Gender segregation, female managers and the gender wage gap

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Motivation

- Women outperforming men in educational attainment and closing the gap in experience, but a gender wage gap (GWG) persists
- Some of this arises through preferences about where to work / hiring discrimination ('sorting across workplaces')
- However, some part also reflects different wage outcomes for like workers within the same firm ('bargaining within workplaces') (see recent Equal Pay cases)
- Growth in women's representation at board level has stimulated interest in the possible 'trickle down' effects to women below the board, but evidence of such effects is limited
- We focus on the effects of female representation in a wider set of management positions, whereby the scope to influence outcomes for individual co-workers is arguably greater.
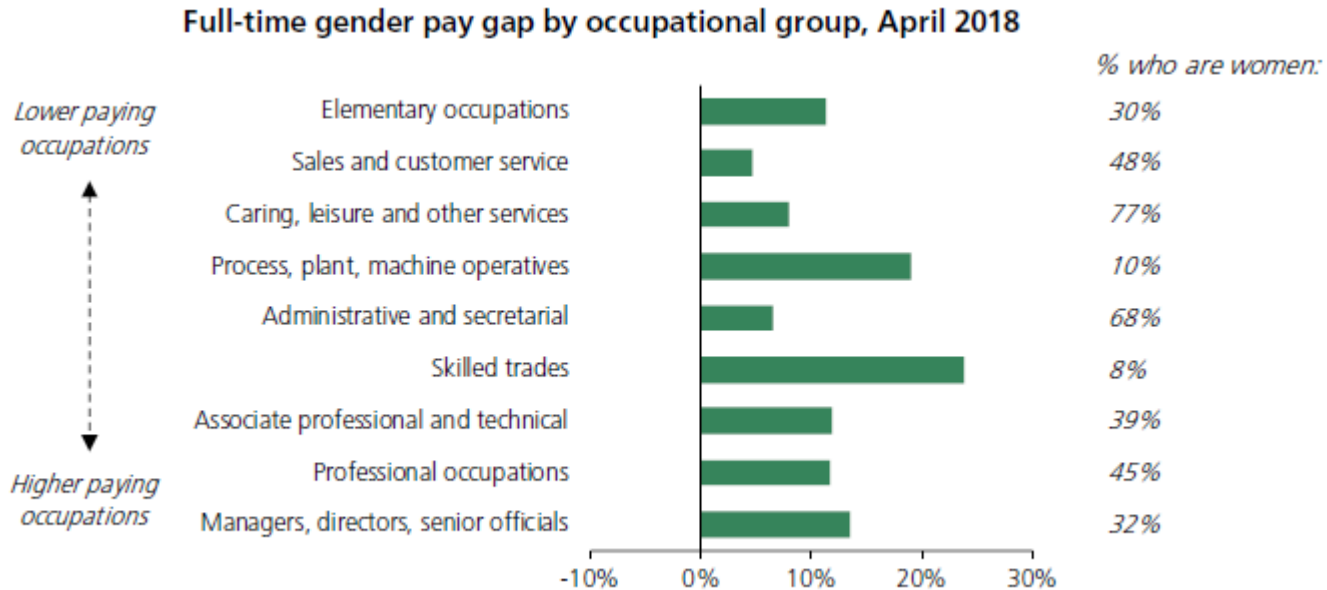
Preview

- We use nationally-representative data on GB workplaces to examine whether the size of the GWG among non-managerial employees in a workplace is affected by the share of workplace managers who are female
- We find that the GWG decreases with an increasing share of women in managerial positions, also presenting evidence that this is a causal relationship
- We further identify one mechanism through which female managers alter the distribution of rewards – discretionary performance pay
- Our findings are consistent with a scenario in which female managers reallocate limited resources from men to women
- They suggest that policy makers should focus increasingly on mechanisms to improve female representation in managerial positions beyond the board

Context

- Women have been closing the education and experience gap
  - Around 33% of women and men now have degree-level qualifications (EHRC, 2019)
- Women have rapidly increased their representation at board level
  - In June 2018, women accounted for 29% of directors in UK FTSE 100 companies, up from 15% in 2012 (Vinnicombe et al, 2018)
- Yet still under-represented across all senior positions
  - 32% of all full-time managers, directors and senior officials are women, cf 45% of full-time professionals (McGuinness and Pyper, 2018)
- GWG persists at all levels of the occupational hierarchy

Context

Full-time gender pay gap by occupational group, April 2018

% who are women:

Elementary occupations	30%
Sales and customer service	48%
Caring, leisure and other services	77%
Process, plant, machine operatives	10%
Administrative and secretarial	68%
Skilled trades	8%
Associate professional and technical	39%
Professional occupations	45%
Managers, directors, senior officials	32%

Lower paying occupations

Higher paying occupations

-10% 0% 10% 20% 30%

Source: McGuinness and Pyper (2018)

Theory and existing evidence

- GWG can arise from two routes:
  - Sorting of workers between different firms (due to 'choices' on the supply side and hiring discrimination on the demand side)
  - Activities within firms that generate different wage outcomes for like workers (e.g. wage setting, work allocation, access to training, promotion)
- Evidence suggests that within-firm wage differences are significant
  - 19ppts of the 22% GWG in Jewell et al (2019)
- Leadership is plausibly important. Female leaders may:
  - Challenge direct gender-based discrimination
  - Change gender norms to reduce indirect discrimination
  - Or … they may judge women more harshly than men would do ("queen bees")

Theory and existing evidence

- Wage gains from increased female representation at board level do not extend beyond the C-suite:
  - Matsa and Miller, 2011: publicly traded US companies, 1979-2009
  - Betrand et al, 2019: impact of mandated board quotas in Norway, 1986-2014
- Studies of broader sets of managerial positions find evidence that female leaders are associated with smaller GWGs lower down the hierarchy:
  - Tate and Yang (2015) for US; Cadoso and Winter-Ebmer (2010) for Portugal; Kunze and Miller (2017) for Norway; Hirsch (2013) for Germany; Hensvik (2014) for Sweden
- But few studies can pinpoint the mechanisms through which different wage outcomes might arise

Data

- Workplace Employment Relations Survey (2004 and 2011)
- Cross-sectional data from around 40,000 employees in 3,200 workplaces (after pooling across years)
- Data from each employee on their job (including wage) and personal characteristics (including gender)
- Data from HR manager in each workplace on workforce composition (including female share of each occupational group) and other workplace demographics (e.g. size, industry, region)
- Panel of around 600 workplaces observed in both years

Methods

- Begin with cross-sectional regressions of hourly wages:
  - Female coefficient shows size of GWG
  - Coeffs. on share female managers / non-managers at the workplace show how wages vary with gender composition of workforce
  - Interaction term shows whether gender composition has different effects for men & women
  - Controls for personal characteristics (age, ethnicity, disability, marital status, qualifications), job characteristics (occupation, job tenure, union membership etc) and workplace/firm characteristics (size, industry, region etc)

Baseline estimates

Dependent variable: Gross hourly wage	(1) Raw	(2) Adjusted, OLS	(3) Baseline, OLS	(4) Workplace FE
Female	-0.194***	-0.113***	-0.156***	-0.138***
	(0.012)	(0.009)	(0.021)	(0.023)
Female Share Managers			-0.085***	
			(0.029)	
Female Share Managers*Female			0.114***	0.137***
			(0.033)	(0.036)
Female Share Non-Managers			-0.078**	
			(0.039)	
Female Share Non-Managers*Female			0.021	-0.031
			(0.040)	(0.043)
Employee characteristics	No	Yes	Yes	Yes
Workplace characteristics	No	Yes	Yes	-
Observations	39,966	39,966	39,966	39966
Adjusted R^2	0.066	0.451	0.452	0.502

Notes. Standard errors in parentheses are clustered at the workplace level.
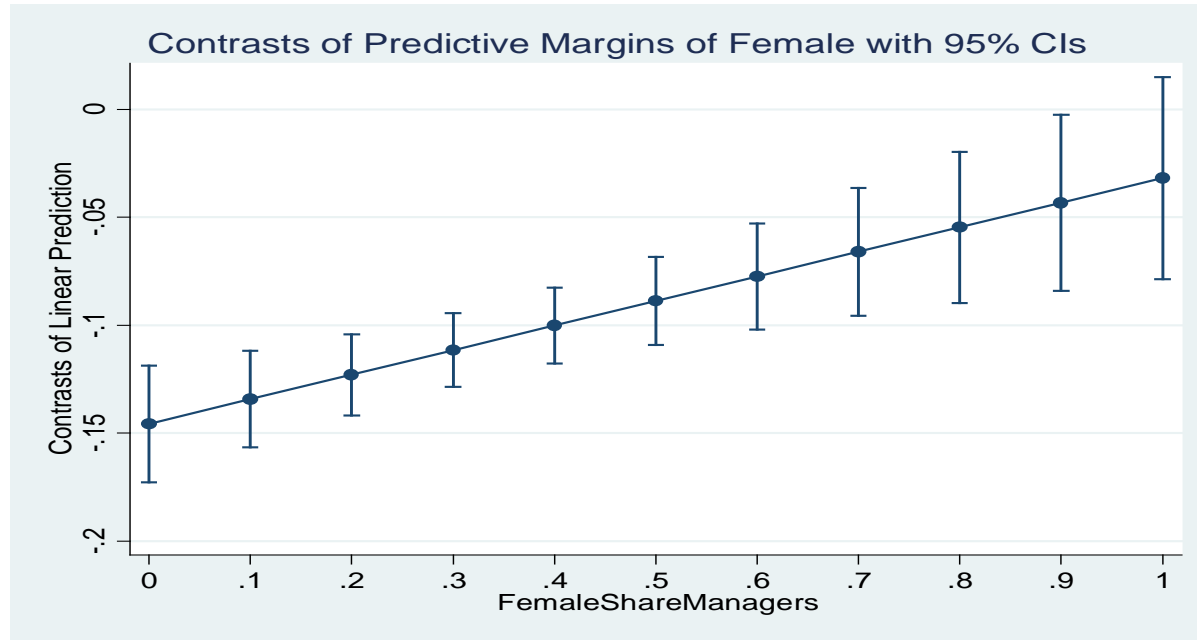
Estimates are weighted using individual level weights.

Levels of significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Impact of female managers on wages
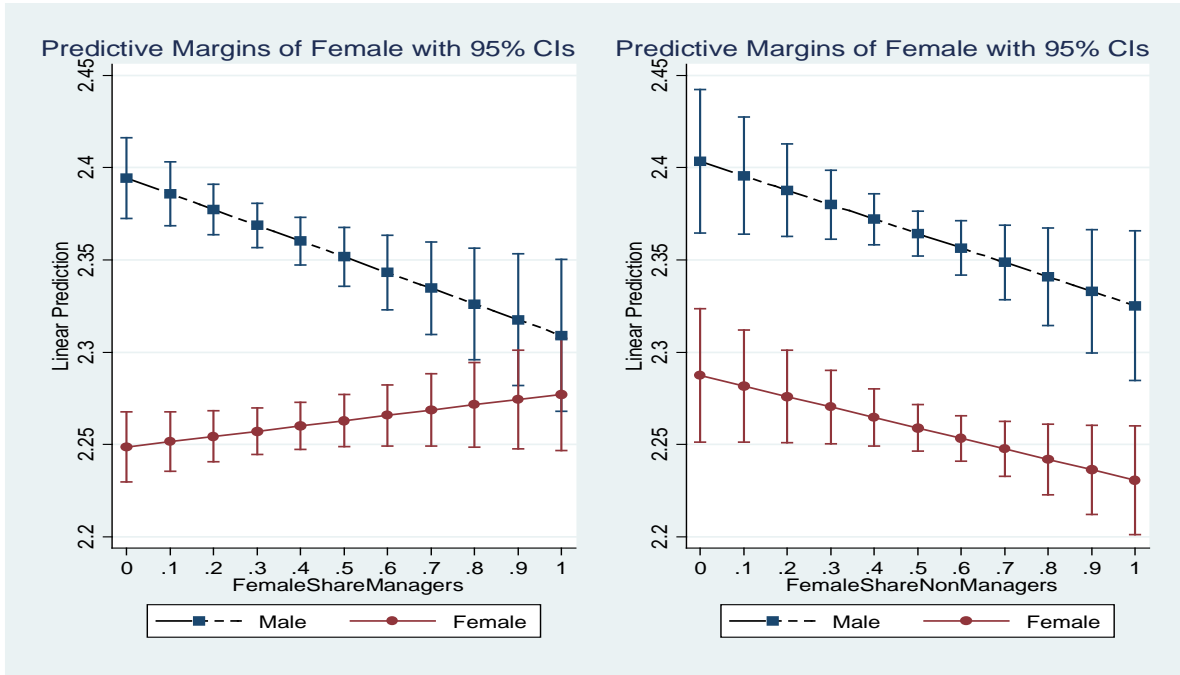
Notes: Estimates obtained from column 3 in previous table.
Vertical lines are 95% confidence intervals

Impact of female managers on the GWG

Contrasts of Predictive Margins of Female with 95% CIs

Notes: Estimates obtained from column 3 in previous table.
Vertical lines are 95% confidence intervals

Sensitivity tests

- Similar pattern of results if we expand 'managers' to include those in supervisory positions
- Similar again if we use the workplace panel to examine how wages change with *changes* in the % female managers:
  - 10 ppt increase in the % female managers reduces the average 'residual wage gap' by one sixth of a standard deviation
- Similar again if we use instrumental variables approach to address possible unobserved correlation between wages and % female managers / non-managers:
  - Instrument 1: % of industry output accounted for by B2C rather than B2B sales
  - Instrument 2: workplace head office in a country with low female employment
  - Instrument 3: % female at national level for workplaces largest occupation

The role of performance pay

- Individual performance-related pay schemes one potential mechanism through managers may influence the GWG
  - Identify employees who are paid to some extent via individual PRP and those who are not
  - Compare the influence of female managers on the GWG among each group

- Influence of female managers on the GWG is more pronounced among PRP workers
  - GWG disappears under PRP once 40% of managers are female
  - GWG disappears under fixed pay once 60% of managers are female

- Consistent with female managers using discretion to remove inequitable treatment / favour women over men
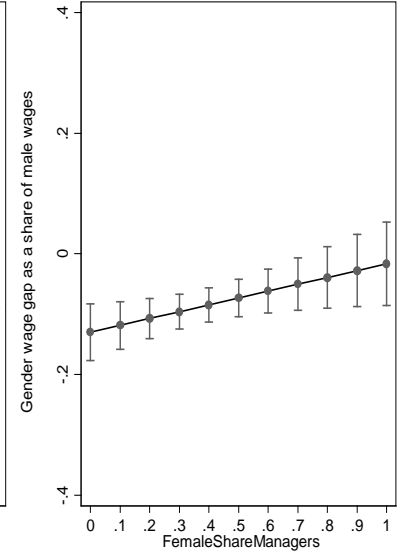
The role of performance pay

Predictive Margins of Female#VariablePay with 95% CIs
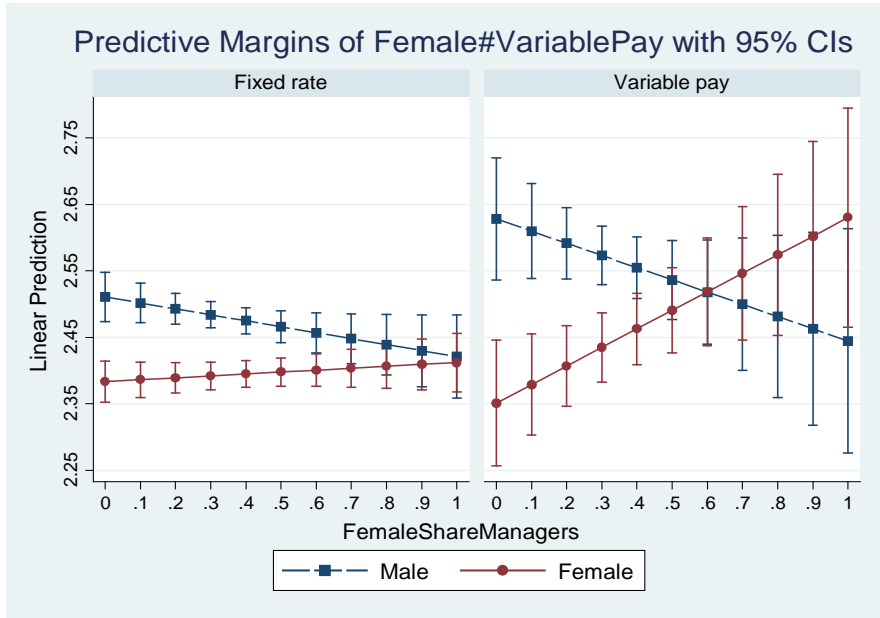
Panel A. Performance pay
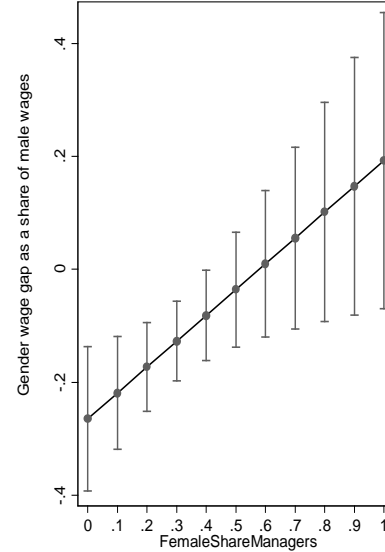
Panel B. Fixed pay

Summary and implications

- We find that the GWG decreases with an increasing share of women in managerial positions, also presenting evidence that this is a causal relationship
- We further identify one mechanism through which female managers alter the distribution of rewards – discretionary performance pay
- Our findings are consistent with a scenario in which female managers tackle discriminatory practices and reallocate limited resources from men to women
- They suggest that policy makers should focus increasingly on mechanisms to improve female representation in managerial positions beyond the board
  - Build on success of Hampton-Alexander to extend scope of GWG reporting to include gender representation at different points in corporate hierarchy

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Additional graphs
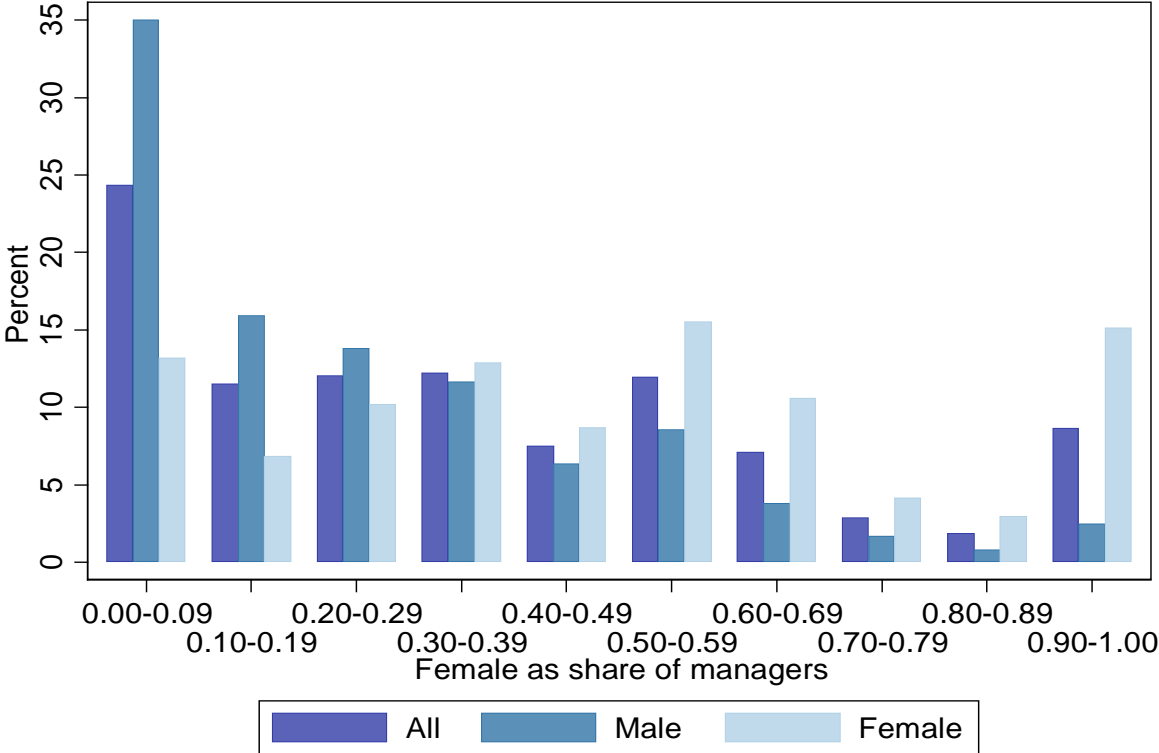
Additional tables

Table 2: Change in Residual Wage Gap: Workplace Panel Analysis

	(1) OLS Workplace FE	(2) OLS Workplace FE	(3) OLS Workplace FE
Female Share Managers	-0.049*		-0.048*
	(0.027)		(0.027)
Female Share Non-Managers		-0.034	-0.026
		(0.044)	(0.045)
Observations	1180	1180	1180
Adjusted R^2	0.016	0.002	0.014

Notes. This workplace panel analysis is performed in two steps. In the first step we estimated the log hourly wages for men and women separately in 2004 and 2011 workplaces. These log hourly wage regressions control for individual characteristics as reported in the Notes of Table 1. We recover employees' residual wages and compute the average residuals for men and women per workplace and take their difference. In the second step this residual wage difference between men and women is the dependent variable and the controls include all the workplace characteristics (except two digit industry and region dummies due to workplace fixed effects) as outlined in the Notes of Table 1. For reasons of brevity we report only the coefficients for the variables of interest. Estimates for the other controls are available upon request. Standard errors are in parentheses and are clustered at the workplace level. Estimates are weighted using workplace level panel weights. Levels of significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Additional tables

Table 3: IV regression

	(1) OLS	(2) IV
Female	-0.156***	-0.103*
	(0.021)	(0.062)
Female Share Managers	-0.085***	-0.402
	(0.029)	(0.455)
Female Share Managers*Female	0.114***	1.046**
	(0.033)	(0.534)
Female Share Non-Managers	-0.078**	0.193
	(0.039)	(0.289)
Female Share Non-Managers*Female	0.021	-0.726
	(0.040)	(0.469)
Observations	39966	39966
Adjusted R^2	0.452	0.419
Kleibergen-Papp rk LM statistic		11.235 [p-val.=0.047]
Hansen J statistic		4.997 [p-val.=0.288]
Anderson-Rubin Wald test		24.62 [p-val.=0.002]
Stock-Wright LM S statistic		26.94 [p-val.=0.001]

Notes. For reasons of brevity we report only the coefficients for the variables of interest (a full set of coefficients is available on request). All controls are the same as outlined in the Notes of Table 1, with the exception that Table 3 necessarily relies on 1-digit, rather than 2-digit, industry dummies (an alternative specification using 2-digit industry controls with fewer instruments is presented in Table A8). Standard errors in parentheses are clustered at the workplace level. The first stage results for the instruments are reported in Table A7. Estimates are weighted using individual level weights.
Levels of significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.