

# Generous actors, selfish actions: markets with other-regarding preferences

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**Abstract** This paper points out that classical competitive outcomes arise in two different market environments even if agents have non-classical preferences. Consumers with separable, other-regarding preferences behave as if they have classical preferences in competitive equilibrium. These outcomes need not be efficient, but under plausible conditions will be efficient following a redistribution of income. In simple double-auction environments competitive outcomes arise under a wide range of assumptions on preferences even without assuming separability. I discuss the importance of the domain of definition of preferences and how the preferences present in the economy influence the performance of the trading institution.

**Keywords** Markets · Other-regarding preferences · Rationality · Self-interest · Welfare theorems · Bargaining · Identification

**JEL Classification** D03 · D11 · D63 · D64

## 1 Introduction

Economics makes predictions about behavior assuming the joint hypotheses of individual greed and equilibrium. The first hypothesis stipulates that individuals act

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This paper describes work related to a presentation at the conference on “Reciprocity: Theories and Facts” in February 2007. Dufwenberg et al. (2008) introduces the notion of well-being and opportunity-based externalities and contained detailed descriptions of the results in Sects. 3 and 4. Sobel (2008) contains a full treatment of the results of Sect. 5. I conducted some of the research described in this manuscript when visiting the Departament d’Economia i d’Història Econòmica and Institut d’Anàlisi Econòmica of the Universitat Autònoma de Barcelona.

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to maximize stable preferences. The second hypothesis requires that individuals have accurate beliefs about their environment and that economy-wide stability conditions hold. The focus on individuals as autonomous decision makers distinguishes economics from sociology and anthropology, disciplines that place more emphasis on how norms, conventions, culture, and group membership directly influence behavior. The assumption that economic agents have consistent goals and successfully optimize contrasts with psychology and computer science, disciplines that emphasize that solving these problems is hard in practice and in theory. The joint hypotheses lead to valid criticisms of the methodology of economists. These criticisms may associate goal-oriented behavior with the pursuit of a particular goal: wealth maximization. The standard tools of economics do not require agents to be income maximizers; economics is well equipped to incorporate evidence that people intrinsically care about the consumption and attitude of others.

The advantage of the economic framework is a consistent collection of methods that may be applied to a wide range of circumstances. Of particular importance is the ability to assess the efficiency of outcomes. A well-known disadvantage of the approach is that it endows individuals with cognitive powers that exceed theoretical and practical limits. A more subtle disadvantage is that it makes it impossible to pose some questions that have been raised by other social sciences. Specifically, if preferences are stable, then it is not possible to discuss how the interaction between individuals and institutions changes preferences.

This essay maintains the hypotheses of greed and equilibrium. It discusses some issues that arise by introducing other-regarding preferences into conventional economic models. When agents have other-regarding preferences, they have an intrinsic desire to sacrifice their narrow self interest to maximize a broad notion of utility.<sup>1</sup>

While it is not possible to say whether certain interactions change preferences within the economic framework, it is also not possible to say that preferences have changed. One might observe a change in choice behavior, but one cannot directly observe a change in preferences. A full understanding of the domain of preferences makes it possible to evaluate the welfare implications of changes in the economic environment.

Section 2 discusses ways to model other-regarding preferences in markets. Section 3 points out the importance of a separability assumption. When the condition holds, individuals with other-regarding preferences will also have consistent preferences over individual consumption and will act as if they had classical preferences in market environments. Section 4 discusses the welfare properties of individuals with other-regarding preferences in competitive markets.

In Sect. 5, I discuss the role of other-regarding preferences in strategic settings. I explain that other-regarding preferences may not be distinguishable from selfish preferences in market settings where trades are anonymous and agents have limited power to manipulate prices. When transactions are not anonymous, other-regarding

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<sup>1</sup> Repeated games are one of many situations in which a classically selfish agent may appear to be unselfish as a means to advance narrow self interests. I do not discuss this form of instrumental other-regarding behavior in this paper. See Postlewaite (1998) and Sobel (2005) for discussions of instrumental justifications of apparent preference for relative performance or reciprocity.

preferences typically matter and the nature of optimal resource-allocation mechanisms will depend on the preferences in the economy. Section 6 provides concluding comments.

## 2 Other-regarding preferences

This section describes issues that arise when modeling other-regarding preferences in markets. For concreteness, consider a pure-exchange economy  $\mathcal{E}$  with  $L$  goods indexed by  $l = 1, \dots, L$ . The price vector is an element of the unit simplex so that a price  $p$  satisfies  $p_l \geq 0$  for all  $l \in L$ , and  $\sum_{l \in L} p_l = 1$ .

There are  $I$  consumers and the consumption set of a typical consumer is assumed to be the non-negative orthant  $\mathbb{R}_+^L$ . The initial endowment of consumer  $i$  is denoted by  $e_i$ , and the bundle consumed by  $i$ , consumer  $i$ 's *own consumption*, is  $x_i = (x_{i1}, \dots, x_{iL}) \in \mathbb{R}_+^L$ .  $x = (x_1, \dots, x_I) \in \mathbb{R}_+^{L \times I}$  is the whole consumption profile. Denote by  $\bar{e}$  the aggregate initial endowment,  $\sum_{i=1}^I e_i$ . The income of consumer  $i$ ,  $w_i$ , is the value of  $i$ 's initial endowment,  $w_i = p e_i$ .

For a given price  $p$  and income  $w_i > 0$ , the budget set of consumer  $i$  is given by

$$B_i(p, w_i) = \{x_i \in \mathbb{R}_+^L : p x_i \leq w_i\}. \quad (1)$$

Restrict attention to strictly positive income and price levels to ensure that the budget set for each agent is compact. As long as we analyze individual behavior alone, we take the income  $w_i > 0$  as given. For equilibrium considerations,  $w_i$  is endogenous.

A market equilibrium consists of a  $p^* \in S$  and a consumption profile  $x^* = (x_1^*, \dots, x_I^*) \in \mathbb{R}_+^{L \times I}$  such that each agent's allocation  $x_i^*$  maximizes utility subject to a budget constraint:

$$x_i^* \text{ is a most preferred element of } B_i(p^*, p^* e_i)$$

and in which markets clear:

$$\sum_{i=1}^I x_i^* = \bar{e}.$$

Markets provide an environment in which there is no strategic interaction. Agents take prices as given. The equilibrium price determines trade possibilities. Transactions are anonymous. In this environment there is no opportunity to observe intentions. There is no way to personalize exchange. Consequently, there is no scope for reciprocity.<sup>2</sup> There is scope for other-regarding preferences, however.

My description of the economy did not specify the domain of preferences. When considering other-regarding preferences, this is a critical issue. Consider for example the possibility that agents are altruistic. Altruism has an unambiguous

<sup>2</sup> One way to introduce some personalized transactions into a general-equilibrium model is to introduce pair-specific commodities and to modify consumption sets. For example, one can introduce a commodity that describes apples that Adam gives to Eve and then define consumption sets so that all other agents hold 0 units of this commodity. In this environment, transactions would not be anonymous.

definition in the biological context: an organism behaves altruistically if its actions lower its own fitness while raising the fitness of others. Biological altruism can be viewed as a conflict of interest between the interests of the unit of selection (the gene) and the organism.<sup>3</sup>

It is trickier to define altruism in an economic sense, at least if one assumes that individuals act to maximize their preferences. In this case, while an agent may sacrifice her own consumption to raise the consumption of others, such an action could be completely selfish. If we use choice behavior to define preferences, it does not make sense to ask whether an individual is willing to sacrifice utility to help someone else.

Perhaps, advances in neuroscience will permit independent measurements of brain activation that can be interpreted as happiness. In that event, it may be possible to identify choice behavior that reduces happiness (as measured by brain activation).<sup>4</sup> At this time, I concentrate on an alternative approach, which is standard in the economics literature. The simple idea is to assume that there are a subset of goods that an individual consumes directly and that agents have preferences over these goods. If preferences do not depend on anything outside of this subset of goods, then the agent is said to be selfish. But the individual may also have preferences defined over a broader domain, for example, the consumption of others. Within this framework, an altruist is someone who sacrifices her own consumption to increase the consumption of others. The framework provides an operational definition of altruism and other forms of other-regarding behavior.

Assume, therefore, that agents have two preferences, an internal preference relationship defined on a narrow domain and a broader preference relationship. The first preference relationship describes an agent's classical selfish preferences. In conventional economic analysis, it would determine the individual's choice behavior. The second preference relationship incorporated broader concerns. This framework raises two conceptual problems. The first question is: what is the appropriate domain of the other-regarding preferences? The second question is: how can one identify the two preference relationships? For example, is it possible to determine the degree to which an agent cares about the welfare of others from market behavior?

The domain of preferences is a critical issue that is rarely discussed explicitly. If I care about my own consumption, then one may infer that I prefer apples to oranges if I select an apple when an orange is available. Even this observation needs to be reviewed. If "available" means "can be purchased at current prices with current wealth," then I may have selected the apple because it was less expensive than the orange. It requires observations of choice behavior under a variety of prices and endowments to accurately learn preferences. Still, in this situation the price of apples influences choices, but not underlying preferences. Prices are not classically part of the domain of preferences. But should the domain of preferences be limited

<sup>3</sup> See Sober and Wilson (1998) for an extensive discussion of biological and psychological altruism.

<sup>4</sup> A more mundane substitute would be to treat responses to survey questions about happiness as independent measures of preferences.

to only what I consume? I may have a preference to conform. I select an apple when other members in a group select apples and an orange when other members of the group choose oranges. This problem is not limited to other-regarding preferences. It may be that I prefer apples to oranges unless I ate an apple yesterday, or if the temperature is sufficiently low, or if I do not have access to a juice squeezer. In order to understand choice behavior fully, therefore, the appropriate factors—history, peer groups, and possibly social norms—must be taken into account.

In this section, I contrast domains for other-regarding preferences in market economies.

## 2.1 Interdependent preferences

If one agent's welfare depends on the welfare of another agent, then their preferences are interdependent. This connection creates a difficulty because it permits the possibility of self reference: Adam's utility depends on Eve's utility which depends on Adam's utility, which in turn ... leading to a potential infinite regress. The literature on this form of interdependent preferences [for example, Bergstrom (1999) and Bramoullé (2001)] provides conditions under which there is a consistent resolution to the problem that leads to reduced-form utility functions defined on a basic commodity space.<sup>5</sup> I will skip this foundational step and assume henceforth that preference relationships can be defined independently but that the domains of preferences may overlap, creating situations in which what one agent consumes influences the utility of other agents.

## 2.2 Well-being externalities

Early studies of interdependent preferences were motivated by the observation that market demand was not always the sum of individual demands. For example, Leibenstein (1950) describes consumption externalities that arise from status concerns.<sup>6</sup>

Pollack (1976) studies dynamic consumption problems in which an agent's demand depends on past demands of other agents. This formulation is a natural generalization of models of habit formation (in which an individual's own past consumption influences current consumption). Preferences of this sort are essential for the study of fashions or products that have snob appeal or general forms of network externality. In the case of fashion, one imagines that individual demand increases when the demand of others increases. When a product has snob appeal, individual demand decreases when the demand of others decreases. In these situations, individuals with other-regarding preferences must behave differently in markets than classical agents.

It is possible to describe these behaviors when the domain of utility functions be equal to the set of allocations ( $\mathbb{R}_+^{L \times I}$ ). Without restrictions, this formulation permits,

<sup>5</sup> Gul and Pesendorfer (2007) offer an alternative, recursive definition of interdependent preferences.

<sup>6</sup> Leibenstein traces the ideas back to Rae (1905).

for example, standard externalities (where the consumption of one agent generates pollution that is harmful to other agents, for example), status concerns (where the marginal utility of a good depends on the distribution of consumption in the economy relative to others), and fashion concerns (for example, when the marginal utility of a good depends on the total consumption in the economy).

Consumption externalities include many different kinds of phenomena and it is useful to limit attention to a special case of *well-being externalities*. A well-being externality arises if the utility function of Agent  $i$  depends on  $x_i$  and the internal utility levels  $m_k(x_k)$  of Agents  $k \neq i$ . Formally, one can represent well-being externalities with a *Bergsonian* utility function:

$$U_i(x_1, \dots, x_I) = V_i(m_1(x_1), \dots, m_I(x_I)). \quad (2)$$

It is natural to assume that  $m_k$  is strictly increasing for each  $k$  and that  $U_i(\cdot)$  is strictly increasing in its  $i$ th argument.

Well-being externalities restrict the general consumption externalities in two ways. First, when well-being externalities exist, individuals have a separate, internal, utility function defined on their own consumption. Second, the connections between individual's preferences are mediated through these internal utility functions. One agent cares only about the (internal) utility level of other agents rather than how the utility is attained. The existence of this preference relationship facilitates the comparison of models with and without externalities by creating the natural classical benchmark of an economy governed by internal preferences. This framework provides a way to generalize existing one-dimensional models of other-regarding preferences tailored to allocations of money.<sup>7</sup> The argument of the interdependent preferences in the one-dimensional model is the distribution of income in the economy. In the generalization, the distribution of utilities replaces the distribution of wealth. (2) implicitly assumes that it is possible for Agent  $i$  to make interpersonal comparisons of internal utility.

When there are well-being externalities, agents care about the internal utility obtained by other members of the economy. Their preferences are not influenced by opportunities (budget sets) nor are they interested in the specific consumption choices of other individuals. Nevertheless, they could be willing to sacrifice their own internal utility to make others better or worse off. That is, spite and altruism are consistent with these preferences. It is reasonable to call Agent  $i$  altruistic (respectively, spiteful) towards Agent  $j$  if  $V_i(\cdot)$  is strictly increasing (respectively, decreasing) in its  $j$ th argument.

Utility functions defined by Bergstrom (1999) satisfy an important property violated by the preferences introduced by Leibenstein (1950) and Pollack (1976). One can identify stable preferences over own consumption from observed choice behavior. An individual can feel bad when he sees others suffering or be jealous of the success of a neighbor without changing choice behavior because of these feelings. I discuss the implications of this property in more detail in Sect. 3.

<sup>7</sup> For examples see Bolton and Ockenfels (2000), Charness and Rabin (2002), and Fehr and Schmidt (1999).

### 2.3 Opportunity-based externalities

To see the importance of opportunity sets, consider an economy in which there are two agents, Adam and Eve. Imagine that Adam has other-regarding preferences, so that his utility depends not only on his own consumption, but on some comparison between himself and Eve. In particular, assume, all other things equal, that he prefers allocations which he does not envy Eve. How can we know whether Adam envies Eve? One possibility is to assume that Adam has internal preferences over consumption bundles that represent Adam's preferences. The internal preferences determine how Adam would act in isolation. With these preference, we could say that Adam envies Eve if (according to his internal preference) Adam would rather have Eve's consumption than his own. Varian (1973) applies this definition to study envy-free allocations in classical competitive environments. Freedom from envy is a desirable property of allocations according to Varian, but he does not assume that envy lowers individual welfare.

With this definition, envy can be described by the Bergsonian utility function of the form  $V_i(m_1(x_1), \dots, m_l(x_l))$ . In particular, envy could be seen as a well-being externality. This formulation leaves something out. What if Eve's internal preferences are different from Adam's? She could choose to consume something Adam finds undesirable. For example, Eve may spend most of her money on state-of-the-art electronic products that do not appeal to Adam. Adam would not envy Eve's consumption, but he might envy her opportunities. If Adam thinks: "If only I had her money, then I would ..." and, in doing so, is made worse off, then the domain of his preferences must include something that describes Eve's opportunity set.<sup>8</sup>

In a market environment, a convenient way to describe opportunity-based externalities is to assume that Agent  $i$ 's utility can be represented by

$$U_i(x_i, B) = V_i(m_i(x_i), m_1(d_i(B_1)), m_2(d_i(B_2)), \dots, m_l(d_i(B_l))) \quad (3)$$

where  $d_i(B_k)$  is the demand that Agent  $i$  would have given Agent  $k$ 's budget.<sup>9</sup> With this formulation, what matters to Agent  $i$  is what he would purchase using Agent  $j$ 's budget set. This formulation provides a convenient way to model preferences for "equality of opportunity". An agent with this form of egalitarian preferences might have sympathy for a poor person who could not purchase subsistence consumption (and be willing to transfer wealth directly to this person), while at the same time be unwilling to help a wealthy person who is starving because she spent her endowment unwisely.<sup>10</sup>

<sup>8</sup> Several authors point out good reasons why opportunities may influence preferences for individual decision makers. Gul and Pesendorfer's (2001) model of temptation and self control is a leading example.

<sup>9</sup> Dekel (2001), Kreps (1979), and Puppe (1996) provide decision-theoretic models of preferences over opportunity sets.

<sup>10</sup> In production economies, labor would be included in an agent's initial endowment. This would permit Agent  $i$  to have different attitudes toward two other agents who had identical endowments of physical goods, but who differed—perhaps because one was able-bodied and the other was not—in their ability to work.

The functional form in Bolton (1991) can be viewed as a generalization of existing one-dimensional models to a multi-good setting.<sup>11</sup> This generalization differs from the one suggested in the section on well-being externalities: Here what replaces the distribution of wealth in Agent  $i$ 's utility function is the distribution of utilities that Agent  $i$  would obtain if she had control of the decision problems of all of the other agents in the economy. In particular, this formulation does not require interpersonal comparisons of internal utilities.

If everyone in the economy shares the same internal utility function ( $m_i$  independent of  $i$ ), then for fixed opportunity sets the alternative approaches are the same. In general, the approaches take a different perspective on the appropriate way to make interpersonal comparisons. In one, agents make social comparisons by explicitly comparing interpersonal (internal) utilities. In the other, an agent compares herself to another by evaluating her utility to the utility she would receive in the other person's position. Both points of view are consistent with the general idea of opportunity-based externality.

### 3 Separability

Assume that Agent  $i$ 's preference relation is defined over allocations  $x$  and over profiles of budget sets  $B$  and is denoted by  $\succeq_i$ . Under standard assumptions the preference relationship can be represented by a utility function. In this section, I describe conditions under which such a preference relationship gives rise to consistent internal preferences.

Since agents' preferences can be represented by a continuous utility function and the budget set is compact, the demand correspondence exists. Provided that an agent's preferences over her own consumption bundles are strictly convex, each agent has a demand function given by

$$d_i(x_{-i}, B) = \arg \max_{x_i \in B_i} U_i(x_i, B).$$

In general, the demand function depends on the consumption choice of other agents  $x_{-i}$  and the profile of consumption possibility sets  $B$ . On the other hand, an agent  $i$  with classical preferences is purely selfish, so her preferences do not depend on  $x_{-i}$  and on  $B_{-i}$ . Since the same holds for the demand function, I say that Agent  $i$  behaves *as if classical* if  $d_i(x_{-i}, B)$  is independent of  $x_{-i}$  and  $B_{-i}$ .

To see when agents behave as if classical, I need another definition. An agent's preferences are *separable* if her evaluation of her own consumption is independent of the consumption of the others and the profile of budget sets.

**Definition 1** Preferences  $\succeq_i$  of Agent  $i$  are separable if for all allocations  $x = (x_1, \dots, x_l)$  and  $x' = (x'_1, \dots, x'_l)$  and all profiles of budget sets  $B$  and  $B'$  we have

<sup>11</sup> Particular functional forms consistent with Bolton (1991) are Andreoni and Miller (2002), Bolton (1991), Cox and Sadiraj (2006), and Kirchsteiger (1994).



$$(x_i, x_{-i}, B) \succeq_i (x'_i, x_{-i}, B)$$

if and only if

$$(x_i, x'_{-i}, B') \succeq_i (x'_i, x'_{-i}, B').$$

Dufwenberg et al. (2008) demonstrate that (provided that standard regularity conditions hold) that Agent  $i$ 's demand is independent of the characteristics of the other agents if and only if Agent  $i$ 's preferences can be represented in the form

$$V_i(m_i(x_i), x_{-i}, B)$$

for a strictly quasi-concave, continuous function  $m_i : \mathbb{R}_+^L \rightarrow \mathbb{R}$  and a function  $V_i : D \subseteq \mathbb{R} \times \mathbb{R}^{(I-1)L} \times \mathcal{B} \rightarrow \mathbb{R}$  that is increasing in its first variable.

Separable preferences can be represented by a utility function of the form  $V_i(m_i(x_i), x_{-i}, B)$ , with  $m_i : \mathbb{R}_+^L \rightarrow \mathbb{R}$  being a continuous, strictly monotone, and strictly quasi-concave function. Due to monotonicity in own consumption,  $V_i$  is strictly increasing in its first argument. If a consumer  $i$  has separable preferences,  $m_i(x_i)$  specifies which consumption bundles consumer  $i$  prefers to other bundles.  $m_i(x_i)$  is Agent  $i$ 's *internal utility function*.  $m_i(\cdot)$  is a measure of consumer  $i$ 's well-being absent any social comparisons.

Maccheroni et al. (2008) and Vostroknutov (2007) present models of other-regarding preferences that do not satisfy the separability assumption, but permit status concerns to be separated from direct consumption. The authors discuss experiments that can separate these two aspects of preferences.

Without the separability assumption, demand behavior will depend on the context. A consumer will choose differently from a given choice set in isolation than if he were embedded in a market economy. Hence, by varying the context in which the agent makes choices from a budget set an observer could confirm the existence of other-regarding preferences. When the separability assumption holds, choices from the budget set will not depend on the context. This does not mean that other-regarding preferences are irrelevant. It is only that the constraint of choosing from a budget set does not permit an agent to exhibit (separable) other-regarding preferences. Conceptually, one could identify the existence of non-classical preferences by eliciting preferences over the entire allocations. In practice, one can interpret the existence of voluntarily non-market transactions as evidence that market allocations are inefficient. Since market outcomes are efficient under classical assumptions, the existence of mutually beneficial transactions implies that some classical condition does not hold.

#### 4 Welfare of equilibria

Under the separability assumption, market behavior looks like selfish behavior. It need not share the welfare properties of selfish behavior. For an interesting class of separable other-regarding preferences there are useful variations of the fundamental welfare theorems.

Under separability, we know that the other regarding component of preferences does not influence market equilibrium. Furthermore, if we assume a social monotonicity property, then the set of efficient outcomes must be a subset of the set of internally efficient outcomes. Social monotonicity guarantees that if the total endowment of the economy increases, then it is possible to redistribute the endowment in a way that makes everyone better off.<sup>12</sup> This (simple) result is intuitive. For the class of preferences described by Bergstrom (1999), the existence of other-regarding preferences shrinks the set of efficient outcomes. Loosely, extreme distributions of initial wealth may lead to inefficient competitive outcomes because agents are unable to make necessary transfers in the market. Efficient equilibria can be decentralized using conventional prices provided the economy equitably redistributes initial endowments. In general, this redistribution cannot be decentralized through direct transfers. That is, it is necessary to coordinate transfers between individuals.

When there are consumption externalities, inefficiencies can arise due to a misallocation of consumption goods. There is no reason to think that market equilibrium will be efficient because individuals will not have proper incentives to take into account the fact that their consumption choices influence the utility of others. Even in the restricted form permitted by Bergstrom (1999), market equilibria may be inefficient. For example, the population may agree that no person should have an income below the subsistence level. Specialization to well-being externalities means that any inefficiencies must be traced to inequities in the income distribution. With an appropriate reallocation of initial endowments, market equilibria will be efficient.

When other-regarding preferences are opportunity based, Dufwenberg et al. (2008) assume that any non-trivial redistribution of income in the population must leave someone worse off. The condition therefore places a limit on the importance distributional concerns have on preferences. When this condition holds, agents do not wish to make unilateral transfers and, for a fixed distribution of income, equilibrium allocations are efficient.

## 5 Strategic settings

I argued that in market settings agents have no opportunity to exhibit preferences for reciprocity. In strategic settings, agents have the ability to condition their behavior on the strategic context, taking into account the intentions of other agents. Models of this sort have been proposed by Geanakoplos et al. (1989), Rabin (1993), and Segal and Sobel (2007). These models enable agents to have intrinsic preference for fairness or reciprocity. They are willing to sacrifice own consumption to reward kindness or punish nastiness in others.

Unlike the market settings described earlier, there are many simple settings in which agents with other-regarding preferences will behave differently than classically greedy agents. These differences have been observed and studied

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<sup>12</sup> See Dufwenberg et al. (2008) for a formal statement.

experimentally. A simple example is an ultimatum bargaining game in which one player, the proposer, makes a take-it-or-leave-it offer to another player, the responder. If the responder agrees, the players receive what the proposer offered. If not, then neither player receives anything. When the proposer can only propose two asymmetric offers, either keeping 80% of the prize or giving away 80% of the prize, the vast majority of proposers ask for the bigger share and the responder accepts the smaller share. When the proposal can also offer an equal split however, a larger fraction of responders reject the offer of 20%.<sup>13</sup> That is, the set of available strategies influences preferences over outcomes.

This observation provides evidence for the existence of other-regarding preferences that depend on the strategic context. In the experiment, the responder's preferences depend on more than the distribution of monetary payoffs. In one situation, the proposer prefers an 80–20 split to a 0–0 split, while in another situation her preferences are reversed. Under the maintained hypothesis that preferences are stable, one cannot conclude from this behavior that preferences have changed. Instead we conclude that preferences depend on more than the distribution of payoffs. The ability to expand the domain of preferences means that the assumption of stable preferences has no empirical content—one can always interpret an apparent change of preferences as the result of a change in some unobserved variable. The refutable hypothesis becomes the domain of preferences. The plausibility of the theory hinges on the ability to rationalize choice using a sufficiently small and compelling domain for preferences. Expanding the domain of preferences to include some way to evaluate the intentions of the offers is behaviorally plausible, descriptively powerful, and analytically tractable. For example, in the case of the ultimatum game, the domain of preferences must be rich enough to allow the proposer to distinguish between an unequal offer made when it was feasible to offer equal shares from one made when all feasible offers had to be unfair.<sup>14</sup>

When discussing other-regarding behavior in market settings, I emphasized the importance of the separability assumption. This assumption made it possible to identify consistent internal preferences. In simple strategic settings, it is possible to dispense with the separability assumption because there is an attractive benchmark for selfish behavior. In bargaining problems, outcomes are often distributions of a single, homogeneous good (money). There it is natural to assume that Agent  $i$ 's utility is increasing in the amount of money she receives (even if her utility depends non-trivially on the money allocated to other agents). In this case, separability holds trivially. In other standard applications, for example, auctions and public goods problems, there are two goods: an indivisible good and money. It is often assumed that the non-money good has a monetary equivalent (for example, in laboratory auctions the experimenter controls the redemption value of the item being auctioned), so all outcomes induce an observable monetary payoff. In contrast to general-equilibrium models, where individuals consume many goods and there are

<sup>13</sup> Falk et al. (2003) report the results of this experiment.

<sup>14</sup> Rabin (1993) and Segal and Sobel (2007) discuss this issue more generally.

many possible internal preferences, in partial-equilibrium models there is a unique way to describe the classical economy.

Sobel (2008) studies a particular trading institution for a model in which a fixed number of buyers and sellers allocate indivisible objects. Assume that sellers have a unit to supply and buyers demand at most one unit. Sellers have a fixed monetary cost of production and buyers can redeem an item for a fixed amount. In the trading game, sellers announce asking prices and buyers announce offers simultaneously. These bids determine a market-clearing price. Buyers who offer more than this price and sellers than bid less trade. When traders care only about their expected monetary surplus, the equilibrium outcome (in undominated strategies) must be competitive. That is, quantity supplied must equal quantity demanded in equilibrium. The same result holds even if agents have other-regarding preferences that place weight on the monetary surplus of all members of the population. They could also depend on the “fairness” of the strategies used. The critical assumption for this result is a replacement assumption. Provided that the market is active at the price  $p$  less than his redemption value, a buyer would prefer to be active than let some other agent trade at that price.<sup>15</sup> As in the case of exchange economies, one cannot identify other-regarding preferences from observed behavior.

In the auction environment studied by Sobel (2008), trades are anonymous and agents have limited ability to influence the market price. Other-regarding preferences play a much larger role in settings where the transactions are more personalized. There is a convincing body of experimental evidence [for example Cabrales and Charness (2003) and Fehr and Schmidt (2000)] that suggests that the presence of other-regarding preferences leads to significant differences in behavior in simple contracting environments. In these settings the features of the optimal contract will differ depending on the nature of the preferences of the contracting parties.<sup>16</sup>

## 6 Conclusion

Economic rationality permits the study of agents with exotic preferences. I have provided a brief overview of modeling issues that arise in the study of other-regarding preferences. When preferences satisfy a separability condition, individuals have well defined internal preferences over their own consumption and observed market behavior of individuals with other-regarding preferences cannot be distinguished from selfish agents who act to maximize internal preferences. There is a sense that the market institution makes it impossible for agents to display their other-regarding preferences. This simple observation has several implications.

Observations consistent with classical theory do not prove classical theory. The appropriate conclusion is that the predictions of standard theory hold under more general assumptions.

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<sup>15</sup> See Sobel (2008) for a complete treatment.

<sup>16</sup> Rauh (2007) and Rob and Zemsky (2002) study the properties of optimal contracts in joint production problems when agents have other-regarding preferences.

Observing selfish behavior in market settings is not evidence that people are selfish, nor is it evidence that the market institution changed people's preferences. The institution does change *behavior*, however.

The welfare properties of economies with other-regarding preferences may differ from those of classical economies. Competitive equilibria may be inefficient. The existence of bilateral transfers that take place outside of the market suggest that market outcomes are not efficient. With both well-being externalities and opportunity-based externalities, I have described conditions under which inefficiencies can be corrected by an appropriate redistribution of income. Under certain circumstances all agents gain when wealth is transferred from rich to poor agents. When these conditions hold, one can obtain efficient outcomes through markets provided that redistributions are possible.

In strategic settings, other-regarding preferences allow the possibility that agents have an intrinsic desire to reciprocate. When agents have limited ability to make direct, personal exchanges with other agents the results from market economies continue to hold: the competitive outcome is the equilibrium when agents have a wide range of other-regarding preferences.

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## References

- Andreoni J, Miller JH (2002) Giving according to GARP: an experimental test of the consistency of preferences for altruism. *Econometrica* 70(2):737–753
- Bergstrom TC (1999) Systems of benevolent utility functions. *J Public Econ Theory* 1(1):71–100
- Bolton G (1991) A comparative model of bargaining: theory and evidence. *Am Econ Rev* 81:1096–1135
- Bolton G, Ockenfels A (2000) ERC: a theory of equity, reciprocity and competition. *Am Econ Rev* 90:166–193
- Bramoullé Y (2001) Interdependent utilities, preference indeterminacy, and social networks. Technical report, University of Toulouse, Toulouse
- Cabrales A, Charness G (2003) Optimal contracts, adverse selection, and social preferences: an experiment. Technical Report 478, Universitat Pompeu Fabra
- Charness G, Rabin M (2002) Understanding social preferences with simple tests. *Quart J Econ* 117(3):817–869
- Cox JC, Sadiraj V (2006) Direct tests of models of social preferences and introduction of a new model. Working Paper 06-13, Georgia State University
- Dekel E, Lipman BL, Rustichini A (2001) Representing preferences with a unique subjective state space. *Econometrica* 69:891–934
- Dufwenberg M, Heidhues P, Kirchsteiger G, Riedel F, Sobel J (2008) Other-regarding preferences in general equilibrium. Technical report, UCSD
- Falk A, Fehr E, Fischbacher U (2003) On the nature of fair behavior. *Econ Inq* 41(1):20–26
- Fehr E, Schmidt K (1999) A theory of fairness, competition, and cooperation. *Quart J Econ* 114:817–868
- Fehr E, Schmidt K (2000) Fairness, incentives and contractual choices. *Eur Econ Rev* 44:1057–1068

- Geanakoplos J, Pearce D, Stacchetti E (1989) Psychological games and sequential rationality. *Games Econ Behav* 1:60–79
- Gul F, Pesendorfer W (2001) Temptation and self-control. *Econometrica* 69(6):1403–1435
- Gul F, Pesendorfer W (2007) The canonical type space for interdependent preferences. Technical report, Princeton University
- Kirchsteiger G (1994) The role of envy in ultimatum games. *J Econ Behav Organ* 25:373–390
- Kreps DM (1979) A representation theorem for 'preference for flexibility'. *Econometrica* 47(3):565–578
- Leibenstein H (1950) Bandwagon, snob, and veblen effects in the theory of consumers' demand. *Quart J Econ* 64(2):183–207
- Maccheroni F, Marinacci M, Rustichini A (2008) Social decision theory: Choosing within and between groups. Technical report, University of Minnesota
- Pollack RA (1976) Interdependent preferences. *Am Econ Rev* 66(3):309–320
- Postlewaite A (1998) The social basis of interdependent preferences. *Eur Econ Rev* 42:779–800
- Puppe C (1996) An axiomatic approach to "preference for freedom of choice". *J Econ Theory* 68(1):174–199
- Rabin M (1993) Incorporating fairness into game theory and economics. *Am Econ Rev* 83(5):1281–1302
- Rae J (1905) *The sociological theory of capital*. Macmillan, London
- Rauh MT (2007) Incentives, solidarity, and the division of labor. Technical report, Indiana University
- Rob R, Zemsky P (2002) Social capital, corporate culture, and incentive intensity. *RAND J Econ* 33(2):243–257, Summer
- Segal U, Sobel J (2007) Tit for tat: foundations of preferences for reciprocity in strategic settings. *J Econ Theory* 136(1):197–216
- Sobel J (2005) Interdependent preferences and reciprocity. *J Econ Lit* 43(2):396–440
- Sobel J (2008) Markets make people appear selfish. Technical report, UCSD
- Sober E, Wilson D (1998) *Unto others: The evolution and psychology of unselfish behavior*. Harvard University Press, Cambridge
- Varian HR (1973) Equity, envy, and efficiency. *J Econ Theory* 9(1):63–91
- Vostroknutov A (2007) Preferences over consumption and status. Technical report, University of Minnesota