



# Social comparison and performance: Experimental evidence on the fair wage–effort hypothesis

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## ABSTRACT

We investigate the impact of wage comparisons for worker productivity. We present three studies which all use three-person gift-exchange experiments. Consistent with Akerlof and Yellen's (1990) fair wage–effort hypothesis we find that disadvantageous wage discrimination leads to lower efforts while advantageous wage discrimination does not increase efforts *on average*. Two studies allow us to measure wage comparison effects at the individual level. We observe strongly heterogeneous wage comparison effects. We also find that reactions to wage discrimination can be attributed to the underlying intentions of discrimination rather than to payoff consequences.

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## 1. Introduction

In a concept coined ‘fair wage–effort hypothesis’, Akerlof and Yellen (1990) stress the importance of fairness considerations for workers’ effort choices. In labor relations where effort is not perfectly contractible workers’ performance might depend on the perceived fairness of their salary. The core assumption of the fair wage–effort hypothesis is that workers compare their wage  $w$  to the fair wage  $w^*$ . Effort is assumed to be increasing in  $w$  as long as a worker’s wage falls short of  $w^*$ ; wage increases beyond  $w^*$  do not increase effort further. In this paper, we investigate this hypothesis experimentally, using a three-person gift-exchange game as our work horse.

There is by now a large body of experimental evidence showing the importance of reciprocity in social exchange situations. Starting with Fehr et al. (1993), the literature on gift-exchange experiments shows that on average the effort of experimental

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workers increases in the generosity of the wage offered by the employer.<sup>1</sup> The existing experimental literature focuses largely on *bilateral* relations between an employer and a worker, or, in other words, on a 'vertical' comparison within a firm's hierarchy. Especially in real workplaces, however, it is most likely that Akerlof and Yellen's "fair wage" is to a large degree determined by 'horizontal' comparisons among employees. It is likely that people take their peers, that is, co-workers who are comparable to them, as a reference group for social comparisons (e.g., Falk and Knell, 2004; Clark and Senik, 2010). If social comparisons are important for work morale, internal pay structures (including wages, fringe benefits, and other perks) are important for performance. In the words of Bewley (1999) who interviewed more than 300 personnel managers: "The main function of internal structure is to ensure internal pay equity, which is critical for good morale" (p. 82).<sup>2</sup>

In this paper we investigate these morale effects using lab experiments. Laboratory experiments are suitable because they allow for the extensive control we need for answering our research questions (Falk and Heckman, 2009; Croson and Gächter, 2010). We concentrate on wage effects and use a three-person gift-exchange game (one employer, two employees) to measure the influence of wage differences on efforts. As common in gift-exchange experiments, effort is costly for employees but higher efforts increase total welfare. We are in particular interested in observing  $e_i(w_i, w_j)$ , where  $e_i$  denotes worker  $i$ 's effort as a function of his or her own wage  $w_i$  and the wage of a co-worker,  $w_j$ . From previous experiments we predict that  $\Delta e_i / \Delta w_i > 0$ , that is, on average employees react reciprocally to their own wage (despite material incentives to choose minimal effort irrespective of wages). The three-person gift-exchange experiment allows a direct measurement of  $\Delta e_i / \Delta w_j$ , that is, *wage comparison effects*—the average reaction of a worker's effort to an observed change in the co-worker's wage. Of particular interest for us are situations of 'pure' pay inequity, that is, inequitable situations that are not justified by situational differences, or differences in performance or merit, which equity theory (e.g., Adams, 1965; Konow, 2000) would predict are acceptable. In the cases we study, unequal pay is simply wage discrimination.

To answer our research question we conducted three studies. In *Study 1* we use three-person gift-exchange games played in the usual sequential (direct response) mode. We repeat the basic three-person gift-exchange game eight times and randomly re-match groups of three players in each round. This is the simplest extension of the two-player game to allow for wage comparison effects. On average our experimental evidence supports Akerlof and Yellen's fair wage–effort hypothesis, if we assume that a worker takes the co-worker's wage as the reference wage. This assumption is plausible because in our experiment workers are identical, act in identical decision situations, and receive information only about their own and their current co-worker's wage. We find that experimental workers who face disadvantageous wage discrimination (that is, who are paid less than their colleague) significantly reduce their effort relative to a situation with equal wages.

In *Study 1* we focus on average wage comparisons. In *Study 2* we look at individual differences in wage comparison. Heterogeneity is interesting for at least three reasons. First, the theoretical solutions of our three-person gift-exchange game with social preferences allow for a wide range of patterns (see Thöni, 2009). Second, also empirically, heterogeneity is to be expected in our environment, given what we know from previous research on social preferences (see, e.g., Fehr and Fischbacher, 2002; Camerer and Fehr, 2006). Third, heterogeneity might also be a reason why some previous studies had difficulties finding wage comparison effects on the aggregate (e.g., Charness and Kuhn, 2007). If individual preferences go in different directions they might cancel each other out in the aggregate. *Study 2* therefore investigates individual heterogeneity by using the strategy method to elicit effort reactions given all possible wage combinations. This has the advantage that we can elicit the entire wage–effort function, i.e., observe  $e_i(w_i, w_j)$  for each individual and *all* possible wage combinations, not just those that happen to arise under the direct response method. The results show that the *average* effort reaction is again consistent with the fair wage–effort hypothesis. Yet, the average masks a large degree of heterogeneity. We observe a great variety of wage comparison patterns and provide a classification.

Finally, *Study 3* explores whether wage comparison effects are due to intentional wage discrimination or due to payoff differences. This question is interesting, given recent evidence that fairness concerns are strongly influenced by perceived intentions (e.g., Falk et al., 2008). To test for the role of intentions we conduct an experiment where a random device chooses the wages. Thus, employers are not responsible for discriminatory wage arrangements. We find that the employer's intention to discriminate wages rather than mere payoff consequences triggers the wage comparison effects.

We see our experimental approach as complementary to other, more conventional empirical methods. The existing empirical studies paint a mixed picture about the consequences of wage inequality.<sup>3</sup> We use laboratory experiments to cleanly isolate wage comparison effects from other confounding factors such as differential productivities and abilities. Our design allows us to observe morale effects directly.<sup>4</sup> Moreover, if wage comparison effects are behaviorally important and can have negative morale effects as suggested by Bewley's quote, we might not be able to observe wage comparison effects easily in the field because naturally occurring wage structures are already designed to avoid negative morale effects.

<sup>1</sup> See, for instance, Fehr et al. (1998); Hannan et al. (2002); Brandts and Charness (2004); Charness et al. (2004) and Charness (2004). For gift-exchange games with more than one employee see Maximiano et al. (2007). For recent overviews see Fehr et al. (2009) and Charness and Kuhn (forthcoming).

<sup>2</sup> See, e.g., Agell and Bennmarker (2007) for similar findings. Clark and Oswald (1996) show that there is a significantly positive connection between an employee's relative income and job satisfaction. Loewenstein et al. (1989) provide a psychological account of inequality in social comparisons.

<sup>3</sup> Some studies find that internal pay dispersion is detrimental for work morale and job performance (e.g., Grund and Westergaard-Nielsen, 2008), others fail to find that pay dispersion has any effect on employees' behavior (e.g., Leonard, 1990), and some studies even find that large pay differentials may have beneficial effects on firm performance (e.g., Winter-Ebmer and Zweimüller, 1999).

<sup>4</sup> For a neuro-economic study on social comparisons that uses a similar methodology see Fließbach et al. (2007).

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