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# Wage inequality and team production: An experimental analysis

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ABSTRACT

Numerous survey studies report that human resource managers curb wage inequality with the intent to avoid detrimental effects on workers' morale. However, there exists little controlled empirical evidence demonstrating that horizontal social comparisons and wage inequality have adverse effects on worker behavior. In this paper, we present data from a laboratory experiment that studies the impact of wage inequality on participation and effort choices in team production. Overall, we do not find evidence that wage inequality has a significant impact on either participation or effort choices.



## 1. Introduction

Does wage inequality influence worker behavior? Numerous survey studies report that human resource managers curb wage inequality to avoid negative effects on workers' morale.[1] Bewley (1999) concludes that "The main function of internal [pay] structure is to ensure internal pay equity, which is critical for good morale." (p. 82). However, there exists little controlled empirical evidence demonstrating that horizontal social comparisons and wage inequality indeed have adverse effects on employee behavior. Without such evidence, the argument that wage compression is a profit-maximizing policy in response to workers' equity concerns remains debatable.

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[1] See, for example, Blinder and Choi (1990) and Campbell and Kamlani (1997).

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In this paper, we report data from a laboratory experiment that studies the impact of wage inequality on participation and effort choices in team production. In our experiment, subjects must first decide whether or not to engage in team production. If they join a team, they can contribute costly effort to produce some joint team output. In return they receive a wage payment. Wage payments increase in team output but they are also influenced by individual stochastic shocks. In our experiments, we vary the correlation of these wage shocks: in one treatment the shocks are perfectly positively correlated so that both team members always get the same wage ("Equal Wages"). In another treatment the shocks are perfectly negatively correlated so that wages always differ ("Unequal Wages"). The important feature of the experimental design is the following: for given team output expected wages and thus monetary incentives to exert effort are identical in both treatments, but expected wage inequality differs decidedly. In a formal model we explicitly show that if sufficiently many agents are inequity averse and suffer utility losses from wage inequality, we should observe a clear treatment effect: average effort levels should be lower and agents should be less keen in participating in team production. In contrast, if all agents are purely self-interested, the treatment difference should not affect effort and participation choices. We study the impact of wage inequality on subjects' team participation choices and effort levels by analyzing behavior across subjects in our two treatments. Overall, our experimental data cannot reject the null-hypothesis that expected wage inequality has no impact on either participation or effort choices.

Our paper complements several recent laboratory experiments that analyze horizontal social comparisons in employment relationships. In Abeler, Altmann, Kube, and Wibral (forthcoming) workers exert effort which firms can then reward with discretionary bonus payments. They find that forcing firms to pay the same bonus to both workers reduces worker effort. The reason is that reciprocity considerations are violated when different effort levels lead to identical bonus payments, and agents who suffer from a violation of their reciprocity considerations subsequently withdraw effort. Maximiano, Sloof, and Sonnemans (2007) study a gift-exchange situation in which firms can offer several workers high fixed wages to induce them to reciprocate with high voluntary effort. They find that the reciprocity relationship between firms and workers is not affected by the number of workers per firm. However, the impact of wage inequality on workers' participation and effort decisions cannot be studied since they restrict firms to offer equal wages. Charness and Kuhn (2007) extend Maximiano, Sloof, and Sonnemans by allowing firms to offer different wages to different workers whose productivities differ. They find that workers' effort choices do not depend on co-workers' wages. In contrast to the seminal theoretical contributions by Akerlof (1982) and Akerlof and Yellen (1990), the experimental literature thus largely suggests that wage compression relative to productivity does not seem to be an optimal firm response to co-worker equity concerns.[2]

Our paper differs in important ways from the existing experimental studies. First, in our experiment we have no subjects acting as firms or principals who set wages. Vertical fairness concerns between firm and worker thus cannot overshadow horizontal social comparisons among workers. Second, the absence of a subject in the role of the principal who sets wages allows us to exogenously vary wage inequality in our treatments. In contrast, Charness and Kuhn implemented productivity differences to induce principals to pay different wages, and such productivity differences might justify wage differences. Third, in our experiment workers jointly produce output that is distributed among them. This payoff interdependence should, if it has any behavioral effect, amplify horizontal social comparisons. Despite these design features, which were all implemented to foster horizontal social comparisons, our results corroborate the existing laboratory evidence that wage inequality does not have adverse behavioral consequences.

Our experimental study also contributes to a series of recent theory papers that investigate the impact of horizontal equity concerns on optimal contracts in moral hazard situations with multiple agents.[3] Two major effects of equity concerns emerge in this literature. First, agents with other-regarding preferences (such as inequity aversion as formulated by Fehr & Schmidt (1999)) must be compensated for expected wage inequality if their participation constraint is binding. Second, wage inequality affects agents' effort choices if by exerting more or less effort agents can reduce wage inequality. We do not explicitly test any particular one of the existing theory models. Rather, we concentrate on finding evidence for these two major effects that were formulated in this literature and that should (as we formally derive below) show up in our experimental setting if sufficiently many agents are inequity averse and compare wages. However, our data does not suggest that wage inequality has an impact on agents' participation decision, nor do we find that wage inequality affects effort choices.

The remainder of the paper is organized as follows. Section 2 develops a simple model of wage inequality in team production. The model allows us to formally derive our hypothesis on the impact of wage inequality on effort and participation decisions in our experimental team production game. Section 3 explains the experimental design and procedures in detail and states our hypothesis. Section 4 presents the results of our study. Section 5 concludes.

## 2. A model of wage inequality in team production

Our experimental design, which is explained in detail in Section 3, is based on the following principal agent situation. A principal hires a team of two agents *a* and *b* to jointly increase the quality of a product. Agents can increase product quality

[2] In a related experimental setting, Güth, Königstein, Kovács, and Zala-Mezõ (2001) find some evidence that principals compress wages to reduce wage inequality – even though they also conclude that agents' effort decisions do not seem to be driven by fairness concerns. However, in a recent experimental paper Gächter and Thöni (forthcoming) show that disadvantageous wage discrimination in three-person gift-exchange experiments does lead to lower effort. See also Clark, Masclet, and Villeval (2010).

[3] See, for example, Itoh (2004), Demougin, Fluet, and Helm (2006), Rey Biel (2008), Bartling (forthcoming), Bartling and von Siemens (2010a, 2010b) and Neilson and Stowe (forthcoming).