gene is still the unit of selection, but this misses the point. Altruistic genes may spread even though they are (within group) detrimental to the individual.

⁵ Game theory is still roundly criticized by many heterodox economists who see it as being just another variation in the selfishness-can-explain-all school of economics. Blaug (1998, p. 18) is particularly harsh in his verdict of game theory: “but game theory has turned out to be an even more seductive technique for economists than general equilibrium theory, encouraging once again the persistent tendency of modern economists to look away from the world and engage instead in armchair deductive theorizing.”

of strong reciprocity, that is, cooperative behavior not based on reciprocal altruism (weak reciprocity). They use their experimental results, and case studies of hunting and gathering societies, to argue that sharing is as much a part of “normal” human behavior as is selfishness.

Some game theory experiments are particularly illuminating. For example, in the Ultimatum Game the leader offers one of two participants a certain sum of money and instructs that participant to share it with the second player. The second player can either accept the offer or reject it in which case neither player gets anything. *Homo economicus* should accept any positive offer, for example, if the first player gets US\$ 100 and offers the second player \$1, he should accept it because more is always preferred to less. Results from the ultimatum game, however, show that offers under 30% of the total are usually rejected because they are not “fair”. The majority of proposers offer between 40 and 50% of the total (Nowak et al., 2000). These results have held up even when played with substantial amounts of real money (Fehr and Tougareva, 1995). A variant of this game is the Dictator Game which allows the first player to give as much or as little money to the second player who is not allowed to reject the offer. The average amount shared in the Dictator game is 50% with two-way identification of the parties involved and 36% in an anonymous game (Bohnet and Frey, 1999), giving strong support the notion that “fairness” is a strong social norm. These and other game theory results show that, in a variety settings under a variety of assumptions, non-selfish motives are a better predictor of behavior than those embodied in *Homo economicus* (Gowdy et al., 2003).

Many other investigations of economic behavior lend support to the importance of cultural context and group norms on economic behavior (Fehr and Gächter, 2002; Henrich et al., 2001). Henrich et al. (2001, pp. 73–74) summarize the results of behavioral experiments in 15 small-scale societies ranging from hunter-gatherers in Tanzania and Paraguay to nomadic herders in Mongolia:

We can summarize our results as follows. First the canonical model is not supported in any society studied. Second, there is considerable more behavioral variability across groups than had been found in previous cross-cultural research, and the canonical model fails in a wider variety of ways than in previous experiments. Third, group-level differences in economic organization and the degree of market integration explain a substantial portion of the behavioral variation across societies: the higher the degree of market integration and the higher the payoffs to cooperation, the greater the level of cooperation in experimental games. Fourth, individual-level economic and demographic variables do not explain behavior either within or across groups. Fifth, behavior in the experiment is generally consistent with economic patterns in everyday life in these societies.

The new behavioral economics challenges the rational actor model in ways that are hard to ignore. First of all, these criticisms are based on empirical evidence not just ad hoc speculation. The empirical evidence against the welfare economic model of behavior is overwhelming. Secondly, the possibility of prosocial behavior can be mathematically demonstrated (Sober and Wilson, 1998, chapter two; Henrich, 2004). It has been easy for mainstream economists to dismiss the contributions of such luminaries as Veblen, Commons, Hirsh, Kapp, and Scitovsky as vague and impressionistic. The current challenge meets orthodoxy on its own turf of econometrics and mathematics and will thus be more difficult to dismiss.

A limitation of game theoretic analysis of behavior is that games are static in the sense that “mutations” cannot enter the system. The rules are set at the beginning of the game and this means that a normative framework is set to which the players have to conform. The players cannot bring in new ideas to solve problems and learn in a dynamic process with real-world feed-back. A large body of evidence suggests that human groups engage in a cognitive division of labor. When groups are assigned specific tasks in experimental studies, such as assembling radios, individual members specialized in remembering different aspects of the assembly process, thus enhancing group performance (Liang et al., 1995). Caporael (1997, p. 280) writes:

Group coordination implies that individuals may be “units” of larger functional entities that cannot be reduced to mere aggregates of autonomously behaving individuals. Accordingly, human cognition could be viewed, at least under some circumstances, as truly social, interdependent with social context and not just “in the head” of the individual organizer. To make temporary and limited use of the information-processing metaphor, humans would be part of a “network,” participating in “truly social” (i.e. irreducible to individual level) groups. This is not to say that there is a transcendental “group mind.” Rather, it identifies the problem of coordination as the “central problem” for human evolutionary analysis.

The use of communication to solve problems is one of the basic characteristics of primates, including humans (De Waal, 1996). If people are not just selfish, but are also capable of being cooperative and even empathetic, solutions to problems can be found through communication and discourse.

Theories of cooperation and interrelatedness are having a major impact in the field of management. House et al. (1995), after an extensive review of the management literature, conclude that multilevel research was one of the most active areas in organization theory. Multilevel approaches overcome a fundamental deficiency in management theorizing and practice, namely treating the various organizational levels and activities within a firm as isolated units. Since the 1970s researchers from the fields of system theory, evolutionary biology, ecology and management have been investigating the implications of the evolution of natural systems for the analysis and management of social systems, especially firms (Ulrich, 1984) and public corporations (Beer, 1989). Ulrich and his associates developed a new managerial approach consisting of a meta-framework that integrates different management sub-disciplines such as decision-making, production theory, and strategic management, by identifying the basic structures and evolutionary rules of the overall system and subsystems. This approach explicitly recognizes the firm as a social system tightly linked with the ecological, technological, social, and political environments.

Another attempt to bring evolutionary thinking to organization theory is the focus on the evolutionary dynamics of organizations. This research sheds light on the on-going interaction and replication processes in an organization acting on “ecological” entities such as employees, technology, energy and resources, and on “genealogical” entities such as norms, values, knowledge, and history at a variety of levels of an organization (Baum, 1996). This opens a wide field of investigation into different processes affecting the past and future evolution of business organization, intra- and extra-organizational exchange and co-evolution (Baum and Singh, 1994). More recently, based on the general principle that

evolving systems always change on several inter-related levels simultaneously, [Sachs and Rühli \(2000\)](#) point to a “meso paradigm” that includes different levels relevant for strategic management (Multilevel Strategic Management). The levels identified are those of the “meme” (core values, competencies and processes/structures of a firm), of the corporation, of the business, of the alliances and of the society.

The existence of group selection and prosocial behavior undermines the basic NWE assumptions of rational economic man including independence of choices, quasi-fixed preferences, full information, and strictly selfish behavior. This has important implications for economic policy.

4. Prosocial behavior and economic policy

In standard theory, *Homo economicus* leads to micro-foundations approach to economic policy ([van den Bergh and Gowdy, 2003](#)). The macro economy is considered to operate by the same rules of constrained optimization used to describe individual firms and households. Typically, a “representative individual” whose behavior is described by a well-behaved utility function and a “representative firm” described by a well-behaved (usually Cobb–Douglas) production function are used to model some real-world phenomenon like global climate change, biodiversity loss, or international trade. Without the assumptions of *Homo economicus* and perfect competition these optimization models cannot reach a unique, stable equilibrium. Neoclassical welfare models assume strictly rational behavior in consumption, constant returns to scale in production, and rely on prices to dynamically adjust supply and demand. These models are much more than interesting theoretical toys. They are the basis for the policy recommendations of neoclassical economics. For example, [Nordhaus \(1992, 2001\)](#) uses a general equilibrium model assuming a CES utility function (implying that market goods are equally substitutable for a stable climate) and a Cobb–Douglas (constant returns to scale) production function to analyze various climate change policies. In this framework, a stable climate is just another commodity on equal footing with a new SUV or a vacation to Disney World. Given the assumptions of the model it is inevitable that the “optimal” global warming policy is to make modest efforts to insure that the costs and benefits of global warming policies are properly priced. Any other policy would reduce social welfare as measured by the model’s estimate of gross world product. According to Nordhaus (quoted in [NewScientist Online, 12 June 2002](#)) “a vague premonition of some potential disaster is insufficient grounds to plunge the world into depression.”

The existence of pure altruism, group selection, and other forms of prosocial behavior has far-reaching implications for economic policy. The first, and most important, policy implication is that impersonal markets are not the best vehicles for the expression of human preferences. If economic decisions do not conform to the axioms of consumer choice, market outcomes are not strictly “rational” and there is no reason to believe that a competitive equilibrium represents a social optimum. The dismal record of the policy recommendations of welfare economists provides convincing evidence that another approach is needed.

Insofar as markets restrict choice to individual, non-social decisions, such choices exclude much of the richness of human behavior. Depending on which of our ancestors is considered

“human”, our species has been making decisions for over 100,000 years or longer based on close personal interactions, direct negotiation, and rewards and punishments to facilitate cooperation. It is not surprising that people have difficulty in making social decisions in impersonal markets. But the prevailing trend is to push more and more critical decisions into the market framework. Current research in behavioral science suggests that this may be misguided. A better approach would allow for group choices within a flexible framework recognizing the importance of within-group diversity.

Decision-making should be parametric and based upon multiple criteria, not on a single money metric. Traditional cost–benefit analysis distorts human preferences by forcing incommensurable preferences into a single number. This criticism also applies to many of the attempts to improve cost–benefit analysis through multi-criteria assessment (MCA). Insofar as these attempts retain the behavioral assumptions of welfare economics, they also restrict choices to the artificial realm of impersonal market exchange.

Policies should focus on the specific problem under consideration rather than relying on spillover effects from achieving hypothetical efficient markets. The major problems we face today are much different than any faced in the past. Human presence on the planet is dominated by one particular socio-economic system, global market capitalism. This system is profoundly affecting the natural world and the array of cultures that still exist on planet earth. The peculiar perspective of a narrowly rational and selfish individual acting at a point in time cannot adequately address problems like global climate change, biodiversity loss, or growing global income inequality.

Neoliberal economic policies are based on the assumptions of the New Welfare Economics including the psychological model of human behavior embedded in economic man. The behavioral literature shows that humans do not act according to these assumptions. The model of economic man underlying NWE has been shown to be a poor predictor of real-world human behavior (Bowles and Gintis, 2002; Fehr and Gächter, 2002; Sigmund et al., 2002). The time is ripe to develop a new economics in the spirit of “consilience” based on the best available science. Replacing neoclassical welfare economics will not be an easy task. And the end result will not be a neat, self-contained and self-reinforcing general equilibrium model. In the future economists will be forced to defend their models and assumptions in the court of scientific judgment just as other scientists have had to do for centuries.

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