The Gender Gap in Compensation among UK firms

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How wide is the gender pay gap (GPG)?

What causes GPG?

Goal

Analyze GPG in UK, 2017

Create efficient sampling design

Data set

2017 UK census company data

Companies > 250 employees

6,713 companies

6 observations reclassified

No Non-response errors

No Non-sampling errors

Variables

Company Name

Company Address

Employer Size (category)

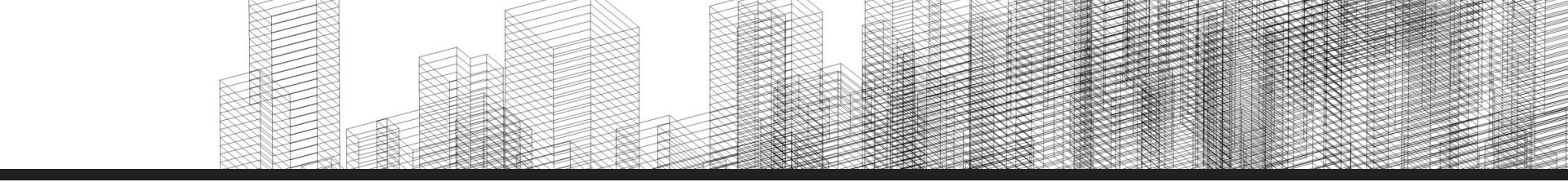
SIC Code

Different Mean/ Median Hourly Percent

Different Mean/Median Bonus Percent

Lower/ Lower middle/ Upper middle/ Upper Quartile

* Other unrelated data are in other dataframe



Population Data Analysis

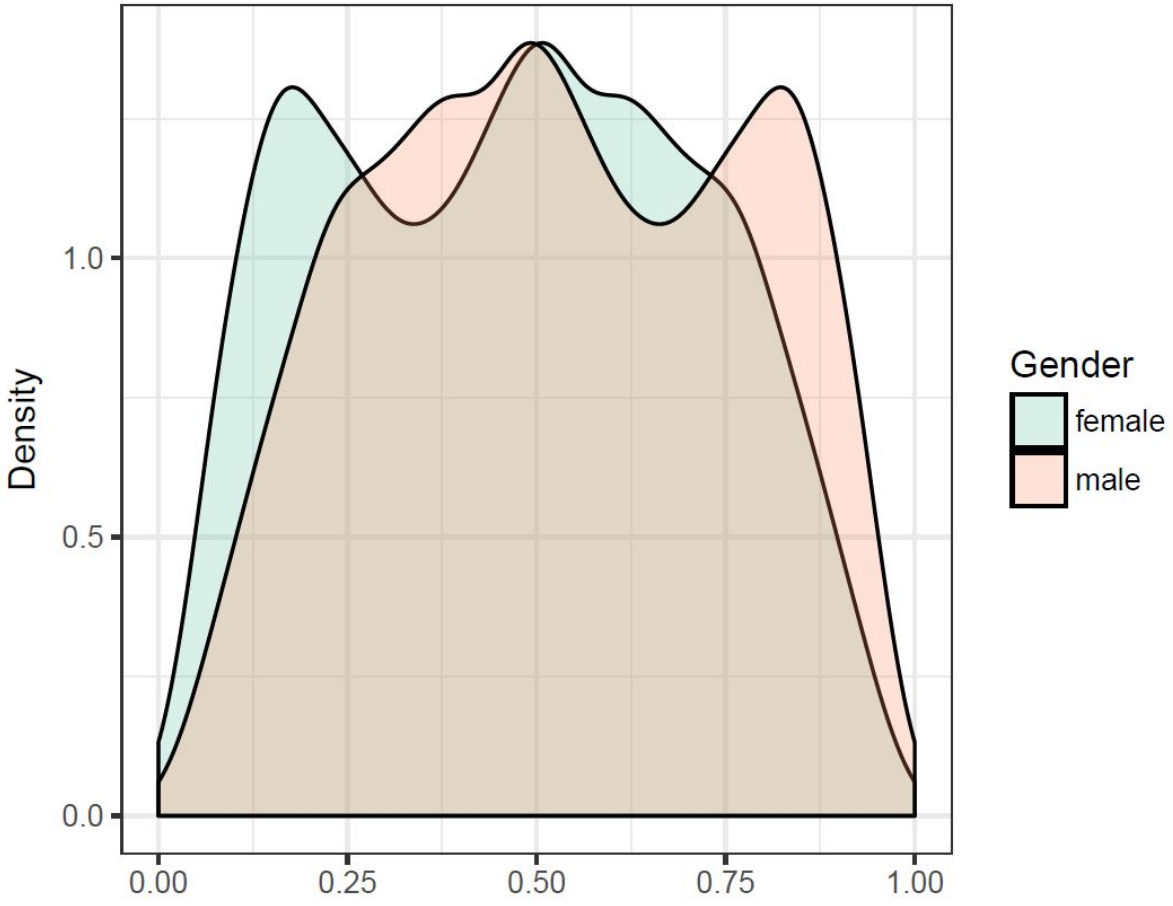


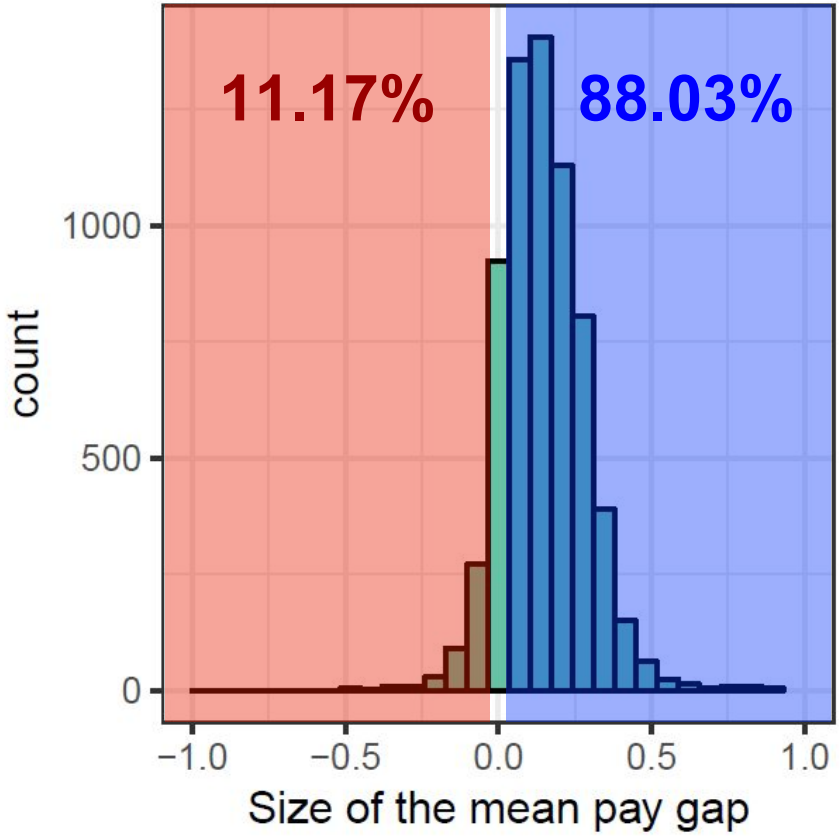
Figure 1: Density of different male-female employee proportions

Population

Average Different **Mean** hourly wage: 14.4%

Average Different **Median** hourly wage: 12.2%

Average Different Mean **Bonus**: 14.1%



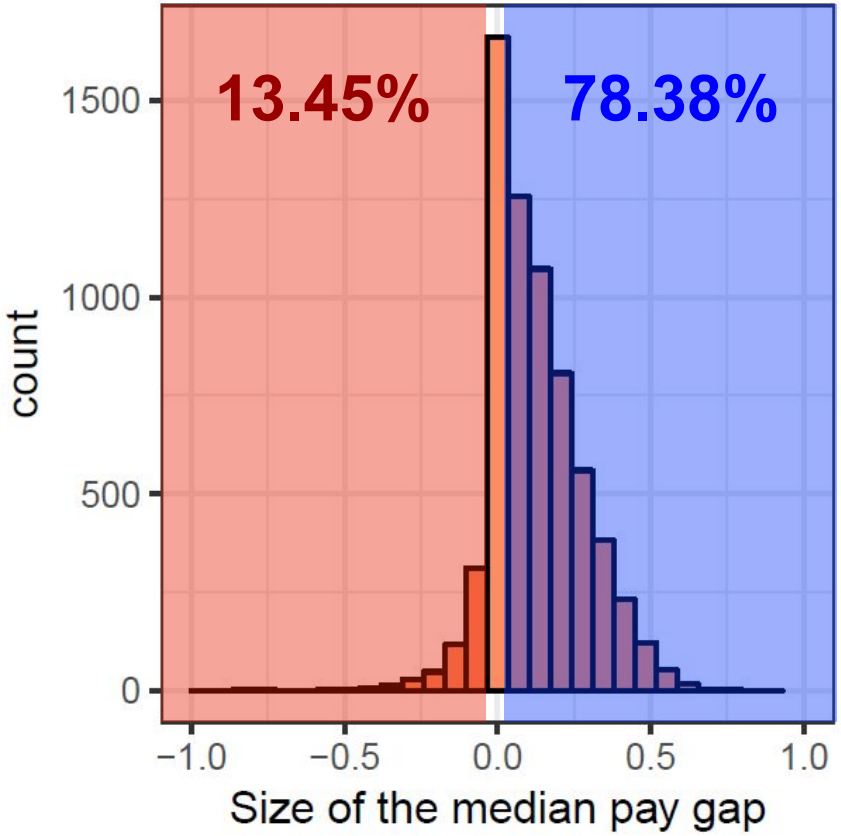


Figure 2: A histogram of the frequency of different sized mean pay gaps

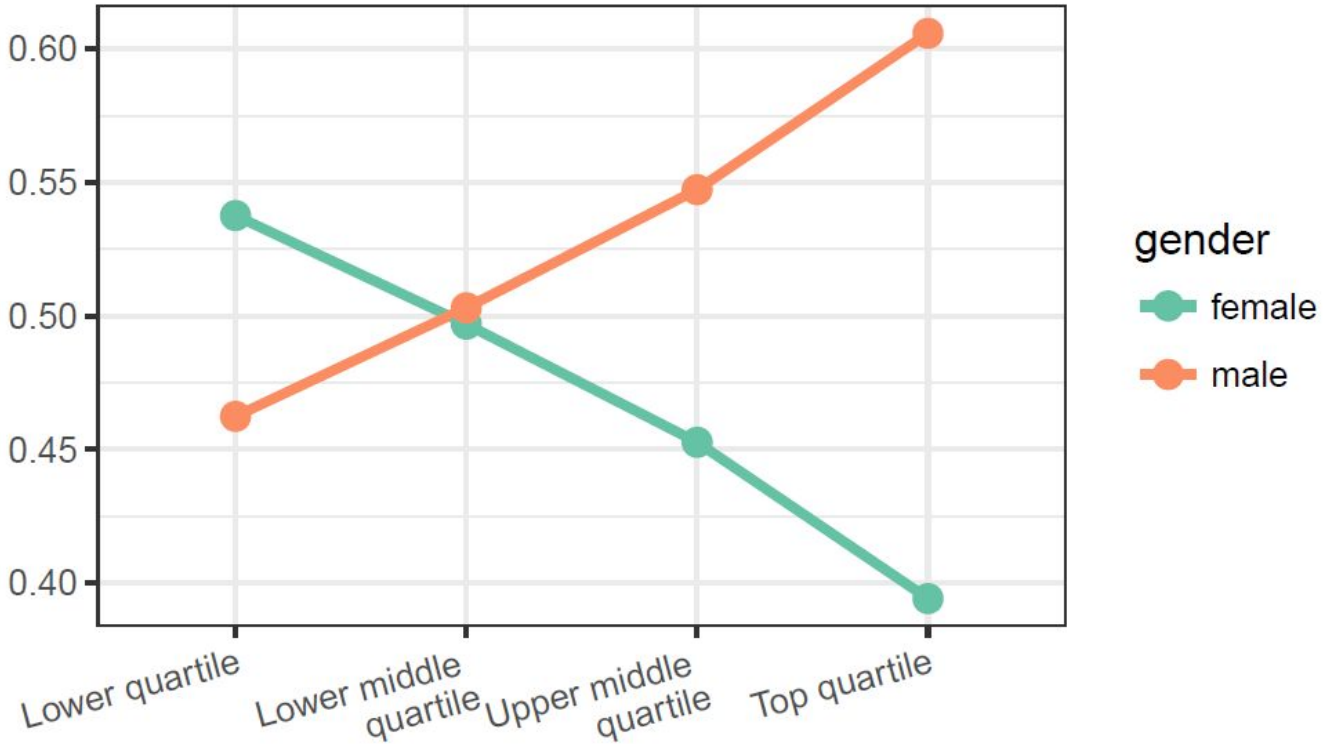


Figure 3: Distribution of males and females within each pay quartile

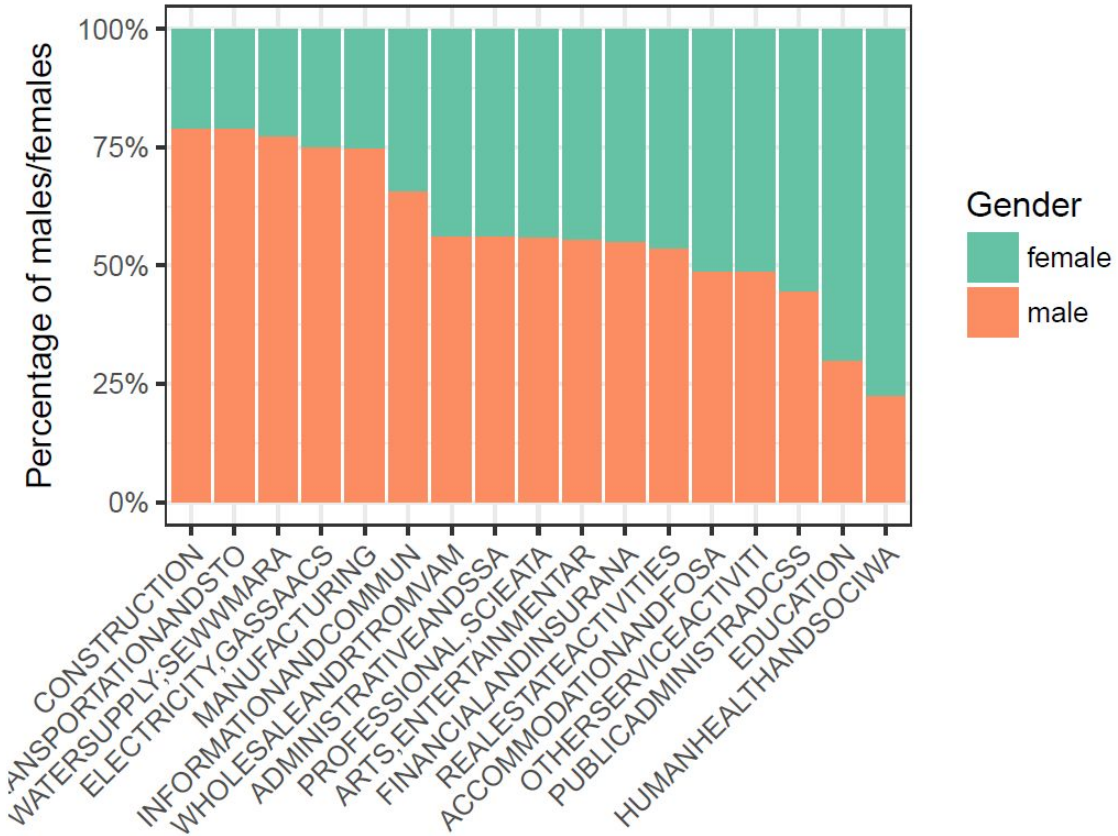
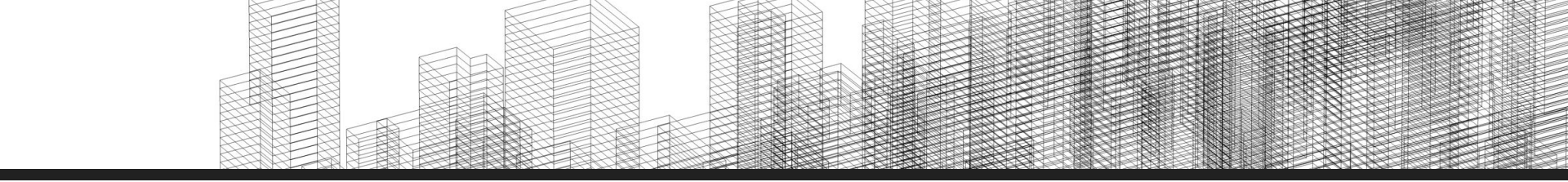


Figure 1: Proportion of males against females across the UK and SIC division



Sampling Design

Simple random sampling

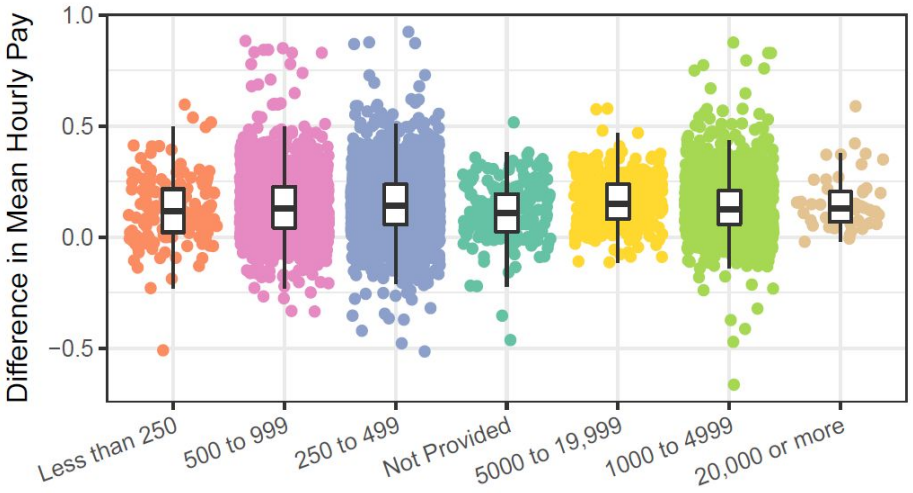
N = 6,713

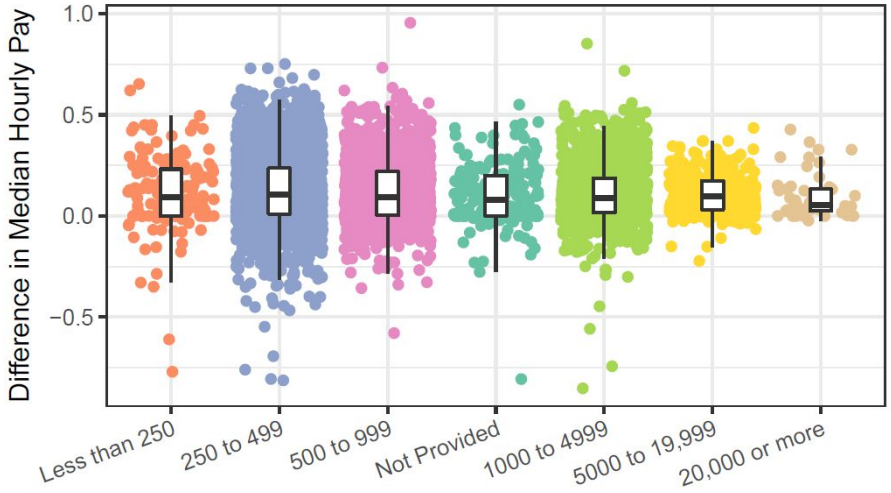
n = 1,000

Inc. prob. = 1000/6713 = 14.9%

	Population	SRS	95% CI
Mean	14.40 %	13.65 %	12.88% ~ 14.43%
Median	12.20 %	11.71 %	10.84% ~ 12.57%

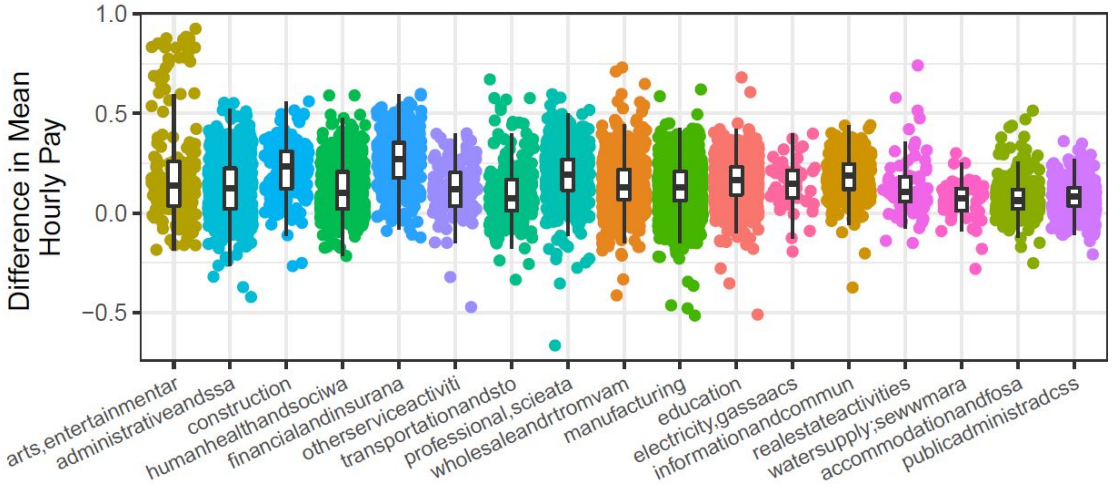
Company Size

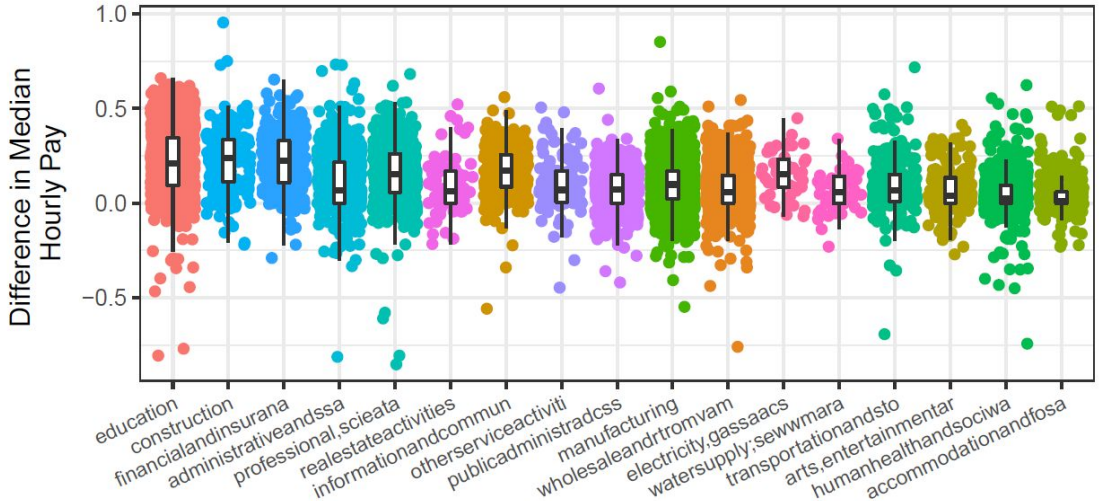




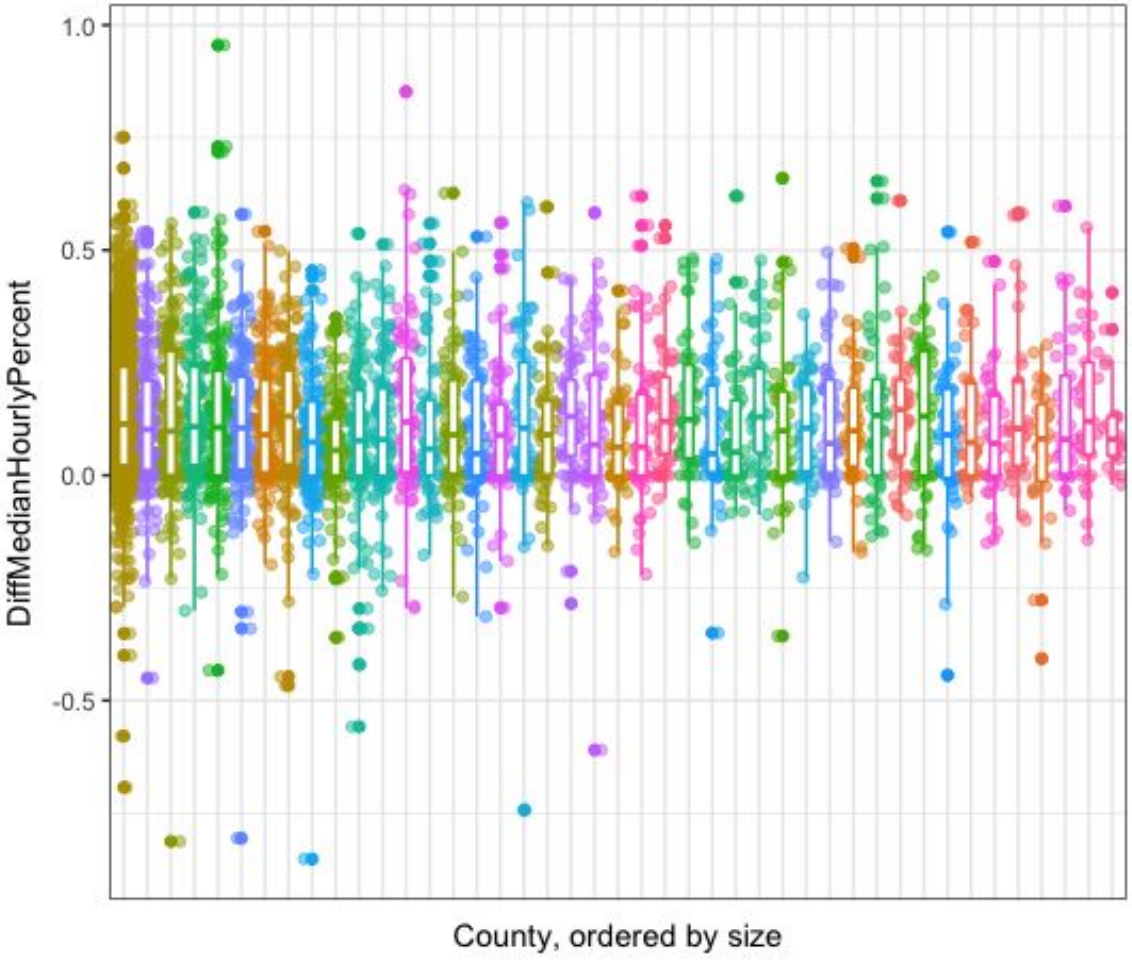
Distribution of median and mean pay gap by employer size (ordered by interquartile range)

Division


Difference in Mean Hourly Pay
1.0
0.5
0.0
−0.5
arts,entertainmentar
administrativeandssa
construction
humanhealthandsociwa
financialandinsurana
otherserviceactiviti
transportationandsto
professional,scieata
wholesaleandrtromvam
manufacturing
education
electricity,gassaacs
informationandcommun
realestateactivities
watersupply;sewwmara
accommodationandfosa
publicadministradcss


Difference in Median Hourly Pay
1.0
0.5
0.0
−0.5
education
construction
financialandinsurana
administrativeandssa
professional,scieata
realestateactivities
informationandcommun
otherserviceactiviti
publicadministradcss
manufacturing
wholesaleandrtromvam
electricity,gassaacs
watersupply;sewwmara
transportationandsto
arts,entertainmentar
humanhealthandsociwa
accommodationandfosa

County


1.0
0.5
0.0
-0.5
DiffMedianHourlyPercent
County, ordered by size

Stratified (PPS)

N = 6,713

n = 991

Probability = 14.8 %

	Population	SRS	PPS
Mean	14.40 %	14.82 %	14.42 %
Median	12.20 %	12.40 %	12.29%

Stratified (Neyman)

N = 6,713

n = 993

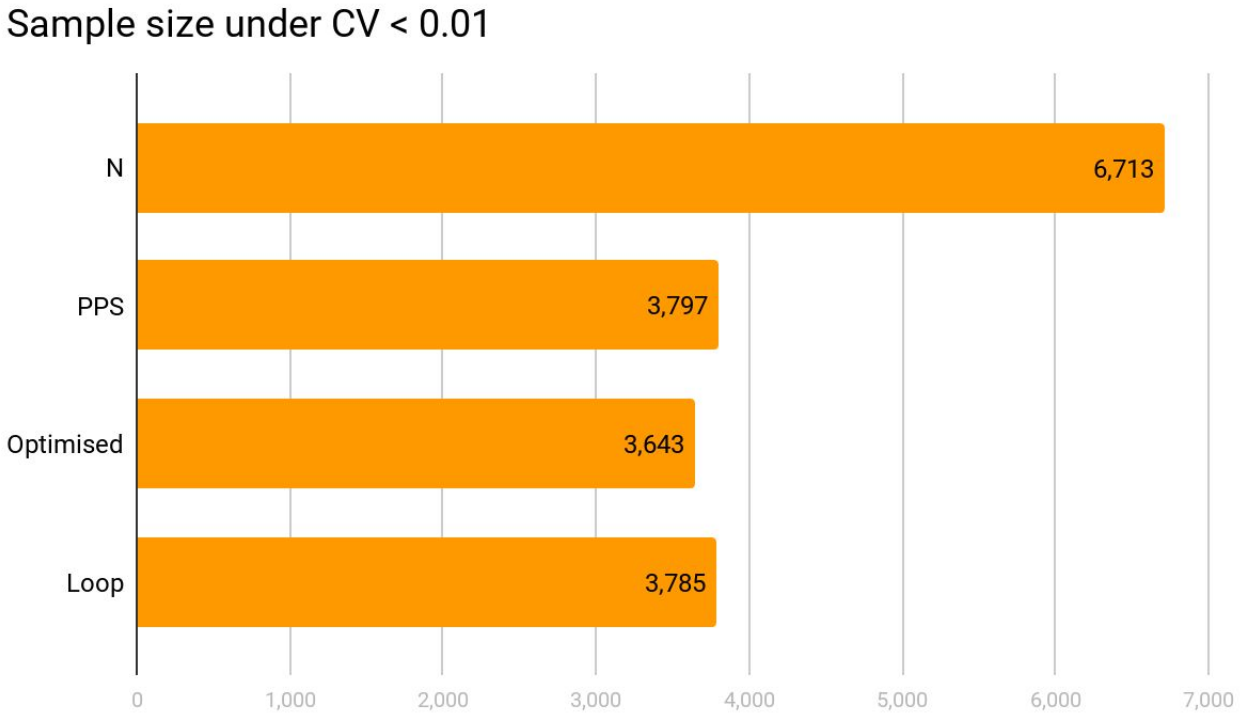
	Population	SRS	PPS	Optimised
Mean	14.40 %	14.82 %	14.42 %	14.79 %
Median	12.20 %	12.40 %	12.29%	12.10 %

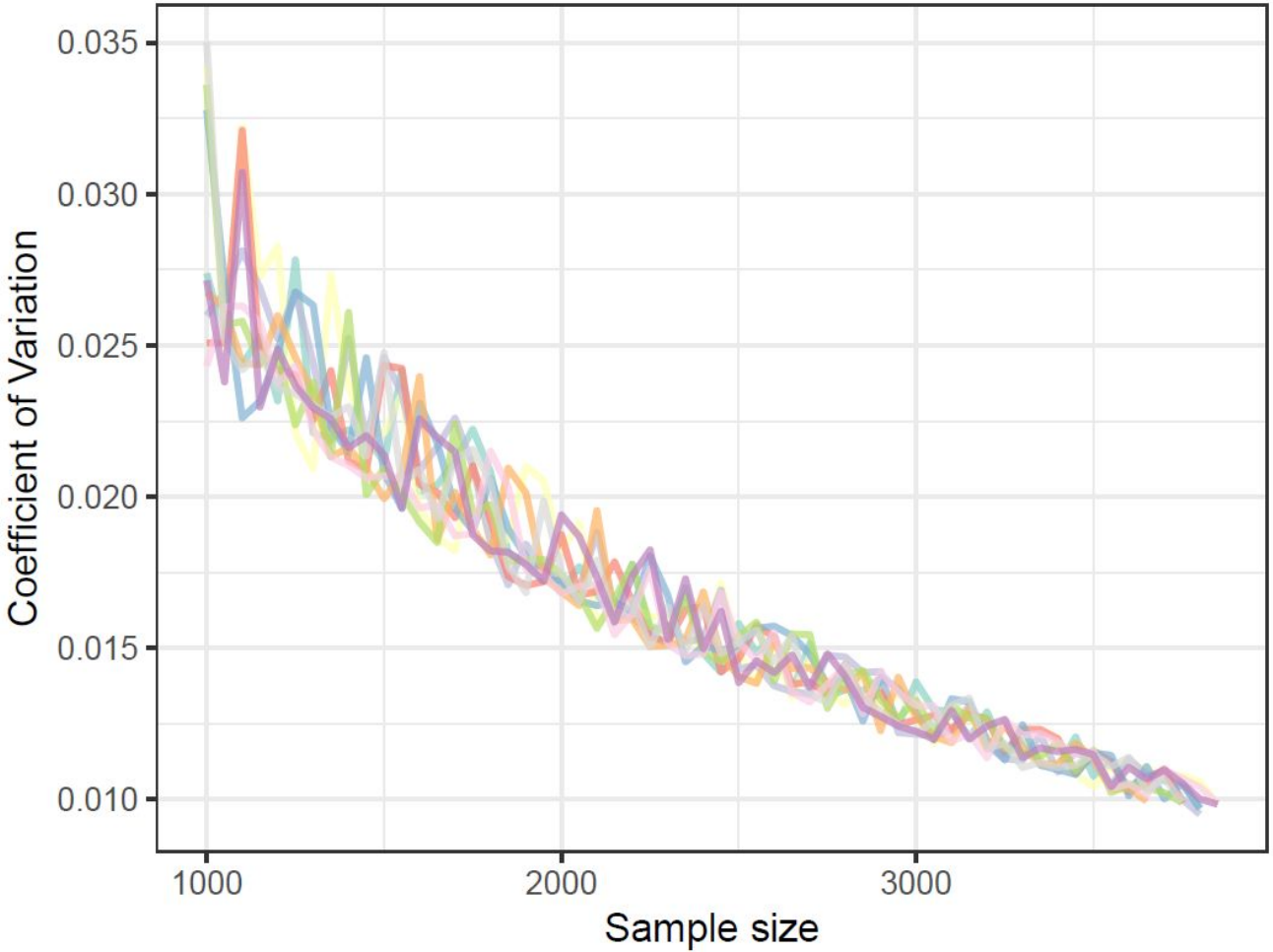
Comparison of sampling designs

PG Metric	Design	Estimate	SE	MOE	Deff
Median	SRS	0.117055	0.0044254	0.0086738	1.0000
Median	PPS	0.122900	0.0043680	0.0085610	0.8516
Median	Neyman	0.121000	0.0041150	0.0080650	0.8313
Mean	SRS	0.136534	0.0039694	0.0077800	1.0000
Mean	PPS	0.142600	0.0039100	0.0076640	0.8997
Mean	Neyman	0.147900	0.0038690	0.0075830	0.8404

Sample size subject to CV<0.01

These sample sizes were all calculated in relation to the mean design, rather than the median





NB. each line is one run of the algorithm. The total number of runs is 10.

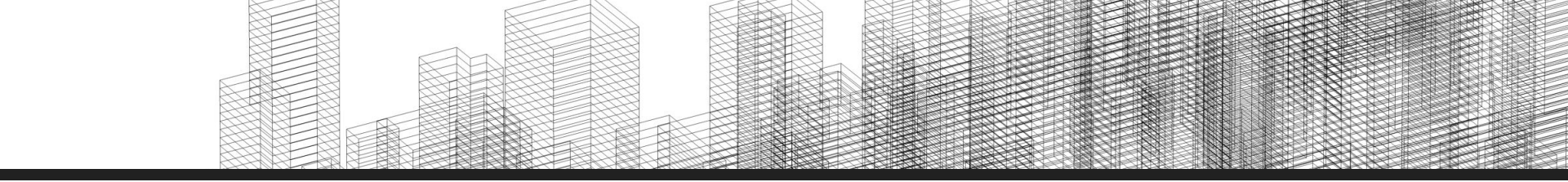
Individual perspective

midpoint of the range e.g. (250+499)/2

0 for no given size

20,000 for size more than 20,000

	Population	Weighted
Mean	14.40 %	15.60 %
Median	12.20 %	10.40 %



Discussion and Conclusion

Discussion / Questions