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Union decline in Britain: Is chauvinism also to blame?

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Union Decline in Britain: Is Chauvinism Also to Blame?

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Union Decline in Britain: Is Chauvinism Also to Blame?

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Discussion Paper No. 6536
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ABSTRACT

Union Decline in Britain: Is Chauvinism Also to Blame?*

The paper examines if workplace gender diversity offers some explanation for the decline of unions in Britain. Using the WERS2004 linked employer-employee data and alternative econometric estimators it reports an inverse relationship between workplace union density and gender diversity. Gender and ownership status based sub-group analyses suggest the inverse relationship to be stronger for male union members and those in the private sector. Gender group size based analysis reveals a positive link between workplace union density and gender diversity in workplaces with a female majority. The findings in this paper may mean that unions (and their main constituents, men) may need to embrace the changing workplace demography genuinely to improve their fate.

JEL Classification: J51, J16, J82

Keywords: trade union decline, gender diversity, linked employer-employee data, Britain

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1. Introduction

There has been a rapid decline in unionization in Britain since the late 1970s; and unions' failure to organise workers in new establishments is thought to be the key factor underpinning the decline (Machin 2000, 2003; Disney *et al.* 1995, 1996; Disney 1990). Although there is some evidence suggesting a post-1997 levelling off in the decline of union membership (Blanden *et al.* 2006), the overwhelming trend is nevertheless one of a decline (Donado and Walde, 2012). Aside from unions' failure to be recognised in new establishments, legislative changes, increased competitive pressures, unions becoming outdated in the modern labour market and changes in the composition of the workforce have been identified as factors contributing to union decline (Bryson 2008, Blanden *et al.* 2006, Machin 2000, Disney *et al.* 1995, Freeman and Pelletier 1990).

Notwithstanding the classical view of distortionary influences of unions, some important roles have been attributed to them in the employment relationship. These include organising workers and providing a collective voice (Freeman and Medoff 1984), allocating risk between firms and workers (Malcomson 1983) and inducing training and providing insurance (Acemoglu *et al.* 2001). It is not entirely clear in the existing literature why unions fail to play such roles in new establishments; and this calls for further research. Unions are institutions whose strength depends on the degree of coalition-building within. This paper argues that workgroup demographic composition may pose some challenges to unions' coalition-building, thereby contributing to their decline.

One aspect of workgroup demographic composition that is shown to affect group and individual labour market outcomes is gender, which Akerlof and Kranton (2000) refer to as "a universally familiar aspect of identity" (p. 716). There is established theoretical and empirical evidence on the influence of workgroup gender composition on workgroup dynamics. Worker outcomes such as discrimination, job satisfaction, performance, trust and well-being have been linked to group identity and gender composition (see, for example, Akerlof and Kranton 2010, 2000; Alesina and La Ferrara 2002).

There is also evidence of widespread gender discrimination in Britain (see, for example, Booth, 2009, Arulampalam, *et al.* 2007, Berthoud and Blekesaune 2007, Riach and Rich 2006, for more recent evidence). Importantly, gender discrimination in the employment relationship is also shown to be a feature of the internal life of unions themselves, with trade union decision-making structures largely dominated by men (Kirton and Greene 2002, Healy and Kirton 2000, Dickens 1997).

In Britain, the period that is widely reported to exhibit the decline of unions has more or less coincided with the considerable increase in the labour market participation of women, which has increased from 37.1 % of the labour force in 1971 to 45.8% in 2005 (ONS 2006). Given this, perceptions of institutionalised sexism and gender discrimination within the union decision-making structure are hardly the recipe for coalition-building. A research question of interest is therefore whether the recent change in workplace gender composition has played some part in the decline of unions in Britain.

This paper aims to address this question by empirically investigating a possible link between workplace union density (WUD hereinafter) and workplace gender diversity (WGD hereinafter). The paper uses data from the 2004 British Workplace Employment Relations Survey (WERS2004), the most authoritative sources of information on employment relations in Britain. The data are nationally representative linked employer-employee data with large number of demographically varied workplaces located across Britain. Employer provided data on WUD and workplace gender composition permit investigation of possible links between the two. The WERS2004 data also have extensive information on employees and workplaces, including workplace location related information, that allow controlling for a wider range of influences than has been achieved in the limited existing literature.

The rest of the paper is organised as follows. Section 2, makes a brief review of existing relevant literature. In section 3, a description of the data and variables used in the empirical analyses will be provided. Section 4 sets out the framework for the empirical analysis undertaken. Section 5 discusses the empirical results obtained before the final section concludes the paper.

2. Related literature

It is well established that the British labour market has undergone substantial de-unionisation since the late 1970s.[1] Some 53 per cent of workers in Britain were union members in 1979. Two decades later, this has declined to 28 per cent (Disney 1990; Disney *et al.* 1994, 1995; Machin 2000, 2003). The key factor underscoring union decline in Britain has been unions' failure to organise workers in new establishments, which is established on the basis of rates of union recognition and derecognition (Blanden *et al.* 2006; Machin 2004, 2003; Disney *et al.* 1994, 1995).

Broadly, rates of union recognition have been substantially lower in relatively newer establishments while unions have rarely been derecognised in existing workplaces (Blanden *et al.* 2006; Gall 2004, 2002; Machin 2003, 2000). There was a relative increase in union recognition rates and a slight fall in derecognition starting from the mid- to late-1990s. These changes have largely been attributed to the statutory provisions contained in the 1999 Employment Relations Act for gaining recognition and the changing political climate with the then incoming Labour government (Blanden *et al.* 2006, Gall 2004). These changes appeared to have levelled off the decline in union membership. Nonetheless, the general pattern of decline in union density is thought to have an inverted-U shape (Donado and Walde, 2012).

Compositional change in British industry in general and the decline of the manufacturing sector in particular have also been crucial in this respect. Manufacturing had been the bedrock of unions in Britain. Its decline, particularly in the 1980s and 1990s, saw concurrent erosion in the size and strength of unions. This has particularly been the case in private sector manufacturing, which experienced the greatest fall in unions, with rate of union recognition subsiding considerably in establishments set up after 1980. The 1980s and early- to mid-1990s had also witnessed legislative changes, including a range of anti-union legislative measures and the outlawing of compulsory union membership (Bryson 2008, Blanden *et al.* 2006, Machin 2000, Disney *et al.* 1995, Freeman and Pelletier 1990).

Aside from the waning importance of manufacturing and legislative changes, other factors linked to the decline of unions include increased (international) competition, decentralised and workplace-based unionism, managerial influence aimed at weakening union influence, macroeconomic factors such as levels of real wage and unemployment, union's own organising behaviour and the change in the composition of employment (Terry 2003; Machin 2000; Borland and Ouliaris 1994; Stewart 1990, 1995; Disney 1990).

The change in the composition of employment alluded to in the union decline literature essentially relates to the waning importance of the manufacturing sector in Britain. The thrust of this argument is that the decline in manufacturing coincided with a rapid growth in the services sector, a sector generally linked to lower rate of unionisation. This change in employment composition is thus inter-industry in nature. As such, neither this nor any of the other reasons in the literature on union decline deals directly with intra-workplace workgroup dynamics. This paper aims to analyse intra-workplace compositional change in employment along gender lines. It is worth noting, however, that some level of similarity between inter-industry and intra-workplace compositional changes in employment. Greene and Kirton (2006) and Howell (1996) note that the rapid growth in the services sector and the parallel increase in 'atyipical' employment are associated with higher female employment, which is also consistent with the

[1] There is extensive literature on trade unions. The review here focuses on one aspect of this literature in particular – union decline.

evidence of recent increase in the labour market participation of women in Britain. The question of importance to this paper is then whether such intra-workplace change in the share of women employees may have contributed to union decline.

There is established theoretical and empirical literature on the influence of workgroup identity, in general, and gender composition, in particular, on workgroup dynamics and outcomes. Worker outcomes such as discrimination, job satisfaction, performance and trust are linked to group identity and gender composition (see, for example, Akerlof and Kranton 2010, 2000; Alesina and La Ferrara 2002; Blalock 1967). In Britain, there are two important labour market characteristics that justify investigating the possible link between union decline and workgroup gender composition. First, the period that is widely reported to exhibit the decline of unions has more or less coincided with the considerable increase in the labour market participation of women, which has increased from 37.1% of the labour force in 1971 to 45.8% in 2005 (ONS 2006). Secondly, there is evidence of widespread gender discrimination in workplaces in Britain (see, for example, Booth, 2009, Arulampalam, *et al.* 2007, Berthoud and Blekesaune 2007, Riach and Rich 2006). Crucially, gender discrimination in the employment relationship is also a well-entrenched feature of the internal life of trade unions, with trade union decision-making structures largely dominated by men (Kirton and Greene 2002, Healy and Kirton 2000, Dickens 1997). Healy and Kirton (2000) note that even though positive action strategies have been adopted by many unions for nearly two decades, the objective of enhancing women's involvement in trade union leadership has hardly been achieved. These factors and perceptions of "institutionalised sexism" (Kirton and Greene 2002, p. 157) hardly serve the purpose of coalition-building, which is what unions need to do to succeed.

There is a dearth of evidence pertaining to possible links between union decline and WGD. This is a major gap in the literature, particularly considering the substantial increase in the labour market participation of women in recent decades and the implication this may have on workgroup dynamics. There is no study on Britain that investigates possible links between union decline and WGD. In the US there are a number of mostly management studies that investigate the link between workgroup demographic composition and union commitment. In a meta-analysis, Bamberger *et al.* (1999) review some 100 periodical articles and book chapters that dwell on the issue of union commitment. They suggest inconsistencies in reported empirical findings, due mainly to the way union commitment is measured.[2] More recently, Bacharach and Bamberger (2004) use a random sample of 1475 workers in NY State to explore the potential spillover effects of demographic dissimilarity on union commitment and instrumentality. Their findings suggest that gender dissimilarity has a significant negative effect on union attachment. As is often the case in such studies, however, the study is based on a relatively small sample size. It also hardly controls for a range of potential confounding influences. Most importantly, the authors acknowledge the limitation of their use of individual-level data, as opposed to the more suitable organisation-level data as used in this paper.

The brief review in the preceding paragraphs indicates that: (*a*) there is no evidence pertaining to the link between WUD and WGD in the UK, (*b*) the literature in the US: (*i*) does not appear to offer consistent findings due to shortcomings stated in Bamberger *et al.* (1999), (*ii*) some of the studies appear to be based on data less well suited than WRES2004, and (*iii*) deals with union commitment, a more subtle yet difficult notion to measure accurately vis-à-vis the WUD measure used in this paper. This paper aims to fill gaps in the existing literature and has several strengths. *First*, it uses the WERS2004 data, which, as detailed in the next section, is well suited to address the research question. *Second*, the linked data also have extensive information

[2] Other reasons cited include: weak or nil influences of certain hypothesised union commitment correlates, sampling error and measurement error. Union commitment is defined as the extent to which an individual has a desire: (*i*) to retain membership, (*ii*) exert effort for, and (*iii*) identify with the objectives of their union. The widely accepted approach is to derive a union commitment scale that empirically yields four dimensions: union loyalty, belief in unionism, willingness to work for the union, and responsibility to the union (Bamberger *et al.* 1999)

on employees, workplaces as well as workplace location specific information, which are all a rarity judging by the data used in the limited existing literature. This enables controlling for observable influences much more comprehensively than has been done to date. *Third*, the WUD and gender composition information, which forms the basis of this study, are provided by employers. As such they are less prone to errors than estimates provided by employees, as some of the studies in the literature have used. Equally, that the paper uses employer provided WUD (and workgroup gender composition) data directly, as opposed to constructing a union commitment measure, avoids measurement errors noted in the literature. *Finally*, the paper employs alternative econometric estimators and sub-group analyses to check for the robustness of the WUD-WGD link, something the exiting literature does not do.

3. Data and variables

3.1 Overview of the Data

The data used in this paper come from the 2004 British Workplace Employment Relations Survey (WERS2004), the most authoritative source of information on employment relations in Great Britain. It offers linked employer-employee data representative of all workplaces with five or more employees in Britain. The sample of workplaces was randomly drawn from the Inter Departmental Business Register (IDBR), disaggregated by type of industry and workplace size. Employees were then selected randomly from these workplaces (Kersley *et al.* 2006). That the data come from a large number of demographically varied workplaces makes possible addressing the research question at hand decisively.

The survey covers a whole host of issues relating to both employers and employees, allowing control on a battery of individual- and workplace-level influences. Moreover, the data have geographic information, including local area unemployment and vacancy rates, which have been used in the empirical analysis carried out in this paper. The final sample used in the empirical analysis comprises of 19475 employees in 1547 workplaces. This is from the initial matched sample of 22451 employees in 1733 workplaces. The reduction in sample size is the result of missing values in either the outcome or control variables used in the empirical analysis. On union membership, 36.6% of employees in the initial matched sample reported to be union members while membership in the final sample stands at 36.1%.

Table A5 in the Appendix reports descriptive statistics based on the final sample. Accordingly, some 34% of employees (or 6598 employees) in the final sample come from workplaces that do not have unions. Nearly all of these (6503 employees or some 98.6%) are from the private sector with the balance (95 employees or some 1.4%) representing public sector employment. Women constitute some 51% of employees from workplaces without unions. In contrast, some 66% (12877) of employees come from workplaces with unions, with women and private sector employees constituting 54% and 54.4%, respectively, of these. The public-private sector split reveals that some 31% (5969) of employees in the final sample come from the public sector, with the balance (13506) representing employees from the private sector. Women make up some 67% and 47% of the public and private sector employees respectively.

3.2 Definition of variables

3.2.1. Outcome variable[3]

The main outcome variable of interest to this study is WUD, which is provided by employers. Figure 1 below depicts a plot of WUD, disaggregated by public and private sector workplaces. Some 52% of private establishments and less than 2% of public ones do not have unions. It also shows that, where there are unions, most public workplaces have a density of 50 per cent or more while the corresponding figure for private workplaces is mostly below 50 per cent.

[3] A separate analysis involving union recognition as an outcome variable has been undertaken although no statistically significant relationship has been found with WGD.

Figure 1: WUD, by ownership of workplaces

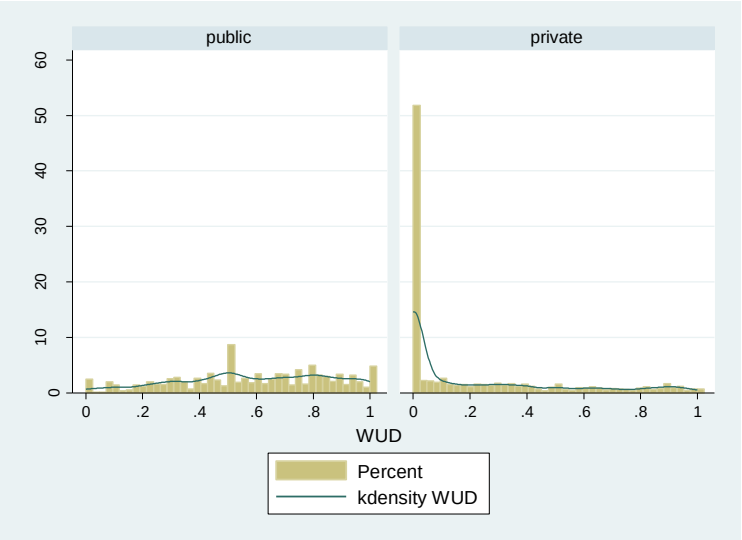
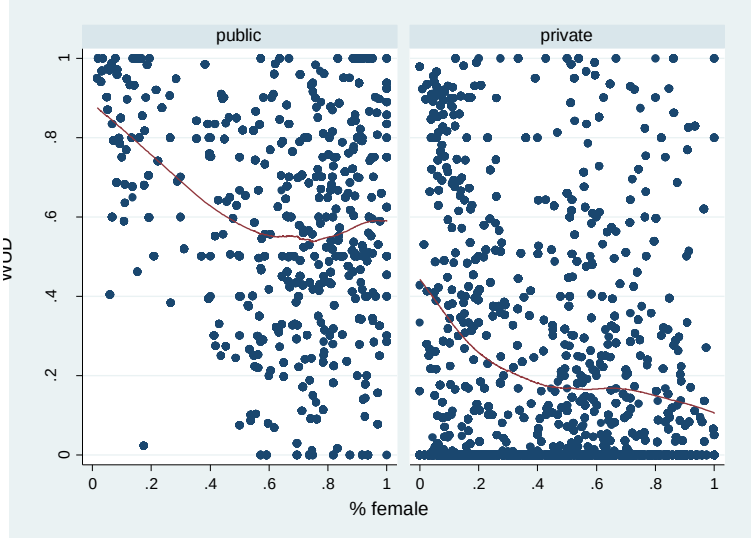


Figure 2 depicts a bivariate smoother of WUD and the % of female employees by ownership status. It shows that WUD declines markedly with the share of female employees at workplaces in a nonlinear fashion.[4]

Figure 2: Lowess smoother of WUD & % female, by ownership



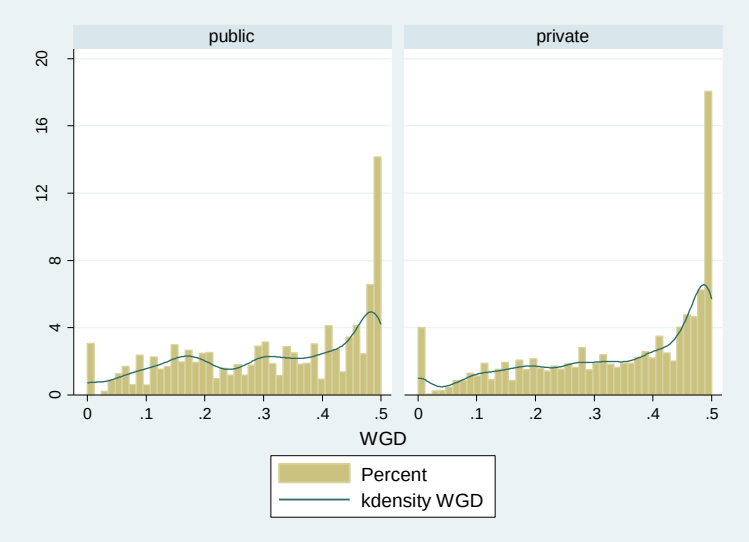
3.2.2. WGD and other control variables

The WGD variable is defined as one minus the Herfindahl Index, $\text{WGD} = 1 - \sum_i S_k^2$, where S represents the shares of female and male employees at a workplace, with i=1, 2.[5] It is computed using information on the proportion of female and male employees at each workplace. Figure 3 depicts the resulting WGD patterns by public and private workplaces. It

[4] Lowess smoother provides locally-weighted-regression based smooth curve of a scatter diagram between two variables *without* making assumptions regarding the shape and/or strength of the relationship between the variables.
[5] The index is also known as Blau's Index and assumes a theoretical value ranging from a minimum of 0, signifying perfect homogeneity, to a maximum of 0.5, signifying perfect heterogeneity.

suggests that most workplaces have balanced or near balanced gender mix. It also shows that 4% of private and some 3% of public employees work in a homogeneous gender group.

Figure 3: WGD, by ownership type of workplaces



Leonard and Levine (2006) point out shortcomings of using percentage (of female/male) measure since it increases linearly with the size of one group, although such an increase amounts to a reduction in the size of the other. The use in this paper of WGD will address this issue of nonlinearity.

Figure 4: Lowess smoother of WUD and WGD, by ownership

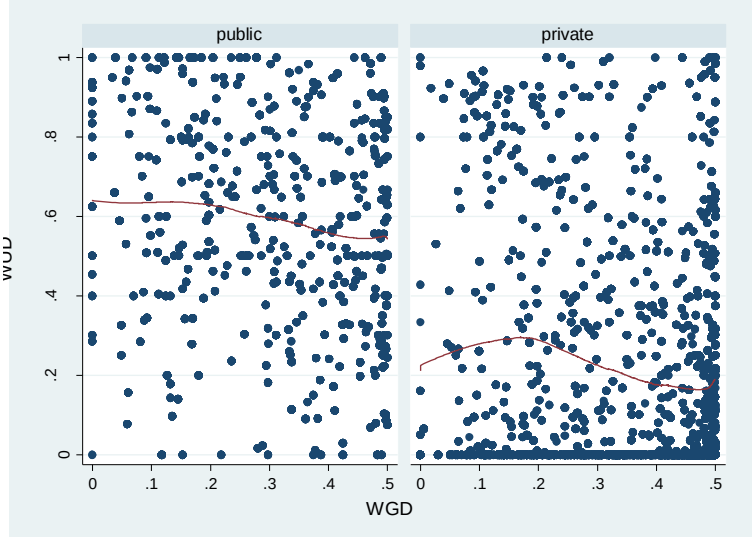


Figure 4 above shows a bivariate lowess smoother of WUD and WGD, by ownership status. As in Figure 2 before it, it shows WUD declining with WGD in a nonlinear fashion, though the relationship is less stark here.

A battery of other controls relating to employees, workplaces and geographic locations, which include travel-to-work area unemployment and vacancy rates, has also been controlled for

in the empirical analysis undertaken in this paper. Table A5 in the appendix reports descriptive statistics on all control variables, separately by workplace union and ownership statuses.

4. A framework of analysis

4.1 Theoretical Background and testable hypotheses

There is an established body of theoretical and empirical work in the social sciences on identity, including group gender composition, and its effects.[6] Akerlof and Kranton (2000) note that "because of its explanatory power, numerous scholars in psychology, sociology, political sciences, anthropology, and history have adopted identity as a central concept" (p. 716). The theoretical basis for identity centred discussions in economics has mostly rested on theories of discrimination until recently, where discrimination is thought to be due to either preference (Becker 1957; Arrow 1972, 1973; Phelps 1972) or information (Aigner and Cain 1977).[7]

However, recent work by Akerlof and Kranton (2000, 2010) has formally introduced identity into economic analysis by incorporating it into individual utility functions. They formalised the earlier "taste" based discrimination explanations by including *identity* into a model of behaviour and showing how identity influences economic outcomes.[8] Gender discrimination in the labour market is one of the issues they specifically dwell on. Their formulation is based on *social identity theory* that posits that an individual's social identity depends on all of the identifications, including gender, the person uses in construing her/his views of the self. They show how identity can be related to occupation arguing "occupations are associated with the social categories 'man' and 'woman,' and individual payoffs from different types of work reflect these gender associations" (p. 732).

Alesina and La Ferrara (2000, 2005), also formalising the *social identity theory*, predict that individual utility from joining a group depends positively on the share of group members of one's own type and negatively on the share of different types. The *group competition theory*, that was chiefly due to Blalock (1967), also give good insights into the implications of such identity formation, particularly if the size of the socially 'subordinate' group were to increase.[9] This, according to Blalock, threatens the resource and power advantages of the 'dominant' group. In return, such threats may prod the 'dominant' group to increase hostility and discrimination against members of the 'subordinate' group.

In the context of unions, actions of the 'dominant' group and perceptions of institutional sexism and discrimination against its 'subordinate' counterpart are unlikely to serve the purpose of consensus- and coalition-building. In fact, this may be the source of friction between the two groups, particularly if the size of the 'subordinate' group is growing. If members of the 'subordinate' group, encouraged by recent equality provisions, were to pose mounting challenge to the authority of the 'dominant' group, it may not be unrealistic to imagine this prodding some members of the 'dominant' group to withdraw their (union) membership. Compulsory union membership was outlawed in Britain in the early 1990s. Given this, some members, who may find it difficult to embrace the changes, may develop a sort of 'why pay membership fee and put up with this nonsense' type attitude and leave their unions.

The size of the 'subordinate' group may also be important in that a growing 'subordinate' group may become more standoffish, thereby further contributing to the decline of

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[6] A good summary of some of these can be found in Akerlof and Kranton (2000), Tolbert et al. (1999) and Tajfel and Turner (1986).

[7] Other theories of relevance to economists include language (difference) based discrimination (Lang 1986) and Lazear (1999)'s communication costs explanation of (racial) diversity.

[8] Akerlof and Kranton (2000) present examples of identity-related behaviours that indicate "that (1) people have identity-based payoffs derived from their own actions, (2) people have identity-based payoffs derived from others' actions, (3) third parties can generate persistent changes in these payoffs, and (4) some people may choose their identity, but choice may be proscribed for others" (p. 717).

[9] Blalock (1967) defines resources as "the actual sources of power or those properties of the individual or group that provide the power potential or ability to exercise power" (p. 113).

unions. The detrimental effect of the negative perceptions on the formation of new unions may not need much elaboration, for a sense of solidarity must be the prerequisite for such an undertaking.

On the basis of the brief theoretical background in the preceding paragraphs and the review of the literature in Section 2, the following testable hypotheses have been set forth, which the empirical analysis that follows will test:

Hypothesis 1: Given, on the one hand, the considerable increase in the labour market participation of women and, on the other hand, the perceptions of institutional sexism and discrimination within the union structure and frictions thereof; WUD and WGD are expected to be negatively related. This hypothesis is tested on the basis of the coefficient of the WGD correlate.

Hypothesis 2: Unions are male dominated traditionally. The (recent) increase in the share of women in the labour market (and in unions) and recent equality provisions might have increased the antagonism between women and men. This may nudge some members of the 'dominant' group (at least those with a chauvinistic view) to leave unions. If so, the negative link between WUD and WGD hypothesised above may be stronger for men.

Hypothesis 3: Alesina and La Ferrara's *social identity theory* based stipulation and predictions of Blalock's *group competition theory* mean that the increase in the size of the 'subordinate' group (women) in a setting where the workplace and union power structures are in the hands of the 'dominant' group (men), may increase the antagonism between the two groups further leading to a larger decline in membership. This hypothesis is tested on the basis of an interaction term between a female majority dummy and WGD.

Hypothesis 4: As noted in Section 3, the data suggest a public sector dominated by female employees. It may also be realistic to assume the public sector to have better provisions aimed at ensuring gender equality than its private counterpart. Given these, it is reasonable to expect stronger negative link between WUD and WGD in the private sector. To test this hypothesis ownership-based sub-group analysis is undertaken.

4.2 Empirical Methodologies

The estimation strategy adopted in this paper is guided by the patterns of WUD in the data, which is depicted in Figure 1 above. Accordingly, unions are present only in a sub-sample of workplaces in the estimation sample in general and the private sub-sample in particular. Workplaces with unions may differ in important unmeasured ways from workplaces without unions, for example in terms of employers' attitude towards unions. This suggests a possible selection problem that needs to be accounted for in the empirical analysis undertaken. To this effect a Heckman selectivity model (Heckman 1979) has been adopted as the main empirical strategy.

Consider the following selection and outcome equations of interest;

$$U_i^* = \mathbf{w}_i'\alpha + v_i \text{ with } U_i = 0 \text{ if } U_i^* \le 0 \ \& \ U_i = 1 \text{ if } U_i^* > 0$$

$$WUD_i^* = \mathbf{x}_i'\beta + \varepsilon_i \text{ with } WUD_i = WUD_i^* \text{ if } U_i = 1 \ \& \ WUD_i \text{ not observed if } U_i = 0 \quad (1)$$

where $i = 1, \ldots, N$ represent employees; the latent variables U_i^* and WUD_i^* represent union presence and its density, respectively, at employee i's workplace; $\mathbf{w}_i$ and $\mathbf{x}_i$ represent

matrices of employee and employer characteristics, and $(v_i, \varepsilon_i) \sim$ bivariate normal $(0, 0, 1, \sigma_\varepsilon^2, \rho)$. That OLS regression of WUD_i^* on $\mathbf{x}_i$ cannot yield consistent estimates of β can be shown as;

$$\text{E}[WUD_i \mid \mathbf{w}_i, \mathbf{x}_i, U_i = 1] = \mathbf{x}_i'\beta + \rho\sigma_\varepsilon \frac{\phi(\mathbf{w}_i'\alpha / \sigma_v)}{\Phi(\mathbf{w}_i'\alpha / \sigma_v)} \neq \mathbf{x}_i'\beta \tag{2}$$

where $\phi(\cdot)$ and $\Phi(\cdot)$ denote the density and the cumulative distribution functions of a standard normal distribution; and $\phi(\cdot)/\Phi(\cdot) = \lambda(\cdot)$ is the inverse of the Mills' ratio. The Heckman two-step procedure augments the OLS regression by an estimate of the omitted regressor based on a first-step probit regression of U_i on $\mathbf{w}_i$, since $\Pr(U_i^* > 0) = \Phi(\mathbf{w}_i'\alpha)$. Defining a new error term $\varepsilon_i^* \equiv WUD_i - \mathbf{x}_i'\beta - \rho\sigma_\varepsilon\lambda(\gamma_v)$ with $\gamma_v = \mathbf{w}_i'\alpha / \sigma_v$, the augmented model becomes;

$$WUD_i \equiv \mathbf{x}_i'\beta + \rho\sigma_\varepsilon\lambda(\gamma_v) + \varepsilon_i^* \tag{3}$$

OLS estimation of equation (3) renders consistent estimates. A test of whether the estimated inverse Mills' ratio term is statistically significant informs if sample selection is an issue. A robust identification requires that exclusion restrictions be imposed in the estimation of equation (3). This requires that at least one regressor in the sample selection equation be excluded from the outcome equation (i.e. $\mathbf{x}_i$ is a proper subset of $\mathbf{w}_i$), which is implemented in the empirical estimation conducted in this paper.[10]

The Heckman two-step approach is preferred on the ground that it addresses possible selectivity in workplace union status. However, that the WUD variable is a fractional response may raise some empirical issues. Papke and Wooldridge (1996, 2008) note that the bounded nature of such response variables and the possibility that some values may lie at the boundaries raise functional form and inference issues.[11] To address such concerns, an alternative model - Fractional Logit model - has also been implemented in this paper.[12] Following Papke and Wooldridge (1996), let $\{(\mathbf{x}_i, WUD_i); i = 1, \ldots, N\}$ denote the sequence of WUD observations with $0 \leq WUD_i \leq 1$ and N being the number of employees. It is then assumed that for all *i*, $\text{E}(WDU_i \mid \mathbf{x}_i) = G(\mathbf{x}_i\beta)$, where $G(\cdot)$ is a known function satisfying $0 < G(z) < 1$ for all $z \in \Re$. This ensures that predicted values of WUD_i lie in the interval (0, 1). In this paper, $G(\cdot)$ is approximated using the logistic function as $G(z) \equiv \Lambda(z) \equiv \exp(z)/[1 + \exp(z)]$.

5. Results and discussion

The bivariate lowess smoothers reported in Section 3 do reveal an inverse relationship between WUD on the one hand and WGD or % female on the other. However, they do not control for potential confounding factors, which the regression based analysis discussed in this section address. As stated earlier, alternative econometric approaches have been implemented in this paper to assess the robustness of the empirical results and to also address empirical issues

[10] Details on the Heckman two-step estimator are readily available in several econometrics texts including Cameron and Trivedi (2005).

[11] Specifically, predicted values of *y* from linear models may not lie in the interval (0, 1). "The drawbacks of linear models for fractional data are analogous to the drawbacks of the linear probability model for binary data." Papke & Wooldridge (1996), p. 620.

[12] In addition, *Tobit* and *Ordered Logit* models have also been estimated, which should offer a check for the robustness of the findings in the paper.

such as sample selection and the bounded nature of the outcome variable that one particular approach may not address fully.

Table 1 to Table 4 below report the empirical results corresponding to the four hypotheses set up in the preceding section.[13] In each case, the first column reports estimated coefficients from the Heckman two-step procedure, while the remaining columns report conditional marginal effects obtained from fractional logit, tobit and ordered logit models. As shown in each of the Tables, the ordered logit models were estimated by first re-coding the union density variable into an ordinal outcome variable of four categories.

For ease of interpretation of estimated coefficients and/or marginal effects, a 'gender diverse' dummy variable has been used in all regressions, instead of the gender diversity index discussed in Section 3. The dummy assumes a value of 1 if the gender diversity index assumes a value of at least 0.25, the median value of the gender diversity index, and 0 otherwise. In all cases, the Heckman two-step estimation was carried out with an exclusion restriction where the first-step selection equation has an 'exogeneous' variable that is excluded from the outcome equation. The 'exogeneous' variable used is the age of the workplace, which is shown in the literature (e.g Machin 2003) to be important in determining the presence of a workplace union. On the other hand, workplace age may not have much of a direct bearing on the level of union density. The linked nature of the WERS2004 data means that there is more than one employee per workplace in the estimation sample. To account for this, standard errors reported in the Tables are all adjusted for the relevant clusters/workplaces each specification represents.

Table 1 reports the main empirical results relating to the WUD-WGD link for the full sample. The findings from each of the specifications suggest that there is a strong and statistically significant inverse relationship between WUD and WGD, lending support to *Hypothesis 1*.

Table 1: WUD and WGD, full sample

	Heckman two-step	Fractional Logit	Tobit	Ordered Logit, with WUD (D) recoded as:			
				D<.25	.25≤D<.5	.5≤D<.75	D≥.75
		dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx
Gender diverse	-0.120***	-0.106***	-0.083***	0.166***	-0.042***	-0.069***	-0.055***
	(0.021)	(0.0192)	(0.0173)	(0.0339)	(0.0099)	(0.0146)	(0.012)
Employee- & workplace-level controls	yes	yes	yes	yes	yes	yes	yes
Lambda (Inverse Mills' Ratio)	-0.159***						
	(0.044)						
Constant	0.733***						
	(0.066)						
Log pseudo-likelihood		-7893.67					
Number of employees	19475/12877	19475	19475	19475			
Number of workplaces/clusters	1547/908	1547	1547	1547			
F(38, 19437)/Wald Chi2(38)			33.77	755.34			
Prob > F/Prob > Chi2			0.000	0.000			
R-squared/Pseudo R2	0.263		0.414	0.202			

The numbers of employees and workplaces for the Heckman 2-step procedure in this and subsequent Tables indicate number of employees and workplaces in the first-step/second-step regressions.
Standard errors adjusted for clusters/workplaces in all specifications.
Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

There are marginal differences in the magnitude of the negative relationships from the different specifications. Employees from gender diverse workplaces (i.e. employees from workplaces with at least the median value of the gender diversity index) are associated with a 12 percentage points decline in WUD in the Heckman two-step specification. The coefficient of the inverse Mills' ratio from the Heckman two-step procedure is also found to be statistically significant suggesting sample selection would have been an issue if OLS were used instead.

[13] The corresponding Tables A1 to A4 in the Appendix report the full regression output.

Conditional marginal effects from the fractional logit and the tobit specifications indicate that employees from gender diverse workplaces are associated with a decline in WUD of between 8.3 and 10.6 percentage points vis-à-vis their counterparts from non-diverse workplaces (i.e. those from workplaces with below the median level of the gender diversity index). Conditional marginal effects from the ordered logit specification suggest that the level of WUD is important in determining the nature of the link between WUD and WGD. Accordingly, employees from gender diverse workplaces are associated with a 16.6 percentage point increase in WUD vis-à-vis their counterparts from non-diverse workplaces, if WUD is below 25%. In contrast, employees from gender diverse workplaces are found to be associated with a decline in WUD of between 4.2 and 6.9 percentage points, if WUD is 25% or more.

Table 2 reports empirical results from gender-based sub-group analysis on the link between WUD and WGD. The results suggest that the negative link between WUD and WGD is specific to male employees, for the most part. The estimated coefficients from the Heckman two-step procedure indicate that female employees from gender diverse workplaces are associated with a 7.7 percentage point decline in WUD vis-à-vis their counterparts from non-diverse workplaces.

Table 2: WUD and WGD, gender-based sub-groups

	Heckman two-step	Fractional Logit	Tobit	Ordered Logit, with WUD (D) recoded as:			
				D<.25	.25≤D<.5	.5≤D<.75	D≥.75
		dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx
	Female						
Gender diverse	-0.077***	-0.037*	-0.021	0.058	-0.016	-0.025	-0.017
	(0.025)	(0.022)	(0.020)	(0.042)	(0.011)	(0.018)	(0.013)
Employee- & workplace-level controls	yes	yes	yes	yes	yes	yes	yes
Lambda (Inverse Mills' Ratio)	-0.120**						
	(0.048)						
Constant	0.626***						
	(0.070)						
Log pseudo-likelihood		-4174.39					
Number of employees	10320/6959	10320	10320	10320			
Number of workplaces/clusters	1446/851	1446	1446	1446			
F(37, 10320)/Wald chi2(37)			26.22	564.13			
Prob > F/Prob > chi2			0.000	0.000			
R-squared/Pseudo R2	0.249		0.433	0.2005			
	Male						
Gender diverse	-0.151***	-0.163***	-0.131***	0.251***	-0.062***	-0.101***	-0.089***
	(0.027)	(0.025)	(0.023)	(0.043)	(0.013)	(0.018)	(0.018)
Employee- & workplace-level controls	yes	yes	yes	yes	yes	yes	yes
Lambda (Inverse Mills' Ratio)	-0.177***						
	(0.051)						
Constant	0.773***						
	(0.083)						
Log pseudo-likelihood		-3633.26					
Number of employees	9155/5918	9155	9155	9155			
Number of workplaces/clusters	1365/826	1365	1365	1365			
F(37, 10320)/Wald chi2(37)			29.71	520.7			
Prob > F/Prob > chi2			0.000	0.000			
R-squared/Pseudo R2	0.294		0.432	0.2216			

Standard errors adjusted for 1547 clusters/workplaces.
Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Male employees from gender diverse workplaces are, on the other hand, associated with 15.1 percentage point decline in WUD vis-à-vis their counterparts from non-diverse workplaces. The decline associated with male employees is thus almost twice of the level estimated for female employees. As before, the coefficient of the inverse Mills' ratio from the Heckman two-step

procedure is negative and statistically significant, suggesting sample selection needed to be accounted for.

In contrast to results from the Heckman two-step procedure, conditional marginal effects from the fractional logit, the tobit and the ordered logit specifications suggest there is barely any significant marginal effect on the link between WUD and WGD for the female subsample. On the other hand, the corresponding marginal effects for the male sub-sample are all statistically significant and large in magnitude. Specifically, conditional marginal effects from the fractional logit and the tobit models suggest male employees from gender diverse workplaces to be associated with a decline in WUD of between 13.1 and 16.3 percentage points vis-à-vis male employees from non-diverse workplaces. Conditional marginal effects from the ordered logit model for this sub-sample once again indicate the importance of the level of WUD in explaining the nature of the link with WGD. Accordingly, male employees from gender diverse workplaces are associated with a 25.2 percentage point increase in WUD for WUD below 25%. For WUD of 25% or more, on the other hand, male employees from gender diverse workplaces are associated with a decline in WUD of between 6.2 and 10.1 percentage points, again compared with male employees from non-diverse workplaces.

Table 3 reports empirical results from the tests conducted to establish whether there is group-size related link between WUD and WGD as stipulated in *Hypothesis 3*. To achieve this, a 'majority female' dummy variable has been generated, which assumes a value of 1 if female employees are a majority (>50%) in a workplace and 0 otherwise. As results reported in Table 3 show, each of the specifications reported in Table 1 was re-estimated with the 'majority female' dummy and an interaction term involving the WGD and the female majority dummy variables.

Table 3: WUD and WGD, group-size-related link

	Heckman two-step	Fractional Logit	Tobit	Ordered Logit, with WUD (D) recoded as:			
				D<.25	.25≤D<.5	.5≤D<.75	D≥.75
		dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx
Gender diverse	-0.161***	-0.172***	-0.150***	0.271***	-0.070***	-0.114***	-0.087***
	(0.030)	(0.026)	(0.025)	(0.047)	(0.015)	(0.021)	(0.017)
Majority female	-0.148***	-0.178***	-0.156***	0.313***	-0.081***	-0.131***	-0.101***
	(0.044)	(0.039)	(0.035)	(0.071)	(0.022)	(0.031)	(0.023)
Gender diverse*majority female	0.094**	0.150***	0.144***	-0.238***	0.061***	0.100***	0.077***
	(0.043)	(0.039)	(0.035)	(0.070)	(0.020)	(0.030)	(0.023)
Employee- & workplace-level controls	yes	yes	yes	yes	yes	yes	yes
Lambda (Inverse Mills' Ratio)	-0.143***						
	(0.044)						
Constant	0.806***						
	(0.069)						
Log pseudo-likelihood		-7842.14					
Number of employees	19475/12877	19475	19475	19475			
Number of workplaces/clusters	1547/908	1547	1547	1547			
F(40, 19435)/Wald chi2(40)			33.08	748.42			
Prob > F/Prob > chi2			0.000	0.000			
R-squared/Pseudo R2	0.273		0.424	0.2074			

Standard errors adjusted for 1547 clusters/workplaces.
Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

The estimated coefficients and conditional marginal effects specific to the interaction term reported in Table 3 are all positive and statistically significant. In terms of magnitude, the estimated coefficient on the interaction term from the Heckman two-step specification reveal that employees from gender diverse and female dominated workplaces are linked with a 9.4 percentage point increase in WUD compared with employees from non-diverse and male dominated workplaces.

Marginal effects from the fractional logit and the tobit specifications on the interaction term also show similar patterns, where gender diverse workplaces with a female majority are

associated with a 15 percentage point increase in WUD compared with non-diverse and male dominated workplaces. The conditional marginal effects from the ordered logit model on the interaction term indicate that employees from gender diverse workplaces with a female majority are associated with a 23.8 percentage point decline in WUD if the level of WUD is below 25%. On the other hand; conditional marginal effects corresponding with WUD of 25% or more indicate an increase of between 6 and 10 percentage points.

Of the employees from gender diverse workplaces, those with a female majority represent a reduced negative relationship between WUD and WGD vis-à-vis those with a male majority. Coefficient estimates from the Heckman two-step specification suggest that employees from gender diverse workplaces with female majority are linked with only a 6.7 percentage point decline in WUD. In contrast, employees from non-diverse workplaces that are dominated by men are associated with a 16.1 percentage point decline in WUD. The estimated conditional marginal effects from the fractional logit and the tobit models suggest even larger differences in the negative relationship between WUD and WGD for workplaces with and without a female majority.

Table 4: WUD and WGD, ownership-based sub-groups

	Public			Private		
	Heckman two-step	Fractional Logit	Tobit	Heckman two-step	Fractional Logit	Tobit
		dy/dx	dy/dx		dy/dx	dy/dx
Gender diverse	-0.072**	-0.069**	-0.064**	-0.149***	-0.099***	-0.075***
	(0.028)	(0.030)	(0.028)	(0.031)	(0.019)	(0.018)
Employee- & workplace-level controls	yes	yes	yes	yes	yes	yes
Lambda (Inverse Mills' Ratio)	0.022			-0.084		
	(0.185)			(0.070)		
Constant	0.373***			0.495***		
	(0.141)			(0.093)		
Log pseudo-likelihood		-2916.27			-4640.37	
Number of employees	5854/5759	5969	5969	13506/7003	13506	13506
Number of workplaces/clusters	407/397	415	415	1132/503	1132	1132
F(36, 5933)/ F(37, 13469)	0.131		6.26			15.29
Prob > F			0.000			0.000
R-squared/Pseudo R2	0.131		0.613	0.244		0.311

'Construction' !=0 predicts success perfectly for the *public sector* sub-group resulting in 'construction' being dropped and 115 observations not being used in the Heckman 2-step model. This has also led the ordered logit model to fail for the public sub-group. Also, 'wholesale & retail trade' is omitted due to collinearity in each specification for the public sub-group.
Standard errors adjusted for 1547 clusters/workplaces.
Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 4 reports results from workplace ownership based sub-group analysis, which is meant to lend some evidence to *Hypothesis 4*. As the descriptive statistics in Section 3 revealed, only 95 employees from workplaces without unions come from the public sector, which make up only 1.4% of employees from workplaces without unions. The small size of the subsample means that some of the predictor variables (for example, construction, as the notes to Table 4 indicate) predict success perfectly. This led to some observations being dropped from the first-step of the Heckman procedure. Importantly, this has also led to the ordered logit model for the public sub-group to fail thus the reporting of results from only three of the specifications.

The estimated coefficients from the Heckman two-step specification and the conditional marginal effects from the fractional logit and the tobit models show that the negative and statistically significant link between WUD and WGD apply for employees from both the public and the private sectors. However, the negative relationship is found to be stronger for employees from the private sector, both in statistical significance and magnitude. The estimated coefficients from the Heckman two-step specification show that employees from the public sector in a gender diverse workplace are associated with a 7.2 percentage point decline in WUD.

In contrast, being an employee from a gender diverse workplace in the private sector is associated with a 14.9 percentage points decline in WUD. Unlike the previous specifications, the coefficients of the inverse Mills' ratios for the ownership based sub-group analysis are not found to be statistically significant. The conditional marginal effects from the alternative fractional logit and tobit models indicate that being an employee from gender diverse workplaces in the private sector is associated with a decline in WUD of between 1.1 and 3 percentage points more than the level of decline in WUD associated with their counterparts in the public sector.

The discussion in this Section thus far has focused on the main empirical results specific to WGD. As reported in the Appendix Tables A1 to A4 and noted earlier, a battery of other controls has also been used in the regression analysis conducted. The estimation results suggest, for the most part, that the young and females are less likely to be union members compared with their middle age and male counterparts, respectively. Those employees with disability, with dependants, on permanent contract, from large establishments, in non-managerial occupations and those from workplaces that encourage union membership are more likely to be union members. As would be expected, those in private establishments and those in industries other than financial and business services are unlikely to be union members. Most of these findings are in line with what the literature on union membership has established.

6. Summary and conclusion

The labour market in Britain has undergone considerable de-unionisation since the late 1970s. The main factor underpinning this has been unions' failure to organise workers in new establishments. Other factors responsible for union decline the literature identifies include increased competition, decentralised and workplace-based unionism, managerial influence aimed at weakening union influence, macroeconomic factors such as levels of real wage and unemployment, union's own organising behaviour and the change in the composition of employment.

The change in the composition of employment the literature alludes to is to do with inter-industry employment changes. There has been considerable intra-workplace employment change in recent decades, which is hitherto unexplored, that may have contributed to union decline. The considerable intra-workplace employment change is due to the increase in the share of women in the labour market in Britain in recent decades, which took place more or less over the same time period as the union decline. The increase in the labour market participation of women in the face of gender discrimination may increase friction between female and male employees within the workplace. This may, in turn, pose challenges in the way of coalition-building, which unions need to achieve in order to succeed.

This paper attempted to study empirically whether the increase in the labour market participation of women and some dynamics thereof at the level of the workplace may have contributed to the decline of unions in Britain. To this effect, it analysed links between workplace union density and gender diversity. The paper also made extensive review of the literature on union decline in Britain and the role identity, in the form of workgroup gender composition, may play in it. The paper sat up four testable hypotheses pertaining to potential link between workplace union density and gender diversity on the basis of the reviewed literature and theories of identity, which it then tested empirically.

The data used in this paper come from the WERS2004 linked employer-employee data, the most authoritative source of information for the study of employment relations in Britain. Employer provided information on workplace union density and workgroup gender composition as well as a whole host of employee and workplace controls have been used to determine if there is a link between workplace union density and employee gender composition. Empirically, alternative econometric specifications have been employed to establish the robustness of the empirical results obtained. The paper has also conducted different types of sub-group analyses.

The empirical findings in the paper lend support to the hypotheses sat up and confirm that: (*i*) there is a negative and statistically significant link between workplace union density and gender diversity, (*ii*) the negative link between workplace union density and gender diversity is stronger for the sub-sample of male employees, (*iii*) the negative link identified is lessened for employees from workplaces with a female majority in general; and becomes positive for employees from workplaces with a female majority that are gender diverse, and (*iv*) the negative link between workplace union density and gender diversity is found to be stronger for employees from private workplaces.

These findings suggest that unions and their main constituents, men, may need to change genuinely and embrace the changing workplaces in Britain fully to improve their fate. As some of the literature have noted, there have certainly been positive changes in the labour market and among unions in Britain that recognised the changes in employment composition within workplaces. Such changes included positive action strategies by (some) unions that are designed to enhance women's involvement in unions. Nonetheless, it may be that there is still some way to go along such positive developments and in genuinely accepting women into unions and their inner workings.

Finally, this paper is rigorous in the sense of using linked data with extensive employer-employee information and alternative econometric strategies. It relies on a cross-section data, however. Future work might usefully use panel data, which are not available currently, and relevant panel data techniques that may shed further light on the link between workplace union density and gender diversity.

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Appendix

Table A1: WUD and WGD, full sample

	Heckman two-step	Fractional Logit	Tobit	Ordered Logit, with WUD (D) recoded as:			
				D<.25	.25≤D<.5	.5≤D<.75	D≥.75
		dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx
Gender diverse	-0.120***	-0.106***	-0.083***	0.166***	-0.042***	-0.069***	-0.055***
	(0.021)	(0.0192)	(0.0173)	(0.0339)	(0.0099)	(0.0146)	(0.012)
Age<30	-0.038***	-0.082***	-0.076***	0.126***	-0.032***	-0.053***	-0.041***
	(0.010)	(0.0091)	(0.0082)	(0.0146)	(0.0049)	(0.0067)	(0.006)
Age30-39	-0.019***	-0.031***	-0.029***	0.049***	-0.012***	-0.021***	-0.016***
	(0.007)	(0.0067)	(0.0060)	(0.0116)	(0.0032)	(0.0049)	(0.004)
Age50+	-0.005	-0.013*	-0.012*	0.027**	-0.007**	-0.011**	-0.009**
	(0.007)	(0.0072)	(0.0065)	(0.0124)	(0.0032)	(0.0053)	(0.004)
Female	-0.043***	-0.045***	-0.036***	0.080***	-0.020***	-0.033***	-0.026***
	(0.009)	(0.0083)	(0.0073)	(0.0146)	(0.0046)	(0.0063)	(0.005)
Married	-0.001	0.012**	0.013***	-0.020**	0.005**	0.008**	0.006**
	(0.006)	(0.0055)	(0.0050)	(0.0093)	(0.0024)	(0.0039)	(0.003)
White	0.037*	0.026	0.016	-0.049	0.013	0.021	0.016
	(0.021)	(0.0195)	(0.0171)	(0.0343)	(0.0089)	(0.0143)	(0.011)
Children <7yrs old	0.004	0.001	-0.001	0.003	-0.001	-0.001	-0.001
	(0.007)	(0.0068)	(0.0060)	(0.0118)	(0.0030)	(0.0049)	(0.004)
Other dependents	0.017***	0.027***	0.025***	-0.040***	0.010***	0.017***	0.013***
	(0.006)	(0.0064)	(0.0057)	(0.0110)	(0.0029)	(0.0047)	(0.004)
Disabled	0.014**	0.017***	0.014**	-0.035***	0.009***	0.015***	0.012***
	(0.007)	(0.0068)	(0.0061)	(0.0120)	(0.0033)	(0.0051)	(0.004)
No academic qualification	-0.005	-0.014	-0.016	0.012	-0.003	-0.005	-0.004
	(0.013)	(0.0127)	(0.0116)	(0.0218)	(0.0055)	(0.0091)	(0.007)
O-level	0.017	0.007	0.001	-0.018	0.005	0.008	0.006
	(0.011)	(0.0107)	(0.0097)	(0.0182)	(0.0047)	(0.0076)	(0.006)
A-level	0.019	0.023*	0.019*	-0.046**	0.012**	0.019**	0.015**
	(0.012)	(0.0113)	(0.0102)	(0.0195)	(0.0051)	(0.0082)	(0.007)
Other qualification	0.006	-0.001	-0.003	-0.004	0.001	0.002	0.001
	(0.009)	(0.0084)	(0.0076)	(0.0147)	(0.0037)	(0.0061)	(0.005)
On permanent contract	0.038***	0.031***	0.024**	-0.057***	0.015***	0.024***	0.019***
	(0.011)	(0.0109)	(0.0094)	(0.0191)	(0.0051)	(0.0081)	(0.007)
Full-time	0.020**	0.042***	0.032***	-0.059***	0.015***	0.025***	0.020***
	(0.010)	(0.0092)	(0.0081)	(0.0160)	(0.0044)	(0.0069)	(0.005)
Works over 48 hours	-0.012	-0.013*	-0.011*	0.025**	-0.006**	-0.010*	-0.008**
	(0.007)	(0.0071)	(0.0064)	(0.0126)	(0.0032)	(0.0053)	(0.004)
Skill same as required by job	-0.002	-0.013**	-0.013***	0.020**	-0.005**	-0.008**	-0.007**
	(0.005)	(0.0051)	(0.0046)	(0.0088)	(0.0023)	(0.0037)	(0.003)
Professional	0.056***	0.040**	0.031**	-0.078***	0.020***	0.032***	0.026***
	(0.017)	(0.0156)	(0.0137)	(0.0268)	(0.0072)	(0.0113)	(0.009)
Associate Prof'l & Technical	0.024*	0.018	0.015	-0.039	0.010	0.016	0.013
	(0.014)	(0.0138)	(0.0121)	(0.0248)	(0.0065)	(0.0103)	(0.008)
Admin. & secretarial	0.037**	0.032**	0.027**	-0.053**	0.013**	0.022**	0.017**
	(0.015)	(0.0142)	(0.0125)	(0.0243)	(0.0063)	(0.0102)	(0.008)
Skilled trades plant & mach.	0.063***	0.092***	0.089***	-0.149***	0.038***	0.062***	0.049***
	(0.020)	(0.0171)	(0.0154)	(0.0295)	(0.0086)	(0.0128)	(0.011)
Personal & customer services	0.028	0.045**	0.045***	-0.073**	0.019**	0.031**	0.024**
	(0.019)	(0.0194)	(0.0162)	(0.0322)	(0.0084)	(0.0134)	(0.011)
Elementary occupations	0.017	0.039**	0.046***	-0.059*	0.015*	0.025*	0.019*
	(0.020)	(0.0188)	(0.0163)	(0.0327)	(0.0083)	(0.0138)	(0.011)
Private establishment	-0.159***	-0.249***	-0.233***	0.434***	-0.110***	-0.181***	-0.143***
	(0.029)	(0.0239)	(0.0209)	(0.0457)	(0.0185)	(0.0233)	(0.016)
Sole establishment	0.001	-0.148***	-0.155***	0.238***	-0.060***	-0.100***	-0.079***
	(0.028)	(0.0259)	(0.0224)	(0.0417)	(0.0134)	(0.0183)	(0.015)
No. of employees/1000	-0.009	0.037***	0.045***	-0.049**	0.012**	0.020**	0.016**
	(0.010)	(0.0113)	(0.0102)	(0.0193)	(0.0051)	(0.0081)	(0.007)
Manufacturing	-0.118**	0.102***	0.142***	-0.178***	0.045***	0.074***	0.059***
	(0.047)	(0.0361)	(0.0328)	(0.0589)	(0.0167)	(0.0252)	(0.019)
Construction	-0.183***	-0.060	-0.016	0.040	-0.010	-0.017	-0.013
	(0.065)	(0.0556)	(0.0471)	(0.0838)	(0.0211)	(0.0350)	(0.028)
Wholesale & retail trade	-0.174***	-0.088*	-0.034	0.157*	-0.040*	-0.066**	-0.052*
	(0.053)	(0.0487)	(0.0371)	(0.0798)	(0.0211)	(0.0332)	(0.027)

Hotel and restaurant	-0.038	0.151***	0.167***	-0.244***	0.062***	0.102***	0.081***
	(0.054)	(0.0399)	(0.0365)	(0.0660)	(0.0192)	(0.0283)	(0.022)
Public & community services	-0.107**	0.124***	0.164***	-0.213***	0.054***	0.089***	0.070***
	(0.049)	(0.0391)	(0.0341)	(0.0665)	(0.0185)	(0.0284)	(0.022)
Education	-0.161***	0.105**	0.163***	-0.156**	0.040**	0.065**	0.052**
	(0.053)	(0.0408)	(0.0351)	(0.0704)	(0.0190)	(0.0297)	(0.023)
Health	-0.220***	0.002	0.061*	0.008	-0.002	-0.003	-0.003
	(0.049)	(0.0411)	(0.0346)	(0.0678)	(0.0172)	(0.0283)	(0.022)
Union membership encouraged	0.043*	0.177***	0.182***	-0.280***	0.071***	0.117***	0.092***
	(0.024)	(0.0212)	(0.0178)	(0.0378)	(0.0123)	(0.0179)	(0.015)
Urban area	-0.026	-0.049**	-0.046**	0.049	-0.012	-0.020	-0.016
	(0.024)	(0.0224)	(0.0198)	(0.0384)	(0.0098)	(0.0160)	(0.013)
Unemployment to vacancy ratio	0.008*	0.002	0.000	-0.001	0.000	0.000	0.000
	(0.004)	(0.0039)	(0.0035)	(0.0068)	(0.0017)	(0.0028)	(0.002)
Log workplace age		0.029***	0.024***	-0.037**	0.009**	0.015**	0.012**
		(0.008)	(0.0074)	(0.0147)	(0.0038)	(0.0063)	(0.005)
Lambda (Inverse Mills' Ratio)	-0.159***						
	(0.044)						
Constant	0.733***						
	(0.066)						
Number of employees	19475/12877	19475	19475	19475			
Number of workplaces/clusters	1547/908	1547	1547	1547			
Log pseudo-likelihood		-7893.67					
F(38, 19437)/Wald Chi2(38)			33.77	755.34			
Prob > F/Prob > Chi2			0.000	0.000			
R-squared/Pseudo R2	0.263		0.414	0.202			

The numbers of employees and workplaces for the Heckman 2-step procedure indicate number of employees and workplaces in the first-step/second-step regressions.
Standard errors adjusted for clusters/workplaces in all specifications.
Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table A2: WUD and WGD, gender-based sub-groups

	Females							Males						
	Heckman two-step	Fractional Logit	Tobit	Ordered Logit, with WUD (D) recoded as:				Heckman two-step	Fractional Logit	Tobit	Ordered Logit, with WUD (D) recoded as:			
				D<.25	.25≤D<.5	.5≤D<.75	D≥.75				D<.25	.25≤D<.5	.5≤D<.75	D≥.75
		dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx		dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx
Gender diverse	-0.077***	-0.037*	-0.021	0.058	-0.016	-0.025	-0.017	-0.151***	-0.163***	-0.131***	0.251***	-0.062***	-0.101***	-0.089***
	(0.025)	(0.022)	(0.020)	(0.042)	(0.011)	(0.018)	(0.013)	(0.027)	(0.025)	(0.023)	(0.043)	(0.013)	(0.018)	(0.018)
Age<30	-0.029***	-0.071***	-0.070***	0.114***	-0.031***	-0.050***	-0.033***	-0.045***	-0.088***	-0.076***	0.129***	-0.032***	-0.052***	-0.045***
	(0.011)	(0.011)	(0.010)	(0.018)	(0.006)	(0.009)	(0.007)	(0.015)	(0.013)	(0.012)	(0.021)	(0.007)	(0.009)	(0.009)
Age30-39	-0.005	-0.018**	-0.020***	0.028*	-0.008*	-0.012*	-0.008*	-0.034***	-0.046***	-0.039***	0.071**	-0.017***	-0.028***	-0.025***
	(0.010)	(0.009)	(0.008)	(0.016)	(0.004)	(0.007)	(0.005)	(0.010)	(0.010)	(0.009)	(0.016)	(0.005)	(0.007)	(0.006)
Age50+	0.000	-0.009	-0.009	0.022	-0.006	-0.010	-0.006	-0.012	-0.021**	-0.017*	0.032*	-0.008*	-0.013*	-0.011*
	(0.009)	(0.009)	(0.008)	(0.016)	(0.005)	(0.007)	(0.005)	(0.010)	(0.010)	(0.009)	(0.018)	(0.004)	(0.007)	(0.006)
Married	-0.000	0.010	0.012*	-0.017	0.005	0.008	0.005	-0.001	0.017**	0.015**	-0.022	0.005	0.009	0.008
	(0.007)	(0.007)	(0.006)	(0.012)	(0.003)	(0.005)	(0.004)	(0.008)	(0.008)	(0.007)	(0.013)	(0.003)	(0.005)	(0.005)
White	0.023	0.001	-0.008	-0.019	0.005	0.008	0.005	0.052**	0.055**	0.043**	-0.088**	0.022**	0.035**	0.031**
	(0.024)	(0.023)	(0.020)	(0.041)	(0.011)	(0.018)	(0.012)	(0.027)	(0.025)	(0.022)	(0.043)	(0.011)	(0.017)	(0.016)
Children <7yrs old	-0.006	0.000	0.001	0.009	-0.002	-0.004	-0.003	0.011	-0.002	-0.005	0.000	0.000	0.000	0.000
	(0.010)	(0.010)	(0.009)	(0.017)	(0.005)	(0.008)	(0.005)	(0.010)	(0.009)	(0.008)	(0.016)	(0.004)	(0.007)	(0.006)
Other dependents	0.015*	0.027***	0.026***	-0.039***	0.011***	0.017***	0.011***	0.023**	0.027***	0.022***	-0.042***	0.010***	0.017***	0.015***
	(0.009)	(0.008)	(0.008)	(0.015)	(0.004)	(0.007)	(0.005)	(0.009)	(0.009)	(0.008)	(0.016)	(0.004)	(0.007)	(0.006)
Disabled	0.010	0.010	0.007	-0.029*	0.008*	0.013*	0.008*	0.021*	0.025***	0.022***	-0.044***	0.011***	0.018***	0.016***
	(0.009)	(0.009)	(0.008)	(0.016)	(0.005)	(0.007)	(0.005)	(0.011)	(0.010)	(0.009)	(0.017)	(0.005)	(0.007)	(0.006)
No academic qualification	-0.009	-0.019	-0.020	0.023	-0.006	-0.010	-0.007	-0.007	-0.013	-0.015	0.005	-0.001	-0.002	-0.002
	(0.015)	(0.015)	(0.013)	(0.028)	(0.008)	(0.012)	(0.008)	(0.018)	(0.018)	(0.016)	(0.029)	(0.007)	(0.012)	(0.010)
O-level	0.013	0.000	-0.005	-0.010	0.003	0.004	0.003	0.019	0.014	0.007	-0.027	0.007	0.011	0.009
	(0.012)	(0.012)	(0.011)	(0.022)	(0.006)	(0.010)	(0.006)	(0.015)	(0.016)	(0.014)	(0.025)	(0.006)	(0.010)	(0.009)
A-level	0.019	0.014	0.012	-0.031	0.008	0.014	0.009	0.020	0.038**	0.031**	-0.073***	0.018***	0.029***	0.026***
	(0.015)	(0.014)	(0.012)	(0.025)	(0.007)	(0.011)	(0.007)	(0.017)	(0.016)	(0.015)	(0.027)	(0.007)	(0.011)	(0.010)
Other qualification	0.015	-0.003	-0.007	-0.001	0.000	0.001	0.000	-0.008	-0.001	0.001	-0.006	0.001	0.002	0.002
	(0.011)	(0.010)	(0.009)	(0.018)	(0.005)	(0.008)	(0.005)	(0.012)	(0.013)	(0.011)	(0.021)	(0.005)	(0.008)	(0.007)
On permanent contract	0.034**	0.018	0.012	-0.038*	0.010	0.017*	0.011*	0.041**	0.051***	0.043***	-0.090***	0.022***	0.036***	0.032***
	(0.014)	(0.013)	(0.011)	(0.023)	(0.006)	(0.010)	(0.007)	(0.017)	(0.016)	(0.014)	(0.029)	(0.008)	(0.012)	(0.011)
Full-time	0.018*	0.033***	0.028***	-0.045***	0.012***	0.020***	0.013***	0.014	0.036**	0.022	-0.056**	0.014**	0.022**	0.020**
	(0.010)	(0.010)	(0.009)	(0.017)	(0.005)	(0.008)	(0.005)	(0.017)	(0.016)	(0.014)	(0.028)	(0.007)	(0.011)	(0.010)
Works over 48 hours	-0.012	-0.014	-0.010	0.025	-0.007	-0.011	-0.007	-0.018*	-0.019*	-0.018**	0.032*	-0.008*	-0.013*	-0.011*
	(0.009)	(0.008)	(0.008)	(0.016)	(0.004)	(0.007)	(0.005)	(0.010)	(0.010)	(0.009)	(0.017)	(0.004)	(0.007)	(0.006)
Skill same as required by job	-0.006	-0.016***	-0.016***	0.026**	-0.007**	-0.011**	-0.008**	0.005	-0.003	-0.005	0.005	-0.001	-0.002	-0.002
	(0.007)	(0.007)	(0.006)	(0.012)	(0.003)	(0.005)	(0.004)	(0.007)	(0.007)	(0.006)	(0.012)	(0.003)	(0.005)	(0.004)
Professional	0.092***	0.086***	0.074***	-0.164***	0.045***	0.072***	0.047***	0.023	-0.004	-0.011	-0.005	0.001	0.002	0.002
	(0.021)	(0.020)	(0.017)	(0.037)	(0.011)	(0.017)	(0.012)	(0.024)	(0.021)	(0.018)	(0.034)	(0.008)	(0.013)	(0.012)
Associate Prof'l & Technical	0.049***	0.033*	0.026*	-0.073**	0.020**	0.032**	0.021**	-0.000	-0.002	-0.002	-0.006	0.001	0.002	0.002
	(0.019)	(0.018)	(0.015)	(0.033)	(0.010)	(0.014)	(0.010)	(0.017)	(0.018)	(0.015)	(0.032)	(0.008)	(0.013)	(0.011)
Admin. & secretarial	0.071***	0.054***	0.043***	-0.096***	0.026***	0.042***	0.028***	-0.002	0.004	0.006	-0.005	0.001	0.002	0.002
	(0.018)	(0.017)	(0.015)	(0.031)	(0.009)	(0.014)	(0.009)	(0.021)	(0.021)	(0.018)	(0.035)	(0.009)	(0.014)	(0.012)
Skilled trades plant & mach.	0.088**	0.105***	0.093***	-0.179***	0.049***	0.078***	0.052***	0.037*	0.069***	0.067***	-0.107***	0.026***	0.043***	0.038***
	(0.037)	(0.033)	(0.030)	(0.058)	(0.017)	(0.026)	(0.018)	(0.020)	(0.019)	(0.016)	(0.031)	(0.008)	(0.013)	(0.012)
Personal & customer services	0.053**	0.063***	0.057***	-0.114***	0.031***	0.050***	0.033***	0.028	0.051	0.049*	-0.074	0.018	0.030	0.026
	(0.021)	(0.020)	(0.017)	(0.036)	(0.011)	(0.016)	(0.011)	(0.029)	(0.031)	(0.026)	(0.052)	(0.013)	(0.021)	(0.019)
Elementary occupations	0.032	0.044*	0.048***	-0.073*	0.020*	0.032*	0.021*	0.007	0.039*	0.044**	-0.058	0.014	0.023	0.020
	(0.025)	(0.024)	(0.021)	(0.042)	(0.012)	(0.019)	(0.013)	(0.025)	(0.023)	(0.019)	(0.040)	(0.010)	(0.016)	(0.014)

Private establishment	-0.165***	-0.253***	-0.241***	0.474***	-0.129***	-0.207***	-0.137***	-0.166***	-0.258***	-0.233***	0.417***	-0.103***	-0.167***	-0.147***
	(0.033)	(0.026)	(0.023)	(0.053)	(0.024)	(0.029)	(0.017)	(0.032)	(0.028)	(0.023)	(0.053)	(0.020)	(0.025)	(0.022)
Sole establishment	-0.007	-0.121***	-0.129***	0.183***	-0.050***	-0.080***	-0.053***	0.003	-0.166***	-0.175***	0.284***	-0.070***	-0.114***	-0.100***
	(0.031)	(0.029)	(0.025)	(0.047)	(0.015)	(0.021)	(0.014)	(0.036)	(0.031)	(0.026)	(0.050)	(0.017)	(0.021)	(0.019)
No. of employees/1000	-0.017	0.016	0.025***	-0.011	0.003	0.005	0.003	0.002	0.061***	0.065***	-0.093***	0.023***	0.037***	0.033***
	(0.010)	(0.011)	(0.010)	(0.017)	(0.005)	(0.008)	(0.005)	(0.014)	(0.017)	(0.014)	(0.031)	(0.008)	(0.013)	(0.011)
Manufacturing	-0.104**	0.054	0.091***	-0.096	0.026	0.042	0.028	-0.117**	0.132***	0.173***	-0.240***	0.059***	0.096****	0.085***
	(0.048)	(0.039)	(0.036)	(0.064)	(0.018)	(0.028)	(0.018)	(0.058)	(0.041)	(0.036)	(0.067)	(0.020)	(0.028)	(0.023)
Construction	-0.157**	-0.029	0.009	0.031	-0.008	-0.013	-0.009	-0.181**	-0.059	-0.008	0.002	-0.001	-0.001	-0.001
	(0.076)	(0.065)	(0.058)	(0.095)	(0.026)	(0.042)	(0.028)	(0.072)	(0.063)	(0.051)	(0.094)	(0.023)	(0.038)	(0.033)
Wholesale & retail trade	-0.182***	-0.081*	-0.033	0.148*	-0.040*	-0.065*	-0.043*	-0.174***	-0.111*	-0.049	0.206**	-0.051*	-0.083**	-0.073**
	(0.052)	(0.047)	(0.038)	(0.079)	(0.022)	(0.034)	(0.023)	(0.065)	(0.060)	(0.043)	(0.099)	(0.026)	(0.040)	(0.035)
Hotel and restaurant	-0.062	0.057	0.067	-0.083	0.023	0.036	0.024	-0.029	0.203***	0.222***	-0.338***	0.083***	0.136***	0.119***
	(0.064)	(0.048)	(0.043)	(0.077)	(0.021)	(0.034)	(0.022)	(0.063)	(0.045)	(0.040)	(0.076)	(0.024)	(0.032)	(0.027)
Public & community services	-0.136***	0.056	0.104***	-0.072	0.020	0.032	0.021	-0.071	0.186***	0.218***	-0.348***	0.086***	0.139***	0.123***
	(0.049)	(0.040)	(0.035)	(0.070)	(0.019)	(0.031)	(0.020)	(0.061)	(0.047)	(0.040)	(0.079)	(0.024)	(0.034)	(0.028)
Education	-0.139***	0.074*	0.134***	-0.085	0.023	0.037	0.025	-0.177***	0.146***	0.210***	-0.248***	0.061***	0.099***	0.087***
	(0.052)	(0.042)	(0.037)	(0.075)	(0.021)	(0.033)	(0.022)	(0.068)	(0.048)	(0.041)	(0.082)	(0.024)	(0.034)	(0.028)
Health	-0.215***	-0.020	0.041	0.064	-0.017	-0.028	-0.019	-0.189***	0.056	0.108***	-0.106	0.026	0.042	0.037
	(0.048)	(0.040)	(0.035)	(0.069)	(0.019)	(0.030)	(0.020)	(0.062)	(0.051)	(0.042)	(0.085)	(0.022)	(0.034)	(0.029)
Union membership encouraged	0.059**	0.161***	0.168***	-0.266***	0.073***	0.116***	0.077***	0.033	0.194***	0.195***	-0.296***	0.073***	0.119***	0.105***
	(0.026)	(0.022)	(0.019)	(0.041)	(0.014)	(0.020)	(0.014)	(0.029)	(0.028)	(0.022)	(0.048)	(0.015)	(0.022)	(0.020)
Urban area	-0.016	-0.043	-0.046*	0.036	-0.010	-0.016	-0.010	-0.033	-0.050**	-0.042*	0.050	-0.012	-0.020	-0.018
	(0.029)	(0.027)	(0.023)	(0.047)	(0.013)	(0.021)	(0.014)	(0.027)	(0.025)	(0.022)	(0.043)	(0.011)	(0.017)	(0.015)
Unemployment to vacancy ratio	0.008*	0.003	0.001	-0.003	0.001	0.001	0.001	0.007	-0.001	-0.002	0.003	-0.001	-0.001	-0.001
	(0.005)	(0.004)	(0.004)	(0.007)	(0.002)	(0.003)	(0.002)	(0.005)	(0.005)	(0.004)	(0.008)	(0.002)	(0.003)	(0.003)
Log workplace age		0.027***	0.022***	-0.039**	0.011**	0.017**	0.011**		0.031***	0.025***	-0.034**	0.008**	0.014**	0.012**
		(0.009)	(0.008)	(0.017)	(0.005)	(0.007)	(0.005)		(0.010)	(0.008)	(0.017)	(0.004)	(0.007)	(0.006)
Lambda (Inverse Mills' Ratio)	-0.120**							-0.177***						
	(0.048)							(0.051)						
Constant	0.626***							0.773***						
	(0.070)							(0.083)						
Log pseudo-likelihood		-4174.39							-3633.26					
Number of employees	10320/6959	10320	10320	10320				9155/5918	9155	9155	9155			
Number of workplaces/clusters	1446/851	1446	1446	1446				1365/826	1365	1365	1365			
F(37, 10320)/Wald chi2(37)			26.22	564.13						29.71	520.7			
Prob > F/Prob > chi2			0.000	0.000						0.000	0.000			
R-squared/Pseudo R2	0.249		0.433	0.2005				0.294		0.432	0.2216			

The numbers of employees and workplaces for the Heckman 2-step procedure indicate number of employees and workplaces in the first-step/second-step regressions.
Standard errors adjusted for 1547 clusters/workplaces.
Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table A3: WUD and WGD, group-size-related link

	Heckman two-step	Fractional Logit	Tobit	Ordered Logit, with WUD (D) recoded as:			
				D<.25	.25≤D<.5	.5≤D<.75	D≥.75
		dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx
Gender diverse	-0.161***	-0.172***	-0.150***	0.271***	-0.070***	-0.114***	-0.087***
	(0.030)	(0.026)	(0.025)	(0.047)	(0.015)	(0.021)	(0.017)
Majority female	-0.148***	-0.178***	-0.156***	0.313***	-0.081***	-0.131***	-0.101***
	(0.044)	(0.039)	(0.035)	(0.071)	(0.022)	(0.031)	(0.023)
Gender diverse*majority female	0.094**	0.150***	0.144***	-0.238***	0.061***	0.100***	0.077***
	(0.043)	(0.039)	(0.035)	(0.070)	(0.020)	(0.030)	(0.023)
Age<30	-0.036***	-0.077***	-0.073***	0.119***	-0.031***	-0.050***	-0.038***
	(0.010)	(0.009)	(0.008)	(0.015)	(0.005)	(0.007)	(0.006)
Age30-39	-0.019***	-0.031***	-0.029***	0.049***	-0.013***	-0.021***	-0.016***
	(0.007)	(0.007)	(0.006)	(0.012)	(0.003)	(0.005)	(0.004)
Age50+	-0.005	-0.013*	-0.012*	0.027**	-0.007**	-0.011**	-0.009**
	(0.007)	(0.007)	(0.006)	(0.012)	(0.003)	(0.005)	(0.004)
Female	-0.023***	-0.020***	-0.016***	0.036***	-0.009***	-0.015***	-0.011***
	(0.007)	(0.007)	(0.006)	(0.012)	(0.003)	(0.005)	(0.004)
Married	-0.001	0.012**	0.013***	-0.019**	0.005**	0.008**	0.006**
	(0.006)	(0.005)	(0.005)	(0.009)	(0.002)	(0.004)	(0.003)
White	0.034*	0.026	0.016	-0.052	0.013	0.022	0.017
	(0.021)	(0.020)	(0.017)	(0.034)	(0.009)	(0.014)	(0.011)
Children <7yrs old	0.004	0.000	-0.002	0.004	-0.001	-0.002	-0.001
	(0.007)	(0.007)	(0.006)	(0.012)	(0.003)	(0.005)	(0.004)
Other dependents	0.019***	0.028***	0.025***	-0.042***	0.011***	0.018***	0.014***
	(0.006)	(0.006)	(0.006)	(0.011)	(0.003)	(0.005)	(0.004)
Disabled	0.015**	0.017***	0.014**	-0.037***	0.010***	0.016***	0.012***
	(0.007)	(0.007)	(0.006)	(0.012)	(0.003)	(0.005)	(0.004)
No academic qualification	-0.008	-0.015	-0.017	0.013	-0.003	-0.005	-0.004
	(0.013)	(0.013)	(0.012)	(0.022)	(0.006)	(0.009)	(0.007)
O-level	0.016	0.008	0.002	-0.019	0.005	0.008	0.006
	(0.011)	(0.011)	(0.010)	(0.018)	(0.005)	(0.008)	(0.006)
A-level	0.021*	0.026**	0.021**	-0.052***	0.013***	0.022***	0.017***
	(0.011)	(0.011)	(0.010)	(0.019)	(0.005)	(0.008)	(0.006)
Other qualification	0.005	-0.001	-0.002	-0.004	0.001	0.002	0.001
	(0.009)	(0.008)	(0.008)	(0.015)	(0.004)	(0.006)	(0.005)
On permanent contract	0.037***	0.030***	0.024***	-0.056***	0.014***	0.023***	0.018***
	(0.012)	(0.011)	(0.009)	(0.019)	(0.005)	(0.008)	(0.006)
Full-time	0.015	0.031***	0.025***	-0.041	0.011***	0.017***	0.013***
	(0.010)	(0.009)	(0.008)	(0.016)	(0.004)	(0.007)	(0.005)
Works over 48 hours	-0.017**	-0.018***	-0.015***	0.034***	-0.009***	-0.014***	-0.011***
	(0.007)	(0.007)	(0.006)	(0.012)	(0.003)	(0.005)	(0.004)
Skill same as required by job	-0.001	-0.010**	-0.011***	0.017*	-0.004*	-0.007*	-0.005*
	(0.005)	(0.005)	(0.005)	(0.009)	(0.002)	(0.004)	(0.003)
Professional	0.054***	0.038***	0.029**	-0.075***	0.019***	0.032***	0.024***
	(0.016)	(0.015)	(0.014)	(0.027)	(0.007)	(0.011)	(0.009)
Associate Prof'l & Technical	0.015	0.010	0.009	-0.025	0.007	0.011	0.008
	(0.014)	(0.014)	(0.012)	(0.025)	(0.006)	(0.010)	(0.008)
Admin. & secretarial	0.034**	0.026*	0.022*	-0.041*	0.011*	0.017*	0.013*
	(0.014)	(0.014)	(0.013)	(0.024)	(0.006)	(0.010)	(0.008)
Skilled trades plant & mach.	0.047**	0.074***	0.073***	-0.119***	0.031***	0.050***	0.038***
	(0.019)	(0.017)	(0.015)	(0.029)	(0.008)	(0.013)	(0.010)
Personal & customer services	0.034*	0.054***	0.051***	-0.090***	0.023***	0.038***	0.029***
	(0.019)	(0.019)	(0.016)	(0.032)	(0.009)	(0.014)	(0.011)
Elementary occupations	0.011	0.032*	0.040**	-0.047	0.012	0.020	0.015
	(0.020)	(0.019)	(0.016)	(0.033)	(0.009)	(0.014)	(0.011)
Private establishment	-0.168***	-0.252***	-0.234***	0.439***	-0.113***	-0.185***	-0.141***
	(0.029)	(0.024)	(0.021)	(0.046)	(0.019)	(0.023)	(0.016)
Sole establishment	-0.009	-0.151***	-0.158***	0.247***	-0.064***	-0.104***	-0.080***
	(0.029)	(0.026)	(0.023)	(0.043)	(0.014)	(0.019)	(0.015)
No. of employees/1000	-0.011	0.031***	0.039***	-0.039**	0.010**	0.016**	0.012**
	(0.010)	(0.011)	(0.010)	(0.019)	(0.005)	(0.008)	(0.006)
Manufacturing	-0.145***	0.077***	0.122***	-0.133**	0.034**	0.056**	0.043**
	(0.050)	(0.037)	(0.034)	(0.061)	(0.017)	(0.026)	(0.019)
Construction	-0.216***	-0.099*	-0.046	0.106	-0.027	-0.045	-0.034
	(0.067)	(0.059)	(0.049)	(0.090)	(0.023)	(0.038)	(0.029)
Wholesale & retail trade	-0.179***	-0.094*	-0.041	0.170**	-0.044**	-0.072**	-0.055**

	(0.055)	(0.049)	(0.038)	(0.082)	(0.022)	(0.034)	(0.027)
Hotel and restaurant	-0.064	0.131***	0.150***	-0.210***	0.054***	0.088***	0.068***
	(0.055)	(0.040)	(0.037)	(0.067)	(0.019)	(0.029)	(0.021)
Public & community services	-0.114**	0.118***	0.159***	-0.206***	0.053***	0.086***	0.066***
	(0.050)	(0.039)	(0.034)	(0.067)	(0.019)	(0.029)	(0.022)
Education	-0.127**	0.136***	0.189***	-0.218***	0.056***	0.092***	0.070***
	(0.054)	(0.042)	(0.036)	(0.075)	(0.022)	(0.032)	(0.024)
Health	-0.189***	0.033	0.087**	-0.053	0.014	0.022	0.017
	(0.051)	(0.043)	(0.036)	(0.073)	(0.019)	(0.031)	(0.023)
Union membership encouraged	0.049**	0.176***	0.181***	-0.283***	0.073***	0.119***	0.091***
	(0.024)	(0.021)	(0.018)	(0.038)	(0.013)	(0.018)	(0.014)
Urban area	-0.023	-0.045**	-0.042**	0.039	-0.010	-0.016	-0.013
	(0.024)	(0.023)	(0.020)	(0.039)	(0.010)	(0.016)	(0.013)
Unemployment to vacancy ratio	0.007	0.001	0.000	0.000	0.000	0.000	0.000
	(0.004)	(0.004)	(0.003)	(0.007)	(0.002)	(0.003)	(0.002)
Log workplace age		0.029***	0.024***	-0.039***	0.010***	0.016***	0.012***
		(0.008)	(0.007)	(0.015)	(0.004)	(0.006)	(0.005)
Lambda (Inverse Mills' Ratio)	-0.143***						
	(0.044)						
Constant	0.806***						
	(0.069)						
Log pseudo-likelihood		-7842.14					
Number of employees	19475/12877	19475	19475	19475			
Number of workplaces/clusters	1547/908	1547	1547	1547			
F(40, 19435)/Wald chi2(40)			33.08	748.42			
Prob > F/Prob > chi2			0.000	0.000			
R-squared/Pseudo R2	0.273		0.424	0.2074			

The numbers of employees and workplaces for the Heckman 2-step procedure indicate number of employees and workplaces in the first-step/second-step regressions.
Standard errors adjusted for 1547 clusters/workplaces.
Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table A4: WUD and WGD, ownership-based sub-groups

	Public			Private		
	Heckman two-step	Fractional Logit	Tobit	Heckman two-step	Fractional Logit	Tobit
		dy/dx	dy/dx		dy/dx	dy/dx
Gender diverse	-0.072**	-0.069**	-0.064**	-0.149***	-0.099***	-0.075***
	(0.028)	(0.030)	(0.028)	(0.031)	(0.019)	(0.018)
Age<30	-0.021*	-0.024*	-0.023*	-0.051***	-0.065***	-0.062***
	(0.012)	(0.013)	(0.013)	(0.016)	(0.009)	(0.008)
Age30-39	-0.009	-0.012	-0.011	-0.030***	-0.027***	-0.026***
	(0.010)	(0.010)	(0.009)	(0.011)	(0.006)	(0.006)
Age50+	-0.024**	-0.031***	-0.030***	0.013	-0.002	-0.004
	(0.010)	(0.010)	(0.010)	(0.010)	(0.007)	(0.007)
Female	-0.044***	-0.047***	-0.045***	-0.036***	-0.027***	-0.022***
	(0.012)	(0.012)	(0.012)	(0.013)	(0.008)	(0.007)
Married	-0.005	-0.006	-0.005	0.008	0.017***	0.017***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.006)	(0.005)
White	0.042*	0.037	0.035	0.039	0.011	0.004
	(0.024)	(0.024)	(0.023)	(0.030)	(0.018)	(0.016)
Children <7yrs old	-0.004	-0.004	-0.004	0.006	0.001	-0.002
	(0.010)	(0.011)	(0.010)	(0.010)	(0.006)	(0.006)
Other dependents	0.014	0.019**	0.019**	0.026***	0.023***	0.022***
	(0.009)	(0.010)	(0.009)	(0.009)	(0.006)	(0.006)
Disabled	0.014	0.017*	0.017*	0.010	0.010	0.008
	(0.010)	(0.010)	(0.010)	(0.010)	(0.006)	(0.006)
No academic qualification	0.022	0.028	0.027*	-0.028	-0.014	-0.014
	(0.017)	(0.017)	(0.016)	(0.018)	(0.013)	(0.013)
O-level	0.021	0.020	0.019	0.010	0.011	0.005
	(0.013)	(0.014)	(0.014)	(0.016)	(0.011)	(0.011)
A-level	0.029*	0.032**	0.032**	0.012	0.022**	0.020**
	(0.015)	(0.016)	(0.015)	(0.017)	(0.011)	(0.011)
Other qualification	0.002	0.001	0.000	0.009	0.010	0.008
	(0.011)	(0.011)	(0.011)	(0.012)	(0.009)	(0.009)
On permanent contract	0.049***	0.046***	0.044***	0.021	0.022*	0.021**
	(0.015)	(0.014)	(0.014)	(0.019)	(0.012)	(0.010)
Full-time	0.021	0.033***	0.033***	0.022	0.024***	0.015*
	(0.013)	(0.013)	(0.013)	(0.016)	(0.010)	(0.009)
Works over 48 hours	0.001	-0.001	-0.003	-0.021**	-0.012*	-0.010
	(0.009)	(0.010)	(0.010)	(0.011)	(0.007)	(0.007)
Skill same as required by job	-0.012	-0.016**	-0.016**	0.002	-0.004	-0.007
	(0.007)	(0.007)	(0.007)	(0.008)	(0.005)	(0.004)
Professional	0.055**	0.054**	0.051**	0.071***	0.027*	0.016
	(0.024)	(0.024)	(0.024)	(0.023)	(0.015)	(0.014)
Associate Prof'l & Technical	0.037*	0.036*	0.033*	0.016	0.011	0.012
	(0.021)	(0.021)	(0.020)	(0.018)	(0.012)	(0.011)
Admin. & secretarial	0.023	0.016	0.013	0.060***	0.032**	0.025**
	(0.021)	(0.021)	(0.021)	(0.021)	(0.013)	(0.012)
Skilled trades plant & mach.	0.100**	0.115***	0.097***	0.061**	0.063***	0.065***
	(0.039)	(0.041)	(0.035)	(0.024)	(0.014)	(0.013)
Personal & customer services	0.043*	0.043*	0.042*	0.019	0.038**	0.038***
	(0.026)	(0.026)	(0.026)	(0.028)	(0.018)	(0.015)
Elementary occupations	0.047*	0.052*	0.049*	0.008	0.026	0.036***
	(0.028)	(0.029)	(0.027)	(0.027)	(0.017)	(0.015)
Sole establishment	-0.031	-0.043	-0.046	0.004	-0.109***	-0.123***
	(0.047)	(0.048)	(0.048)	(0.042)	(0.022)	(0.020)
No. of employees/1000	-0.019*	-0.016	-0.015	0.021	0.057***	0.068***
	(0.011)	(0.011)	(0.011)	(0.023)	(0.015)	(0.015)
Manufacturing	0.359**	0.275	0.249	-0.090*	0.068***	0.109***
	(0.150)	(0.188)	(0.172)	(0.053)	(0.026)	(0.026)
Construction		0.413***	0.334**	-0.269***	-0.119**	-0.049
		(0.154)	(0.143)	(0.069)	(0.053)	(0.041)
Wholesale & retail trade				-0.156***	-0.054	-0.019
				(0.055)	(0.035)	(0.029)
Hotel and restaurant	0.277**	0.255*	0.238*	-0.031	0.084***	0.101***
	(0.136)	(0.145)	(0.141)	(0.058)	(0.032)	(0.030)
Public & community services	0.172	0.150	0.147	-0.018	0.119***	0.149***
	(0.133)	(0.141)	(0.139)	(0.061)	(0.031)	(0.030)
Education	0.172	0.144	0.142	-0.209***	0.049	0.121***

	(0.132)	(0.141)	(0.139)	(0.078)	(0.041)	(0.037)
Health	0.099	0.074	0.071	-0.203***	0.010	0.070**
	(0.133)	(0.141)	(0.138)	(0.060)	(0.037)	(0.032)
Union membership encouraged	0.055**	0.064**	0.062**	0.104*	0.215***	0.235***
	(0.028)	(0.028)	(0.027)	(0.055)	(0.021)	(0.018)
Urban area	-0.005	0.003	0.006	-0.024	-0.048**	-0.048***
	(0.033)	(0.034)	(0.033)	(0.032)	(0.021)	(0.019)
Unemployment to vacancy ratio	-0.001	-0.003	-0.003	0.014**	0.004	0.001
	(0.006)	(0.006)	(0.006)	(0.006)	(0.004)	(0.004)
Log workplace age		0.014	0.014		0.030***	0.024***
		(0.012)	(0.012)		(0.008)	(0.008)
Lambda (Inverse Mills' Ratio)	0.022			-0.084		
	(0.185)			(0.070)		
Constant	0.373***			0.495***		
	(0.141)			(0.093)		
Log pseudo-likelihood		-2916.27			-4640.37	
Number of employees	5854/5759	5969	5969	13506/7003	13506	13506
Number of workplaces/clusters	407/397	415	415	1132/503	1132	1132
F(36, 5933)/ F(37, 13469)	0.131		6.26			15.29
Prob > F			0.000			0.000
R-squared/Pseudo R2	0.131		0.613	0.244		0.311

'Construction' !=0 predicts success perfectly for the *public sector* sub-group resulting in 'construction' being dropped and 115 observations not being used in the Heckman 2-step model. This has also led the ordered logit model to fail for the public sub-group. Also, 'wholesale & retail trade' is omitted due to collinearity in each specification for the public sub-group.

The numbers of employees and workplaces for the Heckman 2-step procedure indicate number of employees and workplaces in the first-step/second-step regressions.

Standard errors adjusted for 1547 clusters/workplaces.

Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table A5. Descriptive statistics, by workplace union & ownership statuses

	Union not present at the workplace				Union present at the workplace				Public				Private			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
WGD	0.345	0.152	0	0.5	0.325	0.148	0	0.5	0.316	0.150	0	0.5	0.339	0.148	0	0.5
Gender diverse(0/1)	0.748	0.434	0	1	0.676	0.468	0	1	0.657	0.475	0	1	0.719	0.449	0	1
Age<30	0.306	0.461	0	1	0.168	0.374	0	1	0.132	0.338	0	1	0.252	0.434	0	1
Age30-39	0.256	0.437	0	1	0.247	0.431	0	1	0.239	0.426	0	1	0.255	0.436	0	1
Age50+	0.224	0.417	0	1	0.287	0.452	0	1	0.309	0.462	0	1	0.246	0.431	0	1
Female	0.509	0.500	0	1	0.540	0.498	0	1	0.667	0.471	0	1	0.469	0.499	0	1
Married	0.619	0.486	0	1	0.708	0.454	0	1	0.725	0.447	0	1	0.658	0.474	0	1
White	0.941	0.235	0	1	0.944	0.231	0	1	0.950	0.219	0	1	0.940	0.238	0	1
Children <7yrs old	0.180	0.385	0	1	0.177	0.382	0	1	0.172	0.378	0	1	0.181	0.385	0	1
Other dependents	0.124	0.330	0	1	0.180	0.384	0	1	0.209	0.407	0	1	0.140	0.347	0	1
Disabled	0.105	0.306	0	1	0.130	0.336	0	1	0.138	0.345	0	1	0.114	0.318	0	1
No academic qualification	0.165	0.371	0	1	0.158	0.365	0	1	0.117	0.321	0	1	0.180	0.384	0	1
O-level	0.248	0.432	0	1	0.220	0.414	0	1	0.194	0.395	0	1	0.245	0.430	0	1
A-level	0.095	0.294	0	1	0.087	0.282	0	1	0.082	0.275	0	1	0.093	0.290	0	1
Other qualification	0.320	0.466	0	1	0.345	0.475	0	1	0.386	0.487	0	1	0.314	0.464	0	1
On permanent contract	0.922	0.268	0	1	0.919	0.273	0	1	0.899	0.301	0	1	0.929	0.257	0	1
Full-time	0.782	0.413	0	1	0.782	0.413	0	1	0.734	0.442	0	1	0.803	0.398	0	1
Works over 48 hours	0.474	0.499	0	1	0.455	0.498	0	1	0.388	0.487	0	1	0.494	0.500	0	1
Skill same as required	0.436	0.496	0	1	0.413	0.492	0	1	0.443	0.497	0	1	0.411	0.492	0	1
Professional	0.083	0.276	0	1	0.138	0.345	0	1	0.205	0.404	0	1	0.082	0.274	0	1
Associate Professional & Technical	0.151	0.358	0	1	0.165	0.371	0	1	0.207	0.405	0	1	0.139	0.346	0	1
Admin. & secretarial	0.203	0.402	0	1	0.173	0.378	0	1	0.206	0.405	0	1	0.173	0.378	0	1
Skilled trades plant & mach.	0.140	0.347	0	1	0.154	0.361	0	1	0.046	0.209	0	1	0.195	0.396	0	1
Personal & customer services	0.156	0.363	0	1	0.156	0.363	0	1	0.158	0.365	0	1	0.155	0.361	0	1
Elementary occupations	0.119	0.324	0	1	0.120	0.325	0	1	0.109	0.311	0	1	0.125	0.330	0	1
Union present	0.000	0.000	0	0	1.000	0.000	1	1	0.984	0.125	0	1	0.519	0.500	0	1
Log workplace age	2.996	1.015	0	5.991	3.352	1.172	0	6.215	3.442	1.184	0	6.215	3.138	1.098	0	5.991
Private establishment	0.986	0.119	0	1	0.544	0.498	0	1	0.000	0.000	0	0	1.000	0.000	1	1
Sole establishment	0.359	0.480	0	1	0.135	0.342	0	1	0.070	0.255	0	1	0.273	0.446	0	1
No. of employees/1000	0.130	0.317	0.005	3.15	0.532	0.996	0.005	9.873	0.527	1.117	0.005	9.873	0.338	0.697	0.005	7.74
Manufacturing	0.143	0.350	0	1	0.169	0.375	0	1	0.013	0.111	0	1	0.226	0.418	0	1
Construction	0.073	0.260	0	1	0.033	0.177	0	1	0.019	0.137	0	1	0.058	0.234	0	1
Wholesale & retail trade	0.180	0.385	0	1	0.062	0.241	0	1	0.000	0.000	0	0	0.147	0.354	0	1
Hotel and restaurant	0.092	0.289	0	1	0.096	0.294	0	1	0.059	0.236	0	1	0.110	0.313	0	1
Public & community services	0.072	0.258	0	1	0.196	0.397	0	1	0.303	0.459	0	1	0.089	0.284	0	1
Education	0.011	0.104	0	1	0.178	0.383	0	1	0.309	0.462	0	1	0.038	0.192	0	1
Health	0.092	0.289	0	1	0.182	0.386	0	1	0.285	0.452	0	1	0.093	0.290	0	1
Union encouraged	0.008	0.092	0	1	0.345	0.476	0	1	0.432	0.495	0	1	0.143	0.350	0	1
Urban area	0.835	0.371	0	1	0.811	0.392	0	1	0.851	0.356	0	1	0.805	0.396	0	1
Unemployment to vacancy ratio	3.536	2.571	0	9	3.265	2.232	0.8	10	3.410	2.348	0.9	10	3.333	2.358	0	9
No. of employees	6598 (33.9%)				12877 (66.1%)				5969 (30.7%)				13506 (69.3%)			
Total number of employees/workplaces	19475/1547															