Closing the engineering gender pay gap

Data analysis

Prepared for:

Quantifying the Engineering Gender Pay Gap

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Engineering gender pay gap

The aim of this report is to investigate the gender pay gap of engineering as a whole, rather than individual engineering companies.

25 companies submitted data, comprising of anonymised data for 41,607 engineers.

These gender pay gap calculations are based on the Gender Pay Reporting Regulations published 22 February 2017.

For the purpose of this report the relevant date is 5 April 2018.

	Percentage
Mean pay gap	10.8%
Median pay gap	11.4%
Mean bonus pay gap	5.4%
Median bonus pay gap	1.2%
Proportion of male employees who received a bonus	79.4%
Proportion of female employees who received a bonus	65.4%

Quartile	Male	Female
Lower	84.0%	16.0%
Lower middle	89.7%	10.3%
Upper middle	91.3%	8.7%
Upper	92.0%	8.0%

Female representation in engineering
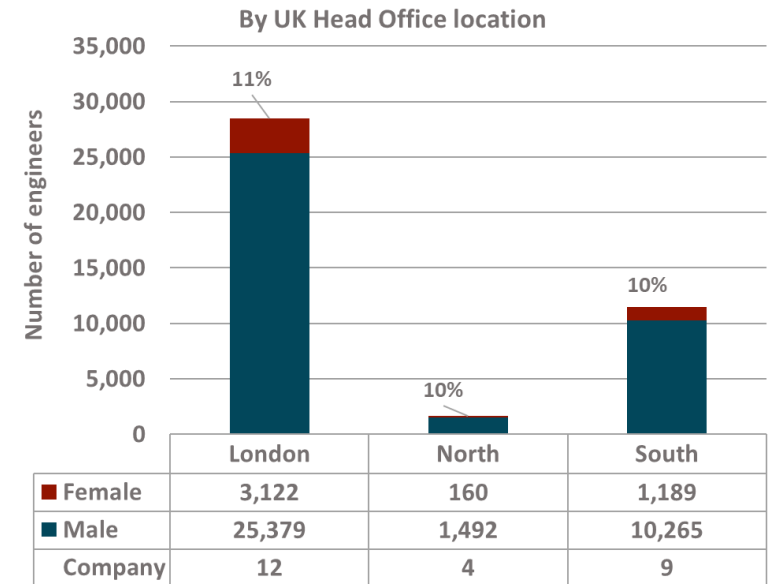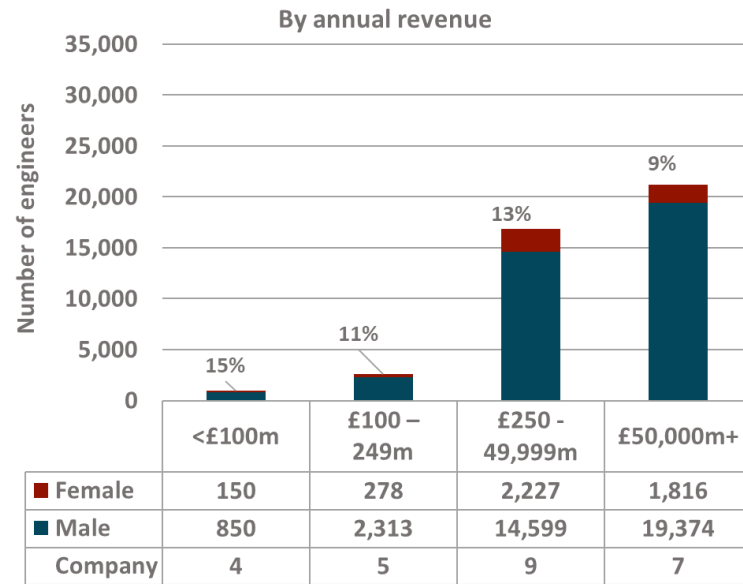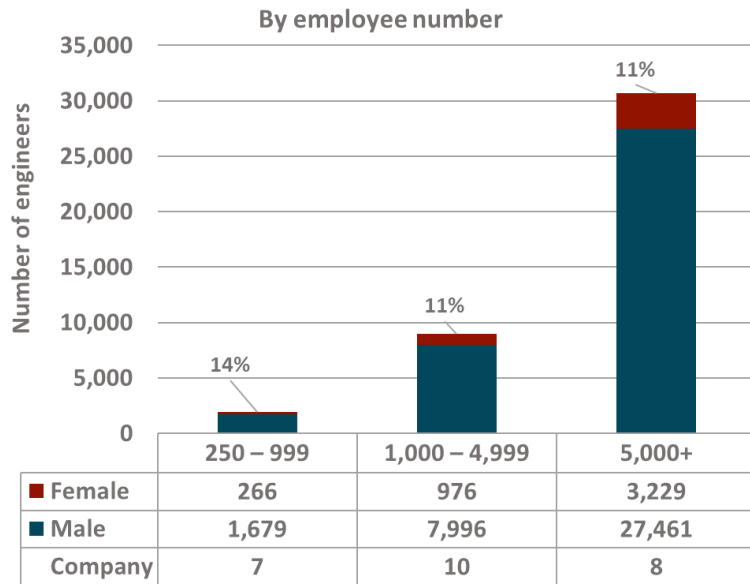
Overall representation
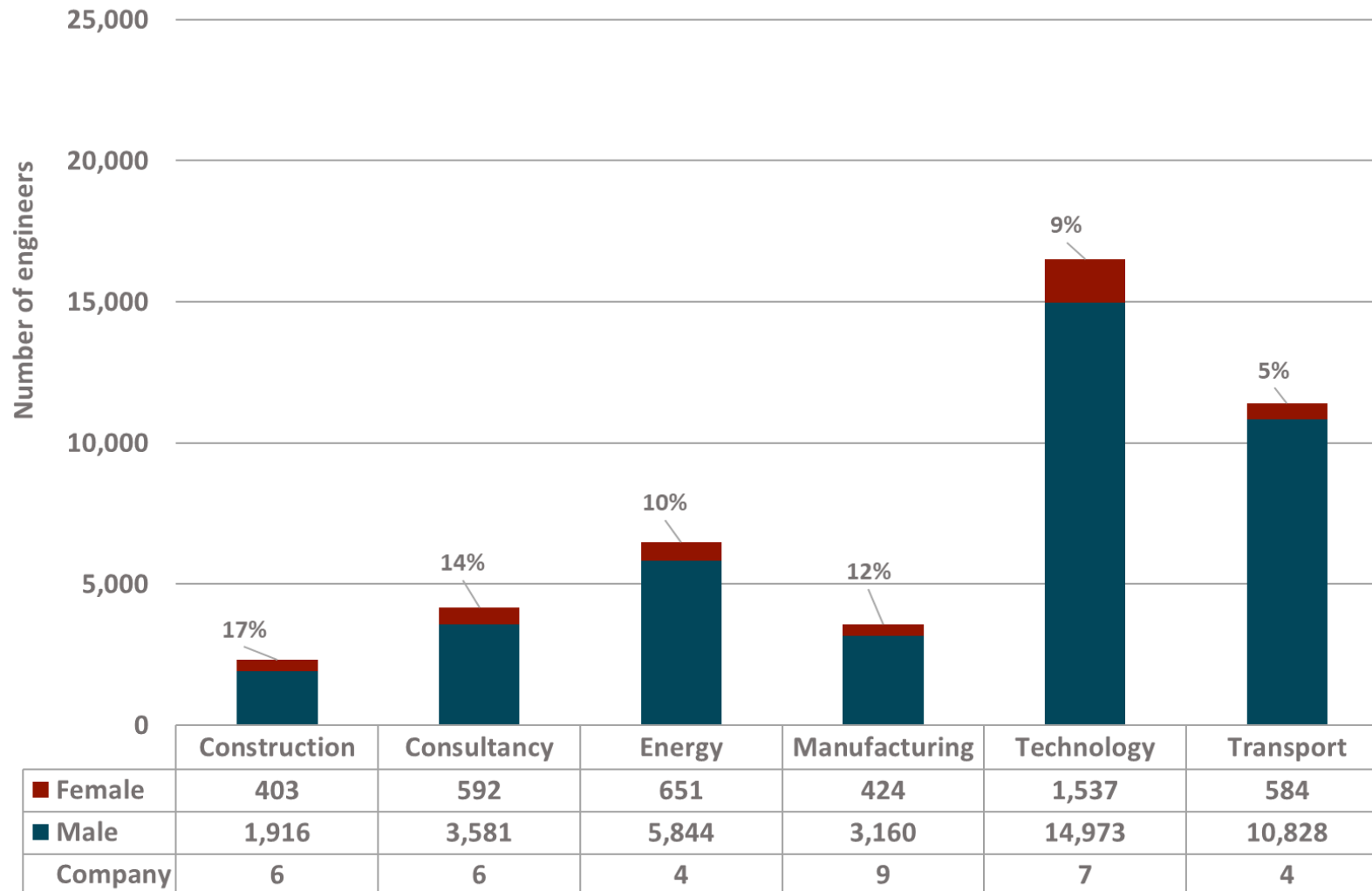

89%
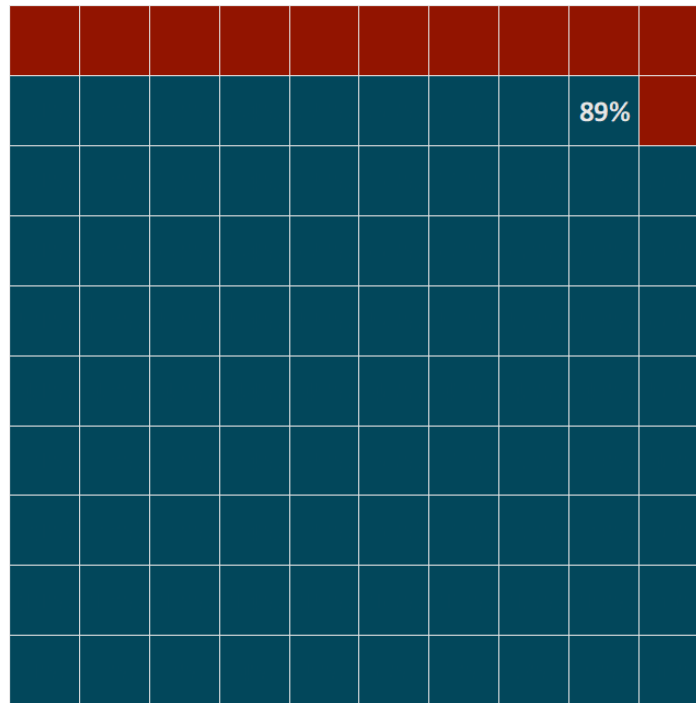
■ Male - 89%
■ Female - 11%

Observations

- The proportion of women in engineering is relatively stable (between 9% & 15%) regardless of company size (revenue and employees)

- Women have slightly higher representation in Consultancy and Construction sectors 17% & 14% respectively)

- Female representation is highest in the 22-29 age range and graduate career level (19%), perhaps reflecting the focus many companies have recently had on increasing gender diversity

- Representation decreases with age and seniority reflecting the historical unattractiveness of the sector to women and / or challenges around female progression

- Of those working full time 9% are women

- There is an even gender split of those working part time, however this represents a more significant proportion of the female population (17%) but only 2% of men

Female representation by company factors

By employee number

	250 – 999	1,000 – 4,999	5,000+
Female	266	976	3,229
Male	1,679	7,996	27,461
Company	7	10	8

By annual revenue

	<£100m	£100 – 249m	£250 – 49,999m	£50,000m+
Female	150	278	2,227	1,816
Male	850	2,313	14,599	19,374
Company	4	5	9	7

By UK Head Office location

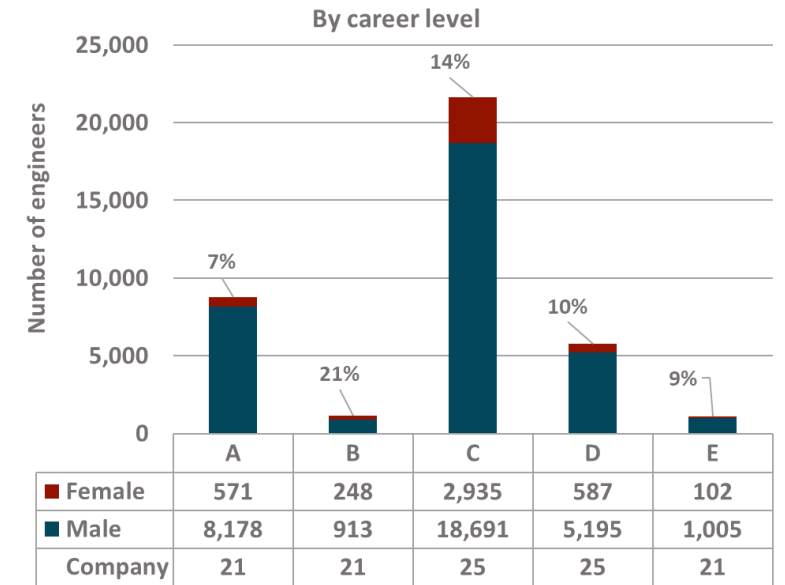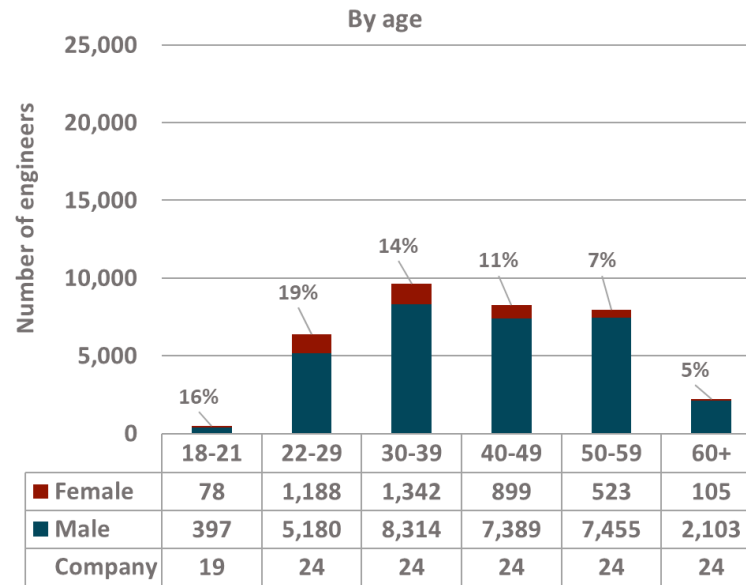|	London	North	South
Female	3,122	160	1,189
Male	25,379	1,492	10,265
Company	12	4	9

Female representation by sector
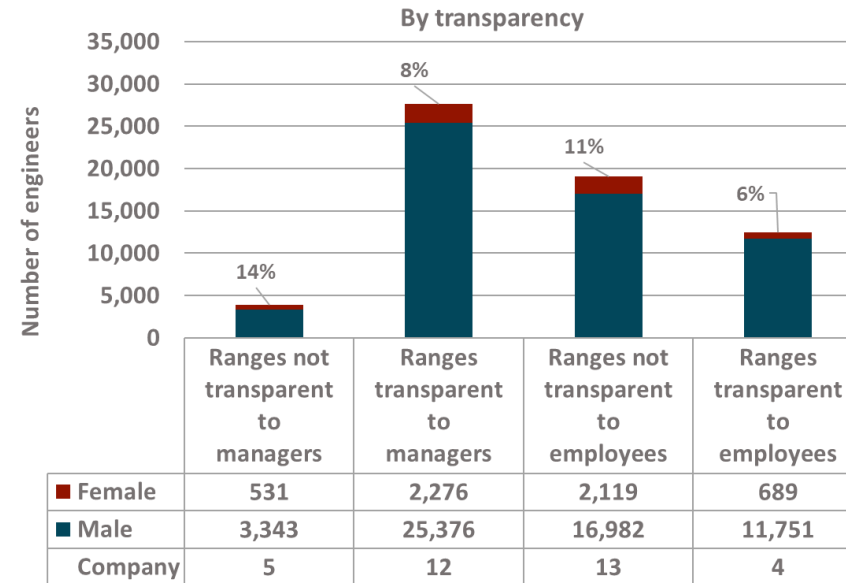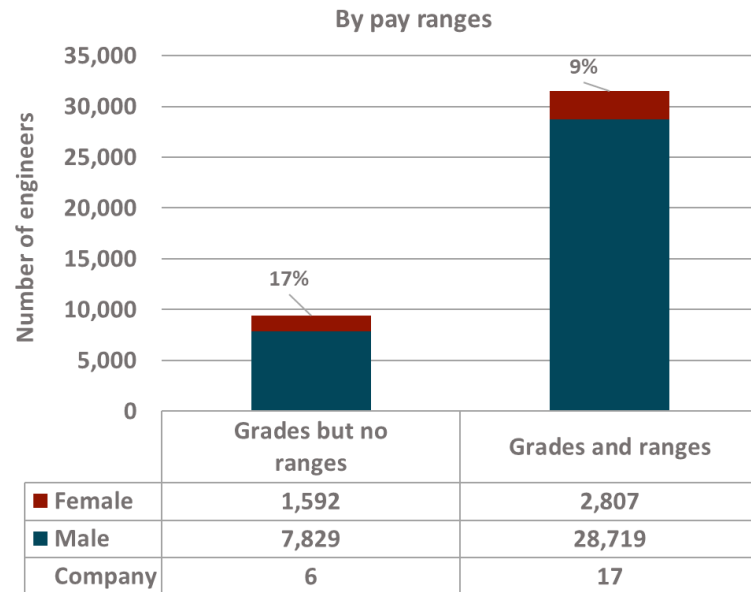## (companies can be in more than one sector)

	Construction	Consultancy	Energy	Manufacturing	Technology	Transport
■ Female	403	592	651	424	1,537	584
■ Male	1,916	3,581	5,844	3,160	14,973	10,828
Company	6	6	4	9	7	4

Female representation by employee traits

By working hours

	Full time	Part time
■ Female	3,665	761
■ Male	36,178	725
Company	24	20

Full time: 9%
Part time: 51%

By age

	18-21	22-29	30-39	40-49	50-59	60+
■ Female	78	1,188	1,342	899	523	105
■ Male	397	5,180	8,314	7,389	7,455	2,103
Company	19	24	24	24	24	24

18-21: 16%, 22-29: 19%, 30-39: 14%, 40-49: 11%, 50-59: 7%, 60+: 5%

By career level

	A	B	C	D	E
■ Female	571	248	2,935	587	102
■ Male	8,178	913	18,691	5,195	1,005
Company	21	21	25	25	21

A: 7%, B: 21%, C: 14%, D: 10%, E: 9%
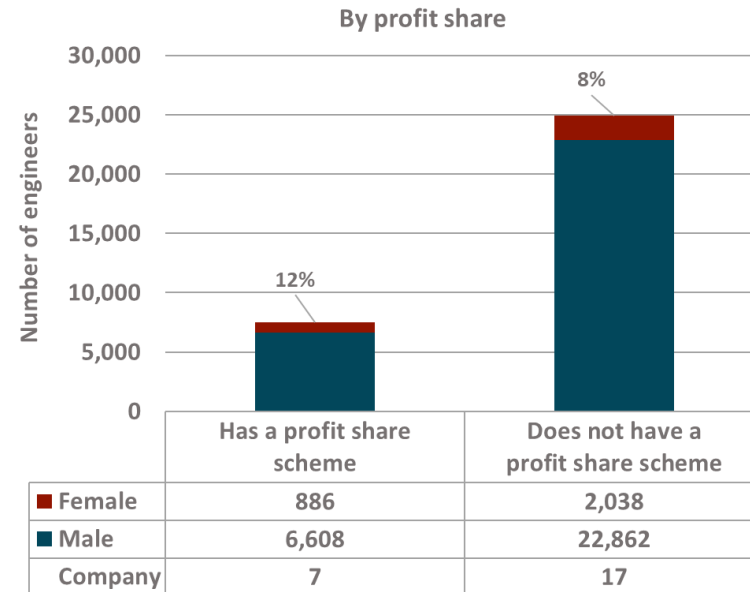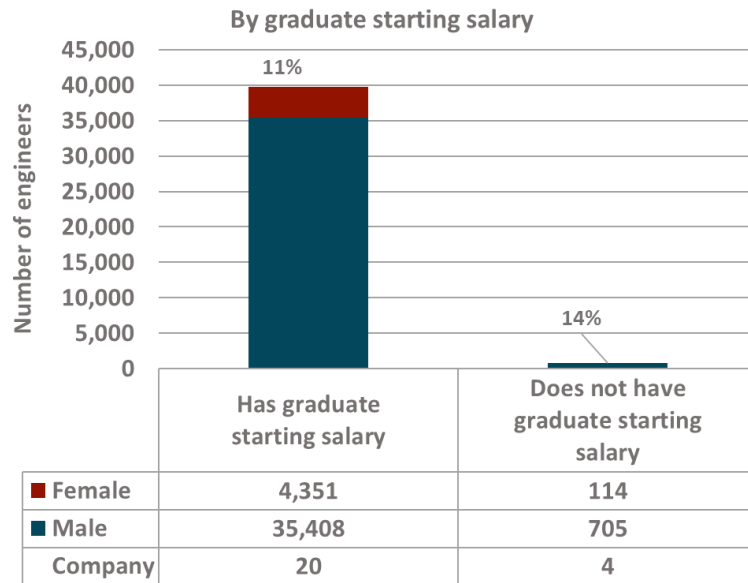
Definitions of Career Levels:
A: Technician / Field Technician / Apprentice Engineer
B: Graduate
C: Professional / Engineer / Manager
D: Senior professional / Senior Engineer / Senior Manager
E: Expert / Chief Engineer / Executive

Female representation by pay policy

By pay ranges

	Grades but no ranges	Grades and ranges
■ Female	1,592	2,807
■ Male	7,829	28,719
Company	6	17

By transparency

	Ranges not transparent to managers	Ranges transparent to managers	Ranges not transparent to employees	Ranges transparent to employees
■ Female	531	2,276	2,119	689
■ Male	3,343	25,376	16,982	11,751
Company	5	12	13	4

Female representation by pay policy

By graduate starting salary

	Has graduate starting salary	Does not have graduate starting salary
■ Female	4,351	114
■ Male	35,408	705
Company	20	4

(11% labelled on "Has graduate starting salary"; 14% labelled on "Does not have graduate starting salary")

By profit share

	Has a profit share scheme	Does not have a profit share scheme
■ Female	886	2,038
■ Male	6,608	22,862
Company	7	17

(12% labelled on "Has a profit share scheme"; 8% labelled on "Does not have a profit share scheme")

Engineering gender pay gaps

Engineering gender pay gap - overall

|	RA Engineering	UK overall	ONS SOC 212
Mean pay gap	10.8%	17.1%	9.2%
Median pay gap	11.4%	17.9%	10.1%
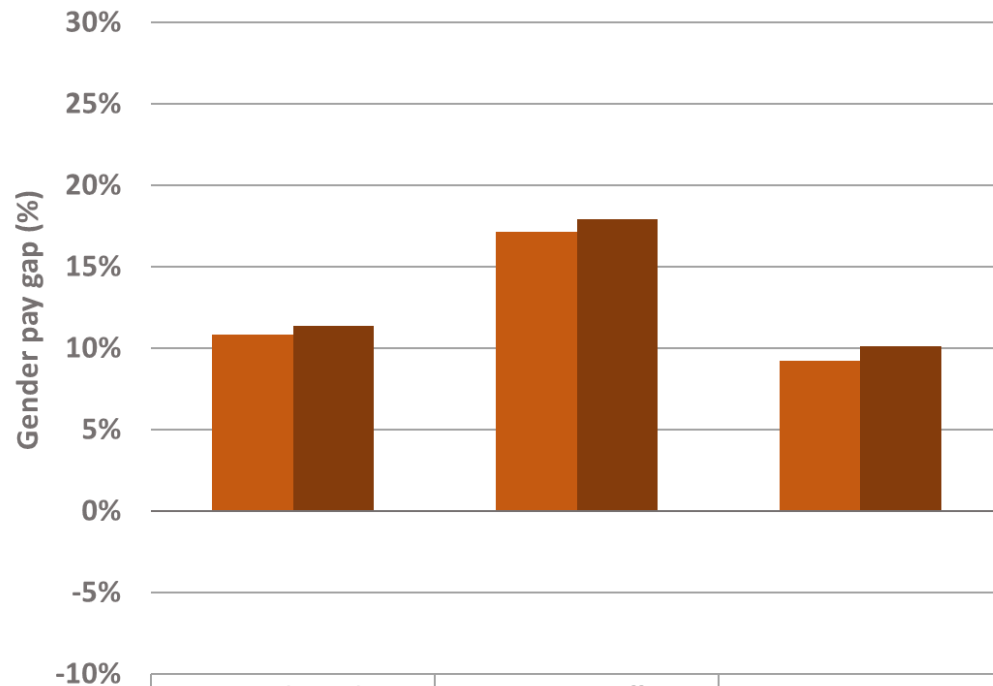
Observations

- As expected, the Engineering gender pay gap (EGPG) is lower than both UK national gender pay gap statistics
- This is because the EGPG represents an 'industry career path' gap rather than an 'all roles' gap
- EGPG is in line with the ONS 'engineering' pay gap, even though the latter wouldn't have been calculated in line with the full regulations

N.B. the RA Engineering EGPG includes a broader definition of 'engineering codes' than the ONS SOC 212

Engineering gender pay gap by company factors

EGPG – by employee number
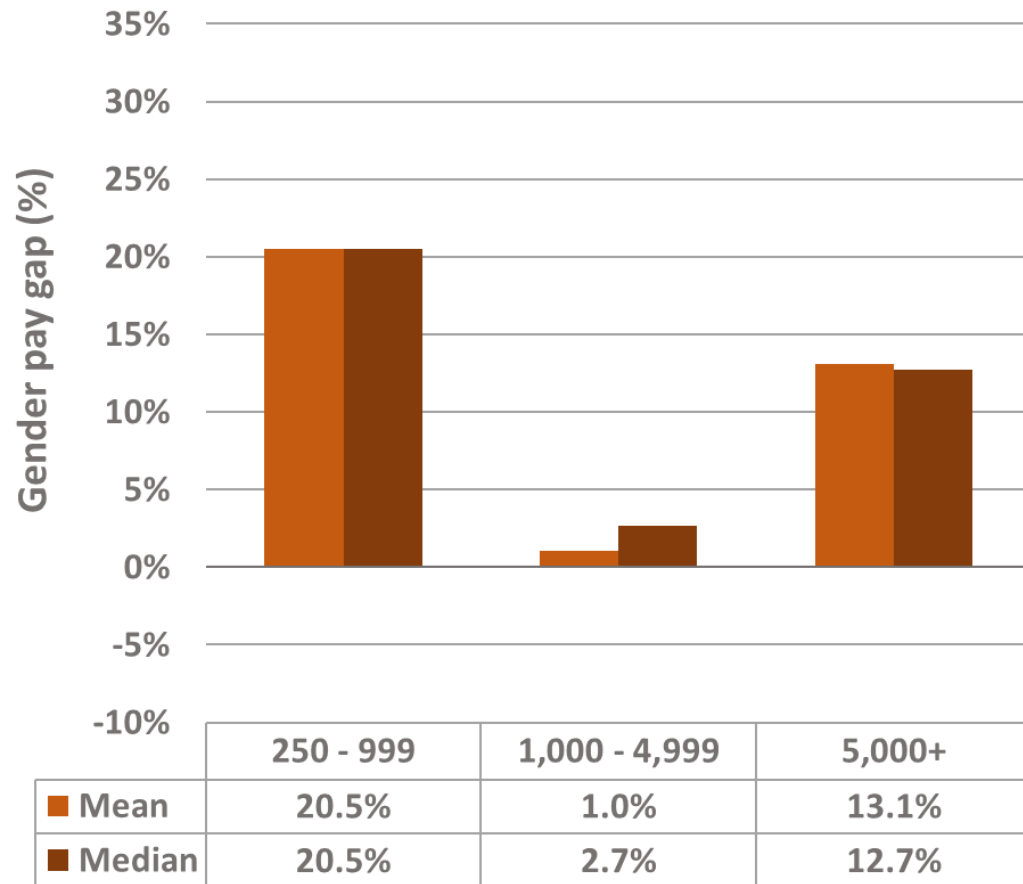
	250 - 999	1,000 - 4,999	5,000+
■ Mean	20.5%	1.0%	13.1%
■ Median	20.5%	2.7%	12.7%

Employee Number	Proportion of male / female in whole dataset		Proportion by employee number	
	Male	Female	Male	Female
250 - 999	5%	6%	86%	14%
1,000 - 4,999	22%	22%	89%	11%
5,000+	74%	72%	89%	11%

- EGPG is largest (20.5%) in the smallest companies, these also have the highest representation of women. Medium sized companies in the sample have the smallest gap (2.7% median)

- However most of the women in the sample work for the largest organisations

- This may reflect that smaller companies do not have the resources or structures in place to address pay and diversity challenges and medium sized companies have resources and are sufficiently agile to respond

EGPG – by annual revenue
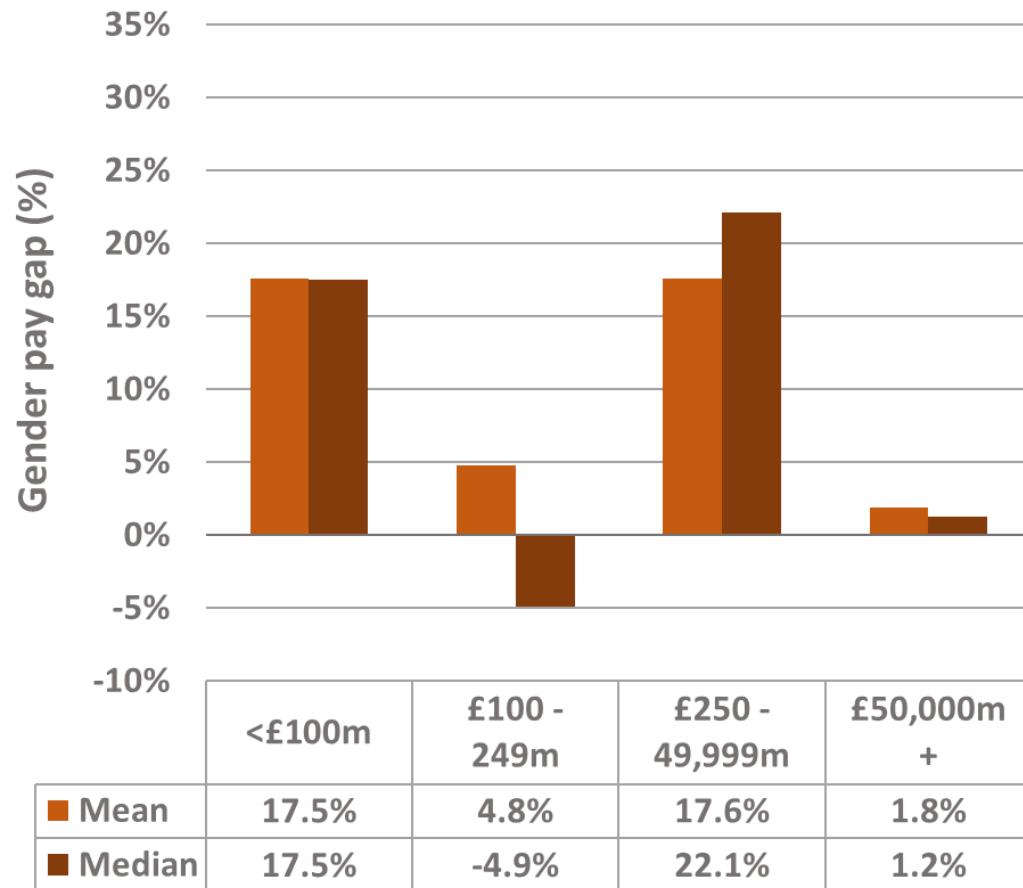
	<£100m	£100 - 249m	£250 - 49,999m	£50,000m +
■ Mean	17.5%	4.8%	17.6%	1.8%
■ Median	17.5%	-4.9%	22.1%	1.2%

Annual Revenue	Proportion of male / female in whole dataset		Proportion by annual revenue	
	Male	Female	Male	Female
<£100m	2%	3%	85%	15%
£100 - 249m	6%	6%	89%	11%
£250 - 49,999m	39%	50%	87%	13%
£50,000m+	52%	41%	91%	9%

- The gap is impacted by company revenue size. The smallest gap (1.2% median) is found in the largest companies

- Medium sized have a median EGPG in favour of women (-4.9%)

- Suggests that both having the resources to address the EGPG and being of a size where action plans are immediately impactful has an effect
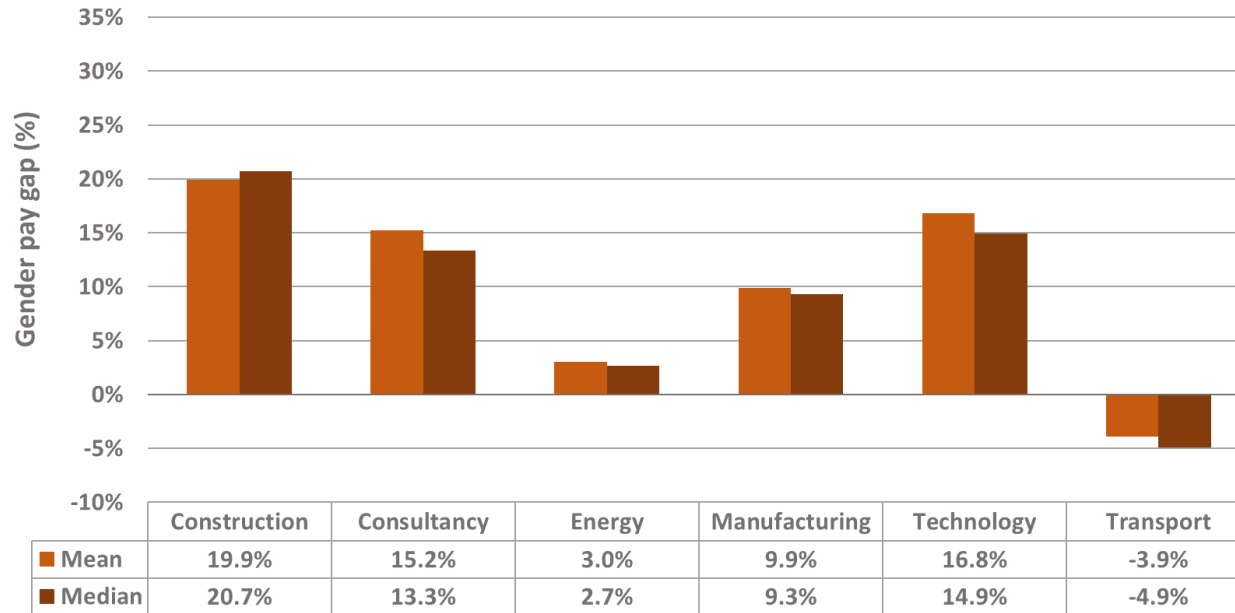
EGPG – by head office location

Location	Proportion of male / female in whole dataset		Proportion by location	
	Male	Female	Male	Female
London	68%	70%	89%	11%
North	4%	4%	90%	10%
South	28%	27%	90%	10%

EGPG – by sector
(companies can be in more than one sector)

Sector	Proportion of male / female in whole dataset		Proportion by sector	
	Male	**Female**	**Male**	**Female**
Construction	5%	9%	83%	17%
Consultancy	10%	13%	86%	14%
Energy	9%	9%	88%	12%
Manufacturing	40%	34%	91%	9%
Technology	16%	15%	90%	10%
Transport	29%	13%	95%	5%

- Although female representation is highest in Construction and Consultancy (17% & 14%) the pay gaps are higher than the overall EGPG (20.7% & 13.3% median respectively)

- The negative EGPG (-4.9% median) in Transport is possibly due to legacy 'public sector' approaches to pay, considerable work done in inclusion within that sector and the high proportion of men in this sector who are in career 'technician' roles (Career level A)

	Construction	Consultancy	Energy	Manufacturing	Technology	Transport
■ Mean	19.9%	15.2%	3.0%	9.9%	16.8%	-3.9%
■ Median	20.7%	13.3%	2.7%	9.3%	14.9%	-4.9%

Engineering gender pay gap by employee traits

EGPG – by age
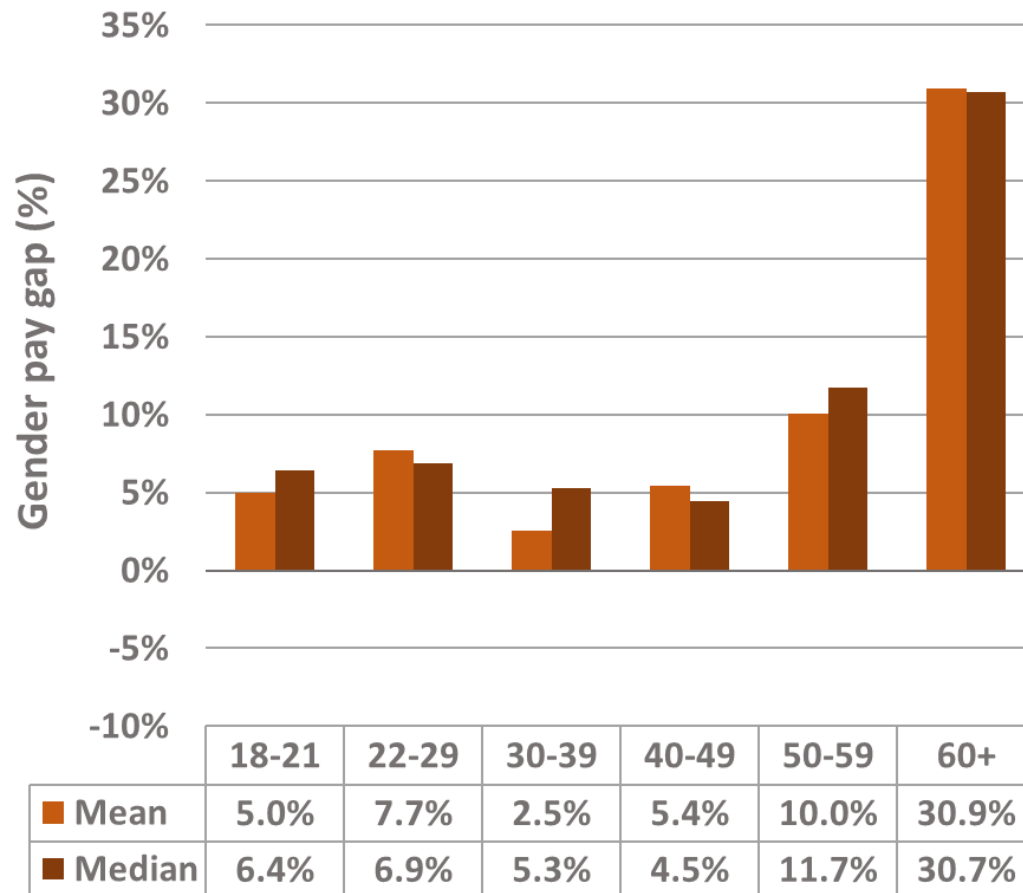
Age	Proportion of male / female in whole dataset		Proportion by age	
	Male	Female	Male	Female
18-21	1%	2%	84%	16%
22-29	14%	27%	81%	19%
30-39	22%	30%	86%	14%
40-49	20%	20%	89%	11%
50-59	20%	12%	93%	7%
60+	6%	2%	95%	5%

- There is a mean 5% EGPG in favour of men as employees join the workforce aged 18-21. This increases to 7.7% for those aged 22-29 years suggesting that men's pay may be progressing faster than women's

- The gap is smaller for those aged 30-39 (mean 2.5%) suggesting women who stayed in the workplace progressed in line with male peers

- After age 40 the gap increases steadily reflecting that male progression may be moving significantly faster than women's . At age 60 the gap is 30.9%

- The impact of age can be seen in the regression analysis section

EGPG – by employment type
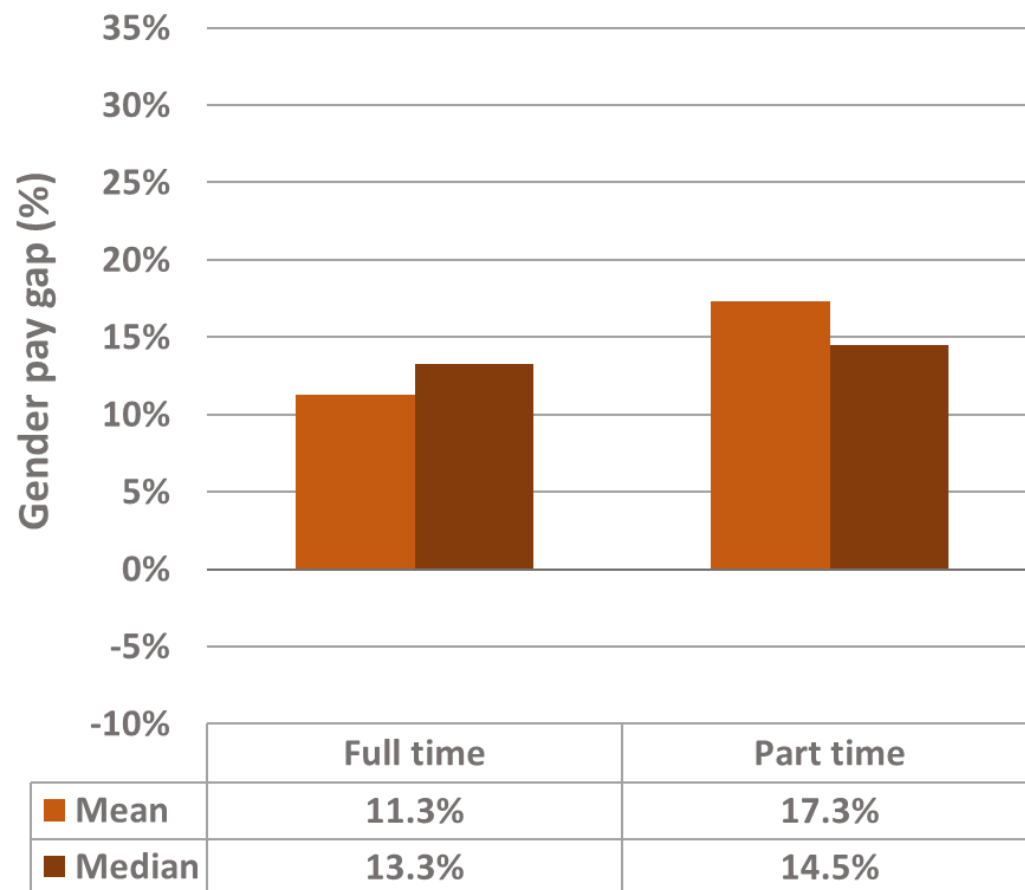
	Full time	Part time
■ Mean	11.3%	17.3%
■ Median	13.3%	14.5%

Full time / Part time	Proportion of male / female in whole dataset		Proportion by employment type	
	Male	Female	Male	Female
Full time	97%	82%	91%	9%
Part time	2%	17%	49%	51%

- Although only 2% of men in the sample work part-time, the EGPG is higher than for full time, showing that male part-timers typically earn more than their female counterparts
- This could reflect that women working part time are less able to progress their pay
- However we also see that male part time rates increase through the ages. Female part time rate peaks in the 40-49 age group
- This is due to the higher level seniority of male part-timers compared to female

20

EGPG – by career level
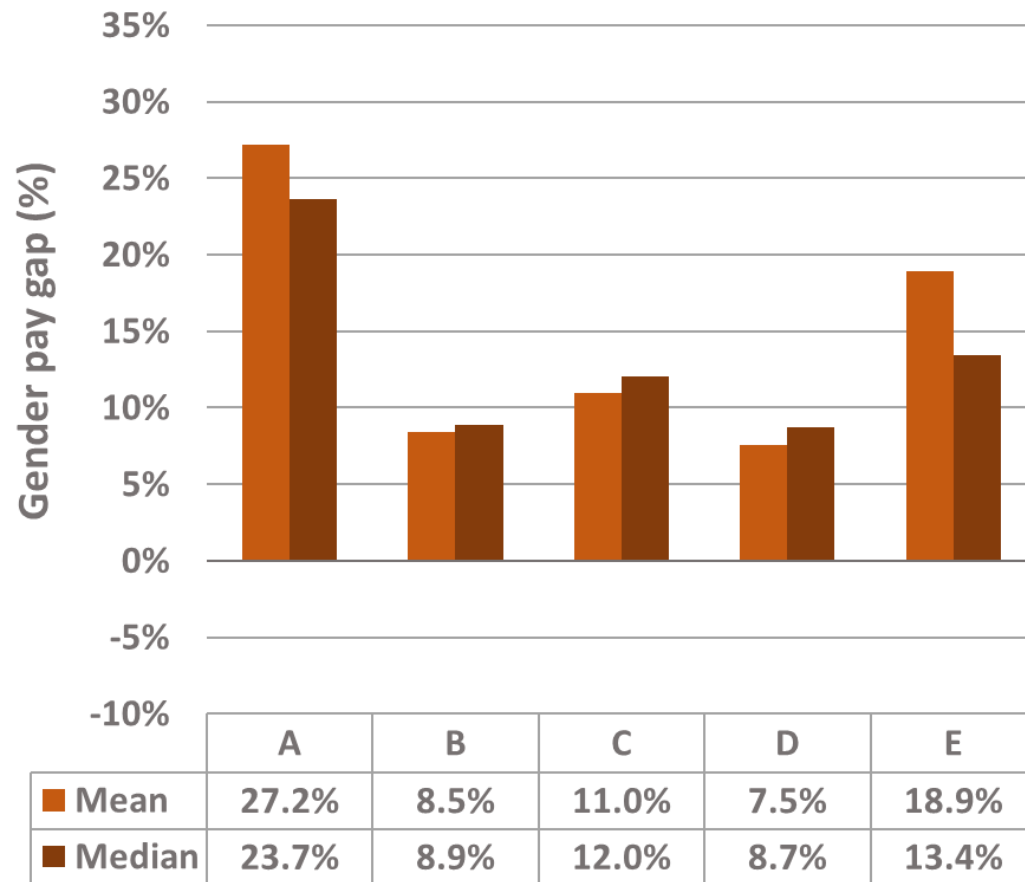
	A	B	C	D	E
■ Mean	27.2%	8.5%	11.0%	7.5%	18.9%
■ Median	23.7%	8.9%	12.0%	8.7%	13.4%

Career Level	Proportion of male / female in whole dataset		Proportion by career level	
	Male	Female	Male	Female
A	22%	13%	93%	7%
B	2%	6%	79%	21%
C	50%	66%	86%	14%
D	14%	13%	90%	10%
E	3%	2%	91%	9%

- The largest EGPG is in the Career Level A – Technicians and Apprentices - (23.7% median) compared to Career Level B - Graduates (8.9% median). This could be due to more men being 'career technicians' whereas for women it is an entry level stepping stone

- Mid-career the gap widens (from Graduate upwards) to 12% median and then closes to 8.7% median for senior professionals and managers

- Many more males are Career Level E (Expert / Executive) at aged 60+

- Most women aged 60+ are in Career Level C (Professional / Engineer / Manager)
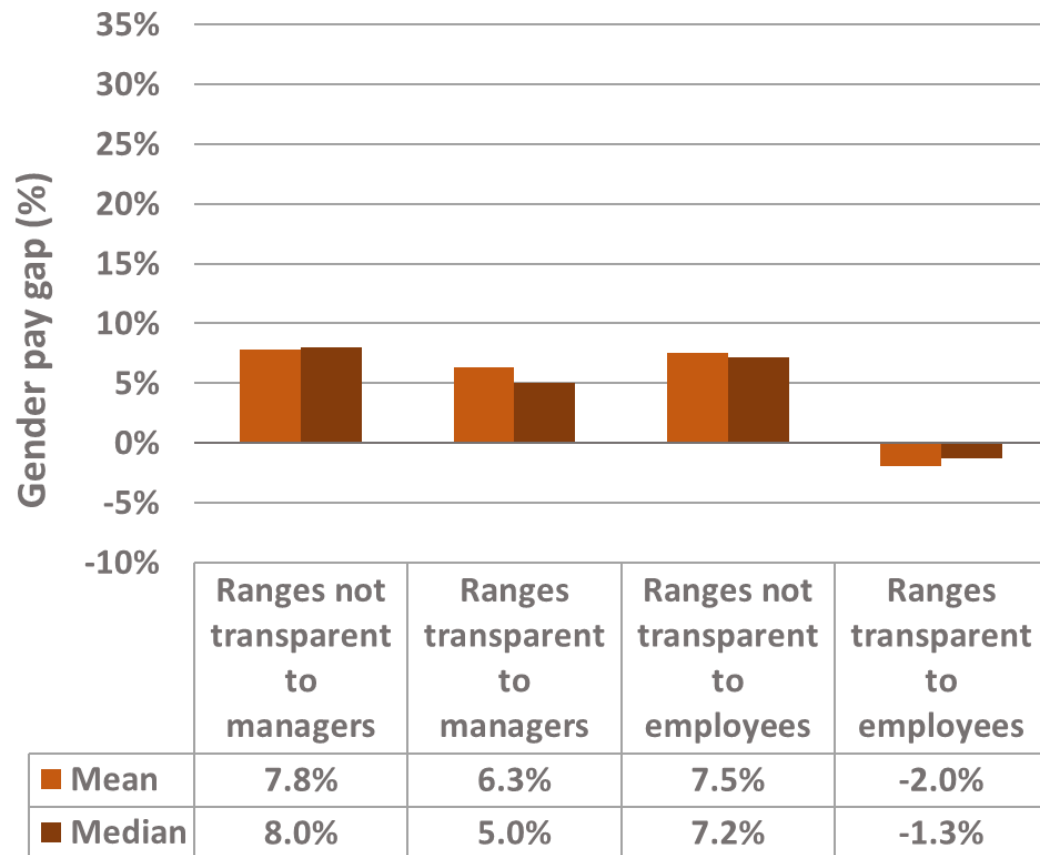
Engineering gender pay gap by pay policy

EGPG – by pay ranges
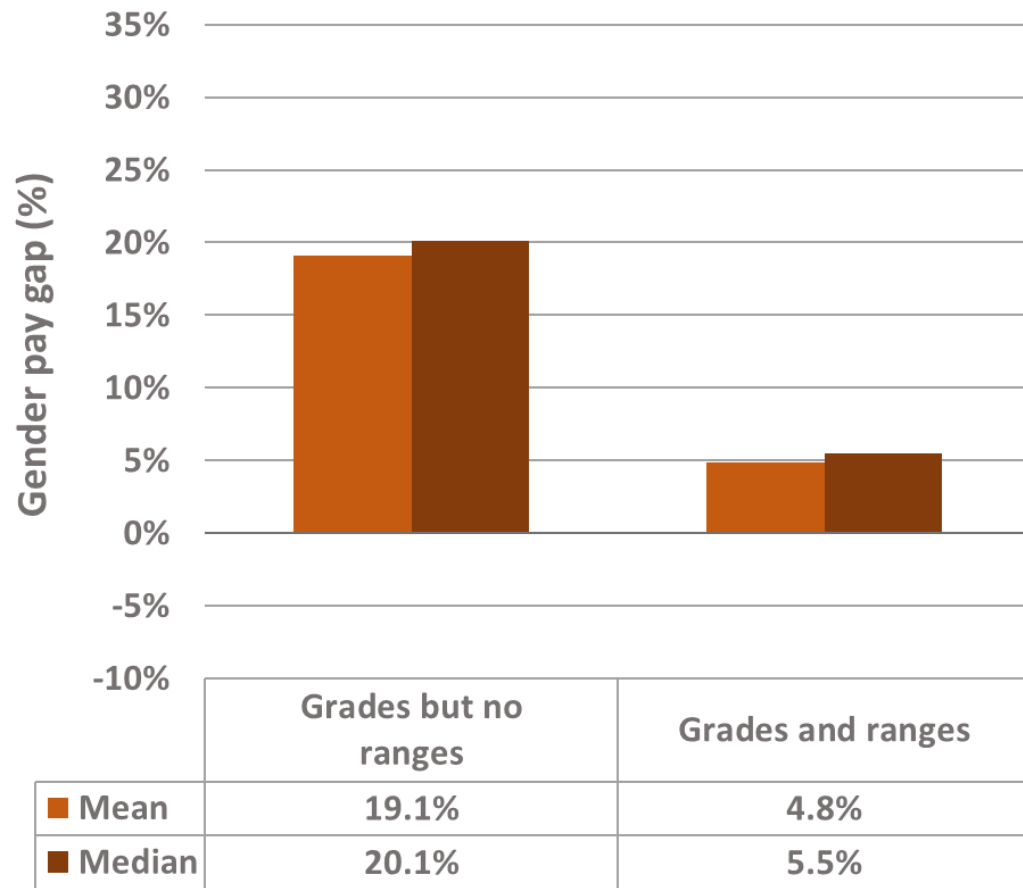
Ranges	Proportion of male / female in whole dataset		Proportion by pay ranges	
	Male	Female	Male	Female
Grades but no ranges	21%	36%	83%	17%
Grades and ranges	77%	63%	91%	9%

	Grades but no ranges	Grades and ranges
■ Mean	19.1%	4.8%
■ Median	20.1%	5.5%

- The EGPG is significantly smaller where companies have clearly defined grades or career levels and pay ranges attached to them
- This demonstrates that having structure and clear principles around pay and pay decisions leads to more objective decisions

EGPG – by transparency

	Ranges not transparent to managers	Ranges transparent to managers	Ranges not transparent to employees	Ranges transparent to employees
■ Mean	7.8%	6.3%	7.5%	-2.0%
■ Median	8.0%	5.0%	7.2%	-1.3%

Transparency	Proportion of male / female in whole dataset		Proportion by transparency	
	Male	Female	Male	Female
Ranges not transparent to managers	9%	12%	86%	14%
Ranges transparent to managers	68%	51%	92%	8%
Ranges not transparent to employees	46%	47%	89%	11%
Ranges transparent to employees	32%	15%	94%	6%

- Where pay ranges are transparent to managers and employees, pay gaps decrease
- Being open and transparent to employees around pay also ensures that those who make pay decisions are accountable and less likely to be impacted by subjective factors
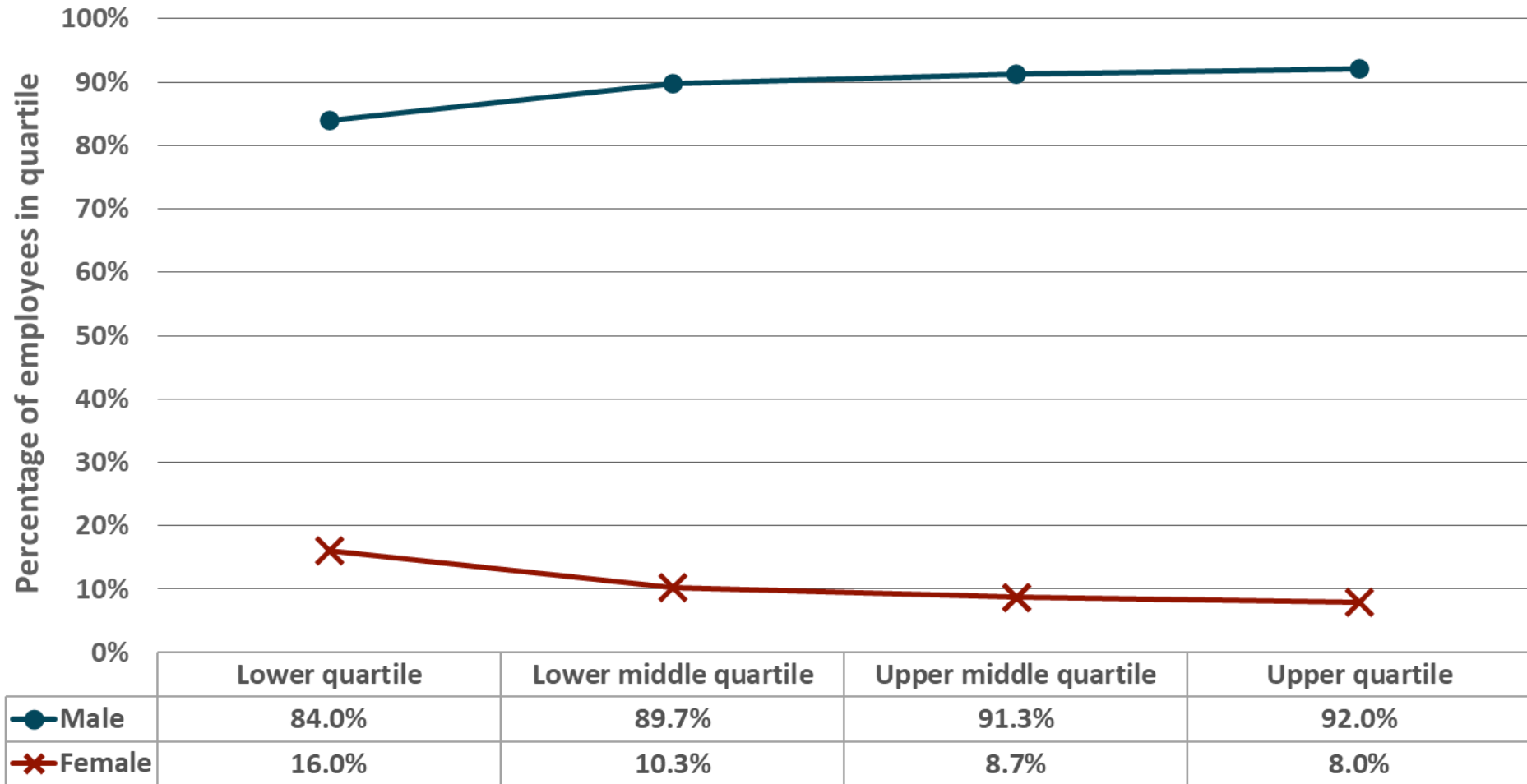
EGPG – by graduate starting salary policy
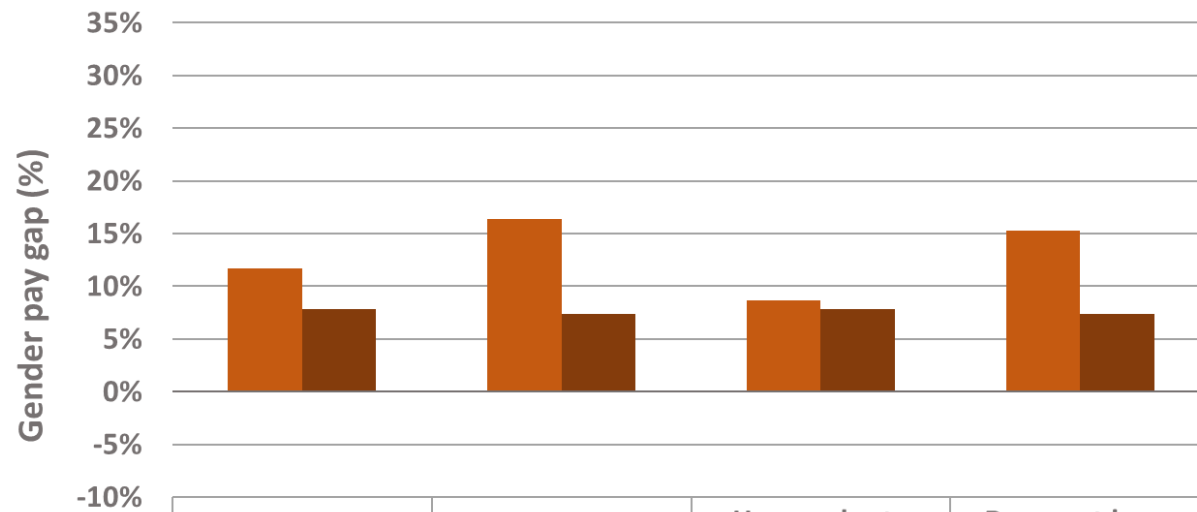
	Has graduate starting salary	Does not have graduate starting salary	Has graduate starting salary 22-29 age bracket	Does not have graduate starting salary 22-29 age bracket
Mean	11.7%	16.4%	8.6%	15.2%
Median	7.8%	7.4%	7.8%	7.4%

Graduate starting salary	Proportion of male / female in whole dataset		Proportion by graduate starting salary	
	Male	Female	Male	Female
Has graduate starting salary	95%	97%	89%	11%
Does not have graduate starting salary	2%	3%	86%	14%
Has graduate starting salary & aged 22-29	13%	26%	81%	19%
Does not have graduate starting salary & aged 22-29	0.3%	0.4%	86%	14%

- The EGPG decreases where companies clearly articulate graduate salaries
- However, an EGPG still exists which suggests other factors are also used in setting pay for this group

Quartiles

Quartiles

	Lower quartile	Lower middle quartile	Upper middle quartile	Upper quartile
●—Male	84.0%	89.7%	91.3%	92.0%
✕—Female	16.0%	10.3%	8.7%	8.0%

EGPG by quartile
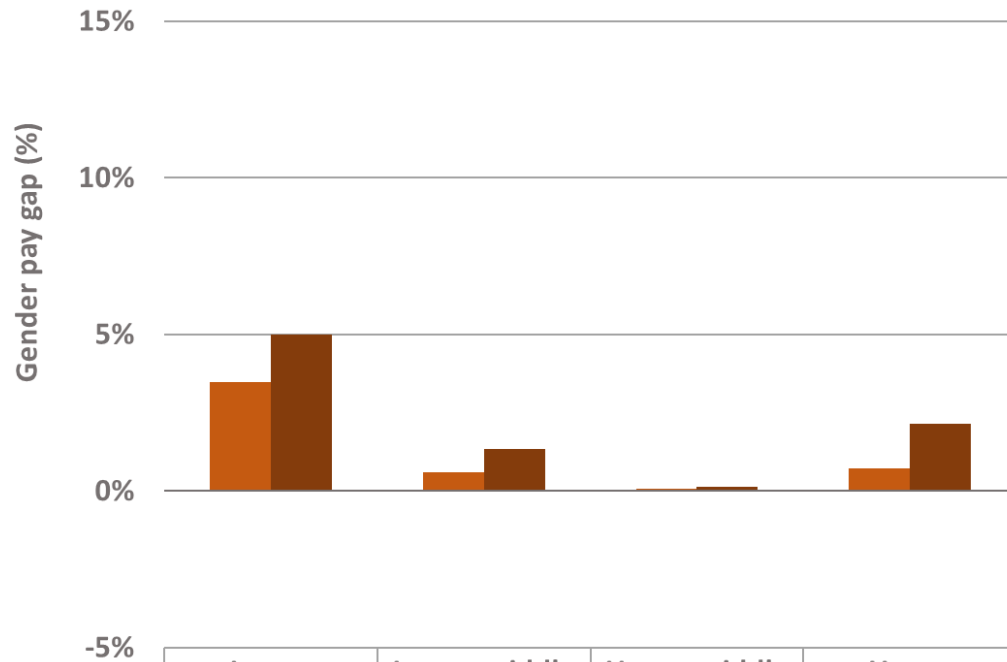
	Lower	Lower middle	Upper middle	Upper
■ Mean pay gap	3.5%	0.6%	0.1%	0.7%
■ Median pay gap	5.0%	1.3%	0.1%	2.1%

Observations

- The proportion of women in the regulatory quartiles decreases as pay progresses with half the proportion of women in the top quartile as the lower quartile

- Although there is a higher representation of women in the lower quartile, it has the largest EGPG. This reflects that men in the quartile are 'career technicians' whereas women may be entry level graduates

Engineering bonus gaps

Engineering bonus gap – overall

	RA Engineering
■ Mean	5.4%
■ Median	1.2%
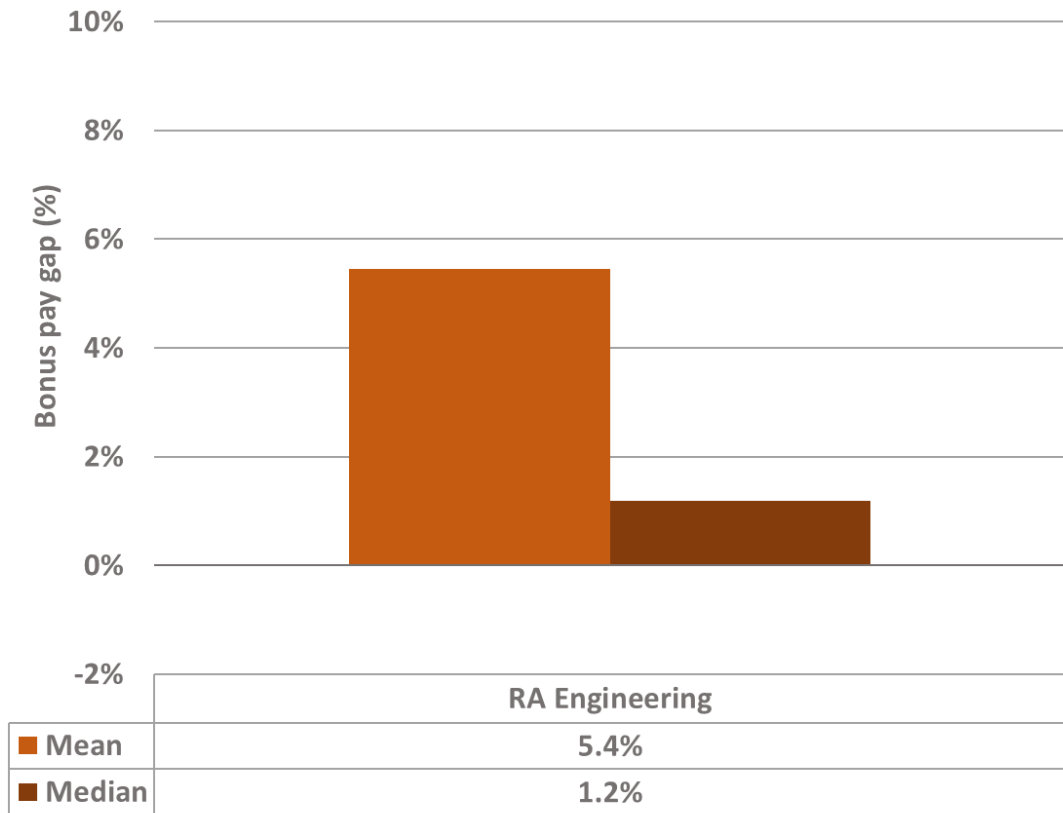
Observations

- Typically 14% fewer women receive a bonus than men
- The proportion of women receiving a bonus varies by career level. The only career level where a higher percentage of women receive a bonus than men is the most senior
- The mean engineering bonus gap (EBG) is higher than the median due to larger bonuses typically paid to the most senior men
- 77% of companies that have a bonus plan, offer a performance bonus scheme linked to personal & / or company performance. 23% of companies offer a profit share scheme, of those 2/3rds do so in addition to a performance bonus plan.
- Of those with a performance bonus scheme 85% link bonus opportunity to grade or seniority
- As bonus awards are linked to a percentage of pay, any pay gap has an impact upon the bonus gap
- Due to the variability in bonus policies across the companies in the sample, the impact of company factors such as size is inconclusive
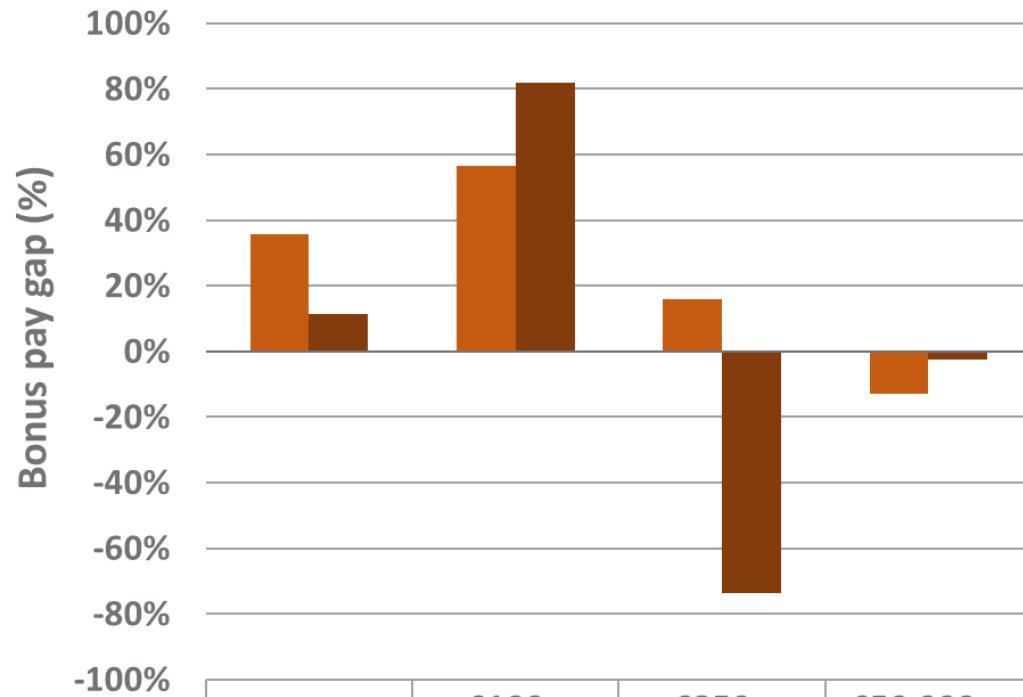
Engineering bonus gap by company factors

EBG – by employee number
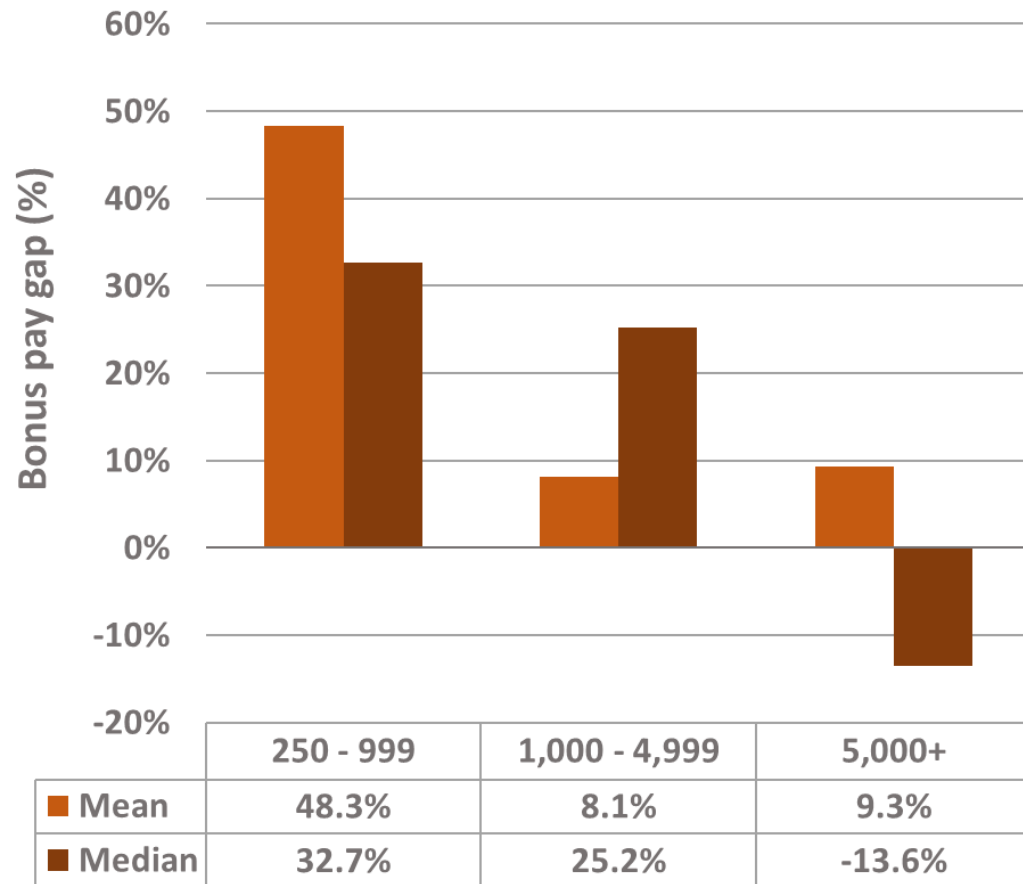
	250 - 999	1,000 - 4,999	5,000+
■ Mean	48.3%	8.1%	9.3%
■ Median	32.7%	25.2%	-13.6%

Employee Number	Proportion of male / female in bonus dataset		Proportion by employee number	
	Male	Female	Male	Female
250 - 999	5%	8%	86%	14%
1,000 - 4,999	22%	27%	89%	11%
5,000+	73%	65%	92%	8%

EBG – by annual revenue

	<£100m	£100 - 249m	£250 - 49,999m	£50,000m +
■ Mean	35.7%	56.5%	15.8%	-12.9%
■ Median	11.2%	81.7%	-73.6%	-2.6%

Annual Revenue	Proportion of male / female in bonus dataset		Proportion by annual revenue	
	Male	Female	Male	Female
<£100m	3%	4%	85%	15%
£100 - 249m	7%	7%	90%	10%
£250 - 49,999m	33%	36%	90%	10%
£50,000m+	58%	52%	92%	8%

EBG – by head office location
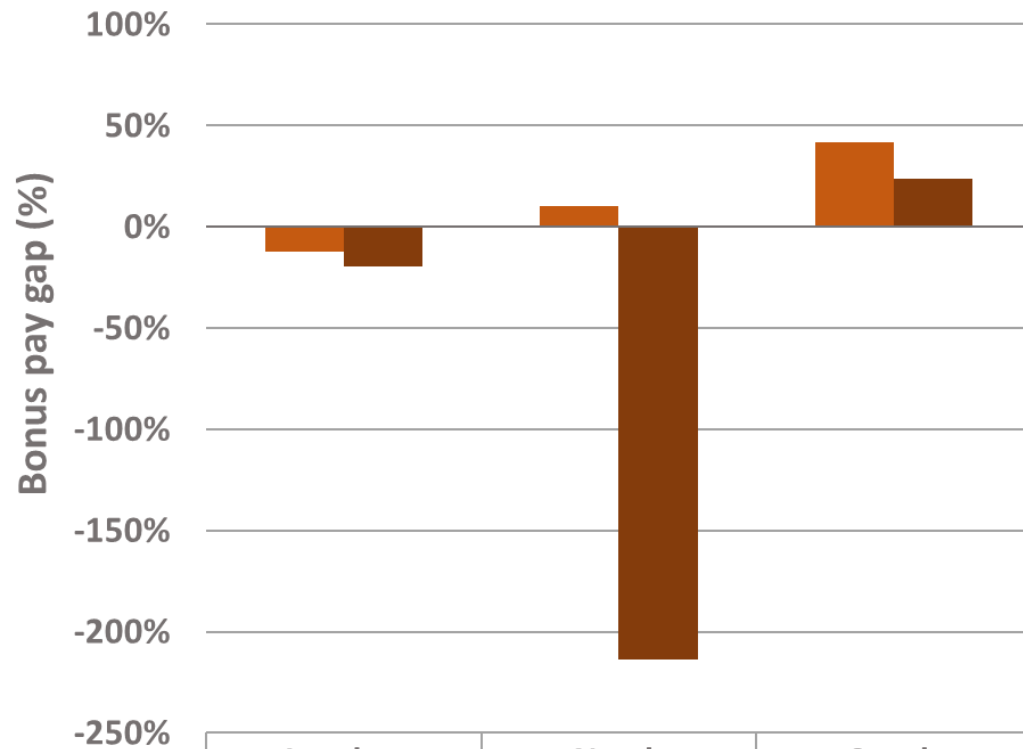
	London	North	South
■ Mean	-12.4%	10.1%	41.7%
■ Median	-19.8%	-213.7%	23.5%

Location	Proportion of male / female in bonus dataset		Proportion by location	
	Male	Female	Male	Female
London	70%	66%	92%	8%
North	4%	5%	91%	9%
South	25%	30%	90%	10%

EBG – by sector
(companies can be in more than one sector)

Sector	Proportion of male / female in bonus dataset		Proportion by sector	
	Male	**Female**	**Male**	**Female**
Construction	8%	18%	81%	19%
Consultancy	13%	24%	84%	16%
Energy	8%	12%	88%	12%
Manufacturing	43%	45%	91%	9%
Technology	15%	17%	90%	10%

Bonus pay gap (%)
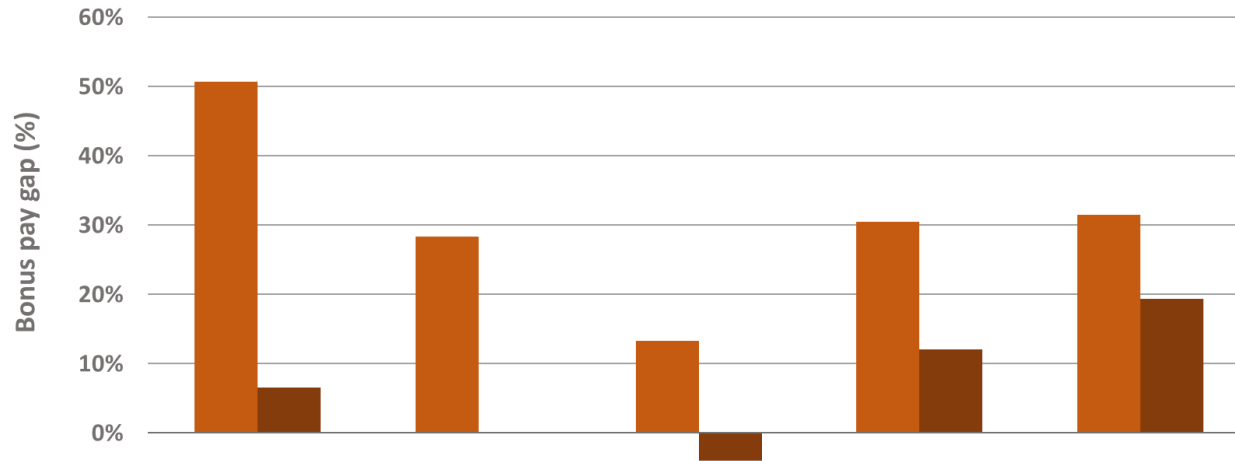
	Construction	Consultancy	Energy	Manufacturing	Technology
■ Mean	50.6%	28.4%	13.3%	30.5%	31.5%
■ Median	6.5%	0.0%	-4.0%	12.1%	19.3%

- On average bonuses paid to men are significantly higher than for women, this reflects that generally there are more senior men than women in the organisation and bonus opportunity is often linked to seniority

- In some sectors (Consultancy and Energy) the typical bonus paid to women is equal to or more than that paid to men

Engineering Bonus Gap by employee traits

EBG – by age
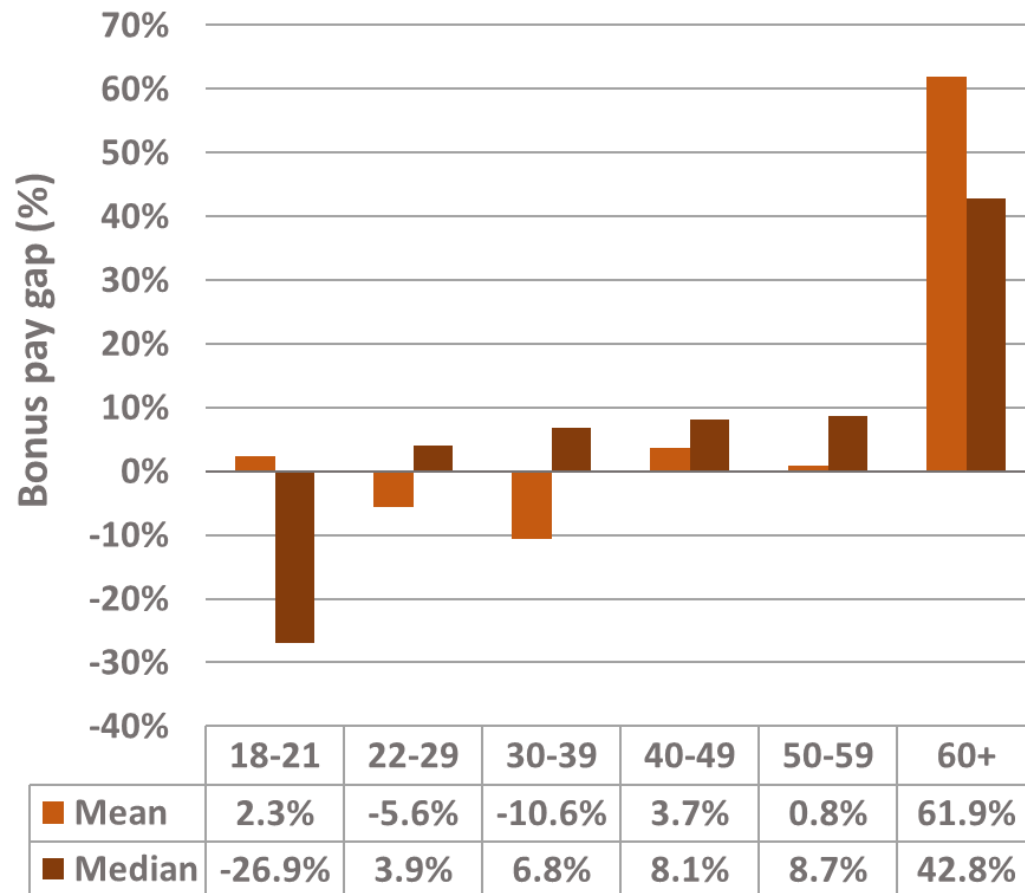
	18-21	22-29	30-39	40-49	50-59	60+
■ Mean	2.3%	-5.6%	-10.6%	3.7%	0.8%	61.9%
■ Median	-26.9%	3.9%	6.8%	8.1%	8.7%	42.8%

Age	Proportion of male / female in bonus dataset		Proportion by age	
	Male	Female	Male	Female
18-21	1%	1%	84%	16%
22-29	12%	24%	84%	16%
30-39	21%	29%	88%	12%
40-49	20%	20%	91%	9%
50-59	21%	13%	94%	6%
60+	5%	3%	95%	5%

- The largest bonus gap is age 60+ reflecting the seniority of men, with only 5% women in this age group
- Women are most highly represented in the 22-29 and 30-39 age ranges. These have the smallest median bonus gaps and negative mean gaps reflecting women receiving on average larger bonuses than men
- The youngest age range has the smallest representation of women but those who receive bonuses typically receive much larger amounts than their male counterparts

EBG – by employment type
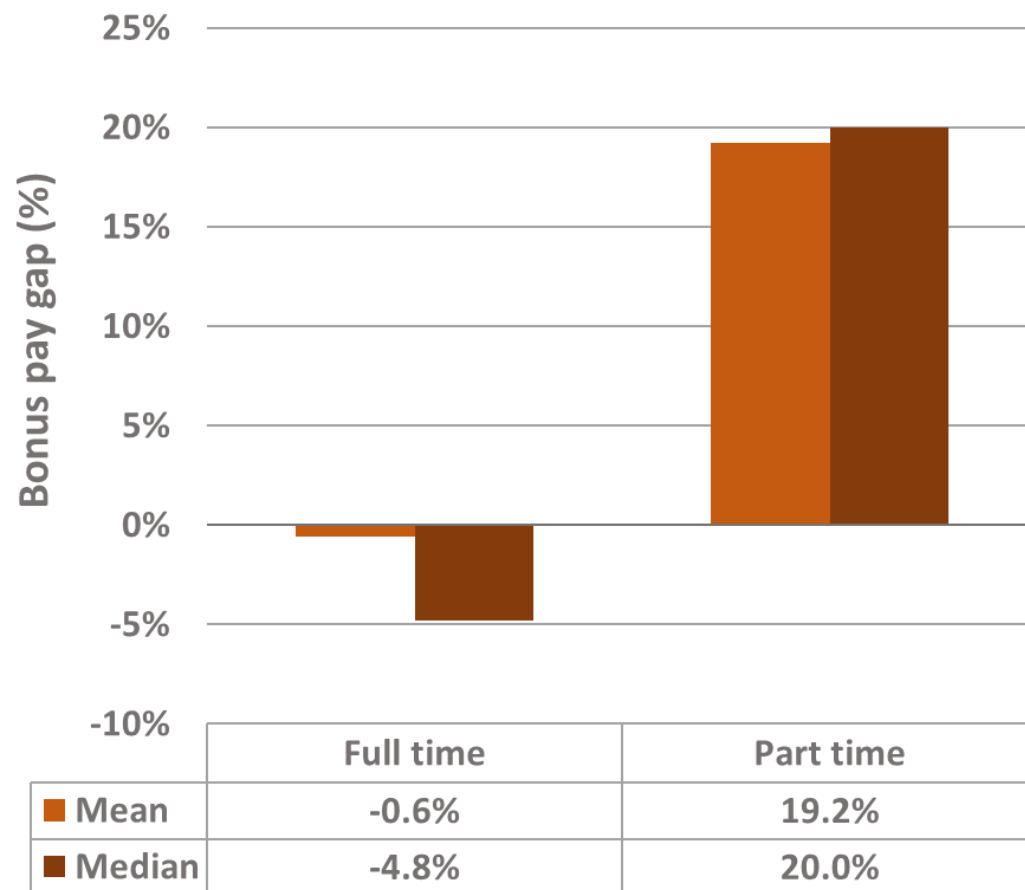
	Full time	Part time
■ Mean	-0.6%	19.2%
■ Median	-4.8%	20.0%

Full time / Part time	Proportion of male / female in bonus dataset		Proportion by employment type	
	Male	Female	Male	Female
Full time	98%	82%	92%	8%
Part time	2%	17%	49%	51%

- A higher proportion of full time men (79%) receive bonuses than full time women (65%)
- However of those full time employees who do receive a bonus, there is a negligible mean bonus gap, and a median bonus gap in favour of women
- 65% of part-timers receive a bonus, this is the same regardless of gender.
- However, the bonus gap is c20%, meaning that male part timers typically receive higher bonuses than their female counterparts, reflecting the relative seniority of male part timers

EBG – by career level
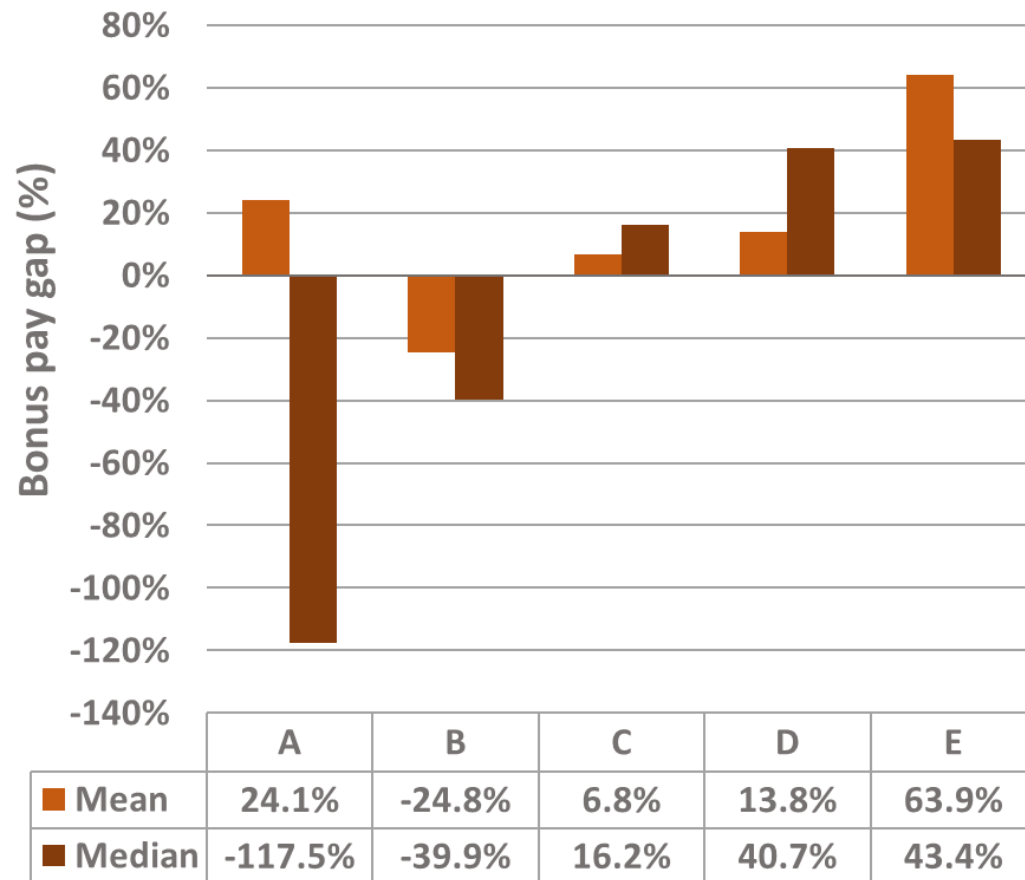
	A	B	C	D	E
■ Mean	24.1%	-24.8%	6.8%	13.8%	63.9%
■ Median	-117.5%	-39.9%	16.2%	40.7%	43.4%

Career Level	Proportion of male / female in bonus dataset		Proportion by Career Level	
	Male	Female	Male	Female
A	23%	13%	95%	5%
B	2%	4%	83%	17%
C	49%	65%	88%	12%
D	13%	14%	91%	9%
E	2%	3%	90%	10%

- The career level with the highest proportion of women is B (Graduate). This has a bonus gap in favour of women
- Most women are in Career level C (Professional / Engineer / Manager). This has a bonus gap in favour of men
- Mean and median bonus gaps increase with seniority

Engineering bonus gap by bonus policy

EBG – by profit share scheme

	Has a profit share scheme	Does not have a profit share scheme
■ Mean	10.4%	15.5%
■ Median	7.3%	-8.4%
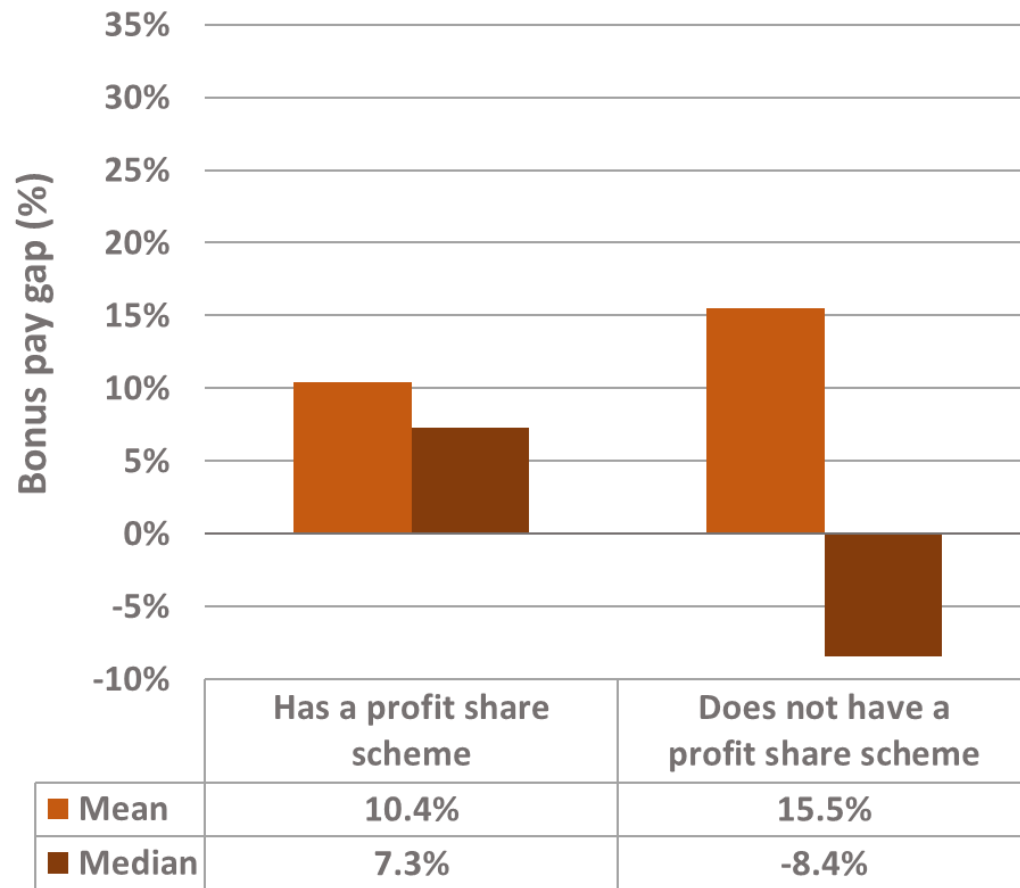
Profit share	Proportion of male / female in bonus dataset		Proportion by profit share scheme	
	Male	Female	Male	Female
Has a profit share scheme	22%	30%	88%	12%
Does not have a profit share scheme	78%	70%	92%	8%

- Most organisations do not have a profit share scheme. Bonus is likely to be linked to individual or corporate performance
- Where a profit share scheme is in place, the mean bonus gap reduces, reflecting the more equitable distribution of variable pay associated with such schemes

Bonus proportions

Bonus proportions

Proportion receiving bonus - overall

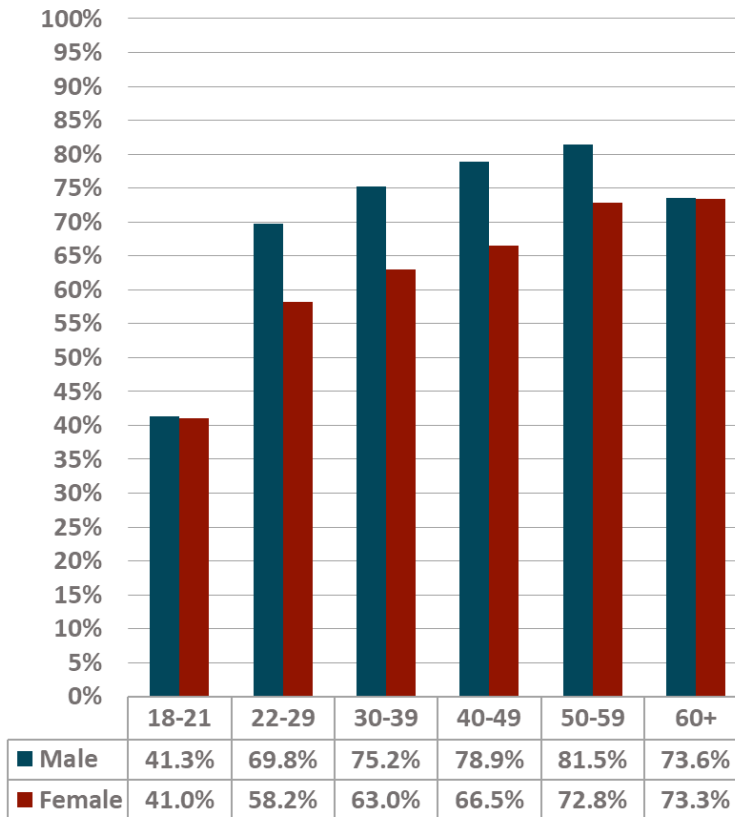|	Percentage
■ Male	79.4%
■ Female	65.4%
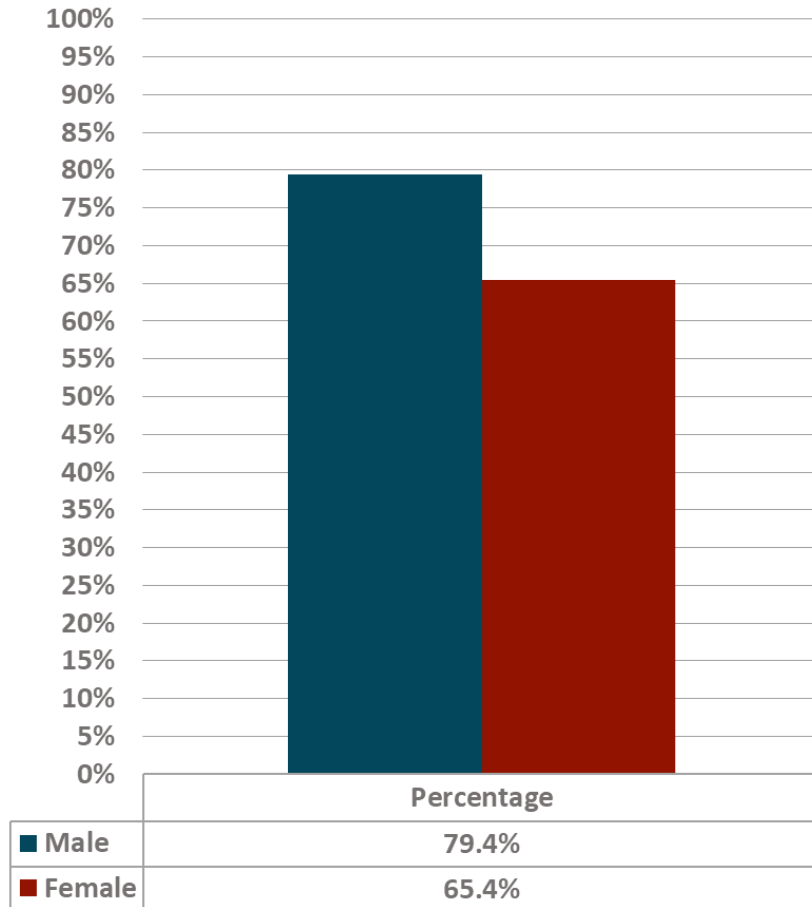
Observations

- Typically more men receive bonuses than women

- The proportion of men and women receiving a bonus is equitable for those working part-time, however male full time employees are 14% more likely to receive a bonus

- The proportions receiving bonus in the youngest and oldest ages ranges is equitable, however from age 21 to age 59 while the proportions receiving for both genders increases, men are more likely to receive a bonus than women

- The incidence of bonus generally increases by career level for both men and women

- Career level A (Technician / Apprentice) has the highest proportion of males receiving a bonus. This reflects the types of technician roles undertaken where bonus may be linked directly to productivity

- The most senior women are more likely to receive a bonus than male counterparts at the same level
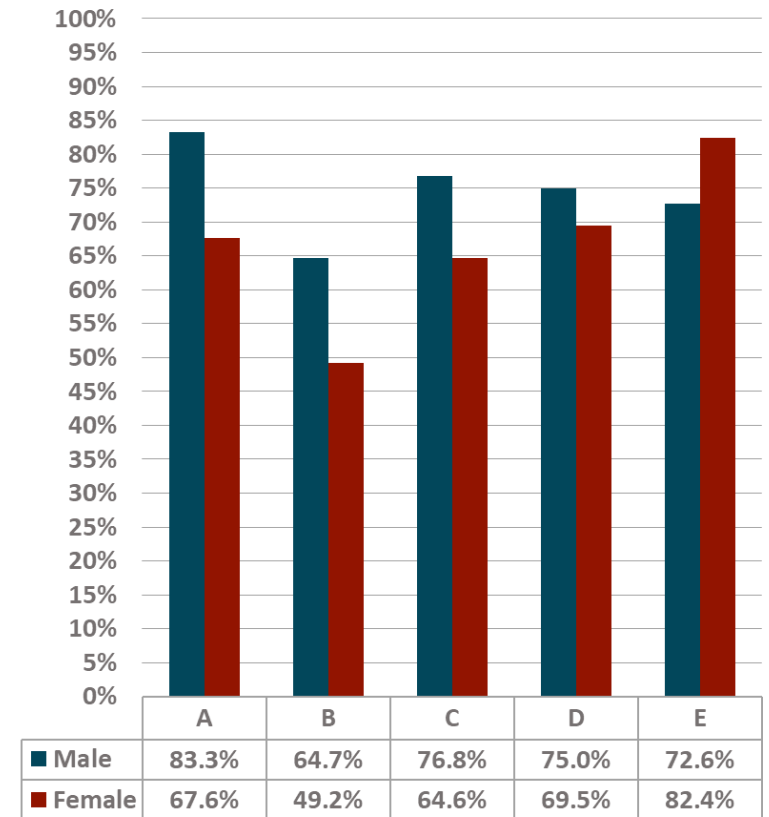
Bonus proportions – by employee traits

Proportion receiving bonus by Working hours

	Full time	Part time
■ Male	79.6%	65.5%
■ Female	65.4%	64.4%

Proportion receiving bonus by Age

	18-21	22-29	30-39	40-49	50-59	60+
■ Male	41.3%	69.8%	75.2%	78.9%	81.5%	73.6%
■ Female	41.0%	58.2%	63.0%	66.5%	72.8%	73.3%
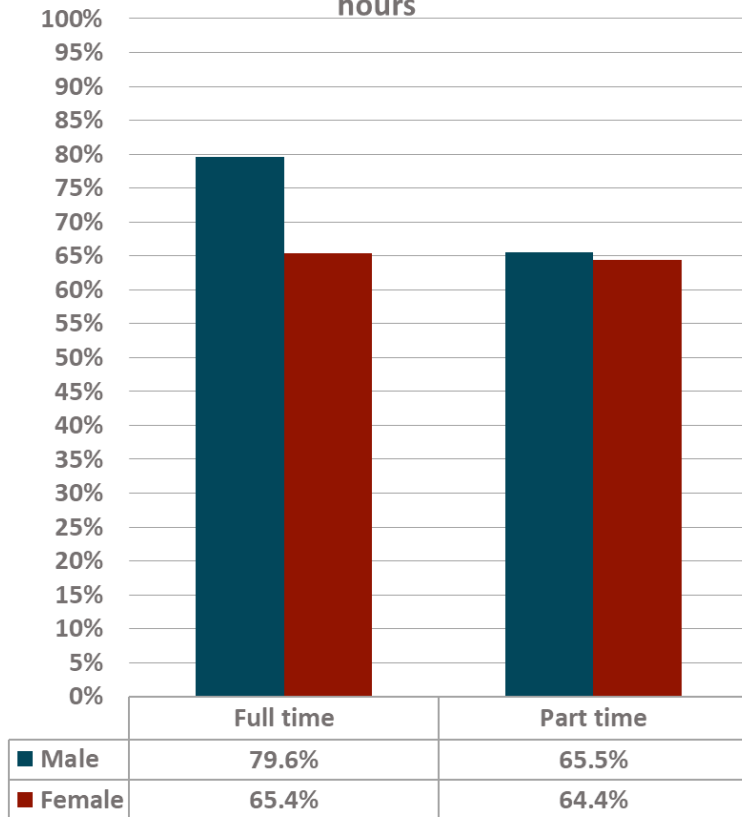
Proportion receiving bonus by Career Level

	A	B	C	D	E
■ Male	83.3%	64.7%	76.8%	75.0%	72.6%
■ Female	67.6%	49.2%	64.6%	69.5%	82.4%

Regression analysis

Regression analysis

Pay

- Analysis shows that men and women's pay is on the same trajectory (albeit with a gap) until aged 40 at which point men's pay increases at a faster rate then women's.
- Both plateau then dip at age 50 but women's pay decreases at a significantly faster rate than men's
- This suggests that at age 50 women established in their careers leave the profession and the remaining women are undertaking more 'junior' roles
- When taking into account the factors analysed, the EGPG reduces to c.7% this could be mitigated further if other factors are included
- The biggest driver of engineering pay is unsurprisingly career progression but 35% is due to unknown factors which could be:
    - Performance
    - Ethnicity and other protected characteristics
    - Bias
    - Pay principles and practices
    - Lack of D&I strategy
    - Company culture
    - Home / life factors
- When all other factors are isolated, gender impacts pay variance by less than 1%
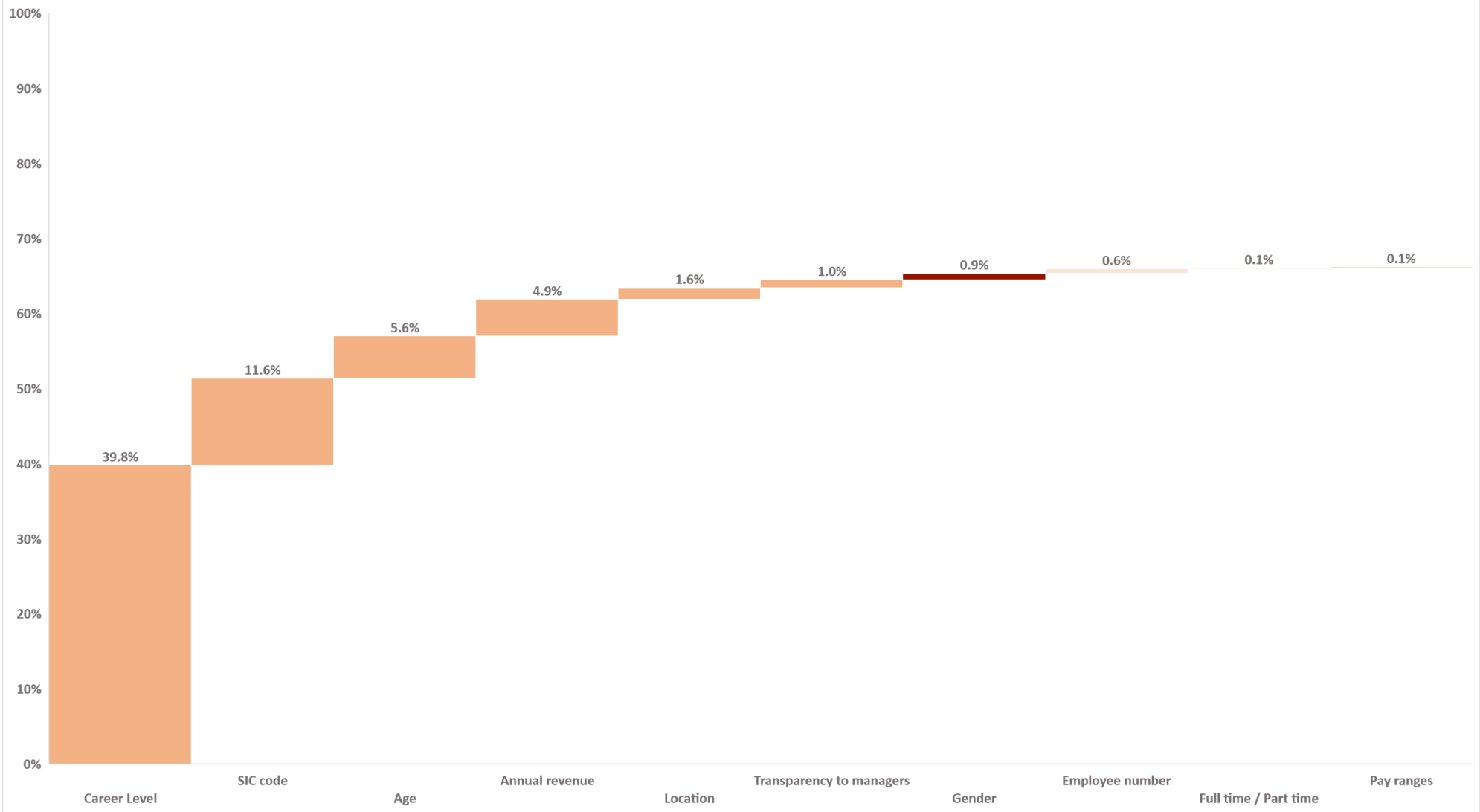
Bonus

- The trajectory of men and women's bonus awards is initially similar
- From age 23 to age 45 women's bonuses are higher than men's, after age 45 men's bonuses exceed women's
- Women's bonuses peak at age 50, men's at age 52
- Women's bonuses decline at a faster rate than men's suggesting that women are not progressing to the most senior levels which attract the highest bonus awards
- The error margin (shown by the grey shading) shows the variance in bonuses across the age groups
- The biggest driver of bonus is the size of organisation (by revenue) that an employee works for.
- Bonus is also influenced heavily by career level reflecting that most bonus plan designs provide for a greater bonus opportunity by seniority
- A performance bonus plan has a greater impact on the bonus gap than a profit share scheme
- Similar to pay, c.40% of what drives bonus is due to unknown factors such as performance rating, performance metrics or other bonus design features
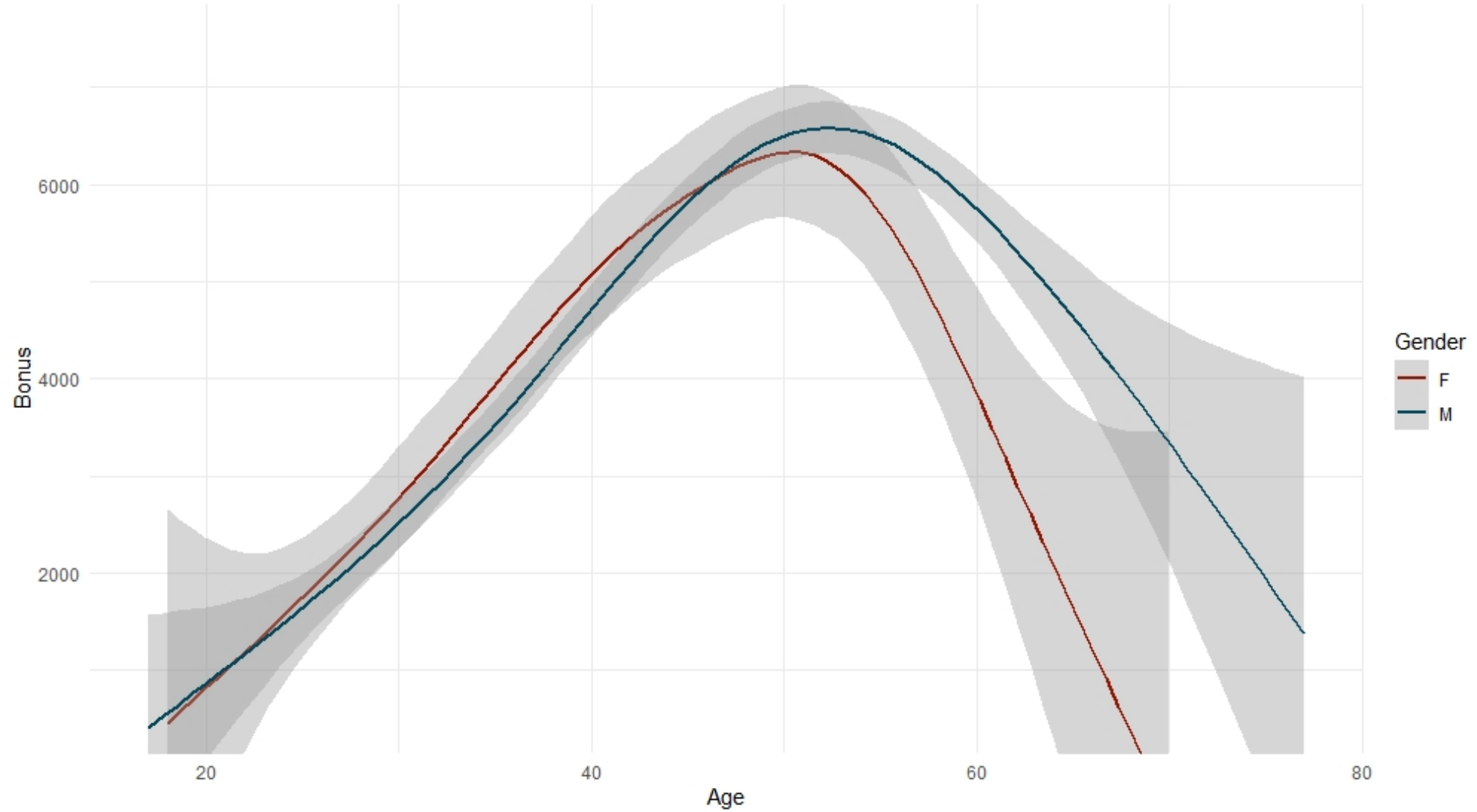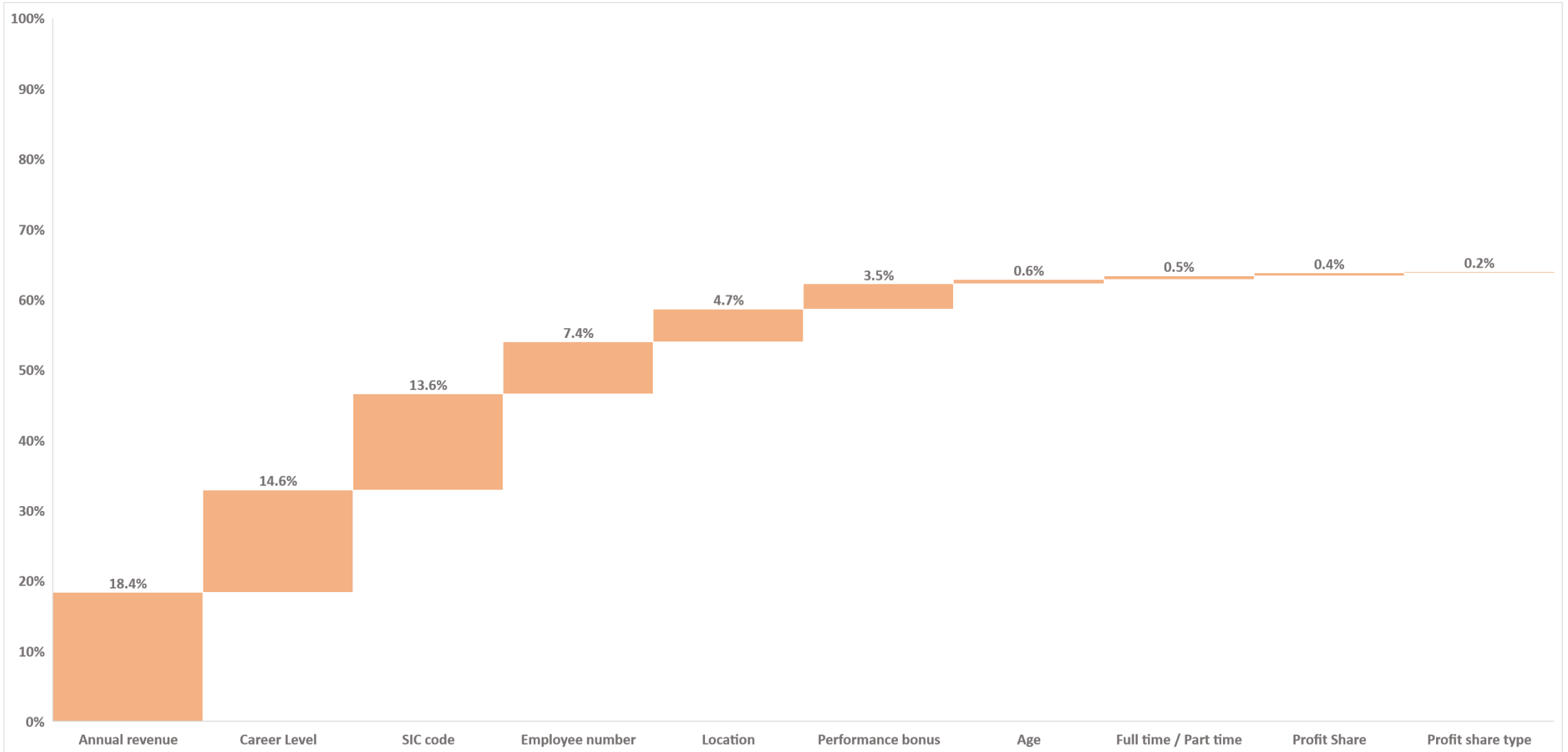- Gender is not shown to significantly impact variance of bonus awards

Pay by age
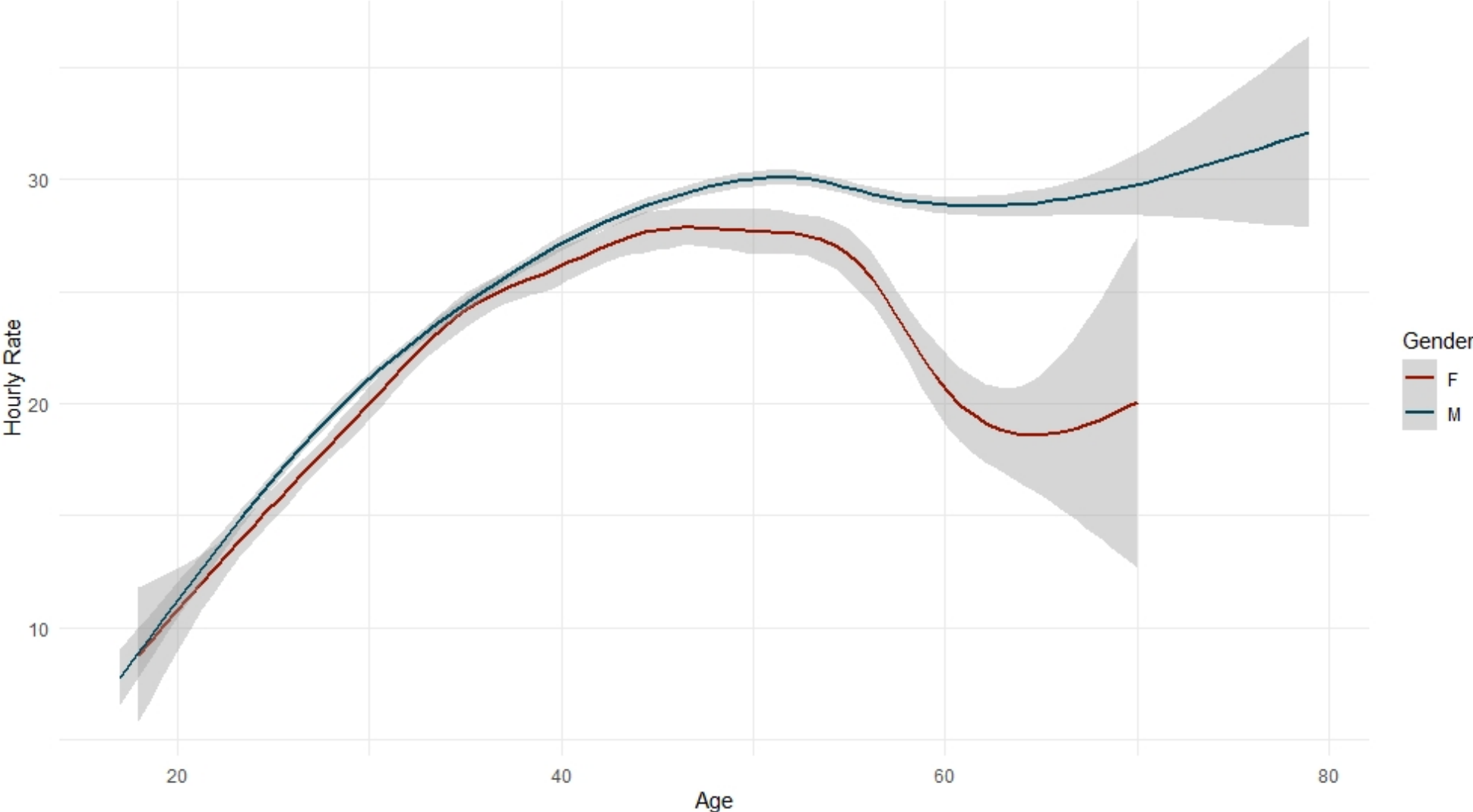
Known contributors to overall pay variance

Bonus by age

Known contributors to overall bonus variance

Methodology

Methodology

Overall results

- Although the data was checked for obvious errors or omissions, the incumbent data provided by each participant company was accepted to be correct as it formed the basis of the company's regulatory submission
- The calculations used were as laid down in the gender pay gap regulations
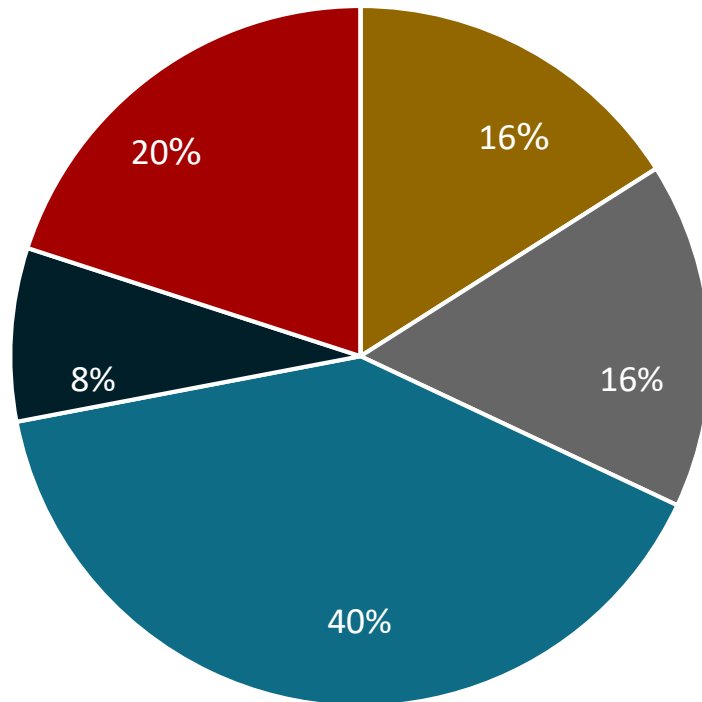
Results by factor

- Only results that met the following criteria are shown:
- more than three companies have data
- no company represents more than 60% of employees (if possible this company was removed to enable results to be provided)
- Companies that bridged more than one sector were included in each, to ensure that there were the numbers to produce results
- There is a correlation coefficient of 0.28 between age and career level. This shows a statistically significant but weak correlation. There are a variety of ages across all career levels, with older employees featuring in all career levels

Further analysis

- Although not required by the regulations, further analysis was undertaken to see which of the factors provided were significant in determining pay variance for engineers. This included regression analysis and Analysis of Variance (ANOVA)
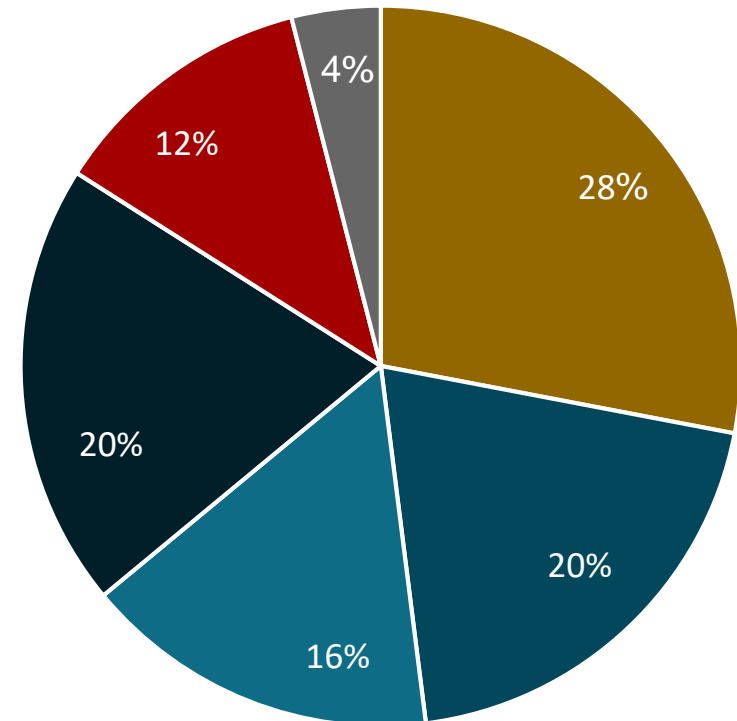
Participant profiles

Employee size

- >20,000 — 16%
- 5,000-19,999 — 16%
- 1,000 - 4,999 — 40%
- 500 - 999 — 8%
- 250 - 499 — 20%
- <250

Revenue size

- £50,000m+ — 28%
- £1,000 - 49,999m — 20%
- £250 - 999m — 16%
- £100 - 249m — 20%
- £25 - 99m — 12%
- <£25m — 4%

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