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Management gender composition and the gender pay gap: Evidence from British panel data

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Women continue to earn less than their male counterparts globally. Scholars and feminist activists have suggested a partial explanation for this gender gap in earnings could be women's limited access to power structures at the workplace. Using the linked employer–employee data of the Workplace Employment Relations Study 2004–2011, this article asks what happens to the gender gap in earnings among non-managerial employees when the share of women in management at the workplace increases. The findings, based on workplace-fixed time-fixed effects regression models, suggest that workplace-level increases in the share of women in management are associated with decreases of the non-managerial gender gap in earnings. This effect appears to be largely unrelated to changes in equality and diversity policies, family-friendly arrangements and support for carers at the workplace.

KEYWORDS

equality and diversity policies, flexible working arrangements, gender pay gap, linked employer–employee data, management gender composition

1 | INTRODUCTION

There is a persistent gender pay gap on the labour market globally (Eurostat, 2017; OECD, 2018). While employee and workplace characteristics explain a large share of this gap, a substantial unexplained component remains (Mumford & Smith, 2009; Weichselbaumer & Winter-Ebmer, 2005). Scholars — and feminist activists alike — have long suggested that women's limited access to organizational power structures may be a partial explanation of the gender gap in earnings (Acker, 1992; Hultin & Szulkin, 1999). A basic premise of this argument is that having established a relative advantage in the reward distribution process, men in power will either seek to maintain this advantage or, at the very least, will not challenge it (Reskin, 1988).

A salient subsequent question, then, is what happens to gender earnings disparities as relatively more women occupy managerial positions. Given that managerial positions enable exerting influence on organizational outcomes and processes (Baron, 1991; Marini, 1989), the presence of female managers might bring about changes in the reward distribution practices. This would mean that beyond the benefits that managerial positions accrue to managers themselves, the effects of the gender composition of management spill over to subordinate positions at the workplace, ultimately decreasing or reversing inequality in non-managerial positions.

This article makes two main contributions to the study of the impact of the management gender composition on the gender gap in earnings among non-managerial employees. First, it studies the effect of the gender composition of management using large-scale nationally representative linked employer–employee panel data. The findings in this study can thus be generalized to a whole population of workplaces.

Second, this article investigates whether, and to what extent, changes in workplace policies and arrangements, such as equality and diversity policies and family-friendly arrangements, explain some of the effects of the management gender composition on the gender gap in earnings. The rich workplace-level information of the data used, the Workplace Employment Relations Study (WERS) 2004–2011 (Department for Business, Innovation and Skills, 2013), enables this question on be addressed.

Using the two-wave WERS panel data, which contain information on workplaces surveyed in 2004 and 2011, I first investigate the effect of workplace-level changes in management gender composition on the gender gap in earnings using workplace-fixed time-fixed effects regression models. In subsequent analyses testing models of mediated moderation, I study the extent to which this effect can be explained by changes in three sets of workplace policies and arrangements: equality and diversity policies, family-friendly arrangements and support for carers.

The WERS 2004–2011 data have a two-fold potential for addressing issues of endogeneity. First, they contain extensive information on workplace characteristics, thereby enabling the control of observable differences between workplaces that may confound the effect of management gender composition. Second, the panel structure of the data permits the estimation of the effect of management gender composition as the share of women in management changes over time *within* workplaces, thereby eliminating unobserved and unobservable time-constant differences between workplaces.

I find that the gender gap in earnings on average decreases with the increase of the share of women in management, both due to an average increase in women's wages and an average decrease in men's wages. In workplaces where pay is certain to be set by management at the workplace, increases in the share of women in management decrease the average gender earnings gap largely by increasing women's average wages, while not decreasing those of men. A maximal increase of the share of women in management of 100 percentage points decreases the predicted average yearly gender gap in earnings — controlling for individual and workplace characteristics — of about 3150 pound sterling, by 54 per cent. This effect appears to be largely unrelated to changes in equality and diversity policies, family-friendly arrangements and support for carers at the workplace.

2 | WHY THE GENDER COMPOSITION OF MANAGEMENT AFFECTS EARNINGS

The gender gap in earnings at the workplace can be a function of allocative and within-job earnings disparities (England, 1992; Hultin & Szulkin, 1999; Petersen & Morgan, 1995). Allocative pay disparities occur due to gender differences in access to positions with high wages, either in terms of promotion or at the time of employment. Within-job earnings disparities exist when there are gender differences in pay for the same job. Managerial gender composition may influence pay by affecting either or both.

There are a number of reasons for expecting the gender composition of management to affect earnings in non-management. The principles of homophily (McPherson, Smith-Lovin, & Cook, 2001) and homosocial reproduction (Rivera, 2013) are often used as a basis for theorizing. Homophily is the inclination of individuals to form bonds with

others who are similar to them along the lines of an ascribed group or category. Homosocial reproduction refers to people's tendency to select individuals (e.g., in hiring, promotion or pay increase) similar to themselves. Given that gender is an important dimension of categorization (Brewer & Kramer, 1985; Tsui & Gutek, 1999), individuals on average tend to prefer others whom they perceive similar to themselves in terms of gender.

Although society at large is not strongly segregated along gender lines (e.g., contexts such as families rarely allow for such segregation), within organizations, gender similarity tends to promote the creation of ties (McPherson et al., 2001). In the context of the present question, this means that managers are inclined to award, promote or support employees similar to them with regard to gender.

Even in the absence of such homophilous preferences at the workplace, women managers may affect the gender gap in earnings by influencing the practice of unequal pay based on present-day gender stereotypes or past stereotypes persisting through organizational inertia (Stainback, Tomaskovic-Devey, & Skaggs, 2010). Women may hold a weaker or no bias against female workers, or support equity efforts because they have experienced inequality themselves. Finally, the mere presence of women in management — especially in high shares — may diminish the salience of gender as a category at the workplace, thereby reducing gender stereotypes (Kanter, 1977), and in turn the gender gap in earnings.

On the employee side, the presence of managers similar in gender terms is expected to increase access to networks of power, through which employees can gain specific human capital relevant for the job, or increase their bargaining power in the reward distribution process (Byrne, 1971). Additionally, in line with role model theory (see, e.g., Beaman, Duflo, Pande, & Topalova, 2012), managers similar in gender may serve as role models for employees, providing motivation that ultimately increases employees' aspirations or productive capacities.

Thus, an increase in the share of women in management at the workplace would on average benefit women in subordinate positions because these employees would have more role model managers who support and mentor them. At the same time, as the share of women in management increases, the relative power of women managers to exert preferences, offer support or activate women's networks, increases (Cardoso & Winter-Ebmer, 2010).

Expectations concerning the effect on men's wages are less clear-cut. It may be that male employees experience relative losses of earnings because they have fewer managers to seek support from, women managers align pay with men's actual performance, and male managers have less power to extend support and exert preferences. However, it could also be that increases in the share of women in management do not affect the wages of men in non-managerial positions, if women managers, for example, do not hold the bias against male employees that men hold against female employees.

Competing arguments questioning the assumption of gender being the most salient category have also been put forward. For example, it has been argued that women may not differ from men in their devaluation of women's work. Auspurg, Hinz, and Sauer (2017) show that both men and women find that women should earn less than comparable men. Status characteristics theory, moreover, contends that in cases concerning a relationship between super- and subordinates, status, rather than gender, is the primary category according to which individuals act (Ely, 1995; Young, 1994). This entails managers keeping to their own status group (i.e., that of managers), not delivering any benefits to subordinate employees even when these are similar to them in terms of gender.

The 'queen bee syndrome' literature (Ellemers, Rink, Derks, & Ryan, 2012; Ellemers, Van den Heuvel, de Gilder, Maass, & Bonvini, 2004), further documents instances of women managers demoting subordinate women to a larger extent than male managers. One explanation for this phenomenon is that women managers relegate women in non-managerial positions as an 'individual mobility response' to the gender discrimination they themselves experience at the workplace (Derks, Ellemers, van Laar, & de Groot, 2011, p. 522).

While there is some experimental evidence for the existence of the queen bee syndrome, studies that deal with the question at hand generally find that in workplaces with larger shares of women in management, the gender gap in earnings among non-managerial employees is smaller (see, e.g., Cardoso & Winter-Ebmer, 2010; Cohen & Huffman, 2007; Hultin & Szulkin, 1999). In light of the above-delineated theoretical considerations and existing evidence, thus, I expect with the increase of the share of women in management, the earnings of women to increase

while those of men to stay the same or decrease. This translates to a decrease in the gender earnings gap among non-managerial employees.

2.1 | Management gender composition and workplace policies

Next to directly influencing the gender gap in earnings, the gender composition of management may also influence the earnings of women and men indirectly, through the institution of gender-related policies and arrangements at the workplace.

Women managers may, for instance, be more likely to implement policies that support gender equity because they have experienced gender inequality themselves, or because they are more responsive to it. These workplace policies could include diversity agendas and practices such as reviewing recruitment and promotion by gender. Insofar as these policies affect the gender pay gap, managers could affect the gap in earnings through their institution.

Next to equality and diversity policies, women managers may be more likely to implement policies that allow the employee to deviate from the 'ideal worker norm' (Budd & Mumford, 2004). One reason for this could be they themselves having experienced the double burden of work and family obligations, or because they want to provide employment opportunities to women who in the absence of such policies would be less likely to work. Reduced working hours and home-based working are two examples of such 'women-friendly' flexible arrangements.

Whether these policies do reduce the gender gap in earnings is, however, unclear. While flexibility arrangements have become common, they are still underused by employees, an important reason therefor being employees do not feel comfortable using them (Blair-Loy, Wharton, & Goodstein, 2011). Next to fearing negative career consequences from using these policies, as Williams, Blair-Loy, and Berdahl (2013) discuss, employees do not use these policies due to the so-called 'flexibility stigma' attached to them.

Existing evidence for the effects of flexible working conditions on the gender gap in earnings is mixed. Mandel and Semyonov (2005) study the effect of 'mother-friendly' policies on the gender earnings gap across 20 countries and find that although these policies have enabled more women to become economically active, they increase, rather than decrease, the gender gap in earnings. Among others, one reason for this finding could be women's decreased labour market experience and employer discrimination. Glass (2004), using US data, finds a negative effect of the use of flexible schedules, telecommuting, reduced working hours and childcare support, on mothers' wage growth; this study however looks only at the effect on women's earnings, not the gender earnings gap.

Other studies find positive effects of flexible policies on the earnings of women, but these do not necessarily translate to decreases of the gender earnings gap. Huffman, King, and Reichelt (2017), using German data, find that women-friendly diversity policies and childcare support reduce the overall gender earnings gap, and especially near the bottom of the earnings distribution. Langner (2017) studies the effect of flexible working hours on German couples' earnings, finding that both women's and men's earnings benefit from flexible working hours. Using US data, Weeden (2005) finds that employees with flexible work conditions earn at least as much, or more than, employees with non-flexible work conditions. However, this wage premium does not differ by gender.

Thus, while equality and diversity policies that explicitly address gender discrimination, such as reviewing promotion for gender discrimination, - insofar as actually implemented - may mediate the effect of the gender composition of management on the gender gap in earnings, it is less clear whether this would be the case for policies that concern working flexibility.

3 | DATA

I use the Workplace Employment Relations Study two-wave panel data (hereafter referred to as 'WERS 2004–2011') — a nationally representative sample of all workplaces in Britain that have at least five employees. WERS 2004–2011 are linked employer–employee data in that they combine information on both workplaces and employees at these

workplaces. Workplace-level data is collected via face-to-face structured interviews with the most senior manager at the workplace. Employee data is collected through self-completion surveys with up to 25 randomly selected employees from each workplace.

Given that the same workplaces were interviewed at two time points, in the years 2004 and 2011, the workplace-level data can be treated as panel data. While different employees from each workplace were surveyed in the two waves, this is not an issue since the main variable of interest — management gender composition — is a workplace characteristic.

Of the 989 surveyed workplaces, 600 returned at least one employee questionnaire in both waves. Managers, directors and senior officials (about 1600) were dropped from the employee sample, given the interest in the earnings gap in non-managerial positions. This yields a sample of 600 workplaces and 13,635 employees, 7175 of which were surveyed in 2004 and 6460 in 2011.

The analytic sample was constructed through listwise deletion of the missing values. Table A1 in the Appendix reports the number of cases lost with each step. The final analytic sample of 452 workplaces and 9245 employees contains about 75 per cent of the initial workplaces and 68 per cent of the employees initially present in the sample. Using multiple imputation as an alternative to listwise deletion of the missing values (see 'Additional Analyses' in the accompanying replication package) does not substantively change the results.

The WERS 2004–2011 is a nationally representative sample of workplaces; the characteristics of the workplaces in the sample thus fairly match the characteristics of workplaces in the population. The majority of existing studies look at workplaces only in the private sector (e.g., Bastos & Monteiro, 2011; Cardoso & Winter-Ebmer, 2010; Flabbi, Macis, Moro, & Schivardi, 2016; Hirsch, 2013; Hultin & Szulkin, 2003). Analyses are often based on data from only one workplace or organization. Penner, Toro-Tulla, and Huffman (2012), for example, study establishments within a single grocery retailer; Abraham (2017) uses data from multiple branches in one financial services firm; Hedija (2015) and Hedija (2016), respectively, study two and one hospital, and Srivastava and Sherman (2015) look into a single financial services firm.

A few studies employ data with samples representative of all industries (namely, Abendroth, Melzer, Kalev, & Tomaskovic-Devey, 2017; Cohen & Huffman, 2007; Hultin & Szulkin, 1999; LaMattina, Picone, Ahoure, & Kimou, 2017). However, these studies are subject to other limitations that may limit the generalizability of their findings. Abendroth et al. (2017), for example, study only large workplaces. Cohen and Huffman (2007) treat the industry as unit of analysis in the absence of linked employer–employee data. Hultin and Szulkin (1999) analyse data that consist of only one employee per workplace.

Using the large-scale WERS 2004–2011 data enables the generalizability of the findings to the whole population of UK workplaces. Regardless of whether or not one finds generalizability and speaking about an average effect desirable, evidence from single sectors or workplaces may be atypical and thus not say much about effects of the share of women in management on the gender gap in earnings elsewhere. Moreover, having workplaces with different characteristics in the sample yields variation that can be exploited in controlling for characteristics that may confound the effect of the management gender composition on the earnings of women and men.

4 | VARIABLES

4.1 | Management gender composition

In indicating the number of women and men in management, workplaces were instructed to adhere to a definition of managers and senior officials as those who "determine policy, direct and coordinate functions, often through a hierarchy of subordinate managers and supervisors" (Department for Business, Innovation and Skills, 2013). Line managers and supervisors are excluded from this group.[1]

The gender composition of management in the analyses that follow is a workplace-level indicator operationalized as the percentage of women managers of all managerial employees at the workplace. Table 1 reports the summary statistics

TABLE 1 Summary statistics and coding of workplace-level variables

	Mean	*SD*	Min	Max	Description
Female managers	38.90	32.70	0	100	Continuous measure of management gender composition. Female managers as percentage of all managerial employees.
Workplace size	479.76	1102.62	5	11,566	Workplace size operationalized as number of employees. Analyses use natural logarithm transformation to correct for skew.
Female employees	51.60	28.73	0	100	Female employees as percentage of all employees.
Share managers	10.00	10.59	0	100	Managers as percentage of all employees. Proxy for the level of bureaucratization of the workplace.
Industry					Industry in which the workplace operates; 12 categories.
Manufacturing	0.14		0	1	
Electricity, gas and water	0.01		0	1	
Construction	0.05		0	1	
Wholesale and retail	0.11		0	1	
Hotels and restaurants	0.03		0	1	
Transport and communication	0.07		0	1	
Financial services	0.02		0	1	
Other business services	0.09		0	1	
Public administration	0.09		0	1	
Education	0.13		0	1	
Health	0.20		0	1	
Other community services	0.05		0	1	
Legal status					Legal status of the workplace; five categories.
Public limited company	0.17		0	1	
Private limited company	0.31		0	1	
Other trading sector	0.24		0	1	
Local/central govt	0.24		0	1	
Other public sector	0.03		0	1	
Foreign-owned	0.11		0	1	Dichotomous variable indicating whether the workplace is foreign-owned, with domestic ownership as reference category.
Workplace age					Number of years the workplace has been in operation; four categories.
<5 years	0.05		0	1	
5–9 years	0.10		0	1	
10–24 years	0.29		0	1	
≥25 years	0.57		0	1	
Observations	904				

Note. WERS 2004–2011, own calculations.

and coding of all workplace-level variables used in the analyses. The average share of women in management across the 452 workplaces in the two waves is 39 per cent. Higher values of the variable indicate higher shares of female managers.

4.2 | Earnings

The outcome variable, weekly pre-tax earnings in pound sterling, is an employee-level variable. This measure includes pay for overtime work and bonuses. The earnings in the two waves are made comparable by deflating the 2011 wages to 2004 wages. The original categorical variable has been transformed into a continuous variable by taking

the midpoints of the categories.[2] Table 2 provides the summary statistics and coding of all employee-level variables. The average weekly wage of all employees in the sample is 335 pound sterling. On average men earn about 120 pound sterling more than women per week (the average weekly earnings of men and women, respectively, are 400 and 280 pound sterling; see Table A3). This translates to an average yearly gender gap in earnings in the analytic sample — not controlling for employee and workplace characteristics — of about 6200 pound sterling.

4.3 | Predictor of interest

Employee gender is coded as a dichotomous variable (unfortunately, most of the existing survey data record gender as binary), with men as reference category. Fifty-six per cent of the employees in the sample are women. The main predictor of interest is the interaction of employee gender and the share of female managers, given the interest in the effect of the gender composition of management on the wages of women and men.

4.4 | Workplace characteristics

Existing research suggests that workplaces managed by women differ systematically from those managed by men. For example, women are more likely to manage workplaces that employ relatively many women, are smaller, more bureaucratic, in the public sector and in lower paying industries (Bertrand & Hallock, 2001; Cardoso & Winter-Ebmer, 2010; Cohen & Huffman, 2007; Hultin & Szulkin, 1999).

At the same time, these workplace characteristics are possibly also related to the gender gap in earnings. For example, the gender gap in earnings tends to be larger in larger workplaces, sectors that employ relatively many men, the private sector and high paying industries (Charles & Grusky, 2005; Cohen & Huffman, 2003). As such, these workplace characteristics represent possible confounders of the effect of management gender composition on the earnings of women and men. To account for this, I control for a number of workplace characteristics that are possibly related to both the management gender composition and the gender gap in earnings.

Workplace size is operationalized as the total number of employees at the workplace. The average workplace size is 480 employees. I furthermore control for the share of women and the share of managers of all employees. The former is used as a measure of the degree of feminization and the latter as a proxy for the level of bureaucratization of the workplace. Women make on average about half of the workforce in the sample; the average share of managers of all employment is 10 per cent. I also control for industry, legal status, type of ownership (foreign or domestic) and age of the workplace. Eleven per cent of the workplaces are foreign-owned and more than half of them have existed for longer than 25 years.

Table A2 in the Appendix shows the summary statistics of these workplace characteristics in workplaces grouped by the share of female managers. Indeed, workplaces managed solely by women are much smaller (40 employees on average) than those fully managed by men (140 employees on average). Generally, the larger the share of women in management, the larger the share of female employees and the more bureaucratized the workplace is. Furthermore, female managers are concentrated in health and education and governmental workplaces. Foreign-owned workplaces are managed by a male majority.

4.5 | Employee characteristics

Next to workplace characteristics, I control for a number of employee characteristics that could be related to both gender and earnings, and thus explain some of the gender gap in earnings. Specifically, these are number of hours worked, number of years worked at the current workplace, amount of for-the-job training, organizational commitment, union membership, age, the presence of a partner and children, and education.

Table A3 in the Appendix shows to what extent women and men differ with respect to these characteristics. Women in the sample work on average fewer hours than men, report higher organizational commitment, are less likely to be members of a union or staff association and are less likely to have a partner or dependent children.

TABLE 2 Summary statistics and coding of employee-level variables

	Mean	*SD*	Min	Max	Description
Wage	335.08	201.16	24	971	Weekly pre-tax pay in pound sterling, including pay for overtime work and bonuses. Recoded as continuous variable by taking the midpoint of the original categorical variable (14 categories), following the methodological advice of Hout (2004).[2] 2011 wages are deflated to 2004 wages. Non-logged earnings are preferred over logged earnings because taking the natural logarithm does not reduce the variance/skewness of the earnings distribution.
Female	0.56		0	1	Dichotomous variable of employee gender, with male as reference category.
Hours worked	34.91	12.35	0	80	Continuous measure of usual weekly working hours including overtime, with maximum number of hours top-coded to 80. This measure is preferred over contractual hours because the wage variable records pay including overtime.
Tenure					Number of years the employee has worked at the current workplace; five categories.
Less than 1 year	0.13		0	1	
1 to less than 2 years	0.11		0	1	
2 to less than 5 years	0.25		0	1	
5 to less than 10 years	0.21		0	1	
10 years or more	0.30		0	1	
Training					Amount of training (other than health and safety training), either paid for or organized by the employer, that the employee has received during the last 12 months; six categories.
None	0.31		0	1	
Less than 1 day	0.12		0	1	
1 to less than 2 days	0.16		0	1	
2 to less than 5 days	0.23		0	1	
5 to less than 10 days	0.10		0	1	
10 days or more	0.08		0	1	
Commitment	2.08	2.47	−6	6	Continuous additive organizational commitment scale, based on three survey items measuring self-reported organizational commitment and motivation.
Union member	0.41		0	1	Dichotomous variable of employee trade union membership, with no trade union membership as reference category.
Age					Age of the employee; six categories. There is no continuous measure of age available in the data.
<20 years	0.03		0	1	
20–29 years	0.17		0	1	
30–39 years	0.24		0	1	
40–49 years	0.27		0	1	
50–59 years	0.23		0	1	
60 + years	0.06		0	1	
Partner	0.68		0	1	Dichotomous variable indicating whether the employee has a partner, with no partner as reference category.

(Continues)

TABLE 2 (Continued)

	Mean	*SD*	Min	Max	Description
Children	0.39		0	1	Dichotomous variable indicating presence of any dependent children, with no dependent children as reference category.
Education					Highest academic qualification obtained; eight categories.
None	0.16		0	1	
Other	0.05		0	1	
CSE or equivalent	0.09		0	1	
O-level or equivalent	0.27		0	1	
1 A-level or equivalent	0.05		0	1	
2+ A-levels or equivalent	0.09		0	1	
Degree or equivalent	0.21		0	1	
Postgrad or equivalent	0.08		0	1	
Observations	9254				

[a]Hout, M. (2004). *Getting the most out of the GSS income measures*. Chicago, IL: National Opinion Research Center.

Note. WERS 2004–2011, own calculations.

4.6 | Workplace policies and arrangements

Finally, Table 3 lists the workplace policies and arrangements. These are classified as seven equality and diversity policies, six family-friendly arrangements and two arrangements for support for carers. This classification is made on substantive grounds rather than a methodological consideration of unidimensionality. Two different arrangements classified as family-friendly (e.g., flexitime and home-based working) may or may not be measuring the same thing. Coded dichotomously, the value 1 (as opposed to 0) indicates the presence of the particular policy or arrangement at the workplace.

I additionally construct six count summary indicators from the 15 workplace policies and arrangements. The first set of three indicates whether the workplace has at least one policy from each of the three types (coded dichotomously, with the value 1 indicating that at least one policy is present and the value 0 that no policy is present). The second set of three indicates the number of policies from each type. Ninety-two per cent of all workplaces have at least one family-friendly arrangement, followed by at least one equality and diversity policy (71 per cent), and finally at least one arrangement for support for carers (42 per cent).

The detailed information on workplace policies and arrangements makes the WERS 2004–2011 data unique for studying the effect of the management gender composition on the gender gap in earnings in relation to workplace policies. Existing research based on data from multiple time points (e.g., Flabbi et al., 2016; Hensvik, 2014) largely uses data from administrative registers, which contain mostly quantitative and little, detailed qualitative information on the workplace.

5 | ANALYTICAL STRATEGY

Identifying the effect of the management gender composition on employees' earnings is challenging. One could compare workplaces that have many female managers to workplaces that have many male managers and observe the earnings of women and men across these workplaces. The problem with such an approach, however, is that, as discussed above, workplaces that are managed by women may be different from those managed by men in a number of respects that possibly relate to the gender gap in earnings at the workplace.

TABLE 3 Summary statistics and coding of workplace policies and arrangements

	Mean	*SD*	Min	Max	Description
Equality and diversity					
Diversity strategic plan	0.50		0	1	Presence of a formal strategic plan covering employee diversity which sets out objectives and how they will be achieved, with no such plan as reference category.
Encourages women applicants	0.16		0	1	Presence of any special procedures to encourage applications from women returning to work after having children and women in general when filling vacancies, with no such procedures as reference category.
Monitors recruitment by gender	0.45		0	1	Whether workplace monitors recruitment and selection by gender, with no monitoring by gender as reference category.
Reviews recruitment for gender discrimination	0.35		0	1	Whether workplace reviews recruitment and selection procedures to identify indirect discrimination by gender, with no reviewing by gender as reference category.
Monitors promotion by gender	0.20		0	1	Whether workplace monitors promotions by gender, with no monitoring by gender as reference category.
Reviews promotion for gender discrimination	0.22		0	1	Whether workplace reviews promotion procedures to identify indirect discrimination by gender, with no reviewing by gender as reference category.
Reviews pay by gender	0.17		0	1	Whether workplace reviews relative pay rates by gender, with no reviewing by gender as reference category.
Family-friendly arrangements					
Home-based working	0.47		0	1	Presence of arrangements to work from home in normal working hours, with no such arrangements as reference category.
Flexitime	0.49		0	1	Presence of flexitime arrangements (where an employee has no set start or finish time but an agreement to work a set number of hours per week or per month), with no such arrangements as reference category.
Job share	0.49		0	1	Presence of job sharing schemes (sharing a full-time job with another employee), with no such schemes as reference category.
Reduced hours	0.82		0	1	Presence of reduced hours (the ability to reduce working hours, e.g., switching from full-time to part-time employment), with no such arrangements as reference category.

(Continues)

TABLE 3 (Continued)

	Mean	*SD*	Min	Max	Description
Compressed hours	0.37		0	1	Presence of compressed hours (i.e., working standard hours across fewer days), with no compressed hours as reference category.
Term-time working	0.37		0	1	Presence of arrangements to work only during school term times, with no such arrangements as reference category.
Support for carers					
Nursery places	0.13		0	1	Whether any employees entitled to workplace nursery or nursery linked with workplace, with no employees entitled to such arrangements as reference category.
Financial help childcare	0.38		0	1	Whether workplace provides financial help with childcare (e.g., childcare vouchers, loans, repayable contributions to fees for childcare outside the workplace, subsidized places not located at the workplace), with no financial help as reference category.
Summary indicators					
Any equality and diversity policy	0.71		0	1	Whether workplace has at least one equality and diversity policy, with none as reference category.
Any flexible work arrangements	0.92		0	1	Whether workplace has any flexible work arrangements, with none as reference category.
Any support for carers	0.42		0	1	Whether workplace offers any support for carers, with no support as reference category.
Number of equality and diversity policies	2.04	2.01	0	7	Number of different equality and diversity policies.
Number of flexible work arrangements	3.00	1.78	0	6	Number of different flexible work arrangements.
Number of support for carers	0.51	0.65	0	2	Number of different arrangements for support for carers.
Observations	904				

Note. WERS 2004–2011, own calculations.

These differences make it difficult to establish whether the effect on earnings is due to the gender composition of management, or other workplace characteristics that are not randomly assigned across different management gender compositions.

One way in which this article attempts to circumvent this challenge is by controlling for a number of observable workplace characteristics introduced in the previous section. Next to these observable characteristics, however, there might also be unobserved and unobservable workplace characteristics that influence the gender gap in earnings, and that systematically differ across different gender compositions of the management.

The WERS panel data enables this latter issue to be addressed. Since information about the same workplace is recorded at two time points — in 2004 and in 2011 — one can compare employees and their wages over time when the management gender composition changes *within the workplace*. I do this using workplace-fixed time-fixed effects regression analysis. Workplace-fixed effects estimations are based only on within-workplace variance, meaning that the effect of the management gender composition on the earnings of men and women at a workplace is identified by

changes in the gender composition of management within the workplace between 2004 and 2011. This filters out unobserved and unobservable time-constant differences between the different workplaces. The inclusion of time-fixed effects controls for the possible influence of time trends.

There has been considerable change in the workplace-level gender management composition between 2004 and 2011. About 80 per cent of the workplaces had a different share of women in management in 2004 and in 2011. Women were more likely to manage workplaces in 2011 than in 2004, the average share of women in management in 2004 being 36 per cent and that in 2011, 41 per cent.

Table 4 shows the workplace-level changes in the share of women in management between 2004 and 2011. Of all workplaces with a fully male-dominated management in 2004, only 39 per cent had an all-male management in 2011. The majority of workplaces with fully female-dominated management in 2004 (66 per cent) continued having a female-dominated management in 2011.

The share of women in management did not increase at all workplaces between the two waves. The largest share of workplaces that experienced a decrease were those that had between 75 and 99 per cent women in management in 2004. Only at 12 per cent of these workplaces was the share within the same range in 2011. Sixty-four per cent of these workplaces had between 50 and 74 per cent women managers in 2011.

Is the effect of the change in the management gender composition on the gender gap in earnings associated with changes in workplace policies and arrangements? As elaborated earlier in the theoretical section, it could be that the relative increase of the share of women in management is related to the introduction or abolishment of workplace policies and arrangements that affect the gender earnings gap.

To investigate whether this is the case, I run mediated moderation analyses, that is, analyses that model workplace policies and arrangements as mediators of the interaction between employee gender and share of women in management (i.e., the effect of employee gender on earnings at different levels of (moderated by) the share of women in management).

There are three conditions that need to be satisfied to conclude that changes in policies mediate the effect of changes in the gender composition of management on the gender earnings gap. First, the effect of changes in management gender composition on the gender pay gap should be statistically significant. Second, workplace-level changes in management gender composition should be significantly associated with changes in workplace policies

TABLE 4 Share of female managers 2004–2011

	Panel A: Main development Percentage of female managers of all managers					
	0%	1–24%	25–49%	50–74%	75–99%	100%
2004	23	21	19	21	4	12
2011	15	20	22	26	3	14
	Panel B: 2004–2011 changes Percentage of female managers of all managers, 2011					
Percentage female managers 2004	0%	1–24%	25–49%	50–74%	75–99%	100%
0%	39	24	16	14	0	7
1–24%	12	54	27	7	0	0
25–49%	9	14	40	34	1	2
50–74%	6	4	18	49	8	15
75–99%	0	0	12	64	12	12
100%	4	0	7	16	7	66
Observations	904					

Note. WERS 2004–2011, own calculations.

and arrangements. Lastly, changes in workplace policies and arrangements should have an effect on the gender earnings gap (Muller, Judd, & Yzerbyt, 2005).

Accordingly, I test three regression models. The first one models employee earnings as a function of the interaction of the share of women managers and employee gender. The second models changes in workplace policies and arrangements as a function of changes in the share of women in management. The third model adds workplace policies to the first model, testing whether changes in these affect the gender gap in earnings beyond the effect of the management gender composition on earnings. I test this set of models for each of the workplace policies and arrangements.

If the three conditions are satisfied, suggesting the presence of mediated moderation, the magnitude of the effect of the share of women in management on the wages of women and men decreases in absolute size after the inclusion of the particular workplace policy or arrangement to the model. This decrease of the effect size represents the share of the effect of change in share of women managers on the gender earnings gap mediated by the introduction or abolishment of the policy.

Table A4 in the Appendix shows the workplace-level changes in policies and arrangements between 2004 and 2011. The share of workplaces that have changed policies between the two waves is sufficiently large to allow the estimation of workplace-fixed effects using these indicators. Depending on the type of policy, between 7 and 50 per cent of the workplaces had a change in policy between the two waves. Not all workplaces changed policies in the direction of introducing a policy that was not present in 2004 in 2011. A substantial share of workplaces reported abolishing policies between the two waves.

6 | FINDINGS

6.1 | The effect of management gender composition on the earnings of women and men

Table 5 reports the results from the workplace-fixed time-fixed effects regression analysis. Model 1 includes only the predictors of interest. Model 2 adds the employee-level controls and Model 3 adds the workplace-level controls.

The log-likelihood ratio (LR) test, which tests whether each subsequent model fits the data better than the previous one, is significant for Model 2 and Model 3, indicating that the employee-level controls (Model 2) and workplace-level control variables (Model 3), are useful additions to the model.

The adjusted *R*-squared values, which show the share of the variation in employee earnings explained by the predictors in the models, increase from Model 1 through Model 3. The additional sets of variables contribute substantially to the increase in explained variation in employee earnings. The predictors of interest (Model 1) explain about 1 per cent of the variation in employee earnings. Adding the employee characteristics (Model 2) substantially increases the explained earnings variation. In the final model (Model 3), the predictors together explain 38 per cent of the variation in earnings.

The employee gender coefficient in Model 1 shows that without controlling for additional employee and workplace characteristics, when there has been no change in the share of women managers, women on average earn about 111 pound sterling per week less than men. The coefficients for the share of women managers and its interaction with employee gender suggest that an increase in the share of women in management decreases the average earnings of men and increases those of women. The magnitude of these effects decreases with the addition of the control variables in the subsequent models, but remains substantial in Model 3.

In Model 3, the coefficient for the employee gender represents the average difference in weekly earnings between women and men at 0 percentage point increase in the share of female managers, controlling for other employee and workplace characteristics. This coefficient means that on average, in workplaces with no increase in the share of women managers, women earn about 72 pound sterling per week less than comparable men. The

TABLE 5 Workplace-fixed Time-fixed Effects Models; Dependent variable: weekly wage

	Model 1	Model 2	Model 3
Female	-111.4*** (6.239)	-72.02*** (5.045)	-71.90*** (5.069)
Female managers	-0.349* (0.164)	-0.251 (0.131)	-0.245 (0.139)
Female x Female managers	0.517*** (0.139)	0.318** (0.110)	0.325** (0.111)
Employee-level controls	No	Yes	Yes
Workplace-level controls	No	No	Yes
Year	-11.05** (3.384)	-17.81*** (2.755)	-20.27*** (2.913)
Constant	401.7*** (6.158)	-16.51 (11.67)	-23.23 (33.46)
adj. R^2	0.0134	0.3778	0.3805
LR Test (Prob)		0.000	0.000
Number of employees	9,254	9,254	9,254
Number of workplaces	452	452	452

Standard errors in parentheses.

Note. WERS 2004–2011, own calculations. Model 1 includes the predictors of interest; Model 2 adds the employee-level controls; Model 3 adds the workplace-level controls; Model 4 adds the interaction of employee gender and share of female managers.

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

coefficient for share of female managers at the workplace is the average effect of 1 percentage point increase in the share of women managers on men's weekly earnings. On average, men's earnings decrease by 0.245 pound sterling per week with each percentage point increase in the share of women in management.

To obtain the effect of 1 percentage point increase of share of female managers on the earnings of women, one needs to add the interaction effect to the main effect of share of female managers, obtaining an effect of 0.08 pound sterling. This value means that on average, women's earnings increase by 0.08 pound sterling per week with each percentage point increase in the share of women in management.

What would be the maximum effect of the increase of the share of women in management on the gender gap in earnings? To calculate this, let us envision a workplace that moved from fully male managed in 2004 to fully managed by women in 2011, thereby experiencing a change of 100 percentage points in the share of women managers. Such a change would translate to an average of 8 pound sterling per week more for women and 24.5 pound sterling per week less for men.

The weekly gender gap in earnings would thus decrease by an average of 32.5 pound sterling. This amounts to an average decrease in the yearly gender earnings gap by 1690 pound sterling. While this decrease does not completely eliminate the predicted average yearly gender gap in earnings — controlling for individual and workplace characteristics — of about 3150 pound sterling, it does decrease it by 54 per cent, which is quite a substantial decrease.

Figure 1 visualizes these effects. The *y*-axis shows the predicted average weekly earnings of non-managerial employees. The *x*-axis shows the percentage point increase in share of female managers at the workplace. The solid line shows the predicted average earnings of men and the dashed line shows women's predicted average earnings.

Figure 1 shows that in workplaces at which the share of women in management did not increase between 2004 and 2011 (0 percentage points on the *x*-axis), men on average earn notably more than women. As we move along the *x*-axis from 0 to 100 percentage point increase in share of female managers, the average weekly earnings of women increase and those of men decrease. At a 100 percentage point increase in the share of women in management, the gender gap in earnings remains significant but is substantially decreased.

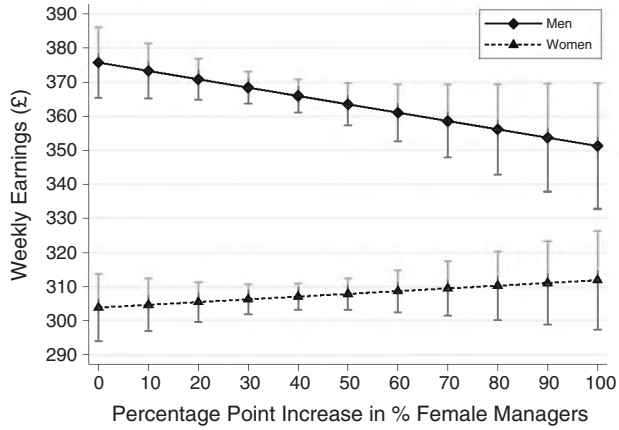

FIGURE 1 Predicted average weekly earnings for women and men.
Note. 95% Confidence Intervals shown

The reduction in the gender earnings gap owing to an increased share of women in management at the workplace is due to a decrease in the average earnings of men, more so than an increase in the average earnings of women. The larger magnitude of the average effect for men (−0.245 pound sterling) than the one for women (0.08 pound sterling) is reflected clearly in the steeper downward slope of the solid line compared to the flatter upward slope of the dashed line in Figure 1.

6.2 | Management gender composition and workplace policies and arrangements

The effect of the interaction between share of women in management and employee gender on earnings, as shown earlier, is statistically significant and substantially meaningful. The other two coefficients, however, are significant only in the case of two out of the 21 workplace policies and arrangements: (i) home-based working; and (ii) reviewing recruitment for gender discrimination. The effects concerning the rest of the policies are not only statistically insignificant, but also substantively small.

Table 6 shows the results from the inclusion of home-based working (Model 2) and reviewing recruitment for gender discrimination (Model 3) to the model regressing employee earnings on (the interaction of) the share of women in management and employee gender, controlling for other employee and workplace characteristics.

Model 1 is identical to Model 3 in Table 5. To recapitulate, testing this model shows that on average, men's weekly earnings decrease by 0.245 pound sterling with each percentage point increase in the share of women in management, controlling for employee and workplace characteristics. Women earn on average 0.08 pound sterling more with each percentage point increase in the share of women managers.

Models 2 and 3 demonstrate, first, what happens with the effect of the management gender composition on the earnings of women and men when home-based working and reviewing recruitment for gender discrimination, respectively, are added to Model 1. Second, they show, by including an interaction term between gender and home-based working and reviewing recruitment for gender discrimination, respectively, how these two affect the gender gap in earnings.

When home-based working is added to Model 1 (Model 2), the magnitude of the effect of the management gender composition on the gender gap in earnings decreases compared to the effect in Model 1. Specifically, an increase in the share of women in management by 1 percentage point decreases the weekly gender earnings gap by 0.302 pound sterling (0.325 pound sterling in Model 1). This decrease in the magnitude of the effect of about

TABLE 6 Home-based working and review of recruitment for gender discrimination; dependent variable: weekly wage

	Model 1	Model 2	Model 3
Female	−71.90*** (5.069)	−77.68*** (5.631)	−80.09*** (6.124)
Female managers	−0.245 (0.139)	−0.222 (0.140)	−0.272 (0.140)
Female × Female managers	0.325** (0.111)	0.302** (0.111)	0.334** (0.111)
Home-based working		12.97* (6.032)	
Home-based working × Female		14.28* (6.060)	
Reviews recruitment for gender discrimination			2.008 (5.713)
Reviews recruitment for gender discrimination × Female			14.07* (5.954)
Employee-level controls	Yes	Yes	Yes
Workplace-level controls	Yes	Yes	Yes
Year	−20.27*** (2.913)	−20.27*** (2.931)	−19.85*** (2.921)
Constant	−23.23 (33.46)	−31.59 (33.73)	−24.30 (33.45)
Adj. R^2	0.3805	0.3808	0.3809
Number of employees	9254	9254	9254
Number of workplaces	452	452	452

Standard errors in parentheses.

Note. WERS 2004–2011, own calculations. Model 1 models employee wage as a function of (the interaction of) share of female managers and employee gender, controlling for employee and workplace characteristics; Model 2 adds the home-based working arrangement and its interaction with employee gender; Model 3 adds the policy of reviewing recruitment for gender discrimination and its interaction with employee gender.

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

9 per cent represents the share of the effect of the share of women in management on the gender earnings gap mediated by the introduction of home-based working at the workplace between 2004 and 2011.

That the introduction of home-based working decreases the gender gap in earnings is evident if one considers the coefficients concerning the effect of the introduction of home-based working on the earnings of men and women. On average, introducing a home-based working arrangement at the workplace increases men's weekly earnings by 12.97 pound sterling and women's weekly earnings by 14.28 pound sterling. Given that the increase in the average wages of women is larger than that of men, the gender gap in earnings decreases.

When reviewing recruitment for gender discrimination is introduced to the model (Model 3), the magnitude of the effect of the share of women in management on the gender gap in earnings *increases* compared to the effect in Model 1. An increase in the share of women managers by 1 percentage point decreases the weekly gender earnings gap by 0.334 pound sterling. Given this increase in the size of the effect by about 3 per cent, the introduction of reviewing recruitment for gender discrimination at the workplace appears to suppress the effect of the management gender composition on the gender gap in earnings.

Understanding why reviewing recruitment for gender discrimination at the workplace appears to suppress the effect of the share of women in management on the gender earnings gap is challenging. In theory, introducing reviewing of recruitment for gender discrimination at the workplace would suppress the effect of the share of women managers on the gender gap in earnings if: (i) increases in the share of women managers are associated with introduction of reviewing recruitment for gender discrimination; and (ii) the introduction of reviewing recruitment for gender discrimination increases the gender gap in earnings.

However, the introduction of reviewing recruitment for gender discrimination appears to decrease the average gender gap in earnings, by increasing women's earnings by an average of 14.07 pound sterling, and not substantially affecting those of men. Thus, it could be that other covariates relevant for the relationship between reviews of recruitment for gender discrimination and the gender gap in earnings are missing from the present analysis.

7 | ADDITIONAL ANALYSES

7.1 | Managers and autonomy to determine pay

The idea that the management gender composition affects the earnings of non-managerial employees is underlined by the assumption that they have the autonomy to do so. The definition of managers provided to the workplaces at the time of the interview, particularly where managers are defined as those who '[…] determine policy, direct and coordinate functions, often through a hierarchy of subordinate managers and supervisors' (Department for Business, Innovation and Skills, 2013), suggests that managers have the power to influence outcomes concerning their subordinates. However, workplaces' adherence to this definition does not guarantee that managers have the autonomy to influence the earnings of non-managerial employees.

A more direct check of this assumption would be to look into the ways in which pay of non-managerial employees is determined. Figure 2 shows the predicted average weekly earnings for women and men in workplaces grouped based on the way the earnings of the largest non-managerial group at the workplace are determined: (i) through industry-wide agreements; (ii) collective bargaining at an organization level; (iii) collective bargaining at the workplace itself; (iv) set by management at a higher level in the organization; (v) set by management at the workplace itself; and (vi) set by an independent pay review body.

In all six panels in Figure 2, the *y*-axes show the predicted average weekly earnings of non-managerial employees. The *x*-axes show the percentage point increase in share of female managers at the workplace. The dashed lines show the predicted average weekly wages of women and the solid lines show men's predicted average wages.

The figure in the middle panel of the second row of Figure 2 visualizes the findings for workplaces of which one is sure to have earnings set by the management at the workplace itself. This figure demonstrates that in workplaces where the earnings of the largest non-managerial group of employees is determined by the management, the change in the share of women in management substantially influences the gender gap in earnings.

Men earn more than women in workplaces with no change in the share of female managers between 2004 and 2011. With the increase in percentage point increase of the share of women in management, the gender gap in earnings decreases and becomes statistically insignificant after a 70 percentage point increase in the share of female managers. While in the overall findings, presented in Figure 1, the gender earnings gap is decreased due to the decrease in the average earnings of men more so than the increase in the average earnings of women, the conclusion here is different. Namely, the gender gap decreases largely due to the increase in the average earnings of women.

The left panel of the second row in Figure 2 appears to mirror the general findings in Figure 1 most closely. The gender gap in earnings becomes statistically insignificant at 70 percentage point increases in the share of women managers, which is largely due to a decrease in the average earnings of men.

In workplaces with pay set by an independent pay review body, the gender gap in earnings increases with the increase in the share of women managers. In workplaces with collective bargaining at the workplace itself, both women and men, but especially women, appear to earn less on average when the share of women in management increases. The reverse is true for workplaces with pay set by collective bargaining at an organization level.

7.2 | Is the effect of management gender composition linear?

It could be that the effect of the change in the management gender composition on the gender earnings gap is not linear. For example, a percentage point increase of 10 may suffice for the effect on the gender earnings gap to take place, with any additional increases not making any difference. This would mean that the predicted lines in Figure 1 change until a 10 percentage point increase on the *x*-axis and are flat afterwards. Alternatively, the effect may disappear when a more substantial change is achieved, for example, at 50 percentage point increase in the share of women managers.

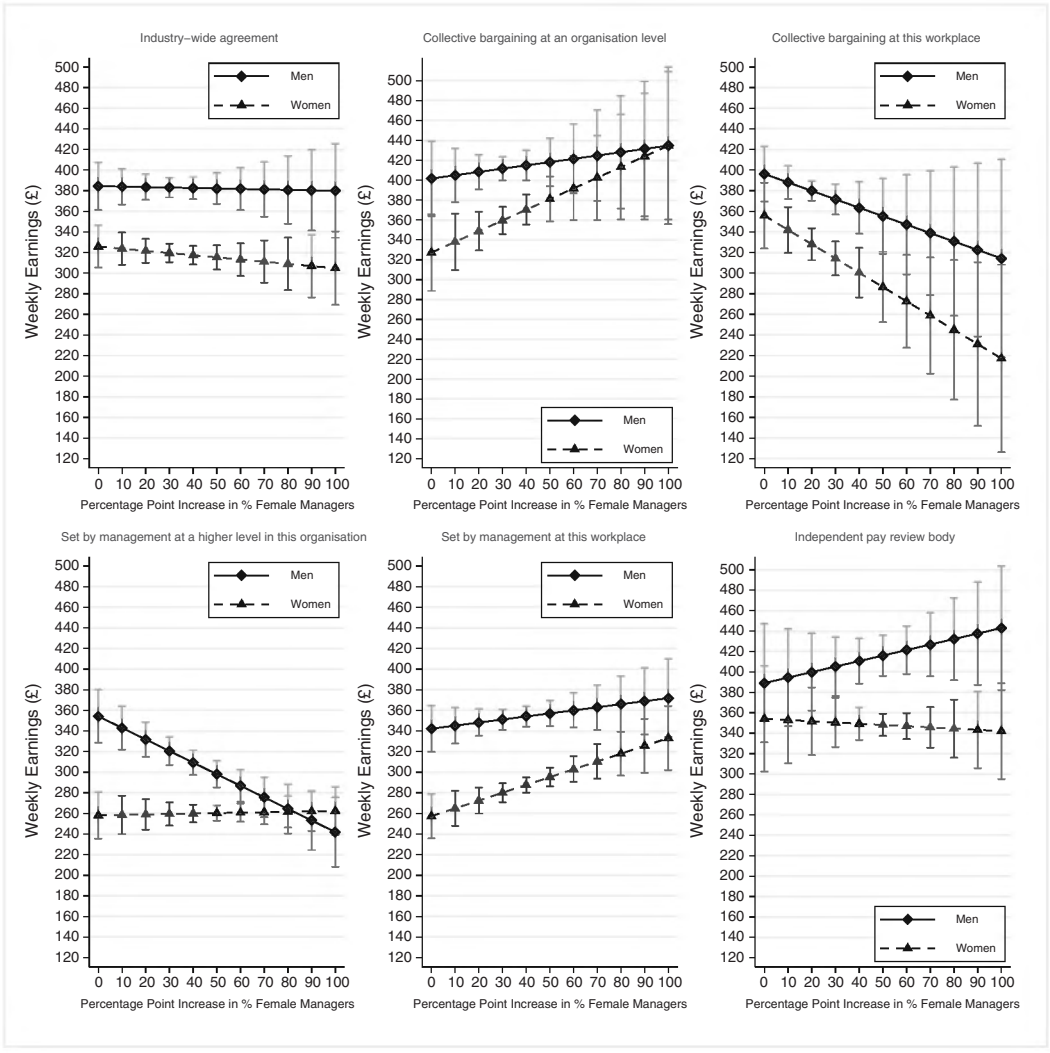

FIGURE 2 Predicted average weekly earnings for women and men by pay system.
Note. Pay system concerns the way pay for the largest non-managerial group at the workplace is determined

To investigate such scenarios, in additional analyses to be found in the accompanying replication package, I test regression splines at 10, 25, 50, 60, 75 and 90 percentage point increase in the share of women in management. The regression splines analysis tests whether the average effect of the management gender composition changes at any of these percentage point increases in the share of female managers. The models with splines fit the data worse than the models without splines; thus, the effect appears to be linear in these data.

7.3 | The issue of ecological fallacy

Finally, some studies (e.g., Penner et al., 2012; Srivastava & Sherman, 2015) have pointed to the possible ecological fallacy brought about by the use of aggregate measures of managers' gender, such as the share of female managers at the workplace. The correlation between the aggregate management gender composition and the gender pay gap may be spurious, if the percentage of female managers and the gender gap among non-managerial workers are both

driven by workplaces' egalitarian ideals. For this reason, these studies advocate for using data linking employees directly to their managers.

While this criticism is valid, it does not fully recognize that the effects on employees' wages may also manifest through the aggregate gender composition of the management. Role modelling, for example, does not necessitate direct interaction between employees and managers, provided that the gender composition of the management is visible to employees.

8 | CONCLUSIONS

Resting on the suggestion that women's limited access to organizational power structures may explain their relative disadvantage in the reward system, this article asked what happens to the gender gap in earnings as relatively more women occupy managerial positions. Using the workplace-level share of women in management as a measure of management gender composition, the analyses showed that an increase in the share of women managers at the workplace on average decreases the gender gap in earnings. A change in the share of women managers of a 100 percentage points — the maximum possible — decreases the predicted average yearly gender gap in earnings of about 3150 pound sterling, controlling for individual and workplace characteristics, by 54 per cent.

In practical terms, whether a change of 100 percentage points in the share of women in management — independent of whether one would want such a change — is drastic, depends on the number of managers at the workplace. In workplaces with only one manager, a 100 percentage point change is easily achievable. But even if one takes a 100 percentage point change in the share of women managers as an extreme case — it would certainly be challenging in workplaces with many managers — smaller changes arguably also contribute to the reduction of the gender gap. For example, an increase of 10 percentage points in the share of women managers would translate to a 5.4 per cent decrease in the gender gap in earnings.

The analyses by type of pay determination system showed that women reduce the gender gap in earnings also in workplaces where one is sure to have pay set by management. Given the variation in how the gender pay gap is affected with the increase of the share of women in management, the presence of the effect of the gender composition of management on the gender earnings gap is coupled with the way pay of non-managerial employees is determined. Women managers do not decrease the gender gap in earnings across all pay determination systems.

Before one concludes, based on the findings presented in Figure 1, that women managers do decrease the gender gap in earnings but largely at the detriment of men's wages, it is important to note that in workplaces which reported to have pay set by the management at the workplace itself (Figure 2, row 2, panel 2), an increased share of women in management decreases the gender gap in earnings largely by increasing women's average earnings and not decreasing those of men.

The second question the article addressed is whether the effect of the increase in the share of women in management on the gender earnings gap is related to changes in workplace equality and diversity policies, family-friendly arrangements and support for carers. The analyses showed that this effect is largely unrelated to changes in workplace policies and arrangements. Two policies are the exception to this pattern: home-based working and reviewing recruitment for gender discrimination. However, the relation of these to the effect of the management gender composition is not substantially strong. The introduction of home-based working appears to mediate about 9 per cent of the effect of the share of women managers on the gender gap in earnings. The introduction of both home-based working and reviewing recruitment for gender discrimination seems to be important for reducing the gender gap in earnings, beyond the effect of the share of women managers at the workplace.

While this article has used the language of mediation, it is important to note that given the nature of the data used, it is not possible to know — beyond theoretically reasoning — the direction of influence between the changes in the share of women in management and changes in workplace policies and arrangements. Thus, the

test of mediation in this article, unlike in ideal, experimentally manipulated conditions (Muller et al., 2005), is of correlational nature.

The explanations for why the share of women in management affects the gender gap in earnings discussed in the theoretical section are all equally plausible. Women managers may reduce the gender earnings gap due to their homophilous preferences, or absence of bias against female employees. The effect could also occur through role modelling and female employees' better access to networks of power. These explanations are not competing and likely operate simultaneously.

While I have not been able to adjudicate which of them has most merit and when, one can at the minimum conclude that this article provides no evidence for either of the competing theories. Contrary to what one would expect based on status characteristics theory, gender does appear to be a meaningful category. Given that women managers increase, rather than decrease, the wages of women, the findings do not provide evidence for a queen bee syndrome.

An important venue for research to come is investigating the relative validity of the different theories on why the gender composition of management affects different outcomes - not only earnings - among non-managerial employees. This would require a close-up study of workplace processes, the involvement of managers in these, and the relationship between workplace processes, managers and employees in non-managerial positions. A challenging endeavour probably best met by ethnographic work.

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DECLARATION OF CONFLICTING INTERESTS

The author declares no potential conflicts of interests with respect to the authorship and/or publication of this article.

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ENDNOTES

[1] "Managers and senior officials determine policy, direct and coordinate functions, often through a hierarchy of subordinate managers and supervisors. They head government, industrial, commercial and other establishments, organisations or departments within such organisations. Occupations include: general managers, production managers, marketing or sales managers, directors of nursing, catering managers and bank managers. This group also includes police inspectors and senior officers in the fire, ambulance and prison services. This group does not include line managers or supervisors. These employees should be grouped within their skill base e.g., a clerical worker supervising other clerical workers would be grouped with them." (Department for Business, Innovation and Skills, 2013).

[2] Given that no continuous earnings variable is available in the data, weekly hours are preferred over dividing the midpoints of categories by number of hours worked. Re-estimated the models by doing the latter (see "Additional Analyses" in the accompanying replication package) however does not change the conclusions.

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SUPPORTING INFORMATION

The replication package to this article is available at the author's website (http://www.stojmenovska.com). The data are available for download at http://www.wers2011.info

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APPENDIX A

TABLE A1 Analytic sample

	Cases lost	Employees 2004	Employees 2011	Workplaces 2004	Workplaces 2011
		7943	7324	600	600
+ Only non-managerial employees	1632	7175	6460	595	596
+ Missing data on outcome	451	7028	6156	594	595
+ Missing data on gender of employee	45	7014	6125	594	595
+ Missing data on share of female managers	775	6426	5938	531	567
+ Missing data on employee-level controls	1406	5754	5204	528	562
+ Missing data on workplace-level controls	105	5731	5122	525	553
+ Missing data on equality and diversity policies	483	5568	4802	511	521
+ Missing data on family-friendly arrangements	0	5568	4802	511	521
+ Missing data on support for carers	19	5558	4793	510	519
+ Only workplaces that appear in both waves after exclusion of missing cases	1097	4964	4290	452	452

Note. WERS 2004–2011, own calculations. Final analytic sample contains 452 workplaces and 9254 employees.

TABLE A2 Summary statistics of workplace-level variables by share of female managers

	Percentage female managers of all managers											
	0%		1–24%		25–49%		50–74%		75–99%		100%	
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
Workplace size	140.64	307.79	723.47	1236.99	598.23	1011.66	704.25	1573.41	303.03	757.39	41.12	40.72
Female employees	30.94	26.73	26.62	17.73	50.97	18.24	67.77	17.82	75.19	13.80	86.14	15.80
Share of managers	7.85	8.77	9.85	8.61	10.68	11.60	11.95	12.63	14.38	16.26	7.58	6.43
Industry												
Manufacturing	0.19		0.35		0.11		0.03		0.03		0.00	
Electricity, gas and water	0.02		0.04		0.01		0.00		0.00		0.00	
Construction	0.12		0.09		0.03		0.01		0.00		0.00	
Wholesale and retail	0.15		0.08		0.14		0.10		0.06		0.07	
Hotels and restaurants	0.04		0.00		0.04		0.05		0.06		0.03	
Transport and communication	0.19		0.11		0.03		0.01		0.00		0.00	
Financial services	0.01		0.03		0.05		0.00		0.03		0.00	
Other business services	0.06		0.13		0.11		0.08		0.13		0.05	
Public administration	0.06		0.09		0.16		0.07		0.09		0.05	
Education	0.05		0.04		0.16		0.23		0.13		0.17	
Health	0.06		0.01		0.11		0.32		0.41		0.57	
Other community services	0.04		0.01		0.05		0.08		0.06		0.06	
Legal status												
Public limited company	0.19		0.31		0.21		0.08		0.06		0.08	
Private limited company	0.42		0.39		0.28		0.21		0.31		0.28	
Other trading sector	0.25		0.16		0.20		0.27		0.25		0.33	
Local/central govt	0.12		0.10		0.25		0.41		0.38		0.29	
Other public sector	0.02		0.04		0.06		0.03		0.00		0.02	
Foreign-owned	0.10		0.26		0.12		0.05		0.00		0.03	

(Continues)

TABLE A2 (Continued)

	Percentage female managers of all managers											
	0%		1–24%		25–49%		50–74%		75–99%		100%	
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
Workplace age												
<5 years	0.04		0.04		0.07		0.07		0.00		0.02	
5–9 years	0.08		0.09		0.15		0.09		0.13		0.08	
10–24 years	0.32		0.19		0.24		0.28		0.31		0.47	
≥25 years	0.56		0.69		0.54		0.56		0.56		0.42	
Observations	170		186		185		213		32		118	

Note. WERS 2004–2011, own calculations. The total number of workplaces is 904 (452 in each wave).

TABLE A3 Summary statistics of employee-level variables by employee gender

	Employee gender			
	Men		Women	
	Mean	*SD*	Mean	*SD*
Wage	402.11	206.66	282.73	180.20
Hours worked	39.13	10.89	31.61	12.42
Tenure				
Less than 1 year	0.12		0.14	
1 to less than 2 years	0.10		0.12	
2 to less than 5 years	0.23		0.26	
5 to less than 10 years	0.21		0.21	
10 years or more	0.34		0.27	
Training				
None	0.35		0.29	
Less than 1 day	0.11		0.12	
1 to less than 2 days	0.15		0.17	
2 to less than 5 days	0.21		0.25	
5 to less than 10 days	0.11		0.10	
10 days or more	0.08		0.07	
Commitment	1.68	2.63	2.39	2.30
Union member	0.45		0.38	
Age				
<20 years	0.02		0.03	
20–29 years	0.16		0.17	
30–39 years	0.24		0.23	
40–49 years	0.27		0.28	
50–59 years	0.23		0.24	
60 + years	0.08		0.05	
Partner	0.70		0.67	
Children	0.40		0.37	
Education				
None	0.18		0.14	
Other	0.06		0.05	
CSE or equivalent	0.10		0.08	
O-level or equivalent	0.24		0.30	
1 A-level or equivalent	0.04		0.06	
2+ A-levels or equivalent	0.08		0.09	
Degree or equivalent	0.22		0.20	
Postgrad or equivalent	0.08		0.08	
Observations	4058		5196	

Note. WERS 2004–2011, own calculations. The total number of employees is 9254.

TABLE A4 Workplace-level changes in policies and arrangements 2004–2011

	% workplaces with policy in 2004 / mean number policies	% workplaces with policy in 2011 / mean number policies	% workplaces that changed policy 2004–2011	% workplaces that implemented policy 2004–2011	% workplaces that abolished policy 2004–2011
Equality and diversity					
Diversity strategic plan	46	54	34	63	37
Encourages women applicants	18	13	25	41	59
Monitors recruitment by gender	45	45	28	51	49
Reviews recruitment for gender discrimination	34	36	31	53	47
Monitors promotion by gender	20	21	18	54	46
Reviews promotion for gender discrimination	21	23	25	53	47
Reviews pay by gender	15	19	18	63	37
Family-friendly arrangements					
Home-based working	44	50	28	61	39
Flexitime	47	50	34	55	45
Job share	53	46	31	39	61
Reduced hours	84	79	23	41	59
Compressed hours	28	46	35	76	24
Term-time working	35	38	22	57	43
Support for carers					
Nursery places	14	12	7	36	64
Financial help childcare	16	59	50	93	7
Summary count variables					
Any equality and diversity policy	69	73	29	57	43
Any flexible work arrangements	93	91	12	42	52
Any support for carers	24	60	45	90	10
Number of equality and diversity policies	1.98	2.11	73		
Number of flexible work arrangements	2.91	3.10	72		
Number of support for carers	0.30	0.71	52		
Observations	904				

Note. WERS 2004–2011, own calculations. Note that the percentages are rounded. For example, in 2004, 202 of the 452 workplaces monitored recruitment by gender, and in 2011, 205 workplaces did so (both rounded to 45%).