

# Crowding Out in the Labor Market: A Pro-Social Setting is Necessary<sup>\*</sup>

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## Abstract

Recent studies, mostly from pro-social settings, suggest that monetary rewards may *crowd out* effort exertion by economic agents. We design a field experiment with data entry workers to investigate the extent of such crowding-out effects in a labor market. Using simple variations in the job description of a task, we induce a natural work setting under the *work* frame and emphasize social preference under the *social* frame. We find that crowding out of labor participation critically depends on framing—while small monetary rewards reduce the participation rate under the social frame, the participation rate is non-decreasing in the wage rate under the work frame. Moreover, among the workers who participate in the task, those who receive a positive wage perform a considerably higher amount of work than those who are paid zero wage under either frame. Thus, there is weak evidence of crowding out only when the task is explicitly given a pro-social flavor and not under a regular work setting. Furthermore, emphasizing social preference in the labor market in such a way reduces the overall labor supply and seems to have an adverse effect on the quality of work.

**JEL Classification Codes:** C93 (Field Experiments), J22 (Labor Supply), D03 (Behavioral Economics), D13 (Work Choice)

**Keywords:** Social Preference, Labor Supply, Crowding Out, Intrinsic and Extrinsic Motivations, Natural Field Experiment

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## I. Introduction

While traditional economic theory concentrates on monetary incentives as the main motivator behind decision making, anecdotal and experimental evidence suggests that extrinsic motivations may impair effort by economic agents in certain situations. Introduction of a small monetary reward often makes non-monetary, or intrinsic, motivation secondary, leading to a *crowding out* of effort. For example, Gneezy and Rustichini (2000) found that teenage volunteers in Israel who were given a small percentage of the charitable donations they collected raised less money than those who volunteered for free. On the other hand, volunteers who received a larger percentage of the donations raised the same amount as the volunteers who did not receive any payment. They also found the same pattern with undergraduate students who solved problems in a psychometric test. Gneezy (2003) terms this the W effect.<sup>1</sup> Similar results have been found in experiments by Heyman and Ariely (2004), Ariely, Bracha, and Meier (2009), and Fuster and Meier (2010).<sup>2</sup> If such a trend continues in a labor market, it will have substantial policy implications. However, a close inspection of these studies shows that they are mostly restricted to pro-social and casual work activities. Under what conditions monetary incentives may backfire in a work environment, where intrinsic motivations are not very salient, remains an open question (Gneezy, Meier, and Rey-Biel, 2011).<sup>3</sup>

In this paper, we design an experiment to test the boundary of this crowding-out effect in a work environment. We compare the impact of providing different levels of monetary incentives for data entry workers under two different framings of the same task. The *social frame* presents the task in a pro-social setting where intrinsic motivation to exert effort in the task is quite salient. The *work frame* presents the task in a regular work setting without emphasizing any intrinsic motivation to work. We specifically test the hypothesis that the W effect is present in the social frame and absent in the work frame. Moreover, we investigate the impact of inducing social preference in a regular work setting on the overall performance of workers.

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<sup>1</sup> In this paper, we use the terms crowding out and W effect interchangeably to refer to the general idea that offering a small monetary reward reduces effort choice and as the monetary incentive increases, effort contribution also increases sometimes surpassing the level under no monetary reward.

<sup>2</sup> Crowding out is often cited regarding blood donation based on the conjecture by Titmuss (1970) that the level of blood donation will be reduced if economic incentives are provided. However, the empirical evidence is somewhat weak. While Mellstrom and Johansson (2008) documented weak evidence of crowding out only for female donors, Goette and Stutzer (2008) and Lacetera, Macis, and Slonim (2011, 2012) find no such evidence.

<sup>3</sup> Also see Kamenica (2012) for a detailed review of the literature on the psychology of incentives.

In the experiments that investigate crowding out, the introduction of a monetary payment seems to reduce the intrinsic motivation to work. The settings investigated in the literature are mostly pro-social where social preference plays a prominent role. However, if intrinsic motivations to exert effort are not strong enough in a regular work setting, monetary incentives will not have a detrimental effect. The theoretical perspective of signaling motivation (Benabou and Tirole 2006; Sliwka 2007; Ellingsen and Johannesson 2008) can explain the mechanism behind monetary incentives crowding out efforts in pro-social activities. When social preference is the primary motivator, introduction of an extrinsic reward dilutes the signaling value of the pro-social behavior. This leads to a reduction of efforts. However, if workers are primarily motivated by extrinsic incentives in a regular work setting, such signaling is unlikely to be a major issue.<sup>4</sup> In our setting, this may suggest that the crowding-out effect will persist only under the social frame but not under the work frame. Inducing social preference in a work setting may shift the nature of the relationship between employer and employee. If a task is considered a favor for the employer, the worker may no longer feel obliged to perform the task up to a professional level. As a result, while inducing social motivations in a work setting may result in the familiar crowding-out effect, it may also have a negative effect on worker performance.

We use both framing and wage variations to investigate the boundary of the detrimental effects of monetary rewards. We recruited students from the Hong Kong University of Science & Technology (HKUST) for a part-time data entry job for a specific time period with a fixed wage, which was the same for all participants. After they finished this *initial task*, each worker was asked whether she was willing to enter similar data as an *additional task*. We manipulated the job description to induce a *work frame* and a *social frame* and to vary the compensation rate for this additional task. Under the work frame, we described this task in a way that invokes a regular work setting. Under the social frame, we framed the task as a favor to the employer to induce social preference. The workers could choose to enter any number of lines between zero and 40 at a specific per-line wage rate where entering zero line indicates not participating in the additional task. Under each frame, a worker was assigned one of four different compensation levels—*free*, *low* (HK\$0.5 per line), *medium* (HK\$2 per line), and *high* (HK\$4 per line). Our

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<sup>4</sup> This, of course, may depend on the inherent level of intrinsic motivations and the nature of the work. For example, in mission-oriented sectors, the signaling motive may be pervasive even for full-time workers.

design, thus, allows us to vary the salience of social preference while keeping the wage rate constant and vice versa.<sup>5</sup>

We observe workers' effort choices at the extensive margin through whether a worker chose to participate in the additional task, at the intensive margin through the number of lines a worker who participated in the additional task chose to enter, and in terms of quality of work through a worker's error rate in data entry. Given the existing literature, one would expect the familiar result of crowding out to occur under the social frame. We find such evidence at the extensive margin. Specifically, the rate of participation in the additional task goes down from 46% to 17% as we move from free to low wage rates. The participation rates are 75% and 79% under the medium and high wage rates, respectively. Yet, we find no such effect under the work frame. The participation rate is 17% under the free treatment. The participation rate shoots up to 52% under the low wage rate and is at least 75% for higher wage rates. Thus, salience of social preference seems to be a necessary condition for crowding out of effort at the introduction of monetary payments.

Interestingly, under the social frame, the crowding-out effect is absent at the intensive margin. Relative to the free treatments, a positive wage rate significantly increases the number of lines entered conditional on participating in the additional task under both frames. Moreover, for each wage rate, framing does not affect the number of lines of data entered during the additional task. Thus, we find the crowding-out effect to be relatively weak in our experiment. While crowding out occurs at the extensive margin only when social preference is explicitly induced, it does not occur at the intensive margin under either framing.

Our experimental design allows us to observe the quality of work in addition to the quantity.<sup>6</sup> In line with recent experimental findings that workers reciprocate by increasing their effort level if they interpret a high wage as kindness of the employer (e.g., Fehr, Kirchsteiger, and Riedl 1993; Gneezy and List 2006), we find that the quality of data entry improves with an

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<sup>5</sup> In most experiments in the literature, one cannot observe the impact of a change in the emphasis of social preferences without varying the level of monetary incentives. Notable exceptions, however, are Lacetera and Macis (2010) and Karlan and McConnell (2012).

<sup>6</sup> The impact of incentives on quality reported in the literature is rather mixed. While Hossain and List (2012) and Kube, Maréchal, and Puppe (2012) do not find much impact of wage incentives on the quality of production, Kube, Maréchal, and Puppe (2011) find no effect on quality when there is a wage hike but find an increase in quality when there is a wage cut.

increase in the wage rate under the work frame. Such reciprocity is absent under the social frame. We also find that the quality level of data is significantly higher under the work frame compared to the social frame for medium and high wage rates. These results indicate a hidden cost associated with the social frame, which may seem counterintuitive at first, especially in light of recent literature on the role of social preference where agents exhibit other regarding behavior even in labor markets.<sup>7</sup> However, if social preference is *explicitly* induced in a setting where it does not naturally arise, as is the case under the social frame, the outcome remains unclear. We posit that the induction of social preference may shift the focus of the decision from a work frame to a social frame of mind. Under the social frame, workers may already consider agreeing to enter additional data as a favor to the employer.<sup>8</sup> This obviates the need to reciprocate with improved quality, and the extrinsic motivations provided by the wage may have a lower overall impact on work quality. Thus, we find evidence of crowding out only when social preferences are invoked, and, further, we find that such invocation is costly for the employer.

List (2006) shows that traders in a well-functioning market are primarily motivated by self-interest, not social preference, when they participate in their natural setting. In an extension of similar intuitions, our results suggest that an employer may be worse off by inducing intrinsic motivations in a setting where it does not naturally arise. We can also relate our results to the economics of identity suggested by Akerlof and Kranton (2000 and 2008). Our experimental setting endogenizes the identity or mental frame of the workers. In the social frame, the workers seem to identify the additional task to volunteering, rather than to regular work. As a result of the difference in identities under the work and social frames, workers may optimize different utility functions and anticipate different social expectations. When we invoke social preference in a labor market so that workers may identify with a pro-social work environment, we find that the impact is counterproductive in terms of quantity and quality of the work.<sup>9</sup>

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<sup>7</sup> For extensive reviews, see Fehr and Schmidt (2003); Sobel (2005); and Fehr, Goette, and Zehnder (2008).

<sup>8</sup> This can be interpreted from the perspective of psychological game theory (Geanakoplos, Pearce, and Stacchetti, 1989), in which a worker forms beliefs about the employer's beliefs about the worker's intentions. When social preference is made salient, a worker under a high wage offer may believe that she is already doing the employer a favor by entering some lines and, hence, is not expected to further reciprocate by improving the quality of work.

<sup>9</sup> This is similar to the results of Gneezy and Rey-Biel (2011) who found social incentives less cost effective than contingent incentives in a field experiment that involved completing a survey.

The rest of the paper is organized as follows: Section II presents the design of the field experiment in details. Section III presents the main results by analyzing the participation rate in the additional task and the quantity and quality of work done in the additional task. To conclude, we discuss the implications of our findings in Section IV.

## **II. Experimental Design**

We recruited students of HKUST using advertisements posted around the campus and on campus electronic bulletin boards for a part-time job of data entry for 40 minutes with a fixed payment of HK\$50. In total, 193 students participated in 10 sessions run in February and March of 2009. All sessions started at 7 p.m. on weekdays. We chose data entry to analyze labor supply because this is a common job for students that requires relatively little natural or acquired skill but substantial mental and physical effort. Each participant was given sheets of data on the Japanese real estate market, which they entered into a computer database. The entered data was used to create the data set for another research project. We informed the workers that the entered data will be used by an Economics professor but did not give them the identity of the professor. They were unaware at that stage that the information from their data entry choice and performance was part of an experiment. Students were allowed to participate in the data entry work only once to eliminate concerns about repeated interaction with the employer. When they arrived, each was given a datasheet to use during the session and were supplied with more datasheets if required. There was no requirement on how many lines of data they needed to enter during the 40 minutes and all workers were paid HK\$50 for this part of the session. The job description for this part was identical for all workers. The number of lines entered by a worker in this part ranged from 10 to 42 with a mean of 22.17.

After spending 40 minutes on the initial task, each worker was given an individual letter that stated that the task for which they were hired was over but they could choose to enter some additional lines of data. This offer to enter more data was framed either as a favor to the employer or simply as more work. Moreover, a subject received one of the four possible wage rates for each line of additional data entry. We recruited all workers using the same method for the same initial task and randomly assigned them to one of four wage rates and to either a work frame or a social frame in the additional task to ensure subjects did not self-select themselves to different treatments. Workers simultaneously and independently chose their work commitments

for the additional task without knowing what the other workers were choosing. They could enter between 0 and 40 (inclusive) data lines. They indicated on the letter how many lines they wanted to enter and returned them to the research assistants conducting the data entry process.<sup>10</sup>

After all the letters were collected, workers who chose not to enter any additional line were paid HK\$50 and they left the room. The workers who chose to enter additional lines stayed to enter the number of lines they committed to enter. Such a worker was paid HK\$50 plus the income from these lines (depending on her wage rate) after she had entered them. The four different levels of wage rate for this task can be categorized as free, low (HK\$0.5 per line), medium (HK\$2 per line), or high (HK\$4 per line).<sup>11</sup> When a worker reported that she was done entering data, we ensured that she had indeed entered at least the number of lines she committed before paying her. Some workers entered a few more lines than they had committed. Nevertheless, we paid them according to the number of lines they committed to enter. Hence, we use the committed number of lines in our analysis. We get the same results if we use the actual number of lines entered instead. Although we asked them to enter the lines correctly, their income did not depend on the quality of the entry. After they had entered the data and left the room, we checked all the entered data and counted the number of errors each had made.

Under the work frame, the task is described purely as work as is common in the labor market. Under the social frame, the workers are asked whether they are willing to do the researchers of the data entry project a favor as they need “help in entering some more pages.” To make intrinsic motivations more salient, we addressed the task as a favor. Our main empirical analysis revolves around comparing the labor supply, both at the extensive and intensive margins, under the two different frames of the additional task. The experimental design also permits us to investigate the product quality (in our case, the accuracy of the entered

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<sup>10</sup> The entire experiment was conducted in English.

<sup>11</sup> Before the experiment, we conducted non-incentivized trials with several students to estimate the average number of data lines entered per hour. They entered almost 30 lines per hour on average. The low, medium, and high wage rates, thus, translate to hourly wages of slightly below HK\$15, HK\$60, and HK\$120, respectively. McDonald HK offers hourly wage rates of HK\$20 to HK\$30, which is in the lowest range of salaries in Hong Kong. The wage rate of a part-time student research assistant at HKUST is HK\$48 per hour. HK\$120 per hour is higher than almost all outside options available to a student. We chose 40 lines to be the maximum number of lines that could be entered in the additional task so that a worker may spend around 2 hours working for us if she entered the highest possible number of lines. The exchange rate is around US\$1 = HK\$7.8.

data) under different framings and wage rates. Our 2×4 design results in eight treatments. They are summarized in the following table:

<b>Wage Rates for the Additional Task</b>				
	<i>Free</i>	<i>Low</i>	<i>Medium</i>	<i>High</i>
		(HK\$0.5/line)	(HK\$2/line)	(HK\$4/line)
<i>Work Frame</i>	<b>WF</b>	<b>WL</b>	<b>WM</b>	<b>WH</b>
<i>Social Frame</i>	<b>SF</b>	<b>SL</b>	<b>SM</b>	<b>SH</b>

A sample of the advertisement flyers posted to recruit workers, a sample datasheet of Japanese real estate market, a screenshot the MS-Access database used to enter the data, and sample letters describing the additional task under the social and work frames are available in the online appendix.

### III. Results

To present the main results, we analyze the participation rate, the number of lines entered, and the quality of the entered data in the additional task. First, we test whether there is a crowding-out effect in terms of participation in the additional task under either frame. Then, we analyze the number of lines entered in the additional task. Finally, we analyze how framing affects the accuracy of data entry in the additional task and also investigate the relation between accuracy of data entry and the wage rate.

#### *Participation in the Additional task*

If a worker chooses to enter at least one line for the additional task, we say that she participated in the additional task. Table 1 and Figure 1, respectively, present the absolute number and the percentage of workers who participated in the additional task for each of the eight treatments. In Figure 1, the dashed and solid lines report the participation percentages for the different wage rates under the social and work frames, respectively. When the wage rate increases from free to low (HK\$0.5 per line), workers behave very differently under the two frames. The proportion of workers who participate in the additional task drops from 46% to 17% between the free and low wage treatments under the social frame. On the other hand, the participation rate increases from 17% to 52% between the free and low wage treatments under the work frame. These changes are statistically significant at the five and one percent levels,



respectively, as shown in Table 2. For medium and high wages, the participation rates are between 75% and 83% in the four treatments. These differences are statistically insignificant. Figure 1 illustrates the presence of the crowding-out effect under the social frame and absence of it under the work frame.

Table 3 presents the marginal effects coefficients from probit regressions of a worker's choice to participate in the additional task on treatment dummies and the worker's gender, the number of lines entered, and the error rate in the initial task.<sup>12</sup> First we analyze the workers' participation decisions under the two frames separately to investigate the wage effect for a specific frame. Then we analyze data from all the workers under both frames together to investigate both the framing and the wage effects. For the remainder of the paper we only present regression results with all workers together. Nevertheless, wage effects within a frame stay qualitatively unchanged if we only analyze data from that specific frame.

Column (1) of Table 3 uses data from only the social frame where the low wage treatment leads to almost 28% lower participation than the free treatment. On the other hand, the medium and high treatments lead to at least a 40% increase in participation rate compared to the free treatment. Column (2) uses data from the work frame where the participation rate is (weakly) monotonic in the wage rate. The low wage treatment raises the participation rate by 44% and the medium and high wage treatments raise the participation rate by at least 56% compared to the free treatment. F-tests show that while both medium and high wage treatments significantly increase the participation rates relative to the low wage treatment, the differences between medium and high wage treatments are not statistically significant under either frame. Column (3) presents regression results using all workers. This allows us to investigate the framing effect for a given wage rate. The differences in the participation rates between the two frames are not statistically significant under the free and high wage treatments.<sup>13</sup> At the low wage, however, the work frame increases participation by 49%. When the wage rate is medium, the work frame increases participation by 29%. One may wonder whether there is any difference between the workers who participate in the additional task and those who do not in terms of their

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<sup>12</sup> We cluster the standard errors with respect to the experimental sessions. The results do not change qualitatively if we do not use such clustering of standard errors.

<sup>13</sup> The seven treatment dummies estimate the impact of the treatments on workers' choices of whether to perform any additional task relative to the free treatment under the social frame (treatment SF).

performance in the initial task. We find no relationship between the number of lines entered in the initial task and whether a worker participated in the additional task. However, workers with higher error rates in the initial task were less likely to participate in the additional task.

When social preference is made salient under the social frame, the introduction of monetary rewards seem to reduce the intrinsic motivation to work. The net impact of the low wage is that significantly fewer workers, compared to the free treatment, participate in the additional task. This result is consistent with the results in Gneezy and Rustichini (2000) and other studies. When the wage is low, the participation rate under the social frame is only a third of that under the work frame. If the negative impact of offering a positive wage under a pro-social setting is lasting, then we should observe a lower participation rate under social frame (compared to the work frame) for higher wages too. However, we do not observe that. A plausible explanation is that when a positive wage is offered under the social frame, a worker tries to determine the value of the favor to the employer from the wage rate.<sup>14</sup> At a low wage, the favor is viewed as relatively unimportant and fewer workers want to enter any additional line. At higher wage rates, it is viewed as more important and, as a consequence, leads to greater levels of participation. As workers focus essentially on the wage rate instead of the importance of the task under the work frame, increasing the wage (weakly) increases participation. Thus, while crowding out happens under the social frame, it can easily be removed by a more standard framing of the task. Overall, we need to explicitly make intrinsic motivations to perform a labor market activity salient in order to observe the crowding-out effect, however, the extent of the effect is quite limited even in that case.

#### *Number of Lines Entered*

Participation in the additional task only tells part of the story. Unlike some other studies, we can distinguish between the labor participation rate and the amount of work done by workers who participated in the additional task. Naturally, next we analyze how the treatments affect labor supply, both overall and conditional on participating. Table 1 presents the average number of lines entered by the workers in the initial and additional tasks. Specifically, it separately lists the averages for all workers and only for the workers who participated in the additional task.

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<sup>14</sup> This is somewhat similar in spirit to Benabou and Tirole (2003), where the agent makes inferences about the difficulty level of a task from the wage the principal offers.

Figure 2 (Panel A) presents the average number of lines entered by only the workers who chose to enter one or more lines of data for the additional task. The dashed and solid lines represent the social and work frames, respectively. The two lines look very similar and Table 2 shows that, conditional on choosing to perform the additional task, there is no significant difference between the two frames in the average number of lines entered for any wage level. For each wage level, we can reject that the variances and distributions of the number of lines entered by the workers who entered at least one additional line are significantly different under the two frames using the variance ratio and Wilcoxon rank-sum tests, respectively.

Under both frames, workers entered a higher number of lines when they were paid for the additional task than under the free treatments. However, the difference in worker behavior is not significantly different among the low, medium, and high wage treatments under either frame. All these results hold when we control for worker characteristics as seen in the regressions presented in Table 4. The table presents regressions of the number of lines entered in the initial and additional tasks by only the workers who participated in the additional task on treatment dummies and other characteristic variables with session-specific fixed effects. Column (1) of Table 4 suggests that there is no trend in data entry in the initial task across the treatments (which the subjects were yet to be exposed to) at the 5% significance level.

The dependent variable in columns (2) and (3) is the number of lines entered in the additional task. Column (2) presents linear regression and column (3) presents Tobit regression with an upper limit of 40. We also include the number of lines entered and the error rate in the initial task as regressors to control for worker characteristics. The regressions confirm that conditional on participating in the additional task, workers entered a small number of lines under the free treatments and more or less the same number of lines under the 6 other treatments where they received a positive wage rate. There is no evidence of a framing effect under any wage rate. Thus, framing affects data entry only at the extensive margin but not at the intensive margin. These results also hold if we control for selection issues by using the Heckman selection model. One caveat here is that the samples for these regressions contain relatively few data points for WF and SL treatments as only subjects who participated in the additional task are considered. Nevertheless, the striking similarity between the labor supply curves conditional on participation under the two frames, as seen in Figure 2A, makes the sample size less of an issue. Note that

while some of the workers who were offered a zero wage rate in the additional task did participate, the participation rate even under the treatment SF is lower than those under the medium and high wage rates. More importantly, they entered a lot fewer lines compared to workers under any treatment that offered a positive wage rate under either frame. A likely explanation can be that these workers participated in the additional task as reciprocation to the relatively high wage offered during the initial task.

The result that framing of the task seems to affect only the participation rate in the additional task, but not the number of lines entered conditional on participating, is consistent with the findings of Ariely, Bracha, and Meier (2009) that signaling of effort to others is an important driving force in pro-social activities. In our experimental setup, the subjects who did not participate in the additional task left the premises immediately after the initial task was over. Thus, entering only a few lines for the additional task was enough to indicate that a subject was helping the employer by entering additional lines as other participants could not observe exactly how many lines a subject entered.<sup>15</sup> This may explain why, although framing affects the rate of participation in the additional task, the number of lines conditional on participating is weakly increasing in the wage rate under both frames. Finally, workers who entered more lines in the initial task also entered more lines in the additional task. This may suggest that workers' inherent productivity or altruism affected labor supply for workers who decided to supply at least some labor in the additional task. The error rate in the initial task, on the other hand, had no impact on the number of lines entered.

Panel B of Figure 2 presents the average number of lines entered by all workers in the additional task. This figure suggests no crowding out or W effect in terms of the total unconditional labor supply under either frame. The difference between the two frames is basically determined by the participation rate. As the number of lines conditional on participating is much higher for low wage compared to zero wage, the net effect is that the average number of committed lines is higher by two lines per worker under the work frame than under the social frame (see Table 1). A t-test suggests that this difference is not statistically significant. When we control for the wage rate and worker characteristics in column (1) of Table

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<sup>15</sup> Although not statistically different, the number of minutes spent per line in the additional task was at least 22% higher under the free treatment than that in any treatment with a positive wage rate.

5, however, we find that the increase in labor supply under the work frame is statistically significant. First, we run a Tobit regression of the number of lines entered in the additional task by all 192 workers on dummy variables for the work frame and wage rates along with other regressors with a lower limit of 0 and an upper limit of 40 lines.<sup>16</sup> The work frame raises the labor supply by more than 30 lines.<sup>17</sup> This analysis assumes that the wage rates have the same effect on labor supply under both framings. However, our earlier analysis showed this may not necessarily be the case. To control for that, in column (2), we present Tobit regression of lines entered by all workers in the additional task on the seven treatment dummies as in Tables 3 and 4. We can estimate the net impact of the work frame, compared to the social frame, on labor supply by summing the coefficients for the wage rate interacted with the work frame and adjusting for the number of workers under the eight treatments. The work frame increased labor supply by 14 lines and this effect is statistically significant with a  $p$ -value smaller than 0.00005 suggesting that the social frame has a negative impact on the overall labor supply.

#### *Quality of Data Entry*

So far, we find that inducing social preference has no impact on labor participation and labor supply for medium and high wage rates. Next we investigate the quality of work. Specifically, we compare workers' accuracy in the additional task across different payment levels within and across frames. Accuracy is measured by computing the error rate, which is the number of incorrect entries divided by the total number of data fields entered, expressed in percentage terms. Table 6 reports the summary statistics of error rates in the additional task across different treatments.<sup>18</sup> It also reports the error rates in the initial task for these workers. While the error rate was slightly lower in the initial task compared to the additional task, there is no trend in the error rate in the initial task. Interestingly, for the additional task, the error rate of workers under the work frame is almost 40% lower than under the social frame when we look only at the medium and high wage rate treatments. A t-test suggests that this difference is significant at the 5% level.

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<sup>16</sup> We find similar framing effects when we run a negative binomial regression.

<sup>17</sup> The estimated impact of the work frame in both columns (1) and (2) is rather large because we use Tobit regressions. The impact remains positive and statistically significant if we use linear regressions instead.

<sup>18</sup> We lost the record of the error rate for one worker in the WH treatment because of an accidental deletion.

Table 7 reports the effect of the work frame on the error rate for workers who participated in the additional task in the medium and high wage rate treatments with session-specific fixed effects. The dependent variables in columns (1) and (2) are the error rates in the initial and additional tasks, respectively. The error rate in the initial task does not depend on framing in the additional task as all workers saw the same job description during the initial task. On the other hand, the error rate under the work frame, in percentage terms, is lower by 1.80 during the additional task. We also control for the error rate in the initial task here. This shows that while labor supply for medium and high wages is similar under the two frames when we look only at the quantity, the social frame fares worse than the work frame for quality-adjusted labor supply.<sup>19</sup> Thus, compared to the work frame, the social frame either reduces the quantity or quality of the work done for any positive wage rate.

Going back to Table 6, we find a downward trend in the error rate with respect to the wage rate in the additional task. Specifically, under both frames, the error rate is lower for the high and medium wage treatments than for the low wage or free treatments. Nevertheless, while the error rate falls sharply for the medium and high wage treatments under the work frame, it falls less sharply under the social frame. Regression results presented in Table 8 show that accuracy increases, *i.e.*, the error rate decreases, with the wage rate only under the work frame. To ensure that this is not due to worker characteristics, we regress the error rates in both the initial and additional tasks for the workers who participated in the additional task on interaction of the frame and the wage rate. In column (1), the dependent variable is the error rate in the initial task. All workers received the same payment for the initial task. At that point, they did not know their future wage rates in the additional task and it had no impact on the error rate in the initial task. On the other hand, column (2) shows that the error rate in the additional task decreases as the wage rate increases only under the work frame. The coefficient on the error rate is also negative for the social frame, but it is smaller in size and statistically insignificant. This result does not change if we analyze the social and work frames separately. To ensure the result's robustness, we estimate equations involving square root, square, or the log of the wage rate and find the impact of the wage rate is statistically significant only under the work frame. We also control for the error rate in the initial task in column (2).

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<sup>19</sup> The framing effect remains significant even if we analyze the medium and high wage treatments separately.

Consistent with recent findings on the role of reciprocity in the labor market, workers worked more accurately when the wage rate was higher under the work frame. In these studies, workers reciprocate the kindness of the employer in the form of higher wage or trust with higher effort. Thus, firms may be better off by offering a wage level higher than the market clearing price (see Akerlof 1982, for the gift exchange hypothesis; Akerlof and Yellen 1990, for the fair wage theory; Fehr, Kirchsteiger and Riedl 1993, Fehr and Falk 2002, Falk and Kosfeld 2006, for experimental evidences). Our study is the first to show that positive reciprocity may also arise in terms of the quality of work when workers are paid per piece wages. We find evidence of reciprocity only under the work frame but not under the social frame. Moreover, when the level of wage rate is equal to the market wage rate or higher, inducing social preference leads to lower quality of work in terms of the accuracy of data entered. A plausible explanation is that when social preference is explicitly induced under the social frame, a worker may feel that entering additional lines is already a favor to the employer. Hence, she is not contractually or morally obliged or expected to further reciprocate the high wage offer by entering data more accurately. This can be considered a new type of crowding out—while a conventional crowding-out effect originates from the introduction of extrinsic motivation, crowding out in terms of quality is caused by the introduction of, seemingly altruistic, intrinsic motivations. All these results together suggest that while making intrinsic motivation more salient in a regular labor setting leads to the familiar crowding-out effect, it may come with some hidden costs.

#### **IV. Discussion**

Recent experimental and theoretical literature suggests that the provision of extrinsic motivation by monetary rewards reduces the extent of intrinsic motivation leading to a reduction in effort choice. As such evidence is found mostly from pro-social and casual activities, we investigate the boundary of the crowding-out effect in a labor setting using a field experiment with part-time data entry workers. Analyzing the labor participation rate, we show that while we can find evidence of crowding out, it occurs only under the frame where social preference rather than labor supply is made salient. In a more natural framing of the task as work, we find no evidence of crowding out. This suggests that the non-monotonic relationship between monetary incentives and effort evidenced in the literature is largely due to the pro-social nature of the tasks themselves and may not be as relevant in standard labor markets. Digging deeper into the data

by analyzing both the quantity and quality of labor supply, we find that creating an atmosphere of social preference in our labor market field experiment is rather detrimental for the employer and it reduces workers' incentives to reciprocate any kindness on the part of the employer.

Our results indicate that mixing extrinsic and intrinsic motivations may not be economically efficient, as previous results have also suggested. However, explicitly inducing social preference, rather than offering monetary incentives, is shown to be economically costly. It may be too bold to conclude that social preference is always harmful for productivity. Rather, the message here is that inducing social preference in a setting where it does not naturally occur may change the perception of the job, leading to some negative impact. Note that our chosen task of data entry is likely considered boring by many and may not provide much intrinsic motivation in itself. One may wonder whether the results can be generalized to tasks within the labor market that provide more intrinsic motivation to begin with. We believe that our results are quite generalizable to common jobs in the labor market, especially unskilled labor employment, that are not considered pro-social or do not naturally provide a considerable level of intrinsic motivation.

Given that our experiment is a one-shot interaction, an important question that can be addressed in future research is whether the results can be applied to a setting where workers and employers interact repeatedly over time and, further, where workers may have career concerns. We feel that the effect of career concerns is unlikely to be dependent on the wage rate. Then, the main result that the  $W$  effect is missing under a regular work setting is likely to persist. Moreover, a common setting in most real-world employment relationships is that the quality of work is difficult to measure and contract on. In such a setting, workers' incentives in the one-shot interaction will be pretty much the same as in a multi-period setting. Therefore, we believe that our results related to product quality will be quite applicable even in a multi-period setting.

An implication of our results is that if an employer needs some task performed for which she cannot make any payment, it is beneficial for her to induce social preference. Instead, if she has a positive amount of money available to pay the employees, she will be better off by not inducing social preference. Under the work frame in our experiment—a scenario designed to simulate a regular work environment—direct monetary payments do not seem to significantly



alter intrinsic motivations to work, perhaps because money is the standard method of payment in such a setting. Received literature has shown that monetary compensations have a somewhat surprising effect on the effort choice of economic agents in pro-social activities. Our results, on the other hand, suggest that standard theoretical predictions about the impact of the wage rate on effort choice and reciprocity may fare quite well in a more typical labor market.

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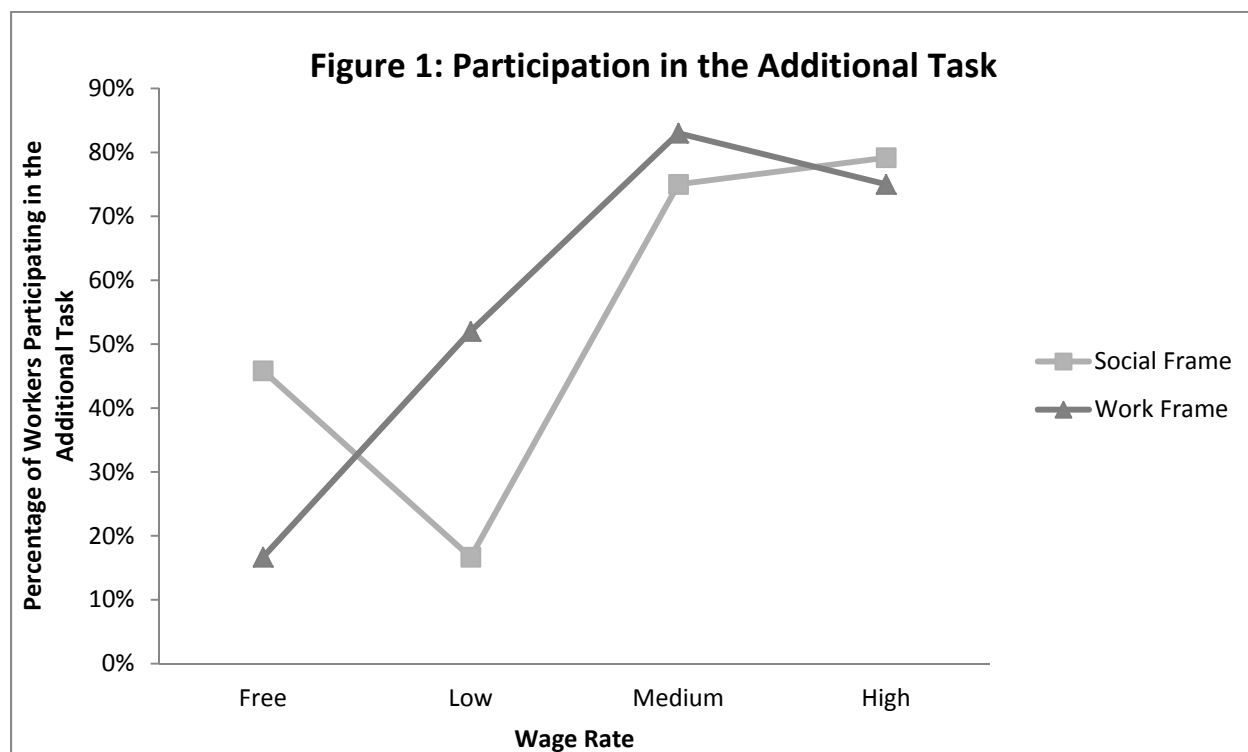
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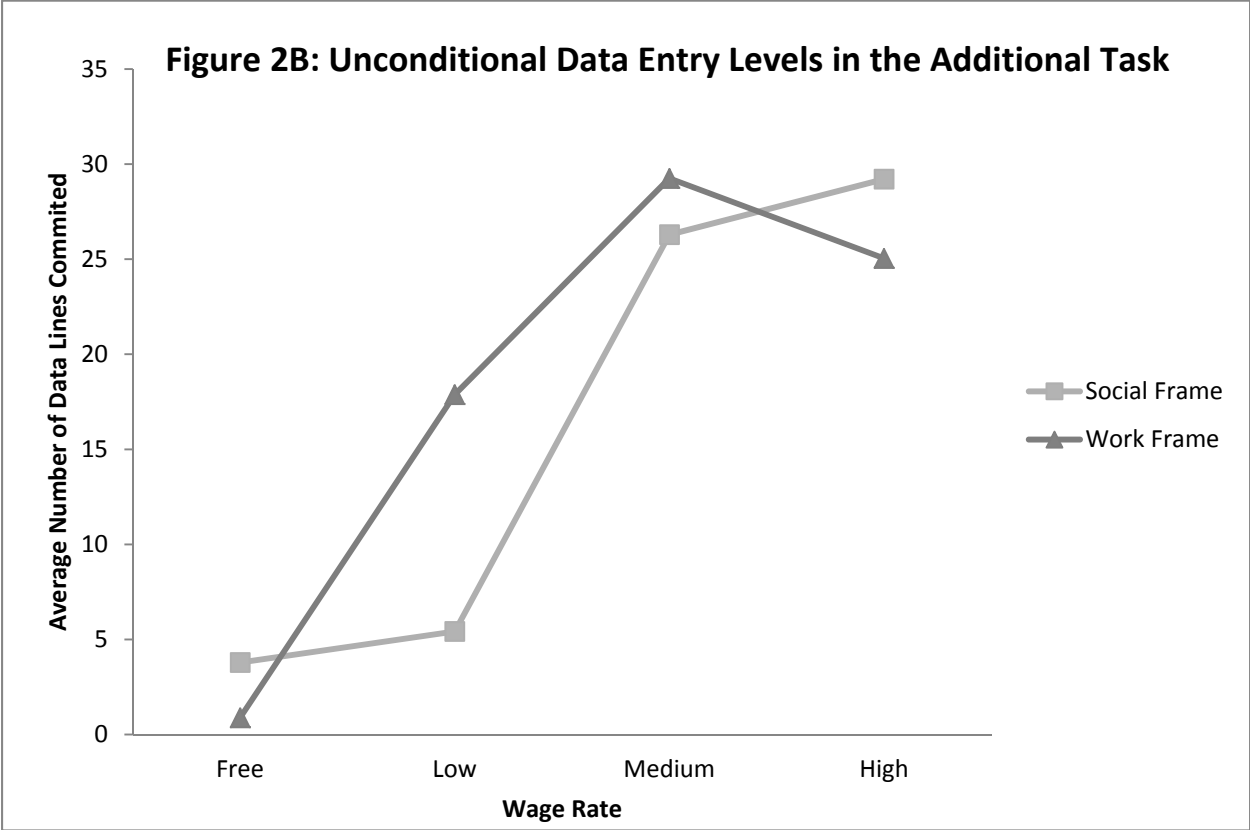
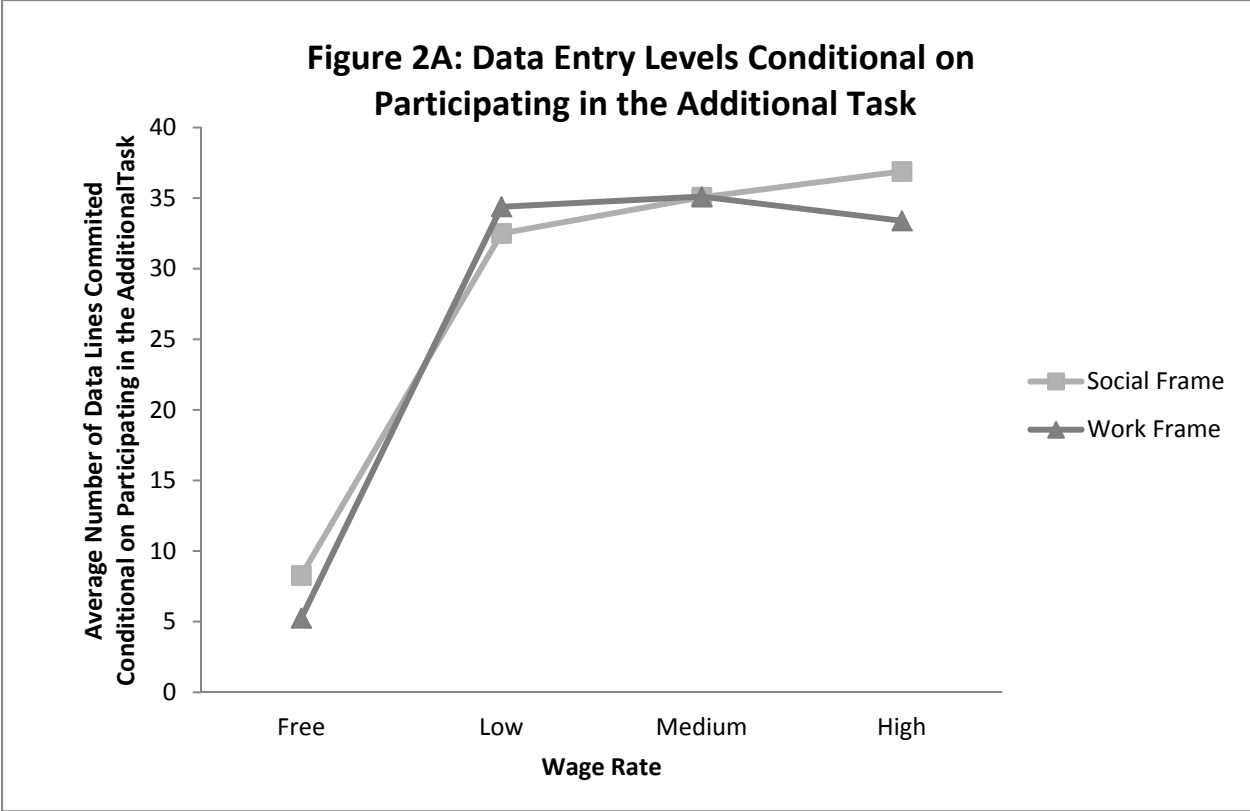


Table 1. Summary Statistics

		<u>Wage Rate for the Additional Task</u>									
		<b>Free (WF)</b>		<b>Low Wage (WL) (HK\$0.5)</b>		<b>Medium Wage (WM) (HK\$2)</b>		<b>High Wage (WH) (HK\$4)</b>		<b>All Treatments Under the Work Frame</b>	
		<b>All Workers</b>	<b>Workers Who Participated in the Additional Task</b>	<b>All Workers</b>	<b>Workers Who Participated in the Additional Task</b>	<b>All Workers</b>	<b>Workers Who Participated in the Additional Task</b>	<b>All Workers</b>	<b>Workers Who Participated in the Additional Task</b>	<b>All Workers</b>	<b>Workers Who Participated in the Additional Task</b>
		Mean (Std. Dev)									
<b>Work Frame</b>	Number of Workers	24	4	25	13	24	20	24	18	97	55
	Number of Lines in the Initial Task	24.21 (7.02)	24.25 (5.19)	22.32 (4.06)	22.31 (4.84)	22.67 (5.61)	22.80 (5.35)	20.58 (4.11)	20.94 (4.39)	22.44 (5.40)	22.18 (4.88)
	Number of Lines Committed in the Additional Task	0.88 (2.35)	5.25 (3.4)	17.88 (20.05)	34.38 (13.74)	29.25 (15.85)	35.10 (9.39)	25.04 (17.51)	33.39 (10.95)	18.26 (18.78)	32.20 (13.03)
		<b>Free (SF)</b>		<b>Low Wage (SL) (HK\$0.5)</b>		<b>Medium Wage (SM) (HK\$2)</b>		<b>High Wage (SH) (HK\$4)</b>		<b>All Treatments Under the Social Frame</b>	
<b>Social Frame</b>	Number of Workers	24	11	24	4	24	18	24	19	96	52
	Number of Lines in the Initial Task	20.29 (5.12)	19.45 (5.99)	21.54 (6.06)	21.25 (4.79)	22.08 (7.11)	23.06 (7.70)	23.67 (5.64)	24.21 (5.19)	21.90 (6.05)	22.58 (6.40)
	Number of Lines Committed in the Additional Task	3.79 (6.06)	8.27 (6.6)	5.42 (13.51)	32.50 (15)	26.29 (17.69)	35.06 (9.91)	29.21 (17.6)	36.89 (9.83)	16.18 (18.45)	29.87 (14.75)

**Table 2. Summary of Tests of Decisions on Extra-task Across and Within Frames**

Across Frames			Within Frames		
Proportion of Workers Choosing to Work	Mean Differences (e.g., SF – WF)	Proportion Test	Proportion of Workers Choosing to Work	Mean Differences (e.g., SF – SL)	Proportion Test
SF vs WF	0.29	2.18**	SF vs SL	0.29	2.18**
SL vs WL	-0.35	-2.60***	SL vs SM	-0.58	-4.06***
SM vs WM	-0.08	-0.71	SM vs SH	-0.04	-0.34
SH vs WH	0.04	0.34	WF vs WL	-0.35	-2.60***
Social vs Work	-0.03	-0.35	WL vs WM	-0.31	-2.34**
			WM vs WH	0.08	0.71
Number of Lines Committed by Workers Who Chose to Work					
		t-Test			t-Test
SF vs WF	3.02	0.86	SF vs SL	-24.23	-4.49***
SL vs WL	-1.88	-0.24	SL vs SM	-2.56	-0.43
SM vs WM	-0.04	-0.01	SM vs SH	-1.84	-0.57
SH vs WH	3.51	1.03	WF vs WL	-29.13	-4.11***
Social vs Work	-2.33	-0.87	WL vs WM	-0.72	-0.18
			WM vs WH	1.71	0.52

Notes: \*, \*\*, and \*\*\* represent significance at 10, 5, and 1 percent levels, respectively.

**Table 3. Determinants of the Decision to Participate in the Additional Task**

<b>Dependent Variable: Participated in the Additional Task</b>			
	<b>Social Frame</b>	<b>Work Frame</b>	<b>All Workers (Both Frames)</b>
	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>
Low Wage	-0.28** (0.14)	0.44*** (0.10)	-0.34** (0.14)
Medium Wage	0.40*** (0.05)	0.60*** (0.05)	0.32*** (0.07)
High Wage	0.44*** (0.11)	0.56*** (0.04)	0.37*** (0.09)
Work Frame × Free Wage			-0.16 (0.23)
Work Frame × Low Wage			0.49*** (0.07)
Work Frame × Medium Wage			0.29** (0.13)
Work Frame × High Wage			0.12 (0.25)
Lines Entered in the Initial Task	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Error Rate in the Initial Task	-0.06*** (0.02)	0.01 (0.02)	-0.03** (0.02)
Female	0.33** (0.13)	-0.16 (0.21)	0.12 (0.13)
Observations	96	96	192
Pseudo R <sup>2</sup>	0.32	0.30	0.26

*Notes:* This table presents the marginal effect coefficients of the Probit regression on whether the subject chose to participate in the additional task with session-specific fixed effects. Low, Medium, and High Wage are dummy variables for the relevant wage treatment. Work Frame is a dummy variable denoting whether the additional task was framed as work. Social Frame is a dummy variable denoting whether the additional task was framed as favor. Female is a dummy variable to indicate the gender of the worker. Standard errors, clustered around the experimental session, are presented inside parentheses. \*, \*\*, and \*\*\* represent significance at 10, 5, and 1 percent levels, respectively.



**Table 4. Determinants of the Number of Lines Committed Conditional on Participating in the Additional Task**

	Dependent Variables:		
	Number of Lines Entered in the Initial Task Conditional on Participating in the Additional Task	Number of Lines Committed in the Additional Task Conditional on Participating in the Additional Task	
	(1)	(2)	(3)
Constant	20.94 <sup>***</sup> (2.26)	-1.27 (4.05)	-24.72 <sup>*</sup> (13.53)
Low Wage	-0.11 (3.26)	26.35 <sup>***</sup> (5.07)	51.32 <sup>***</sup> (13.39)
Medium Wage	2.19 (2.12)	27.27 <sup>***</sup> (2.53)	48.26 <sup>***</sup> (11.69)
High Wage	3.55 (2.36)	27.95 <sup>***</sup> (3.78)	51.95 <sup>***</sup> (12.52)
Work Frame × Free Wage	4.94 <sup>*</sup> (2.58)	-5.40 (7.51)	-11.35 (22.84)
Work Frame × Low Wage	2.49 (3.54)	2.47 (8.75)	-0.02 (22.57)
Work Frame × Medium Wage	0.85 (3.02)	0.07 (6.77)	-5.70 (22.41)
Work Frame × High Wage	-2.02 (3.07)	-2.33 (6.79)	-14.47 (23.38)
Lines Entered in the Initial Task		0.40 <sup>**</sup> (0.15)	1.17 <sup>***</sup> (0.29)
Error Rate in the Initial Task		-0.57 (0.80)	-1.09 (1.86)
Female	-2.25 <sup>**</sup> (0.94)	4.30 <sup>**</sup> (1.65)	11.92 <sup>**</sup> (5.48)
Observations	107	106	106
R <sup>2</sup> / Pseudo R <sup>2</sup>	0.18	0.57	0.14

*Notes:* This table presents the impact of the wage rates on the number of lines entered in the additional task conditional on performing the additional task under each of the frames. Columns (1) and (2) present linear regressions and column (3) presents Tobit regression with an upper limit of 40. Low, Medium, and High Wage are dummy variables for the relevant wage treatment. Work Frame is a dummy variable denoting whether the additional task was framed as work. Social Frame is a dummy variable denoting whether the additional task was framed as favor. Female is a dummy variable to indicate the gender of the worker. Session-specific fixed effects are also included. Standard errors, clustered around the experimental session, are presented inside parentheses. \*, \*\*, and \*\*\* represent significance at 10, 5, and 1 percent levels, respectively.

**Table 5. Determinants of the Number of Lines Committed in the Additional Task**

<b>Dependent Variable: Number of Lines Committed in the Additional Task</b>		
	<b>(1)</b>	<b>(2)</b>
Constant	-107.37*** (26.09)	-72.83** (33.34)
Work Frame	30.77*** (5.29)	
Low Wage	39.46* (22.07)	-19.67 (20.98)
Medium Wage	104.80*** (18.17)	77.59*** (16.72)
High Wage	98.48*** (18.22)	91.54*** (22.80)
Work Frame × Free Wage		-21.91 (14.27)
Work Frame × Low Wage		97.13*** (23.15)
Work Frame × Medium Wage		33.66*** (8.21)
Work Frame × High Wage		-1.77 (17.71)
Lines Entered in the Initial Task	1.92*** (0.58)	1.90** (0.77)
Error Rate in the Initial Task	-3.17 (2.35)	-4.27* (2.28)
Female	24.91* (14.96)	18.72 (18.86)
Observations	192	192
Pseudo R <sup>2</sup>	0.12	0.14
Net Impact of the Work Frame over the Favor Frame (Number of Lines)		14.00***

*Notes:* This table presents the impact of the wage rates on the number of lines entered in the additional task under each of the frames using Tobit regressions with a lower limit of 0 and an upper limit of 40 with session-specific fixed effects. Low, Medium, and High Wage are dummy variables for the relevant wage treatment. Work Frame is a dummy variable denoting whether the additional task was framed as work. Social Frame is a dummy variable denoting whether the additional task was framed as favor. Female is a dummy variable to indicate the gender of the worker. Standard errors, clustered around the experimental session, are presented inside parentheses. \*, \*\*, and \*\*\* represent significance at 10, 5, and 1 percent levels, respectively.

**Table 6. Summary Statistics of the Error Rates in the Initial and Additional Tasks**

Treatment	Error Rate in the Initial Task			Error Rate in the Initial Task of Those Worked in the Additional Task			Error Rate in the Additional Task		
	Mean	Std. Dev.	Observations	Mean	Std. Dev.	Observations	Mean	Std. Dev.	Observations
SF	1.90	2.08	24	1.39	1.21	11	3.09	4.16	11
SL	1.36	1.96	24	2.09	3.30	4	2.39	3.04	4
SM	1.75	2.00	24	1.73	2.12	18	2.08	1.98	18
SH	2.70	4.94	24	1.24	1.26	19	2.00	1.89	19
SM + SH	2.23	3.76	48	1.48	1.73	37	2.04	1.91	37
All Social Treatments	1.93	3.01	96	1.51	1.75	52	2.29	2.59	52
WF	1.87	2.99	24	0.55	0.29	4	2.75	3.4	4
WL	1.95	2.95	25	2.66	3.31	13	3.18	3.66	13
WM	1.02	1.36	24	0.89	1.05	20	1.18	1.36	20
WH	1.05	1.27	23	1.21	1.43	17	1.33	1.12	17
WM + WH	1.03	1.30	47	1.04	1.22	37	1.24	1.24	37
All Work Treatments	1.48	2.32	96	1.39	2.01	54	1.82	2.34	54

*Notes:* The error rate is the number of incorrect entries divided by the total number of data fields entered, expressed in percentage terms.

**Table 7. Determinants of the Error Rates under the Medium and High Wage Rate Treatments**

	Dependent Variable	
	Error Rate in the Initial Task	Error Rate in the Additional Task
	(1)	(2)
Constant	0.86 (0.71)	0.56 (0.71)
Work Frame	1.09 (1.11)	-1.80*** (0.45)
Lines Entered in the Initial Task	-0.002 (0.03)	0.03 (0.03)
Error Rate in the Initial Task		0.65*** (0.14)
Lines Entered in the Additional Task		0.02 (0.02)
Female	-0.22 (0.48)	-0.53** (0.22)
Observations	74	74
R <sup>2</sup>	0.18	0.51
Sample	Workers in Medium and High Wage Treatments Who Participated in the Additional Task	

*Notes:* This table presents the impact of the framing of the job description on the error rates for subjects who chose to participate in the additional task under medium and high wage rates. Work Frame is a dummy variable denoting whether the additional task was framed as work. Social Frame is a dummy variable denoting whether the additional task was framed as favor. Female is a dummy variable to indicate the gender of the worker. Session-specific fixed effects are also included. Standard errors, clustered around the experimental session, are presented inside parentheses. \*, \*\*, and \*\*\* represent significance at 10, 5, and 1 percent levels, respectively.

**Table 8. Relationship Between the Error Rate and the Wage Rate**

	Dependent Variable	
	Error Rate in the Initial	Error Rate in the Additional
	Task	Task
	(1)	(2)
Constant	2.14 <sup>**</sup> (0.83)	1.11 (1.39)
Wage Rate × Work Frame	-0.12 (0.20)	-0.28 <sup>***</sup> (0.06)
Wage Rate × Social Frame	-0.09 (0.23)	-0.11 (0.22)
Lines Entered in the Initial Task	-0.02 (0.04)	0.01 (0.06)
Error Rate in the Initial Task		0.81 <sup>***</sup> (0.12)
Lines Entered in the Additional Task		-0.005 (0.02)
Female	-0.11 (0.64)	0.29 (0.33)
Observations	106	106
R <sup>2</sup>	0.13	0.43
Sample	Workers Who Participated in the Additional Task	

*Notes:* This table presents the impact of the wage rate on error rates for subjects chose to participate in the additional task. Wage Rate × "X" Frame is the interaction of the wage rate at the additional task and a dummy variable denoting the framing of the additional task. Social Frame is a dummy variable denoting whether the additional task was framed as favor. Work Frame is a dummy variable denoting whether the additional task was framed as work. Session-specific fixed effects are also included. Female is a dummy variable to indicate the gender of the worker. Standard errors, clustered around the experimental session, are presented inside parentheses. \*, \*\*, and \*\*\* represent significance at 10, 5, and 1 percent levels, respectively.