

A Behavioral Account of the Labor Market: The Role of Fairness Concerns

Ernst Fehr,¹ Lorenz Goette,² and Christian Zehnder³

¹Institute for Empirical Research in Economics, University of Zurich, CH-8006 Zurich, Switzerland; email: efehr@iew.uzh.ch

²Department of Economics, University of Geneva, CH-1211 Geneva, Switzerland; email: Lorenz.goette@unige.ch

³Faculty of Business and Economics (HEC), University of Lausanne, CH-1015 Lausanne, Switzerland; email: christian.zehnder@unil.ch

Annu. Rev. Econ. 2009. 1:355–84

First published online as a Review in Advance on June 8, 2009

The *Annual Review of Economics* is online at econ.annualreviews.org

This article's doi:
10.1146/annurev.economics.050708.143217

Copyright © 2009 by Annual Reviews.
All rights reserved

1941-1383/09/0904-0355\$20.00

Key Words

labor market, fairness, gift exchange, relational contracts, wage rigidity

Abstract

In this paper, we argue that important labor market phenomena can be better understood if one takes (a) the inherent incompleteness and relational nature of most employment contracts and (b) the existence of reference-dependent fairness concerns among a substantial share of the population into account. Theory shows and experiments confirm that, even if fairness concerns were to exert only weak effects in one-shot interactions, repeated interactions greatly magnify the relevance of such concerns on economic outcomes. We also review evidence from laboratory and field experiments examining the role of wages and fairness on effort, derive predictions from our approach for entry-level wages and incumbent workers' wages, confront these predictions with the evidence, and show that reference-dependent fairness concerns may have important consequences for the effects of economic policies such as minimum wage laws.

1. INTRODUCTION

In this paper, we argue that the institutional and psychological assumptions inherent in the standard competitive model of the labor market often lead to a distorted view of the workings of labor markets. Several facts about labor markets are at odds with the competitive model. For instance, the standard model has a hard time explaining why labor market conditions have little effect on incumbent workers' wages, why nominal wages are downwardly rigid, and why labor market conditions upon entering a firm can have long-lasting effects on workers' pay. Although these facts have important consequences for labor market outcomes, the competitive view of the labor market remains surprisingly persistent and continues to play a dominant role. The standard model in economics also assumes that all actors have preferences defined solely over the level of their own consumption; experimental research, however, has shown this assumption to be problematic in many circumstances. Many individuals are willing to sacrifice some of their own consumption to restore fairness. Furthermore, utility and, in particular, the effects of fairness perceptions on utility are typically reference dependent, as we discuss in the next section.

The standard model of the competitive labor market relies on the assumption of well-specified and complete employment contracts, whereas real-life employment relationships are often characterized by incomplete contracts in which many dimensions of the interaction between employer and worker are left unspecified. In particular, effort is typically not contractible, meaning that the generation of a sufficiently motivated work force is key for a firm's productivity. As a first reaction, one may think this should imply that pay for performance is widespread. However, as we discuss in more detail below, the effective usage of explicit incentives is limited to a narrow set of occupations. Evidence shows that, apart from the upper levels of the firm's management, only few employees face explicit performance incentives, and fixed hourly wages as well as monthly salaries are very common. In a static model, this implies that treating their workers well is the only motivator firms use and that firms rely on workers' preference for fairness to reciprocate the favor. This assumption is in line with the well-documented empirical fact that managers often stress that "workers have many opportunities to take advantage of employers so that it is not wise to depend on coercion and financial incentives alone as motivators. [...] Employers believe that other motivators are necessary, which are best thought of as having to do with generosity" (Bewley 1995).

However, many people doubt that relying on a desire for fairness in workers is enough to overcome the motivational problem incomplete employment contracts pose. We review evidence on one-shot interactions between employers and workers from many laboratory and field experiments indicating that this doubt is justified. Although most studies confirm that many subjects are willing to work harder if they are paid a generous wage rent, the results show that this effect is limited, because there is also a substantial share of subjects who provide little effort. As a consequence, the positive impact of fairness concerns on performance in one-shot employment situations still leaves effort far below the efficient level.

We now turn our attention to a second important feature of labor markets, which the competitive model also neglects: Employment relationships are rarely spot-market transactions where trading partners interact only once. Rather, employers and workers have the option of interacting repeatedly with each other. The fact that many employment relationships are characterized by long-term relations greatly amplifies the importance of fairness

preferences. Game theoretic models of reputation formation show that strictly selfish individuals have an incentive to mimic fair-minded persons in a repeated setting and to exert high effort when offered a noncompetitive wage rent, because this guarantees more rents in the future. Shirking, in contrast, reveals that the individual is egoistic. Firms are unwilling to pay wage rents to selfish workers once they have proven they do not reciprocate generous treatment with high effort. In fact, even the presence of a small share of fair-minded workers in a dynamic environment with repeated interactions can have a large positive impact on performance. This reputation-based mechanism can be tested explicitly in laboratory experiments and proves to be very powerful: If subjects in the role of employers and employees are allowed to enter finitely repeated interactions, a large effort increase occurs, but market interactions deviate systematically from competitive predictions.

The existence of fair-minded workers can also explain another frequently observed phenomenon in the labor market that is hard to reconcile with the competitive model. Ample evidence indicates that there is a sharp difference between wage dynamics in internal and external labor markets: Whereas entry-level wages respond strongly to shocks in aggregated labor market conditions, incumbent workers' wages are much less responsive to changes in the outside environment. This is in line with survey evidence showing that a shift exists in what workers feel entitled to as they enter a firm. Workers who are looking for a job in a new firm seem to evaluate the fairness of a firm's wage offer relative to the going wage in the labor market. Incumbent workers, in contrast, seem to assess the fairness of proposed wage changes in their ongoing employment relative to the status quo. Accordingly, new and incumbent workers may react completely differently to the same wage offer from the firm, and although the firm may adjust the new entrants' wages to labor market conditions, it has a good reason for holding those of the incumbents constant.

Finally, the prevalence of fair-minded workers in the labor market may also have important new implications for policy. The reason is that policy measures may influence the reference point relative to which workers evaluate the fairness of their employment situation. We illustrate this possibility with one of the most widespread instruments of labor market interventions: minimum wage legislation. We discuss experimental evidence showing that changes in the level of minimum wage strongly affect what subjects perceive as a fair wage. In particular, a rise in minimum wages also raises reservation wages, implying that the effect of minimum wages on wages and employment may be very different from what standard labor market theories predict. Furthermore, because the effects of increases and decreases in minimum wages turn out to be asymmetric, minimum wage policy may have effects that prevail even after the policy has been reverted.

We are, of course, not the first to highlight the importance of fairness concerns in employment relations and labor markets. Marshall (1925, 1969) and Hicks (1932) previously argued for the relevance of fairness concerns in wage negotiations. Likewise, authors such as Slichter (1920), Akerlof (1982), and Rees (1993) stressed similar concerns. We believe, however, that the more recent work benefits from the development of game theoretic tools and experimental methods that enable us to sharpen and deepen our understanding of fairness concerns in employment settings. Without game theoretic tools, it is impossible, for example, to prove rigorously the theoretical claim that, even if only a minority of subjects cares for fairness, fairness concerns may nevertheless strongly shape the overall outcome. Likewise, providing rigorous evidence for such a claim without using laboratory experimental tools is hard, if not impossible. Moreover, the recent wave of field

experiments has enabled researchers to study the potential impact of fairness concerns in natural environments. We thus hope that—given these new techniques and opportunities—others will be encouraged to extend and deepen our knowledge of the role of fairness concerns in labor markets.

In the next section, we briefly describe the empirical basis of our main motivational assumptions, i.e., reference-dependent fairness preferences. In Section 3, we substantiate our claim that many labor markets deviate fundamentally from the competitive model because of the inherent incompleteness and relational nature of the employment contract. In Section 4, we review the evidence of laboratory and field experiments that examine the impact of wage variations on effort. In this context, it is interesting to observe that laboratory and field evidence yield converging conclusions about the role of fairness preferences in one-shot or short-term interactions. We also review evidence with a bearing on the role of fairness concerns in repeated interactions and show that several important features of internal labor markets are consistent with the predictions of our approach. Finally, Section 4 discusses the claim that economic policies such as minimum wage laws may induce important shifts in the reference standards that form the basis for fairness judgments, thus causing potentially important effects on reservations wages, actual wages, and employment.

2. PSYCHOLOGICAL FORCES

Standard economic analysis assumes that individuals' preferences are defined only over their own economic payoffs and that these payoffs enter the utility function in levels. However, evidence from two decades of research in experimental economics has questioned this assumption. We discuss two of the most intensively debated topics of this literature. First is the assumption of selfishness, i.e., the notion that one's own consumption or economic payoff alone enters the utility function. The evidence indicates, however, that a significant share of individuals also cares about others' economic payoffs and that the existence of heterogeneous social preferences has important behavioral effects. Second is the way in which economic payoffs enter the utility function. Whereas the standard model assumes that only the level of payoffs matters, the evidence suggests that these levels are valued relative to a reference level. As we discuss in the following sections, incorporating these two features of preferences leads to a new understanding of important labor market phenomena.

2.1. Preferences for Fairness

First proposed by Güth et al. (1982), the ultimatum game is the prototypical game to test whether individuals care not only about their own payoffs, but also about their payoffs relative to those of others. In the ultimatum game, a proposer can make an offer of how to divide, say, \$10 to a second party, called the responder. The responder can accept or reject the offer. If he accepts, the parties receive the split the proposer offers. If the responder rejects the offer, both parties receive nothing. A robust result in these games is that offers of less than 20% to the responder are often rejected, whereas offers of 40% or more are usually accepted (Camerer 2003, Fehr & Schmidt 2002, Roth 1995). As a consequence, many proposers make offers that are close to an equal split. These results challenge the selfishness hypothesis, because the game is played only once, meaning a strictly selfish responder should always accept any positive amount offered. A plausible interpretation

for the rejection of low offers—which is typically also supported by responders’ verbal accounts of their behavior—is that subjects perceive them as unfair. Responders incur a psychological cost if they receive only a small share when proposers could have chosen an equitable split. If this psychological cost is large enough, responders may prefer forgoing their share to avoid the unfair outcome.

Indications of social preferences are not limited to rejections of low offers in the ultimatum game. There exist many other (anonymously played) one-shot games in which observed behaviors cannot be reconciled with the selfishness assumption. In dictator games—a modified version of the ultimatum game in which the responder cannot reject the offer—many people transfer positive amounts although they could earn more money by keeping everything for themselves (Kahneman et al. 1986). In public good games, many people deviate from the dominant strategy of complete free riding and voluntarily contribute to the public good (Ledyard 1995) and, if given the opportunity, take on additional costs to punish noncontributors (Fehr & Gächter 2000). Many trustors in trust games place resources at the disposal of a trustee in the (often correct) expectation that the trustee will return the favor and pay back (Berg et al. 1995). Finally, in gift-exchange games (discussed in detail in Section 4), subjects in the role of workers are frequently willing to provide higher effort than contractually enforceable if their experimental employer provides them with a generous wage rent (Fehr et al. 1993). These examples illustrate not only that fairness matters in various contexts, but also that fairness manifests itself in different forms. Besides the retaliatory or punishing behaviors observed in the ultimatum game, a substantial share of subjects also exhibits a tendency toward altruistic choices and frequently displays positively reciprocal behaviors, i.e., they respond to generous acts with generosity. However, a consensus is emerging among experimentalists that nonselfish punishment motives are often considerably stronger than nonselfish motives to behave in altruistic or positively reciprocal manners—an asymmetry that may yield differing behaviors by workers in response to having their wages cut or increased (Offerman 2002).

The evidence for the existence of social preferences is not confined to student subject pools but holds in subject pools that are representative of whole countries such as Germany (Fehr et al. 2003, Dohmen et al. 2009), the United States (Naef et al. 2008), and the Netherlands (Bellemare & Kröger 2007, Bellemare et al. 2008). It also holds under stake levels of up to three months’ income (Cameron 1999, Fehr et al. 2002, Slonim & Roth 1998) and across many different cultures (Oosterbeek et al. 2004, Roth et al. 1991). However, we must stress that the evidence shows considerable individual heterogeneity in the strength of social preferences, i.e., a significant share of individuals also exhibits fairly selfish behaviors, a fact that turns out to be important in the way social preferences affect labor market phenomena.

Various theories have been suggested for modeling this type of social preferences (Benjamin 2005, Bolton & Ockenfels 2000, Charness & Rabin 2002, Dufwenberg & Kirchsteiger 2004, Falk & Fischbacher 2006, Fehr & Schmidt 1999, Rabin 1993). Although they differ in how they model the details of preferences for fairness and reciprocity, these theories share the important common feature that individuals with such preferences are willing to pay to reduce ostensibly unfair outcomes or to punish unfair behaviors. Some authors have argued that rejection in the ultimatum game can be reduced through sufficient experience with the game (Binmore et al. 1995, Roth & Erev 1995). In light of the procedures used in the experiments, we view such explanations as somewhat far-fetched, as the consequences of rejecting an offer in the one-shot version of the ultimatum

game are straightforward and easily understandable. More recently, neuroscientific studies have corroborated the view that fairness concerns and the punishment of unfair behavior are genuine expressions of preferences. A recent paper (De Quervain et al. 2004) shows that reward-related neural circuits are activated if subjects decide to punish unfair behavior. These neural activations occur even if subjects have to pay to punish. Thus, punishing unfair behavior is, in terms of neural circuitry, no different from spending money for buying a positively valued good. Likewise, Tabibnia & Lieberman (2007) found stronger activation of reward-related brain circuitry if subjects receive an ultimatum game offer of \$5 when the stake size is \$10 than when they receive a \$5 offer from a stake size of \$30. Thus, keeping absolute economic payoffs constant, the reward circuitry in the human brain apparently treats a fair outcome as a reward in itself. It is also interesting that diminishing the activity in the brain region most important for humans' ability for rational decision making—the prefrontal cortex—limits subjects' ability to reject unfair offers (Knoch et al. 2006, 2007); this stands in clear contrast to arguments suggesting that subjects who reject unfair offers do not understand the nature of one-shot interactions (Binmore et al. 1995). More specifically, experimentally induced reductions in the neural activation in the right dorsolateral prefrontal cortex—a brain region that is crucially involved in cognitive control of mental operations and prepotent impulses—substantially reduces rejection rates in the ultimatum game. Thus, those brain regions crucial for rational choices are also needed for making fair choices, consistent with the notion that fair choices can be perfectly rational.

2.2. The Reference Frame of Fairness Judgments

The evidence we reviewed so far establishes that many individuals are willing to incur costs to avoid unfair outcomes or to punish unfair behaviors. Although the simplicity of the ultimatum game renders the 50/50 split a fair outcome (at least in Western cultures¹), many economic transactions are more complicated. For example, individuals may have no choice but to make unfair offers, or changes in the economic environment may give one party a better bargaining position. How do such factors affect fairness judgments and what is their relevance for the labor market?

Falk et al. (2003) provided evidence on how the economic environment can affect fairness judgments by conducting a series of ultimatum games in which they restrict the set of possible offers the proposer can make to the respondent. In some treatments, the proposer can make only unfair offers, whereas, in others, the proposer has a choice between unfair and fair offers. The evidence indicates that responders are more likely to reject the unfair offer when it was intentional, i.e., when the proposer had a choice between a fair and an unfair offer, thus favoring models of fairness in which what matters is not only the outcome, but also how the outcome came about (Dufwenberg & Kirchsteiger 2004, Falk & Fischbacher 2006).

Evidence from surveys indicates that individuals feel strongly about the perceived fairness of wage changes. Kahneman et al. (1986) show that individuals' judgments about whether a pay cut was fair depend strongly on the reason why pay was cut: Workers

¹In some remote small-scale societies (e.g., among the Machiguenga, a small tribe in the Peruvian Amazon) such fairness norms seem to be absent (Henrich et al. 2001). Likewise, chimpanzees also do not reject low offers in the ultimatum game (Jensen et al. 2007).

consider it highly unfair if a firm wants to cut pay simply because labor market conditions deteriorated, whereas cutting pay to save a firm from bankruptcy is more acceptable. Evidence from surveys with personnel managers and compensation officers shows that they also anticipate these motives in their employees (Agell & Lundborg 1995, 2003; Bewley 1999). In the context of labor markets, an important and old question is whether individuals take only the real buying power of their wages into account, or whether they also care about nominal wages. Dating back at least to Keynes (1936), some economists have assumed that individuals are not fully aware of changes in the price level and thus also care about the nominal wage. Goette & Huffman (2007) conducted a study with students about to enter the labor market. In their sample, fairness judgments are solely a function of the real wage, with one exception: Nominal wage cuts trigger very strong negative reactions. They argued that the salience of a nominal wage cut elicits strong negative emotions that sway the students' judgment. This evidence suggests that fairness judgments are primarily affected by real wages, except in the case of nominal wage cuts.

The reference dependence of fairness judgments and the associated framing effects have also been stressed by Kahneman et al. (1986), who show that wage cuts—which are perceived as losses—are viewed more unfairly than identical reductions in real pay that are perceived as an elimination of a gain. In one example, they gave respondents a scenario of a firm that paid a 10% annual bonus over a longer period and then abolished it. The vast majority of respondents considered this fair, even though it effectively cut the workers' incomes by 10%. Other respondents were given a scenario where the workers' base wage was cut by 10%. In this case, the majority of the respondents stated that the action is unfair.

Taken together the experimental evidence overwhelmingly suggests that reference-dependent social preferences are an important component of the human motivational repertoire. However, this does not mean that such preferences always play a role. In fact, the social preference models mentioned above make clear that in certain competitive environments such preferences may play little role (Bolton & Ockenfels 2000, Falk & Fischbacher 2006, Fehr & Schmidt 1999). Therefore, it is important to describe the relevant labor market environment in some detail.

3. THE ECONOMIC ENVIRONMENT: LABOR MARKETS AND EMPLOYMENT RELATIONSHIPS

Many microeconomic textbooks still treat labor markets as a special case of neoclassical trade theory. Instead of trading physical products, the employer and the worker simply exchange well-defined units of labor at a price market competition determines. The literature on the theory of the firm has long recognized that this simple view is not accurate, as it neglects many important aspects of real-life employment relationships (Coase 1937, Simon 1951, Williamson 1975). Most occupations involve multidimensional and complex tasks that are hard to describe in a perfectly fashioned complete contract. The problem is that when the parties conclude the contract, they cannot foresee all the relevant contingencies that may become important in the course of their relationship. As a consequence, the typical employment relationship is governed by an incomplete contract that does not perfectly specify important aspects of the collaboration between the employer and the worker. Contractual incompleteness makes it hard for third parties like a court to evaluate whether the parties have met their obligations, therefore severely limiting the judicial enforceability of the contract. As a result, the employer faces a fundamental

problem: If duties and obligations are only vaguely specified, how can the employer motivate the worker to provide more than minimal effort?

3.1. Explicit Versus Implicit Incentives

If the worker's output is easy to measure, pay for performance may be a simple solution to the motivation problem. If workers' earnings depend on their output, then their interest is best served by exerting nonminimal effort, even though nobody can legally force them to do so (Grossman & Hart 1983, Harris & Raviv 1979, Ross 1973). However, agency theory provides important arguments for why firms may want to refrain from explicit performance pay. One problem with explicit incentives is the so-called multitasking problem (Baker 1992, Holmstrom & Milgrom 1991). Output is complex in many jobs, and only some of its many dimensions are objectively measurable. In cases with nonmeasurable dimensions, the provision of explicit incentives may cause distorted outcomes because workers will allocate all their effort toward those activities the incentive scheme rewards. Incentive pay is thus not effective if workers need to devote time and effort to activities that contribute to the nonmeasurable dimensions of output. Fehr & Schmidt (2004) and Prendergast (1999) provide laboratory and field evidence, respectively, for the relevance of the multitasking problem.

Another related problem is that performance pay may create severe intertemporal problems. The issue is that the employer will always be tempted to adjust the standard for a performance evaluation based on the worker's past performance. If the worker anticipates that there is a tendency for the standard to increase after a period of good performance, the incentives to provide high effort are diluted—a phenomenon called the ratchet effect (Carmichael & MacLeod 2000, Freixas et al. 1985, Gibbons 1987, Kanemoto & MacLeod 1992, Laffont & Tirole 1988, Lazear 1986). To avoid the ratchet effect, the employer may want to commit to fixed-piece rates. But even if such a commitment is credible, the limited ability to react to innovations and progress may considerably reduce the attractiveness of explicit performance pay for the employer. Survey evidence on the prevalence of different compensation forms indicates that there seem to be strong limits to the usage of explicit incentive contracts. Explicit performance pay is still the exception rather than the rule. The vast majority of workers is compensated with hourly wages or salaries and not governed by formal incentive contracts (MacLeod & Parent 1999).

The fact that many firms seem to be constrained to paying flat wages does not mean that they are unable to provide incentives to their workers. Even if the worker's compensation does not explicitly depend on performance, the employer may use the threat of dismissal in case of poor performance or the promise of promotion for extraordinary performance to motivate the worker. For these implicit incentives to be effective, workers must judge remaining with their current employer as more attractive than their next best alternative. In other words, the prospect of keeping their job (or getting promoted) must provide workers with a noncompetitive rent. The literature on conditional contract renewals in repeated interactions between employers and workers shows that such implicit incentives can endogenously enforce the provision of nonminimal effort under incomplete employment contracts (MacLeod & Malcomson 1989, 1993, 1998; Shapiro & Stiglitz 1984). The basic mechanism in all these models is that the employer provides incentives to perform by conditioning the renewal (or the terms) of the employment contract on the worker's past performance.

3.2. The Role of Fairness Concerns Under Incomplete Relational Contracting

In the ultimatum game, concerns for fairness and reciprocity cause rejections of unfair offers and induce proposers to make fair offers. In the context of contractually incomplete employment relations, such concerns are also likely to affect workers' effort choices because the preference for fairness or reciprocity induces workers to choose a higher effort to raise the firm's payoff in response to wage increases (Akerlof 1982, Akerlof & Yellen 1990, Benjamin 2005). However, as we discussed in Section 2, there is considerable individual heterogeneity in the preference for fairness and reciprocity, and a significant share of subjects often behaves in a completely selfish manner. As a consequence, the one-shot effects of fairness may not be strong enough to make the provision of noncompetitive wage premia profitable.

The prevalence of repeated interactions in relational labor contracts, however, greatly amplifies the possibilities for fairness concerns to play a decisive role. This holds even if employers and employees know that they will interact for only a limited number of periods, i.e., even in cases of very limited time horizons. In a finitely repeated context, the presence of even a small fraction of fair-minded workers may also motivate purely selfish workers to exert effort in response to receiving a wage rent (Brown et al. 2004, 2008; Kreps et al. 1982). The intuition is that selfish workers have an incentive to exert effort in order to maintain a good reputation and make the employer believe that they are (at least potentially) fair minded. Such a reputation is valuable for selfish workers because finite repetition implies that the employer pays noncompetitive rents only to workers who have not yet been identified as selfish. The firm anticipates that a selfish worker will always shirk in the final period of the interaction, which unravels all incentives to pay a rent in any period if a worker is known to be selfish. Fair-minded workers, in contrast, exert effort whenever they are paid a fair wage rent. Thus, if the belief about an individual worker's fair-mindedness is high enough, the employer will be willing to pay a high wage even in the last period. Note that the employer's willingness to pay a rent to fair workers disciplines selfish workers because if these workers shirk their responsibilities they will be identified as selfish types, which in turn implies that they will not be paid a rent in the future.

It is important to stress that the existence of reputation equilibria in which all workers—selfish and fair-minded—put forward high effort despite the absence of explicit incentives does not require a large share of fair-minded workers. It is perfectly possible for the fraction of fair-minded individuals to be so small that firms would optimally refrain from paying noncompetitive wage premia in one-shot interactions, while finding it profitable to pay such premia in the reputation equilibria of finitely repeated interactions.

It is sometimes argued that the assumption of the existence of fair-minded individuals in infinitely repeated games is not needed to prove the existence of equilibria with noncompetitive wage rents [as demonstrated in the papers by Shapiro & Stiglitz (1984) and MacLeod & Malcomson (1989, 1998)]. For, even if all people are selfish, noncompetitive rents can be equilibrium phenomena, provided that interactions are infinitely repeated. Although true, this argument is not important for our purposes because the existence of fair-minded subjects is an empirical fact. Physicists also do not argue that we can explain sunset and sundown by assuming that the Sun orbits around the Earth although this incorrect assumption can provide a superficially plausible explanation for these phenomena. In addition, as the next section shows, it is an empirical fact that selfish subjects mimic fair-minded behaviors in repeated interactions (see e.g., Fehr et al. 2009). Moreover,

because there are fair subjects, the range of parameter values (e.g., discount factors) for which equilibria with noncompetitive wage premia exist is greatly expanded. Finally, fairness concerns may play a role as equilibrium selection devices (see MacLeod & Malcomson 1998),² and judgments regarding the fairness of performance evaluations are important whenever performance cannot be objectively assessed (MacLeod 2003).

4. MOTIVATING WORKERS: EVIDENCE FOR THE ROLE OF FAIRNESS AND REPUTATION

In this section, we discuss the empirical role of fairness preferences for the motivation problem in contractually incomplete employment relationships. The cleanest evidence comes from laboratory experiments that implement the essential strategic features of the interaction between employer and worker. In interpreting laboratory studies, a natural concern arises that the effects of fairness identified in this setting may not carry over to the labor markets outside the laboratory (Levitt & List 2007). However, we can allay these doubts by illustrating that the laboratory results are consistent with the findings in field experiments that implement explicit wage manipulations in real-life work environments and other field evidence from instances when firms changed the conditions in employment relationships.

In the first part of the section, we review evidence on the impact of fairness in one-shot encounters between employers and workers. Because reputational considerations cannot play a role in these situations, this evidence reveals the extent to which fairness motives alone help to overcome incentive problems in employment relationships. Despite clear-cut evidence that a nonnegligible number of individuals are fair minded and respond to higher wages by exerting more effort, evidence also shows that many people are selfish and fairness concerns alone may not be sufficient to overcome the motivation problem in incomplete employment contracts. In fact, if fairness concerns are the only force driving effort above non-minimal levels, there are in general large unexploited efficiency gains.

In the second part, we discuss how labor market outcomes change if employer and worker have the option of interacting repeatedly with each other. We show that reputational incentives in endogenously formed long-term relationships greatly magnify the impact of fairness on performance. Indeed, the data indicate that the interaction between fairness and reputation effects can be sufficiently strong to sustain high levels of efficiency, even when the impact of fairness preferences alone is very weak.

4.1. Fairness in Spot Interactions

A well-suited game for studying the impact of wage rents on effort is the so-called gift-exchange game, which was introduced by Fehr et al. (1993). The gift-exchange game is a two-player game that captures the basic strategic features of an incomplete employment contract. The structure of the game is as follows: The employer offers a wage to the

²Another argument that is sometimes put forward is that because many interactions in real life are repeated, people apply rules of thumb or habits of fair behavior in one-shot interactions. However, even though many interactions are repeated, people in modern societies also face many one-time encounters. Moreover, for our account of the labor market, the origin of fairness preferences is not important. Whether many of us behave fairly because our parents imputed these values into our brains or whether genes favor fair behaviors is not important for our purposes. We have to take such behaviors seriously regardless of their evolutionary or educational origins.

worker and requests a certain level of effort. While the wage payment is binding, the requested effort level is not enforceable. Workers can either accept or reject the employer's offer. If the offer is accepted, workers can choose their actual effort level. Workers can choose any effort level and are not restricted by the employer's request. If the offer is rejected, workers receive an unemployment benefit. The employer's profit is equal to the returns generated by the worker's effort minus the wage payment. The worker's payoff, in turn, is calculated as the wage minus the cost of effort. The parameters are usually chosen in such a way that the efficient outcome is achieved when the worker chooses the maximal effort level.

Because providing effort is costly, the self-interest model predicts that the worker always provides the smallest possible effort. However, if fairness considerations matter and workers are willing to reciprocate a generous wage with higher effort, it may be profitable for employers to offer wages that exceed the worker's outside option.

A typical example of a one-shot gift-exchange experiment is the baseline treatment in Brown et al. (2004). During each period, every employer can hire one worker at most and every worker can have one job at maximum. The matching of workers and firms occurs in a simple labor market with an excess supply of workers. A match occurs when a worker accepts a firm's offer. Although the market runs for several periods, reputation formation cannot play a role, because employers cannot distinguish workers from each other when they make wage offers. The results confirm that higher wage offers by firms, on average, induce workers to provide more effort. However, although effort is significantly higher than the minimal effort predicted by self-interest, it is still far below the efficient level: On a scale of 1 to 10, where 10 is the efficient effort level, the realized average effort level was approximately 3. The reason for the limited impact of fairness on performance is found in the huge interindividual differences across subjects. Although there are the fair-minded workers, there is also a substantial share of workers who make mostly selfish choices. The relationship between wages and effort is steep enough to render wage offers above the worker's outside option profitable, but the presence of selfish agents restrains many principals from offering wage rents that would be high enough to induce efficient effort levels from fair-minded workers.

The finding that the impact of fairness alone on market performance is positive but small is very robust and has also been confirmed in a number of other laboratory studies using students as participants (Charness 2004, Charness et al. 2004, Falk & Gächter 2002, Fehr et al. 1993, Hannan et al. 2002). All these authors reported evidence from one-shot gift-exchange experiments and found results very similar to those discussed above: Wages and effort are always positively correlated, but the realized effort level is far from efficient. Fehr et al. (1998) and List (2006) replicated the gift-exchange findings in laboratory experiments with nonstudent subject pools (soldiers and sports-card enthusiasts, respectively) and found that the realized effort levels are similar to those reported in the previous literature.

To assess the external validity of the laboratory findings on the impact of fairness on performance in employment relationships, several recent studies report evidence from field experiments on gift exchange. These studies aim to test the proposition that higher wages are perceived as fairer and consequently elicit higher effort in real-life work environments. Gneezy & List (2006) hired workers to enter books into a library information system. The workers are made aware that this is a one-time employment with no opportunity for future work. The workers are paid either a low (\$12) or a high (\$20) hourly wage, with

no particular reason given for the pay. Overall, output is approximately 10% higher when workers are paid the high wage, but because of large variations across individual output levels and a small sample size (approximately 10 participants per condition), this difference is not statistically significant.³

Al-Ubaydli et al. (2006) conducted a similar study with larger sample sizes (approximately 30 participants per condition). They used a temporary work agency to recruit workers to stuff envelopes. Their rich setup consists of two treatments that allow a clean comparison regarding fairness. All workers in these two conditions were told upon being hired that their hourly wage would be between \$8 and \$16. Subsequently, the workers in one condition were paid \$8 per hour, whereas those in the other condition were paid \$16 per hour. The number of finished envelopes is approximately 22% lower when workers are paid \$8 compared with when they are paid \$16. This difference is highly significant, but it is unclear whether the effect was mainly caused by workers feeling that they were treated unfairly after they received \$8 or whether the highly paid workers put in extra effort. In general, studies that provide a salient manipulation of unfairness have provided the clearest results. Kube et al. (2006) hired students to enter data. All workers were told that they would earn €15 per hour. Later on, some workers are paid €15, whereas two other groups are paid €10 or €20, respectively. Workers who were surprised with a high wage worked approximately 10% more than workers who received the announced wage, but again, perhaps because of the small sample, the effect is not significant and it is therefore not possible to make strong statements. However, when workers received the low wage of €10, the reduction in effort relative to the baseline of €15 is so large (27%) that it is significant despite the small sample. These results confirm that another well-established result from the laboratory is also present in the field: Whereas the positive effects of fair treatment on behavior are usually small, the negative impact of unfair behavior is often large (Offerman 2002).

The studies discussed so far did not examine the specific mechanisms underlying the response (or absence of a response) to wages. One possibility would be to vary the nature of the treatment, e.g., if the principal signals thoughtfulness and caring about one's workers. Kube et al. (2008) hired students for a data entry task and announced earnings of €36 for the three-hour work episode. They compared their baseline treatment where they paid €36 to two different gift treatments. In the monetary gift treatment, the wage is raised to €43, i.e., a wage increase of €7, when the subjects show up for work. In the material gift treatment, the workers receive a gift in the form of a Nalgene bottle worth €7. The wage increase of €7 induces the subjects to enter approximately 6% more data than in the baseline treatment. As usual, the effect is not large enough to be significant, given the small sample size.⁴ However, when the subjects receive the Nalgene bottle, there is a highly significant increase of approximately 30% in entered data. This effect also prevails

³The positive impact of wage increases fades over time in the studies reported in Gneezy & List (2006). However, other studies (mentioned below) did not replicate this finding. It is also surprising that Gneezy and List did not find a learning effect in their task (average output is constant or decreasing over time), whereas other studies implementing the same task (Kube et al. 2006, 2008) found a steep rise in output over time in all treatment conditions. Likewise, the experiment of Cohn et al. (2007)—which lasted for several weeks and is described in more detail below—did not replicate the finding of Gneezy and List.

⁴Notice, however, that the effect of raising the wage above the baseline is positive in every study we have discussed so far. Taking all five studies into account, the probability of this occurring is $p = 0.5^5 < 0.05$ under the null hypothesis of no effect. Thus, the overall evidence rejects the hypothesis that wage increases do not affect effort.

in a treatment in which the price of the Nalgene bottle was saliently visible for the subjects. Moreover, in a subsequent binary choice experiment, the authors gave (other) subjects the choice between the bottle and €7; the vast majority of the subjects preferred the money over the bottle. This suggests that the positive effect of the material gift on effort is not primarily due to the economic value of the gift but that the signaling value of the gift is also important. A plausible interpretation is that workers appreciate having an employer who cares for their welfare and this appreciation may lead to higher effort levels. The results of Kube et al. (2008) provide a rationale for why job rents may contain nonmonetary components.

A second approach toward a better understanding of the mechanisms behind gift exchanges is to collect information from outside the experiment to examine how the response to a wage increase is modulated. Cohn et al. (2007) implemented a wage increase during a newspaper promotion that took place when a publisher launched a new newspaper. It was clear from the outset that the promotion would last a few weeks at most. Therefore, the workers who were hired to distribute the newspaper at train stations and other public places did not have the prospect of long-term employment. The workers were given a CHF 5 increase over their regular hourly pay of CHF 22 and asked to approach the passersby as actively as possible in return for the higher pay. Ten weeks after the experimental wage increase, Cohn et al. (2007) conducted a follow-up survey among the workers in which they measured the wage the workers thought would be appropriate for their work. In addition, they conducted a laboratory experiment to elicit workers' propensity for reciprocal fairness. They found that only those workers who felt treated unfairly at the base wage and who displayed positive reciprocity in the laboratory experiment showed a significantly positive effort response to the wage increase. Individuals who already felt treated fairly at CHF 22 did not respond to the wage increase. Likewise, those who behaved selfishly in the lab experiment also did not respond to the wage increase—regardless of whether they felt underpaid or not. This finding shows that lab experiments can be very useful for understanding what is going on in field experiments. In addition, the finding is in line with the fair wage-effort hypothesis (Akerlof & Yellen 1990), which predicts no effort response for fairly paid or overpaid employees, whereas underpaid workers are predicted to respond to wage variations. These results also show the importance of explicit controls for workers' fairness preferences and fairness perceptions, and they indicate the relevance of individual heterogeneity and the current base wage for an aggregate of gift-exchange effects: If workers already receive a high current wage, the percentage of individuals likely to judge this wage as unfair is relatively low. Few individuals will therefore respond to a wage increase with higher effort, and the average effect is likely to be small. In contrast, if the current base wage is relatively low, many individuals will feel underpaid and finding a positive average gift-exchange effect is thus more likely.⁵

To summarize, field experiments confirm the lab finding that paying higher wages leads to an increase in effort, although—depending on the circumstances—the effects may be small. The wage elasticity of workers outputs ranges from roughly 0.15 in Gneezy & List (2006) to 0.30 in Kube et al. (2006, 2008) and 0.44 in Al-Ubaydly et al. (2006). In the case

⁵This argument may be relevant for the interpretation of Gneezy & List (2006). According to personal communication with Uri Gneezy, the going market wage for the library task in this study was \$7 per hour, whereas the base wage in the neutral treatment was \$12 per hour. Thus, by being paid such a high wage in the neutral treatment, workers likely perceived this wage as already quite fair. Therefore, a further wage increase to \$20, even though it is considerable, should have little effect.

of unambiguous wage cuts, the elasticity is 0.82 in Kube et al. (2006), and it rises to roughly 1.45 if a material gift is provided (Kube et al. 2008). This evidence is consistent with the idea that effort is more responsive to wage cuts than to wage increases and that the psychological properties of the gift (money versus a nonmonetary gift) matter. One study (Cohn et al. 2007) also supports the notion that fairness perceptions mediate effort responses to wage increases, thus providing more direct support for the gift-exchange hypothesis (Akerlof & Yellen 1990). These results also contradict the proposition that laboratory findings rarely carry over to field settings because, the argument goes, the field is fundamentally different (Levitt & List 2007). Similar to laboratory experiments, field experiments show that the impact of fairness in one-shot interactions is likely to be small. Likewise, lab and field experiments suggest that the response to unfairness (i.e., a wage cut) is stronger than the response to kind behavior (i.e., a same-sized wage increase). Finally, as Cohn et al. (2007) show, there is not only consistency between lab responses and field responses to kind acts, but lab experiments also help us to better understand the effort responses observed in the field.

4.2. Fairness in Ongoing Relations

In the studies described above, the authors deliberately implemented conditions that rule out incentives arising from long-term labor relations because they were interested in the forces governing work effort when reputational incentives are absent. However, employment relationships are seldom spot-market transactions where trading partners interact only once. Therefore, we turn our attention to the following labor market studies derived from settings that are characterized by the possibility of forming long-term relations. With regard to the experimental evidence, we focus on papers that implement opportunities for repeated interactions in a setting with a publicly known finite number of periods. This design feature implies that, if the selfishness of all participants is common knowledge, the only equilibrium in the finitely repeated game is identical to the equilibrium in the one-shot game. We can thus conclude that deviations in behavior in the repeated-interaction treatments with regard to the one-shot treatments arise from the interactions between fairness and reputation effects.

An early paper that investigates the effect of repeated interactions in a gift-exchange setup is Falk & Gächter (2002). The authors set up a laboratory experiment with two treatments. In the baseline treatment, each participant plays a sequence of ten one-shot gift-exchange games with ten different partners. In the main treatment, subjects play the same gift-exchange game ten times with the same partner. Each pair of subjects in the second treatment thus has a common history, and both participants can condition their actions on their past experience with their partner. The results of this study reveal that reputational incentives in finitely repeated interactions amplify the positive impact of fairness on performance. The wage-effort relationship is steeper, and average efforts are significantly higher in the treatment with repeated interactions than in the one-shot treatment. The effort level, which can be chosen between 0.1 and 1, stabilizes at approximately 0.55 in the repeated treatment after the first few periods, whereas the effort level in the one-shot treatment evens out around 0.35. The reason for this difference is that in the repeated condition many subjects in the employer role offer high wages only if their worker always provided high effort in the past. As a consequence, selfish workers have a strong incentive to hide their intention and imitate the behavior of fair workers. By

providing high effort in response to high wage offers, selfish workers can generate a reputation of being fair. Because of the conditional offering strategy of employers, such a reputation is valuable, as it gives the workers access to attractive future offers from which they would be excluded if their true intention were revealed. In the final period, when reputational concerns no longer matter, the effort level in the treatment with repeated interactions drops approximately to the level of the one-shot treatment. This end-game effect shows that fairness concerns genuinely motivate roughly the same fraction of subjects in both treatments. However, the long-term nature of the repeated treatment disciplines many selfish individuals who would, in the absence of repeated interaction, play uncooperatively.

Brown et al. (2004) allowed long-term employment relationships to arise endogenously in a market environment with an excess supply of labor. In this experiment, which lasts for 15 periods, employers may address their wage offers to specific workers. They can therefore endogenously build up a long-term relationship with a worker by renewing offers to the same worker in consecutive periods. The comparison of this treatment to a treatment in which long-term relations are excluded provides the basis for measuring the impact of reputation incentives and the interaction of such incentives with fairness concerns. The possibility of contract renewals has strong positive effects on performance: It increases average effort from 3.3 in the treatment with one-shot interactions to 6.9 in the relations treatment. In fact, the modal effort choice is at the minimum in the one-shot condition, whereas the maximum effort is the modal choice in the relations treatment. An end-game effect arises as in Falk & Gächter (2002) because the selfish players no longer extend nonminimal effort levels in the final period.

One interesting aspect in these papers is that the selfish players do not merely raise their effort levels when they can acquire a good reputation, but they literally mimic the effort patterns of the fair-minded players in the nonfinal periods. This means that they provide low effort in response to low wages and high effort in response to high wages, thus contributing to the steepness of the wage-effort relationship. As a consequence, employers face a strong incentive to pay noncompetitive job rents because this enables them to elicit high effort from both fair and selfish workers.

In the meantime, a series of additional papers has confirmed the robustness of the finding that reputation formation in relationships that evolved endogenously greatly fortifies the positive impact of fairness on performance. These papers (discussed in detail by Fehr et al. 2009) provide evidence that reputation effects can be sufficiently strong to sustain very high levels of efficiency, even under adverse conditions. Fehr et al. (2009) and Brown & Zehnder (2007) showed that reputation formation in long-term relations leads to stable trades, even when fairness alone cannot prevent a market collapse. Fehr & Zehnder (2009) confirmed this finding in a setup where asymmetric information implies that output is only an imprecise indicator for effort. Finally, Brown et al. (2008) illustrated the effectiveness of the interaction between reputational incentives and fairness in a market with excess demand for labor and no threat of unemployment.

Field evidence on the role of gift exchange in repeated interactions is provided by Bellemare & Shearer (2007), who report observations from a field experiment in a tree-planting firm. Bellemare & Shearer (2007) implemented a one-time wage gift and examined workers' responses. They showed that effort increases significantly. The setup in this study is somewhat complex, as the tree planters are paid a piece rate and the income change induced by the wage gift may interact with these explicit incentives [see Goette

et al. (2004) for a discussion of these motives]. However, one may argue that it is even more remarkable to find a gift effect on effort in a piece-rate environment where workers' marginal cost of effort provision is already high. The study also provides evidence on the interaction between fairness and repeated-game effects because they have workers in their sample who did not return to their employer during the next tree-planting season. They showed that the effect of the wage gift on effort is significantly positive for both types of workers but for those who returned the next season the effect is stronger. This pattern confirms the complementarity between fairness effects and repeated-game effects that is predicted by theory and observed in the laboratory.

Other evidence of gift exchange in repeated interactions is more indirect and circumstantial. In these cases, firms changed the employment conditions in ongoing employment relations in ways that plausibly led to a negative effect on workers' fairness perceptions. It is interesting to study these episodes because they can be interpreted as a permanent change in the firm's policy toward its workers. Krueger & Mas (2004) examined the quality of Bridgestone/Firestone tires manufactured in different plants during various years. The plant in Decatur, Illinois, experienced serious labor strife after the company not only announced lower wages for new hires and unfavorable changes in the schedule for shift rotations, but also threatened to fire existing staff and hire replacement workers (which they later did). The results show clearly that tires manufactured during the labor strife at Decatur were of significantly lower quality compared with the same type of tires manufactured at different plants in the same years.

In a similar vein, Mas (2008) presents evidence showing that a labor dispute at Caterpillar, a large manufacturing company producing construction equipment, tractors, and other vehicles, had a similarly negative impact on production quality. Negotiations between the union and management broke down after Caterpillar refused to accept a contract that the same union had reached with John Deere, a firm similar to Caterpillar. Relative to comparable Caterpillar equipment produced outside the United States, the equipment produced in the United States during the labor strife shows a lower resale value. Because effort is an important determinant of quality in this business, such a finding indicates that effort was lower during labor strife.

No studies exist that examine how the repeated nature of an employment relationship affects the effectiveness of gift exchange in labor markets. Maréchal & Thöni (2007), however, conducted an experiment in a related field study, thereby tapping into a similar business context. They showed that sales representatives who visit stores to sell pharmaceuticals can increase sales by giving the store manager a gift consisting of six product samples at the beginning of their visits. Giving a gift strongly increases sales from approximately CHF 60 in the condition without gift to approximately CHF 270 in the gift condition. Interestingly, the effect is present only if the sales representative had previously visited the store; gifts on first visits lead to no change in sales. This suggests that the gift taps into an ongoing relationship between the sales representative and the store manager in which the effects of fairness are predicted to be largest.

Evidence also exists showing that, when employers' actions are considered unfair, stronger responses are triggered than when those actions are considered fair. Mas (2006) examined the outcomes of final-offer arbitration cases involving police departments in New Jersey in which the police officers' union and the city were unable to negotiate a new contract. Under final-offer arbitration, the arbitrator has to pick either the offer submitted by the employer or the one submitted by the union. The study documents a

large and significant decline in many indicators of police performance (e.g., number of crimes cleared, probability of incarceration) if the arbitrator selected the employer's offer. This decline in effort is highly sensitive to the size of the loss relative to the expected outcome from final-offer arbitration. If the arbitrator rules in favor of the union, there is a small positive effect on performance, which is almost completely insensitive to the size of the gain.

Lee & Rupp (2007) examined the impact of wage cuts for airline pilots on flight delays. Virtually all the pay cuts they examined were consensual, i.e., the pilots' union agreed to take a cut, as many of the airlines were in, or on the verge of, bankruptcy. There is essentially no effect on delays when pay cuts are consensual. This is in line with the survey evidence in Bewley (1999), showing that workers are willing to accept pay cuts when they feel such cuts are justified, e.g., by the looming bankruptcy of the employer. The one pay cut in Lee & Rupp (2007) that was the result of arbitration, and thus opposed by the pilots—a 26% pay cut at Alaska Airlines—led to a massive increase in flight delays lasting several months. This instance of a pay cut is comparable to those described by Mas (2006) and in line with the predictions from the fairness model.

To summarize, the field evidence on fairness manipulations in ongoing relationships shows that firms may incur extremely high costs if they treat workers in ways that are perceived as unfair. The evidence from Lee & Rupp (2007) also shows that, as indicated by survey evidence, no adverse consequences follow from pay cuts that employees do not perceive as unfair (Bewley 1999). Less is known, however, about the impact of treating workers in a way that is clearly perceived to be fair. Although the results in Maréchal & Thöni (2007) are suggestive of positive effects from fair treatment, this remains to be documented in a labor market setting. In particular, long-term studies with explicit randomization or credible exogenous changes in compensation policies, such as adoption of a set of policies when a firm is bought by another firm, are needed.

4.3. Internal Labor Markets

In a pioneering book, Doeringer & Piore (1971) assert that a sharp distinction exists between internal and external labor market arrangements. In particular, workers seem insulated from outside labor market conditions once they are employed in firms. The authors argue that these arrangements are difficult to explain from the viewpoint of a neoclassical model: “[W]e doubt that any of the major strands of conventional research will prove capable of assimilating the internal labor market into conventional theory in a useful and meaningful way.” As we argue below, fairness preferences have interesting new implications for how firms set wages over time, giving rise to two of the most important features of internal labor markets.

The evidence on fairness perceptions suggests a shift in workers' perceived entitlement as they enter a firm (Kahneman et al. 1986). When forming judgments about fairness, new workers compare the firm's offer to what they could otherwise earn in the labor market, whereas incumbent workers compare a proposed change in the employment relationship to the status quo (similar effect can be observed in the fairness judgments of price changes). A second important regularity is that loss aversion appears to have a strong effect on fairness judgments. For example, a small wage decrease damages fairness judgments much more than a small wage increase boosts fairness perceptions (Kahneman et al. 1986). It is not clear, a priori, whether loss aversion in fairness judgments applies to the

nominal or the real wage. The survey scenarios in Kahneman et al. (1986) hold the real wage cut constant, showing that, over and above the loss in the real wage, individuals consider nominal wage cuts particularly unfair. Shafir et al. (1997) also show that nominal wage cuts are genuinely perceived as more unfair, and Fehr & Tyran (2001, 2008) document that money illusion prevents a quick fall in prices after a negative monetary shock in an experimental price-setting game. As discussed above, Goette & Huffman (2007) present evidence that the salience of a nominal wage cut forms the fairness judgment. They show that if nominal wages are not cut, individuals care strongly about real wage changes.

These features give rise to three specific predictions in the theoretical framework we discussed above.⁶ First, entry-level wages and the wages of incumbent workers respond differently to changes in labor market conditions. Entry-level wages should strongly depend on labor market conditions. If the labor market is tight, workers can find alternative employment at relatively high wages. Thus, a high wage is needed to elicit high effort. When unemployment is high, workers' outside offers will be worse, and they will be willing to exert effort for a lower wage. As a consequence, the firm's optimal entry-level wage is lower when the labor market is slack. For incumbent workers, however, the reference outcome is the contract that was in place the last period, not the worker's outside options. This in itself makes the incumbent workers' wages relatively independent of labor market conditions. Second, cohort effects impact wages: Because last year's contract becomes the reference outcome for this year, keeping the same contract is viewed as fair. Thus, if a worker started out with a high entry-level wage, this wage will become the reference wage for the next period, influencing future wage outcomes. Third, loss aversion also affects wages: If workers' fairness judgments are more strongly affected when their situation worsens, then firms should be reluctant to cut wages. The fairness model is silent as to whether real or nominal wages are the relevant measuring stick for fairness judgments. However, the evidence in Kahneman et al. (1986) and Goette & Huffman (2007) suggests that nominal wage cuts in particular are considered unfair.

The evidence is generally supportive of these predictions. Several studies document that job changers' wages are more cyclical than those of job stayers. Recent studies include Devereux (2001), Devereux & Hart (2006), Haefke et al. (2006), and Solon et al. (1994). In all these studies, wages of individuals entering firms are far more sensitive to business cycle variations. It should be noted that the fairness model does not predict that the incumbents' wages will never change. In particular, if the firm's profit rises, so should the incumbents' wages. Because the studies do not attempt to disentangle shocks that affect firms' profits (for example, productivity shocks) from other shocks (those that change only labor supply), the impact of profit changes on incumbents' wages has not been tested in detail. Beaudry & DiNardo (1991) provide a test of the prediction that labor market conditions have little effect on incumbents' wages. They found that current labor market conditions have almost no effect on current wages, but initial labor market conditions are a significant determinant of entry-level wages. Support for this prediction also comes from several case studies using firms' personnel files (Baker et al. 1994, Eberth 2003, Treble et al. 2001). Compared with data from labor force surveys, such studies, although less representative, show a much clearer picture of how wages change over the course of a

⁶This section draws heavily on Benjamin (2005), in which proofs of all the statements can be found. See also Cabrales et al. (2008) for a theory of how social preferences affect labor markets. Their paper focuses on how concerns for fairness can provide incentives to segregate workers.

career. The evidence of cohort effects is also cleanest in these studies: Entry-level wages vary widely from year to year. Each cohort then gradually increases from the entry-level wage, thus preserving the initial differences in wages. Oreopoulos et al. (2006) use data about Canadian college graduates to examine the long-run effects of unemployment at the time of graduation on wages. They found very strong and long-lasting effects of the labor market conditions upon graduation on later economic outcomes. If graduating in a boom year (with an unemployment rate 5% lower than average), initial earnings are approximately 9% higher. After five years, long after the economy has slowed down again, earnings are still 4% higher and the effect fades only after ten years.⁷ One reason why these effects are so long lasting is that initial business cycle conditions change the job-mobility pattern permanently, as one would expect when these initial conditions permanently affect the firm's compensation policy.

Strong evidence also exists that employers shy away from wage cuts and freeze their employees' wages rather than make small wage cuts. There are two noteworthy features in the distribution of nominal wage changes. First, a clear drop in the density is found just below zero. A large fraction of individuals receive a nominal wage change of zero, but almost nobody receives small wage cuts. Second, small wage increases are frequent. Hence, the distribution of wage changes is asymmetrical: Wage cuts occur less often than expected, as the model predicts. Virtually any study that examines the distribution of wage changes finds this pattern (see, e.g., Altonji & Devereux 2000, Fehr & Goette 2005, Wilson 1999).

When moving to more conventional data sets like the Panel Study of Income Dynamics or other labor market surveys, significant measurement problems arise. In particular, wages are typically reported with error (Bound et al. 1994). This problem is accentuated when looking at wage changes and may wrongly lead researchers to conclude that there is a substantial amount of wage flexibility. Indeed, studies that do not control for measurement error find a significant number of wage cuts, although these studies still find a strong asymmetry in the distribution of wage changes (Card & Hyslop 1996, Dickens et al. 2007, Kahn 1997, McLaughlin 1994). Several methods have been proposed to correct for this problem: Some rely on parametric modeling of measurement error (Altonji & Devereux 2000, Fehr & Goette 2005), whereas others are entirely nonparametric (Dickens & Goette 2006, Gottschalk 2005). The specific form of the correction turns out to have very little impact. All studies find, however, that correcting for measurement error is important. Once these estimators are applied, the evidence obtained from the labor force surveys looks much like that from personnel files, i.e., few wage cuts are found.

Nominal wage rigidity or cohort effects could also be caused by forces other than a combination of fairness preferences and money illusion (Malcomson 1997, 1999). Suppose, for example, that workers are risk averse, firms are risk neutral, and working hours are fixed. In this case, the firm has an incentive to insure its workers against fluctuations in real wages. The real wage is then given by the current labor market conditions and the optimal insurance condition; thus, subsequent labor market events do not affect the real wage. This naturally leads to cohort effects in wages, as the starting wages will differ by year. Yet, these models have difficulties in explaining nominal wage rigidity because they predict that real, not nominal, wages should be insured. Other models (Malcomson 1997,

⁷One might argue that the timing of graduation is endogenous to the business cycle. However, the results are robust to using the unemployment rate four years after enrollment as an instrument.

1999) show that contracts with a fixed wage can induce efficient levels of relationship-specific investments. These models have the property that incumbents' wages respond only to exogenous conditions if the outside option becomes binding. Thus, so long as the real wage is strictly within the boundaries of the real outside option, the nominal wage will not be adjusted to changes in real outside options. They are adjusted only when one of the outside options becomes binding. With positive inflation, this automatically implies that wage cuts will tend to be rare. However, the model also predicts that, during deflation, wage cuts would be frequent and raises rare, with the asymmetry going the other way. There is no evidence that during the great depression in the United States, for example, wage cuts became frequent (Akerlof et al. 1996). Similarly, Imfeld (1991) reports virtually no wage cuts in five large Swiss firms during the period between 1879 and 1890 when prices in Switzerland declined by 20%.

At the more aggregate level, our framework may also help explain some of the business cycle facts for which the standard model has difficulty accounting. First, the model offers a new source of wage stickiness. For example, the model readily predicts that employment should be more volatile than wages. The reason is that raising employment in the face of a positive demand shock lowers average profit (because of diminishing returns to effort). This persuades workers to work harder for a given wage, because the wage is now higher relative to the average profit the firm makes per worker, which in turn increases workers' effort but does not require the firm to pay a much higher wage. Therefore, most of the firm's adjustment will come through changes in employment, making the wage relatively unresponsive to changes in demand on the product market (Danthine & Kurmann 2004). The model also predicts a difference between demand shocks and productivity shocks for wage and employment reactions. In contrast to the demand shock discussed above, a positive productivity shock increases the firm's profit directly. Workers will thus lower their effort for a given wage. However, because workers' effort now becomes more valuable to firms, the incentives of the firm to raise wages are reinforced (Benjamin 2005, Danthine & Kurmann 2004).

4.4. Fairness and the Economic Effects of Minimum Wage Legislations

In this section, we illustrate that the psychological forces described in Section 2 may be crucial for a better understanding of labor market policy. If people have reference-dependent fairness preferences, policy measures may function not only by affecting outcomes but also by shifting the relevant reference points. We use minimum wage legislation to illustrate the empirical relevance of this possibility. The minimum wage example is an especially important one because minimum wages are one of the most common instruments in labor market policy [see, e.g., OECD (1998) for evidence that minimum wage legislations are present in most labor markets in the developed world].

Despite the remarkable attention that minimum wage laws have received, three empirical findings remain puzzling in light of the standard approach in labor economics. First, multiple papers show that minimum wages have so-called spill-over effects, i.e., many firms increase wages by an amount exceeding that necessary to comply with the higher minimum wage (see, e.g., Card & Krueger 1995, Dolado et al. 1997, Katz & Krueger 1992, Teulings et al. 1998, Teulings 2003). Second, several studies report anomalously low utilization of subminimum wages in situations where firms could actually pay workers less than the minimum (Freeman et al. 1981; Katz & Krueger 1991, 1992; Manning &

Dickens 2002). For example, Katz and Krueger (1991) found that introducing the opportunity of paying subminimum wages to youth did not cause a significant decline in teenage workers' wages. Third, there are several cases in which an increase in minimum wages led to zero or even positive employment effects (see, e.g., Card 1992, Card & Krueger 1994, Katz & Krueger 1992, Machin & Manning 1994, OECD 1998, Padilla et al. 1996). This is surprising because the conventional competitive theory predicts that increases in minimum wages should always reduce employment.

A recent experimental study by Falk et al. (2006) suggests that the phenomena mentioned above may be better understood if the labor market is viewed from the behavioral perspective we describe in this paper. In addition to the possibility that workers may have reference-dependent fairness preferences, the experiment by Falk et al. (2006) is based on the idea that labor markets are likely to exhibit imperfectly competitive features. This view is based on a recent line of research in labor economics stipulating that imperfect competition may be the rule rather than the exception in labor markets (Boal & Ransom 1997, Manning 2003). The rationale behind this argument is that labor markets are typically characterized by important frictions (e.g., moving costs, heterogeneous job preferences, or social ties) that prevent the elasticity of an individual firm's labor supply from being close to infinity, a view that also receives empirical support (Barth & Dale-Olsen 1999, Boal & Ransom 1997, Manning 2003). Therefore, it seems reasonable to assume that firms have at least a certain degree of wage-setting power.

Falk et al. (2006) thus implement a simple laboratory labor market in which workers' mobility restrictions in combination with heterogeneous fairness preferences give rise to upward-sloping labor-supply schedules at the firm level. They observed that the minimum wage strongly affects reservation wages, suggesting that the minimum wage provides an anchor for judging the fairness of the actual wage paid. After the introduction of the minimum wage, subjects in the role of workers strongly increase their reservation wages. Whereas almost all reservation wages were clearly below the minimum wage level before its introduction, a substantial share of reservation wages lie above that level after its introduction. The impact of the introduction of the minimum wage on reservation wages corresponds to the evidence presented in Section 2.2. The mini-ultimatum games of Falk et al. (2003) reveal that changes in the set of available but not chosen alternatives may have important consequences for the perceived fairness of a specific action. The introduction of a minimum wage eliminates a whole range of previously possible wage payments from the firms' strategy set. As a consequence, many subjects perceive a wage payment at the minimum wage level, which would have been considered as fair and quite generous before the introduction, as unfairly low after the introduction.

The impact of the minimum wage on reservation wages has important implications for the wage-setting strategy of profit-maximizing employers: They are forced to pay wages above the minimum. Thus, the strong impact of the minimum wage on subjects' reservation wages provides a possible explanation for the spillover effect empirically observed in field studies. Furthermore, the pattern of reservation wages also shapes the employment effects of the minimum wage. Because firms face upward-sloping labor-supply schedules, a wage increase may lead to higher employment for a firm's given labor-supply schedule. However, because the minimum wage raises reservation wages, the labor-supply schedule individual firms face shifts to the left. Accordingly, a potentially positive employment effect of the minimum wage introduction due to imperfect competition is dampened or may even be reversed because of the leftward shift in the labor-supply schedule. Whether

the introduction of the minimum wage ultimately leads to an increase or a reduction in employment depends on the parameters that shape the relative size of the two counteracting effects. The minimum wage has a positive net effect on employment under the conditions chosen in Falk et al. (2006). However, the effect is much smaller than it would have been had subjects' reservation wages remained stable.

In contrast to the experimental settings discussed in the previous section, Falk et al. (2006) implement a labor market with complete employment contracts. However, gift-exchange experiments by Brandts & Charness (2004) and Owens & Kagel (2006) show that the impact of minimum wages on labor supply also prevails if the labor market suffers from contractual incompleteness. Both papers show that the introduction of a minimum wage has two effects. On the one hand, the minimum wage increases average wages, which motivates fair-minded subjects to exert more effort. On the other hand, the minimum wage also changes the fair-minded subjects' willingness to provide effort at a given wage level. Thus, a law that forces employers to pay a certain minimum makes subjects perceive the same wage, once considered fair, to be less fair. As a consequence, the net effect of the minimum wage on effort is ambiguous and depends on the relative size of the two counteracting effects.

Falk et al. (2006) also found that the economic consequences of a removal of the minimum wage are very asymmetric relative to the effects of the introduction. Although subjects' reservation wages decrease somewhat after the removal of the minimum wage, they still substantially exceed those before the introduction of the minimum wage. Therefore, the minimum wage leads to a kind of ratchet effect in subjects' perceptions of what constitutes a fair wage. Subjects who are used to receiving high wages seem to feel morally entitled to receive them even after the abolishment of the minimum wage legislation. The forces behind the stickiness of reservation wages, which are similar to the forces discussed in the context of downward rigidity of wages, also induce an asymmetry in response to actual wages: The absolute change in wages after the introduction of the minimum wage is much larger than after its elimination, implying that minimum wage laws carry important hysteresis effects. Actual wages after the elimination of a minimum wage increase will tend to be higher than before the introduction of a minimum wage increase. The asymmetric effect of the minimum wage on reservation wages may explain why firms may find the utilization of subminimum wage opportunities unprofitable, because these opportunities were typically introduced after a previous increase in the minimum wage.

Of course, the laboratory experiment described above represents only the first step in a long-lasting research endeavor. One experiment alone will never be conclusive—be it a lab or a field experiment. However, the results suggest interesting hypotheses and a high payoff for efforts directed at the collection of hitherto unavailable data, such as reservation wages. Moreover, as the literature on gift exchange shows, effects found in the laboratory may generalize to field settings, and in terms of the minimum wage issue, much is at stake. If the asymmetric impact of minimum wage laws on reservation wages turns out to be a robust finding, it will have profound consequences. First, this finding questions the basic assumption that the minimum wage does not affect labor supply. Second, the upwards shift in the labor-supply curve that increases with the minimum wage introduces a further employment-limiting aspect of minimum wage increases. Third, the asymmetric impact on reservation wages and actual wages challenges the standard assumption in economics that the size of a comparative static result does not depend on the sign of the change in the independent variable. If economic policies generate entitlement effects that respond asymmetrically to the introduction and the removal of a policy, much of what is

taught in economics textbooks needs to be rewritten because the introduction of a policy may have effects that prevail even after it has been abolished.⁸ In the labor market context, this means that reductions in minimum wages are likely to cause much smaller employment effects than one would expect from standard competitive or monopsonistic models.

5. CONCLUSIONS

Many employment relations are only incompletely regulated by explicit contracts, giving employees discretion over their effort choices. In addition, these relations are embedded in a context of repeated interactions between employers and employees. We also know from a large experimental literature—which provides evidence from many different countries, from studies involving high stakes, and from nationally representative experiments—that a substantial share of people exhibits (reference-dependent) social preferences and concerns for fair outcomes. In this paper, we combine these insights and argue that they can help us provide a better understanding of phenomena such as downward nominal wage rigidity, the unresponsiveness of incumbents' wages to labor market conditions, cohort effects, or non-competitive wage premia. Such phenomena are hard to reconcile with the competitive model, but they follow in a relatively straightforward manner from a labor market account that acknowledges (a) the inherent incompleteness and relational nature of most employment contracts and (b) the existence of reference-dependent fairness concerns that are shaped by nominal loss aversion. Direct evidence from laboratory and field experiments supports our account, which is also strengthened by the insight that even a small share of fair-minded workers can have a large impact on long-term employment relations because reputational concerns in repeated interactions greatly magnify the impact of fairness concerns.

The evidence we survey also has several implications for policy and raises new issues. First, downward nominal wage rigidity may create a permanent tradeoff between inflation and unemployment: In an economy with heterogeneous productivity changes, productivity rises in some jobs and declines in others. In the more productive jobs, real wages will rise; in jobs with a productivity decrease, real wages should fall. However, at low levels of inflation, a real-wage cut can be achieved only by cutting nominal wages. Thus, if downward nominal wage rigidity prevails, the aggregate real wage rises permanently because firms are reluctant to cut nominal wages. This reluctance acts like a productivity decrease in the economy and consequently depresses employment and output (Akerlof et al. 1996). Second, the theory and evidence on internal labor markets more generally suggest that any temporary intervention can have effects that last much longer than the standard model suggests. The reason is that any temporary shock that affects entry-level wages matters for future wages because of their impact on the reference standards [see Fehr et al. (2008) for a more detailed discussion].

Our results raise a couple additional issues that future research needs to address. First, little evidence is available on how fairness and relational contracting interact in the field. Although financing a long-term experiment may not be feasible, it may be possible to tap into an existing environment and examine how a change in pay affects effort compared with a case in which essentially no future relationship exists. In this context and from the

⁸Asymmetric responses to the introduction and elimination of policy measures are not restricted to minimum wage legislation. Card & Hyslop (2006) showed, for example, that a dynamic earnings subsidy increased participation of welfare recipients in the labor market even after the subsidy expired.

perspective of our fairness account, the finding that only those wage variations that are associated with perceived fairness variations will tend to change the workers' behavior is worth stressing (Cohn et al. 2007). Thus, the psychological context in which wage variations take place needs to be taken into account to avoid the naive view that every wage increase leads to an effort increase. For example, if workers receive a surprise wage increase without any explanation, understanding why they should view this as a fairness variation becomes difficult. This also means that researchers must collect not only data on wages and effort, but also important related information such as fairness judgments, workers' beliefs about the employers' intentions, the rationale that employers give to workers for why they increase wages, and whether employers expect higher effort in return (and whether workers believe this).

Second, the theory and evidence we discuss here are limited to issues of vertical fairness. This may suffice in some cases, i.e., when a firm hires only identical workers. As our discussion shows, vertical fairness concerns may lead firms to pay more generous wages, leading to particular wage dynamics. As such, this framework could also provide testable hypotheses regarding which firms pay high wages, possibly explaining interindustry wage differentials (Krueger & Summers 1988). Our framework predicts that more profitable firms should pay more to all workers.⁹ However, issues of fairness between workers may become important in other cases (Livernash 1957). Several recent papers provide laboratory evidence on the role of horizontal social comparisons for workers' effort choices in a gift-exchange environment (Charness & Kuhn 2007, Clark et al. 2006, Gächter & Thöni 2005). Neuroimaging experiments also provide evidence for the importance of social comparisons (Fliessbach et al. 2007), and convincing field evidence has arisen that workers influence each other in deciding how hard to work (Mas & Moretti 2008). A plausible interpretation of these results is based on horizontal fairness concerns, raising the possibility that such concerns are more generally important. They may constrain firms even more in their policies and may have more sweeping implications than do the concerns discussed here. For instance, as Cabrales et al. (2008) highlight, having workers who care strongly about relative wages creates an incentive for firms to segregate workers of different skill levels, which has further implications for wage policies. No evidence exists on even the most basic implications from horizontal fairness concerns, and this is clearly an important area for future research.

DISCLOSURE STATEMENT

The authors are not aware of any affiliations, memberships, funding, or financial holdings that might be perceived as affecting the objectivity of this review.

ACKNOWLEDGMENTS

We are very grateful to valuable comments received from Daron Acemoglu, Charles Bellemare, Andrew Clark, Thomas Dohmen, Rafael Lalive, Bentley MacLeod, James Malcomson, and Rudolf Winter-Ebmer.

⁹Our best interpretation of the long and ongoing controversy regarding the role of individual and firm heterogeneity contributions to the industry wage differentials is that a substantial part is due to genuine differences in firms' wage policies (Abowd et al. 1999).

LITERATURE CITED

- Abowd J, Finer H, Kramarz F. 1999. Individual and firm heterogeneity in compensation: an analysis of matched longitudinal employer and employee data for the state of Washington. In *The Creation and Analysis of Employer-Employee Matched Data*, ed. J Haltiwanger, J Lane, J Spletzer, K Troske, pp. 3–24. Amsterdam: North-Holland
- Agell J, Lundborg P. 1995. Theories of pay and unemployment: survey evidence from Swedish manufacturing firms. *Scand. J. Econ.* 97:295–307
- Agell J, Lundborg P. 2003. Survey evidence on wage rigidity and unemployment. *Scand. J. Econ.* 105:15–30
- Akerlof GA. 1982. Labor contracts as partial gift exchange. *Q. J. Econ.* 97:543–69
- Akerlof GA, Dickens WT, Perry GL. 1996. The macroeconomics of low inflation. *Brookings Pap. Econ. Act.* 1996:1–76
- Akerlof GA, Yellen JL. 1990. The fair wage-effort hypothesis and unemployment. *Q. J. Econ.* 105:255–83
- Al-Ubaydli O, Andersen S, Gneezy U, List JA. 2006. *For love or money? Testing non-pecuniary and pecuniary incentive schemes in a field experiment*. Work. Pap., Univ. Chicago
- Altonji JG, Devereux PJ. 2000. The extent and consequences of downward nominal wage rigidity. *Res. Labor Econ.* 19:383–431
- Baker G, Gibbs M, Holmstrom B. 1994. The wage policy of a firm. *Q. J. Econ.* 109:921–55
- Baker GP. 1992. Incentive contracts and performance measurement. *J. Polit. Econ.* 100:598–614
- Barth E, Dale-Olsen H. 1999. *Monopsonistic discrimination and the gender-wage gap*. Work. Pap. 7197, NBER
- Beaudry P, DiNardo J. 1991. The effect of implicit contracts on the movement of wages over the business cycle: evidence from micro data. *J. Polit. Econ.* 99:665–88
- Bellemare C, Kröger S. 2007. On representative social capital. *Eur. Econ. Rev.* 51:181–202
- Bellemare C, Kröger S, van Soest A. 2008. Measuring inequity aversion in a heterogeneous population using experimental decisions and subjective probabilities. *Econometrica* 76:815–39
- Bellemare C, Shearer B. 2007. *Gift exchange within a firm: evidence from a field experiment*. Work. Pap. 0708, CIRPEE
- Benjamin D. 2005. *A Theory of Fairness in the Labor Market*. Cambridge, MA: Harvard Univ. Press
- Berg J, Dickhaut JW, McCabe KA. 1995. Trust, reciprocity, and social history. *Games Econ. Behav.* 10(1):122–42
- Bewley TE. 1999. *Why Wages Don't Fall During a Recession*. Cambridge, MA: Harvard Univ. Press
- Bewley TF. 1995. A depressed labor market as explained by participants. *Am. Econ. Rev.* 85:250–54
- Binmore K, Gale J, Samuelson L. 1995. Learning to be imperfect: the ultimatum game. *Games Econ. Behav.* 8:56–90
- Boal WM, Ransom MR. 1997. Monopsony in the labor market. *J. Econ. Lit.* 35:86–112
- Bolton GE, Ockenfels A. 2000. ERC: a theory of equity, reciprocity, and competition. *Am. Econ. Rev.* 90:166–93
- Bound J, Brown C, Duncan GJ, Rodgers WL. 1994. Evidence on the validity of cross-sectional and longitudinal labor market data. *J. Labor Econ.* 12:345–68
- Brandts J, Charness G. 2004. Do labour market conditions affect gift exchange? Some experimental evidence. *Econ. J.* 114:684–708
- Brown M, Falk A, Fehr E. 2004. Relational contracts and the nature of market interactions. *Econometrica* 72:747–80
- Brown M, Falk A, Fehr E. 2008. *Competition and relational contracts: the role of unemployment as a disciplinary device*. Discuss. Pap. 3345, IZA
- Brown M, Zehnder C. 2007. Credit reporting, relationship banking, and loan repayment. *J. Money Credit Bank* 39:1883–918

- Cabrales A, Calvo-Armengol A, Pavoni N. 2008. Social preferences, skill segregation, and wage dynamics. *Rev. Econ. Stud.* 75:65–98
- Camerer C. 2003. *Behavioral Game Theory*. Princeton, NJ: Princeton Univ. Press
- Cameron LA. 1999. Raising the stakes in the ultimatum game: experimental evidence from Indonesia. *Econ. Inq.* 37:47–59
- Card D. 1992. Do minimum wages reduce employment? A case study of California, 1987–1989. *Ind. Labor Relat. Rev.* 46:38–54
- Card D, Hyslop D. 1996. Does inflation “grease the wheels of the labor market”? Work. Pap. W5538, NBER
- Card D, Hyslop DR. 2006. *The dynamic effects of an earnings subsidy for long-term welfare recipients: evidence from the SSP Applicant Experiment*. Work. Pap. 12774, NBER
- Card D, Krueger A. 1994. Minimum wages and employment: a case study of the fast-food industry in New Jersey and Pennsylvania. *Am. Econ. Rev.* 84:772–93
- Card D, Krueger A. 1995. *Myth and Measurement: The New Economics of the Minimum Wage*. Princeton, NJ: Princeton Univ. Press
- Carmichael HL, MacLeod WB. 2000. Worker cooperation and the ratchet effect. *J. Labor Econ.* 18:1–19
- Charness G. 2004. Attribution and reciprocity in an experimental labor market. *J. Labor Econ.* 22:665–88
- Charness G, Frechette GR, Kagel JH. 2004. How robust is laboratory gift exchange? *Exp. Econ.* 7:189–205
- Charness G, Kuhn P. 2007. Does pay inequality affect worker effort? Experimental evidence. *J. Labor Econ.* 25:693–723
- Charness G, Rabin M. 2002. Understanding social preferences with simple tests. *Q. J. Econ.* 117:817–69
- Clark AE, Masclet D, Marie-Claire V. 2006. *Effort and comparison income*. Discuss. Pap. 2169, IZA
- Coase R. 1937. The nature of the firm. *Economica* 4:386–405
- Cohn A, Fehr E, Goette L. 2007. *Gift exchange and effort: evidence from a field experiment*. Work. Pap., Inst. Empir. Res. Econ., Univ. Zürich
- Danthine J-P, Kurmann A. 2004. Fair wages in a New Keynesian model of the business cycle. *Rev. Econ. Dynam.* 7:107–42
- De Quervain DJF, Fischbacher U, Treyer V, Schelhammer M, Schnyder U, et al. 2004. The neural basis of altruistic punishment. *Science* 305:1254–58
- Devereux PJ. 2001. The cyclicity of real wages within employer-employee matches. *Ind. Labor Relat. Rev.* 54:835–50
- Devereux PJ, Hart RA. 2006. Real wage cyclicity of job stayers, within-company job movers, and between-company job movers. *Ind. Labor Relat. Rev.* 60:105–19
- Dickens W, Goette L. 2006. *Estimating rigidity for the international wage flexibility project*. Work. Pap., Univ. Geneva
- Dickens WT, Goette L, Groshen EL, Holden S, Messina J, et al. 2007. How wages change: micro evidence from the International Wage Flexibility Project. *J. Econ. Perspect.* 21:195–214
- Doeringer P, Piore MJ. 1971. *Internal Labor Markets and Manpower Analysis*. Armonk, NY: ME Sharpe
- Dohmen T, Falk A, Huffman D, Sunde U. 2009. *Homo reciprocans*—survey evidence on behavioral outcomes. *Econ. J.* 119:592–612
- Dolado JJ, Felgueroso F, Jimeno JF. 1997. The effects of minimum bargained wages on earnings: evidence from Spain. *Eur. Econ. Rev.* 41:713–21
- Dufwenberg M, Kirchsteiger G. 2004. A theory of sequential reciprocity. *Games Econ. Behav.* 47:268–98
- Eberth B. 2003. Cohort wage profiles in an internal labour market. *R. Econ. Soc. Annu. Conf.* 2003, No. 71

- Falk A, Fehr E, Fischbacher U. 2003. On the nature of fair behavior. *Econ. Inq.* 41:20–26
- Falk A, Fehr E, Zehnder C. 2006. Fairness perceptions and reservation wages—the behavioral effects of minimum wage laws. *Q. J. Econ.* 121:1347–81
- Falk A, Fischbacher U. 2006. A theory of reciprocity. *Games Econ. Behav.* 54:293–315
- Falk A, Gächter S. 2002. Reputation and reciprocity—consequences for the labour relation. *Scand. J. Econ.* 104:1–26
- Fehr E, Brown M, Zehnder C. 2009. On reputation: a microfoundation of contract enforcement and price rigidity. *Econ. J.* 119:333–53
- Fehr E, Fischbacher U, Rosenblatt BV, Schupp J, Wagner G. 2003. A nation-wide laboratory: examining trust and trustworthiness by integrating behavioral experiments into representative surveys. *Schmollers Jahrb.* 122:519–42
- Fehr E, Fischbacher U, Tougareva E. 2002. *Do high stakes and competition undermine fairness? Evidence from Russia.* Work. Pap. 120, Inst. Empir. Res. Econ., Univ. Zürich
- Fehr E, Gächter S. 2000. Fairness and retaliation: the economics of reciprocity. *J. Econ. Perspect.* 14:159–81
- Fehr E, Goette L. 2005. Robustness and real consequences of nominal wage rigidity. *J. Monet. Econ.* 52:779–804
- Fehr E, Goette L, Zehnder C. 2008. *The behavioral economics of the labor market: central findings and their policy implications.* Work. Pap., Fed. Reserve Bank Boston
- Fehr E, Kirchler E, Weichbold A, Gächter S. 1998. When social norms overpower competition: gift exchange in experimental labor markets. *J. Labor Econ.* 16:324–51
- Fehr E, Kirchsteiger G, Riedl A. 1993. Does fairness prevent market clearing? An experimental investigation. *Q. J. Econ.* 108:437–60
- Fehr E, Schmidt K. 2002. Theories of fairness and reciprocity—evidence and economic applications. In *Advances in Economics and Econometrics*, ed. M Dewatripont, I Hansen, S Turnovsky, pp. 208–57. 8th World Congr., Econ. Soc. Monogr. New York: Cambridge Univ. Press
- Fehr E, Schmidt KM. 1999. A theory of fairness, competition, and cooperation. *Q. J. Econ.* 114: 817–68
- Fehr E, Schmidt KM. 2004. Fairness and incentives in a multi-task principal-agent model. *Scand. J. Econ.* 106:453–74
- Fehr E, Tyran JR. 2008. Limited rationality and strategic interaction. The impact of the strategic environment on nominal inertia. *Econometrica* 76(2):353–94
- Fehr E, Tyran JR. 2001. Does money illusion matter? *Am. Econ. Rev.* 91:1239–62
- Fehr E, Zehnder C. 2009. *Reputation and credit market formation.* Work. Pap., Univ. Zürich
- Fliessbach K, Weber B, Trautner P, Dohmen T, Sunde U, et al. 2007. Social comparison affects reward related brain activity in the human ventral striatum. *Science* 318:1305–8
- Freeman R, Gray W, Ichniowski C. 1981. *Low Cost Student Labor: The Use and Effects of the Subminimum Wage Provisions for Full-Time Students, Report by the Minimum Wage Study Commission.* Washington, DC: GPO
- Freixas X, Guesnerie R, Tirole J. 1985. Planning under incomplete information and the ratchet effect. *Rev. Econ. Stud.* 52:173–91
- Gächter S, Thöni C. 2005. *Wage comparisons and performance: an experimental approach.* Discuss. Pap., Univ. St. Gallen
- Gibbons R. 1987. Piece-rate incentive schemes. *J. Labor Econ.* 5:413–29
- Gneezy U, List J. 2006. Putting behavioral economics to work: field evidence of gift exchange. *Econometrica* 74:1365–84
- Goette L, Huffman D. 2007. Do emotions lead to better labor market outcomes? In *Do Emotions Lead to Better or Worse Decisions?*, ed. K Vohs, R Baumeister, G Loewenstein, pp. 71–104. New York: Russell Sage Found.
- Goette L, Huffman D, Fehr E. 2004. Loss aversion and labor supply. *J. Eur. Econ. Assoc.* 2:216–28

- Gottschalk P. 2005. Downward nominal-wage flexibility: real or measurement error? *Rev. Econ. Stat.* 87:556–68
- Grossman S, Hart O. 1983. An analysis of the principal-agent problem. *Econometrica* 51:7–45
- Güth W, Schmittberger R, Schwarze B. 1982. An experimental analysis of ultimatum bargaining. *J. Econ. Behav. Organ.* 3:367–88
- Haefke C, Sonntag M, van Rens T. 2006. *Wage rigidity and job creation*. 2006 Meet. Pap. 773, Soc. Econ. Dyn.
- Hannan RL, Kagel JH, Moser DV. 2002. Partial gift exchange in an experimental labor market: impact of subject population differences, productivity differences, and effort requests on behavior. *J. Labor Econ.* 20:923–51
- Harris M, Raviv A. 1979. Optimal incentive contracts with imperfect information. *J. Econ. Theory* 20:231–59
- Henrich J, Boyd R, Bowles S, Camerer C, Fehr E, et al. 2001. In search of homo economicus: behavioral experiments in 15 small-scale societies. *Am. Econ. Rev.* 91:73–78
- Hicks JR. 1932. *The Theory of Wages*. London: Macmillan
- Holmstrom B, Milgrom P. 1991. Multitask principal-agent analyses: incentive contracts, asset ownership, and job design. *J. Law Econ. Organ.* 7:24–52
- Imfeld D. 1991. *Lohnstarrheit und soziale Sicherheit des Arbeitsplatzes vor dem Gewerkschaftszeitalter: Ausgewählte schweizerische Arbeitsmärkte im Spiegel einzelwirtschaftlicher Daten aus dem späten 19. Jahrhundert*. Ph.D. thesis. Univ. Zurich
- Jensen K, Call J, Tomasello M. 2007. Chimpanzees are rational maximizers in the ultimatum game. *Science* 318:107–9
- Kahn S. 1997. Evidence of nominal wage stickiness from microdata. *Am. Econ. Rev.* 87:993–1008
- Kahneman D, Knetsch JL, Thaler R. 1986. Fairness as a constraint on profit seeking: entitlements in the market. *Am. Econ. Rev.* 76:728–41
- Kanemoto Y, MacLeod WB. 1992. The ratchet effect and the market for second-hand workers. *J. Labor Econ.* 10:85–98
- Katz LF, Krueger AB. 1991. The effects of the new minimum wage in a low-wage labor market. *Proc. Annu. Meet. Ind. Relat. Res. Assoc.* 43:254–65
- Katz LF, Krueger AB. 1992. The effect of the minimum wage on the fast-food industry. *Ind. Labor Relat. Rev.* 46:6–21
- Keynes JM. 1936. *The General Theory of Employment, Interest and Money*. London: Macmillan
- Knoch D, Nitsche MA, Fischbacher U, Eisenegger C, Pascual-Leone A, Fehr E. 2007. Studying the neurobiology of social interaction with transcranial direct current stimulation—the example of punishing unfairness. *Cereb. Cortex* 18:1987–90
- Knoch D, Pascual-Leone A, Meyer K, Treyer V, Fehr E. 2006. Diminishing reciprocal fairness by disrupting the right prefrontal cortex. *Science* 314:829–32
- Kreps DM, Milgrom P, Roberts J, Wilson R. 1982. Rational cooperation in the finitely repeated prisoners' dilemma. *J. Econ. Theory* 27:245–52
- Krueger AB, Mas A. 2004. Strikes, scabs, and tread separations: labor strife and the production of defective Bridgestone/Firestone tires. *J. Polit. Econ.* 112:253–89
- Krueger AB, Summers LH. 1988. Efficiency wages and the inter-industry wage structure. *Econometrica* 56:259–93
- Kube S, Maréchal MA, Puppe C. 2006. *Putting reciprocity to work—positive versus negative responses in the field*. Work. Pap. 2006-27, Univ. St. Gallen
- Kube S, Maréchal MA, Puppe C. 2008. *The currency of reciprocity*. Work. Pap. 377, Inst. Empir. Res. Econ., Univ. Zürich
- Laffont J-J, Tirole J. 1988. The dynamics of incentive contracts. *Econometrica* 56:1153–75
- Lazear E. 1986. Salaries and piece rates. *J. Bus.* 59:405–31
- Ledyard J. 1995. Public goods: a survey of experimental research. In *Handbook of Experimental Economics*, ed. JH Kagel, AE Roth, pp. 111–94. Princeton, NJ: Princeton Univ. Press

- Lee D, Rupp NG. 2007. Retracting a gift: How does employee effort respond to wage reductions? *J. Labor Econ.* 25:725–61
- Levitt S, List JA. 2007. What do laboratory experiments measuring social preferences tell us about the real world? *J. Econ. Perspect.* 21:153–74
- List JA. 2006. The behavioralist meets the market: measuring social preferences and reputation effects in actual transactions. *J. Polit. Econ.* 114:1–37
- Livernash ER. 1957. The internal wage structure. In *New Concepts in Wage Determination*, ed. GW Taylor, FC Pierson, pp. 143–72. New York: McGraw Hill
- Machin S, Manning A. 1994. The effects of minimum wages on wage dispersion and employment. *Ind. Labor Relat. Rev.* 47:319–29
- MacLeod WB. 2003. Optimal contracting with subjective evaluation. *Am. Econ. Rev.* 93:216–40
- MacLeod WB, Malcomson JM. 1989. Implicit contracts, incentive compatibility, and involuntary unemployment. *Econometrica* 57:447–80
- MacLeod WB, Malcomson JM. 1993. Wage premiums and profit maximization in efficiency wage models. *Eur. Econ. Rev.* 37:1223–49
- MacLeod WB, Malcomson JM. 1998. Motivation and markets. *Am. Econ. Rev.* 88:388–411
- MacLeod WB, Parent D. 1999. Job characteristics and the form of compensation. *Res. Labor Econ.* 18:177–242
- Malcomson JM. 1997. Contracts, hold-up, and labor markets. *J. Econ. Lit.* 35:1916–57
- Malcomson JM. 1999. Individual employment contracts. In *Handbook of Labor Economics*, ed. O Ashenfelter, D Card, pp. 2292–356. Amsterdam/New York: Elsevier
- Manning A. 2003. *Monopsony in Motion: Imperfect Competition in Labor Markets*. Princeton, NJ: Princeton Univ. Press
- Manning A, Dickens R. 2002. *The Impact of the National Minimum Wage on the Wage Distribution, Poverty and the Gender Pay Gap*. London: Cent. Econ. Perform.
- Maréchal MA, Thöni C. 2007. *Do managers reciprocate? Field experimental evidence from a competitive market*. Discuss. Pap. 2007-09, Univ. St. Gallen
- Marshall A. 1925. A fair rate of wages. In *Memorials of Alfred Marshall*, ed. AC Pigou, pp. 212–26. London: Macmillan
- Marshall A. 1969. *Principles of Economics*. London: Macmillan (Student Ed.)
- Mas A. 2006. Pay, reference points, and police performance. *Q. J. Econ.* 121:783–821
- Mas A. 2008. Labor unrest and the quality of production: evidence from the construction equipment resale market. *Rev. Econ. Stud.* 75:229–58
- Mas A, Moretti E. 2008. Peers at work. *Am. Econ. Rev.* 99:112–45
- McLaughlin K. 1994. Rigid wages? *J. Monet. Econ.* 34:383–414
- Naef M, Fehr E, Fischbacher U, Schupp J, Wagner G. 2008. *Decomposing trust—explaining national and ethnic trust differences*. Work. Pap. Inst. Empir. Res. Econ., Univ. Zürich
- OECD. 1998. *Employment Outlook*, pp. 31–79. Paris: OECD
- Offerman T. 2002. Hurting hurts more than helping helps. *Eur. Econ. Rev.* 46:1423–37
- Oosterbeek H, Sloof R, van de Kuilen G. 2004. Cultural differences in ultimatum game experiments: evidence from a meta analysis. *Exp. Econ.* 7:171–88
- Oreopoulos P, von Wachter T, Heisz A. 2006. *The short- and long-term career effects of graduating in a recession: hysteresis and heterogeneity in the market for college graduates*. Work. Pap. 12159, NBER
- Owens MF, Kagel JH. 2006. *Minimum wage restrictions and employee effort in labor markets with gift exchange present*. Mimeogr., Dep. Econ., Ohio State Univ.
- Padilla AJ, Bentolila S, Dolado JJ. 1996. Wage bargaining in industries with market power. *J. Econ. Manag. Strategy* 5:535–64
- Prendergast C. 1999. The provision of incentives in firms. *J. Econ. Lit.* 37:7–63
- Rabin M. 1993. Incorporating fairness into game theory and economics. *Am. Econ. Rev.* 83: 1281–302

- Rees A. 1993. The role of fairness in wage determination. *J. Labor Econ.* 11:243–52
- Ross S. 1973. The economic theory of agency: the principal's problem. *Am. Econ. Rev.* 63:134–39
- Roth AE. 1995. Introduction to experimental economics. In *The Handbook of Experimental Economics*, ed. JH Kagel, AE Roth, pp. 3–109. Princeton, NJ: Princeton Univ. Press
- Roth AE, Erev I. 1995. Learning in extensive-form games: experimental data and simple dynamic models in the intermediate term. *Games Econ. Behav.* 8:164–212
- Roth AE, Prasnikar V, Okuno-Fujiwara M, Zamir S. 1991. Bargaining and market behavior in Jerusalem, Ljubljana, Pittsburgh, and Tokyo: an experimental study. *Am. Econ. Rev.* 81:1068–95
- Shafir E, Diamond P, Tversky A. 1997. Money illusion. *Q. J. Econ.* 112:341–74
- Shapiro C, Stiglitz JE. 1984. Equilibrium unemployment as a worker discipline device. *Am. Econ. Rev.* 74:433–44
- Simon H. 1951. A formal theory of the employment relationship. *Econometrica* 19:293–305
- Slichter SH. 1920. Industry morale. *Q. J. Econ.* 35:36–60
- Slonim R, Roth AE. 1998. Learning in high stakes ultimatum games: an experiment in the Slovak Republic. *Econometrica* 66:569–96
- Solon G, Barsky R, Parker JA. 1994. Measuring the cyclicalty of real wages: How important is composition bias? *Q. J. Econ.* 109:1–25
- Tabibnia G, Lieberman MD. 2007. Fairness and cooperation are rewarding: evidence from social cognitive neuroscience. *Ann. NY Acad. Sci.* 1118:90–101
- Teulings C, von Dieten L, Vogels E. 1998. *Minimoomloon, arbeidsmarkt en inkomensverdeling*. Den Haag: Sdu Uitgevers
- Teulings CN. 2003. The contribution of minimum wages to increasing wage inequality. *Econ. J.* 113:801–33
- Treble J, van Gameren E, Bridges S, Barmby T. 2001. The internal economics of the firm: further evidence from personal data. *Labour Econ.* 8:531–52
- Williamson O. 1975. *Markets and Hierarchies: Analysis and Antitrust Implications*. New York: Free Press
- Wilson BA. 1999. Wage rigidity: a look inside the firm. *Financ. Econ. Discuss. Ser.* 1999–22. Board Gov. Fed. Reserve Syst. (U.S.)