

WHAT DRIVES THE GENDER WAGE GAP?

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SUMMARY HAIKU

Women are paid less,
but aren't less valuable.
We blame sexism.

INTRODUCTION

In New Zealand, as in other OECD countries, women on average earn substantially less than men who appear similar. This paper uses a decade of annual wage and productivity data for the whole of New Zealand to examine the extent to which the gender wage gap can be explained by women working in low-paying industries or firms, gender differences in productivity, and various types of discrimination.

A particular innovation of this paper is that we use firm productivity data to estimate the relative contributions to firm output of male and female workers, and compare these to their relative wages. This allows us to test whether male and female workers are paid the same for work of the same value, without having to assume that male and female workers with the same observable characteristics, such as age and education, are equally productive.

KEY MESSAGES

This study is different to most previous wage gap studies in that it tests whether men and women are paid different wages for adding the same amount of value to their employer. In contrast, most studies of the gender wage gap do not observe the value of a worker's contribution. Most studies assume that differences in the value contributed by employees are fully captured by characteristics such as education, age, etc, and that any wage differences between men and women who are the same in terms of these characteristics represent discrimination.

Our research suggests sexism is likely to be a major driver of the gender wage gap, but differences in willingness or ability to bargain are unlikely to play a major role.

Women are overrepresented in industries that pay less (e.g. food and beverage services), but this explains only 7% of the overall gender wage gap. Women working in low-paying firms within industries explains an additional 5% of the overall gender wage gap. So, only 12% of the gender wage gap is due to the particular industries and firms where women choose to work.

A woman in a private for-profit firm who makes the same value of contribution to her firm as a man in the same industry is paid 84 cents for every \$1 the man is paid.

The gender wage gap increases with age and the length of time spent in the same job; this would not be the case if employers initially stereotyping women as low-productivity were responsible.

METHODOLOGY

We first use standard wage regressions to test the extent to which the overall gender gap in hourly wages is driven by women working in low-paying industries or firms. We regress the log of individual annual earnings on log FTEs, age

controls, year fixed effects, and a dummy for being female. Our wage data are a 50 percent sample of every employee in New Zealand from 2001 to 2011. To this basic regression we then add disaggregated industry fixed effects. This tests how much the gender wage gap decreases when we restrict our comparison to men and women within industries only. Alternatively, we add firm fixed effects to test how much the gender wage gap decreases when we compare men and women within firms only.

We next combine wage and employee data with data on firms' outputs and inputs to estimate the extent to which the within-industry gender wage gap results from women being less productive than men. Here we focus on private for-profit firms with at least 5 employees. This excludes government organisations, including those in the health and education sectors, because the output of the sectors is not valued in the market and so the productivity of these organisations cannot be measured the same way.

We use firm-year level data and estimate a production function that shows how firm output varies with total labour input and other inputs, and a similar wage bill equation that shows how the firm's total wage bill varies with total labour input and other inputs. In both cases, we assume total labour input is male labour plus a constant multiplied by female labour, and estimate the value of the constant along with the other parameters of the model. In the production function, the constant captures the productivity of women relative to that of men. That is, the number of male employees who must be brought into a firm to replace each female employee removed to keep firm output constant. In the wage bill equation, the constant captures the average wage of women relative to that of men.

We calculate the gender wage gap that is unexplained by productivity differences as the percentage difference between these constants in the production function and the wage bill equation. This measures the extent to which women are paid less for doing work of the same value.

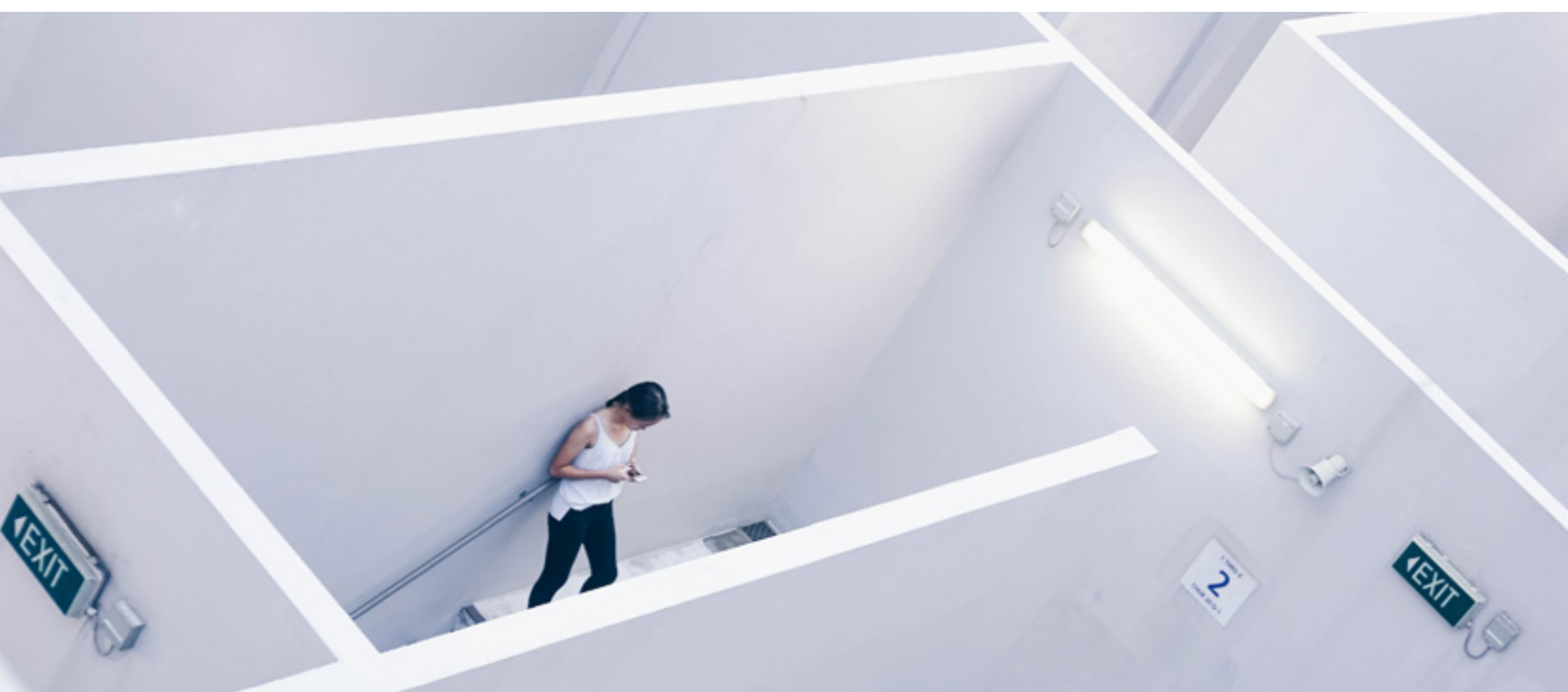
We then repeat this analysis, but allowing relative productivity and relative wages to differ freely by gender and age group, or by gender and length of tenure with the firm. This allows us to determine if the unexplained gender wage gap varies by employee age or tenure.

Next we calculate the unexplained gender wage gap separately for each of 39 industries each year. We attempt to explain the differences in the unexplained gender wage gap using indices that capture three characteristics of the industry: the skill level of the employees, the level of the competition firms face in their product markets, and the difficulty firms have hiring skilled employees. From the types of industries with high discrimination, we attempt to infer the most likely drivers of the unexplained gender wage gap.

POTENTIAL DRIVERS OF THE UNEXPLAINED GENDER WAGE GAP

The gender wage gap that is not explained by differences in productivity could have several different causes.

1. **Statistical discrimination:** This can occur when workers are unable to credibly signal their productivity to potential employers. If women are less productive than men on average or have more variation in their productivity, employers might interpret being a woman as a sign of low productivity and be willing to pay women less than they pay similar-seeming men. If statistical discrimination were driving the unexplained gender wage gap, women with more labour market experience or who have worked for a particular firm for longer, and who have thus had more opportunity to demonstrate their productivity, would be paid similarly to equally productive men.



2. Differences in willingness or ability to bargain: If women are less confident than men at bargaining with their employers for higher wages, as the economics literature suggests, women may end up getting paid less to do the same work even if employers are not prejudiced against women. Bargaining is expected to be more important when the labour market is tight and prospective employees have better alternatives if they turn down a job. Thus if gender differences in bargaining were the main driver of the unexplained gender wage gap we would expect this gap to be larger in industries and years in which firms have more difficulty hiring.

3. Taste-based discrimination on the part of employers: This is what we might think of as classic discrimination: some employers prefer to hire men, and may be more likely to reject female job applicants or offer them lower wages for the same work. A firm that chooses not to hire a qualified woman and leaves a vacancy unfilled as a result is likely to be foregoing profits until it can fill the vacancy. Filling the vacancy with a male applicant will take longer when the labour market is tight and employers are competing for qualified candidates, thus the cost to firms of taste-based discrimination is higher when hiring is difficult. If taste-based discrimination were the main driver of the unexplained wage gap, we would thus see a larger gap in industries and years when firms report less difficulty hiring employees.

RESULTS: THE SORTING OF WOMEN INTO LOWER-PAYING INDUSTRIES AND FIRMS

In our standard wage regressions of individuals' log wages on a female dummy, log FTEs, year fixed effects, and age controls, the coefficient on female suggests women earn 20% less than men of the same age. Note this may overestimate the raw gender wage gap by about 5 percentage points because our FTE measure, created by Fabling and Maré (2015), can't distinguish high-income people who work part-time from lower-income people who work full-time. Adding disaggregated industry fixed effects reduces the coefficient on female by 7%. That is, the fact women are overrepresented in industries that pay less (e.g. food and beverage services) explains only 7% of the overall gender wage gap. Adding firm fixed effects instead reduces the coefficient on being female by 12%, meaning 12% of the overall gender wage gap is explained by women working in firms that pay all their workers less.

We conclude the gender wage gap is not primarily explained by women tending to work in low-paying firms or industries. This conclusion is unchanged if we instead study only employees in private for-profit firms with at least five employees, on which we focus next.

The proportion of the gender wage gap that is explained by sorting between industries is lower than in other OECD countries that have been studied. This is likely to reflect the flexible labour market in New Zealand, which allows for larger within-firm wage differences and also has opened up a wider variety of jobs for women.



RESULTS: THE UNEXPLAINED GENDER WAGE GAP

Between 2001 and 2011 in private for-profit firms with at least five employees, we find no evidence of a statistically significant difference between the productivity of men and women in the same industry. However, we find an average unexplained gender wage gap of 16%. That is, women are paid 16% less than men in the same industry for making the same value of contribution to their firm.

When we allow gender differences to vary by age, we find older men are paid more than are younger men for doing work of the same value. We also find the unexplained gender wage gap increases with age. There is no evidence that women under 25 are paid less than equally productive men of the same age, whereas women aged 25 to 39 are paid 16% less, women aged 40 to 54 are paid 21% less, and women aged 55 and over are paid 49% less.

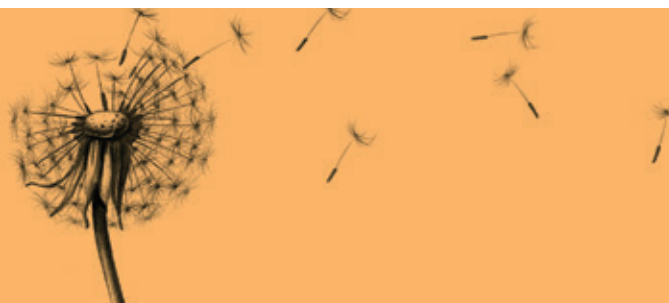
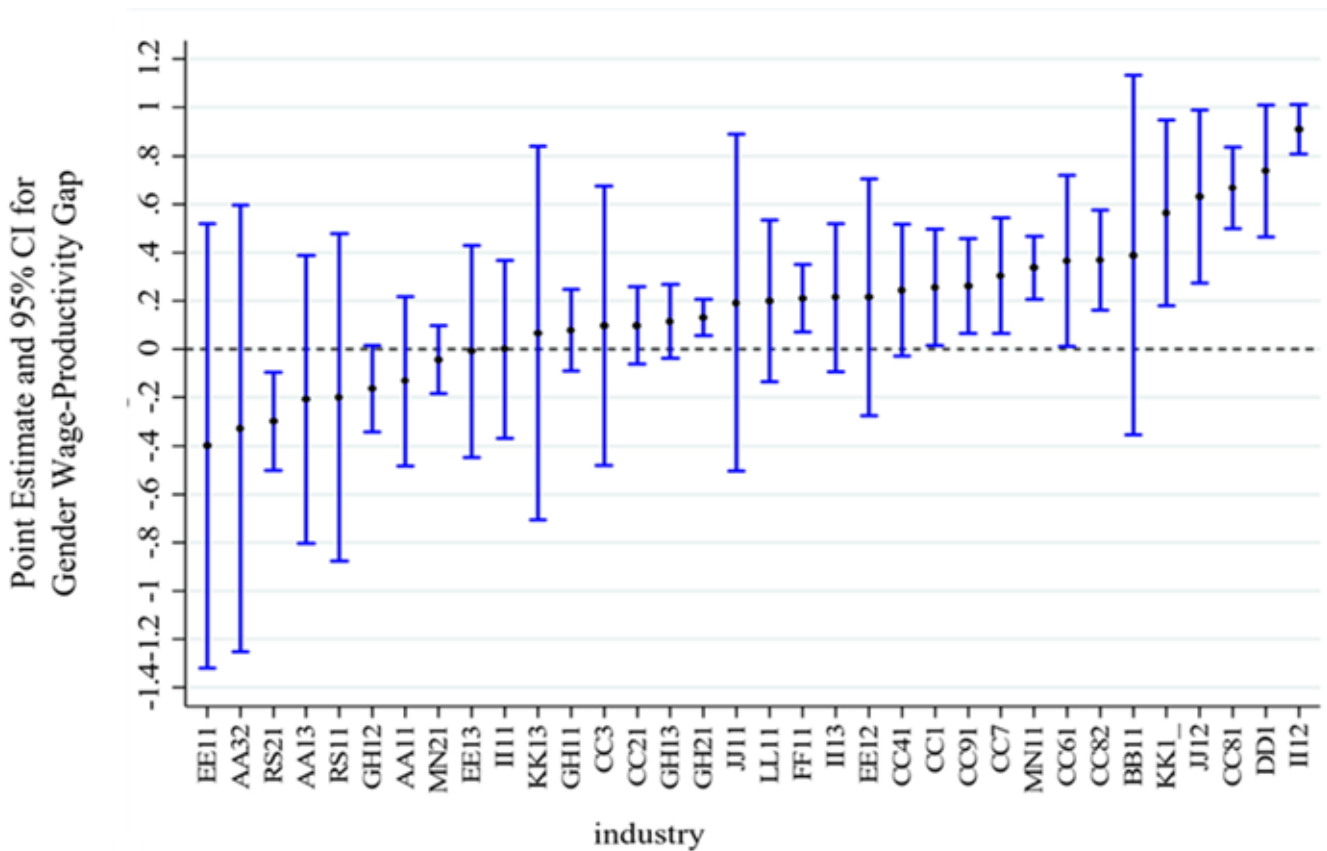
Allowing gender differences to differ with tenure at the firm tells a similar story. Women in their first year with their employer are not paid significantly less than equally productive men in their first year. However, in their second and subsequent years women are paid over 20% less.

If statistical discrimination were the main driver of the unexplained gender wage gap, the gap would decrease with age and tenure. We find the opposite, so it is likely the unexplained gender wage gap is primarily driven by something else.

RESULTS: DIFFERENCES IN UNEXPLAINED GENDER WAGE GAPS ACROSS INDUSTRIES

When we estimate the unexplained gender wage gap separately by industry, we find considerable differences across industries (though in many cases the wage gaps are not precisely estimated).

Figure 1: Variation in the Gender Wage-Productivity Gap across Industries



In some industries the unexplained gender wage gap favours women, though in only one such case is the gap statistically different to zero. The most negative unexplained gender wage gaps are for:

- EE11: Building construction
- AA32: Agriculture, Forestry and Fishing Support Services and Hunting
- RS21: Other Services
- AA13: Dairy cattle farming

The majority of industries exhibit unexplained gender wage gaps that favour men; the estimated gap is largest in:

- II12: Rail, Water, Air and Other Transport
- DD1: Electricity, Gas, Water and Waste Services
- CC81: Transport Equipment Manufacturing
- JJ12: Telecommunications, Internet and Library Services

These sectors are all typically thought to be non-competitive with the potential for monopoly-created profits.

Finally, for the period 2005-11 we tried to explain differences in estimated unexplained gender wage gaps across industries and years using our indices for worker skill level, firm's competition in the product market, and firms' reported difficulty hiring skilled workers. We found higher unexplained gender wage gaps in industry-years with higher-skill workers, especially when the firms in the industry faced little competition.

This result is consistent with theory. Both high-skill workers and low competition are associated with higher firm profits, which mean there is more surplus to be divided between the firm and the employees, and more potential for gender differences in how much surplus the employee captures.

In industry-years with the most potential for unexplained gender wage gaps, namely ones with high-skill workers and low competition, we find the unexplained wage gap is larger when firms find it easy to hire skilled workers. This is more consistent with taste-based discrimination being a major driving factor of the unexplained gender wage gap, and less consistent with gender differences in bargaining ability being important.





CONCLUSIONS

We find that gender differences in sorting between either industries or firms explain only a small proportion of the overall gender wage gap in New Zealand between 2001 and 2011. When we use data on firm outputs to estimate the extent to which women are paid less because they are less productive, we find insignificant productivity differences between men and women within industries, and that women in for-profit firms with at least five employees are paid on average 16% than men for work of the same value.

This gender wage that is unexplained by differences in productivity increases with age and worker tenure at the firm, which suggests it is not primarily driven by statistical discrimination.

The unexplained gender wage gap is also higher in industries with high-skill workers, low competition in firm product markets, and, within such industries, where firms find hiring easy. These differences are more consistent with sexism on the part of employers being a major driver of the unexplained wage gap, and less consistent with gender differences in ability to bargain for higher wages being important.

Our finding that sexism negatively affects women in many sectors of the economy is discouraging and suggests that stronger enforcement of equal pay regulations could be beneficial. It also seems likely that similar situations exist in the majority of OECD countries, where labour markets are less flexible or shifts towards the service sector have been slower.

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