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Relative Pay and Labor Supply

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Abstract:

The authors use a laboratory experiment to examine the impact of relative wages on labor supply. They test the hypothesis that, ceteris paribus, making a given wage high (low) relative to other wage levels will lead to an increase (decrease) in labor supply. They find that labor supply does respond significantly to relative pay, and in the expected direction. However, when a strong enough reason is given for the relative low pay, this difference disappears.

JEL Classifications: J22, J31, D03

Keywords: labor supply; relative pay; experimental economics

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1. Introduction

Going back to Adam Smith (1759), a fundamental psychological insight is that people respond to relative as well as absolute levels of economic variables. Smith posited that people are motivated by the desire to produce material improvement (in comparison to past levels) and by vanity—the desire to compare favorably to others. Later economists, most prominently Leibenstein (1950), Duesenberry (1952), and Frank (1985) have pursued the logical implications of such relative concerns by examining their consequences for patterns of consumption, job choice, and labor force participation. For example, Duesenberry's "relative income hypothesis" posits that people compare their current consumption to that of others, which can help explain the classic pattern of increasing marginal propensity to consume (MPC) as a function of wealth cross-sectionally, but not over time, and Frank has shown that if individuals derive positive utility from upward comparisons to other people's incomes and negative utility from downward comparisons, they will be willing to sacrifice absolute income to be a "big fish in a small pond"—a pattern for which he provides diverse evidence.

By definition, relative consumption or income is measured relative to a reference point (Kahneman and Tversky 1979; Kőszegi and Rabin 2006). Reference points were found, for example, to influence job satisfaction (see, for example, Pfeffer and Langton 1993). In a survey of 18 European countries, Clark and Senik (2010) find that work colleagues are the most frequently cited reference group, and in a survey of employees in the University of California system, Card et al. (2010) find that the likelihood of searching for a new job is higher among those whose incomes compare unfavorably to those of their colleagues.

In this paper, we test whether relative pay affects labor supply, where relative pay is interpreted as one's current pay relative to past wages, or as one's pay relative to the pay others receive.[1] Summers (1986) and Feldstein and Poterba (1984) argue that an individual's reservation wage depends on past wages, and in the context of work morale Bewley (1999), drawing on extensive interviews with corporate managers during a recession, provides support for the claim that past wages are a salient point of comparison that is important for the labor market.

[1] Relative pay may also be defined relative to expectations shaped by other factors. However, in this paper, we treat relative pay as relative only to past pay or to other people's pay.

Nevertheless, finding direct evidence on the effect of relative pay, including past wages, is difficult. In the literature, the studies that stress past wages as a salient point of comparison rely mainly on survey data, and little direct evidence is available documenting the impact of relative wages on labor supply. Converging evidence using methods such as experiments may therefore be important in this case.

In this paper, we experimentally test the hypothesis that relative pay affects labor supply and, ceteris paribus, making a given pay rate high (low) relative to other pay levels will increase (decrease) labor supply. To test this hypothesis, we offer participants the option to work on a given task for a piece-rate pay level that is either high or low. In one condition, participants are only aware of one pay rate, whereas participants in the second condition have a natural reference point—the other piece-rate pay level offered. We find that relative pay comparisons do affect labor supply: when interpersonal comparisons were available—that is, when participants were aware of different pay rates given for the same task—lower-paid individuals supplied significantly less work time relative to higher-paid individuals, and significantly less time than when they were unaware of the higher pay rates. Perhaps surprisingly, however, when such interpersonal comparisons were not available, labor supply was not different across the different pay rates. When using intrapersonal comparisons, achieved by offering participants different pay rates on different occasions for similar tasks, the individuals who were offered higher remuneration than they had previously received were more likely to choose to work compared with those individuals who were offered less pay than they had previously received. Although not our main focus, for the sake of comparisons with other experimental results, we also examine the effect of relative pay on effort and find none: disclosing information on other pay rates did not affect effort during the chosen work period.[2]

[2] There are also several recent experimental studies that examine the effect of relative pay reciprocity (see Charness and Kuhn 2011 for a survey). Past wages have been shown to influence productivity in some studies (e.g., Kube, Marechal, and Puppe (2010), and Cohn, Fehr, and Goette (2010)), but not in others (Greiner, Ockenfels, and Werner (2011). Charness and Kuhn (2007), Fischer and Steiger (2009), and Hennig-Schmidt, Sadrieh, and Rockenbach (2010) find no effect of others' pay on effort, while Ku and Salmon (2009), Gächter and Thöni (2010), Cohn, Fehr, and Goette (2011) and Greiner, Ockenfels, and Werner (2011) do find an effect. These experimental studies are designed to test the effect of relative pay on productivity once one has already committed to doing work over a certain time period, while we are interested in the effect of relative pay on the period of work one would choose to commit to do. Labor supply decisions, unlike the on-the-job effort decision, bear no obvious connection to reciprocity.

As noted, we also examine the moderating impact on relative pay effects of providing a reason for pay differentials. Langer, Blank, and Chanowitz (1978), in a famous psychology study, found that people who cut in line to use a copier were much less likely to meet resistance (only 7 percent of the time) when they provided an almost content-free reason for making the request ("May I use the copy machine, because I have to make copies?") than when they provided no reason (40 percent). Somewhat consistent with this finding, we find that the relative pay effect disappears when subjects were given a moderately trivial reason for the difference in relative pay, but this result did not hold when the reason given was patently arbitrary.

In the remainder of the paper, section 2 provides the experimental design and results of Study 1 and Study 2. Study 1 examines the effect of interpersonal comparisons, while Study 2 examines the effect of intrapersonal comparisons on labor supply. Section 3 concludes.

2. Study 1: Relative Pay—Interpersonal Comparisons

Subjects at an economics experimental laboratory who had participated in an unrelated prior experiment were given the option to participate in an additional study. We used students who had already participated in another experiment in order to make their potential decision not to work on our task reasonable.

Participants were told that the experiment involved solving problems. Each problem required them to find three numbers in a 4x4 matrix that exactly sum to 10 (see the example in the appendix). Subjects were given practice solving one problem, and then were informed about the pay rate they could receive for solving more problems. They were then asked to decide how long they wished to work on the task—any time between zero and 30 minutes. Once they were done working on this task, they were told that the experiment would conclude and that they would receive their earnings in cash. Although the study was conducted in groups, each subject privately made their key decision about the length of time to work.

Subjects were randomly assigned to one of two main treatments. In the "No Relative" treatment, all participants in a single session received the same pay rate per correctly solved matrix, and were therefore not aware of other pay rates. Half the participants received $0.40, and the other half received $0.80 (randomization occurred on the session level). Because

participants in the No Relative treatment were only aware of a single pay rate, no relative pay considerations of the interpersonal type were possible.

By contrast, in the "Relative" treatment subjects were aware that they could receive one of two different pay rates. In this condition, the instructions stated that two pay rates were possible, thus that some subjects would be randomly assigned to receive the lower pay rate ($0.40) while others would receive the higher pay rate ($0.80). Once pay rates were determined, we publicly announced each participant's rate.

Beyond testing the impact of relative pay information on the labor supply decision, we also included an additional manipulation to test a boundary condition—whether differential pay has an effect on labor supply when the difference appears to be justified. This boundary condition is especially interesting because in many real-world cases, a reason such as the length of tenure with a firm—which is potentially unrelated to one's productivity—is an acceptable basis for differential pay. To address the question of whether providing a reason for the pay difference would reduce or eliminate the impact of relative pay on the labor supply choice, participants assigned to the relative pay treatment were further randomized to one of two conditions. In the "Random Notes" condition, each participant drew a note from an envelope containing 10 notes—five marked "40," for $0.40, and five marked "80" for $0.80. After a participant drew a note under the Random Notes method, he or she announced the number. Then the experimenter announced either "you got 40" or "you got 80" and pressed a button to activate the appropriate pay rate for the program. This procedure was designed to make it salient that the assigned pay rate was completely random—meaning no plausible rationale for the pay differential was provided.

In the "Random Essay" condition, in contrast, the assigned pay rate was based on the deliberately arbitrary evaluation of an essay. Specifically, participants wrote a short essay, up to 1000 characters (about 200 words), describing their previous day's lunch experience. They wrote the essay before receiving *any* information about this study. After completing the essay, participants were told (truthfully) that we determined the pay assignment according to the number of "r"s in their essay: those with "r" counts higher than the median received $0.80 per correctly solved matrix, and those with "r" counts less than the median received $0.40 per matrix. In the Random Essay method, the experimenter announced the individuals' pay rates

one by one ("you got 40" or "you got 80") and activated the appropriate pay rates for the program.

One hundred and seventy seven Harvard students at the Harvard Decision Science Lab participated in this study—60 in the No Relative treatment and 117 in the Relative treatment, where 59 were assigned pay rates using the Random Notes method and 58 using the Random Essay method.

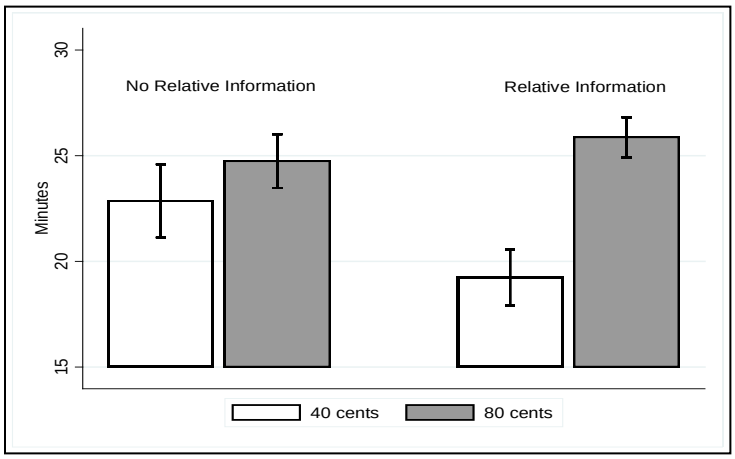
Results

Labor supply—the average time participants wished to work on the matrices task—was not sensitive to the pay rate in the No Relative treatment. As is evident from the two left-hand bars in figure 1, participants who received $0.40 per correctly solved matrix worked 22.86 minutes on average, whereas those who received $0.80 worked 24.74 minutes on average. This difference is not statistically significant ($t(58) = -0.88$.)

In sharp contrast, as is evident in the two right-hand bars of figure 1, the pay rate had a significant impact on labor supply for participants in the Relative treatment (for both the Random Notes and Random Essay methods): those given the low pay rate supplied significantly less labor than those assigned the high pay rate. More specifically, participants who received $0.40 per correctly solved matrix worked 19.24 minutes on average, whereas those who received $0.80 worked 25.86 minutes on average. This difference is statistically significant ($t(115) = -3.87$.)

An interesting pattern, evident in figure 1, is that receiving relative pay information lowered participants' labor supply in the low relative pay condition relative to the No Relative pay condition ($t(92)=1.57$; one sided t-test $p=0.059$) but did not raise labor supply much in the high relative pay condition ($t(81)=-0.716$). If this is a general result, it suggests that providing relative pay information is a no-win proposition for employers.

Figure 1: Average Labor Supply (Minutes)



Note: The bars represent the standard error of the mean.

The effect of relative pay was significant for both forms of assignment in the Relative treatment. In the Random Notes condition, participants with the low rate worked 20.82 minutes on average, whereas those who received the high rate worked 26.88 minutes on average (t (57)=–2.6693, p<.01.). In the Random Essay condition, participants with the low pay rate worked 17.51 minutes on average, whereas those with the high pay rate worked 24.92 minutes on average (t (56)=2.90, p<.01.). Contrary to the prediction derived from Langer's finding, there were no statistically significant differences in behavior between the Random Notes or the Random Essay method. The $0.40 piece rate resulted in a labor supply of 20.82 minutes when using the Random Notes and 17.51 minutes when using the Random Essay (t (63)=1.24.), whereas the $0.80 piece rate resulted in a labor supply of 26.88 and 24.92 minutes, respectively, for the two conditions (t (50)=1.03.).

Table 1 presents results from an ordinary least squares (OLS) and a Tobit regression of the number of minutes supplied based on (1) pay rate, (2) awareness of alternative pay, and (3) the interaction of these two factors. We used a Tobit regression to take into account the two possible corner solutions—zero minutes (not working at all) or 30 minutes (the maximum time allowed). The regressions reinforce the results presented in the figures: when a single pay rate is given in isolation, the pay level has no effect on labor supply as measured by minutes of work supplied. However, when information on other possible pay levels—relative pay information—is provided, the pay level does matter for labor supply. The regressions further highlight that relative pay information reduces the labor supply of those receiving the low pay rate much more than it increases the labor supply of those getting the high pay rate. Making a given pay rate

low relative to another pay rate significantly reduces labor supply; making a given pay rate high, on the other hand, has a positive but insignificant effect.

Table 1: The Effect of Relative Pay on Labor Supply

	OLS	Tobit
High Pay Rate ($0.80=1)	1. 87	3.26
	(1.33)	(0.86)
Relative Pay Information (Yes=1)	–3.61	–6.67
	(–2.27)**	(–2.35)**
Relative Pay Information x High Pay Rate	4.73	9.80
	(2.29)**	(2.09)**
Constant	22.86	30.32
	(47.82)***	(26.67)***
N	177	177
R-squared	0.094	0.016

Note: Dependent variable: minutes of work supplied. Standard errors are clustered at the session level. Tobit regression is censored at 0 and 30 minutes. *t*-values in parentheses. *** Significant at the 1-percent level, ** Significant at the 5-percent level, * Significant at the 10-percent level.

Although our main focus is on how relative pay information affects labor supply, we also examined whether relative pay had an effect on effort. We measure effort by calculating the participant's overall success rate[3] and the average time per correctly solved matrix. Examining both measures, we find no evidence that relative pay affects effort. The average success rate in the No Relative treatment was 0.52 under $0.40 and 0.48 under $0.80 (t (55)=0.6127). Average success rate in the Relative treatment was 0.43 when pay was $0.40 and 0.48 when pay was $0.80 (t (105)=–1.02). Running an OLS regression of the success rate on whether one received high incentives, received relative pay information, and the interaction of the two variables reveals that neither relative pay information nor incentives affect the success rate. Similarly, when using the same regressors, an OLS regression of the average time per a successful matrix solution reveals no effect of incentives (high/low) or of relative pay information. These results are presented in Table 2 below.

[3] Participants could skip a matrix by submitting a clearly wrong answer. For productivity, we are therefore interested in average time spent per correctly solved matrix.

Table 2: Effort Measures

	Success Rate	Average Time per Success
High Pay Rate ($0.80=1)	–0.03	–1.59
	(0.53)	(–1.22)
Relative Pay Information (Yes=1)	–0.09	0.69
	(–1.23)	(0.48)
Relative Pay Information x High Pay Rate	0.08	0.34
	(1.04)	(0.23)
Constant	0.52	7.33
	(7.59)***	(6.25)***
N	164	156
R-squared	0.020	0.015

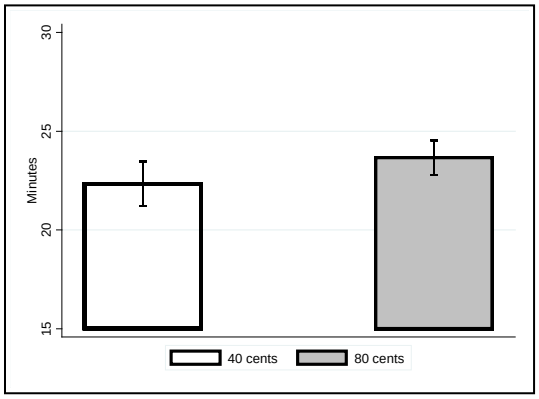
Note: Dependent variable: success rate or average time per success. OLS regressions, clustered at the session level. *t*-values in parentheses. *** Significant at the 1-percent level, ** Significant at the 5-percent level, * Significant at the 10-percent level

2.1. Relative Pay Effect with Stronger Justification

Having established that relative pay can affect labor supply, but not finding an effect when the pay differential is justified, we hypothesized that the justification given in the first study may have appeared too excessively arbitrary to have an impact on participants' behavior. In this study, we test a somewhat stronger version of the rationale manipulation. We add an additional treatment, "Essay Evaluation," in which we made the piece-rate pay assignments by counting the number of times that the letter "r" occurs in a pre-written essay, as before. Indeed, we followed the same protocol as in the Relative treatment using the Random Essay method, the only difference being that in contrast to the Relative treatment, where payment was clearly random (we announced the criterion of "r" counts for the assignment), participants in the Essay Evaluation treatment believed it was not. Instead of announcing the assignment criterion, we only told participants that our evaluations of their essays would determine their individual pay-rate assignment. By not revealing the exact evaluation criterion, this statement masks the random nature of how pay rates are assigned and gives, even if unrelated, a reason for the differential pay. We recruited 150 students from the same subject pool as in the above treatments to participate in the Essay Evaluation treatment.

Compared to the Relative treatment, we find that labor supply in the Essay Evaluation treatment was not different across pay rates (see figure 2). Those who received $0.40 worked 22.33 minutes on average, whereas those who received $0.80 worked 23.65 minutes on average (t (148)=–0.92, p=0.35). Recall that in the Relative treatment using almost an identical protocol (the Random Essay method[4]), labor supply differed significantly across pay rates: those who received $0.40 per matrix worked 17.51 minutes on average, and those who received $0.80 per matrix worked 24.92 minutes on average, a statistically significant difference.

Figure 2: Average Labor Supply (Minutes)
Essay Evaluation Treatment



Using OLS and Tobit regressions, clustered on the session level, we examine the effect of relative pay on labor when a justification for this differential is and is not provided. We generated a dummy variable that takes a value of one (1) for the Essay Evaluation treatment where a (stronger) justification—"essay evaluation"—is given for the differential pay. The results are shown below in tables 3 (OLS) and 4 (Tobit). The first column in each table reports the results when attention is restricted only to the Relative treatment using the Random Essay method, whereas the second column reports the results when comparing the Essay Evaluation treatment using either one of the two methods in the Relative treatment (the Random Notes and the Random Essay methods).

[4] The only difference being the transparency of the evaluation criterion: in the Relative treatment using the Random Essay method the evaluation criterion was revealed, while in the Essay Evaluation treatment it was not.

Table 3: Role of Justification in the Effect of Relative Pay on Labor Supply (OLS)

	(1) Random Essay Only	(2) Random Notes & Random Essay
High Pay Rate ($0.80=1)	7.40	6.61
	(3.86)***	(4.43)***
Strong Justification (Essay Evaluation=1)	4.82	3.09
	(1.96)*	(1.52)
Strong Justification x High Pay Rate	–6.08	–5.29
	(–2.40)**	(–2.39)**
Constant	17.51	19.24
	(8.62)***	(12.83)***
N	208	267
R-squared	0.059	0.062

Dependent variable: minutes of work supplied. OLS regressions, clustered at the session level. *t*-values in parentheses. *** Significant at the 1-percent level, ** Significant at the 5-percent level, * Significant at the 10-percent level.

Table 4: Role of Justification in the Effect of Relative Pay on Labor Supply (Tobit)

	(1) Random Essay Only	(2) Random Notes & Random Essay
High Pay Rate ($0.80=1)	14.26	12.96
	(3.91)***	(4.33)***
Strong Justification (Essay Evaluation=1)	7.45	5.04
	(1.66)*	(1.26)
Strong Justification x High Pay Rate	–11.75	–10.43
	(–2.33)**	(–2.27)**
Constant	21.04	23.56
	(5.68)***	(7.48)***
N	208	267
R-squared	0.009	0.010

Dependent variable: minutes of work supplied. Tobit regressions, clustered at the session level, censored at 0 and 30 minutes. *t*-values in parentheses. *** Significant at the 1-percent level, ** Significant at the 5%-percent level, * Significant at the 10-percent level.

As the regressions depicted in tables 3 and 4 reveal, having a stronger justification for the pay differential influences the effectiveness of incentives on labor supply. In fact, the stronger justification eliminates the positive effect of the high pay rate completely (an F test for the sum of the main effect, "High Pay Rate," and its interaction with "Justification" is insignificant under all specifications).

These results suggest that when participants can find an excuse for a differential wage, the relative pay effect on labor supply seems to disappear: participants accept their assigned pay as if it is the pay rate they deserve. However, in the absence of a reason for the differential pay, such as when the pay assignment is clearly random, the effect of relative pay on labor supply is significant. This result is confirmed using a regression with all treatments (see table A1 in the appendix).

Interestingly, in running an OLS regression to examine the relationship between effort and (1) pay level, (2) the justification for differential pay (Essay Evaluation treatment), and (3) the interaction of these two variables, we find that none (justification, pay level, or their interaction) matter for labor effort. See table A2 in the appendix for the results. These results are similar to our previous finding that once one decides to work, he or she will exert the same effort level during the chosen duration of work.

2.2. Study 2: Intrapersonal Comparisons

In Study 1, the natural reference point is the pay rate that the other participants receive. In this subsection, we aim to test whether people can use other informational sources as reference pay; in particular, whether an individual's own previous wages influences his or her current labor supply decisions.

To test this hypothesis, we approached 200 students who participated in a 30-minute marketing study in a behavioral lab at the University of Chicago. For the initial marketing study, we promised that all participants would earn at least $5; however, on site, half the participants received $15 instead (this randomization occurred on the day of the study, such that individuals participating on the same day received the same pay level). One week after completing the marketing study, participants received an e-mail message inviting them to a follow-up study that would take 15 minutes. We told them the study would take place in the lab at 8:30 on Friday morning.

We told half the participants that the pay rate for this new study would be $5, and the other half that it would be $15. We randomized the monetary offer for each subgroup (those who had previously earned $5 or $15) such that we had four groups of 50 students each: those who had previously earned $5 and were now offered $5 (5, 5), and similarly (5, 15), (15, 5), and (15, 15). The variable of interest in this study is the fraction of participants who showed up to complete the survey—that is, the take-up rates.

Results

Table 5 reports the fraction of participants who turned up to complete the survey as a function of how much they had been paid in the prior study and how much they were promised for completing the current survey.

Table 5: Show Up Rates by Pay in Stage 1 and 2

		Promised Pay, Stage 2	
		$5	$15
Pay in Stage 1	$5	40%	72%
	$15	18%	52%

Participants in the (15, 15) treatment were more likely to show up to complete the survey than those in the (5, 5) treatment (52 percent vs. 40 percent), but the difference is not significant ($p<.25$, chi square test).

Comparing rows within each of the two columns allows one to examine the effect of prior pay holding current pay constant. Of those who were promised $5, the participants in the (5, 5) treatment were significantly more likely to show up and complete the survey than those in the (15, 5) treatment (40 percent vs. 18 percent; $\chi^2(1)=5.9$, $p<.05$). Of those promised $15 to show up and complete the survey, the ones in the (5, 15) treatment were significantly more likely to show up than those in the (15, 15) treatment (72 percent vs. 52 percent; $\chi^2(1)=4.2$, $p<.05$).

In line with the results of Study 1, these results further support the hypothesis that reference pay affects subsequent take-up rates. We find that the participant take-up rate is more sensitive to changes in the wage rate than to absolute levels.

3. Conclusion

This paper directly shows the importance that relative pay plays in labor supply decisions. What is the mechanism producing this responsiveness? One possibility, in line with "coherent arbitrariness" (Ariely, Loewenstein, and Prelec 2003), is that subjects have little idea how much they should be paid for a given task. For example, once participants became aware that some people were being paid $0.40 per matrix, they inferred that earning $0.80 was a pretty good piece rate. This logic could potentially explain the results of comparing the No Relative and Relative treatments in Study 1. However, this explanation is inconsistent with the results of the "Essay Evaluation" treatment where essay evaluation served as a (stronger) justification for the differential pay: although relative pay information was available, it had no effect on labor supply.

The other possible explanation is the role of fairness considerations: subjects may judge differential pay for the same work to be inherently unfair. This explanation is, in principle, in line with the pattern of our results and with the spirit of Bewley's (2003) assertion that "a major purpose of internal structure is to avoid disputes and jealousy over pay. The scheme is chosen so that most employees deem it to be fair and equitable. Since there are no universally accepted norms of justice, the system is inevitably somewhat arbitrary and its legitimacy may depend largely on company tradition." That is, even if internal pay schemes are arbitrary, these serve as enough of an excuse for employees not to compare their pay with that of other people with similar jobs and skills. Importantly, Bewley stresses the need for employees to view the payment scheme as fair. However, although evaluating the essay without stating the exact criterion for evaluation was an acceptable justification for the differential pay, in the sense that it did not backfire, we find no evidence that the channel through which it works is fairness. In a post-study feedback question we find that only 15 percent of the participants in the Essay Evaluation treatment viewed the assignment procedure as fair, whereas a significantly higher share of

participants—50 percent —viewed it as fair when we surveyed them after the Relative treatment (using the Random Essay method).[5]

The studies in this paper show that the participants were paying attention to the rewards offered in the experiment, but did not pay much attention to the incentives they encountered outside the experiment. The students who participated in the experiment are exposed to numerous opportunities to participate in experiments at a variety of pay rates, as well as other earning opportunities. Yet, participants' strong responsiveness to the different rewards our experiments offered suggests that they were largely inwardly focused; they narrowly "bracketed" their decisions on the rewards offered within the experiment (c.f., Benartzi and Thaler 1997; Gneezy and Potters 1997; Read, Loewenstein, and Rabin 1999). Previous studies on labor supply have observed similar narrow bracketing effects, such as Camerer et al. (1997), which found that New York City taxi drivers bracketed their labor supply decisions "one day at a time."

Finally, in this paper, we provide new support for the importance of relative pay comparisons as a determinant of labor supply. Our data provide direct evidence for the responsiveness of labor supply to relative wages. This complements Bewley's study on the importance of the relative wage within the firm, and suggests that entrepreneurs who attempt to take advantage of high unemployment by offering positions at lower wages may encounter difficulty in filling those positions. Although this idea demands further research, it might offer some explanation for any observed outward shift in the Beveridge curve.

[5] The exact question was, "How fair did you find the procedure that determined whether you received $0.40 or $0.80 per correct matrix?" We used a 5-point scale and then classified their responses as "unfair," "unclear," and "fair" if they selected less than "3," exactly "3," or more than "3," respectively.

References

Ariely, Dan, George Loewenstein, and Drazen Prelec. 2003. "'Coherent Arbitrariness': Stable Demand Curves without Stable Preferences." *Quarterly Journal of Economics* 118(1): 73–106.

Bewley, Truman F. 1999. *Why Wages Don't Fall During a Recession*. Cambridge, MA: Harvard University Press.

Bewley, Truman F. 2003. "Labor Market Behavior." In *How Humans Behave: Implications for Economics and Economic Policy*, ed. Richard W. Kopcke, Jane Sneddon Little, and Geoffrey M.B. Tootell. Boston: Federal Reserve Bank of Boston. Available at http://www.bostonfed.org/economic/conf/conf48/papers/bewley.pdf.

Benartzi, Shlomo, and Richard H. Thaler. 1995. "Myopic Loss Aversion and the Equity Premium Puzzle." *Quarterly Journal of Economics* 110(1): 73–92.

Camerer, Colin., Linda Babcock, George Loewenstein, and Richard Thaler. 1997. "Labor Supply of New York City Cabdrivers: One Day at a Time." *Quarterly Journal of Economic*s 112(2): 407–441.

Card, David, Alexandre Mas, Enrico Moretti, and Emmanuel Saez. 2010. "Inequality at Work: The Effect of Peer Salaries on Job Satisfaction." Working Paper No. 16396. Cambridge, MA: National Bureau of Economic Research.

Charness, Gary, and Peter Kuhn. 2007. "Does Pay Inequality Affect Worker Effort? Experimental Evidence." *Journal of Labor Economics* 25(4): 693–723.

Charness, Gary, and Peter Kuhn. 2011. "Lab Labor: What Can Labor Economists Learn from the Lab?" In *Handbook of Labor Economics*, Vol. 4A, ed. Orley Ashenfelter and David Card, pp. 229–330. Amsterdam: Elsevier.

Clark, Andrew E., and Claudia Senik. 2010. "Who Compares to Whom? The Anatomy of Income Comparisons in Europe." *The Economic Journal* 120(544): 573–594.

Cohn, Alain, Ernst Fehr, and Lorenz Götte. 2011. "Fair Wages and Effort: Evidence from a Field Experiment." CEPR Working Paper. London: Centre for Economic Policy Research. Available at http://www.cepr.org/meets/wkcn/3/3542/papers/GotteFinal-P.pdf.

Cohn, Alain, Ernst Fehr, Benedikt Herrmann, and Frédéric Schneider. 2011. "Social Comparison in the Workplace: Evidence from a Field Experiment." IZA Discussion Paper 5550. Bonn: IZA. Available at http://ftp.iza.org/dp5550.pdf.

Duesenberry, James S. 1952. *Income, Saving, and the Theory of Consumer Behavior*. Cambridge, MA: Harvard University Press.

Feldstein, Martin, and James Poterba. 1984. "Unemployment Insurance and Reservation Wages." *Journal of Public Economics* 23(2): 141–167.

Fischer, Sven, and Eva-Maria Steiger. 2009. "Exploring the Effects of Unequal and Secretive Pay. Jena Economic Research Papers 2009-107. Jena, Germany: Friedrich Schiller University and Max Planck Institute of Economics. Available at http://www.wiwi.uni-jena.de/Papers/jerp2009/wp_2009_107.pdf.

Frank, Robert H. 1985. *Choosing the Right Pond: Human Behavior and the Quest for Status*. New York: Oxford University Press.

Gächter, Simon, and Christian Thöni. 2010. "Social Comparison and Performance: Experimental Evidence on the Fair Wage-Effort Hypothesis." *Journal of Economic Behavior & Organization* 76(3): 531–543.

Gneezy, Uri, and Jan Potters. 1997. "An Experiment on Risk Taking and Evaluation Periods." *Quarterly Journal of Economics* 112 (2): 631–645.

Greiner, Ben, Axel Ockenfels, and Peter Werner. 2011. "Wage Transparency and Performance: A Real-Effort Experiment." *Economics Letters* 111(3): 236–238.

Hennig-Schmidt,Heike,Abdolkarim Sadrieh, and Bettina Rockenbach. 2010. "In Search of Workers' Real Effort Reciprocity—A Field and Laboratory Experiment." *Journal of the European Economic Association* 8(4): 817–837.

Kahneman, Daniel, and Amos Tversky. 1979. "Prospect Theory: An Analysis of Decision under Risk." *Econometrica* 47(2): 263–291.

Kőszegi, Botond, and Matthew Rabin. 2006. "A Model of Reference-Dependent Preferences." *Quarterly Journal of Economics* 121(4): 1133–1165.

Ku, Hyejin, and Timothy C. Salmon. 2009. "The Incentive Effects of Inequality: An Experimental Investigation." Working Paper. Available at http://myweb.fsu.edu/tsalmon/KS.pdf.

Kube, Sebastian, MichelAndré Maréchal, and Clemens Puppe. 2010. "The Currency of Reciprocity - Gift-Exchange in the Workplace." Institute for Empircal Research in Economics IEW Working Paper No. 377. Zurich: University of Zurich. Available at http://www.iew.uzh.ch/wp/iewwp377.pdf.

Langer, Ellen J., Arthur Blank, and Benzion Chanowitz. 1978. "The Mindlessness of Ostensibly Thoughtful Action: The Role of 'Placebic' Information in Interpersonal Interaction." *Journal of Personality and Social Psychology* 36(6): 635–642

Leibenstein, H. 1950. "Bandwagon, Snob and Veblen Effects in the Theory of Consumers' Demand." *Quarterly Journal of Economics* 64(2):183–207.

Pfeffer, Jeffrey, and Nancy Langton. 1993. "The Effect of Wage Dispersion on Satisfaction, Productivity, and Working Collaboratively: Evidence from College and University Faculty." *Administrative Science Quarterly* 38(3):382–407.

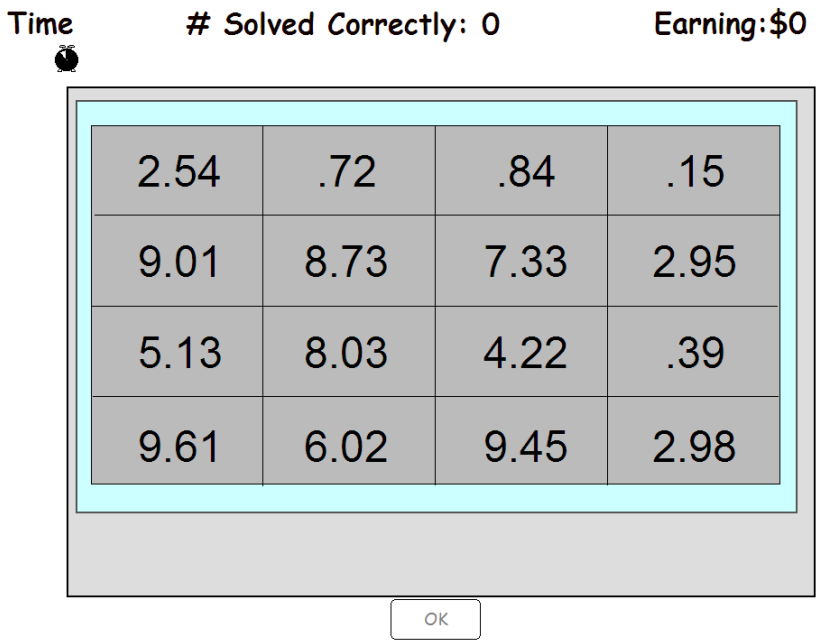
Read, Daniel, George Loewenstein, and Matthew Rabin. 1999. "Choice Bracketing." *Journal of Risk* and Uncertainty19(1–3):171–197.

Smith, Adam. 1759. *The Theory of Moral Sentiments*. Amherst, NY: Prometheus Books.

Summers, Lawrence H. 1986. "Why Is the Unemployment Rate So Very High near Full Employment?" *Brookings Papers on Economic Activity* 2: 339–383.

Appendix

Sample of the Task used in Treatments One- Three



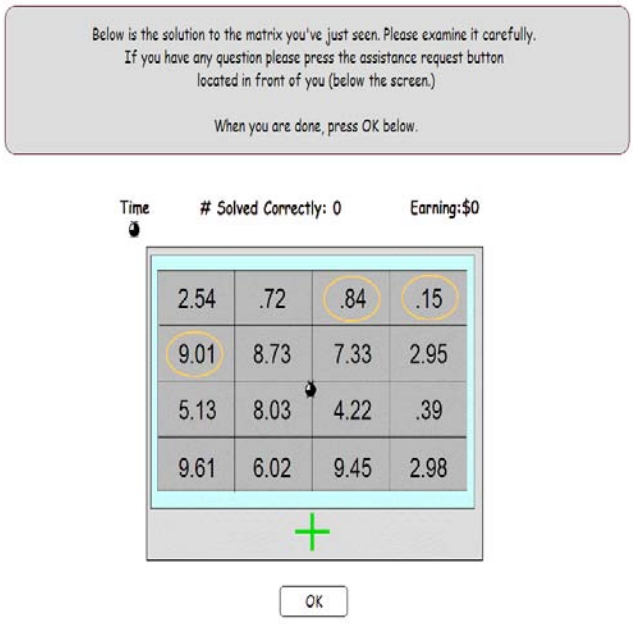


Table A1: Role of information and Justification in the Effect of Relative Pay on Labor Supply

	(1) OLS	(2) Tobit
High Pay Rate ($0.80=1)	1.87	3.23
	(1.35)	(0.88)
Relative Pay Information (Yes=1)	–3.61	–6.61
	(–2.31)**	(–2.31)**
Relative Pay Information x High Pay Rate	4.73	9.70
	(2.33)**	(2.05)**
Strong Justification(Essay Evaluation=1)	3.09	5.03
	(1.52)	(1.26)
Strong Justification x High Pay Rate	–5.29	–10.41
	(–2.40)**	(–2.27)**
Constant	22.86	30.15
	(48.58)***	(30.82)***
N	327	327
R-squared	0.057	0.0098

Dependent variable: minutes of work supplied. Standard errors are clustered at the session level. Tobit regression is censored at 0 and 30 minutes. *t*-values in parentheses. *** Significant at the 1-percent level, ** Significant at the 5-percent level, * Significant at the 10-percent level

Table A2 – Role of Justification in the Effect of Relative Pay on Effort

	Success Rate	Average Time per Success
High Pay Rate ($0.80=1)	0.04	–1.24
	(1.45)	(–1.60)
Strong Justification (Essay Evaluation=1)	0.04	–1.21
	(0.98)	(–1.17)
Strong Justification x High Pay Rate	0.00	0.54
	(0.00)	(0.56)
Constant	0.43	8.03
	(15.45)***	(9.41)***
N	248	233
R-squared	0.018	0.012

Dependent variable: success rate or average time per success. OLS regressions, clustered at the session level. *t*-values in parentheses. *** Significant at the 1-percent level, ** Significant at the 5-percent level, * Significant at the 10-percent level