Team or Individual: What Determines Workers' Preferred Bonus Schemes?

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Abstract

This paper uses data from a firm with team production to investigate the association between workers' productivity, risk aversion and preferred bonus scheme (team or individual). Standard economics make a strong prediction in this case. Workers persistently producing above the team average should vote for an individual bonus. The only concern that may moderate this preference is risk aversion. The economic model predicts the case at hand fairly well. Relative work place productivity is strongly associated with a preference for individual bonuses, and risk aversion is associated with a preference for a team bonus. There is, however, one noticeable exception to this pattern: a substantial fraction of low performers prefer an individual bonus. I argue there are two types of other regarding concerns that can explain why under-performers prefer a payment system that reduces their income; distributional fairness and social emotions.

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Keywords: payment systems, risk aversion, social appraisal, fairness.

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1 Introduction

Individuals who participate in economic laboratory experiments are surprisingly generous. In lab simulated labour relations many "workers" display considerable non-selfish behaviour, indicating a range of social motivations. Are real workers in real firms equally willing to reciprocate, share and reduce income inequality?

The answer has great practical relevance. The effectiveness of financial incentives depends critically on workers' motivation. Individuals who feel uncomfortable when their colleagues' are lagging behind work harder under a piece rate than in a tournament (Bandiera et al 2005). Workers who dislike income inequality may produce more under a team bonus than under an individual bonus (Engelmaier and Wambach 2010). In addition, when workers exhibit social preferences the firm can incentivize performance not only by paying their workers extra income, but also – for example – by paying them respect (Ellingsen and Johannesson 2007).

It is disputed to what extent the level and structure of the pro-sociality observed in the lab carries over to economic exchange in the field (Levitt and List 2007). But despite its importance, there are relatively few empirical studies assessing the relevance of social preferences at real workplaces. This paper contributes to that limited literature.

The data is from a customer service centre of an insurance company. It is an inbound call centre where agents are organized in teams. They provide customer services (information) and they sell new insurance products. The firm has for a long time (since 2001) used monetary incentives to boost performance, especially sales. The sales bonus has, in varying degree, rewarded both individual and team sales. In a survey conducted in 2009, workers stated their preferences over bonus schemes (individual or team bonus). They also made decisions in a sequence of hypothetical income gambles, enabling me to construct an estimate of each agent's risk aversion. In addition to the survey information the data contains long records of weekly sales for each worker which permits an accurate estimate of each agent's relative (to team average) workplace productivity.

The economic self interest hypothesis makes a clear prediction in this case: Workers who consistently produce more than the team average should vote for an individual bonus, while those lagging behind ought to go for a team bonus. The only reason why a selfish

worker who, on average, produces more than his team mates may find a team bonus attractive is because it diminishes income uncertainty.[2]

Controlling for other factors such as gender, length and type of education, age, tenure, etc I find that higher sales (relative to the team average) increases the likelihood of preferring individual bonuses (p <0,01). There is also a tendency that workers who reveal more risk aversion in the income gambles prefer a team bonus, but this association is more uncertain.

Although self interest is a strong predictor for the agents' preferences over pay schemes, a relatively large fraction of the workers vote against their economic interests. Among those selling consistently above the team average, 69 % prefer individual bonuses, while 14,2% prefer a team bonus (the rest express no preference between individual and team incentives). The fraction of low-performers who vote against their economic self interest is larger; among the agents who sell below the team average 40 % prefer individual incentives while 48% prefer team incentives (the rest are neutral).

These findings run counter to a strict deterministic interpretation of the self interest hypothesis. One possible explanation, holding on to assumption that workers prefer arrangements that maximizes their own income, is that agents performing below average believe they will excel and produce above average in the future. The idea that low performers oppose redistribution due to a "prospect of upward mobility" (POUM) was first formalised by Benabou and Ok 2001. Another explanation that seems pertinent given the level of generosity individuals' display in lab experiments is that workers vote against their economic self interest because they have social preferences. Note however that the pattern reported above is incompatible with the predictions of the inequality aversion model presented in Fehr and Schmidt 1999, as inequality aversion cannot account for the fact that it is especially low-performing workers who favour a payment scheme that goes against their material self-interests. If egalitarianism is the only fairness standard, individuals who have an aversion towards income inequality and who sell below the team average have *both* selfish and fairness reasons for preferring a team bonus. Hence, the inequality aversion model predicts that we should not observe that workers, producing regularly below the average of the team, vote for an individual bonus. To explain the observed pattern in a model where individuals have

[2] Differences in preferences over bonus schemes could, in principle, also be traced to differences in beliefs: Individuals who believe free riding is a problem may, for efficiency reasons, prefer an individual bonus. Free riding is not an important issue at this workplace. It is easy for team members to exert peer pressure on each other since members are clustered together in an open office landscape. Each team also has a team leader, a coach, who supervises individual team members. In the survey very few of the responders said that the team bonus suffers from free riding

fairness preferences over income distributions, we must allow for a pluralism of norms (see Cappelen et al 2007). I discuss this possibility and alternative explanations for the pattern found in the data in section 6 of the paper. I, start, however with a brief discussion of related research.

2 Contribution and relation to previous literature

When workers know their own relative productivity and free riding is not an issue, as I shall argue is the case in this customer service centre, the choice between team and individual pay is essentially a choice of how to divide income within a group. Workers can vote selfishly for the bonus that maximizes personal income, or they can be generous and support an alternative that increases the income of others at their own cost. How individuals divide money between themselves and others have been studied extensively in the lab over the last two decades. The simplest sharing experiment is the Dictator Game. Results from this game, and from its cousins (for example return decisions in a Trust Game), reveal that many individuals are willing to share their money in controlled laboratory experiments, see Camerer 2003 for a general discussion of these games.

A major difference between a standard Dictator Game and the case at hand is that when team members express their preference over bonus schemes, the amount they "divide" does not fall into their hands as manna from heaven. The sum to be divided is produced by the team members. There are lab experiments where individuals produce/invest before they divide the proceeds (see Cappelen et al 2007 for references). When production precedes distribution entitlement norms affect individuals' willingness to share. Individuals who contribute more will in general claim a larger share of the pie (Cappelen et al 2007, Esarey et al 2011). Compared to the studies of production and sharing in the lab, this study has advantages and drawbacks.

The production phase is clearly more relevant here than in the lab experiments, where participants typically are set to do 10 to 20 minutes of trivial task solving before they divide the proceedings. Another advantage is that the workers I study are familiar with the sharing problem they are asked to take a stand on. For many years the bonus has been based on both individual and team sales and the relative importance of team performance has varied over time. In one period team members had to vote over two alternatives; a bonus with 80% weight on team sales and 20% on individual sales, or a bonus scheme with opposite weights.

I think it is noteworthy that the subjects I study take a stand on a sharing problem they find relevant and are familiar with. Participants in laboratory experiments may feel a bit baffled by the strangeness of the situation they are put in.

A potential drawback of this study is that agents state their preferences over bonus schemes; their response has no, at least no immediate, financial consequence. I am not so worried about this. As pointed out above, the outline of the bonus scheme – and especially whether the bonus should be based on individual or team performance - is of real concern for these workers. I see no reason why they should conceal their true preference in the survey. On the contrary, if they believe that the results from the study will be used to craft a new bonus scheme, they have every reason to state how they really rank the alternatives.

3 The workplace and the bonus scheme

The workers provide customer services trough an inbound call centre. A computer based phone system automatically channels new calls to available personnel. Operators use the computer to obtain the information they need to assist customers, and to register new information in the customer data base. Their main assignment is to update existing clients about their insurance coverage, notify them if there are any changes that seem relevant and inform them about new products that are available. All this should be done as fast as possible, in a friendly and courteous way. In addition to the service assignment, the operators sell insurance products. The customer service unit is an important sales channel in the company (approximately 30% of the company's total sales come from the customer service centre).

In 2009 at the time when the survey was conducted, 108 full time agents were employed at the customer service centre. The average age of the agents was 32 years. The typical employee has 2 or 3 years of college education, often in business and economics, and has worked for this company for 4 years. There is a surplus of women (60%) working in the customer service centre.

Agents belong to teams consisting of 8 - 15 employees. Team members are clustered together in an open office landscape. Each team has a team leader who organizes, motivates and supervises the agents. Although agents belong to teams, their work duties are to a large extent individualistic; only rarely do they need assistance from team mates to do their job.

The bonus scheme agents were asked to assess in the survey was introduced in 2001 to enhance sales. At the start performance related pay amounted to (on average) 5% of the salary. In 2009 performance pay had increased to 14% of total compensation. In an attempt

to balance sales incentives the company has also rewarded a number of variables that captures the quality of the services that are provided (claims ratio, customer renewal and contract renewal). The sales bonus is, however, by far the most important element, as it accounts for 90 % of variable pay.

At its introduction the bonus was fully team based. Since 2004, however, the sales bonus has depended on both individual and team sales. The weight assigned to individual performance (relative to team performance) has varied over time. To receive the individual bonus the agent must sell more than 102% of an assigned sales budget. For sales above that level the bonus increases in steps. The team receives a bonus if the team members together produce more than 102 % of the team budget (which is equal to the sum of the individual budgets). The team members are instructed to register sales online. At any time they are able to keep track of their own sales relative to the budget, and also how well their team is doing. The team leader will often inform the members if they are lagging behind and need to improve their performance in order to pass the hurdle that releases a bonus.

4 The data

The data comes from two different sources. In a survey conducted (via email) in the end of September 2009, the agents answered a battery of questions concerning their attitudes towards risks, preferred bonus design, main motivation for exerting effort, team and company identification etc. The survey was sent via email to 108 persons, of which 5 turned out to be on long term leave. Of the 103 persons who *could* answer the survey, 80 did. Of the responders, 68 persons were employed as full time customer service agents, the rest were either team leaders or workers with work duties that excluded them from taking part in the bonus scheme (they did not sell insurance).

In addition to self reported attitudes and preferences, I have weekly registered data on a number of individual workplace behaviours. This information is collected from a computerized phone system. It records on a weekly basis for each agent the number of minutes they are logged on the phone system, sick absence, the number phones they answer, how many units they sell and the premium value of their sales. It also includes a record of which team each agent belongs to.

The aim of this study is to examine how agents' preferred bonus system relates to risk aversion and relative productivity. Let me therefore briefly describe each of these variables.

Preferred bonus scheme: Agents were asked to respond to the following statement: *"I think the bonus should be based on individual performance, not on team performance"*. They responded along a Likert scale, with the following alternatives "totally agree", "agree", "neither agree nor disagree", "disagree", "totally disagree". My interpretation of the responses is that those who answer "totally agree" are strongly in favour of individual bonuses, while those who ticked of "totally disagree" are strongly in favour of a team bonus.

Risk preferences: Agents made a sequence of choices among two different job alternatives, one with a sure income identical to current income, the other alternative was a risky job that paid either twice the amount of the current job or only a fraction $\lambda < 1$ of the current salary, both outcomes being equally likely.[3] The initial gamble was described as follows:

"Suppose that you are the only income earner in your household. Suppose also that reasons beyond your control force you to change occupation. You can choose between two alternatives. Job 1 guarantees you the same income as your current income. Job 2 gives you a 50% chance of an income twice as high as your current income, but with a 50% chance it results in a reduction of your current income by one third. What is your immediate reaction? Would you choose job 1 or job 2?"

After having made a choice the respondents got a new pair of alternatives. Agents, who selected the safe job in the first round, got an alternative with a higher λ (it increased from 2/3 to 4/5). Those who preferred the risky job in the first stage got a new risky alternative with a lower λ (it fell from 2/3 to 1/2). Based on the choices made, and excluding risk loving attitudes, each agent can be classified with a λ in one of four intervals: [0, ½], (½, ⅔], (⅔, 4/5], or (4/5, 1]. These intervals have a natural ordering from "weakly risk averse" to "very risk averse".

Relative productivity ("Diff-sales"): The data on workplace behaviour runs from 2003 until the end of 2009. In the analysis I use data from week 13 in 2009 until the week the survey was conducted (week 31) to estimate individual productivity. I have chosen a relatively narrow time window for different reasons. If agents want a bonus that maximizes their own

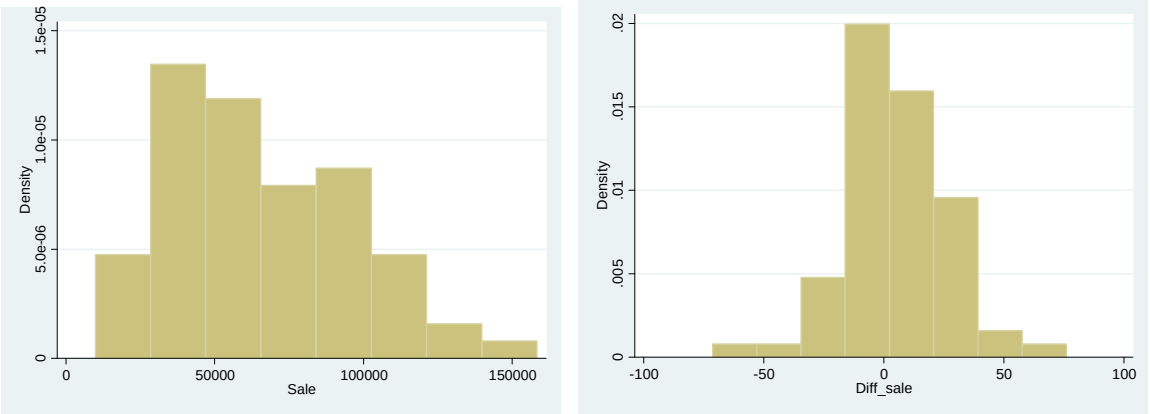
[3] My approach to elicit risk aversion is equivalent to the one used in Aarbu and Schroyen 2009, which builds on Barsky at al 1997.

income it is their current (future) relative productivity that should guide their choice of payment schemes. The problem with using just a few weeks of production to assess productivity is measurement errors. Having 18 weeks of production should, however, be sufficient to get a reasonably precise assessment of individual productivity.

A more mundane reason for confining attention to production after week 13 in 2009, is that a new team was established in week 12 of that year and this team recruited most of its workers from existing teams. Hence, if I extend the time window and include production prior to the second quarter of 2009 I would not get unique team identification for each worker. For each worker I have calculated the weekly difference between the value (premium value) of own sales and the mean value of all other team members' sales. It is worth noting that this variable is not based only on the sales of those who answered the survey, but on the sales of all team members. The variable *Diff-sales* aggregates this difference over all the relevant weeks. Sales data for 92 individual workers is used to construct the Diff-sales variable. A person who has the value 20 000 on the *Diff-sales* variable sells on average insurance with a premium value that 20 000 krone above the team average.

Figure 1, panel (a) plots the distribution of the average weekly insurance premium of sales for the relevant period for all the workers included in this study, measured in 1000 NOK units. One Norwegian Krone (NOK) is worth around 1/6 of a US$, so on average the premium value of weekly sales is around 10 000 US$. Panel (b) depicts the distribution of the variable *Diff-sales* measured in 1000 NOK units.

Figur 1: The distribution of sales and *Diff-sales*.



Panel a Panel b

It is interesting to compare sales for those who answered the questionnaire with those who did not in order to check if there is a systematic difference between the groups. Table 1 lists the mean and standard errors (in brackets below) for key variables. Although there are some differences in the means across the two groups (especially in the *Diff-sales* variable) none of them are significant at any conventional level.

Table 1: Differences between responders and non-responders

Variable	***Responders* (N=68)**	***Non-responders* (N=24)**
Premium value of sales	66463 (32365)	53286 (24257)
Difference in premium value of sales	5974 (22035)	-2267 (24747)
Yearly salary in NOK	320369 (21944)	327798 (31605)
Age-group	4.67 (2.14)	4.45 (2.60)
Male	.39 (.49)	.33 (.48)

Note: The variable Age-group is equal to 1 if the person was born before 1955; 2 if birth date is in the interval "1956-1961"; 3 if birth date is in the interval "1961-1965" etc.

5 Regression results

From Table 1, we can see that workers who favour individual bonuses sell considerably more than their team mates. They also tend to be less risk averse than their colleagues. The *Mean-lambda* variable that is reported in the Table 1 is constructed as follows. The choices made in the hypothetical income gamble classify agents into different "lambda intervals". To assign

an exact lambda value to each worker I have given each of them the mean value of the interval they belong to; agents making choices that assign them to the lowest interval gets a λ equal to 0.25 agents in the second lowest interval gets a value 0.58 etc. The *Mean-lambda* value is the average λ value of the agents who display the same bonus preference. The table also reveal a tendency for men to favour a bonus based on individual performance. I have also cross tabulated many other variables one might expect would vary with preferred bonus scheme (for example type of education (economics or not, tenure, etc.) but I did not detect any interesting patterns.

Table 2: Cross tabulation of preferred bonus against Diff-sales, risk aversion and gender

Preferred bonus scheme	***Individuals***	***Diff-sales***	***Mean lambda (risk aversion)***	***Male***
Strongly in favour of individual bonus	12 (18%)	25460,2	0,68	7 (58%)
In favour of individual bonus	30 (44%)	15852,2	0,72	12 (43%)
Neutral	8 (12%)	8180,3	0,85	4 (40%)
In favour of team bonus	14 (20%)	-12685,8	0,80	3 (21%)
Strongly in favour of team bonus	4 (6%)	-4101,3	0,86	1 (25%)

Table 2 reports the results from a multivariate regression. The dependent variable is the preferred bonus system. It is numerically coded such that 1 is given to those who strongly prefer individual bonuses, and 5 to those who strongly prefer team bonus. I have estimated a linear model (OLS) and an ordered logit model (olog). To capture the relationship between bonus preferences and risk aversion I created a dummy for individuals with high risk aversion; the variable *High-risk* takes the value 1 if lambda belongs to the interval [⅔, 1].[4]

[4] 38 individuals belong to this category.

Table 2: OLS and Ordered Logit: The dependent variable is preferred bonus scheme.

	(1) ols1	(2) ols2	(3) olog1	(4) olog2
Diff-sale	-0,0188*** (0,0062)	-0,0179*** (0,0061)	-0,0317*** (0,0107)	-0,0307*** (0,0108)
High-risk	0,4409 (0,2718)	0,4345 (0,2685)	0,7517 (0,4649)	0,7900* (0,4679)
Male		-0,4371 (0,2719)		-0,7417 (0,4704)
Cons	2,3953*** (0,2030)	2,5673*** (0,2273)		
N	68	68	68	68
R^2	0.144	0.178		

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The regressions confirm that the workers tend to prefer a bonus scheme that maximizes their own income. The table also show that risk aversion relates negatively with a preference for individual pay, this association has a *p*-value of around 0,1. When we control for risk aversion and sales gender has no significant direct impact on bonus preferences. The OLS coefficients for Diff-sales have a straightforward interpretation. Consider for example the ols2 specification, an increase in Diff-sales of 60 (if the absolute value of the difference between own sales and the team average sales increases with 60 000 NOK, that is approximately two standard deviations) is associated with one unit increase in the stated preference for an individual bonus.

6 Discussion

Although economic self interest serves as a good predictor for preferences over bonus systems, the fit is far from perfect. Among the 37 workers who sell more than the average of their team, 6 prefer a team bonus. Among the 31 workers who sell less than the team average, as many as 17 prefer an individual bonus. What explains the apparent deviation from self-interest?

Perhaps workers vote for a scheme that reduces their own income because there are mistaken about their own productivity. Given the emphasis there is on sales and the sales bonus in this firm, and the fact that part of the bonus depend on what the team sell, I do not find this explanation very convincing. However, even workers who are fully aware of their current poor relative production, and who only care about their own income, may rationally prefer an individual bonus scheme if they foresee a rise in their relative performance in the future. This is the prospect of upward mobility (POUM) idea that explored by Benabou and Ok 2001. How can we examine the relevance POUM? Expectations of future relative performance are most likely based on the current trend in production. Hence, if it is the prospect of upward mobility that explains why low achievers prefer individual bonuses, we should observe that the workers who currently produce below the average but who nevertheless favour individual incentives are on a steeper trend than the rest of their team mates. I have tested this conjecture and there is no evidence for such a pattern in the data.

Another reason why workers may prefer a bonus scheme that reduces their own income is fairness considerations. Fehr and Schmidt (1999) suggest that individuals are, in varying degree, inequality averse. In their model individuals trade off the utility derived from own income against the costs of deviating from an equal distribution of income. The weight assigned to the inequality costs varies between individuals and it is sensitive to whether an individual is above or below the average. Inequality aversion can explain why some of the high achievers prefer a team bonus, but it cannot account for the fact that it is especially among workers with poor performance we find those who prefer a bonus scheme that oppose their financial interests. An inequality averse worker who sell less than the team average faces no trade off between self interest and fairness since a team bonus minimizes inequity costs *and* maximizes own income.

Egalitarianism is, however, not the only reasonable fairness ideal when production precedes distribution. In such a setting one could argue in favour of a *meritocratic* fairness

principle which rewards individuals according to their contributions, for example measured by production.[5] A worker who endorses the meritocratic fairness principle and produces below the team average faces a real trade off when he has to choose between a team based or individual based bonus: By choosing an individual bonus he sacrifices money in order to act in accordance with his fairness standard; by choosing a team bonus he earns more money but violates his fairness ideal. If this worker is sufficiently fair minded, that is, if he experiences a sufficiently high utility loss by deviating from the proportionality principle, he will vote for an individual bonus, even though a team bonus would give him a higher income. A model with two fairness standards, equality and meritocracy, and with workers who differ with respect to how fair minded they are (how much income they are willing to forgo in order to behave in accordance with their fairness standard) could certainly explain the pattern observe in the data.

The mere fact that such a model *can* reproduce patterns in the data does not mean it captures the main motives behind the choices made. I would argue there is another mechanism that needs to be taken into account and that is how team pay intensifies (perceived) negative social judgments and the unpleasantness of lagging behind in a team. A team bonus accentuates relative productivity within a team. It is unpleasant to be reminded that one is an under-performer. It is perhaps even more unpleasant to be reminded by other team members that one is dragging down their performance and income. Hence, I think it plausible that some of the low productivity workers voted for an individual bonus *not* because it is a choice in accordance with their fairness ideal, but because such a bonus alleviates the stigma, stress, guilt and shame associated with having below average productivity.

The fairness model is extremely cerebral; the focus is on how well the distribution of incomes adheres to a fairness principle. It does not take into account the social aspect of interaction, that is, how it *feels* to be a low productivity worker in a production team. A growing body of evidence show that individuals do not only care about the distribution of outcomes (income) but also about the perceived social appraisal that is associated with final outcomes, or the process leading up to these outcomes, see List (2007) and Fershtman et al (2008). The psychological mechanisms that are evoked in work groups are hard to incite in anonymous one shot lab experiments, but Charness and Dufwenberg 2006 makes an attempt to address the relevance of one such mechanism. They suggest that co-workers, or partners, expectations may have an impact on behaviour due to guilt aversion: it feels bad not to live up

[5] For a thorough discussion of production and fairness the reader should consult Cappelen at al 2007.

to others' expectations. They find experimental evidence for this supposition, but this result is contested (Ellingsen et al 2010). My conjecture is that this mechanism is important in team work and may therefore explain why low productivity workers prefer individual bonus schemes.

6 Conclusions

Economic theory assumes that material self interest and risk aversion are central motivations in economic interactions. Hence, this theory makes a strong prediction when workers, who is well informed about their own relative productivity, has to choose between a team based or individual based bonus scheme: Workers with high productivity will choose an individual bonus scheme. The only concern that may weaken this preference is risk aversion. I have tested this conjecture with data from a real firm. The conclusion is that the economic model predicts the case at hand fairly well. The most noticeable divergence from the prediction of the economic model is that there is a large fraction of low productivity workers who prefer an individual bonus scheme. Since it is unlikely that it is the prospect of upward mobility (POUM) in production that explains this departure from income maximization, it is natural to presume there are concerns beyond self regarding income maximization that compel low performers to vote for an individual bonus. I have argued that there are two different types of other regarding concerns that can explain these behavioural patterns; distributional fairness preferences and social emotions.

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