THE TWO FACES OF ADAM SMITH

Vernon L. Smith

Southern Economic Association
Distinguished Guest Lecture
Atlanta, November 21, 1997

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> 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 ... This division of labor … is not originally the effect of any human wisdom, which foresees and intends that general opulence to which it gives occasion. It is the necessary, though very slow and gradual, consequence of a certain propensity in human nature which has in view no such extensive utility; the propensity to truck, barter, and exchange one thing for another.
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> Wealth of Nations (1776; 1909, 19, 20)
>
> How selfish soever man may be supposed, there are evidently some principles in his nature, which interest him in the fortune of others, and render their happiness necessary to him, though he derives nothing from it except the pleasure of seeing it.
>
> The Theory of Moral Sentiments (1759; 1976, 9)

The juxtaposition of these two statements lays bare what would appear to be directly contradictory views of human nature held by Adam Smith. This has long been noted and perhaps helps to account for the greater notoriety of the Wealth of Nations in both popular and academic discourse. Thus, as observed by Jacob Viner, "Many writers, including the present author at an

early stage of his study of Smith, have found these two works in some measure basically inconsistent." (Viner 1991, 250).

These two views are not inconsistent, however, if we recognize that a universal propensity for social exchange is a fundamental distinguishing feature of the hominid line, and that it finds expression in both personal exchange in small-group social transactions, and in impersonal trade through large-group markets. Thus, Smith had but one behavioral axiom, "the propensity to truck, barter, and exchange one thing for another," where the objects of trade I will interpret to include not only goods, but also gifts, assistance and favors out of sympathy, that is, "generosity, humanity, kindness, compassion, mutual friendship and esteem" (Smith 1759; 1976, 38). As can be seen in both the ethnographic record, and in laboratory experiments, whether it is goods or favors that are exchanged, they bestow gains from trade that humans seek relentlessly in all social transactions. Thus, Adam Smith's single axiom, broadly interpreted to include the social exchange of goods and favors across time, as well as the simultaneous trade of goods for money or other goods, is sufficient to characterize a major portion of the human social and cultural enterprise. It explains why human nature appears to be simultaneously self-regarding and other-regarding. It may also provide an understanding of the origin and ultimate foundation of property rights.

A property right is a guarantee allowing actions to occur within the guidelines defined by the right. We automatically look to the State as the guarantor against reprisal when rights are exercised by rights holders. But property rights predate nation states. This is because social exchange within stateless tribes, and trade between such tribes, predate the agricultural revolution a mere 10,000 years ago -- little more than an eye blink in the time scale for the emergence of humanity. Both social exchange and trade implicitly recognize mutual rights to act, which are conveyed in what we commonly refer to as "property rights." In what sense are

such rights "natural?" The answer, I think, is to be found in the universality, spontaneity and evolutionary fitness value of reciprocity behavior. Reciprocity in human nature (and prominently in our closest primate relative, the chimpanzee) is the foundation of our uniqueness as creatures of social exchange which we extended to include trade with nonkin and nontribal members long, long, before we adopted herder and farmer life styles.

The Origins of Trade: Reciprocity, Hunter-Gatherer Sharing, and the Market Economy

Reciprocity in Chimpanzee Communities

Humans and modern chimpanzees – biologically our closest cousin – are believe to have branched off from a common ancestor about 5-6 million years ago. (Diamond 1992, 15-31). Our chimp relative more than any other nonhuman primate, shares with us a remarkable sophistication in social organization (de Waal 1989; 1996), but I want particularly to emphasize the chimp capacity to engage in acts of reciprocity, both positive and negative (McCabe, Rassenti and Smith 1996). By positive reciprocity, I mean individual A responds, nonsimultaneously, with like acts, when individual B has transferred goods or favors to A. Such behavior is common among the chimps studied by de Waal at the Yerkes Regional Primate Research Center, and the Arnheim Zoo. Thus, the number of food transfers in each direction were positively related to those in the opposite direction: "if A shared a lot with B, B generally shared a lot with A, and if A shared little with C, C also shared little with A." Also, "grooming affected subsequent sharing: A's chances for getting food from B improved if A had groomed B earlier that day." (de Waal 1996, 153, 245-246).

Negative reciprocity occurs when individuals are punished for "cheating" on a social exchange; i.e. failing to return positive reciprocity to those that have provided it to them. Negative reciprocity is the endogenous policeman in social exchange that defines natural

property rights systems. Positive reciprocity, or "reciprocal altruism" (Trivers 1971), is subject to invasion by selfish free riders. Hence the importance of negative reciprocity to punish free riders, as an implicit transaction or enforcement cost of positive reciprocity.

Negative reciprocity is also observed in ape communities. Group expression of negative reciprocity was particularly intense, as well as prominently delayed, overnight, in the following incident reported by de Waal.

> One balmy evening, when the keeper called the chimpanzees inside, two adolescent females refused to enter the building. The rule at Arnheim Zoo being that none of the apes receive food until all of them have moved from the island into their sleeping quarters, the chimpanzees actively assist with the rule's enforcement: latecomers meet with a great deal of hostility from the hungry colony.
>
> When the obstinate teenagers finally entered, more than two hours late, they were given a separate bedroom so as to prevent reprisals. This protected them only temporarily, however. The next morning, out on the island, the entire colony vented its frustration about the delayed meal by a mass pursuit ending in a physical beating of the culprits. Needless to say, they were the first to come in that evening. (de Waal 1996, 89).

Apes also appear to understand exchange, or at least have no difficulty interpreting intent when something is offered by a human in return for retrieving on object. For example, someone leaves an item, such as a screwdriver, behind in the ape enclosure. "One of its inhabitants will quickly grasp what we mean when we hold up a tidbit while pointing or nodding at the item. She will fetch the tool and trade it for the food." (de Waal 1996, 147).

Reciprocity and the Origins of Human Trade

For at least 2.5 million years (Klein 1989, 163; also see Semaw, et al. 1997) our hominid ancestors lived as tool making hunter-gatherers in small extended families and tribes. Some of our brethren still live as hunter-gatherers whose life styles have been intensively studied by ethnologists for exactly one century (Boas 1897), providing clues as to what life in the Paleolithic period might have been like. It is only in roughly the last 10,000 years that most of our ancestors abandoned this traditional life style beginning in the Near East, first by domesticating sheep about 10,500 years ago, then about 9,500 years ago by growing various grains that had been gathered by foraging technologies developed much earlier. Similar independent changes occurred in North America and the Far East. Although this agricultural revolution accelerated a previous tendency to a more sedentary life, and greater dependence on trade through specialization, the origins of trade are far older, going back at least 100,000 years, and perhaps much earlier.

The key to understanding our long "propensity to truck, barter and exchange" is to be found, I think, in our evolved capacity for reciprocity which formed the foundation for social exchange long before there was trade in the conventional economic sense. All humans, in all cultures, engage in the trading of favors. Although the cultural forms of reciprocity are endlessly variable, functionally, reciprocity is universal. We do beneficial things for our friends, and implicitly we expect beneficial acts in kind from them. In fact this condition essentially defines the difference between friends and foes. We avoid close relationships with those who do not reciprocate. You invite me to dinner and two months later I invite you to dinner. I lend you my car when yours is in the shop and on another occasion you offer me your basketball tickets when you are out of town. Close friends need not be conscious of "keeping accounts," and the fact that

we are in a trading relationship is as natural as it is subconscious and taken for granted. Once either of two friends become conscious of asymmetry in reciprocation, the friendship may become threatened. People who persistently have trouble forming and maintaining friendships are subclinical sociopaths who fail to possess a subconscious capacity and intuition for reciprocity. Prisons contain a disproportionate share of a population's sociopaths (Mealy 1995).

Gift Exchange with the Eskimo

That trade can be hypothesized to have grown directly out of social, or gift, exchange is illustrated by the individual's negotiating stance in many extant hunter-gatherer tribes. Consider the trading procedures that accompanied an exchange by the Greenland Eskimo at the turn of this century. Peter Freuchen, the first Caucasian to establish a permanent trading post at Thule, describes the multiday process of striking an agreement with a man and his wife who arrive with a sled load of fox skins. (Freuchen 1961). First, there is denial that he even has any skins because he is such an incompetent hunter. Then, he generally denigrades the quality and condition of any skins that he might have. They are unworthy objects in comparison to the fine merchandise in Freuchen's post. Finally, inspection is allowed, and Freuchen heaps praise on the hunter's supply of fine skins. But the man insists that the skins are "too poor" for him to accept pay. But Freuchen wants to show his gratitude through his "poor" gifts. Ultimately, there is endless examination of the post's merchandise, which of course is insisted by the trapper to be of far greater value than what is on the sled. Eventually a deal is consummated, which can be interpreted as a mutual exchange of gifts, each side receiving a far more valuable gift from the other, than provided by self. So, the gains from exchange are enormous for each side, and the inevitable deal was struck, but it was necessary to embed it in a verbal process which is the

inverse of what your automobile dealer and you go through when you trade in your used car for a new one.

Kinship, Trade, and Self-Enforcing Property Rights

These considerations suggest the hypothesis that positive reciprocity as voluntary social exchange originated in the nuclear family where close kin relationships allowed gene surviorship even if reciprocation was weak by making it easier to detect free-riding and allowing it to be more easily punished. Since the tribal society is essentially an extended family with kin relationships continuing to have some force, the model of family reciprocity is expanded in a wider circle. The genius of trade was to allow the gains from social exchange to be extended beyond the reach of the family and the tribe. That it might initially have involved kin relationships has been emphasized by Dalton (1977) who observed from ethnographic studies that young nubile women were exchanged between tribes as a mechanism for purchasing peace and political stability, thereby creating an environment conducive to the intertribal exchange of private goods, but also public goods like unmolested rights to trade routes, crests, technical knowledge, and ceremonial functions. Hence, the first extensions of trade beyond the tribe continued to rely on nepotism. This would have been efficient insofar as it reduced reliance on negative reciprocity to constrain the violation of implicit contracts.

Once a continuing trading relationship is established across time, the reciprocal benefits of exchange provide the foundation for self enforcing property rights. Suppose you make ceramic pots and I make spears – both predate agriculture: ceramics appear at least 27,000 years ago (Klein 1989, 376) while recent finds establish a wood spear industry and big game hunting at the astonishingly early date of 400,000 years ago (Thieme 1997, 807). Once we establish a trading relationship, you become dependent on my spears and I become dependent on your

ceramic products, because both are perishable and both require specialized human capital. Consequently, we each have a stake in protecting the other's property rights. If either of us plays the game of "steal," rather than the game of "trade," that ends the trading relationship and thereby the gains from exchange. It is also natural for us to form a pact to defend our common interest against external nomadic marauders. The same incentives carry into the agricultural revolution, except now you grow corn, I grow pigs, and we exchange our respective surpluses beyond immediate home consumption needs.

And at some point some uncomprehending "genius" invented something that would be called "money," and reciprocity is broken free of the double coincidence of wants for particularized commodity pairs. Trading based on gift exchange, is now totally relieved of any need to keep track of who owes who what. As reported by Lee (1968a, 21-22), the cultural traditions of !Kung bushman villages are nightmares of incessant talk about dividing the meat from hunting.

Evolutionary Psychology and "Mindreading:" Implications for Property Rights as Natural Order

Humphrey (1976a) was the first psychologist to argue that human consciousness evolved to equip us for strategic interaction in social transactions. Being conscious of self, and aware of one's own thoughts and desires, enabled one to read the minds of – predict the behavior of – others from their words and actions. This capacity, however, is largely intuitive and need not be consciously calculating: as I speak, images form in your mind as to what must be in mine. We know that complex behavior is possible in the absence of conscious awareness, or memory of it. Petit mal seizures constitute a disorder of the brain in which a person suffers sudden loss of higher brain stem functions. The victims lose conscious experience but continue their activities

which can include complex behavior like playing the piano. That the modularity of the brain allows subconscious learning is proved in experiments with amnesiacs, who are taught a new task, which they perform with skill, but have no memory of having learned it. (Knowlton, Mangels and Squire 1996; for a review also see Squire and Knowlton). Consciousness must therefore be associated with modules, or mental mechanisms in the brain that are distinct from other mental mechanisms.

Most of what we know and can do we learned without conscious awareness or memory of the learning. How vision constructs images of the external world in the brain is something we have no conscious awareness of. The same is true for natural (spoken) language. But some things are not learned naturally, they require conscious applications of mental activity, as when we learn left from right or to play the piano (although some can play "by ear" and never learn to read music), or what a Nash equilibrium is. This last can be hard to learn or to understand, yet Nash outcomes can never-the-less be achieved unsuspectedly by experimental subjects in repetitive private information environments who know nothing of the equilibrium logic. (Smith, 1982; McCabe, Rassenti and Smith, 1998).

Evolutionary psychologists argue that your mind is like a Swiss army knife, which is composed of numerous computational modules highly specialized for particular functions that are context-dependent and domain-specific – modules for vision, language, cheater detection, friend-or-foe detection, and so on. A controversial question is whether there are innate modules that govern our reciprocity behavior. Thus, it has been said that, "all we do in life is discover what is already built into our brains. While the environment may shape the way in which any given organism develops, it shapes it only as far as preexisting capacities in that organism allow. Thus the environment selects from the built-in operations; it does not modify them." (Gazzaniga 1992, 2-3). I don't know if these things are true, but the last decade has uncovered evidence for

genetic causes or predispositions in a long series of maladies and behaviors that were once thought to be a product of the environment, culture or upbringing. When I was growing up everything was thought to be like the Thurber cartoon depicting a woman being interrogated by the authorities, with a body on the floor along side a pistol. The caption, "Well, you see, the story really goes back to when I was a teensy-weensy little girl." (Thurber 1943, 156). One thing, however, seems clear: we cannot rule out the hypothesis that what we inherit in nature is a major, if not the only, factor in the reciprocity norms traditionally thought to be the product of culture. Major modifications of fruit fly behavior have been manipulated by controlled experiments in sexual selection (Rice 1996). Some 10,000 generations of controlled breeding of dogs has yielded an astonishing range of behavioral capacities which have been shown experimentally to have heritable components (Scott and Fuller 1965). This wide range is the result of selection from the original gene pool of the wolf.

The standard economics and social science model of the mind, contrary to the above, is that it is like a general-purpose logic machine. All decision tasks, regardless of context, constitute maximization problems subject to external constraints whether from the physical environment or the reaction functions of other agents. This is what we teach as economists. Furthermore, as we all know, it is hard to teach – it does not come naturally – and many give up unable to learn it. But that does not mean they will fail to function effectively in social and economic exchange in life or in a laboratory experiment. This is because people have natural intuitive mechanisms – modules that serve them well in daily interchanges -- enabling them to "read" situations and the intentions and likely reactions of others without deep, tutored, cognitive analysis.

Awareness of our own mental phenomena is what permits us to "mindread;" i.e. infer the mental states of others from their actions or words. Baron-Cohen (1995, 31-58) hypothesizes

that our mindreading ability utilizes such modules as an "intentionality detector" (ID), and a "shared attention mechanism" (SAM) which provide inputs to a "theory of mind mechanism" (TOMM). The ID is concerned with inferring the intentions of another, like "she is hungry," a dyadic relation, while SAM is triadic: "Mary and I both see the onrushing car." The more sophisticated capacity of the TOMM enables us to know that another person can have a false belief. This is what makes deception, bluffing, double crossing, etc., possible in strategic interaction. The "pretend" play of young children, as well as various experimental tests, make it plain that humans by about age 4 years develop a fully operational TOMM. But not every child and adult has an intact TOMM, and in some even the SAM is faulty. These are people afflicted with autism.

A diagnostic test for autism is the "Smarties Test." Smarties are a British candy like M&Ms. Show a Smarties box to a four year old child, and ask him what he thinks is in the box. He says, "candy." Now let him look inside the box, which in fact has been emptied of candy and filled with pencils, and tell the child that you are going to ask the same question of the next child that enters the room. You then ask the subject what the next child will think is in the box. A normal preschooler is most likely to reply "candy," or "Smarties," while an autistic child is most likely to reply "pencils." The autistic child is not aware of mental phenomena in others.

Yet autistics can have normal, even superior, intelligence as measured by standard IQ tests. Their natural language ability is intact, normal, even superior. (The vast majority of mentally retarded children, for example those with Down's or William's syndrome, when they are at the equivalent four year old developmental stage, have no difficulty passing the Smarties test, have good natural language ability, but do very poorly on IQ and other intelligence tests). As adults, autistics can learn to predict how others will act in particular circumstances by simply calling on a vast library of memorized experiences, as in the case of Temple Grandin who has a

PhD in agricultural science, but she has no intuitive sense of others' actions in social situations (Sacks 1993-4). She reports feeling like "an anthropologist on Mars." The technical language of science is easy for her while social language is completely nonintuitive – jokes, irony, allusions, metaphors are beyond her natural instincts.

The implications of all this for the theme of this paper is straight forward. Normal human beings, and even those with various, and substantial, limitations on their general intelligence have intact mental modules which enable them to be intuitively aware of mental phenomena in others. This enables me to see not only the value to me of possessing certain rights to act but also to know intuitively the value of such rights for others. Hence, my willingness to defend friends against external foes. This evolved social capacity appears to be a normal part of the development of the human mind; it is as much a part of the natural order as being hungry, and requiring that hunger to be satisfied.

The Experimental Record Shows that Human Nature is both Self-regarding and Other-regarding

Noncooperative Behavior Makes Impersonal Markets Work

The puzzle implicit in the two great works of Adam Smith is whether, why and how cooperation and noncooperation (classical competition) can coexist. We have seen that even in our chimp relatives what clearly coexists is positive and negative reciprocity. But these behaviors are complementary: positive reciprocity needs the negative side to keep free-riders from invading a population of reciprocating altruists which we have called social exchange. This is not precisely what Adam Smith was talking about. He was talking about the juxtaposition of positive reciprocity and self loving, or noncooperative behavior. Why do <u>these</u> coexist? Noncooperative behavior is the absence of positive reciprocity, not negative reciprocity, which

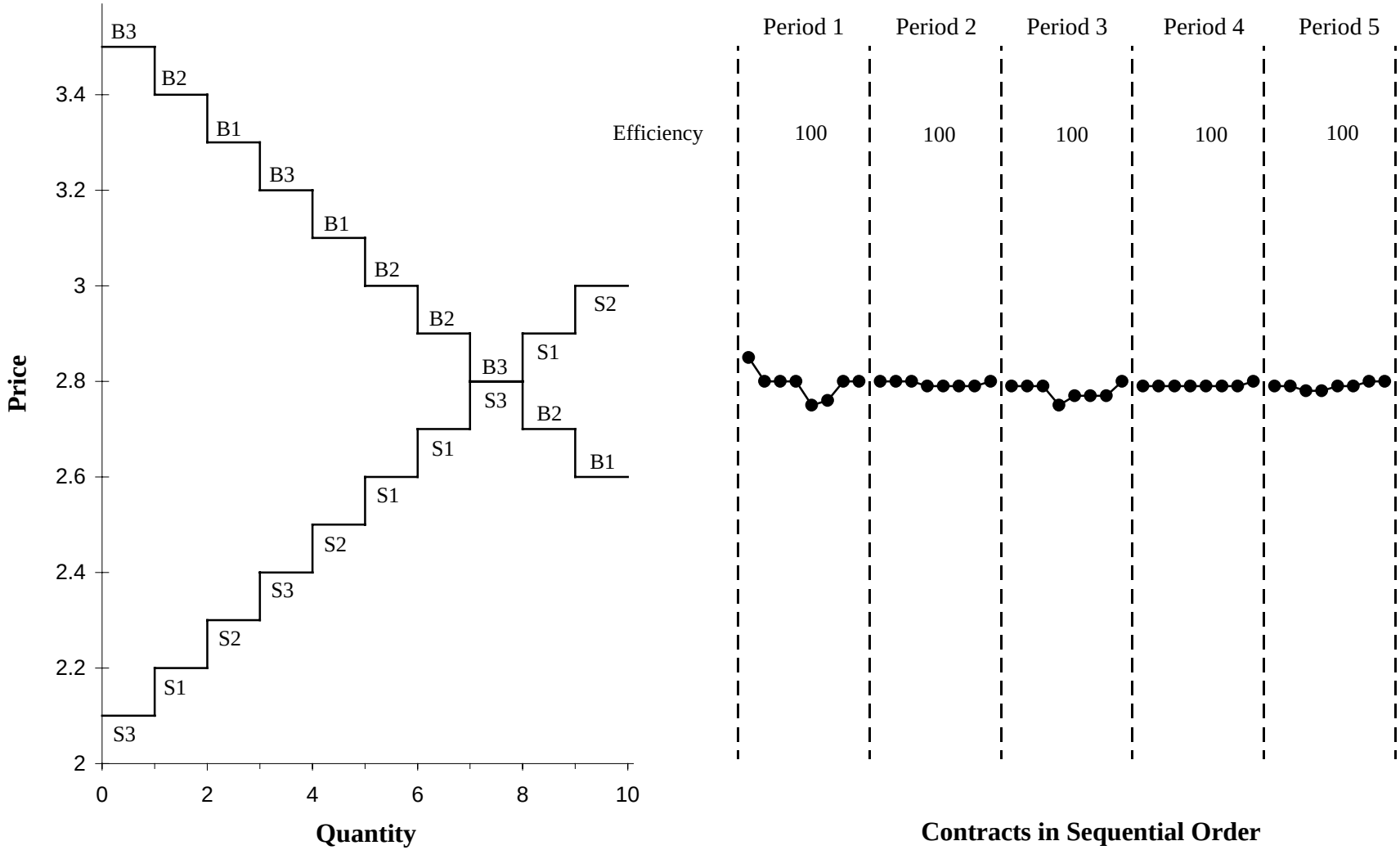
incurs private cost to punish defection from offers to cooperate. The key is to distinguish impersonal market exchange from personal social and economic exchange, and to understand that efficiency in the former is based on noncooperative behavior while efficiency in the latter requires reciprocity.

First, we illustrate the long standing experimental result that "self love" as expressed in a market of impersonally interacting agents simultaneously maximizes the individual's return, given the self-loving behavior of everyone else, and maximizes the aggregate gains from exchange. Agents both maximize the size of the pie, and maximize their share against the maximizing behavior of all others, as per the teaching in the Wealth of Nations, and technically first established by Cournot in 1838 when the number of agents, N, becomes large. (Cournot invented the idea of a noncooperative equilibrium, but because of the sociology of our profession, we call it a Nash equilibrium).

Figure 1 plots the contracts in an experiment using the double auction institutional rules of trade which are universal the world over in commodity, financial and derivatives markets; buyers announce bids to buy, sellers announce offers to sell, or asks (in this case in an electronic exchange), a new bid has to be higher than the standing last (and best) bid while a new offer must be below the standing last offer. This yields a bid/ask spread that can only become smaller until a contract occurs, either with some buyer accepting the standing ask or some seller accepting the standing bid.

The supply and demand schedules on the left are induced into the market by assigning value steps to individual buyers (three buyers, B1, B2 and B3 as shown), and cost steps to individual sellers (S1, S2 and S3). Each buyer knows only her own values, and similarly for the sellers. No subject sees what is shown in Figure 1, although each can observe the bids, offers, and contracts as they occur in real time. Efficiency, computed as the percentage of the consumer

Figure 1


B3
B2
B1
B3
B1
B2
B2
B3
S3
S2
S1
B2
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S3
S2
S1
S3
Price
2
2.2
2.4
2.6
2.8
3
3.2
3.4
0
2
4
6
8
10
Quantity
Efficiency
Period 1
Period 2
Period 3
Period 4
Period 5
100
100
100
100
100
Contracts in Sequential Order

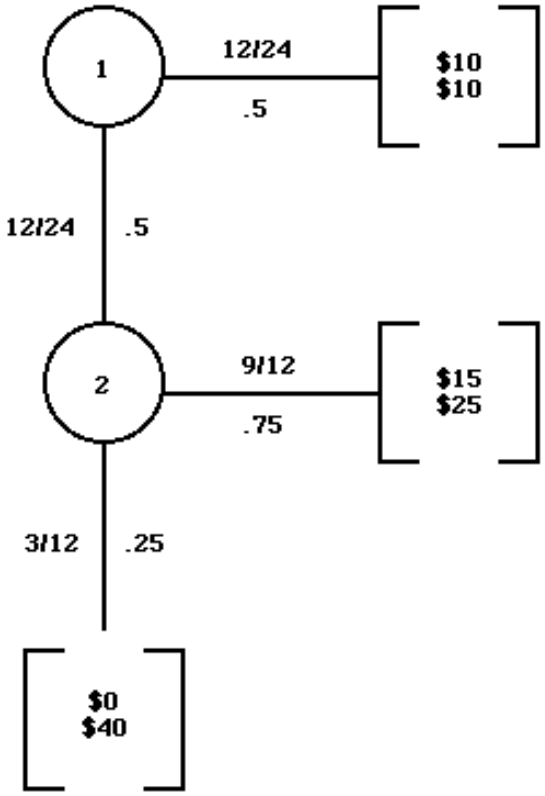
plus producer surplus that is realized by all subjects, always tends to approach 100% over time, as claimed implicitly in the Wealth of Nations: surplus is the wealth created by the exchange made possible by the existence of the market in Figure 1. This is measured by the triangular area in Figure 1 between the supply and demand schedules and to the left of their intersection. Furthermore, at the competitive equilibrium, achieved by the close of period one in continuous repeat trading, (P, Q) = ($2.80, 8) in Figure 1, each buyer and seller is maximizing his/her profits which are paid in cash by the experimenter. Each contract price on the right pairs a buyer and a seller, with the buyer paid in cash the difference between his or her value for the unit bought and the contract price; the seller is paid in cash the difference between the contract price and his or her cost for the unit sold.

Hence, in impersonal markets, people behave noncooperatively, and this maximizes the gains from exchange.

But it is Reciprocity Behavior that Makes Personal Exchange Work

Figure 2 shows a two-person extensive form game tree reported in Dickhaut, et al. (1997). Starting at the top of the tree player 1 moves right or down. Then 2 moves right or down. The game stops when a payoff box is reached giving 1 the upper amount, and 2 the lower amount, in dollars. Thus, if 1 moves right at the top, the game stops and 1 earns $10 and 2 earns $10. There are twelve people in the room, each paired anonymously at random with one other person randomly assigned to be player 1 or 2. Each sits at a computer terminal, and decisions are made by clicking the mouse on an arrow corresponding to each possible move (not shown). Each person sees all payoffs, and all moves in sequence.

Figure 2
Two Person Investment Trust Decision Tree
Moves and Outcomes for N = 24 Pairs



We say that player 1 can either decide to play noncooperatively by moving right at the top, or to opt for reciprocity by moving down. To see why, we first apply the game theoretic principles of backward induction, and dominance or maximization in the self-interest. According to these principles if player 2 is given a chance to move at the second node, she will move down because the $40 payoff to player 2 is greater than the $25 payoff from a move right. Player 1, assuming that player 2 is self interested will see that Player 2 will make this choice, and he will move right at the first node, yielding the noncooperative equilibrium outcome ($10, $10).

Alternatively, there is a cooperative interpretation based on reciprocity that argues for a move down at the top by player 1. Why? If player 1 moves down at the top, giving up the "sure thing" of $10 on the right, it can be interpreted as expressing 1's intention to achieve the outcome ($15, $25) provided that player 2 reciprocates by moving right; in effect 1 is telling 2, "Look, we can both do better at ($15, $25), below right, than if I play for ($10, $10). Indeed, I obviously would not be moving down at the top, if I expected you to defect on the offer to cooperate. I am trusting you to give me a return on my risky investment." Although in the experiment we do not tell this story, think of a move down by player 1 as an investment of $10, which is tripled to $30, yielding a very large gain. Then player 2 can either choose to split the $30 evenly, giving $15 to Player 1, and keeping $15, which totals $25 after adding player 2's original $10, or player 2 can keep the entire $30, yielding a total of $40 for himself, and nothing for player 1. In the experiment we do not tell this story, because we do not want to prompt player 2's "moral sentiments," but simply leave it up to his homegrown natural instincts to make the choice.

Even under the conditions of an abstract game with agents interacting anonymously the reciprocity hypothesis asserts that some people will be pre programmed to engage naturally in acts of positive reciprocity, in this case requiring trust. We would expect reciprocity to be

common in face-to-face negotiation (as shown, for example, by Hoffman and Spitzer, 1982), and for this reason we use anonymity, which gives the noncooperative game theoretic outcome a more favorable prospect by controlling for social communication. In the context of the previous discussion, think of a move down by player 1 as an exercise in trading favors: player 1 offers to favor player 2 with a gain of $15, expecting player 1 to reciprocate by not defecting to collect the $40.

The move results for 24 pairs of subjects are indicated on each leg of the game tree. Exactly half , or 12 of the subjects signal reciprocity by moving down, and three-quarters (nine) of the players 2 reciprocate by moving right. The data strongly reject the game theoretic hypothesis that in a single interactive play of the game subjects will overwhelmingly play noncooperatively, and that conditional on moving down, players 2 will overwhelmingly defect. Furthermore, based on subsequent moves by players 2, the expected return to a player 1 from moving down is 0.75 X $15 + 0.25 X $0 = $11.25 which exceeds the noncooperative outcome, $10.

Why do half the players 1 and three-quarters of the players 2 appear to be irrational? My answer is that many people are programmed for repeated social exchange. This is part of their natural instincts. It serves their self interest, in the repeated play of the different games that we call "life," to have a reputation for giving and returning favors; i.e. the average person is accustomed to giving and returning favors across different life games. They have not had the course in which they are taught the alleged difference between one-shot and repeated interactions, which is a useful abstraction for understanding the power of repetition, but not necessarily the guide they use for action. On average, subjects' instincts serve them well. Data from many other extensive form games support these results in single play game protocols. If the

games are played repeatedly with the same pairs, cooperation increases substantially, so there is no question that repetition of such games greatly reinforces cooperative outcomes by bringing in those who are more cautious and distrustful in single play protocols (McCabe, Rassenti and Smith, 1996).

Earned Property Rights: Effect on Outcomes in Ultimatum and Dictator Games

Suppose you have acquired a specific right. You might have obtained it by accident, as if it were awarded by a flip of a coin, or you might have done something to earn it. Will such circumstances affect recognition of your right by others? Will it affect your willingness to take advantage of the right? Hoffman and Spitzer (1985) found it necessary to develop an answer to these questions as part of their seminal experimental study of Coase bargaining. According to Coase's argument if two parties are capable of harming each other, but can negotiate, they will strike an efficient bargain whichever party, the "controller," has the legal right to inflict damage. The experimental results overwhelmingly confirm this prediction. The subjects, however, who are the controllers, always failed to extract the full individually rational share of the bargaining surplus as predicted by game theory. Thus, two bargainers negotiate face-to-face for sharing $14, with the controller having the right to collect $12 if an agreement is not reached. Both parties know this. With an external option of $12, the controller should never settle for less; i.e. the joint objective would be to negotiate a split of the $2 difference. Instead, the bargainers tend strongly to share the $14 equally, which has been interpreted as due to a "fairness" norm.

Hoffman and Spitzer (1985) hypothesized that subjects do not consider an asymmetric property right to be legitimate if it is awarded by a coin flip as in their experiments. Consequently, they replicated all their experiments with a new treatment: the right to be the

controller was awarded to the subject who won a pregame of skill ("nim") before the bargaining experiment. More than two-thirds of the controllers now obtain at least $12 whereas under the random assignment none did. Shogren (1997) has shown that individual rationality is even greater if the game is run as a tournament. But tournaments undercut reciprocity; they are the interesting and important exception that proves the rule.

That an earned property right is considered natural and legitimate has also been demonstrated by Hoffman, McCabe, Shachat and Smith (1994; hereafter HMSS) in their study of ultimatum game bargaining. In this game, two individuals, matched anonymously in a room with 12 people, bargain over the allocation of 10 one-dollar bills between them, using the following rules: one person, selected by a process described below, is the proposer, who makes an offer of $x(0 \leq x \leq \$10)$ of the bills to the other person, the responder either accepts or rejects x. If it is rejected each person receives zero dollars; if it is accepted the responder will be paid $x, and the proposer $(10 - x). The game theoretic solution is for the proposer to offer the minimum unit of account, $1, and for the responder to accept – accept because one dollar is better than nothing, and the proposer, seeing that this is the case, will not need to offer more. The experiment normally uses an instructional procedure in which the people in the room are randomly matched into pairs, and one person is randomly chosen to be the proposer. The instructions also inform each subject that $10 has been "provisionally allocated to each pair," and that their task is to "divide" the $10. In these circumstances, replicated by many researchers, the observed most frequent offer is x = $5 with a mean offer somewhat in excess of $4, a clear violation of the game theoretic prediction. The explanation usually offered for this tendency toward an equal split of the $10 is "fairness" although it is not clear how this can be an explanation since "fairness" is a name for the equal splitting that is observed (Kahneman, Knetsch and Thaler 1986). It seems

strange to think that one has "explained" an observation by giving it a transparent name. The real question is, "Why are people fair?" Equal splitting has also been explained as due to "manners," but why is it considered mannerly; i.e. where do such manners come from? (Camerer and Thaler 1995). A more generous interpretation of "fairness" is that it is utilitarian; as implied by the quotation from The Theory of Moral Sentiments, the proposer derives nothing from it except the pleasure of giving the respondent a sizable share of the money. But even here we can ask why humans might be constituted to derive such pleasures; i.e. what might be the evolutionary functions served by such a constitution.

I and my coauthors report ultimatum game results that question the "utility for other" interpretation,. Taking our cue from Hoffman and Spitzer (1985), we conjectured that part of the observed generosity of proposers was the fact that their property right was both ambiguous and "illegitimate." Ambiguous because the standard instructions state that the $10 has been "provisionally allocated to each pair." Also, the right to be the proposer is acquired by chance, and the task is to "divide $10," which suggests sharing. In these circumstances the proposers right to act in a self-interested manner may not be recognized as legitimate within the implicit rules of the game, and the proposer may not feel justified in taking advantage of the right. These considerations suggest that context-dependent expectations, that derive directly from "mindreading," not utility for another's reward, may be involved in the outcome.

Reported below are ultimatum game experiments, using anonymous pairing of subjects, under three treatment conditions. To control for the effect of experience N = 24 distinct subject pairs participated under each treatment; each pair participated once and only once in one of the treatments.

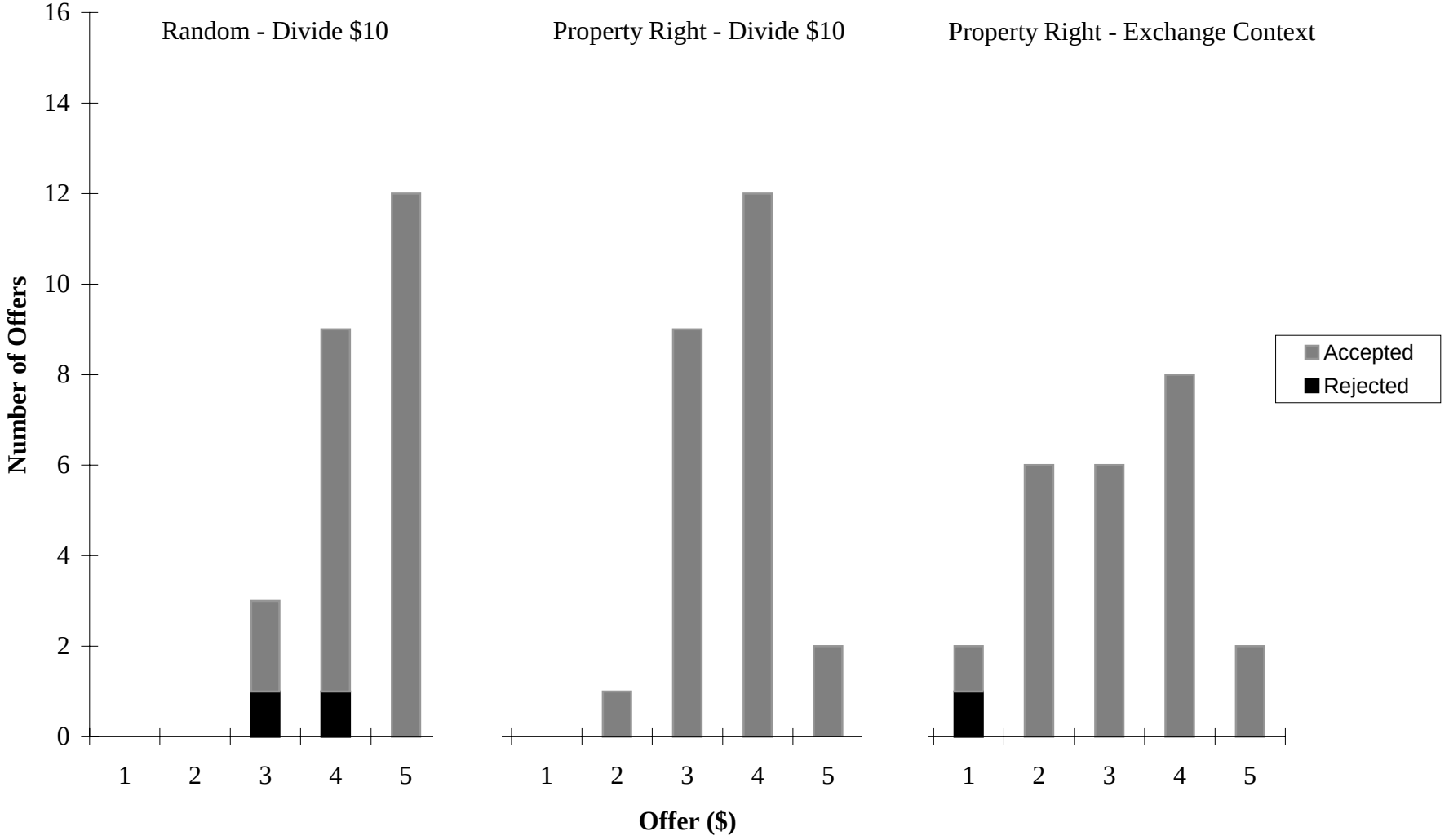
(1) Random entitlement; divide $10. In this treatment we replicated the instructional procedures used previously. (Kahneman, Knetsch and Thaler 1986; Forsythe, Horowitz, Savin and Sefton 1994, hereafter FHSS). The results were statistically equivalent to those reported by FHSS.

(2) Earned property right entitlement; divide $10. The instructional procedures are like those in (1) except a general knowledge test consisting of 10 questions is administered. The 12 subjects in the room are then ordered by test score from highest to lowest (ties are broken in favor of those finishing earlier). The top six are paired with the bottom six, and the former are assigned the role of proposers. All are told that the former as a group have earned the right to be proposers.

(3) Property right entitlement; exchange. The transaction is now formulated as an exchange between a seller (proposer) and a buyer (responder) in which the seller chooses a price, x = 0, 1, 2, …, 10 dollars. As in (2) the pregame test determines who is a seller and who is a buyer. The buyer can then either buy or not buy. If he buys, the buyer's profit is $(10 - x) and the seller's profit is x. If he does not buy, each gets zero profit. Hence, the game is identical to one in which a proposer offers 10 - x to the responder. But the setting is that of an exchange. In this context, we hypothesized that the seller (proposer) would offer less than under treatment (2), because the right of sellers to move first and quote an advantageous price is considered to be a legitimate right in addition to its having been earned.

The results are shown in Figure 3. The amounts offered on the horizontal axis, at each cumulative frequency level on the vertical axis, decreases as we move from the baseline replication (1) through (2), and (3). As predicted, offers are less generous under the earned property right entitlement conditions than in the random entitlement, divide $10 baseline, and

Figure 3
Ultimatum Game Results



when the earned property right is combined with exchange, offers are still less generous. Also of particular interest is the fact that the overall percentage of rejected offers does not increase significantly as we move from (1) to the other treatments. This is consistent with the hypothesis that proposers expect to offer less with no increase in the probability of rejection, and that this is compatible with responder expectations. Each correctly "reads" the mind of the other.

In terms of the theme in this paper both proposers and responders in ultimatum games take account of the conditions under which rights to act have been conveyed. In particular a person with a legitimate right believes he/she can use that right in a more self regarding manner than when the right is ambiguous, ill-defined or illegitimate, and others (responders in this case) agree with, or respect, these beliefs of the rights holder.

Dictator Game

In the dictator game, the right of the responder to reject the proposer's offer is eliminated. Now the offer yields the proposer $(10 - x) for certain and the equilibrium offer is zero. The dictator game was used by FHSS to test the hypothesis that fairness alone drove proposer generosity in the ultimatum game; i.e. if one offers $x > 0$ because of fairness then nullifying the strategic component – the prospect of rejection – should not alter the amounts offered. In fact dictator game offers are much lower than ultimatum game offers showing that, as noted by FHSS, the self-interest is alive and well – proposers take into account the strategic prospect that their offer may be rejected.. But dictators still give substantial positive amounts (in FHSS, 80% of the dictators give $1 or more, and their distribution of offers is statistically replicated by Hoffman, McCabe and Smith 1996, 654).

We summarize two of the dictator game treatments reported by HMSS:

(1′) Random entitlement; divide $10. This is the same as (1) above except that the responder cannot veto the proposer's offer.

(2′) Double blind condition. Dictators and recipients are recruited to separate rooms: 15 in room A and 14 in room B. the dictators are in room A, and one subject is chosen to monitor the experiment. This assures the subjects that one of them will verify that their exists a room B with 14 recipients. Common instructions are read in both rooms. 14 opaque, unmarked envelopes are in a box in room A; 12 contain 10 one-dollar bills and 10 blank sheets of paper cut to the size of a dollar bill; 2 contain 20 blank sheets of paper. Hence, all are the same thickness. Each subject, in order, chooses an envelope, goes to the back of the room and sits down in front of a large privacy box, leans inside the box, opens the envelope, and pockets 10 pieces of money and paper in any combination from 0 to 10 pieces of money (or paper), reseals the envelope, drops it in a second box, leaves the room and the building. When all have finished, the monitor takes the box of envelopes to room B, sits outside, and calls the roster of names, one at a time from room B. Each person opens the envelope, and the monitor records the number of one-dollar bills it contains on a plain white sheet of paper containing no names.

Consequently in (2′), no one, including the experimenter, the monitor, nor any one who subsequently sees the data, can know how much money each person in room A left in the envelope. The two dummy envelopes with no money still guarantee this condition even if no subject in room A leaves any money in the envelope. Giving is thus blind with respect to all but the giver. In all other dictator (and ultimatum) game experiments, the experimenter knew each decision for purposes of making payments. The double blind conditions remove all social context in the sense of providing complete privacy.

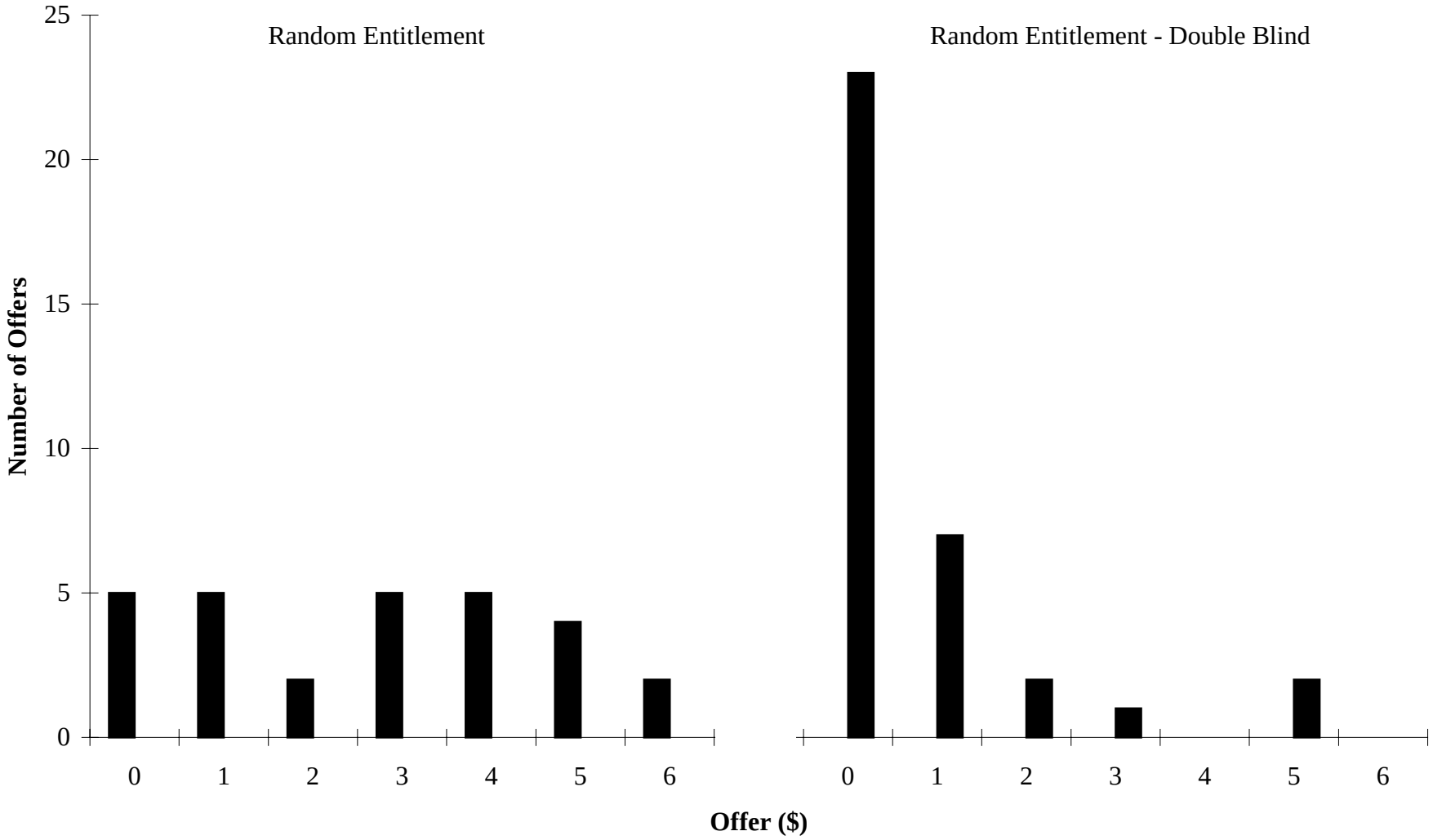
The results are charted in Figure 4. The double blind treatment dramatically lowers the offer distribution relative to the standard reported dictator game experiments Now 64% give nothing, while 84% give 0 or $1. (Not shown in Figure 4, but counted, is an inexplicable offer of $9!) In random entitlement/divide $10, 18% give nothing, while 36% give 0 or $1.

This supports the claim of those who argue for "the social function of intellect" (Humphrey 1976b). It is consciousness that enables mindreading, reciprocity and all social interaction to be intuitively meaningful. The appearance of other-regardingness comes from the self-regarding requirements of, and the need for, reciprocity in social exchange. Take away all social context – no others can know – and we see the naked expression of purely self-regarding behavior.

Reciprocity behavior and outgroups vs. ingroups

Casual observation suggests the hypothesis that the same person can reciprocate toward individuals who are part of an ingroup to which the person belongs, but be noncooperative toward those in an outgroup for which the individual feels no affinity. This phenomenon obviously characterizes kin groups. Ingroup versus outgroup recognition appears to subtly trigger friend-or-foe detection which impacts behavior without conscious awareness. Social psychologists have long known how easy it is to create behavior-modifying high versus low status, or ingroup versus outgroup identity in subjects. Experimental economists have demonstrated group/status identify phenomena in the context of both personal exchange (ultimatum bargaining games) and impersonal exchange (competitive double auction markets). Thus Ball and Eckel (1996) separate subjects between a "high status" and a "low status" group

Figure 4
Dictator Game Results



with high status recognized publically by giving the members of this group stars to wear. Group assignments used a trivia quiz to "strengthen the manipulation" (p. 389) but the assignments were not based on correct answers. Stars played No-stars, both as proposers and responders in the ultimatum game. The results show that both the low and high status proposers are more generous with the high than with the low status respondents.

Ball, et al. (1997) apply a rational actors model of status to a double auction market design with 101 distinct competitive equilibrium prices. Different prices affect only the division of the gains from trade between buyers and sellers. Low versus high status is hypothesized to yield higher earnings for the latter than the former. Using a dynamic regression model of convergence containing a dummy variable to measure the effect of status on the buyer's share of surplus, higher status subjects earn a significantly higher share of the surplus than low status subjects. Since status was assigned as in Ball and Eckel (1996), and also by a purely random procedure, it was possible to test for the effect of the status awarding procedure. There was no significant effect attributable to the way status was achieved. This is consistent with the general finding that status can be trivially created with any group of subjects, but that it has nontrivial affects on decision behavior.

Finally, we note that Rutherford, et al. (1997) use an extensive form game studied by McCabe, Rassenti and Smith (1996) to examine the effect of ingroup versus outgroup (not the special case of high versus low status) treatments on cooperative behavior, and the willingness to make personally costly choices in order to punish defectors on offers to cooperate. During the early experimental phase of group formation, subjects were found to be more tolerant of defections from offers of cooperation by ingroup than outgroup members, but became less

forgiving and more willing to punish defection by ingroup than outgroup members after the groups had persisted for a longer period.

Concluding Remarks

The puzzle that humans are simultaneously other-regarding and self-regarding, that they are relentless in seeking gains from exchange, and that the apparent inconsistency in the two faces of Adam Smith – sentimental and competitive behavior – is resolved (I claim) by making the distinction between personal and impersonal exchange. Smith, being an astute observer could see that exchange was a positive sum game leading to specialization and wealth creation limited only by the extent of the market. He also saw that humans were capable of kindness and compassion in their ordinary daily interactions, a contrary observation that he could not just leave unattended with the statement of how it is that we get our dinner from the butcher, baker and brewer. But this beneficence he attributed to design by the great Director of nature, Providence, the Judge of hearts, and so on. It is not clearly connected in Smith's thinking with the informal social exchange of favors and goods, from which markets ultimately appear to have arose. Smith's explanation of beneficence was utilitarian – the ultimate conversation stopper, because it is accepted as unexplained input – not expectational through exchange across time (positive reciprocity), as implied by his statement that man is interested in the fortune and happiness of others, "though he derives nothing from it except the pleasure of seeing it" – pleasure indeed, I would argue, from the expectation of reciprocal benefits. Try <u>never</u> returning like benefits to a friend, and see how long your friendship will run on her other regarding utility! Friends don't do that to friends. But to the Scottish moral philosopher it was just too much to see in gifts, the

hidden benefits of gifts in return. Smith never asked why, outside of Divine design, otherwise selfish humans derived nothing from beneficence to others "except the pleasure of seeing it."

Besides the theorem on specialization and markets, Smith's other incredible insight was that every individual in making the annual revenue of society as great as he can "neither intends to promote the public interest, nor knows how much he is promoting it." This is because the behavioral processes underlying the theorem operate subconsciously "like an invisible hand" on the economic agent who consciously seeks only his own gain. This invisibility is also half the equation that helps us to see why this same agent is prone to distrust the market and interfere with it. After all, "By pursuing his own interest he frequently promotes that of the society more effectively than when he really intends to promote it." (Smith 1776; 1909, 351)

Here is the other half of that equation: we are able to appreciate the benefits of social exchange, that doing good accomplishes good because that is our experience in friendships. Not knowing of the invisible good accomplished by the self-interest in markets, but knowing of the good we accomplish by doing things for friends, we are led to believe we can do good by intervening into markets.

It is true that Smith failed to put his two books together into a single coherent system of thought. But careful observer that Smith was, he was right to insist that the earlier book was concerned with important features of the human condition that should not be ignored. From the perspective of contemporary data, and insights, I think we can now see the faint outlines of a single system based on the "propensity to truck, barter, and exchange" interpreted more broadly than seems to have been intended by Smith.

This single system, I have argued, served to underpin the implicit development of property rights by early humans. This is because social exchange within tribal extended families

cannot be viable without mutual recognition of rights to act. If A gives help, favors, food or objects to B, B must recognize his own obligation to fulfill A's right to something in return, somewhere, sometime, if the relationship is to be maintained. This is the foundation of human social behavior, of bilateral associations, friendships in particular, and friendship in general. But social exchange requires not only positive reciprocity – trading favors – but also negative reciprocity, the endogenous policeman whereby failures to reciprocate are punished with unkind acts in which A reminds B of his or her obligations. Without negative reciprocity, reciprocating altruists invite invasion by free riders.

As humans we are born social exchangers, much as we are born to learn naturally, without being taught, any language we hear spoken around us, which language becomes the communication basis of social exchange. In this sense the property rights that support these spontaneous exchange systems are natural, and it is natural for formalized societies to embody such rights in legal codes that mirror the vast human experience captured in exchange practices.

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