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Social Preferences and Competition

There is a general presumption that social preferences can be ignored if markets are competitive. Market experiments (Smith 1962) and recent theoretical results (Dufwenberg et al. Forthcoming) suggest that competition forces people to behave as if they were purely self-interested. We qualify this view. Social preferences tend to be irrelevant if two conditions are met: separability of preferences and completeness of contracts. These conditions are often plausible, but they fail to hold when uncertainty is important (financial markets) or when incomplete contracts are traded (labor markets). Social preferences can explain many of the anomalies frequently observed on these markets.

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THERE IS A folk wisdom in behavioral economics that social preferences do not matter in competitive markets. Hundreds of market experiments, starting with Smith (1962, 1964), have shown that the standard neoclassical model predicts the actual market outcomes quite well, even if these outcomes are very unfair and give all the surplus to one side of the market. This has been supported theoretically by Fehr and Schmidt (1999) and Dufwenberg et al. (Forthcoming) who show that competition forces all market participants to behave as if they were purely self-interested. The purpose of this paper is to qualify this view. I will discuss the experimental and theoretical literature and argue that the folk wisdom is indeed correct if two conditions are met: preferences satisfy a "separability condition" (first identified by Dufwenberg et al. Forthcoming) and complete contingent contracts are traded. These conditions are plausible in many markets for well-defined physical goods. However, they fail to hold when uncertainty is important (e.g., on financial

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markets) or when incomplete contracts are traded (e.g., on labor markets). In fact, social preferences are consistent with many of the anomalies frequently observed in these markets. Furthermore, even if the two conditions are met and market outcomes correspond to the predictions of the standard neoclassical model, the two fundamental theorems of welfare need not hold.

The standard neoclassical model is built on the assumption that all economic agents are only interested in their own material well-being. However, there is a large body of experimental and field evidence showing that many people are not purely self-interested. Many people care about the welfare of other people. They are willing to sacrifice own resources to promote fairness, to help those who have been kind to them, and to punish those who have been unkind. This has been called "social preferences" or "other-regarding preferences" in the behavioral literature, which is briefly surveyed in Section 1.[1] I discuss the experimental evidence on social preferences and show that this evidence is not restricted to lab experiments for small stakes with undergraduate students but that it extends to large stakes, representative samples of the population, and field experiments. Furthermore, I briefly discuss the most prominent theoretical models that have been suggested to explain this evidence.

Section 2 considers competitive markets. It discusses the market experiments by Smith (1962, 1964) and others showing that the neoclassical model does a very good job in predicting actual market outcomes even if these outcomes are very unfair and if many of the assumptions of this model are not satisfied. The competitive equilibrium outcome prevails even if there is only a limited number of buyers and sellers, if market transparency is imperfect, if there is no Walrasian auctioneer, and if some market participants have strong social preferences. The fact that social preferences do not seem to matter in these experiments has been analyzed theoretically by Fehr and Schmidt (1999) who show that in ultimatum games with responder or proposer competition players are forced to behave as if they were purely self-interested. Dufwenberg et al. (Forthcoming) consider a general equilibrium model and allow for a large class of social preferences. They identify a necessary and sufficient condition on preferences, called "separability," which implies that agents with social preferences behave as if they were "classical" (i.e., purely self-interested). But, the separability condition does not imply the two fundamental theorems of welfare. If some agents have social preferences, competitive equilibria may fail to be efficient.

Dufwenberg et al. (Forthcoming) point out that the separability condition is particularly strong if there is uncertainty, but they do not explore this issue.[2] In Section 3, I use the example of an asset market to point out why the separability condition fails to hold if uncertainty is important. I show that large deviations from the neoclassical prediction are possible even if all players form rational expectations. Social

1. The two terms are used synonymously in the literature. For brevity, I will mostly use the expression "social" preferences.

2. See, however, Heidhues and Riedel (2007, Section 4.1) who show that with uncertainty an EU Bergsonian Utility function that depends on the consumption of all agents in the economy is not a separable utility function *ex ante*.

preferences may give rise to multiple equilibria, to herding, and to booms and busts on asset markets.

An implicit assumption in Dufwenberg et al. (Forthcoming) and in the market experiments by Smith and others is that complete contingent contracts are traded, that is, the contract perfectly specifies the quality of the good for all possible states of the world. If contracts are complete, the market price determines how the gains from trade are split, but it does not affect the efficiency of the transaction.

In Section 4, I consider competitive markets where incomplete contracts are traded. A prime example is a labor contract. Many recent experiments have shown that if the employee's effort cannot be contracted upon then paying a higher (fixed) wage induces many employees to spend more effort voluntarily. Thus, the wage (price) determines not only the distribution but also the size of the surplus. Social preferences matter because they can be used as a substitute for performance-based incentive schemes.

There are several recent experimental studies showing that the role of social preferences is magnified when parties interact repeatedly and form relational contracts (Brown, Falk, and Fehr 2004, 2008) or if parties interact one-shot but can acquire a reputation for fair or trustworthy behavior (Bartling, Fehr, and Schmidt 2009). These papers also show that competition may foster the role of social preferences as an enforcement device and induce employees to spend more effort. In these experiments, employees earn rents that are not competed away, prices fail to clear the market, involuntary unemployment is a stable phenomenon, changes of market conditions affect prices much less on markets for incomplete contracts than on market for complete contracts, and minimum wages tend to increase even those wages that are not directly affected by the minimum wage. All these phenomena have also been observed in the field. They cannot be explained by the standard neoclassical model but they are consistent with models of social preferences.

Section 5 concludes with a brief summary of the main insights of this paper and their implications for macroeconomics.

1. EXPERIMENTAL EVIDENCE AND THEORETICAL MODELS OF SOCIAL PREFERENCES

There is a large body of experimental evidence showing:

(i) Many people do not only care about their own material well-being but are also concerned about the payoffs of other people they interact with.
(ii) People are heterogeneous. Some people care a lot about other people's payoffs, while others care very little.

It is impossible to explain observed economic behavior in many situations without taking (i) and (ii) into account. In the first part of this section, I give a short overview on the experimental evidence of social preferences. I will show that this evidence is

quite robust and not restricted to lab experiments with undergraduate students and small stakes. In the second part, I briefly discuss some theoretical models of social preferences.

1.1 Evidence on Social Preferences

The first and probably most famous experiment on social preferences is the *ultimatum game* introduced by Güth, Schmittberger, and Schwarze (1982). In this experiment player 1, the proposer, can make a proposal on how to divide, say, \$10 between himself and an anonymous player 2. Player 2, the responder, can either accept or reject the proposal. In the latter case, both players get a payoff of 0. Clearly, a rational and purely self-interested player 2 should accept any positive offer. However, a robust observation is that responders frequently reject low offers (Roth 1995, Camerer 2003, Fehr and Schmidt 2003). Because the responder's decision problem is so simple and transparent (accept the offer or get nothing), it is difficult to argue that subjects fail to understand it. If responders reject an offer $x > 0$, they reveal that they prefer the payoff allocation (0, 0) to the allocation $(10 - x, x)$ even if this does not maximize their own monetary payoff. In fact, when asked why they chose to destroy their own payoff, many subjects in the role of the responder say that the proposer's offer was "unfair." They want the unfair behavior of player 1 punished, even if this is costly. More recently, neuroscientific studies provide evidence that is consistent with the view that fairness concerns and the punishment of unfair behavior are an expression of preferences. Quervain et al. (2004) show that reward-related neural circuits are activated when subjects decide to punish unfair behavior—even if they have to pay to punish. These are the same neural circuits that are activated when the subjects decide to buy a good that they value.

Another robust regularity of ultimatum game experiments is that most subjects in the role of player 1 offer between 40% and 50% of the surplus to player 2. There are two possible explanations for this behavior. Player 1 may offer a fair share to player 2 because he prefers a fair allocation with a lower payoff to himself to an unfair allocation where he gets more. Or, he may offer a fair allocation because he is afraid that an unfair offer will be rejected. The *dictator game* experiment discriminates between these hypotheses. Like in the ultimatum game, player 1 can make a proposal on how to divide \$10 between himself and player 2. However, in the dictator game player 2 cannot reject the proposal. The proposal is dictated by the proposer. Forsythe et al. (1994) were the first to compare offers in the ultimatum game to offers in the dictator game. They find that offers in the dictator game are considerably less generous. A significant fraction of dictators give nothing. This shows that many proposers are generous only for strategic reasons in the ultimatum game. Nevertheless, most subjects still give a positive amount (up to 50% of the pie) to player 2. Again, the dictator game is so straightforward that proposers must know what they are doing. Thus, the experimental evidence suggests that many subjects are willing to give up some resources to help others.

There are many other experiments in which observed behaviors are inconsistent with the self-interest assumption.[3] For example, in *public good games* many people deviate from the dominant strategy of free-riding and voluntarily contribute to the public good (Ledyard 1995). Furthermore, if given the opportunity, they are willing to punish noncontributors even if this is costly to themselves (Fehr and Gaechter 2000). In *trust games*, player 1 can make an investment that increases the payoff of player 2 (the "trustee"). The trustee can return the favor and voluntarily pay something back. A selfish trustee will not pay back and should not be trusted. However, many subjects in the role of player 1 invest in the (often correct) expectation that the trustee will return the favor and pay back (Berg, Dickhaut, and McCabe 1995). In *gift exchange games* (further discussed in Section 4), subjects in the role of workers provide higher effort than contractually enforceable if their employers offer generous wages (Fehr, Kirchsteiger, and Riedl 1993).

If everybody cared strongly about fairness and reciprocity, most public good and incentive problems would disappear. Unfortunately, this is not the case. While many subjects are willing to spend resources to achieve a fair allocation or to reciprocate kind or unkind behavior, there are also many subjects who behave very selfishly. They do not give anything in dictator games, they free-ride in public good games, and they do not reciprocate in trust and gift exchange games. To understand the outcomes of these experiments, it is necessary to acknowledge the heterogeneity of social preferences and to study the interaction of fair-minded and self-interested subjects (Fehr and Schmidt 1999, Fehr, Klein, and Schmidt 2007).

Most of these experiments have been conducted with modest amounts of money at stake and with subject pools of undergraduate students at Western universities. Thus, a natural question is how robust these results are. Several papers examine high stakes experiments. Perhaps surprisingly, even large increases in the monetary stakes did little or nothing to change behavior. Cameron (1999) conducted ultimatum games in Indonesia. In one treatment, subjects could earn the equivalent of 3 months' income. Nevertheless, she finds no effect of the stake level on proposers' behavior and only a small reduction of the rejection probability of the responder when stakes are high. Fehr, Fischbacher, and Tougareva (2002) conducted gift exchange games in Russia. In one treatment their subjects earned, on average, the income of 1 week, in another treatment the income of 10 weeks. Despite this large increase in monetary payoffs, there are no significant differences in behavior across conditions.

The experimental evidence is not confined to student populations. Several studies conducted experiments with subject pools that are representative of whole countries such as Germany (Dohmen et al. 2009) or the Netherlands (Bellemare, Kröger, and van Soest 2008). Differences in behavior to student subject pools are small. If anything, students behave slightly more selfishly than a representative sample of the population.

3. See Fehr and Schmidt (2006) for a detailed survey on this literature.

There are also a few studies that did experiments across different cultures. Roth et al. (1991) conducted ultimatum games in Israel, Japan, Slovenia, and the United States. They find somewhat lower rejection rates and lower offers in Japan and Israel compared to the United States and Slovenia, but the differences are small. Large differences in behavior across cultures are observed by Henrich et al. (2001). They report the results of ultimatum game experiments conducted in 15 small-scale societies with little exposure to Western societies. For example, the average offer made by the Machiguenga (who live in the Amazon jungle of Peru) is only 26%, while the Lamalera (whale hunters on a remote Pacific island in East Indonesia) offer 56% on average. This evidence suggests that fairness norms are at least partially determined by culture, but also that the cultural differences concerning fairness between most Western countries are small.

Laboratory experiments allow the researcher to tightly control the decisions of the subjects. However, behavior observed in the artificial environment of a lab may differ substantially from behavior in natural environments. Some recent studies have addressed this issue and implemented gift exchange situations in natural environments. In these studies, experimenters have exogenously manipulated the wage paid to real workers in situations with a one-shot character. For example, workers had to perform tasks such as data entry (Gneezy and List 2006, Kube, Maréchal, and Puppe 2006, Englmaier and Leider 2008), stuffing envelopes (Al-Ubaydli et al. 2008), planting trees (Bellemare and Shearer 2007), and newspaper promotion (Cohn, Fehr, and Goette 2007). The general message of these studies is that significant reciprocal responses exist in these field environments. For example, a wage cut relative to the promised or expected payment reduces workers' output significantly (Kube et al. 2006). The impact of a wage increase is less pronounced. Cohn et al. (2007) find that only those workers who considered the previous wage as unfairly low respond to an increase in wages with a significantly positive effort increase, while those workers who perceive the previous wage as fair do not work harder.[4]

1.2 Theoretical Models of Social Preferences

Various theories have been developed to explain the experimental evidence. All of these theories employ "social preferences" in the sense that the utility of a subject not only depends on his own consumption level but also on the consumption of other players. At least three types of models can be distinguished: (i) *outcome-based social preferences*, (ii) *intention-based social preferences*, and (iii) *type-dependent social preferences*.

In models of *outcome-based social preferences*, the utility of each player depends directly on the material payoff of other players in his reference group. For example, theories of unconditional altruism (Andreoni and Miller 2002, Charness and Rabin

4. Kube, Maréchal, and Puppe (2008) show that workers who receive a nonmonetary gift in gift-wrap paper exhibit a large increase in effort while workers who received the monetary value of the gift increase their effort significantly less. However, most workers preferred the monetary amount to the gift. Thus, the gift wrapping has a strong effect, perhaps because it makes the gift more salient and more personal.

2002) assume that the utility of a player not only depends on his own material payoff but is also monotonically increasing in the monetary payoff of other players. Altruism can explain giving in dictator games and reciprocal behavior in trust and gift exchange games, but it cannot explain why subjects reject unfair offers in ultimatum games or punish free-riders in public good games. The opposite assumption is made in models of unconditional envy or spitefulness (Bolton 1991, Kirchsteiger 1994). Envy is consistent with spiteful behavior in ultimatum games and public good games with punishment, but it cannot explain positive reciprocity and generosity. A conditional form of altruism and/or envy is inequity aversion (Fehr and Schmidt 1999, Bolton and Ockenfels 2000). An inequity-averse person is willing to spend own resources in order to achieve a more equitable allocation of payoffs in his reference group. In most experimental games, "equity" is defined as equality of monetary payoffs and the reference group is assumed to be the set of players a subject interacts with.[5] Thus, if an inequality-averse person is worse off than the other people in his reference group his utility function decreases with the monetary payoff of his opponents, while if this person is better off, he becomes altruistic. These models are consistent with generous behavior in dictator, trust, and gift exchange games and with spiteful behavior in ultimatum games and public good games with punishment.

A particularly simple formalization of inequity aversion is the Fehr–Schmidt (1999) model that assumes that the utility function of player i is given by

$$U_i(x_i, x_{-i}) = x_i - \alpha_i \frac{1}{N-1} \sum_{j=1}^{N} \max\{x_j - x_i, 0\} - \beta_i \frac{1}{N-1} \times \sum_{j=1}^{N} \max\{x_i - x_j, 0\}, \tag{1}$$

with $0 \leq \beta_i \leq \alpha_i$ and $0 \leq \beta_i < 1$.[6] Thus, inequity aversion is assumed to be linear in payoff differences, and people are assumed to care more strongly about inequity that is to their disadvantage than about inequity to their advantage ($\beta_i \leq \alpha_i$). Because of its simplicity, this model can allow for heterogeneous preferences and still be easily applied to any experimental game. If all agents were inequity averse to the same degree, it would be impossible to explain the wide spectrum of fair-minded and unfair behavior in many experiments. Fehr and Schmidt show that these outcomes are often driven by the interaction between self-interested and inequity-averse players. For example, a few strongly inequity-averse players are sufficient to induce full cooperation by all subjects in a public good game with punishment while a few

5. In the real world, the definition of equity and of the reference group is often less obvious and depends on the specific application.

6. If $\beta_i \geq 1$, player i's payoff function may fail to be monotonically increasing in his own monetary payoff. In this case, player i may prefer to destroy his own income in order to reduce the payoff difference to his opponent who has a lower payoff than he does. Fehr and Schmidt (1999) exclude this implausible case by imposing $\beta_i < 1$.

selfish players ($\alpha_i = \beta_i = 0$) are sufficient to induce a very unfair outcome in an ultimatum game with responder competition.

The Fehr–Schmidt model is consistent with observed behavior in many experimental games but it assumes that people care only about outcomes and not about intentions. In some situations this is problematic. For example, Falk, Fehr, and Fischbacher (2003) consider a mini-ultimatum game in which the proposer is restricted to choose between two different allocations. In one treatment, he can choose between (8, 2) and (5, 5), in another treatment he can choose between (8, 2) and (10, 0). In the first treatment, the choice of (8, 2) may be considered greedy, because he could have offered the equal split (5, 5). In the second treatment, the choice of (8, 2) may be considered generous, because the only alternative would have been (10, 0). Models of outcome-based social preferences predict that if the second mover is offered (8, 2) he should behave the same way no matter whether the alternative had been (5, 5) or (10, 0). However, in the experiment about 45% of the responders reject (8, 2) if the alternative is (5, 5), while only 20% reject this proposal if the alternative is (10, 0). Thus, in addition to outcome-based inequity-aversion intentions clearly matter.

Models of *intention-based social preferences* try to capture this effect (Rabin 1993, Dufwenberg and Kirchsteiger 2004, Falk and Fischbacher 2006, Battigalli and Dufwenberg 2009). In these models, preferences are defined not only over outcomes but also over beliefs about why an agent has chosen certain actions. This requires the use of psychological game theory (Geanakoplos, Pearce, and Stacchetti, 1989). Unfortunately, these models often give rise to multiple equilibria with self-fulfilling beliefs: if everybody believes that everybody else acts kindly, it is optimal to be kind, but it is also equilibrium that everybody is hostile because everybody believes everybody else to be hostile as well. Thus, these models are less suitable to predict behavior.

Finally, there are models of *type-based social preferences* (Levine 1998, Rotemberg, 2008). In these models, a player behaves kindly to a "good" person and hostile toward a "bad" person. Note that it is the type of a person and not the intention behind an action that affects preferences. Thus, type-based reciprocity can be modeled by using conventional game theory. However, if the type of player is private information, the game turns into a signaling game that often exhibits multiple equilibria.

2. ARE SOCIAL PREFERENCES IRRELEVANT IN COMPETITIVE MARKETS?

2.1 Market Experiments

The first experiments on competitive markets were conducted by Edward H. Chamberlin in Harvard in the 1940s. On the first day of his beginning graduate course on monopolistic competition, he used to divide his students into buyers and sellers of a fictitious good. Each buyer was assigned a different reservation price and each seller a different cost to deliver the good. Reservation prices and costs were private

information. Then he gave his students a few minutes to find a trading partner and to haggle about the price. When he compared the actual trades with the prediction of neoclassical price theory, the typical result was that prices fluctuated widely and that the traded quantity was often larger than the competitive equilibrium quantity (Chamberlin 1948).

In the late 1950s, Vernon Smith, a student of Chamberlin at Harvard, conjectured that the problem with Chamberlin's market experiment was the lack of public information about available bids and offers. Smith (1962, 1964) conducted a series of market experiments that differed from Chamberlin's experiments in two dimensions: First, all bids and offers were publicly recorded in order to improve market transparency. Because buyers and sellers can make bids and offers simultaneously, this market design is called a "double auction." It resembles the trading rules and procedures of the traditional trading floor of most financial markets before the introduction of computerized trading. Second, each experimental session had several rounds, so that his subjects could learn by experience. The experimental results are striking: prices quickly converge to equilibrium prices and the traded quantity is very close to the efficient quantity predicted by competitive equilibrium. Neoclassical price theory predicts the market outcome well although many of the assumptions of perfectly competitive markets are only imperfectly satisfied. The number of buyers and sellers is finite (and rather small), market transparency is imperfect, and there is no Walrasian auctioneer.

The experimental results match the predictions of neoclassical price theory even under extreme conditions. For example, Holt and Langan (1986) conducted a double auction in which all buyers have the same reservation price and all sellers have the same cost. If there is excess supply, the theory predicts that all surplus goes to the buyers; if there is excess demand, all surplus goes to the sellers. Many market participants consider these outcomes as very unfair. Nevertheless, after a few trading periods these are exactly the market outcomes observed in the experiments.

Roth et al. (1991) introduced competition into the ultimatum game. In their experiment, there are n proposers who simultaneously propose a share $s_i \in [0, 1]$, $i \in \{1, \ldots, n\}$, to one responder. Then the responder can either accept or reject the *highest* offer $\overline{s} = \max\{s_i\}$. They conducted experimental sessions in four different countries. In all sessions the maximum offer converged quickly to 1, which was accepted by the responder. Thus, the responder received all the gains from trade while the proposers got nothing. Similarly, Güth, Nadege, and Rulliere (1998) conducted an ultimatum game with responder competition. One proposer offers a share $s \in [0, 1]$ to n responders. Simultaneously, each responder decides on his acceptance threshold. If several responders have an acceptance threshold that is smaller than the proposed share, one of them is selected at random and gets s, all other responders get nothing. After five periods, the average acceptance threshold is below 5%, with 71% of the responders stipulating a threshold of exactly zero. Thus, even though most subjects reject unfair offers in the standard ultimatum game, they are willing to accept them if there is competition.

2.2 Irrelevance Theorems

Why is it that many people seem to have strong social preferences when they interact in small groups, while they seem to be purely self-interested when there is competition? Fehr and Schmidt (1999) addressed this puzzle. Using their model of inequity aversion they analyze ultimatum games with responder and proposer competition. They show that no matter how the joint distribution of α and β looks like, competition forces players to behave as if they were purely self-interested (Fehr and Schmidt 1999, Propositions 2 and 3). The intuition for this result is easy to understand in the ultimatum game with proposer competition. Note first that because of $\beta < 1$ the responder will accept any offer $s \geq 0.5$. Furthermore, it cannot be a subgame perfect equilibrium that all proposers offer $s_i < 0.5$, because at least one of them would have an incentive to overbid his competitors. So consider an equilibrium candidate with $0.5 \leq \overline{s} < 1$. It cannot be the case that one proposer offers less than $\overline{s}$ in equilibrium, because this proposer would get a monetary payoff of 0 for sure and suffer from the inequality to his disadvantage, while if he offered $\overline{s}$ he would get $1 - \overline{s}$ and less inequality to his disadvantage with positive probability. Thus, all proposers must offer $\overline{s}$. But then, each proposer would be better off by offering $\overline{s} + \varepsilon$. This offer gives him $1 - \overline{s} - \varepsilon$ with probability 1, which is better if ε is sufficiently small. Thus, as in a game with Bertrand competition, each proposer has an incentive to overbid the other proposers. The only equilibrium outcome has at least two proposers offering$s = 1$. This example shows that it is impossible for any one party to enforce a fair or equal outcome if there is competition. By insisting on his fair share, a player only hurts himself, but he cannot prevent the other market participants from trading.[7]

More recently, Dufwenberg et al. (Forthcoming) have looked at this question from the perspective of general equilibrium theory. They consider a standard general equilibrium model and allow for a fairly general class of social preferences. The preference relation of each market participant can be represented by a utility function that may depend not only on his own consumption vector, x_i, but also on the consumption vectors x_{-i} of all other market participants. Furthermore, it may depend on the vector of budget sets, B, of all market participants. Thus, they allow for the possibility that a consumer does not care about the consumption bundle chosen by another consumer, but he does care about the consumption possibilities (the budget set) of this consumer.

In a classical general equilibrium model, the utility of a consumer depends on his own consumption vector only. Thus, a consumer behaves "as if classical," if his demand function is independent of the consumption bundles and budget sets of all other consumers. Dufwenberg et al. (Forthcoming) offer a necessary and sufficient condition for a consumer to behave "as if classical," that is, for his demand function to be independent of the consumption and income of all other consumers. A consumer behaves "as if classical" if and only if his preferences are separable, that is, if and

7. Bolton and Ockenfels (2000) consider Bertrand and Cournot Games and show that the standard Nash equilibria of these games are also equilibria if some of the players suffer if they have ERC preferences, that is, if their payoff differs from the average payoff in the group.

only if his preference relation can be represented by a utility function of the form

$$V_i(m_i(x_i), x_{-i}, B), \tag{2}$$

and if $V_i(\cdot)$ is strictly increasing in its first argument. The function $m_i(x_i)$ is called the consumer's *internal utility function*. The idea of the separability condition is simple. Because V_i is strictly increasing in the internal utility m_i, the consumer wants to maximize m_i. However, m_i depends only on x_i and is independent of (x_{-i}, B). Thus, for any (x_{-i}, B) the consumer chooses the same consumption bundle x_i^*; that is, he behaves as if classical. If all consumers have preferences that are separable, then all consumers behave as if classical, and social preferences do not affect market behavior. Thus, an economy in which agents have social preferences is observationally equivalent to an economy in which each agent only cares about his own consumption.

In an economy with separable social preferences, Walrasian equilibria must be internally efficient; that is, it is impossible to increase the internal utility m_i of some consumers without reducing the internal utility of some other consumers. However, an internally efficient allocation need not be Pareto-efficient. The reason is that social preferences give rise to externalities that will not be internalized if each agent chooses a consumption bundle that maximizes his internal utility. Thus, the two fundamental welfare theorems need not hold in this economy. A Walrasian equilibrium may be Pareto-inefficient, and a Pareto-efficient allocation need not be a Walrasian equilibrium.

Dufwenberg et al. (Forthcoming) show that if a social monotonicity condition holds, that is, if it is possible to distribute any amount of money z in a such way among consumers that all consumers are strictly better off, then the set of Pareto-efficient allocations is a subset of the set of internally efficient allocations. In this case, the second welfare theorem trivially holds, because any internally efficient allocation can be implemented as a Walrasian equilibrium by using suitable lump-sum transfers. However, the first welfare theorem need not hold. There may be Walrasian equilibria that are internally efficient but not Pareto-efficient. Thus, if people have social preferences, redistribution may be necessary to achieve a Pareto-efficient allocation. For example, it there are two groups of consumers, rich and poor, and if the rich have sufficiently strong altruistic preferences, then a Pareto improvement can be achieved by transferring wealth from the rich to the poor. Note that this cannot be achieved with bilateral transfers if each of the rich is small. If one rich person gives some of his wealth to the poor, he suffers from the loss of his own consumption while the gains of the poor are negligible. However, if all of the rich give up some of their wealth there is a strong impact on the welfare of the poor and everybody is better off. A solution to this collective action problem is redistributive taxation. Note that this argument for redistribution is based only on individual preferences.

The separability condition offers an explanation for why we observe the competitive equilibrium outcomes predicted by neoclassical price theory in the market experiments by Smith and others and in the ultimatum games with competition. This condition is satisfied by the most prominent models of outcome-based social

preferences (such as Fehr–Schmidt 1999, Bolton–Ockenfels 2000 and Charness–Rabin 2002).[8] Nevertheless, it is important to keep in mind that the separability condition is restrictive. It requires that the demand of each consumer is independent of the consumption vectors and budget sets of all other consumers in the economy. In a world without uncertainty, this assumption is plausible as a first approximation.[9] With uncertainty, however, separability is very unlikely to hold. In the next section, I will provide a simple example of an asset market illustrating this point.

3. COMPETITION UNDER UNCERTAINTY

Consider an economy with aggregate uncertainty in which each consumer has to decide how to allocate his wealth across different states of the world. If the consumer has social preferences, his utility in one state of the world depends not only on his own consumption level in this state but also on the consumption of other agents in his reference group in this state. For example, a consumer may experience a larger disutility from a sudden drop in consumption if he is the only one who is suffering as compared to a situation in which everybody in his neighborhood is affected by the same shock. Thus, the marginal rate of substitution between consumption in state 1 and in state 2 depends on how much other people consume in these two states. This violates separability.

If there is aggregate uncertainty and people have social preferences, there is a natural tendency for herding and multiple equilibria on asset markets even if these markets are competitive and everybody is perfectly rational. This has been pointed out by Gebhardt (2002, 2004). Let me illustrate this point with a simple example.

Suppose that there is a continuum of identical consumers indexed by$i$, $i \in [0, 1]$, each of whom has to decide on how much of his wealth to invest in a safe and in several risky assets. Consumers are inequity averse in the sense of Fehr and Schmidt (1999), that is, their utility function is given by

$$V(x) = m(x_i) - \alpha \int_0^1 \max\{x_j - x_i, 0\} dj - \beta \int_0^1 \max\{x_i - x_j, 0\}\, dj, \qquad (3)$$

where x_i is the level of wealth enjoyed by the consumer after the state of the world has materialized and $m(x_i)$ is an internal utility function as in Dufwenberg et al.

8. Note that there is only one consumption good in these models. If preferences are monotonic (e.g., if $\beta_i < 1$ in the Fehr–Schmidt model), a consumer trivially chooses to always expend his entire budget, that is, $x_i = w_i$, independently of the consumption levels of all other consumers. However, this condition is nongeneric in the class of all possible outcome-based social preferences.

9. To be sure, even in a world without uncertainty the separability condition need not always hold. For example, my marginal utility from conspicuous goods (expensive cars, jewelry, fashion goods, etc.) may depend on how much of these goods my neighbors consume and/or on how wealthy they are.

(Forthcoming) reflecting the consumption utility that the consumer derives from consuming x_i with $m'(x_i) > 0$ and $m''(x_i) < 0$. Thus, the consumer is assumed to be risk averse in his utility over wealth but risk neutral in his disutility from inequity aversion.[10] Consumers want to maximize the expected value of $V(x)$.

If $\alpha = \beta = 0$, this is just a von Neumann–Morgenstern utility function. In this case, under standard assumptions, there exists a unique optimal portfolio choice for any vector of asset prices and a unique asset market equilibrium. If α and/or β are strictly positive, however, the consumer is not only concerned about his consumption risk, but also about the "social" risk that he may fall behind (or move ahead) of everybody else. Therefore, agents dislike taking risks that are not taken by their reference group. For example, suppose that there are two assets that have the same return and risk profiles but are not perfectly correlated. A self-interest agent wants to buy a convex combination of the two assets in order to reduce his total risk exposure. In contrast, an agent who is sufficiently inequity averse wants to hold the same asset allocation that is held by his reference group. If everybody holds only the first asset, he will do so as well. The reason is that if he buys some of the other asset he may fall behind his reference group in some states of the world and suffer a utility loss from inequity aversion in addition to the monetary loss. By buying the same portfolio as his reference group, he insures against this risk.

If an agent has social preferences, it may be optimal to hold a portfolio with a risk–return profile that is strictly dominated by some other portfolio provided that enough other people in his reference group do so as well. Herding is an optimal strategy if investors have social preferences. If all my friends buy large new houses, I may do so as well even if I believe that the expected return of this investment is negative. If prices continue to go up, I do not want to be left behind. If prices fall, I am not the only one whose wealth is reduced ("Two in distress make sorrow less"). Herding gives rise to multiple asset market equilibria. Gebhardt (2002, 2004) shows that these effects can be used to generate time-varying risk premia, stock market bubbles and crashes even if all market participants have rational expectations and behave optimally.

4. COMPETITION FOR INCOMPLETE CONTRACTS

An implicit assumption in the general equilibrium model of Dufwenberg et al. (Forthcoming) as well as in the market experiments of Smith and others is that complete contracts are traded. The quality of the good is observable by the trading parties and verifiable by the courts. The parties can write a complete contingent contract that specifies all aspects of their relationship in every possible state of the world. Any deviations from the terms of the contract are deterred by the threat of high

10. Risk aversion over inequity aversion would not change results but complicate the exposition.

damage payments that are enforced by the courts. The market price determines how the gains from trade are split, but it does not affect the efficiency of the transaction.

In the real world, however, many contracts are highly incomplete. A prime example for an incomplete contract is the employment relationship. A labor contract cannot specify in detail what the worker is supposed to do. Most occupations involve multiple and complex tasks, the optimal action to be taken depends on many contingencies that are unknown in advance, and it is impossible to constantly monitor the employee. This gives rise to severe incentive problems. In this section, I will argue that in markets for incomplete contracts concerns for fairness and reciprocity may mitigate or exacerbate incentive problems. In these markets, the market price has two functions. It not only determines how the gains from trade are split, it also affects the incentives of the involved parties and thereby the size of the surplus that is generated.

4.1 A Simple Model

Let us start out with a simple model in which a firm pays a fixed wage to a worker who then chooses his effort level.[11] Suppose that the material utility of the worker is given by

$$u = w - \frac{e^2}{2}, \tag{4}$$

where w is his wage and e is his "voluntary" effort, that is, the effort in addition to the effort that can be enforced by the contract. This minimum enforceable effort level is normalized to zero. The firm's profit from employing the worker is given by

$$\pi = \underline{\pi} + k \cdot e - w, \tag{5}$$

where $\underline{\pi}$ is the revenue that the firm gets if the worker chooses the minimum enforceable effort level and k is the worker's productivity of effort. All variables are measured in real terms (everybody is perfectly rational, so money illusion is not an issue). The worker must be paid at least $\underline{w}$, which can be interpreted as the minimum wage or as the outside option of the worker, which depends on labor market conditions, unemployment benefits, etc. We assume for simplicity that $\underline{\pi} \geq \underline{w}$.[12]

Suppose that the worker is inequity averse as in Fehr and Schmidt (1999) with $0.5 < \beta < 1$, that is, if w is sufficiently large he wants to choose an effort level e that equalizes his rent, $w - \underline{w} - \frac{e^2}{2}$, and the profit that the firm makes from employing

11. I am grateful to David Laibson for suggesting this model.

12. The analysis of the case where $\underline{\pi} < \underline{w}$ is straightforward and yields similar results but requires more case distinctions.

him at wage w, $\pi = \underline{\pi} + k \cdot e - w$. Such an inequity-averse worker chooses

$$e = \begin{cases} 0 & \text{if } w \leq \dfrac{\underline{\pi} + \underline{w}}{2} \\ \overline{e} & \text{if } w > \dfrac{\underline{\pi} + \underline{w}}{2} \end{cases}, \tag{6}$$

where $\overline{e}$ is given by

$$w - \frac{\overline{e}^2}{2} - \underline{w} = \underline{\pi} + k \cdot \overline{e} - w, \tag{7}$$

which implies

$$\overline{e} = -k + \sqrt{k^2 + 4w - 2(\underline{w} + \underline{\pi})}. \tag{8}$$

Thus, if $w \geq \frac{1}{2}(\underline{w} + \underline{\pi})$ the worker's effort is an increasing but concave function of the wage he is offered. It decreases with the minimum (or outside option) wage $\underline{w}$ and the profit $\underline{\pi}$ that the firm can enforce without the workers voluntary cooperation.

In this model, a wage that is smaller than the benchmark wage $w^b = \frac{\underline{\pi}+\underline{w}}{2}$ is considered unfair and induces the worker to choose $e = 0$ because the firm gains more from the employment relationship than the worker. In a more general model, this benchmark wage could be affected by other factors as well. It may depend on the worker's employment history and the wages he was paid in previous periods, it may depend on the wages of his coworkers in the same firm, on the wages paid by other firms for similar jobs, etc.

The firm chooses w to maximize its profits. It offers either $w = \underline{w}$, which induces $e = 0$ and yields $\pi = \underline{\pi} - \underline{w}$, or it offers

$$w^* = \underset{w \geq \frac{\underline{w}+\underline{\pi}}{2}}{\arg\max} \left\{ \underline{\pi} + k \cdot \left(-k + \sqrt{k^2 + 4w - 2(\underline{w} + \underline{\pi})} \right) - w \right\}. \tag{9}$$

The FOC of this problem implies

$$w^* = \frac{3}{4}k^2 + \frac{1}{2}(\underline{w} + \underline{\pi}). \tag{10}$$

Note that the optimal wage w^* is increasing in the worker's productivity k, in the firm's profit $\underline{\pi}$, and in the minimum (or outside option) wage $\underline{w}$.

If the firm offers w^*, the fair worker chooses $\overline{e}(w^*) = -k + \sqrt{4k^2} = k$, which yields profit $\pi(w^*) = \underline{\pi} + \frac{k^2}{4} - \frac{1}{2}(\underline{w} + \underline{\pi})$. This profit is larger than $\pi(\underline{w}) = \underline{\pi} - \underline{w}$ if and only if $k \geq \sqrt{2(\underline{\pi} + \underline{w})}$. Thus, efficiency wages will be offered only to the more productive workers. Furthermore, if the minimum (or outside option) wage increases, the set of workers who are offered efficiency wages is increased.

This simple model has several interesting implications. First, it shows that a fair-minded worker will reciprocate to a generous wage by spending more effort

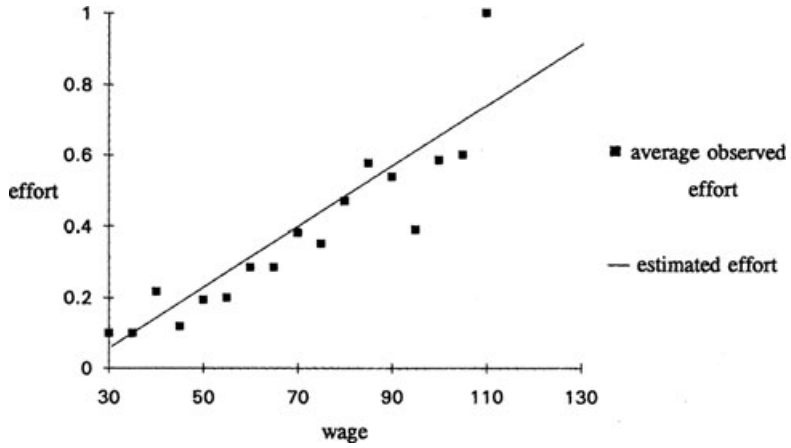

FIG. 1. The Effort–Wage Relation in a Gift Exchange Game.

SOURCE: Fehr, Kirchsteiger, and Riedl (1993, Figure I).

voluntarily. Second, it shows that it may be profitable for firms to pay "fair" wages that leave a rent to the worker in access of his outside option utility in order to induce him to spend more effort. Third, it shows that this strategy is profitable only if the worker's voluntary effort is sufficiently productive and if the firm is sufficiently certain that it faces a worker who is going to reciprocate. Otherwise, the firm will offer a "complete" contract that leaves no rent to the worker and induces the minimum enforceable effort level. Finally, the model predicts how wages are affected by several exogenous parameters of the model that I will come back to in the following subsections.

4.2 Social Preferences as a Contract Enforcement Device

There is substantial experimental evidence from the lab and the field showing that many people withdraw effort when they feel treated unfairly and that some people are willing to work harder when they feel treated generously. Fehr et al. (1993) introduced the gift exchange game to the experimental literature that has the same structure as our model. At the first stage, a subject in the role of a "firm" can offer a fixed wage to a subject in the role of a "worker." At the second stage, the worker chooses an effort level. Effort increases the payoff of the firm and the gains from trade, but it is personally costly to the worker.

Figure 1 reports the observed average behavior in the experiment: For low wages, almost all workers choose the minimum effort level. However, if higher wages are offered, many workers choose higher effort levels. There is a lot of heterogeneity in workers' behaviors. Many workers choose the minimum effort level no matter what wage they are offered, but other workers are willing to reciprocate to high wages by working harder.

This effect has been corroborated by many other experimental studies including Charness (2004), Charness, Frechette, and Kagel (2004), Gaechter and Falk (2002), Fehr et al. (2007), and Hannan, Kagel, and Moser (2002). More recently, there have also been several field experiments confirming this result, including Al-Ubaydli et al. (2008), Kube et al. (2006), and Kube, Maréchal, and Puppe (2008).[13] However, in all of these experiments the average effort level is far below the efficient effort level for two reasons. First, only some of the workers reciprocate to high wages by choosing high effort levels. Second, because of this, it is often not profitable for employers to offer high wages.

The effectiveness of social preferences as a contract enforcement device increases substantially if parties interact repeatedly so that relational contracts are feasible (MacLeod and Malcomson 1989, Baker, Gibbons, and Murphy 1994). Brown et al. (2004) conducted an experiment where employers can hire the same workers repeatedly. The employer can identify the worker he is matched with by an identification number and make a private contract offer to him in the next period if he wants to rehire him. If the offer is accepted, the employer and the worker stay together for another period, if it is rejected, the firm can still hire another worker on the market. The experiment ends after 15 periods. In the treatment with one-shot interaction, the average effort is 3.3, significantly more than the minimum effort of 1, but far less than the efficient effort of 10. With repeated interaction, the average effort increases to 6.9.

The possibility of repeated interaction greatly amplifies the role of social preferences, even if all players interact for only a limited number of periods. If it is common knowledge that all players are selfish, a simple backward induction argument shows that workers will shirk in all periods and employers will offer the lowest possible wage. However, if there is asymmetric information and employers do not know whether they face a selfish or a fair-minded worker, high effort and high wages can be sustained. The intuition is familiar from the work of Kreps et al. (1982) on finitely repeated games with asymmetric information. If a worker is identified as selfish, he will be offered the lowest possible wage in all future periods. Therefore, a selfish worker has an incentive to choose a high effort level in order to maintain a good reputation. In equilibrium, all employers offer high wages to workers with a good reputation and low wages to workers who shirked, and all workers work hard except for the last few periods when the selfish workers start shirking with positive probability while the fair-minded workers continue to spend high effort. Thus, a small fraction of fair-minded workers can induce purely self-interested workers to work hard and employers to pay generous wages.

Reputation does not require relational contracting. In Bartling et al. (2009), we conduct an experiment in which employers and workers interact one-shot, but the employer can observe the agent's effort level in the last three periods. Furthermore, the employer can choose whether to control or to trust his agent. If the employer

13. See Fehr, Goette, and Zehnder (2009) for a survey of this literature.

trusts, the worker is free to choose any effort level between 1 and 10. If he controls, the worker must choose at least an effort level of 3, but he is slightly less productive. Bartling et al. (2009) find that most workers spend high effort if and only if they are offered a generous wage. If they are offered a low wage, most workers choose low effort (or reject the contract), even if this damages their reputation. Furthermore, there is a small fraction of workers who always choose the lowest effort level and do not learn that it pays off to acquire a good reputation. The optimal strategy for employers is to trust and to offer generous wages to workers with a good reputation and to control and offer low wages to workers with a poor reputation.

Bartling et al. (2009) observe a clustering of two types of job offers. Employers either offer "good jobs" that involve full discretion, high wages, and substantial rents that are left on the table to induce the worker to work hard. Or, they offer "bad jobs" that involve control, low wages, and hardly any rents for workers. Good job offers induce much higher effort and are more profitable for employers if and only if they are offered to high-reputation workers. However, some employers do not learn that "good" job offers pay off. Furthermore, if workers have a low reputation or if reputation building is impossible because employers do not observe how workers behaved in the past then bad job offers outperform good job offers.

The clustering of job attributes that we observe in the lab is confirmed by field evidence that indicates that high wages, high rents, and high discretion are highly correlated. In the Socioeconomic Panel, a representative sample of the German population is asked a wide range of questions including questions on workplace characteristics, job satisfaction, earnings, education, work experience, etc. The 2001 wave of the survey asked 22,351 individuals the following questions: "Can you decide yourself how to complete your work tasks?" and "Is your work performance strictly monitored?" The answers to these questions (either "applies completely," "applies partly," or "does not apply at all") can be taken as a measure of job discretion. After controlling for occupation, industry, education, labor market experience, tenure, firm size, hours of work, gender, and many other factors, we still find that there is a positive, highly significant correlation between job discretion and earnings and between job discretion and job satisfaction. Jobs with high discretion (full autonomy and no monitoring) are associated with 10% higher wages than jobs with no discretion. Furthermore, jobs with high discretion are associated with significantly higher job satisfaction, indicating that these jobs offer rents to employees.

4.3 Competitive Markets for Incomplete Contracts

Brown et al. (2004) implemented the gift exchange game in a competitive labor market. In each period, firms make wage offers. Every employer can hire at most one worker and every worker can accept at most one job offer. There is an excess supply of workers, so not all workers can get a job. The experimental results confirm that higher wages induce workers to choose higher effort levels (on average). Furthermore, even though unemployed workers are eager to accept job offers with lower wages, employers are very reluctant to offer lower wages because they are afraid that lower

wages will induce less effort. In fact, when some of them do reduce wages, workers accept these contracts but shirk. Thus, because effort is endogenous it is indeed more profitable to pay a rent rather than to hold workers down to their reservation utility. This implies that the price mechanism may fail to clear the labor market. In the experiment, there are unemployed workers who are prepared to accept jobs at lower wages. Nevertheless, firms are not willing to cut wages because they rationally anticipate that lower wages will induce less effort. Thus, involuntary unemployment persists.

This has also been shown in several field studies. For example, based on interview evidence with CEOs and personnel managers of hundreds of companies Bewley (1995, 1999) concludes that firms are very reluctant to cut wages because they expect a wage cut to hurt morale. Managers report that it is more profitable to fire some workers rather than to reduce wages for all workers because the former strategy causes less resistance among the remaining workforce. This offers an explanation for why wages do not fall in a recession.

When there is involuntary unemployment, relational contracts are very valuable to employed workers. It could be argued that they provide high effort only because they are afraid to lose their jobs and to become unemployed.[14] The question arises whether relational contracts also work when the labor market is tight and workers can easily find new jobs. Brown et al. (2008) implemented an experimental labor market with an excess demand for workers. They find that effective relational contracts emerge even if there is full employment. If a worker works hard, the incumbent firm offers a high wage in the next period that exceeds the going market wage that is paid to workers who change employers. Thus, workers who stay with one firm and work hard receive a rent that induces them to be loyal to their current employer. The lower wage paid to workers who change employers is based on the expectation that these workers are more likely to shirk.

Comparing the market outcomes with an excess supply of workers in Brown et al. (2004) to the market outcomes with an excess demand for workers in Brown et al. (2008) the authors find that there is more turnover if there is excess demand. However, the average effort is roughly the same under both conditions, presumably because the negative effect on effort of a higher turnover is compensated by the positive effect of higher wages that are paid if there is an excess demand for workers. It is interesting to note that the wage difference between the excess demand and the excess supply condition is positive but comparatively small. In two control treatments, the authors also implemented markets for complete contracts in which effort could be specified in the contract and enforced by the courts. They find that the wage difference between excess demand and excess supply is much larger if complete contracts are traded than if incomplete contracts are traded. This is consistent with the model of Section 4.1. An increase of the outside option wage $\underline{w}$ by 1 dollar increases the optimal wage w^* by only 50 cents. Thus, wages are less flexible when contracts are incomplete.

14. See, for example, Shapiro and Stiglitz (1984).

In Bartling et al. (2009), we consider a competition treatment where employers compete for workers and workers compete for jobs. In this experiment, the number of workers equals the number of jobs, so there is neither excess demand nor excess supply. We find a new effect of competition. If each firm is matched with exactly one worker (bilateral monopoly), only half of the contracts are trust contracts with high wages. In this case, the average effort is 4.7, significantly more than the minimal enforceable effort of 3, but less than half of the efficient effort of 10. If firms compete for workers and workers compete for jobs, the fraction of generous trust contracts increases to almost 80% and average effort rises to 7.3. We show that competition makes reputation building more attractive. Firms compete for workers with the best reputations driving up their wages. This induces workers to spend more effort in order to gain a high reputation. Those workers who fail to do so get control contracts with very low wages. Thus, competition increases the quasi-rents paid for good performance and thereby fosters trust and trustworthiness. It also increases the reliance on incomplete contracts and on reciprocity as an enforcement device. This is in stark contrast to the folk wisdom that competition drives out the role of social preferences.

Whether a certain wage is considered fair strongly depends on the reference group to which workers compare themselves. When a new worker is hired for a job, the going market wage for this job seems to be a natural benchmark. On the other hand, an incumbent worker is more likely to compare a proposed change in the employment relationship to the status quo. Thus, if we interpret the benchmark wage w^b in our model along these lines, the model gives rise to the following predictions. First, entry-level wages respond more strongly to changes in labor market conditions than the wages of incumbent workers. Second, there are cohort effects. A worker who entered the firm with a high entry-level wage (because the labor market was tight) considers this high wage as the reference point for the wage negotiations in the next period and will demand and get a higher wage than another worker who entered the firm with a low entry-level wage.

There is a lot of empirical evidence supporting these predictions. Several studies show that the wages of individuals who enter a firm are far more sensitive to the business cycle than wages of incumbent workers. There is also substantial evidence for cohort effects. Oreopoulos, Wachter, and Heisz (2006) show that Canadian students graduating in a boom year get wages that are about 9% higher than average. After 5 years, wages are still 4% higher, and the effect fades only after 10 years.[15]

Finally, social preferences shed new light on some puzzling empirical findings about minimum wages. First, several empirical papers report that minimum wages have spillover effects (Card and Krueger 1995, Teulings 2003). After the introduction of a minimum wage, firms increase wages by more than necessary to comply with the new regulation. This is consistent with our model. An increase of the minimum $\underline{w}$ not only increases wages of those workers who are paid the minimum wage, but also the wages of the more productive workers who are offered a "fair wage" w^*. Second,

15. See Fehr et al. (2009) for a more detailed discussion of these effects and the empirical literature.

firms make little use of the possibility to pay subminimum wages to some of their workers. For example, Katz and Krueger (1991) report that wages of teenage workers did not decline significantly after the introduction of an exception to the minimum wage law that allowed firms to pay subminimum wages to young workers. Again, this is consistent with our model if the minimum wage is the benchmark to which young workers compare their wages.

Falk and Fischbacher (2006) consider the introduction of a minimum wage in an experimental labor market. They find that the minimum wage strongly affects reservation wages. This suggests that the minimum wage is perceived as a benchmark for evaluating the fairness of wage offers. Most workers are willing to accept wages significantly below the minimum wage before its introduction. After the minimum wage has been introduced, however, many workers perceive a wage payment at the minimum wage level as unfair and reject these offers. A wage that is perceived as quite generous before the introduction of the minimum wage is perceived as greedy thereafter. This explains why firms have to pay more than the minimum wage if they want to appeal to the reciprocity of their workers. Furthermore, Falk, Fehr, and Zehnder (2006) observe a hysteresis effect. If the minimum wage is abolished, workers still use it as a benchmark and consider wage offers below the minimum wage as unfair. This is consistent with the observation of Katz and Krueger (1991) that firms did not use the possibility to pay subminimum wages to young workers after the corresponding change in the minimum wage law.

5. CONCLUSIONS

Most modern macroeconomics is based on the standard neoclassical model of perfectly competitive markets and perfectly rational and self-interested economic agents. There is substantial experimental and field evidence showing that many people are not purely self-interested. Nevertheless, hundreds of market experiments have shown that the neoclassical model predicts market outcomes very well, even if these outcomes are highly unfair. Recent theoretical models of social preferences explain why this is the case. They show that if there is strong competition, if preferences are separable, and if complete contracts are traded social preferences do not affect behavior. All market participants are forced to behave as if they were purely self-interested. Thus, on markets for well-defined goods where uncertainty is not an issue the standard neoclassical model is a good first approximation of market behavior.

However, there are some important markets where this conclusion fails. First, if uncertainty is important the separability assumption is likely to be violated. A consumer with social preferences compares his consumption in any state of the world to the consumption of his peers in this state. This affects his consumption, his saving, and his investment decisions. For example, a consumer who cares about his income as compared to the income of his neighbors suffers most if he is the only one whose income is reduced. In order to buy "social insurance," the consumer invests

in a similar portfolio as everybody else does. This gives rise to multiple equilibria, herding, and possible booms and busts on financial markets.

Second, social preferences matter when contracts are incomplete. An incomplete contract transforms a market relationship that is governed by competition into a bilateral relationship that is governed by trust and reciprocity. A typical incomplete contract is the employment relationship. Models of social preferences can explain many anomalies that are frequently observed on labor markets and in labor market experiments. Despite strong competition, employees earn rents that are not competed away, prices fail to clear the market, involuntary unemployment is a stable phenomenon, changes of market conditions affect prices much less on markets for incomplete contracts than on market for complete contracts, and minimum wages tend to increase even those wages that are not directly affected by the minimum wage. These phenomena are inconsistent with the standard neoclassical model. If macroeconomists want to deal with these phenomena in their models, they cannot ignore the existence of social preferences.

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