

Optimal Gift-giving under Different Labor Market Conditions: Assessing Relevance and Composition of Gifts using Field Experiments

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Abstract

We investigate the economic relevance of gift giving and the composition of optimal gifts within the firm where output is contractible. We develop and estimate a structural econometric model that identifies workers' optimal reaction to monetary gifts received from their employer. We estimate the model using data from two separate field experiments, both conducted within a tree-planting firm. We use the estimated structural parameters to generalize beyond the experiment; we simulate how workers would react to different gifts on the part of the firm, permitting the characterization of profit maximizing gifts. We find that gifts have a role to play within an optimal incentive contract, increasing in importance under slack economic conditions. While the actual gift paid during the experiment did not increase profits, the introduction of an optimal gift would increase firm profits by up to 10%. Moreover, we find that gifts should be given by setting piece-rates above the market clearing level rather than handing out a positive base wage.

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1 Introduction

Economists are paying increasing attention to the role that gift giving can play within the firm. Theoretical models (dating to Akerlof, 1982) suggest that gifts induce reciprocal worker effort, implying that gift giving can form part of an optimal incentive contract. Experimental studies (both laboratory and field) have shown that workers do respond to

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monetary gifts from their employer, at least in the short run, by increasing their productivity (see, for example, Fehr, Kirchsteiger and Reidl, 1993; Gneezy and List, 2006; Bellemare and Shearer, 2007). However, the positive reaction of workers to gifts does not guarantee that gift-giving is a profitable policy option for the firm – the value of marginal effort to the firm may be less than the value of the gift.

Experiments which calculate treatment effects can evaluate profitability only within a specific environment, and have provided mixed evidence on this issue (eg. Fehr, Kirchsteiger and Reidl, 1993; Gneezy and List, 2006).¹ However, experimental gifts are typically chosen by researchers, not the firm. What is more, the lack of profitability of a specific gift, within a specific economic environment, does not rule out the economic relevance of gift-giving in general – other gifts, not observed within a particular experiment, may generate profits. Indeed, a more complete evaluation of gift giving must consider the efficiency of gifts as part of a contract which maximizes firm profits. If gifts are to be adopted, then gift-giving must not be dominated (or crowded out) by alternative effort-inducing instruments that are available to the firm.

In this paper, we consider gift-giving within a tree-planting firm where output is contractible, allowing the firm to pay their workers piece rates.² We investigate whether gifts have an economic role to play within this contracting environment, and if so, under what economic conditions. We then discuss the composition of profitable gifts. In particular, we focus on whether optimal gifts should be offered in the form of a change in piece-rate and/or base wage. We base our analysis on field experiments conducted within the firm, using our results to calculate profit maximizing gift-giving/piece rate contracts.

Determining profit maximizing contracts requires generalizing beyond single-treatment experiments to compare worker responses to several different contracts and gifts. Repeated experiments may not be practical in this regard, particularly within the field. Most experimental work on gifts seeks to isolate the response to the gift from the response to future surpluses within the firm. Consequently, gifts are presented as one-time-events (Gneezy and List (2006)), precluding repeated experiments. As well, most field experi-

¹Falk (2007) finds that gift-giving is a profitable device to raise charitable contributions.

²Empirical studies have produced strong evidence that workers react to the incentives provided by piece-rates (eg. Paarsch and Shearer, 1999, 2005; Lazear, 2000; Shearer, 2004).

ments seek to avoid Hawthorne Effects³ by keeping workers ignorant of the fact that they are participating in an experiment; examples include Gneezy and List (2006) and Bellemare and Shearer (2007). This requires explaining the gift in a manner that is credible to the workers, yet exceptional. Repeating experiments may jeopardize the credibility of these explanations, contaminating the results. Finally, randomizing gifts within a single experiment can create jealousies among workers within the firm and may be ruled out on principle by firm managers.⁴

An alternative approach is to exploit the observed behaviour within a limited number of experiments to estimate structural parameters that govern worker responses to gifts. These parameters can then be used to calculate profit-maximizing gifts that take account of the worker's reaction to different contracts. We follow this approach, developing and estimating an economic model of gift giving within the tree-planting firm. Applying structural models to experimental data has been advocated by Heckman and Smith (1995) as a means of permitting generalization. It has been applied to social experiments by Todd and Wolpin (2006) and by Lise, Seitz and Smith (2005) and to firm-level field experiments by Shearer (2004) and Paarsch and Shearer (2007).

In our model, the worker's effort decision is governed by two key parameters: one measuring the curvature of the cost of effort function and another, a kindness parameter, measuring the worker's response to monetary gifts from the firm. Modelling worker utility as a function of kindness the firm and the worker is in the spirit of Rabin's (1993) theoretical work on fairness and reciprocity. We show that optimal gift-giving/piece-rate contracts can be calculated from the knowledge of these parameters and an additional parameter, capturing general working conditions.

We identify our model through a series of field experiments conducted within the tree-planting firm. During the first experiment (which we call "the piece-rate experiment") the piece rate paid to workers was exogenously increased by between 20 and 28 percent. The recorded data, containing information on the number of trees each worker planted and the piece rate they received, identifies the curvature of the worker's cost of effort

³If workers know that they are participating in an experiment their behaviour may be affected, limiting the generalizability of the experimental results.

⁴Bellemare and Shearer (2007), the firm insisted that the gift be the same to everybody

function. During the second experiment (which we denote “the gift experiment”), workers received a monetary gift of \$80 from their employer, in addition to their regular piece rate. This represented a substantial amount of money to these workers, approximately 40% of average daily earnings. The recorded data, which contains information on the number of trees planted with and without the gift, identifies the worker’s kindness parameter, conditional on the cost of effort.

Our results show that gifts do have a role to play within this firm. While the experimental gift did not generate a profitable response, other gifts would have been profitable, at least under certain economic conditions. Our analysis points to the importance of the substitutability of piece rates and gifts, and crowding out – under economic conditions that lead to low-powered incentives, gifts become more profitable. This is captured in our model by labour-market conditions which determine piece rates in the absence of gifts. Our policy analysis concentrates on three questions. First, we consider if another gift would have generated a profitable response within the conducted experiment. Here, our results are negative – the explicit incentives provided by the observed piece rate (20 cents per tree) reduce the profitability of gifts. Second, we ask if gifts would play a role within an optimal contract, allowing the firm to select both the piece rate and the gift. Here, we find that gifts would increase profits (by up to 10%) if the firm were constrained to pay the same contract to all workers. Third, we analyze the composition of optimal gifts. We find that profitable gifts should be provided by setting higher than market clearing piece-rates rather than a positive base wage. This is explained in our model by the fact that workers respond more strongly to piece-rates than to base wage gifts.

The rest of the paper is organized as follows. The next section describes the institutional setting of the tree-planting industry in British Columbia and the firm in which the experiment took place. In Section 3 we describe the experiments. Section 4 presents the economic model. In Section 5 we discuss identification. In Section 6 we present the results and in Section 7 we conclude.

2 Tree Planting in British Columbia

2.1 The Industry

While timber is a renewable resource, active reforestation can increase the speed at which forests regenerate and also allows the control of species composition. In British Columbia, extensive reforestation is undertaken by both the Ministry of Forests and the major timber-harvesting firms.

Tracts of land that have recently been logged are allocated to tree-planting firms through a process of competitive bidding. These auctions typically take place in the autumn of the year preceding the planting season, which generally runs from early spring through to late summer. Tree-planting firms submit bids over the price per tree (or bid price) that they will receive to complete a given contract. These bids are calculated after having observed the planting conditions (eg. the slope and rockiness of the terrain) on the land to be planted. These conditions affect the number of trees that can be planted in a given day and therefore affect labour costs. The lowest-bidding firm wins the contract, returning to the site the following year with hired workers to plant trees.

Tree planting is a simple, yet physically exhausting, task. It involves digging a hole with a special shovel, placing a seedling in this hole, and then covering its roots with soil, ensuring that the tree is upright and that the roots are fully covered. The amount of effort required to perform the task depends on the terrain on which the planting is done and weather conditions. Flat plateaux are much easier to plant than steep mountain sides and hard, rocky soil is more difficult to plant than soft terrain. British Columbia is a very mountainous region of Canada; the terrain can vary a great deal from site to site.

Planters are paid using piece-rate contracts. Under these contracts, planters are paid in proportion to their output. Generally, no explicit base wage or production standard exists, although firms are governed by minimum-wage laws. Output is measured as the number of trees planted per day.

3 The Firm

Our experiments were conducted within a medium sized tree-planting firm that employs approximately 70 planters per year. The planters represent a very broad group of individuals, including returning seasonal workers and students working on their summer holidays. They range in age from 19 to 56.

This firm pays its planters piece rates; daily earnings for a planter are determined by the product of the piece rate and the number of trees the planter planted on that day. Blocks to be planted typically contain between 20 and 30 planter-days of work, with some lasting over 100 planter-days. For each block, the firm decides on a piece rate that applies to all planting done on the block. The piece rate for a particular block is set as a function of the planting conditions on that block. Since planting conditions affect the number of trees that workers can plant, blocks for which average conditions are more difficult require higher piece rates to attract planters.

Contracts, comprising a number of blocks in the same geographic area, are planted by crews of workers under a supervisor. Each crew typically has from 10 to 20 planters. All workers planting on the same block receive the same piece rate; no matching of workers to planting conditions occurs. Typically, planters are assigned to plots within a block as they disembark from the ground transportation taking them to the planting site. They also have little contact with other workers during their work day. Thus, to a first approximation, planters were randomly assigned to plots. Identification of our structural model exploits the exogenous variation induced by two experiments conducted inside this firm.

4 The Field Experiments

4.1 The Piece-Rate Experiment

The experiment took place on three separate blocks, over a three-month period in 2003. During the experiment, each homogeneous block was divided into two parts. One of these parts was then randomly chosen to be planted under the regular piece rate, the other to be planted under the treatment piece rate (equal to the regular piece rate plus five cents).

The regular piece rates paid on these blocks were 18 cents and 23 cents, respectively. The treatment piece rates therefore represented an increase of between 21 and 27 percent above the regular piece rate; 21 planters participated in the piece-rate experiment.

In order to avoid any possible Hawthorne effects, the experimental change in the piece rate was presented to the workers within the context of the normal daily operations of the firm. To accomplish this, the firm presented the treatment and control blocks as separate blocks, with separate piece rates.⁵ Note that this required spatial separation of the plots to be planted under each piece rate. As such, individual plots could not be randomly assigned to regular and treatment piece rates, but rather half of the block was randomly assigned to regular and half to treatment piece rates.

4.2 The Gift Experiment

The gift experiment took place on one homogeneous planting block which was planted over a seven-day period in June, 2006. This seven-day period was spread over two weeks. The first and second days of planting on the block took place on Thursday and Friday of the first week. The remaining 5 days of planting on the block took place from Monday to Friday of the following week. The piece rate paid to planters on this block was \$0.20 per tree. Eighteen planters were involved in the experiment, each planting between two and seven days on the experimental block. All eighteen planters were present for the second and third days of planting on the experimental block.

Upon arrival at the experimental block for the second day of planting, planters were informed that they would receive a lump-sum of \$80 for that day's work, in addition to the regular piece rate of twenty cents per tree. In order to avoid any effects of the experiment on participation, the \$80 was presented to the planters after they had departed from the base camp.

Workers in the gift experiment were unaware that they were participating in an exper-

⁵ A convincing explanation for the difference in piece rates was prepared invoking the fact that conditions on the treatment blocks had changed since the original bidding. This sometimes happens when the block has been unexpectedly prepared by the government. In practice, no explanation was needed as none of the planters questioned the higher piece rates.

iment. This allowed us to formulate the money as a gift to the planters from the firm and to observe the worker's response to that gift in their natural work environment. To this end, planters were told by the firm manager that there was extra money in the contract since some of the previously-planted blocks had been expected to present access problems to the workers. This caused the firm to bid "walkin" compensation to the contract for those blocks.⁶ In the end, the access problems did not materialize and the compensation was not needed. In spite of this, the manager had decided to share the extra money with the planters. This represented a realistic explanation to the workers since access problems occur occasionally and "walkin-fees" are the typical solution of the firm when they occur.⁷

A second important feature of our design is that workers were told the gift was a one-time event that would not be repeated. This was reinforced by attaching the gift to an extremely rare occurrence, minimizing any repeated-game effects whereby the workers might respond in the hopes of earning future gifts (or surpluses); see, for example, Shapiro and Stiglitz (1984) or Macleod and Malcolmson, (1989). Access problems requiring walkin fees occur on approximately 2-3% of all planting blocks. The firm plants approximately 300 blocks in a given year and most workers are affected only once or twice per year. That in itself is a rare event. Even more exceptional is the fact that the originally observed access problems did not materialize – the government unexpectedly opened an access road. Firm managers affirmed that, while this does occur, (the government sometimes acts to open up areas to logging), it was an extremely rare event, occurring on perhaps 1% of the blocks for which walkin fees are bid.⁸

Finally, the manager was instructed to treat the day of the gift as a normal working day: planters worked the same number of hours as a regular workday and were monitored in the same way. What is more, the manager reported that nothing out of the ordinary (such as a truck breaking down or trees being delivered late) occurred on that day that would affect planting.

⁶"Walkin-fees" compensate planters for time spent walking into planting sites and are bid into contracts to plant sites that are difficult to access.

⁷None of the planters questioned this explanation.

⁸This suggests that the event will occur approximately once in every 3000 blocks planted, implying a worker would have to work, on average, 10 years in the firm to experience it.

5 Economic Model

In this section, we present our model which can be solved for the optimal contract consisting of a piece-rate and a monetary gift. The next section discusses the identification of the model using the exogenous variation in piece-rates and gifts provided by our field experiments.

5.1 Technology

The daily output of worker i on block j , Y_{ij} , is a function of worker effort, E_{ij} and a random production shock, S_{ij} . We specify

$$Y_{ij} = E_{ij}S_{ij} \quad (1)$$

where S_{ij} is a positive random variable with

$$S_{ij} \sim IID(\mu_j, \sigma_j^2). \quad (2)$$

5.2 Utility

Workers have utility functions given by

$$U_i(W_{ij}, E_{ij}) = W_{ij} - C_i(E_{ij}) + \beta Y_{ij}G_{ij} \quad (3)$$

where W_{ij} represents daily earnings and $C(E_{ij})$ is the worker's cost of effort function and $\beta Y_{ij}G_{ij}$ represents the kindness function, capturing how workers respond to gifts from the firm. Following the work of Rabin (1993) on fairness, it specifies that the worker receives utility from returning value to the firm (in terms of output Y_{ij}). The utility gained is proportional to the size of the gift G_{ij} (or kindness) from the firm (defined in (6)). We specify the cost of effort function as a power function

$$C_i(E_{ij}) = \kappa_i \frac{\gamma}{\gamma + 1} E_{ij}^{(\gamma+1)/\gamma} \quad (4)$$

where, γ is a curvature parameter and κ_i allows for individual heterogeneity.

We first develop our model under piece rates, the typical compensation system of the firm. Later we extend it to consider gifts. In developing our model, we closely follow the actual piece-rate setting policy of the firm, based on extensive interviews with firm managers.

5.3 Timing

The timing of events in our model is as follows:

- for a particular block j to be planted, Nature chooses the pair (μ_j, σ_j^2) , the parameters of the distribution of S_{ij} ;
- the firm observes (μ_j, σ_j^2) , and then chooses a contract ω_j ;
- the planter observes $(\mu_j, \sigma_j^2, \omega_j)$, and accepts or rejects the contract;
- if the planter accepts the contract, then he is randomly assigned to plant a particular plot on the block (*ie*, s_{ij} , a particular value of S_{ij} is attributed to the planter);
- the planter observes s_{ij} , and chooses an effort level E_{ij} producing output Y_{ij} ;
- the firm observes Y_{ij} , and pays earnings.

To solve the model, we work backwards. First, we solve for the planter's optimal effort level conditional on a given piece rate and productivity shock. Then we solve for the firm's choice of the piece rate, taking the reaction of the planter as given. Note that, in order to induce the planter to accept the contract, the contract must satisfy the planter's participation constraint.

5.4 Piece Rates

Workers are typically paid the same piece-rate r_j on block j : $W_{ij} = r_j Y_{ij}$ and receive no gifts ($G_{ij} = 0$). Substituting (4) into (3) and using (1), optimal effort (for a specific realization of s_{ij}) and output are given by

$$E_{ij}^{NG} = \left[\frac{r_j s_{ij}}{\kappa_i} \right]^\gamma \quad (5a)$$

$$Y_{ij}^{NG} = \left[\frac{r_j}{\kappa_i} \right]^\gamma s_{ij}^{\gamma+1} \quad (5b)$$

5.5 Definition of Gifts

Crucial to any analysis of gift giving is the definition of a gift. During our experiment the definition seems simple: it is the size of the bonus paid to workers. Yet, its simplicity is due to the fact that the piece rate is fixed. In settings where the firm can offer a gift by selecting both a piece rate and a base wage the definition must be more general. Here, we define the gift to be the gain in expected utility holding effort fixed at pre-gift levels. In particular, let the original piece-rate contract be defined by r_j and the effort level $E_{ij}(r_j)$. Under a gift contract, denoted by a piece rate, R_{ij} and a base wage B_{ij} , we define the gift to the worker as given by

$$\begin{aligned} G_{ij}(R_{ij}, B_{ij}, r_j) &= E \{ B_{ij} + R_{ij} E_{ij}(r_j) S_{ij} - C_i(E_{ij}(r_j)) - [r_j E_{ij}(r_j) S_{ij} - C_i(E_{ij}(r_j))] \} \\ &= B_{ij} + (R_{ij} - r_j) \frac{r_j^\gamma E(S_{ij}^{\gamma+1})}{\kappa_i^\gamma}. \end{aligned} \quad (6)$$

The definition of gifts in (6) allows in principle the piece-rate R_{ij} and base wage B_{ij} paid to workers to vary across workers on a given block j . Notice, when the piece rate is fixed at pre-gift levels ($R_{ij} = r_j$) and when the base wage is the same for each worker on the block j (as during the experiment) $G_{ij} = B_j$. Finally, this definition of gifts is empirically tractible - it depends on γ and $\frac{E(S_{ij}^{\gamma+1})}{\kappa_i^\gamma}$, both of which are identified given our data (see Section 6).⁹

5.6 Gifts and Reciprocity

When the worker receives a monetary gift from the firm, $G_{ij} > 0$, and workers' response to the gift depends on their kindness parameter, β . Worker effort and output (given a realization of s_{ij}) are given by

$$E_{ij}^G = \left[\frac{(R_{ij} + \beta G_{ij}) s_{ij}}{\kappa_i} \right]^\gamma \quad (7a)$$

$$Y_{ij}^G = \left[\frac{R_{ij} + \beta G_{ij}}{\kappa_i} \right]^\gamma s_{ij}^{(\gamma+1)} \quad (7b)$$

⁹Alternatively, it would be possible to define gifts in (6) conditional on the shock $S_{ij} = s_{ij}$. This would not affect our parameter estimates given our experimental gift was given as a base wage ($G_{ij} = B_j$ in (6)) and thus is independent of the way we treat S_{ij} . It would however complicate the policy analysis of optimal gift-giving contracts in section 9.2. See footnote 17 for a more detailed discussion.

Furthermore, under the original piece-rate contract, $R_{ij} = r_j$ and $B_{ij} = 0$, such that $G_{ij} = 0$. Then, (7a) and (7b) are equal to (5a) and (5b) respectively.

5.7 Profits

The firm's expected profit π from worker i on block j under gift giving is given by

$$\begin{aligned} E(\pi_{ij}) &= (P_j - R_{ij})E(Y_{ij}^G) - B_{ij} \\ &= (P_j - R_{ij}) [R_{ij} + \beta G_{ij}(R_{ij}, B_{ij}, r_j)]^\gamma A_{ij} - B_{ij}. \end{aligned} \quad (8)$$

where

$$A_{ij} = \frac{E(S_{ij}^{\gamma+1})}{\kappa_i^\gamma}. \quad (9)$$

Notice that expected profits are a function of the structural parameters γ, β as well as the parameter A_{ij} capturing individual ability and planting conditions.

6 Identification and Estimation

From (8), calculating profit on the experimental block requires identifying γ, β and A_{ij} .¹⁰ We exploit two sources of experimental data to identify the parameters of the model.

6.1 Experimental Piece-Rate Data

The first source of identification is experimental variation in the piece rate, used to identify γ . During an experiment, conducted in 2003, the piece rate paid to planters was exogenously increased by 5 cents, from a base of either 18 cents or 23 cents. Let r^T and r^C denote

¹⁰Generalizing to other blocks would require imposing more structure on the estimation problem. One possibility would impose that piece-rate contracts satisfy the participation constraint of the marginal individual (denoted h) with productivity parameter κ_h . For example, let \bar{u} denote the utility of worker h from leaving the firm (his outside option). Under these circumstances, A_{ij} can be written as

$$A_{ij} = \left[\frac{\kappa_h}{\kappa_i} \right]^\gamma \frac{\bar{u}}{r_j^{\gamma+1}} \quad (10)$$

a function of structural parameters and the piece rate paid on a particular block.

the treatment and control piece rates, respectively. Then, from (5b),

$$\ln(Y_{ij}^T) = \gamma \ln r_j^T - \gamma \ln \kappa_i + (\gamma + 1) \ln(S_{ij}) \quad (11a)$$

$$\ln(Y_{ij}^C) = \gamma \ln r_j^C - \gamma \ln \kappa_i + (\gamma + 1) \ln(S_{ij}). \quad (11b)$$

Let J^{pr} denote the number of blocks in the piece-rate experiment, and I^{pr} the number of planters. Furthermore, define $\{D_j : j = 1, 2, \dots, J^{pr}\}$ as dummy variables taking a value of 1 for block j , and 0 otherwise. Similarly, define $\{D_i : i = 1, 2, \dots, I^{pr}\}$ as dummy variables taking a value of 1 for planter i , and 0 otherwise. Then, combining (11a) and (11b) gives

$$\ln(Y_{ij}) = a_0 + \sum_{i=2}^{I^{pr}} a_{1i} D_i + \sum_{j=2}^{J^{pr}} a_{2j} D_j + \gamma (r_j^T - r_j^C) D^T + \epsilon_{ij} \quad (12)$$

where

$$a_0 = -\gamma \ln \kappa_1 + \gamma \ln r_1^C + (\gamma + 1) E(\ln S_{i1})$$

$$a_{1i} = \gamma (\ln \kappa_1 - \ln \kappa_i)$$

$$a_{2j} = (\gamma + 1) [E(\ln S_{ij}) - E(\ln S_{i1})] + \gamma (\ln r_j^C - \ln r_1^C)$$

$$\epsilon_{ij} = (\gamma + 1) [\ln S_{ij} - E(\ln S_{ij})]$$

and

$$D_{ij}^T = \begin{cases} 1 & \text{if paid treatment piece rate on block } j, \\ 0 & \text{if paid control piece rate on block } j. \end{cases}$$

The exogenous variation in the piece rate implies that the expected value of ϵ_{ij} is equal to zero, conditional on the included regressors. Hence, the model in (12) identifies γ .¹¹

6.2 Experimental Gift Data

The second source of identification comes from the gift-giving experiment, used here to identify β and A_{ij} for the block on which the gift-giving experiment took place. From (5b) and (7b) and using the fact that $G_{ij} = B_j$ in the experiment we can write

$$\ln(Y_{ij}^G) = \gamma \ln [r_j + \beta B_j] - \gamma \ln \kappa_i + (\gamma + 1) \ln(S_{ij}) \quad (13a)$$

$$\ln(Y_{ij}^{NG}) = \gamma \ln r_j - \gamma \ln \kappa_i + (\gamma + 1) \ln(S_{ij}) \quad (13b)$$

¹¹We do not interpret the piece-rate experiment in terms of gifts, since the increase piece rate was not presented to the workers as a gift. See footnote 5. Recent work has highlighted the manner in which "gifts" are presented as determining their effect; see Fehr and (2007).

Combining (13a) and (13b) gives

$$\ln Y_{ij}^* = \gamma[\ln(r_j + \beta B_j) - \ln r_j]DGIFT_{ij} - \gamma \ln \kappa_i + (\gamma + 1)\mathbf{E}(\ln S_{ij}) + v_{ij} \quad (14)$$

where

$$\begin{aligned} Y_{ij}^* &= \ln Y_{ij} - \gamma \ln r_j \\ v_{ij} &= (\gamma + 1) [\ln S_{ij} - \mathbf{E}(\ln S_{ij})] \end{aligned}$$

and

$$DGIFT_{ij} = \begin{cases} 1 & \text{if receive gift,} \\ 0 & \text{else.} \end{cases}$$

The model (14) includes individual-specific effects which are needed to recover an estimate of A_{ij} . In order to gain information over individual-specific heterogeneity we supplement the experimental data with payroll data, collected on the experimental participants, planting on blocks near to the experimental block. We specify $(\gamma + 1)\mathbf{E}(\ln S_{ij})$ as a block-specific effect, D_j , and $\gamma \ln \kappa_i$ as an individual-specific term, D_i . The estimating equation is

$$\ln Y_{ij}^* = b_0 + \sum_{i=2}^{I^s} b_{1i}D_i + \gamma[\ln(r_j + \beta B_j) - \ln r_j]DGIFT_{ij} + \sum_{j=2}^{J^s} b_{2j}D_j + v_{ij} \quad (15)$$

where I^s denotes the number of planters in the gift experiment and J^s the number of blocks. The exogenous variation in the gift implies that the expected value of v_{ij} is equal to zero, conditional on the included regressors. Hence, conditional on γ , the model in (15) identifies β .

Notice as well that

$$S_{ij}^{\gamma+1} = \exp^{(\gamma+1)\ln S_{ij}} = \exp^{(\gamma+1)\mathbf{E}(\ln S_{ij})+v_{ij}}$$

giving

$$\mathbf{E}\left(S_{ij}^{\gamma+1}\right) = \exp^{(\gamma+1)\mathbf{E}(\ln S_{ij})}\mathbf{E}\left(\exp^{v_{ij}}\right).$$

Hence,

$$\begin{aligned} A_{ij} &= \frac{\mathbf{E}\left(S_{ij}^{\gamma+1}\right)}{\kappa_i^\gamma} \\ &= \frac{\exp^{(\gamma+1)\mathbf{E}(\ln S_{ij})}}{\kappa_i^\gamma}\mathbf{E}\left(\exp^{v_{ij}}\right) \\ &= \exp^{b_0+\sum_{i=2}^{I^s} b_{1i}D_i+\sum_{j=2}^{J^s} b_{2j}D_j} \times \mathbf{E}\left(\exp^{v_{ij}}\right) \end{aligned}$$

which we estimate by

$$\hat{A}_{ij} = \exp^{\hat{b}_0 + \sum_{i=2}^{I^g} \hat{b}_{1i} D_i + \sum_{j=2}^{J^g} \hat{b}_{2j} D_j} \times \sum_i \frac{\exp^{\hat{\vartheta}_{ij}}}{n_j}$$

where $\hat{\vartheta}_{ij}$ denote the residuals from (15).

6.3 Estimation of model parameters

We estimate our model parameters using a two-step, non-linear least squares estimator. In the first step, we estimate γ from (12) using the experimental variation in the piece rate. We then estimate β and A_{ij} , conditional on γ , from (15) using the gift-giving experimental data. To calculate the critical value for the t-statistic on β , taking account of its dependence on γ , we used the bootstrap technique.¹²

7 Descriptive statistics

Table 1 presents the summary statistics of the piece-rate experiment averaged over all planters in both treatment and control conditions. The average daily number of trees planted under the control conditions is 888.95, with a relatively high standard deviation. Under the treatment conditions, the average number of trees planted climbs to 1012.39. This reflects a 13.9% increase in planter productivity relative to the control conditions, a change consistent with the higher piece-rates paid in the treatment conditions.

Table 2 presents the summary statistics of the gift experiment averaged over all planters in both treatment and control conditions. Under the control conditions, planters received 0.20\$ per tree planted, yielding an average daily productivity of 1063.64 trees planted. When the gift is handed out (treatment conditions), the average daily number of trees

¹²The bootstrap proceeded as follows. First, we generated 999 bootstrap estimates of γ from the piece-rate experiment. For each estimated value of γ , denoted $\hat{\gamma}_b^*$, we then bootstrapped a sample from the gift-giving experiment, estimated $\hat{\beta}_b^*$ and calculated

$$t_b^* = \frac{\hat{\beta}_b^* - \hat{\beta}}{s_{\hat{\beta}_b^*}}.$$

This gives 999 values of the bootstrapped test statistic which we order from smallest to largest. The upper-tail (5%) critical value for the test statistic is the 975th value in the ordered series of t_b^* ; see, for example, Cameron and Trivedi (2005), page 363.

planted is 1153.06, an 8.4% increase in planter productivity relative to planting without a gift.

Table 3 presents the summary statistics for the gift-experiment planters, planting on both experimental and non-experimental blocks. The average number of trees planted per day is equal to 988 trees. This is lower than on the experimental block and reflects the fact that the experiment was conducted on somewhat easier conditions than average. This is also reflected in the fact that the average piece rate is \$0.23, higher than that paid on the experimental block. We note, however, that average earnings are very similar – \$220 per day when averaged over all blocks and \$230 on the experimental block.

8 Estimation Results

The estimate of γ is equal to 0.39. A statistical test of the null hypothesis that γ is equal to zero is rejected at all levels of statistical significance – the p -value is essentially equal to zero.¹³

8.1 Homogeneous Response

The estimate of β is equal to .00071 and is statistically significant at the 5% level¹⁴ – the t -statistic for β is equal to 1.77, while the (bootstrapped) critical value for the t -statistic is equal to 1.67.

8.2 Heterogeneous Response

To allow for heterogeneity in response to the gift we allow β to be a function of observable individual characteristics: age and tenure. In particular, we specify

$$\beta_i = \beta_0 + \beta_1 \times tenure_i + \beta_2 \times age_i + \beta_3 \times age_i \times tenure_i. \quad (16)$$

¹³Controlling for daily temperature in (12) had no effect on the results.

¹⁴We controlled for daily temperature, rainfall and day of the week in the estimation of (15). The estimates of these parameters are available from the authors on request.

The estimated response function is ¹⁵

$$\hat{\beta}_i = 0.00042 + 0.00043 \times tenure_i + (2.72e - 6) \times age_i - (9.79e - 6) \times age_i \times tenure_i$$

(0.71) (5.44)^{***} (0.24) (-5.54)^{***} (17)

Here, the estimated t-statistics are given in parentheses; *** denotes statistical significance at the 1% level.¹⁶ The estimates suggest that reciprocity is associated with a longer tenure within the firm, yet this effect is diminished with age. The positive effect of tenure on reciprocity is consistent with Akerlof's (1982) notion that the benefits from gift giving increases with time spent in the firm; see, Bellemare and Shearer (2007) for a more complete discussion.

The estimated individual responses to the gift along with the estimated values of A_{ij} (for the experimental block, are presented in Table 4. In general, the estimates show considerable heterogeneity in response. The small number of treatment observations affects the precision with which we can measure individual responses. Nevertheless, these responses are statistically significant at the 10% level for 10 planters, at the 5% level for 8 planters and at the 1% level for 2 planters. While the effect is estimated to be negative for one planter, it is not statistically significant. The A_{ij} parameters are all very precisely estimated. This is perhaps not surprising since this parameter represents average productivity of individual i on the experimental block. Notice as well that from (9), $E(S_{ij}^{\gamma+1})$ is the same across planters on block j , implying higher values of A_{ij} represent more productive workers (individuals with lower values of κ_i). The estimates show substantial heterogeneity in planter productivity.

¹⁵The bootstrapped 1% critical values for a two-sided alternative are equal to 3.10 (β_0), 4.06 (β_1), 2.94 (β_2) and -3.88 (β_3). The bootstrapped 5% critical values are equal to 2.45 (β_0), 2.90 (β_1), 1.98 (β_2) and -2.85 (β_3).

¹⁶We controlled for daily temperature, rainfall and day of the week in the estimation of (15). The estimates of these parameters are available from the authors on request.

9 Policy Analysis

The firm received 35 cents for each tree planted on this contract and paid a piece rate of 20 cents to its workers, giving a net revenue of 15 cents per tree. The workers responded to the firm's gift with an increase of output in the order of 117 trees. Hence the 80 dollar gift generated only 17 dollars of revenue – the exchange of gifts was not profitable for the firm. However, it is important to bear in mind that the experimental gift was chosen by economists, not the firm. Other gifts may well generate profitable responses. To investigate this we use our estimated parameters (allowing for heterogeneous response) to calculate the profits of alternative gift contracts. Throughout this section, \bar{r}_j represents the standard piece rate paid to all planters on the experimental block (denoted j) during the gift experiment.

9.1 Profitable Experiments

We now consider whether other experimental base wage gifts B_{ij} could have been profitable, planting on the same block at the same piece rate. In a more general setting, the firm can chose planter specific experimental base wage gifts (B_{ij} for $i = 1, 2, \dots, n$) to maximize expected profits across all workers, given the block and the observed piece rate. This implies that the firm solves

$$\max_{B_{1j}, B_{2j}, \dots, B_{nj}} \sum_{i=1}^n (P_j - \bar{r}_j) [\bar{r}_j + \beta_i B_{ij}]^\gamma A_{ij} - B_{ij} \quad (18)$$

subject to

$$B_{ij} + [\bar{r}_j + \beta_i B_{ij}]^{(\gamma+1)} \frac{A_{ij}}{(\gamma+1)} \geq \frac{\bar{r}_j^{\gamma+1} A_{ij}}{(\gamma+1)} \quad \forall i \quad (19)$$

Because base wage gifts B_{ij} are allowed to differ across workers, the solution to (18) coincides with the simpler solution of solving, for each worker i ,

$$\max_{B_{ij}} (P_j - \bar{r}_j) [\bar{r}_j + \beta_i B_{ij}]^\gamma A_{ij} - B_{ij} \quad (20)$$

subject to the participation constraint of worker i . Since the participation constraint is satisfied for any positive base wage gift B_{ij} , we can analyze the profitability of any B_{ij} by

considering the unconstrained maximization of (20) – a necessary condition for positive gifts to increase profits is that the gradient of (20) with respect to the base wage gift be positive when evaluated at $B_{ij} = 0$. The gradient is given by

$$(P_j - \bar{r})\gamma\beta_i(\bar{r}_j + \beta_i B_{ij})^{\gamma-1} A_{ij} - 1 \quad (21)$$

Evaluating at $B_{ij} = 0$ and rearranging gives

$$-\bar{r}_j^{1-\gamma} - A_{ij}\gamma\beta_i\bar{r}_j + A_{ij}\gamma\beta_i P_j. \quad (22)$$

We evaluate this expression at the estimated parameters for each worker. We find that the values are all negative, suggesting that no positive base wage gifts B_{ij} would have generated a profitable response under these conditions, for any of these workers. It also follows that the special case of restricting $B_{ij} = B_j$ for all i and solving (18) under the participation constraints of all workers results in unprofitable positive values of B_j . Hence, there are also no homogeneous gifts that could have generated a profitable response.

A closer look at the effort function (7a) is revealing in considering these results. Since output is measurable (and contractible) gifts and piece rates are substitutes. Furthermore, because the piece-rate incentives are strong and workers' response to the gift is relatively small (the average $\hat{\beta}_i = .0009$) the profitability of a gift is attenuated at the observed piece rate.

9.2 Optimal Gift-giving Contracts

Given, the gift induces a response from workers, a more general question is whether or not the firm could increase profits by including gifts in their compensation system. In contrast to the previous section where the piece rate was fixed, we now allow the firm to use a gift contract characterized by a piece rate R_{ij} and a base wage B_{ij} to maximize profits subject to keeping the workers' utility constant at the level observed under the piece rate contract \bar{r}_j on the experimental block. Since the piece rate in the gift contract R_{ij} is a choice variable, the definition of a gift must be extended to include changes in the piece rate (see (6)).

9.2.1 Individual-Specific Contracts

We first consider individually tailored contracts. The firm's problem is to separately maximize the expected worker profit from each worker i . In particular, the firm solves

$$\max_{(R_{ij}, B_{ij})} (P_j - R_{ij}) [R_{ij} + \beta_i G_{ij}(R_{ij}, B_{ij}, \bar{r}_j)]^\gamma A_{ij} - B_{ij} \quad (23)$$

where $G_{ij}(R_{ij}, B_{ij}, \bar{r}_j)$ is given by (6). The firm chooses R_{ij} and B_{ij} to maximize (23) subject to the participation constraint of worker i

$$B_{ij} + [R_{ij} + \beta_i G_{ij}(R_{ij}, B_{ij}, \bar{r}_j)]^{(\gamma+1)} \frac{A_{ij}}{(\gamma+1)} \geq \frac{\bar{r}_j^{\gamma+1} A_{ij}}{(\gamma+1)}. \quad (24)$$

Notice that the constraint (24) of each worker is identified given identification of $(\gamma, \beta_i, A_{ij})$.¹⁷

Hence, we can solve (23) for each worker numerically at the parameter estimates from the model. The results are given in Table 5.¹⁸ Notice that this contract increases firm profits vis-à-vis piece-rate profits by approximately 6.7 percent, yet the offered gift is negligible – less than 10 cents in each case. In fact, in the presence of gifts, the firm increases the piece rate incentives to workers and reduces the base wage to capture rents. This is very similar to the standard solution to the principal-agent problem whereby the firm sells planting rights to the workers and offers a high-powered incentive contract in return.

9.2.2 Optimal Homogeneous Contracts

The contracts in the previous section were tailored to individual workers - each received a unique piece rate and base wage on block j . Perhaps more realistically, we now consider how the firm would select on a specific block a gift contract if the piece rate R_j and base

¹⁷An alternative discussed in section 5.5 is to define the gift conditional on the shock s_{ij} which implies that G_{ij} would depend on the realization s_{ij} . The expected profit from worker i would then be given by

$$E(\pi_{ij}^G | R_{ij}, B_{ij}, r_j) = \int (P_j - R_{ij}) \left[\frac{R_{ij} + \beta_i G_{ij}(R_{ij}, B_{ij}, r_j, s_{ij})}{\kappa_i} \right]^\gamma s_{ij}^{(\gamma+1)} f(s_{ij}) ds_{ij} - B_{ij} \quad (25)$$

Given the dependence of G_{ij} on s_{ij} , identification of the expected profit requires identifying the distribution of s_{ij} and the distribution of κ_i . This would require possibly different data and/or additional model assumptions.

¹⁸To solve for the optimal contract we conducted a grid search over values of R_{ij} and B_{ij} . For each point in the grid we calculated firm profits and the participation constraint. The argmax being that point that gave the highest profits among the set of points satisfying the participation constraint.

wage B_j had to be the same for all workers. In this case the firm solves the following problem

$$\max_{(R_j, B_j)} \sum_{i=1}^{I^s} (P_j - R_j) [R_j + \beta_i G_{ij}(R_j, B_j, \bar{r}_j)]^\gamma A_{ij} - B_j \quad (26)$$

with respect to (R_j, B_j) subject to the participation constraint

$$B_j + [R_j + \beta_i G_{ij}(R_j, B_j, \bar{r}_j)]^{(\gamma+1)} \frac{A_{ij}}{(\gamma+1)} \geq \frac{\bar{r}_j^{\gamma+1} A_{ij}}{(\gamma+1)} \quad (27)$$

holding for each worker.

We evaluate (26) at the estimated parameter values. Here, we find that gifts are very small. The average gift is equal to \$1.61, while the minimum gift is zero and the maximum gift is \$2.94. The gifts are comprised of a negative base wage (-\$2.56) and a small increase in the piece rate (\$0.204 versus \$0.20). Gifts differ among workers in spite of the homogeneous contract since the value of the change (in expected utility) in the piece rate depends on worker ability. Moreover, introducing gifts has a negligible effect on firm profits in this context. One interpretation of this result is that the observed contract is a close approximation to the profit maximizing homogenous contract within the current labour market.

Different Labour Markets

Some authors have suggested that gifts are most useful in the presence of low-powered explicit incentives, either due to crowding out (Fehr and Gächter, 2002) or due to multi-tasking problems rendering high-powered incentives ineffective (Fehr and Falk, 2002). To address these issues, we solve the problem of the firm given in (26) under lower piece rates \bar{r}_j , holding worker ability constant. One scenario that would lead to a reduced piece rate within the context of our model is a decrease in worker outside alternatives, due to a slack labour market.¹⁹

To proceed, we calculate the contract that maximizes (26) subject to (27), at values of $\bar{r}_j \in (0.01, 0.35)$. The results, presented graphically in Figures 1 through 4, suggest that there is a role for gifts in this firm, although that role is somewhat muted under current

¹⁹This scenario can be exemplified by extending the discussion in footnote 10, where it is assumed that the firm selects the piece rate to satisfy the participation constraint of the marginal worker with productivity

labour-market conditions. Figure 1 graphs profits from the piece-rate contract and the gift-giving contract. We note that gifts are not optimal beyond the observed piece rate $\bar{r}_j = .2$, yet are profitable in the region $\bar{r}_j < 0.2$),²⁰ generating an increase in profits in the order of 10% over the piece-rate contract at $\bar{r}_j = .1$, where the average gift paid to workers (Figure 2) would be \$19.50 – the maximum gift would be \$37.54. The importance of gifts decreases as we approach the observed piece rate, yet the maximum gift is still above \$10 at a piece rate of \$0.18.

Figures 3 and 4 show the composition of the gift. It is noteworthy that, while gifts occur, they are not in the form that one might expect – the base-wage is always negative, compensated to the workers by an increase in the piece rate. In effect, a gift in the form of a higher piece rate generates effort on two levels: first, through the increase in the marginal return to effort; and second, through the reciprocal response to the gift.

10 Discussion and Conclusions

This paper adds to the empirical literature on gift giving, concentrating on the profitability of gifts within the firm. We have used field experiments to measure worker response to gifts, identifying structural parameters which permit the generalization of results beyond the experimental setting.

Our results suggest that gifts do have a role to play in this firm, particularly when parameter κ_h . Under these circumstances, evaluating (10) at \bar{r}_j and solving for \bar{r}_j using (9) we get

$$\bar{r}_j = \left[\frac{\bar{u}\kappa_h^\gamma}{E(S_{ij}^{\gamma+1})} \right]^{\frac{1}{\gamma+1}} \quad (28)$$

Hence, holding all else constant, a decrease in the utility of the outside alternatives of the marginal worker \bar{u} decreases the piece rate \bar{r}_j chosen by the firm.

²⁰In the absence of gifts, the estimated profit-maximizing piece rate on the gift experimental block is given by

$$\hat{r}_j = \frac{\hat{\gamma}}{\hat{\gamma} + 1} P_j = 0.0987. \quad (29)$$

This is much less than the 20-cent piece rate observed on the block and represents what the firm would pay if it did not have to meet the participation constraint of workers. Given this, the economically relevant region of comparison is given by $\bar{r}_j \geq 0.1$.

contracts are homogenous across workers. While the experimental gift was not profitable, other gifts would be; we estimate that firm profits would increase by up to 10 percent, vis-à-vis a piece-rate contract, by the introduction of an optimal gift. We also estimate that the value of gifts increases under slack labor market conditions.

It is notable that gifts have an economic impact within a firm where output is measurable. The principal of reciprocity states that workers will respond to gifts by returning value to the firm. Yet, if measurable output is valuable (as in tree planting), then piece rates and gifts are close substitutes and their use is determined by relative cost (or relative worker reaction to incentives). In our case, worker response to piece rates is relatively high; hence piece rates limit the effect of gifts during the experiment. In situations where the market clearing piece rate is low however (due to labour-market conditions in our model), then the relative value of gifts increases. In other industries measurable output may not generate value to the firm (Holmstrom and Milgrom, 1991; Baker, 1992), further increasing the relative value of gifts.

Our analysis also provides new insights on the composition of optimal gifts. We found - somewhat unexpectedly - that gifts should be provided by setting higher than market clearing piece-rates rather than a positive base wage. This finding relates to existing experimental results which have failed to find profitable base wage gifts in environments with contractible output (Gneezy and List (2006)). Our analysis suggests that workers respond more strongly to piece-rates than to base wage gifts, thus lowering the relative profitability of the later.

Our results also have implications for the analysis of experimental data. Experiments provide exogenous variation in contracts, simplifying the identification of treatment effects. Yet economists are increasingly calling for the generalization of experimental results. Applying economic models to experimental data allows for the identification of structural parameters, permits generalization and adds value to experiments.

Finally, we note that our model is static and neglects some important dynamic issues associated with gift giving. Perhaps the most important is the rate at which gifts can, or should be distributed by the firm. Our results suggest that gifts have an effect on worker productivity and can, on special occasions, be profitable. Yet, an increasing body of evi-

dence suggests that the effects of gifts are short term (Gneezy and List, 2006; Bellemare and Shearer, 2007). Whether or not gifts can form the basis of a profitable, long-term personnel policy or should only be used on special occasions remains a question for future research.

Control Sample: 109 Observations				
Variable	Average	Std. Deviation Gift	Minimum	Maximum
Number of Trees	888.85	325.46	390	1765
Piece Rate	0.21	0.03	0.18	0.23
Daily Earnings	182.65	50.40	89.70	317.70
Treatment Sample: 88 Observations				
Variable	Average	Std. Deviation Gift	Minimum	Maximum
Number of Trees	1012.39	351.23	375	1965
Piece Rate	0.26	0.02	0.23	0.28
Daily Earnings	254.56	68.98	105.00	451.95

Table 1: Summary Statistics: Piece-Rate Experiment

Control Sample: 66 Observations				
Variable	Average	Std. Deviation Gift	Minimum	Maximum
Number of Trees	1063.64	269.96	670	1625
Piece Rate	0.2	0	0.2	0.2
Piece-Rate Earnings	212.73	53.99	134	325
Gift	0	0	0	0
Total Daily Earnings	212.73	53.99	134	325
Treatment Sample: 18 Observations				
Variable	Average	Std. Deviation Gift	Minimum	Maximum
Number of Trees	1153.06	323.23	705	1845
Piece Rate	0.2	0	0.2	0.2
Piece-Rate Earnings	230.61	64.65	141	369
Gift	80	0	80	80
Total Daily Earnings	310.61	64.65	221	449

Table 2: Summary Statistics: Gift Experiment

Control Sample: 678 Observations				
Variable	Average	Std. Deviation Gift	Minimum	Maximum
Number of Trees	978.82	309.4249	210	2100
Piece Rate	0.23	.04	0.16	0.35
Piece-Rate Earnings	219.57	59.25	48.30	420

Table 3: Summary Statistics: All Blocks

Planter	Estimated β_i	Standard Error	t-statistic		Estimated A_{ij}	Standard Error	t-statistic
1	0.00063	0.00039	1.61	**	1935.10	283.48	6.83
2	0.00069	0.00043	1.58	*	1637.96	242.36	6.75
3	0.00047	0.00043	1.10		1207.93	196.11	6.16
4	0.00146	0.00053	2.74	**	2242.82	332.49	6.75
5	0.00025	0.00034	0.72		1566.87	240.64	6.51
6	0.00137	0.00051	2.67	** *	2434.87	359.21	6.78
7	0.00048	0.00041	1.17		1529.66	235.30	6.50
8	0.00053	0.00036	1.50	**	2534.42	384.40	6.59
9	0.00049	0.00039	1.28		1534.89	233.20	6.58
10	0.00053	0.00036	1.48	**	1928.05	283.28	6.81
11	0.00064	0.00040	1.61	**	1767.96	261.12	6.77
12	0.00052	0.00036	1.48	**	2588.63	391.06	6.62
13	0.00135	0.00052	2.57		2412.57	352.77	6.84
14	0.00050	0.00038	1.30		1500.76	231.74	6.48
15	0.00082	0.00041	2.00	*	2161.51	330.01	6.55
16	0.00049	0.00039	1.28		1537.70	229.87	6.70
17	-0.00013	0.00033	-0.40		2437.17	359.46	6.78
18	0.00242	0.00069	3.49	** *	2336.72	345.36	6.77

Table 4: Individual-specific responses: *, ** and ** * denote significance at the 10, 5 and 1 percent levels respectively. All the estimated $A_{i,j}$ s are significant at 1 percent level.

Planter	Estimated A_{ij}	Optimal Gift Contract				Profits		
		Piece Rate	Base Wage	Gift	Piece-Rate Contract	Gift Contract	% Change	
1	1935.10	0.271	-73.0	0.013	154.25	164.538	6.668	
2	1637.96	0.271	-61.8	0.001	130.57	139.281	6.674	
3	1207.93	0.274	-47.5	0.002	96.29	102.708	6.667	
4	2242.82	0.273	-87.0	0.007	178.78	190.708	6.671	
5	1566.87	0.271	-59.1	0.019	124.90	133.219	6.660	
6	2434.87	0.273	-94.4	0.057	194.09	206.999	6.651	
7	1529.66	0.270	-56.9	0.002	121.93	130.068	6.671	
8	2534.42	0.273	-98.3	0.019	202.03	215.491	6.665	
9	1534.89	0.271	-57.9	0.013	122.35	130.506	6.666	
10	1928.05	0.270	-71.7	0.023	153.69	163.925	6.659	
11	1767.96	0.271	-66.7	0.007	140.93	150.331	6.671	
12	2588.63	0.273	-100.4	0.022	206.35	220.098	6.664	
13	2412.57	0.272	-92.3	0.010	192.31	205.143	6.672	
14	1500.76	0.272	-57.4	0.023	119.63	127.595	6.658	
15	2161.51	0.272	-82.7	0.004	172.30	183.799	6.674	
16	1537.70	0.270	-57.2	0.002	122.58	130.752	6.672	
17	2437.17	0.273	-94.5	0.047	194.27	207.192	6.649	
18	2336.72	0.272	-89.4	0.008	186.27	198.696	6.673	

Table 5: Optimal piece-rate/base-wage - gift contract for each planter in the gift experiment. $A_{ij} = \frac{E(S_{ij}^{(r+1)})}{\kappa_j^r}$

Figure 1: Piece-Rate and Gift-Giving Profits with homogeneous gift contracts under slack labor market conditions

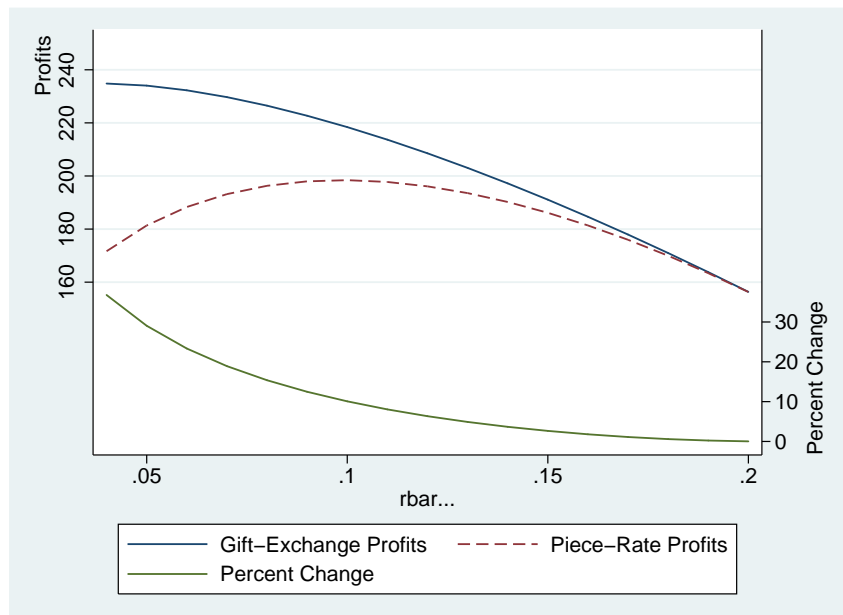


Figure 2: Average and Maximum Gifts with homogeneous gift contracts under slack labor market conditions

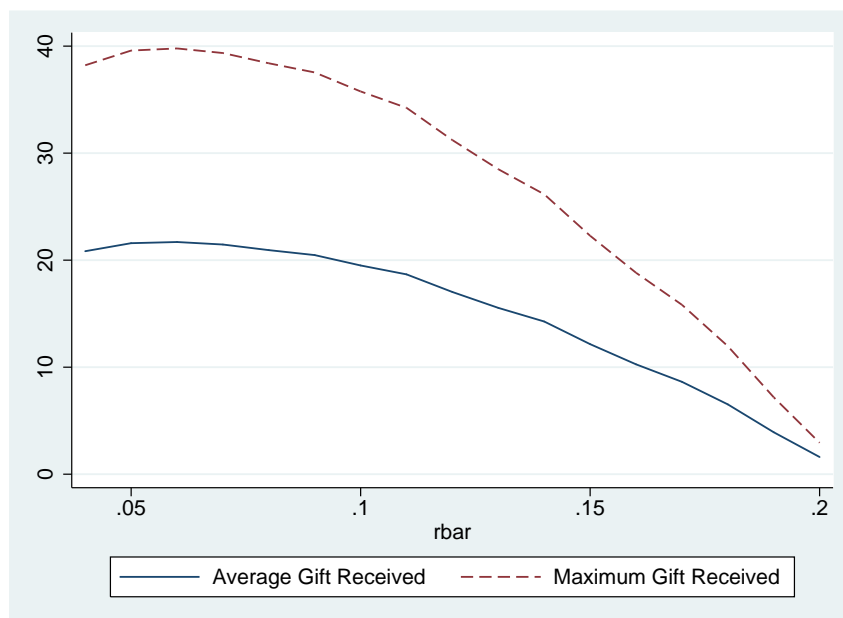


Figure 3: Composition of Gifts (The Piece Rate) with homogeneous gift contracts under slack labor market conditions

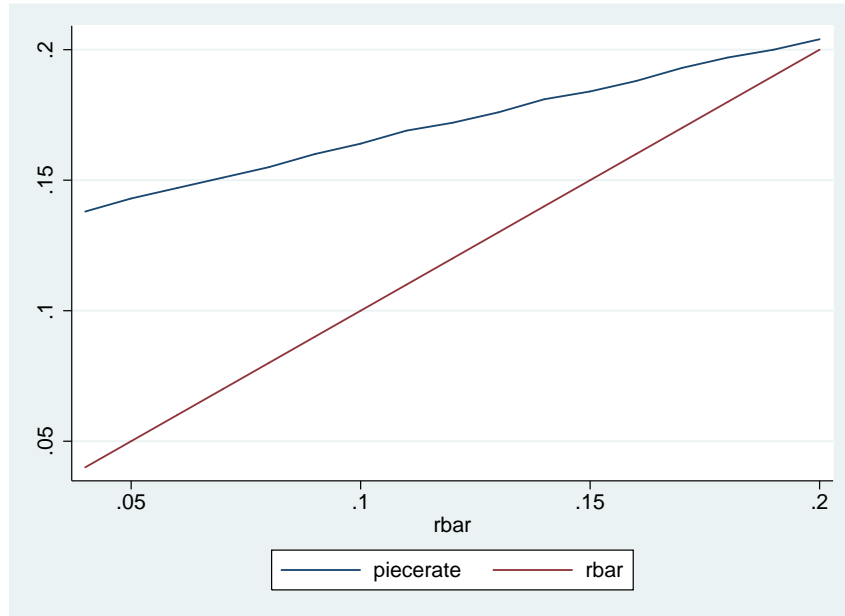
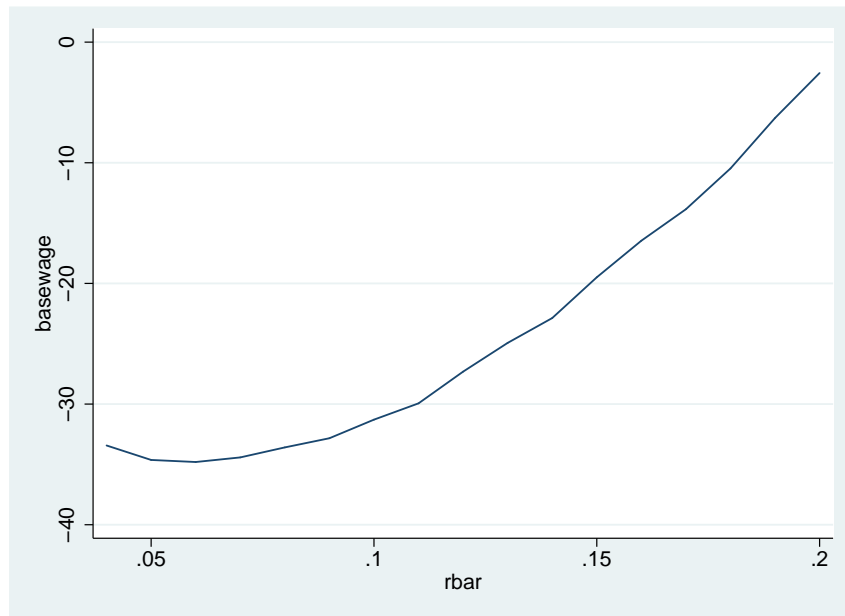


Figure 4: Composition of Gifts (The Base Wage) with homogeneous gift contracts under slack labor market conditions



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