

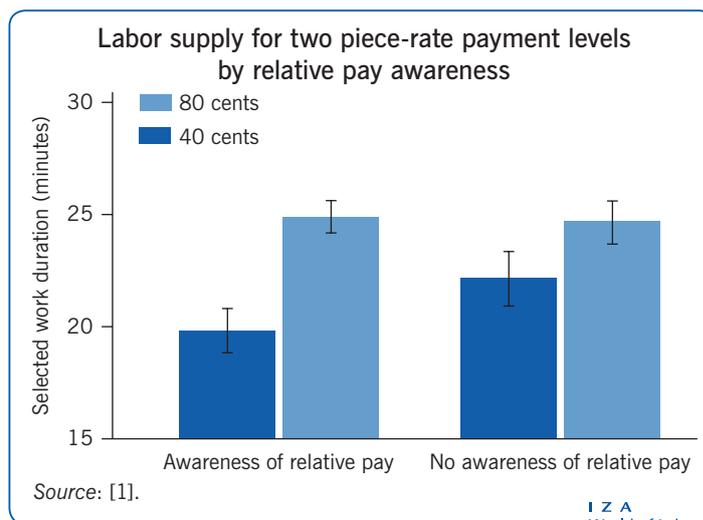
Relative pay, effort, and labor supply

Comparisons to others' pay and to one's own past earnings can affect willingness to work and effort on the job

Keywords: relative pay, effort, labor supply, lab experiments, field experiments

ELEVATOR PITCH

Recent studies show that even irrelevant relative pay information—earnings compared to the past or to others—significantly affects workers' willingness to work (labor supply) and effort. This effect stems mainly from those whose pay compares unfavorably; accordingly, earning less compared to others or less than in the past significantly reduces one's willingness to work and effort exerted on the job. Comparing favorably, however, has mixed effects—with usually no effect on effort, but positive or no effects on labor supply. Understanding when relative pay increases labor supply and effort can thus help firms devise optimal payment structures.



KEY FINDINGS

Pros

- + Knowledge about relative pay that bears no new information should, theoretically, not affect labor supply and on-the-job effort; but in fact it does.
- + Recent studies indicate that the effect of relative pay is almost exclusively negative and stems from those who reduce their labor supply and on-the-job efforts in response to being compared unfavorably.
- + The effect of relative pay is conditional on workers being aware of wage differentials; when an acceptable reason for differential pay is provided, no adverse consequences are found.

Cons

- While some studies show that receiving favorable relative pay can increase labor supply, the results are not found consistently, and thus no general positive effects can be inferred.
- Although convincing, recent results on relative pay are shown in just a few limited settings.
- Much of the research has been conducted in a controlled environment where the relevant reference pay is straightforward; in real life, however, the relevant reference pay is often complex and the findings are therefore difficult to generalize.

AUTHOR'S MAIN MESSAGE

Relative pay information may reduce labor supply and productivity. The transparency of differential pay and productivity across workers, as well as the ease at which differential pay or pay cuts can be explained to workers can help determine the success or failure of using relative payment schemes. These concerns can result in wage compression (lower wage differentials compared to productivity differentials), different wage structures across industry or skill, and may also contribute to unemployment. Considering the work environment when designing optimal incentives is therefore key, and strong differential pay is likely beneficial when it is well justified or private.

MOTIVATION

According to standard economic theory, decisions such as taking up a job or how much effort to exert on the job balance marginal cost and marginal benefit (e.g. pay). Being aware of relative pay that bears no new information, that is, information that sheds no new light on the task to perform, on other work opportunities, or that cannot serve to change one's pay, should not be a factor in those decisions. Based on these ideas, companies often use strong incentives, in the form of competition and differential pay, to motivate workers.

Nevertheless, individuals are generally shown to be affected by relative thinking. For instance, people often respond to gains or losses in income, rather than to the resulting overall total amount. Individuals also respond to social status, which is, by definition, the position of an individual in relation to others. In the labor market, relative thinking means that relative pay—one's earnings relative to one's own earnings in the past or relative to others—may matter in an important way. For example past wages are thought to influence reservation wages (the minimum wage at which an individual is willing to work), and therefore, unemployment; whereas pay cuts are thought to dampen morale, and hence effort.

Despite the suggestive evidence on reservation wages and morale, it is difficult to find direct causal relationships between relative pay and labor supply. Other relevant questions that are likewise important, yet difficult to show directly include: Does relative pay affect exerting effort on the job? Does low relative pay motivate workers to work harder to get ahead, or does it discourage their efforts? Does high relative pay cause employees to reciprocate by working harder? A collection of new studies provides direct evidence and answers these questions, to some extent.

DISCUSSION OF PROS AND CONS

Relative pay and labor supply

Results of lab and field experiments and empirical work all show that relative pay does affect labor supply, where by labor supply we mean an individual's decision of how much time to work, if at all. The findings indicate that relative pay affects those who compare unfavorably, i.e. whose pay is lower than others or compared to their past earnings, and it leads them to reduce their labor supply. At the same time, relative pay has no effect on the labor supply of those who compare favorably, i.e. whose pay is higher than others or compared to their past earnings.

In the lab, this has been shown in simple settings where participants were asked to choose how much to work on a given task for a piece-rate pay. There were two pay levels: high and low. In one condition, participants were only aware of one pay rate—their own—while in the second condition, participants were aware of both piece-rate levels. When participants were aware of both pay levels, it revealed that some participants earned less and some earned more than others in the room. The results show a strong effect of relative pay on labor supply: when participants were aware of the differential pay (i.e. different pay for different people doing a similar job), lower-paid individuals supplied significantly less work time relative to higher-paid individuals, and significantly less work time compared to lower-paid individuals who were unaware of the higher pay rates. Those who earned the

higher rate, however, were not affected by the relative pay information—see the illustration on page 1 [1]. Similar results to those found in the lab were also found in the field. In a study examining low-skilled manufacturing teams in India, teams were randomly assigned to either receive equal or differential pay; each team in the factory produced a different product, but within each team, all team members produced the exact same product. In this setting, team members are the obvious reference group, and the results show that those who earn less than their peers are less likely to show up to work [2].

These findings are also supported in empirical work. Using survey data on job satisfaction and intentions to quit, it has been shown that University of California employees who were aware of being paid less than their peers had lower job satisfaction and reported a higher likelihood of quitting [3]. Interestingly, there was no analogous effect on employees who were aware of being paid more than their peers. While this study was only suggestive (as it was based on quitting *intentions*), a recent study complements this result by analyzing actual quitting data of workers in a large US retail company. The study explores relative pay effects that followed a pay *raise* to all employees. The structure of the pay increase resulted in cases of differential pay of ten cents among employees whose pay, prior to the raise, was one cent apart. This differential pay—pay relative to others doing a similar job—led to higher rates of quitting among those who fared unfavorably [4].

While these results focus on interpersonal relative pay—i.e. pay relative to others—there is also evidence that a person’s own past pay has a similar effect [1]. To test this relationship, researchers approached participants in an unrelated marketing study and offered those participants (after the completion of the initial study) to return to the lab for a similar task. The participants were offered either the same or a different amount of money compared to the first study, resulting in individuals who were offered more than before, less than before, or the same amount as before. The findings show that individuals who were offered more than they earned before for a similar task were most likely show up to work, whereas individuals who were offered less than before were the least likely to show up.

Relative pay and effort

In addition to willingness to work, relative pay also affects a worker’s decision about how much effort to exert on the job. Economists often think of effort as a “gift-exchange”: The employer gifts the worker with good pay and the worker reciprocates with high effort level. Several lab experiments that mimic such environments (also known as “gift-exchange studies”) do indeed find that workers select high effort for high pay. In the context of relative pay, the question is thus whether differential pay would affect this reciprocal relationship: Would awareness of differential pay make the highly paid workers feel obligated to exert even more effort, and lower paid workers to retaliate with low effort levels?

Two lab experiments investigate this question in a gift-exchange environment where workers are identical—meaning that both the cost of any given effort level and its effect on the “employer” payoff is identical for all workers—but receive differential pay. The findings show that comparing unfavorably to others in terms of pay does indeed lead to lower effort selection [5], [6]. However, receiving a higher wage than others does not necessarily lead to greater efforts [6]. The result that relative pay is important for effort

is also supported by survey evidence, which indicates that workers' income rank in their reference group's income distribution correlates positively with the extent to which one agrees with the assertion that they are "... willing to work harder than I have to in order to help the firm or organization I work for to succeed" [5]. That is, the lower a worker's income rank, the less willing they are to work hard, which corresponds closely to the idea of effort exertion on the job.

While the above lab results can be criticized since in the gift-exchange setting effort is measured by a number selection (i.e. participants simply select a number that represents the level of effort they give their "employer"; a larger number costs more to the worker and increases the employer's payoff), the same pattern has been shown to emerge in a real-effort task environment. For instance, a lab experiment in which participants were randomly selected to receive a pay increase or a pay cut showed that when participants were aware of the differential pay, those who received a pay cut reduced their efforts, while there was no effect on effort by those who received a pay raise [7]. More recent field experiments find the same pattern and add to it by showing that the effect holds not only when relative pay is relative to others, but also when it is relative to one's past [8]. In one field experiment, workers were recruited to distribute promotion cards in pairs. After an initial phase, some pairs received the same wage as before, some had one worker's pay cut, and in some pairs both workers had their pay cut. Lower relative pay, compared to the past, led to a reduction in performance, and lower relative pay compared to the other worker in the pair reduced the performance of the worker who compared unfavorably even further. However, there was no effect on those who were in a differential pay condition and earned more than their peer.

A second field experiment that finds a similar pattern is the previously mentioned study conducted with manufacturing teams in India. As reported earlier, the differential pay caused individuals who earn less than their peers to be less likely to show up to work (i.e. an effect on labor supply). Additionally, for those who compare unfavorably and do show up to work, their productivity (i.e. effort) is lower. At the same time, no effect was found on the productivity of those who receive higher pay [2]. The same results emerge in another recent field experiment using the online platform TaskRabbit [9]. This is important evidence, because the wage at TaskRabbit is not set by the employer; rather, workers bid their asking price for the job, making this a unique example of worker-driven differential pay. This study finds that individuals who learn that they are paid less compared to others for the same job exert less effort, as captured by quality or time spent completing their work. Once again, no effect was found on those who earn more than their peers.

Finally, support for this pattern was also found outside the lab in the context of bonus payments. Specifically, a study examined managers in a firm operating both in the US and in Germany, where each manager is assigned a target bonus. The actual bonus awarded each year depends on performance evaluations, with the firm setting some general rules, and each manager's supervisor then having final discretion in pinning down the manager's bonus amount. Moreover, awarding one manager in a department more than 100% of their allotted bonus target comes at a cost of a lower bonus percentage to another manager in the department, due to a fixed departmental bonus budget. Given this bonus structure, and using the fact that the managers in one location were given the information on their final bonus percentage compared to the allotted target (i.e. 90% of the target, 110% of the target) while workers in another location were not, the study finds

that being aware that one's bonus percentage is lower than the allotted 100% significantly reduces satisfaction and productivity while being aware of exceeding the 100% bonus has no significant effect, consistent with the experimental results [10].

Providing a reason for differential pay

While the above results on the effect of relative pay on effort may strike one as intuitively true, in many cases, workers passively accept differential pay or pay cuts. That is, they do not seem to reduce their efforts in response to earning less compared to their peers. Interestingly, two experimental studies in which employers used differential pay find that neither the workers who are paid less, nor those who earn more than their peer change their efforts in response [11], [12]. This stands in contrast to the results reviewed above. The key difference between the studies that do find an effect of relative pay on effort and these two that do *not* find this relationship is that in the latter two it was common knowledge that workers had different productivities. Differential productivity may therefore serve as an acceptable explanation for differential pay.

The idea that workers might accept differential productivity as a justification for differential pay to the point that it offsets potential negative effects is consistent with findings in the lab and the field. In the lab, it was shown that when participants were given a reason for differential pay, even if the reason was irrelevant to the task, the negative effect of relative pay disappeared [1]. Specifically, in the lab experiment where participants were asked to choose time of work on a given task, some of those who were aware of the two pay rates for the same job were asked to write a short essay prior to the study. These participants were then told that their pay rate was based on an evaluation of the short (unrelated) essay; unbeknownst to the participants, the evaluation process was entirely random. This rather weak explanation was sufficient to offset the detrimental effect of relative pay on labor supply found in that study. Interestingly, when the random evaluation procedure of the essay was revealed, the detrimental effect of relative pay on labor supply (for those who earned less) re-emerged.

A similar effect was found in the field experiment that examined manufacturing teams in India [2]. The study finds that when there was a clear productivity differential within a team, the detrimental effect of receiving lower pay on productivity and labor supply was completely offset. In other words, the observable productivity differential served as an acceptable explanation for why team members received differential pay, thereby negating its negative effects. Empirical evidence is also consistent with these results: The study examining bonus payments finds that the negative effect of receiving a bonus percentage that was less than the target 100% was muted when managers felt their performance evaluation was appropriate [10]. Related to this result, a gift-exchange study finds that intentions matter—when wage differentials were picked by a random device rather than by the employer, then, despite some workers receiving lower pay, the negative effect of differential pay on effort disappeared [6].

Potential underlying mechanisms

The evidence that relative pay affects labor supply and effort on the job is consistent with reference-dependent preferences. That is, that individuals' utility, or benefit, depends

not only on the overall amount they are being paid, but also on its deviation from some reference point.

Reference-dependent preferences, in the context of labor decisions, may reflect inequality aversion—a dislike for inequality. If inequality aversion is a factor in driving the relative pay effect, then the expected effect would be that people who compare favorably and earn more increase their effort (higher cost) and those who compare unfavorably and earn less reduce their effort (lower cost). By increasing the cost for those who are paid more and reducing the cost for those who earn less, the outcome (i.e. an individual's pay minus costs) becomes closer, i.e. more equal. Importantly, however, this explanation implies an effect regardless of whether a justification for the relative pay such as tenure at the firm or performance on a different task is provided or not.

Another possibility is that reference-dependent preferences are a reflection of fairness concerns and reciprocity. In this case, the reference point is a fair pay and the reaction to a given pay is in accordance with whether that pay is perceived as fair or not. If other people's pay or the pay earned in the past informs one's perception of what is fair pay, then those factors would affect individual behavior. In particular, pay that is compared unfavorably to that received by others or to the pay received in the past may be considered unfair, triggering a reciprocal reaction in the form of lower effort or lower labor supply. This mechanism further implies that intention or justification for the relative pay would matter. If lower pay is thought to be based on a difference in productivity in another task or tenure at the firm, for instance, then the reference pay, i.e. the fair pay, may be revised and the worker would not negatively reciprocate against the employer.

Status concerns, i.e. caring about one's standing relative to others, may also be a factor in driving the relative pay effect and is consistent with reference-dependent preferences. The idea is that individuals like high status and dislike low status, and therefore may become discouraged when they are paid less than others, thereby leading to reduced effort or labor supply. Conversely, those who are paid more than others may have an elevated motive to perform and thus increase their effort or labor supply. The effect of status is complex since others need to know of one's status to confer status, and the reference group is endogenously chosen by the individual. As such, in the context of relative pay, status is most likely to have an effect in environments where earnings or bonuses are known publicly and no effect in environments where earnings or bonuses are private. The effect of justification, as well, is more nuanced if status is a factor in the effect of relative pay. If a justification for a differential pay leads one to change his or her reference group such that he or she attains a higher status (within the new reference group) then the justification would counteract the negative effect of relative pay. For instance, if a company justifies differential pay by tenure at the firm, the reference group may change from anyone in the firm doing a similar job to new hires. Suppose a new hire earns less than others in her department doing the same job but earns relatively more compared to new hires. If this new hire revises her reference group in response to the justification, then the initial negative status effect may disappear. Yet, if the justification does not manage to change one's reference group, it would not change status and would thus not offset the negative effect of relative pay.

However, given that the effect is found even when incentives are private and that there is evidence that status-irrelevant justifications play a central role, status concerns do not seem to explain the evidence well. Thus, one is left with the inequality-aversion and

fairness and reciprocity explanations. The inequality-aversion explanation suggests that individuals dislike inequality in general, regardless of their own income rank. This explanation therefore implies a symmetric response whether one earns more or less than others. In addition, if inequality-aversion is the main reason for the effect, intentions or justification for differential pay such as tenure at the firm or performance on another task should not play a role since such justification does not change the fact of inequality. Hence, inequality-aversion does not seem to fit the evidence well either.

The fairness and reciprocity explanation, while potentially resulting in a symmetric response, can also accommodate an asymmetric response. For instance, if the highest available pay is considered the fair pay, then only negative reciprocity would be expected. Importantly, justifications and intentions are at the core of the fairness-reciprocity explanation, and of the mechanisms discussed so far, it fits the results best. Nevertheless, different mechanisms may matter in different environments; therefore, while the behavioral pattern seems robust, more evidence is needed to draw conclusions on the driving force behind the effect.

LIMITATIONS AND GAPS

The evidence suggests that unjustified relative pay can have negative effects on both willingness to work and effort on the job. Yet, most studies focus on one aspect only. In gift-exchange settings, for instance, workers can determine their effort level and it is the only way for them to express their frustration due to unfavorable relative pay. By contrast, the study of the effect of relative pay on workers in the University of California [3] and the one on unequal raises in a large retail firm [4] focus exclusively on workers' quitting intentions or actual quitting rates, i.e. labor supply.

While in a few experiments relative pay had the potential to affect both labor supply and effort provision, in effect, their settings were more suitable for testing only one of these dimensions. For instance, in the lab experiment where participants chose their time of work, payment was based on a piece-rate and there was no employer–employee relationship involved [1]. In that setting, participants' efforts benefit only themselves; hence, reflecting one's frustration is likely to be expressed in terms of labor supply rather than effort. Indeed, this is reflected in the findings, which show a detrimental effect of relative pay on labor supply, but no effect on productivity. In two of the discussed field experiments—the first at TaskRabbit [9] and the second distributing promotion cards [8]—while the focus was on performance, workers could, in principle, quit; however, none of the workers actually did. Examining the settings of these experiments closely shows that both used very short-term work engagements (between an hour and a few hours), and workers learned of the differential pay only after accepting the gig. That makes it natural to respond to relative pay in terms of effort rather than by quitting. Furthermore, in the TaskRabbit study, workers bid for work, which likely made them feel obligated to complete the work that they “won” (i.e. were hired to do), resulting in productivity being the only channel through which they could react to the relative pay.

The study of manufacturing teams in India is perhaps the only study where a natural reaction to relative pay was both in terms of labor supply and effort on the job [2]. While the study examines a temporary work engagement, it was a month-long engagement, wages were based on a flat daily fee, and wages were set by the employer. That is, because

showing up to work would entail a fixed wage, workers could shirk on effort to express their frustration, and having a month-long engagement is sufficient for workers to consider quitting as a viable response to the relative pay. This study does indeed find detrimental effects of relative pay on both labor supply and effort on the job.

Given that there is only one study where responding to relative pay is natural via both labor supply and effort, more research is needed to fully understand how relative pay manifests itself in the labor market.

It is also important to note that all recent studies focus on very low-skill tasks. Hence, to find out whether the effect translates into other settings with more skilled labor, further research is needed to investigate the effect in different environments, industries, and with tasks that are more diverse.

Finally, while the experimental settings were designed such that the relevant reference pay was clear, in many real-life environments this is not the case. For instance, individuals' reference pay may be the pay of workers in the same firm doing the same job, doing a very similar job, or perhaps the pay of other workers doing different jobs in the same company. The reference pay may also be affected by the pay of similar workers in different firms. Consistent with this idea, it has been shown that following the Security Exchange Act in 1934 that mandated pay disclosure for listed firms in the US, the pay of CEOs was compressed, controlling for size and industry. Interestingly, the pay of the CEOs who compared unfavorably to others leading similar-sized firms in the industry went up, while the pay of those who compared favorably did not generally fall (except for the top 2%) [13].

Hence, applying insights from the studies summarized above to real-life environments should be done with caution. One must think carefully about what constitutes workers' reference pay in each specific case, the task at hand, and the transparency of the relative pay.

SUMMARY AND POLICY ADVICE

The evidence suggests that relative pay negatively affects decisions relevant for the labor market, such as labor supply and on-the-job effort. The effect stems from those whose pay compares unfavorably—whether compared to others' or to their own past pay—leading them to supply less labor and exert less effort.

The potential negative effect of relative pay and the conditions under which it is found are clearly important to consider when designing workers' incentives, especially differential pay, and when thinking of unemployment during times of recession.

One important condition to consider is the workers' awareness of, and/or the reason for relative pay. Workers seem to accept lower relative pay when there is even a weak acceptable explanation for it. Hence, strong differential pay may be effective in environments where productivity differences, past evaluation, or perhaps tenure at the firm, are obvious or when workers are unlikely to communicate with each other with respect to pay. On the other hand, in environments where employees work in close proximity and are similar in many respects, relative pay may backfire; that is, it may lead to lower productivity or difficulty retaining workers.

Relative pay also has implications for unemployment, as past pay has been shown to affect labor supply. During the Great Recession, for instance, most of the jobs lost were concentrated in the construction industry, where the weekly wage is higher than in industries the unemployed could likely switch to, such as transportation and hospitality. Although this idea demands further research, relative pay may be part of the explanation for the prolonged unemployment spells workers went through in this recent recession. Likewise, if differential pay across workers is a factor in reducing labor supply, it may also contribute to unemployment: Unlike the effect of current pay relative to one's past pay, differential pay effects on unemployment may depend on the observability of pay across workers and the extent of the difference across employees (wage compression).

While there is a need for further research, the evidence is quite convincing that relative pay influences labor-relevant decisions, and that to alleviate its potentially negative consequences, explaining the need for pay cuts during times of recession or providing convincing reasons for adopting differential pay may be beneficial for firms who are concerned with their workers' productivity and/or hiring more workers.

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Competing interests

The IZA World of Labor project is committed to the *IZA Guiding Principles of Research Integrity*. The author declares to have observed these principles.

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