

Unionism and Peer-Referencing[⊥]

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Abstract:

This study assesses the ‘fair-wage-effort’ hypothesis, by examining (a) the relationship between relative wage comparisons and job satisfaction and quitting intentions, and (b) the relative ranking of stated effort inducing-incentives, in a novel dataset of unionised and non-unionised European employees. By distinguishing between downward and upward-looking wage comparisons, it is shown that wage comparisons to similar workers exert an asymmetric impact on the job satisfaction of union workers, a pattern consistent with inequity-aversion and conformism to the reference point. Moreover, union workers evaluate peer observation and good industrial relations more highly than payment and other incentives. In contrast, non-union workers are found to be more status-seeking in their satisfaction responses and less dependent on their peers in their effort choices. The results are robust to endogenous union membership, considerations of generic loss aversion and across different tenure profiles. They are supportive of the individual egalitarian bias of collective wage determination and self-enforcing effort norms.

Keywords: Unions, Peers, Inequity Aversion, Conformism, Discretionary Effort

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1. Introduction

The industrial relations literature has established that trade unions historically exerted an equalizing effect on the distribution of wages (Freeman, 1980b; Freeman and Medoff, 1984; Card, 1996), and the decline in rates of unionisation has provided one of the key explanations for the patterns of increasing inequality (Freeman, 1993; Blau and Kahn, 1996; DiNardo et al., 1996; Fortin and Lemieux, 1997; DiNardo and Lemieux, 1997; Machin, 1997; Card, 1998; Katz and Autor, 1999; Card et al., 2004), and vice versa (Card, 2001). Unions increase the wage differential between unionised and non-unionised workers, but lower inequality by reducing differentials among workers within the union, often between unions or agreements (Flanagan, 1976), and by raising the wages of workers whose characteristics are associated with lower earnings (Card, 1996; Gottschalk and Smeeding, 1997; Lemieux, 1998).

Hence, researchers commonly specify union utility functions that incorporate ‘relative concerns’, assuming rent maximization, compared to the relative competitive level (Oswald, 1979; 1985; Drakopoulos, 2007) or a ‘pay-leader’ firm (Smith, 1996). Much of union wage negotiations concern the question of what constitutes a ‘fair’ wage. Trade unions foster awareness of pay rates in the labour market in order to stimulate member interest in wage gains. Rees (1993) offers evidence on how the wages of ‘others’ can be a powerful force in trade union-employer bargaining outcomes. Thus, the unionised sector is often thought of as a primary factor of wage rigidity and employment instability in models that attribute unemployment to rigid wages. Keynes (1936) pointed out that workers react to wage raises smaller than those given by other firms as they would react to pay cuts. However, such ‘orbits of coercive comparison’ (Ross, 1948) entail an element of equity, as ‘depending on traditions in their industry, unions may regard themselves as entitled to the same absolute or percentage increase previously won by another union’ (Rees, 1993). The field survey evidence in Bewley (1998) suggests that union workers care more about wage bargaining outcomes relative to other workers. In contrast, non-union workers are found to care more about changes in wages but are relatively insensitive to absolute wage levels or wage levels relative to comparable workers in other firms¹. Mas (2006) presents evidence on the deterioration of police performance due to pay raises below the reference point in the final offer arbitration for police unions.

¹ This empirical observation contributed to the “coherent arbitrariness conjecture” (Ariely et al., 2003; 2006), according to which individuals do not have a prior good idea of certain preferences, but formulate these based on experience and stimuli provided by the environment.

However, horizontal wage equality is considered a foundation of a fair wage scheme in collective bargaining processes, and typically prevails in unionised workplaces (Medoff and Abraham 1980). The assumption is that if workers care foremost about equality, a wage scheme that guarantees equal wages for co-workers should lead to an efficiency-enhancing gift-exchange relation, minimizing resentment, low morale, and envy within the workforce, and ultimately low performance (Bewley, 1999; Abeler et al., 2009). For example, Rees (1993) reviews how unions first accepted and then abolished two-tier wage structures for incumbent workers. However, Lazear (1989) points out that while the desire for egalitarian wage treatment is common in unionised workplaces, as an attempt to preserve worker unity, to maintain good morale, and to create a cooperative work environment, it is far from obvious how a compressed salary structure can be morale improving or even ‘fair’, as ‘better’ workers, who exert higher effort, might feel disenchanting by the scheme. While it is thought to encourage cooperation, it may have a negative impact on effort levels (Lazear, 1989; 1991). Only when performance of co-workers is the same, equity and equality are likely to coincide. Thus, it is likely that under compressed wage structures, a certain level of effort becomes a self-enforcing norm observable by other workers. Kandel and Lazear (1992) incorporate this notion in a model where deviations from the equilibrium value of effort are disliked by other workers, thereby bringing disutility to the deviator. The extent of this disutility affects the equilibrium level of effort, and as a result, a (Nash) equilibrium effort level becomes a self-enforcing norm. Barron and Paulson-Gjerde (1997) suggest that the potential of peer pressure in team settings provides an incentive to the principal to reduce the marginal compensation rule to reduce costly monitoring.

Thus, economic considerations of efficiency can provide an explanation for the relationship between collective pay-setting and relatively egalitarian outcomes/distributions of wages. Wallestein (1999) suggests that institutional and behavioural considerations can provide important, complementary and relevant explanations, in terms of the way wage-setting institutions affect different groups of workers, and the application of workplace norms. For instance, wage-setting institutions may affect the ability of different groups of workers to pursue their self-interest, and also shape and alter the application of norms of fairness. The behavioural theory of labour negotiations by Walton and McKersie (1991²) distinguishes between four types of bargaining prevalent in behaviour during negotiations, i.e. distributive, integrative, attitudinal,

² Originally published in 1965.

and importantly, intra-organisational³. The latter function is aimed at achieving consensus within the negotiating parties. The authors discuss how the decline of unionism and its replacement by collective agreements make intra-organisational bargaining particularly intense, as management negotiations find it challenging to develop consensus among members of the relevant negotiating bodies, as union representatives did with their constituents.

However, for egalitarian wages to be morale-inducing, inequity-averse preferences must be incorporated in the utility function of unionised workers. Although developments in behavioural economics have provided strong arguments in support of the assumption that individuals care about the outcomes of others, establishing the individual egalitarian bias of collective decision making in the process of wage determination and understanding its sources are still interesting open questions. Such preferences can precede and even induce union formation and/or membership (Farber and Saks, 1980), or they can be considered as ‘conformist’ behaviour, in the sense of conforming to the norm (Akerlof, 1980; Booth, 1985). Hirschman (1982) emphasized how economic institutions can induce specific behaviours, which may finally become part of the behavioral profile of the individual. For instance, Goette, *et al.* (2006) find that group membership increases willingness to enforce a norm of cooperative behavior toward fellow group members, highlighting how the group aspect of organizations can foster efficient behavior in the absence of, or in spite of, purely selfish incentives. Kreps *et al.* (1982) suggested that for reasons of reputation and repetition, the presence of a small fraction of individual with fairness concerns can have a powerful impact on non-selfish types. Under appropriate conditions, traditional economic factors can generate conformism⁴ and the development of social norms (Bernheim, 1994). Moreover, agents may act similarly because similar actions sometimes create mutual positive externalities (Katz and Shapiro, 1986; Banerjee & Besley, 1990). Finally, individuals often gain information via peer observation and tend to imitate those who they think are better informed (Conlisk, 1980; Banerjee, 1992; Bikhchandani, Hirschleifer and Welch, 1992).

³ Distributive bargaining is a competitive conflict process intended to influence the division of limited resources. Integrative bargaining comprises of activities aimed at increasing the joint gain available to the negotiating parties. Attitudinal structuring is shaped by activities that influence the attitudes of the parties towards each other. Intra-organisational bargaining involves negotiation activities within the negotiating parties aimed at achieving consensus, and aligning the expectations of chief negotiators/representatives and their constituents/principals.

⁴ The main characteristic of conformist behaviour is that utility declines as the distance between the individual's behaviour and that of everyone else increases (Frank, 1985a; Akerlof, 1997). This is contrasted with the case of status behaviour, in which utility depends positively on the difference between the individual's own status and the status of others.

In view of the above features of unionism, this study assesses the ‘fair-wage-effort’ hypothesis (Akerlof, 1982; Akerlof and Yellen, 1990) for unionised and non-unionised workers, using a unique dataset of European employees from seven countries. It does so by investigating: (a) the relationship between relative wage comparisons and the job satisfaction and quitting intentions, and (b) the relative ranking of stated effort inducing-incentives. By distinguishing between downward and upward-looking wage comparisons, it is shown that wage comparisons to similar workers exert an asymmetric impact on the job satisfaction of union workers, a pattern consistent with inequity-aversion and conformism to the reference point. Moreover, union workers evaluate peer observation and good industrial relations more highly than payment and other incentives, compared to their non-union counterparts. In contrast, non-union workers are found to be gain satisfaction from status-seeking comparisons, and have their effort levels less dependent on their peers and more responsive to payment incentives. The results are robust to endogenous union membership, considerations of generic loss aversion captured by own past wage comparison, hold for different tenure profiles, including internal labour market considerations. They are supportive of the individual egalitarian bias of collective wage determination and self-enforcing effort norms.

The structure of the remaining of this paper is as follows: *Section 2* introduces the dataset and discusses the background of the seven countries examined. *Section 3* presents the empirical strategy adopted, discussing the relevant literature and the methodological issues. *Section 4* reports the empirical results and their discussion, and *Section 5* provides the concluding remarks.

2. The Data and Descriptive Statistics

2.1 The Database

The data used in this study is part of the *EPICURUS* survey. *EPICURUS* is a multi-country project funded by the European Commission. The data was collected during the 4th quarter of 2004, in Denmark, Finland, France, Greece, the Netherlands, Spain and the United Kingdom. Identical questionnaires were administered in all countries and were translated in several rounds by native speakers, experienced in survey design. Four European companies specializing in surveys were employed for the task. They reported no complaints from the respondents or other problems associated with the survey. The questionnaires were administered to a homogenous

group of individuals. The target group was unskilled/semi-skilled employees between the ages of 18 and 65. The survey included only individuals with low or middle education (*i.e.* it excluded individuals with a 5 or 6 education level in the 1997 ISCED International Classification scale)⁵. Students, self-employed and employees in fishery and agriculture were also excluded. Some 1,000 individuals per country were interviewed, with the exception of Greece (800), Spain and Finland (300), due to budgetary constraints.

The dataset contains the essential demographic information and extensive information at the individual and the household level. A large number of questions address issues related to current and past job outcomes, job satisfaction and well-being⁶. The sample comprises of 5,463 individuals, 33.9% (1,854) of which are union members and the remaining 66.1% (3,609) are non-unionised workers. The descriptive statistics in *Table 1* suggest that the sample is fairly representative of the actual unionisation rate per country, noting that the EPICURUS sample is based on low and semi-skilled employees. The rates of union membership in the sample are: 80.1% in Denmark, 12.6% in France, 22.9% in Greece, 28.4% in the Netherlands, 58% in Denmark, and 19.4% in the United Kingdom. Actual union membership is the key feature of interest in this study, as opposed to other collective agreement schemes⁷. The distinction between the above is made clear in the questionnaire.

[Insert Table 1 about here]

2.2 Unionisation and Inequality in the 7 Countries

The notable discrepancy between the very high rates of unionisation in the Nordic and Scandinavian countries and the lower and decreasing rates of unionisation in the remaining countries offer an interesting initial setting to review the evolution of unionism and income/wage inequality. *Figure 1* plots the evolution of trade union densities and Gini coefficients for the seven countries in the sample. The data is from the World Bank's 'Measuring Income Inequality' Database ([Deininger and Lynn, 1996](#)), the CIA World Factbooks and

⁵ *A posteriori* analysis of background variables shows that the sample successfully represents the targeted population.

⁶ An extensive analysis of the questionnaire and the obtained database is available from the authors upon request is also available in the reports to the European Commission ([EPICURUS Project, 2004; 2005](#)). Moreover, descriptions of other features of the dataset are available in [Panos and Theodossiou \(2009\)](#), and [Pouliakas and Theodossiou \(2009\)](#).

⁷ The rates of collective agreement coverage in the seven countries in the sample are: 62.9% in Denmark, 50.2% in France, 32% in Greece, 77.5% in the Netherlands, 48.7% in Spain, 65% in Finland, and 28.6% in the United Kingdom.

ICTWSS Database on Institutional Characteristics of Trade Unions (Visser, 2009) for the period between 1955 and 2007. Observation of the time-series suggests decreasing inequality for increasing union density rates in Denmark and Finland, and roughly the inverse relationship for the years after 1985 in the remaining countries, where inequality increases and trade union density rates decrease. The scatter-plot for the pooled data at the right of the figure reveals a negative trend in the relationship between the two variables. This pattern is consistent with the associations found in the literature, including the association between the centralisation of labour market institutions and inequality in European countries (Cholezas and Tsakoglou, 2007).

[Insert Figure 1 about here]

The bars in the two panels of *Figure 2* show the country comparisons of wage inequality within the samples of union and non-union workers in the EPICURUS database for the year 2004. Panel (A) presents the ratio of wages of the 90th and 10th percentile by country and union membership, and Panel (B) the respective ratio between the 75th and the 25th percentile. With the only exception of Finland, wage inequality is greater among non-union workers. The differences between the two groups are far more pronounced in Denmark, France, Netherlands and the United Kingdom. In view of these interesting patterns of unionisation and inequality in the seven countries, the remainder of this paper investigates the microeconomic implications of wage inequality, by examining the relationship between wage comparisons and job satisfaction, their impact on quitting intentions, and the ranking of incentive mechanisms for the discretionary effort levels of unionised and non-unionised workers. The next sub-section presents the descriptive statistics of the main variables in this study, overall, and then for union and non-union workers respectively.

[Insert Figure 2 about here]

2.3 Descriptive Statistics

Table 2 presents the variables used in this study, along with their means for the pooled dataset, and separately for the union and non-union worker groups. Significance levels from a t-test of differences in the means between the two latter groups are also presented. It is shown that union workers are more likely to earn higher wages compared to non-union workers⁸. The average PPP-divided net monthly wage for the union sample is €1,876 versus €1,590 for the non-union

⁸ Wages are divided by the purchasing power parity in each country.

sample. The difference is statistically significant at the 1% level. Union workers have slightly higher weekly work hours, with an average of 36.1, as opposed to 35.1 hours for non-union workers. The former are more likely to be older, with higher labour market experience and job tenure, more likely to be male, in permanent jobs, in civil service and the public sector, in large firms, and more likely to have received some form of training during the last year. Moreover, union workers are more likely to be employed in the industries of Public Administration and Defence, Health and Social Work, Transportation and Communications, Manufacturing and Utilities. They are also more likely to be found in occupations such as Technical and Associate Professional, Personal and Protective, Plant and Machine Operatives, Labouring and Professional.

[Insert Table 2 about here]

The univariate comparisons in *Table 2* indicate union workers report higher levels of job satisfaction, a pattern driven mostly by the Nordic and Scandinavian workers. They are also less likely to intend to quit their job in the near future, with 37.7% of the union workers reporting that they intend to quit their job⁹, as opposed to 33.6% of the non-union worker sub-sample. Finally, union workers are more likely to be employed at a workplace where the union is recognised to negotiate the collective wage agreement, and in industries with higher union densities. The latter two variables and their construction will be discussed in greater detail in *section 4*.

3. Background and Empirical Strategy

The empirical strategy in this paper consists of two parts. The first part starts with the examination of the impact of wage comparisons on job satisfaction, and then on the quitting intentions of the employed respondents. Both satisfaction with work and the intention to quit are examined. In the second part, this study examines the relationship between incentive mechanisms and the level of discretionary effort at work, as stated by individual respondents. The set of incentives considered involves ‘mechanisms’ such as the observation and opinions of colleagues, the climate of industrial relations, payment incentives, *etc.* Of primary interest is to

⁹ The intention to quit is captured by the response “*I will quit myself*” to the question: “*What would be the main reason to stop working with your current employer in your main job?*”

examine whether union workers are more likely to care for equitable outcomes, both in terms of their remuneration and then consequently, the effort exerted at work. Moreover, some additional work with respect to the identification and robustness of the results is performed and described in the next paragraphs.

3.1 Peer-Referencing in Wages

The key assumption made throughout this paper is that individuals care about the outcomes of others. Most of the representative agent models that incorporate reference-dependent preferences in the utility function, considers status-seeking as the norm based on evolutionary arguments (e.g. [Samuelson, 2004](#); [Rayo and Becker, 2007](#)). However, the potential existence of groups in the population with distinct norms and values is one of the most important consequences of social interaction theory. [Adams' \(1963; 1965\)](#) equity theory posits that the utility value a person gains from a particular rate of pay is dependent on an evaluative judgment of his or her rewards-to-effort ratio in relation to that of similar co-workers. Thus, fairness judgments within groups are likely to target the minimization of the gap between wage and the reference standard for all members of the group ([Kahneman et al., 1986](#)). A strong feature of such comparisons is loss aversion, i.e. the tendency for losses to loom larger than gains. In that spirit of [Tversky and Kahneman \(1991\)](#), if the employee discovers that other workers are paid more for the same job, a feeling of inequity arises and the utility of the wage drop sharply. However, for inequity aversion to arise, the individual should also not gain utility from being paid more than other workers in similar jobs. Thus, wage comparisons need to be 'asymmetric', with a small or no impact on utility from earning more than the reference level, and a strong negative impact if earning less. The hypothesis that income comparisons are not symmetric can be traced in the works of [Duesenberry \(1949\)](#), [Hollander \(2001\)](#), and [Frank \(1985a, b\)](#).

Few models in the literature tackle the issue of such preference heterogeneity. First, [Akerlof \(1997\)](#) introduces sufficient heterogeneity into a model that shows how social interaction can produce distinct groups, which can be interpreted as stable subcultures or social classes. His 'twin' models of status and conformity can describe the behaviour of individuals who try to distance themselves from others or come closer to them, respectively. Both models have representative agents, so that, in equilibrium everyone behaves in exactly the same way and the behaviour of everyone else is well defined. Furthermore, [Fehr and Schmidt \(1999\)](#) introduce the

feature of self-centered inequity aversion¹⁰ in a model, where if a fraction of people care about equity then the economic environment determines the dominant type of behaviour in equilibrium. The great insight of their work is that the heterogeneity of preferences interacts in important ways with the economic environment. Similar ideas can be found in the models by [Bernheim \(1994\)](#), and [Clark and Oswald \(1998\)](#).

Following the distinction between status-seeking and conformity introduced by [Akerlof \(1997\)](#), and the incorporation of both advantageous and disadvantageous inequality concerns in the utility function by [Fehr and Schmidt \(1999\)](#), one can describe the employee's utility from work as:

$$S_i = x_i - \alpha(\bar{x} - x_i) - \beta(x_i - \bar{x}) + \gamma'_j z_{ij} \quad (1)$$

where x_i is the wage of individual i , and \bar{x} the reference wage, *i.e.* the average wage of a relevant comparison group, such as similarly qualified workers. Utility from work can also be thought to depend on j individual and work related characteristics (z). The second term in (1) measures the utility loss from disadvantageous inequality, *i.e.* the amount of utility lost from falling behind the reference group. The third term measures the loss from advantageous inequality, *i.e.* the amount of utility lost from failing to conform to others. The assumption in [Fehr and Schmidt \(1999\)](#) is that: $\beta \leq \alpha$ and $0 \leq \beta < 1$. When $\beta=0$ and $\alpha>0$, (1) converges to the standard model of distributional preferences, *i.e.* that of simple competitive preferences, consistent with the psychology of status, the early works of [Veblen \(1899\)](#) and [Duesenberry \(1949\)](#), and the model of status by [Akerlof \(1997\)](#). When $\alpha=0$ and $\beta>0$, (1) is equivalent to Akerlof's 'twin' model of conformity.

Rearrangement of (1) leads to its empirical analogue:

$$S_i = x_i + \alpha(x_i - \bar{x}) + \beta(\bar{x} - x_i) + \gamma'_j z_{ij} + \varepsilon_i \quad (2)$$

where ε is the usual error term. This is a flexible specification that allows the potential that income comparisons are not symmetric. In this context, asymmetry means that, while the job satisfaction of individuals is negatively affected by an income below that of their reference group, individuals with an income above that of their reference group do not experience a positive

¹⁰ Inequity aversion means that people resist inequitable outcomes, *i.e.* they are willing to give up some material payoff in order to move to the direction of more equitable outcomes. Inequity aversion is self-centered if people do not care per se about inequity that exists among other people, but are only interested in the fairness of their own material payoff relative to the payoff of others.

impact on the utility from work¹¹, *i.e.* $\beta < 0$ and $a \geq 0$ for the case of inequity aversion or conformism.

One unique feature of the *EPICURUS* questionnaire is that it includes detailed questions about reference point comparisons, *i.e.* with respect to the wages of similarly qualified workers, and own wages in the past. Martin (1982) provides an extensive review of laboratory, organisational and social comparison research, suggesting that in the choice of a particular comparison person, individuals usually select other individuals similar to themselves, and this is particularly the case for blue-collar workers. Moreover, the questionnaire design in this study allows for both upward and downward looking comparisons to these two reference points. In examining potential asymmetries in the impact of peer wage comparisons on job satisfaction, it is interesting to distinguish between inequity aversion and a more generic type of loss aversion in wage comparisons. This robustness exercise exploits the availability of suitable data on wage comparisons with own earnings in the year prior to the survey and is discussed in more detail in the next section.

In the extremely rich *EPICURUS* questionnaire there are two questions introduced in different parts, that examine these issues: Question 40 (out of 75 in the 1st part of the questionnaire) asks: “*All things considered, which of these statements do you feel best describes your present pay?*” The following six options are offered to the respondents: “*I earn much more than other workers who have a similar type of work (more than 20%)*”; “*I earn somewhat more than other workers who have a similar type of work (more than 10%)*”; “*I earn about the same as other workers who have a similar type of work*”; “*I earn somewhat less than other workers who have a similar type of work (less than 10%)*”; “*I earn much less than other workers who have a similar type of work (less than 20%)*”; “*Don't know/Don't Answer*”. In a similar spirit, question 19 states: “*If you compare your earnings from your main job of this year with your main job earnings a year back, are your present earnings...*” A set of the six following options is offered to the respondents: “*Much more than last year (more than 10%)*”; “*Somewhat more than last year (about 10% more)*”; “*About the same as this year*”; “*Somewhat less than last year (about 10% less)*”; “*Much less than last year (more than 10% less)*”; “*Don't know/Last year I was not working*”.

Table 3 presents summary statistics for the responses in the two questions, along with a t-test for differences in the means between the union and the non-union workers. In the first panel of the

¹¹ This idea was introduced by Duesenberry (1949, Chap. 2), who argued that poorer individuals are negatively influenced by the income of their richer peers, while the opposite is not true, *i.e.* richer individuals do not get happier from knowing their income is above that of their peers.

table, nearly half of the population in each group reports that they earn about the same as other workers who have a similar job. However, there is a notable difference between the two groups in the other categories. Union workers are more likely to respond that they earn somewhat more than other workers; 17% of union workers belong to this category, compared to 14.4% of non-union workers. Moreover, the fraction of individuals describing their wage as somewhat or much lower compared to similar workers is higher in both categories among the non-union sample. 32.2% of non-union workers in total think they are earning less than their peers, compared to 24.2% of union workers. In both groups, a figure close to 4.5% could not or did not want to compare their wages.

[Insert Table 3 about here]

In the second panel of Table 3, it is evident that the vast majority of workers in both groups find that they earn about the same as in the year prior to the survey. The figures are 63.8% for union and 55.2% for non-union workers, and the difference between the two averages is statistically significant at the 1% level. However, non-union workers are more likely to declare greater wage variability, both in terms of wage increases and decreases, compared to their union counterparts. Thus, non-union workers are more likely to have experienced a wage increase compared to last year, of either a small or a large magnitude. 8.8% of non-union workers report that their wage has increased by more than 10% compared to last year, compared to 6.2% of union workers. The figures for those whose wage has somewhat increased, by less than 10%, are 22.1% for non-union, and 19.7% for union workers. This latter difference is significant at the 5% level. Moreover, 4.3% of non-union workers report that they receive a much lower wage compared to the year prior to the survey, as opposed to a significantly lower 2.8% of union workers. Finally, 6.9% of union workers find that they are getting paid somewhat less than before, compared to 7.3% of non-union workers; the difference in the means between the two groups is not statistically significant.

Thus, overall, union workers are more likely to describe their pay as similar or somewhat higher to that of other workers in similar jobs. They are also less likely to experience both large wage increases and decreases. The empirical test for asymmetry utilises two new variables, a.k.a. *richer* and *poorer*, that are created as follows: The top and bottom two categories of the responses to the wage comparison questions presented in Table 3 are merged into two variables, i.e. “*Earning more than...*” and “*Earning less than...*”. Thus, three categorical variables are obtained, distinguishing between: “*Earning more than...*”; “*Earning about the same as...*”, and “*Earning less than...*”. Two sets of

such variables are obtained reflecting peer wage comparisons and then own wage comparisons with the year prior to the survey. These variables are then incorporated into job satisfaction and quitting regressions, allowing for downward and upward-looking wage comparisons with the peer group and own past. The reference category is “*Earning about the same as...*”. The specification includes the set of explanatory variables z , own earnings, and the comparison variables, *i.e.* *richer* and *poorer*. The relationship between downward and upward-looking wage comparisons and job satisfaction and quitting intentions is examined in the regressions of the next section. In the estimation of (2), concerns for status or inequity aversion/conformity are indicated by the relative magnitude and separate and joint significance of the variables *richer* and *poorer*.

3.2 Peer-Referencing and Discretionary Effort

The second part of this study examines the relationship between a set of incentives and effort at work. We consider a set of factors that affect the current level of effort exerted at work, as stated by the respondent. In the survey, the respondents were asked to rate the importance of each of the seven incentives mentioned for the level of effort they exert in their work. Specifically, question 58 asked: “*Which, if any, of the things listed below are important for the effort you put in your work? Please, grade each factor by a number from 1 to 5, where 1 stands for ‘very unimportant’ and 5 stands for ‘very important’.*” A set of seven incentive mechanisms was offered: “*A machine or assembly line*”; “*Clients or customers*”; “*Relations with a supervisor or boss*”; “*The observation and opinion by our colleagues*”; “*Your own discretion*”; “*Payment incentives, such as premiums, bonuses, performance pay*”; “*Reports and appraisals*”. It is reasonable to assume that workers are accurate in assessing the importance of factors responsible for the discretionary effort they exert at work. Similar measures are used in [Clark et al. \(2008\)](#) and [Pouliakas and Theodossiou \(2009\)](#). The rationale for the inclusion of these particular incentive mechanisms in the option set is intuitive and explained below¹².

First, the importance of “*A machine or assembly line*” in the production process and the effort put at work is likely to be low, taking into account the low popularity of Taylorite schemes. Second, the marketing literature stresses the importance of “organizational culture” ([Jaworski and Kohli, 1993](#)), which is focused on customer-driven service ([Kiska, 2004](#)). Thus, the contact with “*Clients or customers*” is likely to be an important incentive, and this contact can be thought to exert an impact on employee effort. Third, relations with “*A supervisor or boss*” are likely to be conducive

¹² Of course the list of seven incentives examined is not exhaustive. It is beyond doubt that other motivators can be considered.

to a positive climate of industrial relations, and vice versa. In environments of closer social interaction, reciprocal considerations also become relevant. On that contrary, closer monitoring that could also involve “*Reports and appraisals*” is an important method that tackles the agency problem. The risk of penalty imposition upon shirking detection is thought to have a positive impact on employee performance. An opposite view suggests that strict monitoring can be counterproductive due to lack of trust on the evaluation by superiors (Lawler, 1971), or control-aversion (Frey, 1993; Falk and Kösfeld, 2006).

Of particular interest in this study is the fourth mechanism that is related to peer observation and opinions by “*Your colleagues*”. Individuals are often motivated by social approval in their actions and the experimental evidence is ample, particularly from public good experiments (Gächter and Fehr, 1999; Fehr and Falk, 2002). A reason for excess impact of the beliefs of others is the pressure to conform, or social pressure (Asch, 1951; Festinger, 1954; Akerlof, 1991). Peer pressure is seen as a mechanism that is preventive of free-riding in teamwork settings (Prendergast, 1999), particularly effective for workers with lower-skills, productivity and education (Weiss, 1987; Hansen, 1997; Falk and Ichino, 2006). Importantly, peer pressure can be induced by wage compression (Lazear, 1989; 1991; Kandel and Lazear, 1992), which is commonly practiced in unionized workplaces.

Fifth, personal motivation in terms of “*Your own discretion*” can be thought to be one of the most important determinants of the effort at work. Benabou and Tirole (2002) stress that confidence in one’s abilities and efficacy can help the individual undertake more ambitious goals and persist in the face of adversity, and that higher self-confidence enhances the motivation to act. Finally, “*Payment incentives*”, such as bonuses and profit-sharing schemes, are often thought to mitigate moral hazard problems. However, their overall impact on the agent’s effort is ambiguous, and largely dependent on the marginal cost of effort, along with the nature of work. They can have a crowding-out effect on teamwork (Milgrom and Roberts, 1992) and even individual worker effort in jobs that entail intrinsic motivation (Frey and Oberholzer-Gee, 1997; Kreps, 1997; Benabou and Tirole, 2003), particularly when pursued aggressively (Baker et al., 1988).

[Insert Table 4 about here]

Table 4 presents the average valuation and its standard deviation for each incentive mechanism in the two questions, for the pooled sample and then for the union and non-union workers, respectively. The differences in the means are assessed using a t-test, a rank-ordered test (Fligner and Policello, 1981), a Fischer-Pitman permutation test. The latter two take into account the fact

that responses are given on an ordinal scale, from 1 (lower) to 5 (higher). *Figure 1* maps the frequencies of the scaled responses in columns, to facilitate their optical inspection. The sample averages in Table 4 and the bar columns in the figure suggest that union workers give greater valuation in the first five incentives, particularly in the ‘machine or assembly line’, the ‘relationships with a boss or supervisor’, the ‘colleagues’, and ‘own discretion’. However, union workers value ‘payment incentives’, and ‘reports and appraisals’ as less pivotal to the level of effort put in their work, compared to their non-union counterparts.

[Insert Figure 1 about here]

Given these empirical strategies for the two main features of interest in this study, the next two sections will discuss the treatment of the key methodological issues, and then the results obtained from the implementation of the strategies.

4. Methodological Issues

This section discusses three methodological issues related to the empirical strategy in this study, namely the cardinalisation of the ordinal job satisfaction variable, the treatment of endogenous switching into union membership, and the estimation of the ranking of the impact of incentives on the level of discretionary effort.

4.1 *The COLS Approach for Ordinal Dependent Variables*

The job satisfaction measure is an ordered categorical variable. In the *EPICURUS* questionnaire, respondents were asked: “*All things considered, how satisfied or dissatisfied are you with your present main job, using a 0-10 scale? (Where 0 stands for 'completely dissatisfied' and 10 stands for 'completely satisfied')*”.

Since individuals evaluate the satisfaction with their work on a discrete scale from 0 to 10, their true satisfaction is a latent variable, *i.e.* its true value is not observed exactly. The observed evaluation S_i^* is an ordered categorical variable. Thus, job satisfaction is assumed to be described by a latent variable (S) of an individual i reporting a job satisfaction level S_i^* , *i.e.*:

$$S_i^* = f(x_i + a(x_i - \bar{x}) + \beta(\bar{x} - x_i) + \gamma'_j z_{ij} + \varepsilon_i) \quad (3)$$

where f is an increasing function from 0 to 10, with domain $(-\infty, +\infty)$. Equivalently, reported job satisfaction can be described by the model equation (2).

One can adopt an appropriate linearization of the ordinal evaluation responses, as an alternative to the traditionally used Ordered Probit or Logit techniques. This study uses the Cardinal OLS (COLS) approach (van Praag and Ferrer-i-Carbonell, 2004). This assumes that respondents are supplying a cardinal evaluation, but it takes into account that they are unable to give precise information about their evaluation, due to the categorical format of the response categories. Thus, any observed value of the discrete variable S_i^* represents a transformation of the latent satisfaction S_i belonging to one of the intervals: $[0, 0.5]$, $(0.5, 1]$, ..., $(9.5, 10]$. Normalizing the scale to the $[0,1]$ -interval, the COLS approach replaces the inexactly known value of S_i by its conditional expectation \bar{S}_i , according to the following formula (Maddala, 1983, p.366):

$$\bar{S}_i = E(S_i | \lambda_{n-1} < S_i \leq \lambda_n) = \frac{n(\lambda_{n-1}) - n(\lambda_n)}{N(\lambda_n) - N(\lambda_{n-1})} \quad (4)$$

where $n(\cdot)$ and $N(\cdot)$ stand for the normal density and distribution functions, respectively, and λ takes its values in $\{0, 0.05, 0.15, \dots, 0.95, 1\}$.

After reported job satisfaction is transformed into the conditional mean of the latent satisfaction, OLS can be applied to the transformed linear model:

$$\bar{S}_i = x_i + a(x_i - \bar{x}) + \beta(\bar{x} - x_i) + \gamma'_j z_{ij} + \varepsilon_i \quad (5)$$

where ε_i is a symmetric error term with mean zero. COLS is shown to yield consistent parameter estimates (Ferrer-i-Carbonell and Frijters, 2004), identical to those obtained by ordered probit (except for a factor of proportionality), as efficient as probit estimates (Stewart, 1983), but computationally much easier.

4.2 *Endogenous Switching into Union Membership*

Equation (5) is estimated for the pooled sample and then for the sub-sample of union and non-union workers. A Kolmogorov-Smirnov test on the equality of the distributions of job satisfaction for the groups of union and non-union workers rejects the null hypothesis at all conventional levels ($D=0.0942$, $p\text{-value}=0.000$). This is also verified using a two-sample Robust

Rank-Order Test (Fligner and Policello, 1981), testing that the two independent groups are sampled from the same population (U-statistic=-6.380, p-value=0.000)¹³. However, estimating versions of equation (5) for union and non-union workers via COLS is subject to an endogenous sample selection issue, as long as the unobserved determinants of union membership are correlated with unobservables in the job satisfaction equations.

The view that preferences and attitudes over wage and effort outcomes can differ and such differences can pre-exist and even induce union formation can not be refuted a priori. For example, inequity-averse individuals might be more likely to work in unionized workplaces or become union members (Farber and Saks, 1980; Fuller and Hester, 2001), and the correlation of unobservables should be positive in that case. Moreover, worker concerns with peer wages, particularly asymmetric concerns (*i.e.* only underpayment matters) can lead profit maximizing firms to compress wages and alter the structure of optimal contracts (Charness and Kuhn, 2005; Englemaier and Wambach, 2007). Alternatively, such norms and values can be enforced as a ‘social custom’ or enhanced by union membership and the common wage compression practiced in unionised workplaces (Asch, 1955; Booth, 1984). If unions do have a voice or informational role, they might decrease satisfaction with pay changes that appear unfair in relation to other comparable workers or firm performance (Smith, 2009).

However, the individual’s job satisfaction is only observed after the individual has decided to join a trade union. Thus, it is important to account for endogenous switching into union membership when estimating the determinants of the job satisfaction of union and non-union workers. Selecting the sample of (non-)unionized individuals generates selectivity issues and the estimated coefficients by COLS may suffer from sample selection bias. Thus, estimates for union and non-union workers are also presented after self-selection in union membership is taken into account. This is accomplished via using a Heckman-type selection correction model (Heckman, 1978; 1979; Lee, 1978; Maddala, 1983). The model takes into account the latent propensity of an individual to become a member of a trade union, as follows:

$$L_i^* = \beta_m' y_{im} + n_i \quad (6)$$

where L indicates union membership and n is a normally distributed error term, with $E(y, n)=0$. At least one variable in y must be identifying the selection equation, while excluded from the evaluation equation (4), *i.e.* $j \leq m$. The choice of instruments, *i.e.* the exogenous variables

¹³ The robust rank-order test is an alternative of the Mann-Whitney-Wilcoxon test for non-normal populations with unequal variances. This test assumes neither normality, nor equal variances, nor equal shape.

that identify the first stage equation for union membership, but must be unrelated to the job satisfaction of union and non-union workers is pivotal in this model. The choice of instruments in this study benefits from the richness of the EPICURUS data, and the availability of rich external data. Two new variables are defined, depicting *Union Recognition* and *Union Concentration*, and are used to identify the union membership equation.

Union Recognition is a dummy variable taking the value 1 if the firm where the individual is working is covered by a collective wage agreement that is negotiated solely by a trade union, and the value 0, if it is not covered by a collective wage agreement, or if it is covered by an agreement that is not negotiated by a trade union. The summary statistics in Table 2 show that 43.6% of the individuals in the sample are employed in firms where a trade union is the sole negotiator of collective agreements. The summary statistics for the two groups further show that 67.1% of union workers are employed in such firms, as opposed to 31.5% of non-union workers. The difference is statistically significant at the 1% level.

Union Concentration is created by the use of two data sources. The 2009 Database on Institutional Characteristics of Trade Unions (Visser, 2009) provides historical data on 90 variables related to collective action in 34 countries. A summary measure of concentration of unions at peak and sectoral level is used for the seven countries. This is generated as the summation of membership concentration at central or confederal level (Herfindahl index at central or peak level) and membership concentration at the industry level, within confederations (Herfindahl index at sectoral level). This measure is then multiplied by the union membership rates by country and industry from within the EPICURUS database (and multiplied by ten). The statistics at the bottom of Table 3 indicated that the measure for union concentration has a higher value for union workers compared to their non-union counterparts, and the difference is statistically at the 1% level.

The two instruments are then used to identify the first stage equation for union membership, shown in the Appendix Table A1. The six specifications of the Table correspond to five different specifications for the satisfaction equation, and one for the effort model. Although these will be discussed in more detail in the next section, it is important to point out that the two variables for *Union Recognition* and *Union Concentration* in the middle of the table are highly statistically significant and both exert a large positive impact on the probability of trade union membership. Moreover, they are jointly significant, with a Wald χ^2 test ranging from 175.3 to 385.7 (depending on the specification) and rejecting the null at all conventional levels. The

modified version of equation (4) for job satisfaction that controls for endogenous union membership is then estimated for union and non-union workers separately via maximum likelihood. This is an efficient estimator that allows for robust standard errors. Similar versions are estimated for the quitting intentions variable, using a linear probability model at the second stage.

4.3 The Ranking of the Impact of Incentives on Discretionary Effort

The second stage of the empirical strategy involves the regression analysis of the relationship between incentives and the level of discretionary effort at work. The analysis aims at obtaining a ranking of the impact of effort-inducing factors. Table 4 provides an initial ranking in terms of the average rating of each incentive. However, this is only indicative, as it could also be attributed to the different likelihood of unionism in different types of jobs and industries. It is important that the magnitude of the effect of each incentive mechanism is obtained via regression analysis, controlling for a number of individual and work attributes. In the survey, respondents were asked to evaluate a vector of incentives on a scale from 1 to 5, indicating the importance of each element on the level of effort and the intention to increase the level of effort, respectively. Thus, the examination of the ranking of each mechanism with respect to the magnitude of its effect on overall discretionary effort requires the creation of a pseudo-panel dataset. This is obtained from the pooling of the individual responses to each element of the vector of incentives. This feature creates a setting of conjoint analysis for the examination of the incentive ranking, that also allows to control for unobserved heterogeneity.

After the pooling of the individual responses, the overall level of effort is not observed exactly. Instead, a discrete ordered categorical variables E^L is observed. Preferences in case-rank data are typically analysed in the framework of the rank-ordered logit (ROLM) model (Beggs *et al.*, 1981). In the spirit of the conventional random utility framework (Manski, 1977), the effort ratings of each surveyed individual $i = 1, \dots, N$, over the set of incentive options, $k = 1, \dots, K$, are represented as a set of latent variables $E_{i1}^*, \dots, E_{iK}^*$, defined as:

$$E_{ik}^* = V_{ik} + \omega_{ik} = \xi'_k I_{ik} + \omega_{ik} \quad (7)$$

where V_{ik} is the deterministic part of the rating determined by the interaction of individual observable characteristics, ξ , and the relative weights associated with the k alternatives, I_k , while ω_{ik} is the random component of the ratings. Assuming that the respondents' ratings imply a

complete ordering, r_i , of the importance of each incentive tool, so that: $E_{i1}^* > E_{i2}^* \dots > E_{iK}^*$, and that ω_{ik} follows an independent type-I extreme value distribution (McFadden, 1974), the probability of observing a particular ranking r_i equals:

$$P[r_i, I] = P(E_{i1}^* > E_{i2}^* \dots > E_{iK}^*) = \prod_{k=1}^{K-1} \frac{e^{\xi_k' I_{ik}}}{\sum_{l=k}^K e^{\xi_l' I_{il}}} \quad (8)$$

The ranking of the impact of the proposed incentives is obtained by estimating ROLM discretionary effort regressions for the union and non-union sub-samples, utilising Efron's method of handling potential 'ties' in the workers' responses, *i.e.* capturing indifference among the alternatives as indicated by equal effort scores (Pouliakas and Theodossiou, 2009).

In order to ensure the robustness of the rankings obtained, ordered probit models with random effects are also estimated for union and non-union workers. These also incorporate controls variables capturing individual characteristics that do not vary across evaluations. The individual random effects account for the unobservable characteristics that are constant across each incentive's evaluation, but different for each individual: for example, individual personal traits such as collegiality, motivation, ability etc. Thus, the regression accounts for the fact that given personal characteristics, more highly motivated individuals tend to report higher E than less motivated individuals. This is equivalent to adding the vector of z individual characteristics in Eq. (7) and rewriting the error structure as:

$$\omega_{ik} = v_k + u_{ik} \quad (8)$$

where v_k is the individual random effect and u_{ik} is the usual error term. Typically, the error terms are assumed to be random and not correlated with the observable explanatory variables. Finally, as a third alternative, COLS effort models are estimated allowing for endogenous switching into union membership are estimated to ensure robustness, in the framework of section 4.2.

5. Results and Discussion

This section presents and discusses the results. Section 5.1 discusses the effects of relative wage comparisons on job satisfaction. Section 5.2 examines the impact of wage comparisons on

quitting intentions. Then, Section 5.3 discusses the ranking of the incentives for the level of discretionary effort.

5.1 Job Satisfaction and Peer Wage Comparisons

5.1.1 Pooled Sample

Table 5 introduces the specifications for job satisfaction regressions, and presents the estimation results from COLS regressions in the pooled sample of union and non-union workers. Coefficients and robust standard errors are reported. The set of control variables includes the standard correlates of job satisfaction, *i.e.* the logarithms of monthly wages and weekly hours of work, overtime hours, dummy variables for gender, lower education (among the low/middle educated in the sample), marital status and logarithms for the number of children aged less than 16, age and tenure at work. Additional controls include dummy variables for trade union membership, training, permanent job status, the climate of industrial relations. Finally, the specifications incorporate vectors of dummy variables for sector (4), firm size (5), working conditions (3), occupation (10), industry (17), and country (7). This is the baseline specification of *Column 1*. Then, *Column 2* incorporates two dummy variables for individuals earning more than workers in similar jobs (*richer*) and individuals earning less than their reference group (*poorer*) respectively. The reference category comprises of individuals earning about the same as their peers. The specification in *Column 3* encompasses interaction terms between the two peer wage comparison variables and union status. Finally, *Columns 4* and *5* incorporate comparisons with own wages in the last year, and interaction terms between union status and past wage comparisons, respectively.

[Insert Table 5 about here]

The results in *Column 1* are indicative of the typical correlates of job satisfaction. Wages exhibit a positive impact on job satisfaction, and the relationship between the latter and weekly working hours is negative. The male and the low educated are less satisfied with their jobs. The logarithms of age and tenure have opposite effects on job satisfaction, with the latter being U-shaped in tenure controlling for age. Workers receiving training are more satisfied with their jobs, and a good climate of industrial relations exerts a positive impact on job satisfaction (Bender and Sloane, 1988). The civil servants, employees in small firms (1-10 workers), and individuals in non-repetitive jobs are more satisfied. The employees in Denmark and Finland

report higher levels of job satisfaction *ceteris paribus*, and employees in the United Kingdom appear to be the least satisfied[‡].

Column 2 incorporates the two variables of main interest, indicating downward and upward-looking wage comparisons with the group of peer workers. The estimation results indicate that these two factors exert a symmetric effect on job satisfaction, with workers earning more than their peers being happier with their work (0.142) and those earning less being less satisfied (-0.198), compared to those who earn about the same as their peers. The F-statistic from the test of the linear constraint that the summation of the two coefficients is equal to zero ($\alpha + \beta = 0$) fails to reject the null hypothesis (shown at the bottom of the Table). Thus, the effects of downward and upward-looking comparisons on job satisfaction are symmetric in the pooled sample. The incorporation of the interaction terms between union membership and peer wage comparisons in *Column 3* suggests negative interactions between union membership and wage comparisons. Specifically, while individuals earning more than their peers are more satisfied with their jobs on average (0.182), the effect is significantly smaller for unionised workers earning more than their reference group (-0.108). Thus, the positive impact of downward-looking comparisons diminishes for union workers. The magnitude of the negative interaction term is large and significant at the 1% level. The interaction term between union membership and upward-looking comparisons is negative, but of a smaller magnitude (-0.066) and statistically insignificant at all conventional levels.

Columns 4 and *5* incorporate the comparison terms with own wages in the year prior to the survey and their interactions with union membership, respectively. Intuitively, individuals earning more than the previous year are happier with their jobs, while those experiencing a wage decrease are less satisfied than those earning about the same as in the year prior to the survey. A test of the summation of the two terms being equal to zero fails to reject the null hypothesis at the 10% level. The inclusion of the interaction terms with union membership in *Column 5* suggests insignificant interactions between union membership and past comparison terms. However, the negative interaction term for unionised workers earning more than the peer group remains significant (Column 5).

5.1.2 Differences between Union and Non-Union Workers

In light of the negative interaction term between union membership and downward-looking comparisons, *Table 6* extends the analysis by presenting COLS estimation results for union and

non-union workers from models that account for endogenous switching into union membership. The four panels of the Table present separate specifications. Panels (A) and (B) incorporate the peer comparison terms in the equations for union and non-union workers. Panels (C) and (D) incorporate both peer and past comparison terms and serve as robustness tests. Thus, Panel (A) presents a minimal specification with a limited number of control variables, while Panel (B) presents a specification similar to that of column 2 in Table 5. Coefficients and robust standard errors are reported. Two additional tests are presented as complementary results in each set of columns: (i) At the right of each panel, a Wald χ^2 test with 1 degree of freedom, equal to $\frac{(Coef_j^U - Coef_j^{NU})^2}{(SE_j^U)^2 + (SE_j^{NU})^2}$, tests the hypothesis that the difference in the coefficients between union and non-union workers is equal to zero (ii) At the bottom of each column, a χ^2 test with 1 degree of freedom test the hypothesis that the summation of the coefficients of the comparison terms is equal to zero. That test examines the symmetry of the coefficients of the peer (and then the past-) comparison terms.

The exogenous identifying restrictions for the trade union membership equation (shown in detail in *Appendix Table A1*) are the *Union Recognition* and *Union Concentration* variables. These have been shown to exert a significant impact on the probability to be a trade union member and can be intuitively assumed not to exert a significant impact on the job satisfaction equations. The test statistics at the bottom of Table 6 show that the two identifying restrictions used are insignificant in predicting job satisfaction for the union and non-union regressions. A Wald χ^2 test with 2 degrees of freedom can not reject the hypothesis that the coefficients of the two variables are jointly equal to zero, in all four panels of the satisfaction equations. Moreover, separate estimations of job satisfaction, incorporating the two variables[‡], clearly show they are also individually insignificant in explaining job satisfaction. However, they are both jointly and individually significant in the selection equation of union membership at the first stage. Furthermore, a Lagrange multiplier (LM) test examining whether the omitted union recognition and concentration variables should be included in the job satisfaction equations can not reject the null hypothesis that they should not be included, at all conventional levels. Finally, LR χ^2 tests reject the independence of the three equations in all panels. Hence, the identifying restrictions for the union membership equation perform very satisfactorily, both intuitively and statistically.

In Panel (A), the tentative specification is estimated for the job satisfaction of union and non-union workers. This specification only includes the peer comparison terms, wages, hours, education, gender, marital status the logarithm of age, country dummy variables and a constant term. It excludes the remaining variables that are included in the specification of Panel (B) to ensure the robustness of the results. The results from the two specifications of Panels (A) and (B) suggest an interesting pattern for the impact of peer comparisons. There is a difference on the impact of downward-looking comparisons between union and non-union workers that accords with the negative interaction term observed in Table 5. Specifically, the impact of downward and upward looking comparisons is asymmetric for union workers, while it is symmetric for their non-union counterparts. Union workers earning more than their peer reference group (*richer*) are somewhat more satisfied with their jobs (0.085) in Panel (A), although the coefficient is marginally significant at the 10% level. Union workers earning less are much less satisfied (-0.278), and the coefficient is significant at the 1% level. The χ^2 test for the symmetry of the coefficients of the two peer comparison terms rejects the null hypothesis for union workers at all conventional levels (shown at the bottom of the table). On the contrary, the two terms exert strong and significant opposite impacts of high magnitude and significance (at the 1% level) for the non-union worker sample. The coefficient is 0.212 for non-union workers earning more than their peers, and -0.220 for non-union workers earning less. The test for the symmetry of the coefficients can not reject the null hypothesis that their summation is equal to zero indicating symmetric peer wage comparisons for non-union workers. The Wald χ^2 test for the difference in the coefficients between union and non-union workers shows that the coefficients of the downward-looking peer comparison terms are significantly different at the 5%, while the difference in the upward-looking comparison terms is not statistically significant.

The pattern of asymmetric peer comparisons for union workers is clearly indicative of the descriptions of inequity aversion in [Fehr and Schmidt \(1999\)](#) and conformism in [Akerlof \(1997\)](#), in sheer contrast to symmetric comparisons for their non-union counterparts, indicating competitive preferences in accordance with status-seeking. The robustness of the results is further reinforced in the broader specification of Panel (B). The positive coefficient for those earning more than their peers (0.070) is statistically insignificant for union workers, indicating they are not significantly more satisfied with their jobs because of earning more than their peers. In contrast, union workers earning less are still significantly less satisfied (-0.209). The pattern remains symmetric for non-union workers, with those earning more than their peers being more satisfied (0.187) and those earning less being less satisfied (-0.189). Both coefficients are

significant at the 1% level. The tests at the bottom of the panel verify that peer comparisons exert an asymmetric impact on the job satisfaction of union workers ($\chi^2=4.00$) and a symmetric effect for non-union workers ($\chi^2=0.01$). Moreover, the coefficients of the downward-looking terms are significantly different between union and non-union workers, but the coefficients of the upward-looking terms are not. It is also worth noting that the results with respect to the impact of past comparisons are robust in COLS regressions for the two samples, without the controls for endogenous switching[‡].

[Insert Table 6 about here]

5.1.3 Robustness I: Generic Loss Aversion

For the pattern observed for union workers to be interpreted as inequity aversion, in line with [Fehr and Schmidt \(1999\)](#) and conformist as in [Akerlof \(1997\)](#), it must be the case that this asymmetry is not indicating a more generic pattern of loss aversion exhibited by union workers. Loss aversion, that is, the tendency for losses to loom larger than gains is a prominent feature of reference point comparisons according to the prospect theory ([Kahneman and Tversky, 1979](#); [Tversky and Kahneman, 1992](#)). For loss aversion to be in alignment with inequity aversion, it must be the case that it is only observed when it comes to comparisons to the earnings of similar workers, and not in other comparisons. As a test of this proposition, the specification in Panel (C) of Table 6 incorporates own wage comparison terms, *i.e.* comparisons with own earnings during the year prior to the survey. If loss aversion is observed with own wage comparisons, then the previous pattern can be attributed to a more generic loss aversion displayed by union workers.

The incorporation of the terms for comparisons with wages in the previous year does not alter the asymmetry in the impact of peer wage comparisons for union workers and the respective symmetry for their non-union counterparts. The previous patterns in the differences and summations of the coefficients remain the same and are statistically significant at the 10% level. Interestingly, the past comparison terms exert a symmetric impact on the job satisfaction of both union and non-union workers. Individuals in an increasing wage profile are significantly more satisfied with their works and those earning less are significantly less satisfied. The pattern holds for both union and non-union workers. A Wald χ^2 tests at the bottom of the Table accepts the hypothesis that the summation of the coefficients for those earning more than last year and those earning less is equal to zero, for both samples. Moreover, the differences in the coefficients of the past comparison terms between the two groups of workers are statistically insignificant,

for both downward and upward-looking past comparison terms. Thus, loss aversion does not appear to be a significant feature for neither of the two groups of workers, when it comes to wage comparisons with their own earnings during the previous year. However, it is a strong pattern when it comes to peer wage comparisons for the union workers. Non-generic loss aversion that is only expressed with respect to the earnings of the peers can more plausibly be attributed to inequity aversion and/or conformism.

5.1.4. *Robustness II: Excluding Northern European Countries*

As a second robustness check, the specifications of panel C in Table 6 are estimated excluding the two countries from Northern Europe, *i.e.* Denmark and Finland. The two countries are characterized by particularly high rates of unionisation and lower inequality indices (see e.g. Figure 1 and Table 1). Thus, this exercise intends to invest if the results are driven by Northern European workers which comprise nearly half of the union sample. Experiencing lower inequality, it might be the case that they exhibit greater inequity aversion from the remaining of the sample. Panel D presents estimates for the sample in the five remaining countries. The results remain virtually identical to those of Panel C. Peer wage comparisons exert an asymmetric impact on the job satisfaction of union workers, while the effect is symmetric for non-union workers. The difference in the coefficients of downward-looking comparisons between union and non-union workers is statistically significant at the 5% level. A minor difference from the previous estimates is related to the impact of downward-looking impact of past comparisons, which is insignificant for union workers. However, the χ^2 test at the bottom of the Table refutes the interpretation of a generic loss aversion for union workers. Thus, the estimates for the sample excluding the Northern European countries confirm the pattern of inequity aversion/conformism established for the union workers and the status-seeking profile shown in the job satisfaction of non-union workers.

5.1.5 *Robustness III: Tenure Profiles*

Fairness preferences have important implications for the prevalence of internal labour markets, norms of effort, and the optimal wage policy. Internal labour market considerations would indicate that for incumbent workers the reference outcome is likely to be the status quo, *i.e.* the contract in place during the previous period, and not the outside options to the worker. However, workers who enter a firm are more likely to compare the offer they are given by the firm to what they could obtain elsewhere in the labour market to form fairness judgments. Thus,

a prediction from this is that the job satisfaction of new entrants will be more responsive to peer wage comparisons. For instance, one can surmise that new entrants in unionised firms are more status-seeking than the incumbent workers. Moreover, if inequity aversion is the outcome of experience induced by the wage compression in unionised firms, one would expect inequity aversion to be higher for workers with higher tenure.

The top panel of *Figure 4* plots the satisfaction-tenure profiles for workers in the three peer comparison groups, by union membership status. Average predicted values in 0.1 log-tenure bands are plotted for workers earning more than their peer groups, those earning about the same, and those earning less than their peers. 95% confidence intervals are also shown in the graph for each group. The predicted values are obtained from COLS regressions for the pooled sample, using the specification of Column 4 in *Table 5*. The inspection of the two panels of *Figure 4* shows that the difference in the impact of downward-looking comparisons between the two groups is robust along different tenure profiles. For the union workers, the satisfaction difference between those earning about the same and those earning less is significant across the vast majority of tenure profiles. The dotted line for the predicted satisfaction of those earning less rarely overlaps with the confidence interval for the predicted satisfaction of those earning about the same. On the contrary, the difference in predicted satisfaction between those earning more and those earning about the same is insignificant in the majority of tenure bands, as the predicted line for the former and the confidence interval of the prediction for the latter overlap very often and across several different tenure profiles. Clearly, the differences are far more pronounced in the non-union sample, and the predictions for all three peer comparison groups seldom overlap with the confidence intervals of the predictions for the nearby groups. Thus, this exercise supports the view that the patterns established in the regressions hold across different tenure profiles.

Moreover, union workers with less years of tenure do not seem to enjoy significantly higher satisfaction from earning more than their colleagues, compared to new union workers earning about the same. The bottom panel of *Figure 4* plots the linear predictions from the same specification. Satisfaction-tenure profiles for workers in the three peer comparison groups are shown, by union membership status, along with 95% confidence intervals. The overlaps between the confidence intervals verify the conclusions derived from the observation of the top figure. The predicted satisfaction differences between union workers earning more and those earning about the same than their peers are not significant along all tenure profiles. This is not the case

for the non-union workers. Thus, for union workers, the peer comparison-satisfaction profiles are not affected by tenure on the job, a result also confirmed by regressions with tenure-comparison interaction terms[‡]. Hence, repeated interaction can not solely explain the prevalence of inequity aversion among unionised workers, and new entrants are not more or less likely to be inequity-averse.

5.2 *Peer Comparison and Quitting Intentions*

In the previous paragraphs, the impact of upward and downward-looking wage comparisons on job satisfaction suggests that union workers exhibit inequity-averse attitudes in the form of asymmetric wage comparisons with similar workers. On the contrary, non-union workers exhibit more symmetric profiles in their wage comparisons, in accordance with status-seeking behaviour. Thus, union workers gain satisfaction by not falling behind their peer group, but getting ahead from their peers in terms of earnings does not make them more satisfied with their jobs. This section examines the impact of wage comparisons on quitting intentions. The aim is to examine if preferences for status or fairness persist in expressions other than job satisfaction. Quitting intentions are more likely to reflect more closely [Kahneman's \(1994; 1999; 2000\)](#) concept of decision utility. In contrast, the concept of job satisfaction is more closely related to expressions of experienced utility¹⁴. Moreover, it has been shown that union workers are less likely to quit their jobs or to intend to do so, a pattern that can be explained within the loyalty, exit-voice framework ([Freeman, 1976; 1980a; Freeman and Medoff, 1984; Hersch and Stone, 1981, Panos and Theodossiou, 2009](#)). Thus, while it is likely that union workers may be more inequity-averse, such preferences may find expressions through other types of industrial action, rather than quitting or intending to do so.

[Table 7](#) presents estimates of the intention to quit the job in the near future, incorporating peer wage and past own wage comparison terms. Column 1 presents marginal effects and robust standard errors from a logit model for the pooled sample. Columns 2 and 3 utilise a linear probability model that accounts for endogenous switching into union membership, and present coefficients and robust standard errors. The results do not differ from the estimates of two separate logit models, for union and non-union workers respectively[‡]. The linear probability model is preferred as it can incorporate the endogenous switching model. The estimates for the

¹⁴ Experienced or remembered utility is more about enjoyment and memory of retrospective assessments of episodes. Decision utility is more about wanting and is more closely linked to observed preferences.

pooled model suggest that earning less than similar workers increases the probability to intend to quit by 5.2% compared to workers earning about the same as their peers. The effect is large, given that the observed quitting probability is 36.3% (in Table 3). Earning more than one's peer group does not exert a significant impact on the intention to quit. Furthermore, wage increases compared to the previous year decrease the probability of intending to quit by 4%, compared to individuals earning the same. Earning less than the year prior to the survey does not exert a significant impact, but one should note that the overall fraction of workers that experienced a wage decrease is small, *i.e.* 11% of the sample, and these workers are more likely to have lower tenure on the job.

The distinction between union and non-union workers in the endogenous switching model of Table 7 indicates that the patterns shown in the pooled sample hold for the sample of non-union workers. Those earning less than their peers are more likely to intend to quit, and individuals in increasing wage profiles less likely to intend to do so. On the contrary, peer and past wage comparisons do not exhibit a significant impact on the quitting intention of unionised workers. Union workers are less likely to intend to do so in general, and this is evident from both the summary statistics in Table 2 and the negative coefficient of trade union membership in *Column 1* of Table 7. Thus, the inequity aversion observed among union workers in the job satisfaction regressions is not significant in explaining quitting decisions. Union workers are less likely to intend to quit their job in general, and this is not significantly affected by being above or below one's reference wage group. An explanation within the exit-voice framework would suggest that union workers who experience wage inequality are more likely to express their dissatisfaction in other ways, such as working-to-rule or industrial action, as opposed to quitting their job. However, the fact that upward peer wage comparisons and wage increases affect the quitting intentions of non-union workers reinforces the previous interpretation that attributes more competitive preferences to them, compared to the union workers who are less willing to quit their job.

[Insert Table 7 about here]

5.3 Effort Reference Points: Discretionary Effort & Incentives

The results in the previous section are indicative of lower wage inequality experienced by union workers, accompanied by inequity-averse attitudes as revealed by the impact of peer wage comparisons on job satisfaction. However, such tastes do not exert a significant impact on the

intention to quit the job among union workers. Non-union employees are more likely to be affected by such comparisons. In the spirit of the fair-wage-effort idea, this section assesses differences in the norms of effort between the two groups, by examining the relationship between a set of relevant incentive mechanisms and the level of discretionary effort at work. In the questionnaires, respondents were asked to evaluate the factors that they considered important for the effort they put in their job, by rating their importance on a scale from 1 to 5. The initial inspection of the responses in Table 4 and Figure 3 shows that union workers are more likely to give a higher evaluation to the opinion and observation by fellow-workers opinion as a factor important for the effort they put in their job. Furthermore, they are significantly less likely to respond to other incentives such as payments and reports and appraisals, compared to non-union workers.

It is thus important to investigate the ranking of the incentive mechanisms controlling for a number of other characteristics and unobserved heterogeneity. *Table 8* presents the results of the consistent ranking obtained using a variety of econometric models. Panel (A) presents the ranking from COLS effort regressions on the pseudo-panel of pooled responses. This method is used for consistency with the previous sections and to allow the incorporation of controls for endogenous switching into union membership. Panel (B) presents the ranking obtained from the rank ordered logit model, utilising Efron’s method of handling potential ‘ties’ in the workers’ responses. This method accounts for potential indifference among the alternatives as indicated by equal effort scores. Finally, Panel (C) present estimates from the random effects ordered probit for the union and non-union workers. Coefficients and robust standard errors are presented throughout, along with the relative ranking of the coefficients for the union and non-union workers. The models in panels (A) and (C) also allow for the incorporation of a set of control variables, such as occupation and industry variables that can be expected to determine the level of effort at work.

Interestingly, all three methods used provide a consistent ranking of the incentive mechanisms with regards to their impact on the level of discretionary effort. The results are also consistent with estimates from pooled models with interaction terms (for panels A and C; not shown). The rankings obtained for the two sub-samples are the following.

Union workers:

$$\begin{aligned}
 & \textit{Own discretion} \geq \textit{Colleagues' opinion} \geq \textit{Clients/Customers} \geq \textit{Supervisor/boss} \geq \textit{Payment incentives} \geq \\
 & \geq \textit{Reports/appraisals} \geq \textit{Machine/assembly line}
 \end{aligned}$$

Non-Union workers:

$$\begin{aligned} \text{Own discretion} \geq \text{Clients/Customers} \geq \text{Payment incentives} \geq \text{Colleagues' opinion} \geq \text{Supervisor/boss} \geq \\ \geq \text{Reports/appraisals} \geq \text{Machine/assembly line} \end{aligned}$$

The rankings obtained show that comments and opinions by fellow co-workers is the second most important incentive among union workers. Colleagues rank fourth among non-union employees. Moreover, payment incentives obtain a higher ranking among non-union workers, compared to their union counterparts. Union workers are also more likely to value the climate of industrial relations, in terms of their relationship with their employer/supervisor, more highly compared to their non-union counterparts.

[Insert Table 8 about here]

The higher ranking obtained for peer observation and opinion in the discretionary effort levels of union workers is indicative of the prevalence of self-enforcing norms with respect to certain levels of required effort when pay inequality is lower among colleagues. This pattern is conducive to the argument that when a certain level of effort becomes a self-enforcing norm, observable by other workers, deviations from the equilibrium value of effort are likely to be disliked by other workers (Lazear, 1989; 1991; Kandel and Lazear, 1992). This brings disutility to the deviator through loss of reputation, and the extent of this disutility affects the equilibrium level of effort. In Roy's (1952) case study of an Illinois machine shop, insiders established group norms concerning effort and colluded to prevent the hiring of rate-busting outside workers. Workers who produced more than the level of output considered 'fair' were ostracized by others. Moreover, Mas and Moretti (2009) present direct evidence of social pressure via observation. They find that high productivity cashiers in a supermarket chain increase the productivity of co-workers that are present in the same shift, an effect not due to exchange of information. The positive peer effect occurs only when the more productive co-worker can observe the worker's productivity¹⁵.

¹⁵ An increase by 1% in the average permanent productivity of the workers behind increases the productivity of the peer by 0.23%. The effect is even larger for co-workers that are working at a closer distance. There is no effect of a highly-productive co-worker in front.

6. Concluding Remarks

The literature provides substantial empirical evidence on the impact of relative income on utility from work and labour market outcomes such as job performance (see [Clark et al., 2008](#); [DellaVigna, 2009](#); for extensive reviews). However, while most of the literature considers the incorporation of status concerns as an innovation, the potential existence of subgroups that behave differently from the majority of the population has received little attention. The present study contributes to the literature on ‘relativity’ and inequality, by providing evidence in favour of the existence of labour market groups with distinct attitudes with respect to the relationship with their reference group of peers. The case in point is based on the groups of the unionised and non-unionised workers.

This paper empirically examines two particular facets of union membership using a new dataset of semi-skilled European workers from seven countries. The features of unionism provide a natural setting to examine the implications of the ‘fair-wage-effort’ ideas. In view of the evidence that trade unions promote greater wage equality, this study examines whether the norms that govern the behaviour of union workers, related to “*fair treatment*” and its relationship to the effort exerted on the job differ from those of non-union workers. In particular, it examines the impact of peer wage comparisons on satisfaction with work and quitting intentions, and the relationship between peer-referencing and effort. The evidence presented supports the Keynesian view that workers care for relative outcomes, but suggests that there is heterogeneity in relative wage comparisons.

The results suggest that union workers exhibit inequity-averse/conformist attitudes when they assess the utility derived from work based on peer wage comparisons. They are found to be unhappier if they earn less than their peer reference group, but not significantly happier if they earn more. However, these comparisons do not induce quitting intentions among union workers. On the contrary, non-union workers are more likely to show status-seeking patterns in their utility from work, and be affected in their quitting decisions by peer wage comparisons. The evidence is consistent with the idea of the “*fair wage*” reference points. Conformist compliance to the “*fair wage*” becomes a norm affecting the utility from work of union members. The results are robust to generic loss aversion considerations, different country sub-samples and across different tenure profiles. Moreover, union workers are more likely to target a certain level of effort that is dependent upon peer observation and opinions. Finally, relationships with the

employer/supervisor obtain a higher ranking among union workers, and payment incentives a lower ranking compared to their non-union counterparts.

Such preferences can precede and even induce union formation and/or membership, or they can be considered as ‘conformist’ behaviour, in the sense of conforming to the norm. However, the robustness of the results in endogenous switching models and across tenure profiles suggests that inequity aversion can not be solely attributed to endogenous union membership. The views and reactions of unionized workers are more likely to be influenced by social interactions with their colleagues or similar workers in other firms, mediated by the union. In a relevant work, [Mas \(2008\)](#) reviews evidence from the literature on group polarization suggesting that members of group discussions advocate more extreme positions than individuals who do not participate in group discussions. Thus, strong feedback effects across individuals due to social interactions can have persistent and lasting effects on behaviour. In addition, certain mechanisms are more likely to induce peer observation and make certain levels of effort a norm that becomes self-enforcing and subject to the monitoring of peers. The discussion above suggests that group cohesive norms are more likely to prevail among unionized workers. Cohesive group norms are another channel through which workers can identify with their organization and might involve a sense of identity induced by group membership. Such group norms can be the outcome of adaptation to cooperation, expressed in a form of cognitive dissonance¹⁶.

Endnotes:

‡ The mentioned results that are not shown, due to space considerations, are available from the authors upon request.

¹⁶ [Festinger \(1957\)](#) describes cognitive dissonance as internal pressure for an after-the-fact rationalization of an unexpected phenomenon, in a situation where people are confronted with something that conflicts with their previously held beliefs. [Frederick and Loewenstein \(1999\)](#) define hedonic adaptation as a reduction in the affective intensity of favourable and unfavourable circumstances.

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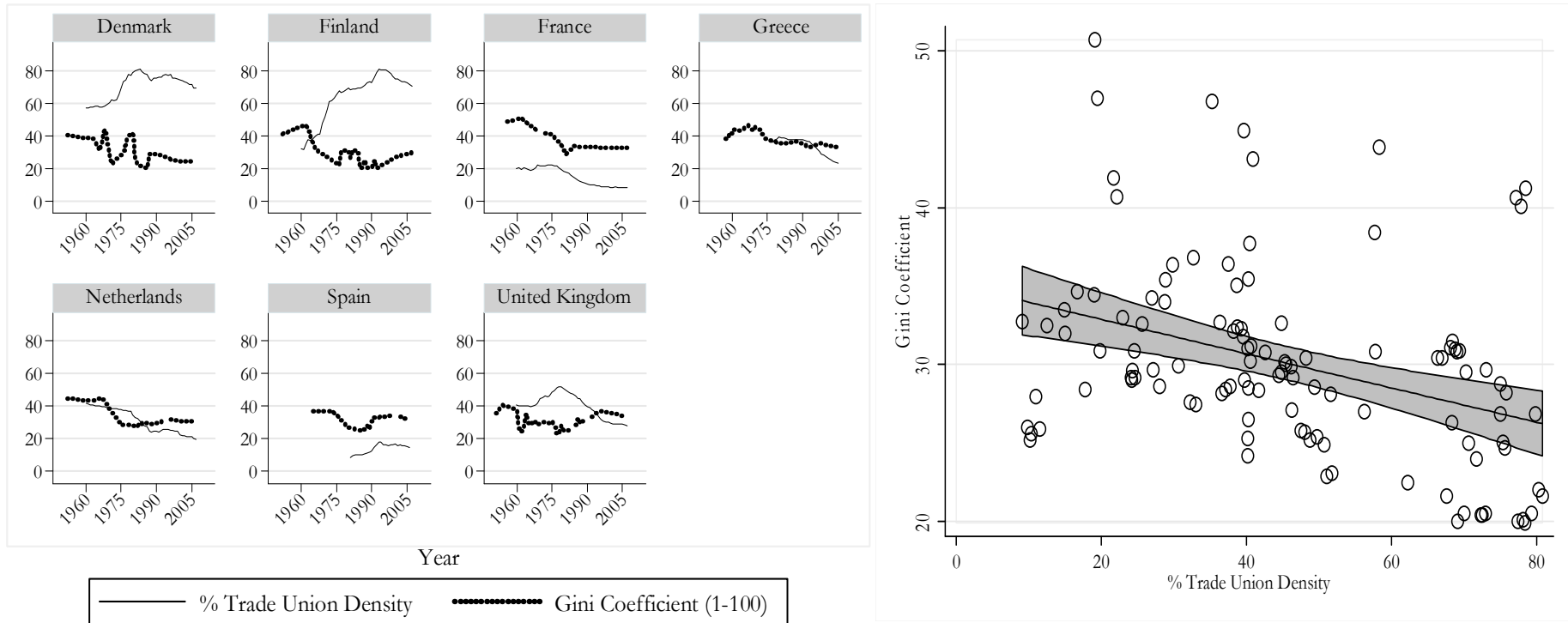
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Figure 1
 Unionisation and Income Inequality in the 7 Countries in the Sample

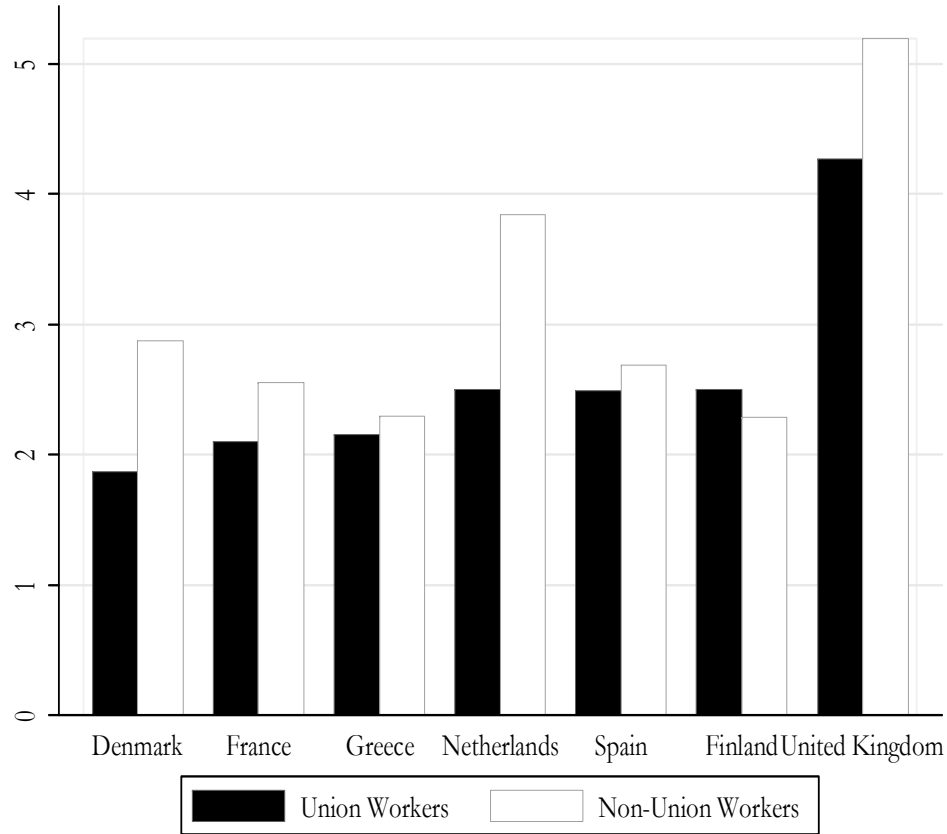


Notes:

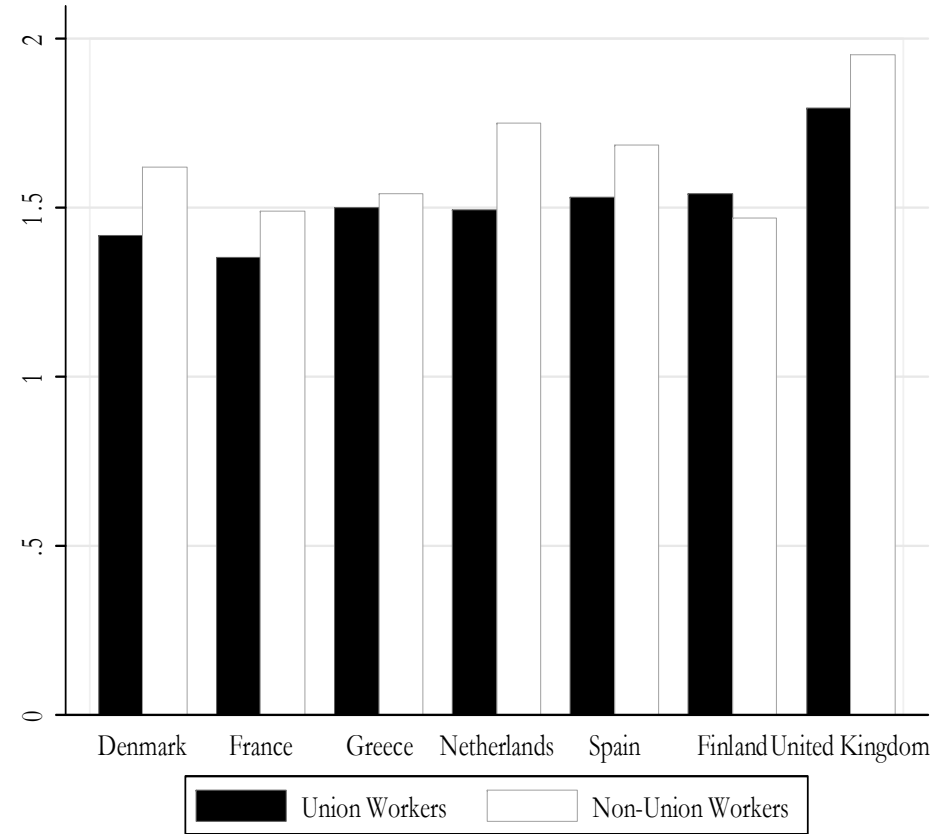
The sources of the historical data for the seven countries in the sample are: The evolution of the Gini coefficient (1955-2007) is from the World Bank's 'Measuring Income Inequality' Database (Deininger and Lynn, 1996): <http://go.worldbank.org/UVPO9KSJJ0>, and the CIA World Factbooks for later years. The trade union density (1960-2007) is from the ICTWSS Database on Institutional Characteristics of Trade Unions (Visser, 2009): <http://www.uva-aias.net/207>

Figure 2
 Unionisation and Wage Inequality in the 7 Countries in the Sample

A) 90-10 Wage Inequality



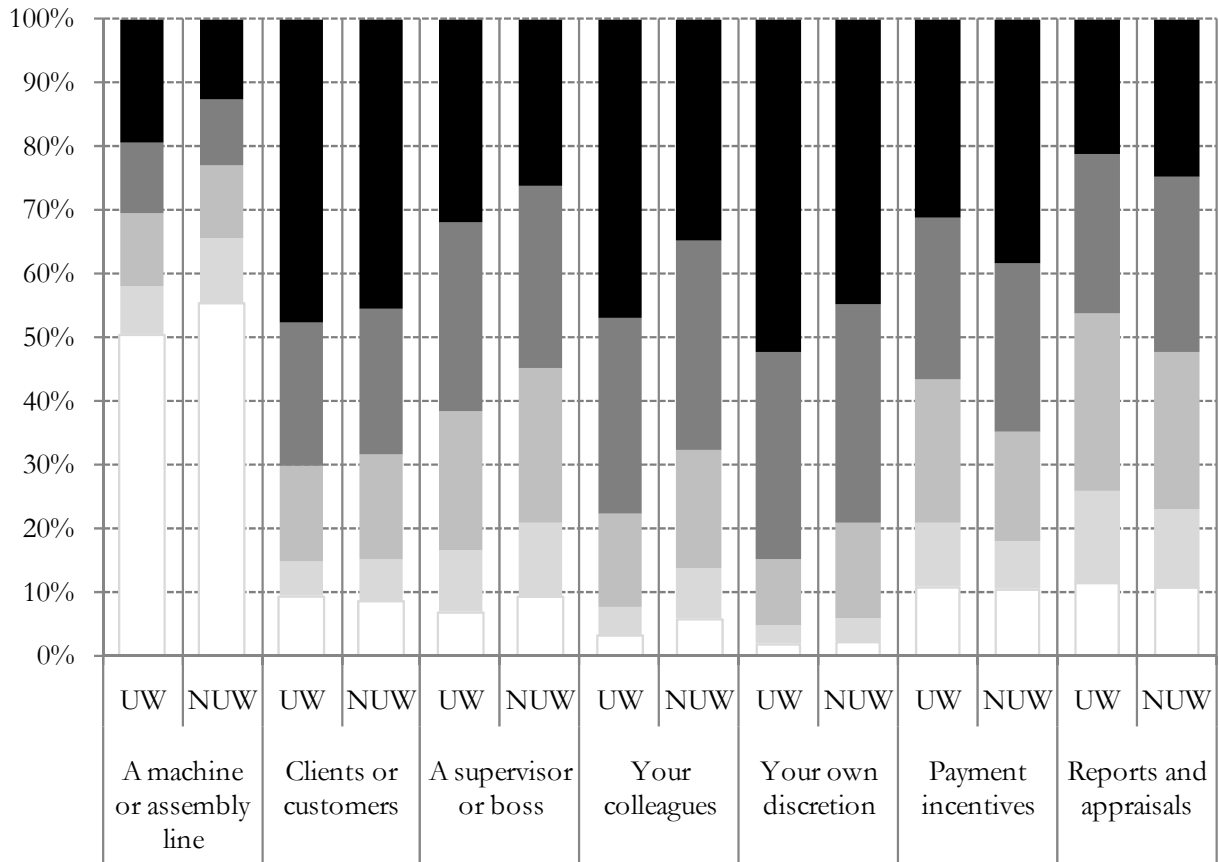
B) 75-25 Wage Inequality



Notes:

Data is for the year 2004. Wage inequality is calculated from within the EPICURUS database for the year 2004.

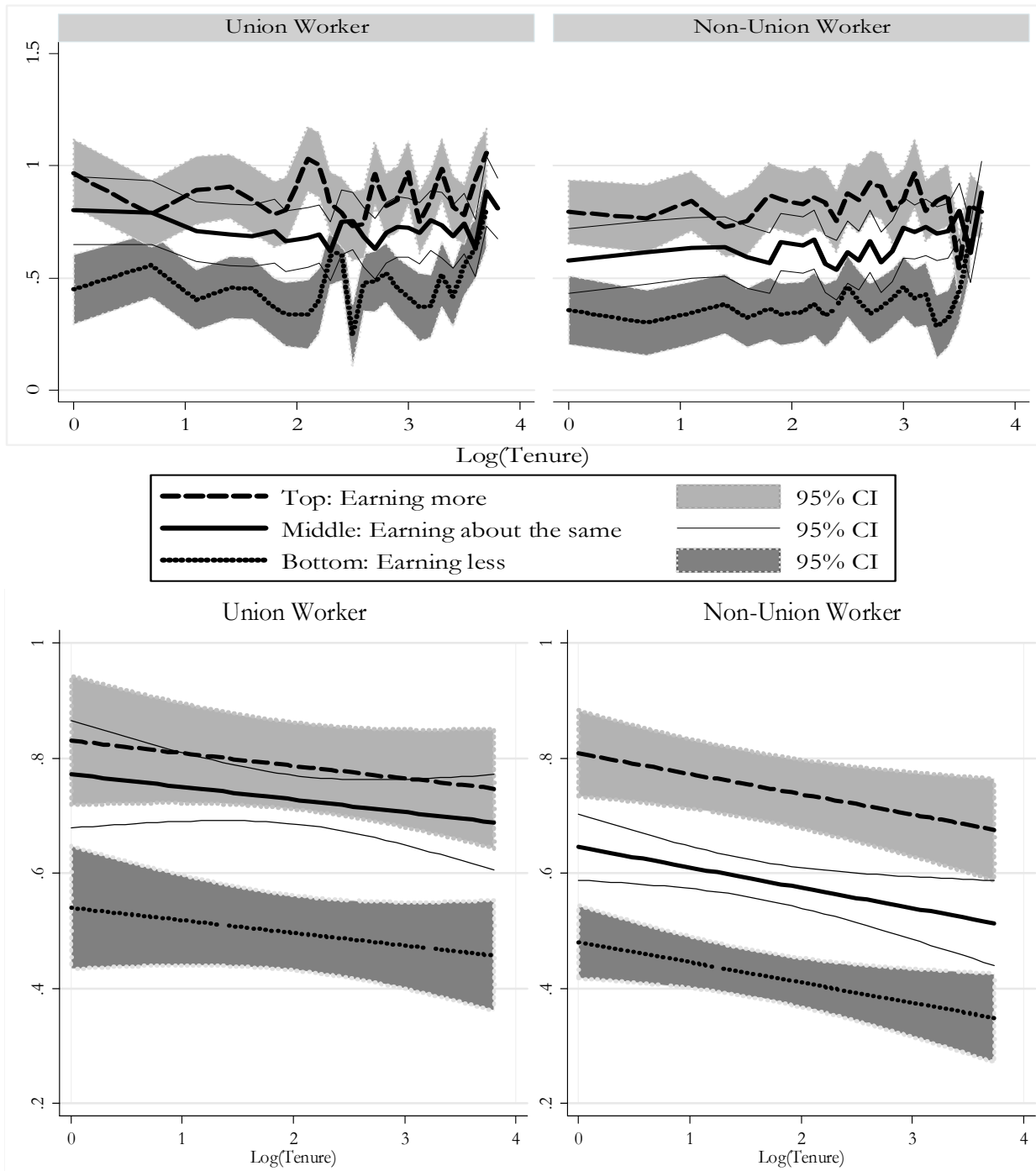
Figure 3
Incentives and the Level of Effort



Notes:

The frequencies in the figure are from replies to the question: "From 1 (lighter) to 5 (darker): *Which is important for the effort you put in your work?*" (EPICURUS Database, 2004)

Figure 4
Peer Wage Comparisons and Job Satisfaction by Tenure



Notes:

The figures plot average predicted values and 95% confidence intervals by 0.1 log-tenure bands, for each peer wage comparison group. The fitted values are obtained from a COLS regression on the pooled sample, using the specification of column 4 in Table 5.

Table 1
The Sample

| | Sample | | | % Union Membership | | | |
|----------------------|-------------|---------------|-------------------|--------------------|---------------------------------|--------------------------------|---|
| | Sample Size | Union Workers | Non-Union Workers | EPICURUS 2004 | ICTWSS ^[a] 2004-2005 | E.U. Total ^[b] 2006 | E.U. (2006) Blue-Collar: Unskilled – Skilled ^[b] |
| <i>Pooled Sample</i> | 5,463 | 1,854 | 3,609 | 33.9% | 34.6% | 38.3% | - |
| Denmark | 1,011 | 810 | 201 | 80.1% | 71.7% | 84% | 80%-89% |
| France | 1,008 | 127 | 881 | 12.6% | 8.0% | 12% | - |
| Greece | 800 | 183 | 617 | 22.9% | 23.0% | 22% | 11%-27% |
| Netherlands | 1,007 | 296 | 711 | 29.4% | 22.0% | 28% | 26%-42% |
| Spain | 304 | 52 | 252 | 17.1% | 15.2% | 16% | 14%-18% |
| Finland | 331 | 192 | 139 | 58.0% | 72.9% | 76% | 72%-81% |
| United Kingdom | 1,002 | 194 | 808 | 19.4% | 29.5% | 30% | 19%-29% |

Sources:

^[a] ICTWSS Database on Institutional Characteristics of Trade Unions (Visser, 2009): <http://www.uva-aias.net/207>

^[b] European Commission (2006): p.25-26.

Table 2
Selected Summary Statistics for the Pooled Sample: Averages and Mean Differences

| Variable | Pooled Sample | Union Workers | Non-Union Workers |
|-----------------------------------|---------------|---------------|-------------------|
| Job Satisfaction | 6.93 | 7.14*** | 6.82 |
| Quitting Intention | 36.3% | 33.6% | 37.7%*** |
| Net Monthly Wage | 1,688.6 | 1,876.1*** | 1590.0 |
| Hours of Work per week | 35.5 | 36.1*** | 35.1 |
| Age | 37.2 | 40.5*** | 35.6 |
| Tenure | 9.1 | 11.9*** | 7.7 |
| Experience | 19.0 | 22.2*** | 17.4 |
| Paid Overtime Hours | 1.1 | 1.2 | 1.0 |
| No. of Children aged less than 16 | 0.7 | 0.8*** | 0.7 |
| Male | 50.3% | 58.6%*** | 46.1% |
| Married | 47.3% | 52.8%*** | 44.6% |
| Permanent contract | 82.5% | 85.2%*** | 81.1% |
| Training during last year | 39.9% | 48.1%*** | 35.7% |
| Good Industrial Relations | 84.5% | 83.8% | 84.8% |
| Work Description | | | |
| In control of own work | 6.9% | 7.4% | 6.7% |
| Choice over tasks | 63.3% | 64.9%* | 62.4% |
| Completely fixed routine | 28.3% | 26.4% | 29.3%** |
| Sector | | | |
| Private Sector | 62.6% | 51.2% | 68.4%*** |
| Non-Profit Institutions | 6.6% | 5.6% | 7.2%** |
| Civil Service | 19.8% | 31.2%*** | 13.9% |
| Public Sector | 11.0% | 12%* | 10.5% |
| Firm Size | | | |
| 1-10 employees | 19.8% | 10.7% | 24.4%*** |
| 10-24 employees | 15.2% | 12.6% | 16.6%*** |
| 25-99 employees | 20.3% | 19.7% | 20.5% |
| 100-499 employees | 21.3% | 27.9%*** | 17.9% |
| More than 500 employees | 23.4% | 29.1%*** | 20.5% |

Table 2 continued from last page

| | Pooled | Union | Non-Union |
|---|--------|----------|-----------|
| Occupation | | | |
| Managers | 2.6% | 1.7% | 3.1%*** |
| Professional | 3.5% | 4.9%*** | 2.8% |
| Technical & Associate Professional | 12.6% | 16.3%*** | 10.7% |
| Clerical & Secretarial | 25.3% | 22.3% | 26.9%*** |
| Craft & Related Trades | 2.6% | 2.1% | 2.9%* |
| Personal & Protective Service | 5.4% | 7.7%*** | 4.2% |
| Labouring in mining, construction, manufact. & transportation | 5.1% | 6.2%*** | 4.5% |
| Sales and Services | 13.9% | 8.9% | 16.5%*** |
| Plant & Machine Operators and Assemblers | 4.3% | 7.0%*** | 2.9% |
| Armed Forces | 2.1% | 2.4% | 1.9% |
| Other Occupations | 22.6% | 20.7% | 23.7%** |
| Industry | | | |
| Mining & Quarrying | 0.1% | 0.1% | 0.1% |
| Utilities | 1.4% | 2.1%*** | 1.0% |
| Manufacturing | 8.2% | 10.6%*** | 6.9% |
| Construction | 4.4% | 3.7% | 4.7%* |
| Trade & Repairs | 12.4% | 7.4% | 15.0%*** |
| Hotels & Restaurants | 3.6% | 1.4% | 4.8%*** |
| Transport, Storage & Communication | 8.1% | 10.3%*** | 7.0% |
| Financial Intermediation | 3.7% | 2.9% | 4.2%** |
| Real Estate & Business | 1.7% | 1.5% | 1.9% |
| Other Services | 13.3% | 14.0% | 12.9% |
| Public Administration & Defence | 9.0% | 12.9%*** | 7.0% |
| Education | 3.8% | 3.7% | 3.9% |
| Health and Social Work | 9.7% | 11.4%*** | 8.9% |
| Community, Social and Personal Service | 4.1% | 4.3% | 4.0% |
| Private Households | 0.6% | 0.1% | 0.9%*** |
| Extra-Territorial Organisations | 0.6% | 0.5% | 0.7% |
| Other Activities | 15.3% | 13.4% | 16.3%*** |
| Instruments | | | |
| Union Recognition | 43.6% | 67.1%*** | 31.5% |
| Union Concentration | 1.48 | 2.75*** | 0.83 |

Notes:

p<0.10, ** p<0.05, *** p<0.01: From a t-test of mean differences between union and non-union workers.

Table 3
Summary Statistics: Wage Comparisons with Similar Workers and Own Past

| | Pooled | Union | Non-Union | t-test |
|--|-----------------|-----------------|-----------------|-----------|
| Q40: All things considered, which of these statements do you feel best describes your present pay? | | | | |
| I earn much more than other workers who have a similar type of work | 1.5% (0.12) | 1.3% (0.11) | 1.6% (0.12) | -0.82 |
| I earn somewhat more than other workers who have a similar type of work | 15.3% (0.36) | 17.0% (0.38) | 14.4% (0.35) | 2.51 ** |
| I earn about the same as other workers who have a similar type of work | 49.3% (0.50) | 53.4% (0.50) | 47.2% (0.50) | 4.33 *** |
| I earn somewhat less than other workers who have a similar type of work | 19.9% (0.40) | 17.5% (0.38) | 21.1% (0.41) | -3.17 *** |
| I earn much less than other workers who have a similar type of work | 9.6% (0.29) | 6.7% (0.25) | 11.1% (0.31) | -5.17 *** |
| Don't know | 4.4% (0.20) | 4.1% (0.20) | 4.6% (0.21) | -0.90 |
| Q19: If you compare your earnings from your main job of this year with your main job earnings a year back, are your present earnings ...? | | | | |
| Much more than last year (more than 10%) | 7.9% (0.27) | 6.2% (0.24) | 8.8% (0.28) | -3.46 *** |
| Somewhat more than last year (about 10% more) | 21.3% (0.41) | 19.7% (0.40) | 22.1% (0.42) | -2.07 ** |
| About the same as this year | 58.1% (0.49) | 63.8% (0.48) | 55.2% (0.50) | 6.11 *** |
| Somewhat less than last year (about 10% less) | 7.2% (0.26) | 6.9% (0.25) | 7.3% (0.26) | -0.63 |
| Much less than last year (more than 10% less) | 3.8% (0.19) | 2.8% (0.16) | 4.3% (0.20) | -2.88 *** |
| <i>Don't know/Last year I was not working</i> | 1.7% (0.13) | 0.8% (0.09) | 2.2% (0.15) | -3.94 *** |

Notes:

Means and standard deviations in parentheses. The t-test is on the difference in the means between union and non-union workers (* p<0.10, ** p<0.05, *** p<0.01).

Table 4
Summary Statistics: Incentives and Effort

| <i>Q58: From 1 (very unimportant) to 5 (very important): "Which is important for the effort you put in your work?"</i> | | | | | | | | | |
|--|------------------|------------------|----------------------|-----------|--|-----------|---|------------------------|--|
| | Pooled Sample | Union Workers | Non-Union Workers | t-test | Robust Rank-Order test (asymptotic p-values) | | Fisher-Pitman permutation test (p-values) | | |
| | | | | | Two-sided | One-sided | $\mu^U - \mu^{NU} = 0$ | $\mu^U - \mu^{NU} < 0$ | |
| A machine or assembly line | 2.23 (1.53) | 2.42 (1.63) | 2.15 (1.48) | 5.24 *** | 0.000 | 0.000 | 0.000 | 0.000 | |
| Clients or customers | 3.91 (1.29) | 3.93 (1.30) | 3.90 (1.29) | 0.87 | 0.561 | 0.281 | 0.390 | 0.195 | |
| A supervisor or boss | 3.57 (1.24) | 3.70 (1.21) | 3.51 (1.25) | 5.43 *** | 0.000 | 0.000 | 0.000 | 0.000 | |
| Your colleagues | 3.93 (1.13) | 4.14 (1.03) | 3.82 (1.16) | 9.66 *** | 0.000 | 0.000 | 0.000 | 0.000 | |
| Your own discretion | 4.21 (0.95) | 4.30 (0.91) | 4.16 (0.96) | 5.32 *** | 0.0004 | 0.0002 | 0.000 | 0.000 | |
| Payment incentives | 3.68 (1.32) | 3.56 (1.31) | 3.74 (1.32) | -4.77 *** | 0.000 | 0.000 | 0.000 | 1.000 | |
| Reports and appraisals | 3.40 (1.28) | 3.30 (1.27) | 3.43 (1.28) | -2.95 *** | 0.002 | 0.001 | 0.003 | 0.999 | |

Notes:

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. μ stands for mean.

Table 5
Job Satisfaction and Relative Comparisons in the Pooled Sample

| Dependent Variable: Job Satisfaction (COLS) | (1) | (2) | (3) | (4) | (5) |
|--|----------------------|----------------------|----------------------|----------------------|----------------------|
| Earning more than workers who have a similar type of work | - | 0.142*** [0.028] | 0.182*** [0.035] | 0.127*** [0.028] | 0.159*** [0.034] |
| Earning less than workers who have a similar type of work | - | -0.198*** [0.023] | -0.176*** [0.027] | -0.184*** [0.022] | -0.164*** [0.027] |
| Trade Union x Earning more than similar workers | - | - | -0.108* [0.057] | - | -0.088* [0.053] |
| Trade Union x Earning less than similar workers | - | - | -0.066 [0.048] | - | -0.062 [0.047] |
| Earning more than last year | - | - | - | 0.152*** [0.022] | 0.169*** [0.027] |
| Earning less than last year | - | - | - | -0.117*** [0.034] | -0.106*** [0.039] |
| Trade Union x Earning more than last year | - | - | - | - | -0.055 [0.046] |
| Trade Union x Earning less than last year | - | - | - | - | -0.03 [0.068] |
| Log(Monthly Wage) | 0.053** [0.023] | 0.019 [0.025] | 0.020 [0.025] | 0.010 [0.025] | 0.011 [0.022] |
| Log(Weekly Hours) | -0.070* [0.040] | -0.030 [0.042] | -0.033 [0.042] | -0.044 [0.042] | -0.047 [0.040] |
| Low Education | -0.093** [0.040] | -0.086* [0.045] | -0.085* [0.045] | -0.080* [0.045] | -0.079** [0.039] |
| Male | -0.049** [0.021] | -0.043** [0.021] | -0.045** [0.021] | -0.047** [0.021] | -0.049** [0.021] |
| Married | 0.019 [0.023] | 0.013 [0.022] | 0.013 [0.022] | 0.011 [0.022] | 0.011 [0.022] |
| Log(Age) | 0.183*** [0.044] | 0.163*** [0.046] | 0.163*** [0.046] | 0.222*** [0.046] | 0.222*** [0.044] |
| Trade Union | -0.040 [0.026] | -0.051** [0.024] | -0.012 [0.030] | -0.042* [0.024] | 0.010 [0.035] |
| Log(Paid Overtime Hours) | 0.032** [0.014] | 0.032** [0.014] | 0.032** [0.014] | 0.031** [0.014] | 0.032** [0.013] |
| Log(Children aged<16) | 0.006 [0.021] | 0.008 [0.022] | 0.007 [0.022] | 0.013 [0.022] | 0.013 [0.021] |
| Log(Tenure) | -0.039*** [0.012] | -0.036*** [0.013] | -0.035*** [0.013] | -0.032** [0.013] | -0.032*** [0.012] |
| Permanent Job | 0.044 [0.028] | 0.035 [0.029] | 0.035 [0.029] | 0.026 [0.029] | 0.026 [0.028] |
| Training in the last year | 0.072*** [0.021] | 0.061*** [0.021] | 0.060*** [0.021] | 0.052** [0.021] | 0.052** [0.021] |
| Good relations with employer/supervisor | 0.625*** [0.027] | 0.592*** [0.029] | 0.592*** [0.029] | 0.580*** [0.029] | 0.580*** [0.027] |
| F-statistic: $\alpha^{PEERS} + \beta^{PEERS=0}$ (p-value) | - | 1.94 (0.164) | - | 2.07 (0.151) | - |
| F-statistic: $\alpha^{PAST} + \beta^{PAST=0}$ (p-value) | - | - | - | 0.64 (0.424) | - |
| No. of Observations | 4,908 | 4,908 | 4,908 | 4,908 | 4,908 |
| R ² | 0.187 | 0.211 | 0.211 | 0.223 | 0.223 |
| Log-Likelihood | -4,995.3 | -4,923.4 | -4,921 | -4,886.1 | -4,883.6 |
| F-statistic | 21.09*** | 20.98*** | 20.38*** | 21.59*** | 22.85*** |

Notes:

* p<0.10, ** p<0.05, *** p<0.01. COLS Regressions: coefficients and robust standard errors in brackets. The specification also includes a constant term and dummy variables for: Working conditions (3), Sector (4), Firm Size (5), Occupation (10), Industry (17), and Country (7). α and β stand earning more and earning less than the comparison group, as in Eq. (2).

Table 6
Job Satisfaction and Relative Comparisons by Union Status: Endogenous Switching Models

| Dependent Variable: Job Satisfaction (COLS) | (A) | | | (B) | | | (C) | | | (D) | | |
|---|----------------------|----------------------|---------------|----------------------|----------------------|---------------|----------------------|----------------------|---------------|----------------------|----------------------|---------------|
| | UW | NUW | Wald χ^2 | UW | NUW | Wald χ^2 | UW | NUW | Wald χ^2 | UW | NUW | Wald χ^2 |
| Earning more than workers who have a similar type of work | 0.085* [0.048] | 0.212*** [0.037] | 4.38** | 0.070 [0.045] | 0.187*** [0.035] | 4.12** | 0.066 [0.045] | 0.166*** [0.034] | 3.09* | 0.040 [0.057] | 0.183*** [0.037] | 4.41** |
| Earning less than workers who have a similar type of work | -0.278*** [0.045] | -0.220*** [0.032] | 1.12 | -0.209*** [0.041] | -0.189*** [0.028] | 0.15 | -0.191*** [0.041] | -0.178*** [0.028] | 0.08 | -0.236*** [0.053] | -0.179*** [0.029] | 0.88 |
| Earning more than last year | - | - | - | - | - | - | 0.140*** [0.040] | 0.149*** [0.028] | 0.03 | 0.082 [0.054] | 0.162*** [0.030] | 1.72 |
| Earning less than last year | - | - | - | - | - | - | -0.146** [0.058] | -0.098** [0.039] | 0.46 | -0.134** [0.065] | -0.083** [0.041] | 0.43 |
| Log(Monthly Wage) | 0.038 [0.047] | 0.057 [0.036] | 0.10 | -0.007 [0.043] | 0.024 [0.028] | 0.37 | -0.01 [0.043] | 0.013 [0.027] | 0.22 | -0.063 [0.057] | 0.016 [0.029] | 1.52 |
| Log(Weekly Hours) | -0.009 [0.087] | -0.041 [0.054] | 0.10 | -0.027 [0.082] | -0.035 [0.048] | 0.01 | -0.048 [0.082] | -0.047 [0.048] | 0.01 | 0.189* [0.112] | -0.053 [0.050] | 3.87** |
| Low education | -0.037 [0.061] | -0.086 [0.075] | 0.26 | -0.056 [0.056] | -0.117** [0.058] | 0.57 | -0.056 [0.056] | -0.103* [0.057] | 0.34 | 0.027 [0.092] | -0.084 [0.064] | 0.99 |
| Male | -0.089** [0.044] | -0.046 [0.036] | 0.59 | -0.098*** [0.036] | -0.011 [0.028] | 3.65* | -0.098*** [0.036] | -0.02 [0.028] | 2.98* | -0.083 [0.056] | -0.021 [0.030] | 0.92 |
| Married | 0.023 [0.037] | 0.027 [0.030] | 0.01 | 0.025 [0.038] | -0.003 [0.029] | 0.33 | 0.023 [0.038] | -0.005 [0.029] | 0.35 | -0.001 [0.053] | 0.002 [0.031] | 0.01 |
| Log(Paid Overtime Hours) | - | - | - | 0.041* [0.023] | 0.033* [0.017] | 0.09 | 0.043* [0.023] | 0.030* [0.017] | 0.20 | 0.090*** [0.027] | 0.025 [0.018] | 3.82* |
| Log(Children aged<16) | - | - | - | -0.018 [0.037] | 0.029 [0.027] | 1.02 | -0.011 [0.036] | 0.031 [0.027] | 0.89 | 0.013 [0.048] | 0.032 [0.028] | 0.12 |
| Log(Age) | 0.154 [0.114] | 0.175 [0.133] | 0.01 | 0.08 [0.085] | 0.240*** [0.056] | 2.47 | 0.131 [0.085] | 0.286*** [0.057] | 2.30 | 0.233** [0.113] | 0.263*** [0.058] | 0.05 |
| Log(Tenure) | - | - | - | -0.071*** [0.023] | -0.016 [0.016] | 3.84* | -0.065*** [0.023] | -0.016 [0.016] | 3.07* | -0.046 [0.033] | -0.015 [0.017] | 0.69 |
| Permanent Job | - | - | - | 0.029 [0.050] | 0.046 [0.035] | 0.07 | 0.034 [0.050] | 0.031 [0.035] | 0.01 | 0.096 [0.078] | 0.055 [0.037] | 0.23 |
| Training in the last year | - | - | - | 0.031 [0.036] | 0.078*** [0.027] | 1.11 | 0.027 [0.036] | 0.066** [0.027] | 0.76 | 0.083* [0.047] | 0.075*** [0.028] | 0.02 |
| Good relations with employer/supervisor | - | - | - | 0.639*** [0.046] | 0.553*** [0.035] | 2.22 | 0.620*** [0.046] | 0.549*** [0.034] | 1.56 | 0.463*** [0.057] | 0.521*** [0.036] | 0.76 |

Table 6 continued in next page

Table 6 continued from last page

| | (1) | | | (2) | | | (3) | | | (4) | | |
|--|-----------|-----------|---------------|-----------|-----------|---------------|-----------|-----------|---------------|-----------|-----------|-------------------|
| | UW | NUW | Wald χ^2 | UW | NUW | Wald χ^2 | UW | NUW | Wald χ^2 | UW | NUW | Wald χ^2 |
| Working Conditions [3] | - | - | | + | + | | + | + | | + | + | |
| Sector [4] | - | - | | + | + | | + | + | | + | + | |
| Firm Size [4] | - | - | | + | + | | + | + | | + | + | |
| Occupation [10] | - | - | | + | + | | + | + | | + | + | |
| Industry [17] | - | - | | + | + | | + | + | | + | + | |
| Country [7] [‡] | + | + | | + | + | | + | + | | + | + | ([‡] 5) |
| Constant | + | + | | + | + | | + | + | | + | + | |
| $\ln\sigma$ | -0.344*** | -0.336*** | | -0.335*** | -0.363*** | | -0.342*** | -0.385*** | | -0.560*** | -0.377*** | |
| | [0.038] | [0.039] | | [0.037] | [0.020] | | [0.037] | [0.021] | | [0.026] | [0.018] | |
| ρ | -0.128 | 0.185 | | -0.691*** | 0.608*** | | -0.685*** | 0.513*** | | 0.015 | 0.652*** | |
| | [0.210] | [0.436] | | [0.144] | [0.100] | | [0.143] | [0.124] | | [0.126] | [0.095] | |
| Symmetry – Joint coefficients: | | | | | | | | | | | | |
| $\chi^2_{(1)}$ test: $\alpha^{PEERS} + \beta^{PEERS}=0$ | 7.01*** | 0.02 | | 4.00** | 0.01 | | 3.31* | 0.05 | | 5.00** | 0.01 | |
| (p-value) | (0.008) | (0.886) | | (0.045) | (0.956) | | (0.069) | (0.818) | | (0.025) | (0.946) | |
| $\chi^2_{(1)}$ test: $\alpha^{PAST} + \beta^{PAST}=0$ | - | - | | - | - | | 0.01 | 0.91 | | 0.32 | 2.04 | |
| (p-value) | | | | | | | (0.940) | (0.339) | | (0.570) | (0.153) | |
| Sub-sample disaggregation: | | | | | | | | | | | | |
| LR χ^2 test for independence ($\rho=0$) | 20.55*** | (0.000) | | 15.95*** | (0.000) | | 5.32** | (0.021) | | 19.10*** | (0.000) | |
| Wald $\chi^2_{(2)}$ for joint sig. of restrictions (1 st stage) | 385.73*** | (0.000) | | 175.30*** | (0.000) | | 174.90*** | (0.000) | | 175.38*** | (0.000) | |
| Wald $F_{(2)}$ for joint sig. of excluded (2 nd stage) | 1.96 | 1.19 | | 0.56 | 1.57 | | 0.59 | 1.54 | | 0.26 | 2.09 | |
| | (0.141) | (0.303) | | (0.572) | (0.207) | | (0.556) | (0.214) | | (0.770) | (0.124) | |
| LM ₍₂₎ test for omitted variables (2 nd stage) | 3.99 | 2.50 | | 1.47 | 3.42 | | 1.54 | 3.38 | | 0.77 | 4.56 | |
| | (0.136) | (0.287) | | (0.481) | (0.181) | | (0.463) | (0.184) | | (0.682) | (0.103) | |
| No. of Observations | | 4,911 | | | 4,908 | | | 4,908 | | | 3,670 | |
| Log-Likelihood | | -7,382.7 | | | -6,909.6 | | | -6,872.6 | | | -4,953.1 | |
| Wald χ^2 | | 104.02*** | | | 413.24*** | | | 440.25*** | | | 267.52*** | |

Notes:

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Endogenous switching COLS regressions: coefficients and robust standard errors in brackets.

The first stage regressions are presented in columns (1)-(4) of Table A1 in the Appendix.

$\ln\sigma$ is the log square-root of the variance of the residual of the regression part of the model. ρ is the transformation of the correlation between the errors from the two equations.

The critical values for the Wald test of a two-sided hypothesis from the χ^2 -distribution with one degree of freedom are: 1%: 6.635; 5%: 3.841; 10%: 2.706.

[‡] Model 4 excludes the Northern European countries with the highest rates of unionisation, i.e. Denmark and Finland.

Table 7
Quitting Intentions and Relative Comparison

| | Logit | Endogenous Switching LPM | | |
|--|----------------------|--------------------------|----------------------|---------------|
| | Pooled Sample | UW | NUW | Wald χ^2 |
| Earning more than workers who have a similar type of work | 0.005 [0.021] | 0.004 [0.029] | 0.010 [0.023] | 0.03 |
| Earning less than workers who have a similar type of work | 0.052*** [0.018] | 0.022 [0.027] | 0.051*** [0.019] | 0.76 |
| Earning more than last year | -0.040** [0.017] | 0.011 [0.026] | -0.057*** [0.019] | 4.53** |
| Earning less than last year | -0.019 [0.024] | 0.019 [0.037] | -0.025 [0.027] | 0.92 |
| Log(Monthly Wage) | 0.024 [0.017] | 0.022 [0.027] | 0.026 [0.018] | 0.02 |
| Log(Weekly Hours) | -0.084*** [0.032] | 0.013 [0.054] | -0.102*** [0.032] | 3.40* |
| Log(Paid Overtime Hours) | 0.019* [0.010] | 0.014 [0.015] | 0.021* [0.012] | 0.12 |
| Trade Union | -0.061*** [0.019] | - | - | - |
| Low education | 0.030 [0.031] | 0.004 [0.035] | 0.014 [0.039] | 0.04 |
| Male | 0.043*** [0.016] | 0.021 [0.024] | 0.060*** [0.019] | 1.69 |
| Married | -0.034** [0.017] | 0.005 [0.024] | -0.047** [0.019] | 2.81* |
| Log(Children aged<16) | 0.055*** [0.016] | 0.095*** [0.023] | 0.019 [0.018] | 6.70*** |
| Log(Age) | -0.363*** [0.033] | -0.313*** [0.058] | -0.296*** [0.038] | 0.06 |
| Log(Tenure) | -0.057*** [0.009] | -0.067*** [0.015] | -0.027** [0.011] | 4.42** |
| Permanent Job | 0.170*** [0.018] | 0.217*** [0.032] | 0.135*** [0.023] | 4.40** |
| Training in the last year | 0.008 [0.016] | 0.02 [0.023] | 0.01 [0.018] | 0.12 |
| Good relations with employer/supervisor | -0.052** [0.021] | -0.085*** [0.030] | -0.028 [0.023] | 2.30 |
| $\ln\sigma$ | - | -0.856*** [0.018] | -0.793*** [0.015] | |
| ρ | - | 0.075 [0.189] | 0.252*** [0.095] | |
| $\chi^2_{(1)}$ test: $\alpha^{PEERS} + \beta^{PEERS}=0$ (p-value) | 3.48* (0.062) | 0.36 (0.551) | 3.20* (0.074) | |
| $\chi^2_{(1)}$ test: $\alpha^{PAST} + \beta^{PAST}=0$ (p-value) | 3.25* (0.071) | 0.38 (0.539) | 5.22** (0.022) | |
| No. of Observations | 4,915 | 4,915 | | |
| R ² | 0.128 | - | | |
| Log-Likelihood | -2,817.8 | -4,942.1 | | |
| Wald χ^2 | 666.13*** | 399.69*** | | |
| LR $\chi^2_{(1)}$ test of independent equations | - | 5.45** | | |

Notes: * p<0.10, ** p<0.05, *** p<0.01.

Marginal effects and robust standard errors are reported in brackets for the Logit model. Coefficients and robust standard errors are reported for the Linear Probability Model. The rest of the specification in Column 4 of Table 5 and its comments apply.

Table 8
Incentives and the Level of Effort

| | A) Endogenous Switching | | | | B) Rank Ordered | | | | C) Random Effects | | | |
|--|-------------------------|------------|-----------|------------|-----------------|------------|----------|------------|-------------------|------------|-----------------|------|
| | COLS | | | | Logit | | | | Ordered Probit | | | |
| | UW | Rank | NUW | Rank | UW | Rank | NUW | Rank | UW | Rank | NUW | Rank |
| Own discretion | 1.202*** | [1] | 1.113*** | [1] | 1.659*** | [1] | 1.558*** | [1] | 2.028*** | [1] | 1.940*** | [1] |
| | [0.025] | | [0.018] | | [0.041] | | [0.029] | | [0.042] | | [0.030] | |
| Colleagues' observation and opinion | 1.153*** | [2] | 0.932*** | [4] | 1.576*** | [2] | 1.273*** | [4] | 1.924*** | [2] | 1.621*** | [4] |
| | [0.025] | | [0.018] | | [0.040] | | [0.029] | | [0.042] | | [0.030] | |
| Clients or customers | 0.980*** | [3] | 0.976*** | [2] | 1.213*** | [3] | 1.323*** | [2] | 1.624*** | [3] | 1.676*** | [2] |
| | [0.025] | | [0.018] | | [0.040] | | [0.029] | | [0.041] | | [0.030] | |
| A supervisor or boss | 0.868*** | [4] | 0.752*** | [5] | 1.163*** | [4] | 1.071*** | [5] | 1.446*** | [4] | 1.315*** | [5] |
| | [0.025] | | [0.018] | | [0.040] | | [0.029] | | [0.040] | | [0.029] | |
| Payment incentives | 0.731*** | [5] | 0.952*** | [3] | 0.957*** | [5] | 1.274*** | [3] | 1.233*** | [5] | 1.644*** | [3] |
| | [0.025] | | [0.018] | | [0.039] | | [0.029] | | [0.040] | | [0.030] | |
| Reports and appraisals | 0.459*** | [6] | 0.689*** | [6] | 0.633*** | [6] | 0.947*** | [6] | 0.814*** | [6] | 1.211*** | [6] |
| | [0.025] | | [0.018] | | [0.039] | | [0.029] | | [0.039] | | [0.029] | |
| Machine or Assembly Line | [Ref.] | | [Ref.] | | [Ref.] | | [Ref.] | | [Ref.] | | [Ref.] | |
| Log(Monthly Wage) | -0.025 | | 0.001 | | - | | - | | -0.036 | | -0.007 | |
| | [0.017] | | [0.011] | | | | | | [0.038] | | [0.026] | |
| Log(Weekly Hours) | 0.093*** | | 0.050*** | | - | | - | | 0.156** | | 0.093** | |
| | [0.034] | | [0.019] | | | | | | [0.075] | | [0.045] | |
| Male | -0.040*** | | -0.035*** | | - | | - | | -0.064** | | -0.060** | |
| | [0.015] | | [0.011] | | | | | | [0.032] | | [0.026] | |
| Training in the last year | 0.032** | | 0.030*** | | - | | - | | 0.054* | | 0.053** | |
| | [0.014] | | [0.011] | | | | | | [0.032] | | [0.025] | |
| Good relations with employer/supervisor | 0.034* | | 0.033** | | - | | - | | 0.06 | | 0.059* | |
| | [0.018] | | [0.014] | | | | | | [0.041] | | [0.032] | |
| Other Individual Charact. [7] | + | | + | | - | | - | | + | | + | |
| Working Conditions [3] | + | | + | | - | | - | | + | | + | |
| Sector [4] | + | | + | | - | | - | | + | | + | |
| Firm Size [4] | + | | + | | - | | - | | + | | + | |
| Occupation [10] | + | | + | | - | | - | | + | | + | |
| Industry [17] | + | | + | | - | | - | | + | | + | |
| Country [7] | + | | + | | - | | - | | + | | + | |
| Constant | + | | + | | - | | - | | + | | + | |
| $\ln\sigma$ | -0.330*** | | -0.350*** | | - | | - | | - | | - | |
| | [0.007] | | [0.005] | | | | | | | | | |
| ρ | -0.027 | | 0.001 | | - | | - | | - | | - | |
| | [0.051] | | [0.047] | | | | | | | | | |
| Cutoff point 1 | - | | - | | - | | - | | -0.224 [0.612] | | 0.600**[0.277] | |
| Cutoff point 2 | - | | - | | - | | - | | 0.123 [0.612] | | 1.005***[0.277] | |
| Cutoff point 3 | - | | - | | - | | - | | 0.715 [0.612] | | 1.636***[0.278] | |
| Cutoff point 4 | - | | - | | - | | - | | 1.460**[0.612] | | 2.443***[0.278] | |
| rho | - | | - | | - | | - | | 0.161***[0.010] | | 0.187***[0.008] | |
| No. of Observations | | 34,405 | | 12,978 | | 25,263 | | 11,942 | | 22,463 | | |
| Pseudo R2 | | - | | 0.200 | | 0.170 | | - | | - | | |
| Log-Likelihood | | -51,126.1 | | -7,416.5 | | -14,759.7 | | -16,248.9 | | -31,093.3 | | |
| F-Statistic | | - | | - | | - | | - | | - | | |
| χ^2 | | 3,778.7*** | | 3,700.9*** | | 6,028.9*** | | 3,581.1*** | | 5,794.8*** | | |

Notes:

* p<0.10, ** p<0.05, *** p<0.01

Other individual characteristics included as control variables are: Married, Log(Children aged<16), Log(Age), Log(Tenure), Log(Paid Overtime Hours), Low education, Permanent Job.

The first stage regression for the models in Panel (A) is given in Column 5 of Table A1 in the Appendix.

Appendix Table A1
Trade Union Membership

| | (1) | (2) | (3) | (4) | (5) |
|--|---------------------|---------------------|---------------------|---------------------|----------------------|
| Earning more than similar workers | -0.024 [0.021] | -0.008 [0.022] | -0.005 [0.022] | 0.024 [0.018] | - |
| Earning less than similar workers | -0.032* [0.018] | -0.032* [0.018] | -0.035* [0.018] | -0.012 [0.014] | - |
| Earning more than last year | - | - | -0.042** [0.018] | -0.026* [0.014] | - |
| Earning less than last year | - | - | 0.016 [0.026] | 0.022 [0.020] | - |
| Log(Monthly Wage) | 0.027 [0.017] | 0.015 [0.018] | 0.017 [0.018] | 0.012 [0.013] | 0.018*** [0.007] |
| Log(Weekly Hours) | 0.059* [0.033] | 0.059* [0.034] | 0.062* [0.034] | 0.032 [0.028] | 0.054*** [0.013] |
| Log(Paid Overtime Hours) | - | 0.016 [0.011] | 0.016 [0.011] | 0.013 [0.008] | 0.015*** [0.004] |
| Male | 0.060*** [0.016] | 0.035** [0.017] | 0.036** [0.017] | 0.035** [0.015] | 0.034*** [0.007] |
| Married | 0.017 [0.017] | -0.004 [0.018] | -0.004 [0.018] | -0.011 [0.015] | -0.004 [0.007] |
| Log(Children aged<16) | - | 0.038** [0.017] | 0.037** [0.017] | 0.015 [0.013] | 0.038*** [0.006] |
| Low education | -0.040 [0.031] | -0.016 [0.032] | -0.017 [0.032] | -0.010 [0.028] | -0.017 [0.012] |
| Log(Age) | 0.308*** [0.032] | 0.219*** [0.038] | 0.204*** [0.038] | 0.108*** [0.030] | 0.221* [0.014] |
| Log(Tenure) | - | 0.060*** [0.010] | 0.058*** [0.010] | 0.048*** [0.008] | 0.060*** [0.004] |
| Permanent Job | - | -0.007 [0.025] | -0.006 [0.025] | -0.012 [0.021] | -0.005 [0.010] |
| Training in the last year | - | 0.025 [0.017] | 0.027 [0.017] | 0.027* [0.014] | 0.026*** [0.006] |
| Good relations with employer/supervisor | - | -0.047** [0.023] | -0.043* [0.023] | -0.028 [0.018] | -0.043*** [0.009] |
| Union Recognition | 0.277*** [0.017] | 0.226*** [0.019] | 0.227*** [0.019] | 0.200*** [0.017] | 0.229*** [0.007] |
| Union Concentration | 0.229*** [0.024] | 0.188*** [0.038] | 0.187*** [0.038] | 0.128*** [0.031] | 0.189*** [0.014] |
| Clients or customers | - | - | - | - | -0.0002 [0.011] |
| A supervisor or boss | - | - | - | - | -0.0002 [0.011] |
| Colleagues' observation and opinion | - | - | - | - | -0.0003 [0.011] |
| Own discretion | - | - | - | - | -0.0003 [0.011] |
| Payment incentives | - | - | - | - | 0.0001 [0.011] |
| Reports and appraisals | - | - | - | - | 0.0002 [0.011] |
| Machine or Assembly Line | - | - | - | - | (Ref.) |
| Working Conditions [3] | - | + | + | + | + |
| Sector [4] | - | + | + | + | + |
| Firm Size [4] | - | + | + | + | + |
| Occupation [10] | - | + | + | + | + |
| Industry [17] | - | + | + | + | + |
| Country [7] | + | + | + | + | + |
| Constant | + | + | + | + | + |

Appendix Table A1 continued in next page

Appendix Table A1 continued from last page

| | | | | | |
|--------------------------------------|-------------|-------------|-------------|-----------|-------------|
| Observed Probability | 0.3475 | 0.3471 | 0.3471 | 0.2084 | 0.3471 |
| Predicted Probability | 0.3460 | 0.3455 | 0.3455 | 0.2088 | 0.3454 |
| Average Derivative Adjustment Factor | 0.2263 | 0.2261 | 0.2261 | 0.1652 | 0.2261 |
| No. of Observations | 4,918 | 4,915 | 4,915 | 3,676 | 34,405 |
| Pseudo R ² | 0.337 | 0.365 | 0.366 | 0.244 | 0.365 |
| Log-Likelihood | -2,104.7 | -2,014.8 | -2,011.6 | -1,421.9 | -14,114.7 |
| LR χ^2 | 1,351.85*** | 1,446.35*** | 1,455.72*** | 716.92*** | 10,124.3*** |

Notes: * p<0.10, ** p<0.05, *** p<0.01

Probit model: Marginal effects and robust standard errors presented in brackets.