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BEYOND SKILLS AND OCCUPATIONS: UNPACKING AUSTRALIA'S GENDER WAGE GAP

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Summary

Australian women earn on average 15% less per hour than men. But what drives this pay gap? Is it rooted in different occupational choices between men and women? Or does it reflect differences in pay across genders for identical occupations? We answer these questions using population-wide taxation data covering the Australian workforce.

We find that occupational choices—where men and women diverge in their career paths—account for only one-fifth of the gender wage gap. The bulk of the disparity, about 80%, arises from variations in pay within the same occupations.

Next, we ask if worker attributes can shed light on why men and women choose different occupations and why they get paid differently in the same occupation.

We find that differences in individual attributes, such as job tenure or full-time status between men and women do not explain occupational sorting or the gender pay gap within occupations. Gender differences in cognitive skills (via the proxy of Australian Tertiary Admissions Rank scores) offer some explanation for why men and women select different occupations. Nevertheless, differences in ATARs between men and women do not contribute to the gender differences in pay within occupations. The majority of the wage gap within the same occupation is largely due to how being married and having dependent children affects hourly wages more for women than men.

Further research is planned at e61 to better understand the causes of these pay differences.

1. Introduction

In late February, the Workplace Gender Equality Agency released statistics on the full-time gender pay gap across large Australian companies.[1] As a result, numerous companies issued statements, with a recurring theme: women predominantly occupy lower-paying roles within these organisations. Several of these companies have initiated strategies aimed at increasing female representation in higher-paying positions.[2] However, it is unclear whether these strategies seeking to increase women's participation in high-paying occupations will (and to what extent) narrow the gender wage gap.

This research piece answers this question —by quantifying the impact of **occupational sorting** between men and women, and the pay gap **within** the same occupations —on Australia's gender wage gap. Put simply, we are interested in whether the gender gap is driven by women disproportionately working in low-paying occupations or by men and women being paid differently within the same occupation.

Using data from the entire Australian workforce we find that occupational differences play a role in the gender gap, contributing to about one-fifth of it.[3] Nevertheless, these differences do not constitute the primary factor. Indeed, about 80% of the gender pay gap is driven by men and women being paid differently while employed in the same occupation.

1 https://www.wgea.gov.au/. Access on March 2024.
2 https://www.afr.com/work-and-careers/workplace/qantas-plan-to-get-more-women-into-its-pilot-ranks-20240229-p5f8v2
3 Previous studies in Australia have employed survey data to answer these questions and have found that differences in men's and women's occupations explain less than 5% of the gender wage gap, with most being accounted for by differences in pay within the same occupation (Cobb-Clark & Tan, 2011; Coelli, 2014).

An important follow-up question emerges: can personal characteristics explain why men and women enter into different occupations, or why they are paid differently within the same occupation? For instance, if men generally achieve higher educational levels, this might explain why they end up working in higher-paying occupations. Similarly, if the male engineering workforce is much older or more experienced than the female engineering workforce, this will likely contribute to pay differences.

We answer this question by looking into how personal traits like age, education level, and school performance might tell us why men and women end up in different jobs and why their pay differs even when they do the same work. Figuring out what causes the gender wage gap is the key to helping policymakers come up with solutions to what is seen as a longstanding social and economic issue.

Overall we find that in 2016:

- Men and women are substantially segregated across occupations. For men and women to be distributed equally across occupations, two-fifths of men would have to change occupations (or two-fifths of women).
- Approximately one-fifth of the estimated overall **hourly** gender wage gap is driven by men and women working in occupations with different pay rates. The remainder is driven by differences in pay within the same occupation.
- We can see from the data that differences between genders in personal characteristics such as full-time status, educational attainment, number of dependents, and Australian Tertiary Admissions Rank (ATAR) scores do not account for the gender pay gap within occupations nor do they explain why women sort into lower-paying occupations. Among university-educated individuals of similar ATARs, women are less likely to sort into higher-paying career options (e.g. Science, Technology, Engineering and Mathematics or STEM).
- Marriage and parenthood have a different effect on women's hourly earnings than they do on men's, which drive many of the differences in hourly pay within occupations.

2. The Occupations of Men and Women

We begin our analysis by documenting the type of occupations men and women are employed in, and the extent of occupational sorting.

Data from the entire Australian workforce aged 25-60 shows that women tend to be over-represented in roles such as carers, nurses, teachers, and clerical positions. By contrast, men are disproportionately represented in trade professions, machinery operators, and STEM professions (Figure 1). The lack of women in STEM occupations (which are high-paying for both genders) lends some preliminary evidence for the role that occupational segregation plays in the pay gap.

Occupational Segregation in Australia To measure occupation segregation between men and women in Australia we compute the Duncan Segregation Index.[a]. This index is calculated as

$$\frac{1}{2}\sum |p_{jm} - p_{jf}|$$

where j denotes one of the 23 occupations, and p_{jm} and p_{jf} represent the proportions of men and women, respectively, employed in occupation j. The index ranges from 0 to 1, with 0 representing perfect gender integration, with the share of men and women being equal in all occupations, and 1 indicating complete gender segregation.

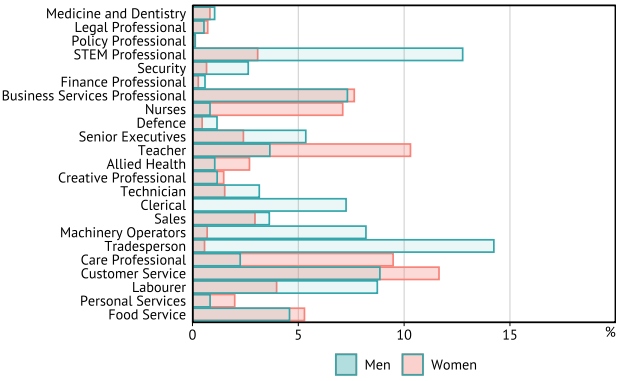
Using ABS data in 2016, we calculate that 44% of Australian women (or men) would have to switch occupations for men and women to be equally distributed across occupations.

a The index was employed by Duncan and Duncan, 1955 and is a common measure of occupational segregation

The fact that men and women work in different occupations does not automatically imply that occupational sorting drives the gender wage gap. We plot our constructed measures of hourly pay across occupations and genders. (Figure 2). Even for women in occupations that have historically been highly remunerated for males, these gaps still loom. The average female finance professional (financial brokers, dealers, and investment managers) earns a similar hourly amount to the average male nurse, despite male finance professionals being the second-most well-paid profession.

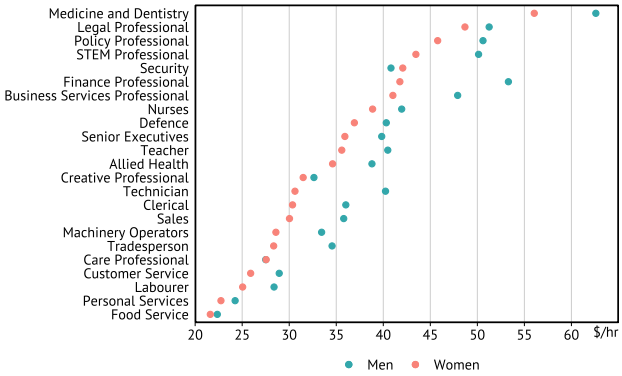
While 25% of males are concentrated in lower-paying professions such as Trades and Machinery Operators, the average pay of males in these occupations is still $5 per hour more than the average pay rate of females who work in Clerical occupations (24% of the female workforce).

Figure 1: Distribution Across Occupations



* Census respondents 2016
Sources: ABS; e61

Figure 2: Average Hourly Wages



* Census respondents 2016
Sources: ABS; e61

3. Decomposing the Hourly Gender Wage Gap

After documenting the extent of occupational sorting, in this section, we investigate if it drives the gender wage gap in Australia. We adopt an approach similar to Brown et al., 1980 and Cobb-Clark and Tan, 2011, and decompose the gender pay gap into its components using two stages. Figure 3 explains in detail the decomposition.[4]

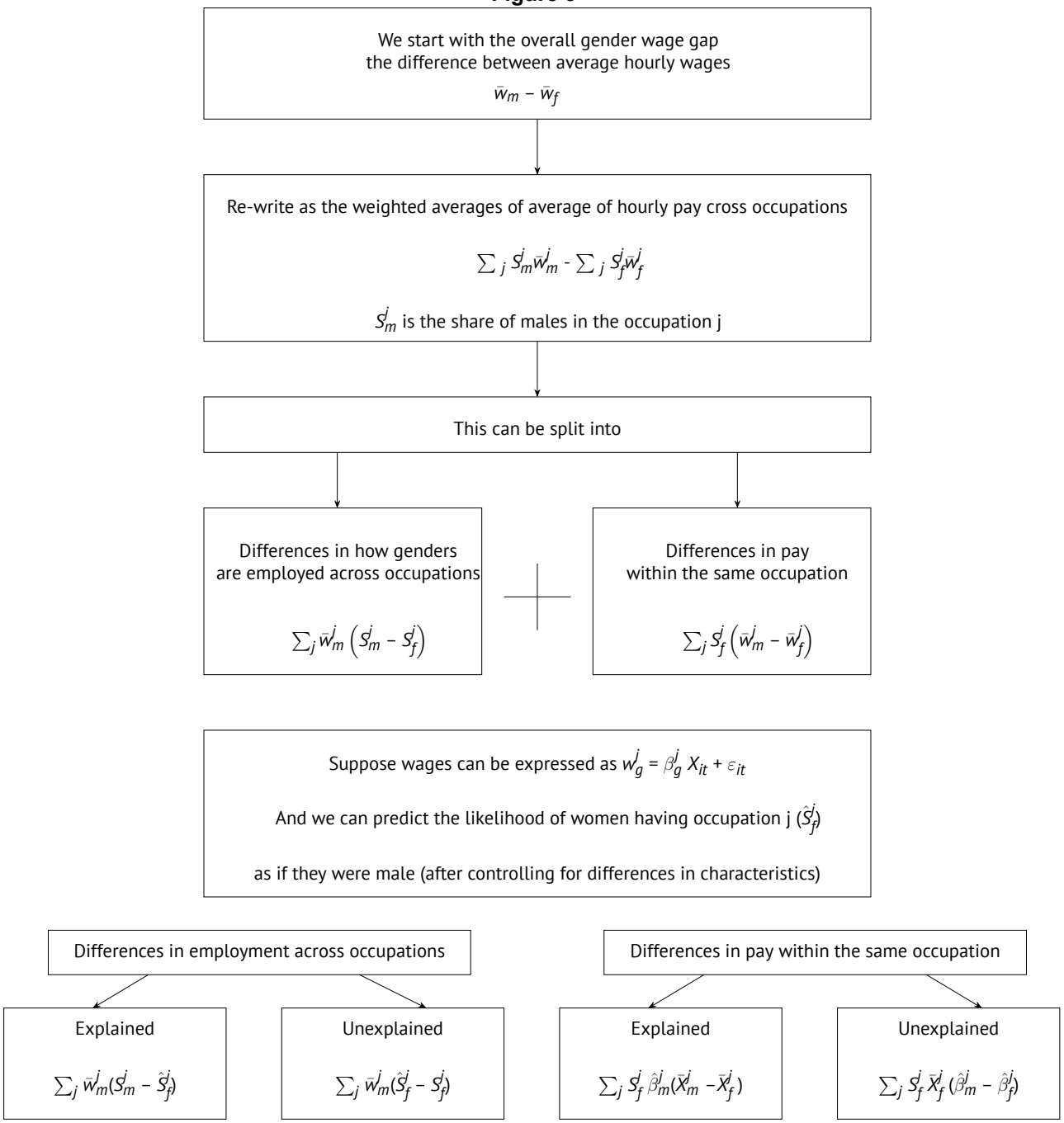
First, we assess how much of the gap is explained by men and women **sorting** into different occupations and how much is due to differences in pay **within** the same occupations. Second, we assess how much of both of these effects (occupational sorting and differences in pay within occupations) can be **explained** by other observed characteristics (such as education level, job tenure, or full-time status) and how much remains **unexplained** even when we take account of these factors.

This effectively gives us four components of the gender pay gap, as shown at the bottom of Figure 3.

1. **Across Occupation-Explained**: the component arising from differences in occupations worked by men and women, which can be explained by observed differences in personal characteristics between men and women.
2. **Across Occupation-Unexplained**: the component arising from differences in occupations worked by men and women, which cannot be explained by these observed differences in personal characteristics.
3. **Within Occupation-Explained**: the component arising from differences in pay between men and women within the same occupation that can be explained by observed differences in personal characteristics across genders.
4. **Within Occupation-Unexplained**: the component arising from differences in pay within the same occupation, which cannot be explained by observed differences in personal characteristics.

4 See Appendix A.1 for a detailed decomposition.

Figure 3



We run this decomposition first using earnings information on the entire Australian workforce aged 25-60. With information on the amount of hours they worked in the week before Census night, in 2016, we construct a measure of hourly pay. We also observe occupations and group them into 23 broad categories[5].

5 See Appendix.

Figure 4: Hourly Gender Wage Gap in 2016

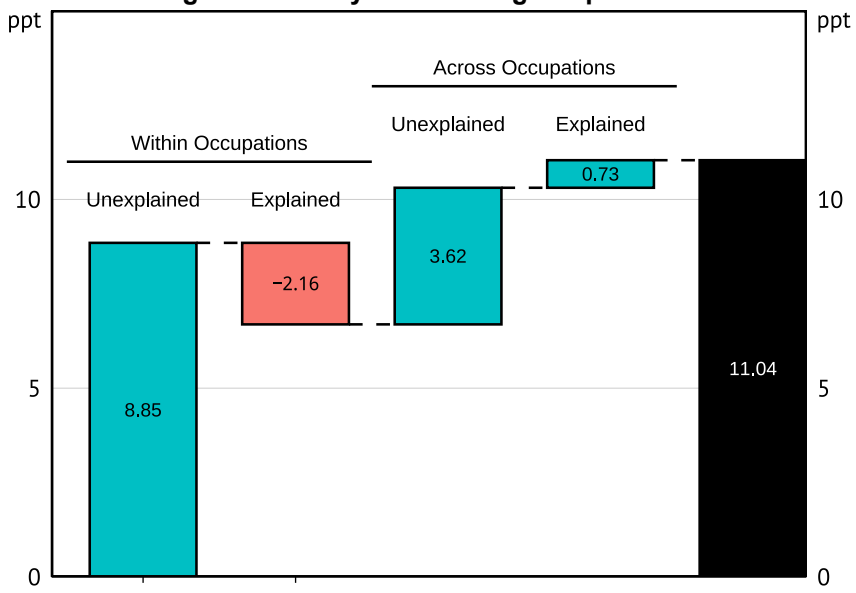
* Census Respondents
Sources: ABS; e61

Overall, we find that differences in pay within occupations explain about 80% of the gender pay gap, while the remainder is explained by the differences in occupational sorting patterns (Figure 4).

The majority of the gender wage gap within occupations cannot be explained by differences in job tenure, full-time status, or education level. If we were to focus only on the explained differences in hourly pay between men and women, the gender pay gap would be negative. In other words, if the gender gap was solely determined by individual characteristics, such as job tenure, full-time status, or education level, women, who are more likely to have the appropriate characteristics, would earn higher hourly rates than men. This is because women are more likely to attend university and be employed casually, which, holding all else equal, has a higher (hourly) rate of pay.

We then run the analysis for the sample of people for whom we have ATARs (Figure 5). Among those who attend university, men typically have higher ATARs (lower ATAR men are less likely to attend university compared with lower ATAR women). Therefore, on average, the men who do go to university select higher ATAR courses and hence achieve higher earnings in future occupations, which explains some differences in earnings between occupations.

Figure 5: Hourly Gender Wage Gap in 2016



* People who started university after 2004
Sources: ABS; e61

4. Can we explain why women and men work in different occupations?

Why do women and men often find themselves in different occupations? Could this be driven by inherent differences between men and women, such as varying skills and characteristics? How might these differences account for their distinct occupational choices?

The intuition behind that is as follows. Men and women might choose different jobs because they bring different skills to the table. Suppose, for example, that men generally have more years of education than women, and are therefore more likely than women to work in high-skill occupations. This difference falls into the 'explained' category since it's based on what we can see, like education levels. On the other hand, while men and women may have the same level of educational attainment, men still tend to get high-skill jobs, while women choose jobs that ask for less of their time. This shows something else is at play. Even with the same education, they're getting different outcomes. In this case, men and women have the same level of education but have different returns to it. This would enter into the 'unexplained' component. To distinguish between the 'explained' and 'unexplained' components of occupational choices we predict what jobs women would choose if they kept their traits (like education level) but acted like men in their job choices.

To do this, we model how males choose their occupations based on the personal characteristics we observed about them in the data (See A.2 for more details). We consider demand-side factors (i.e. education, training, and experience), and supply-side factors (i.e. household size).

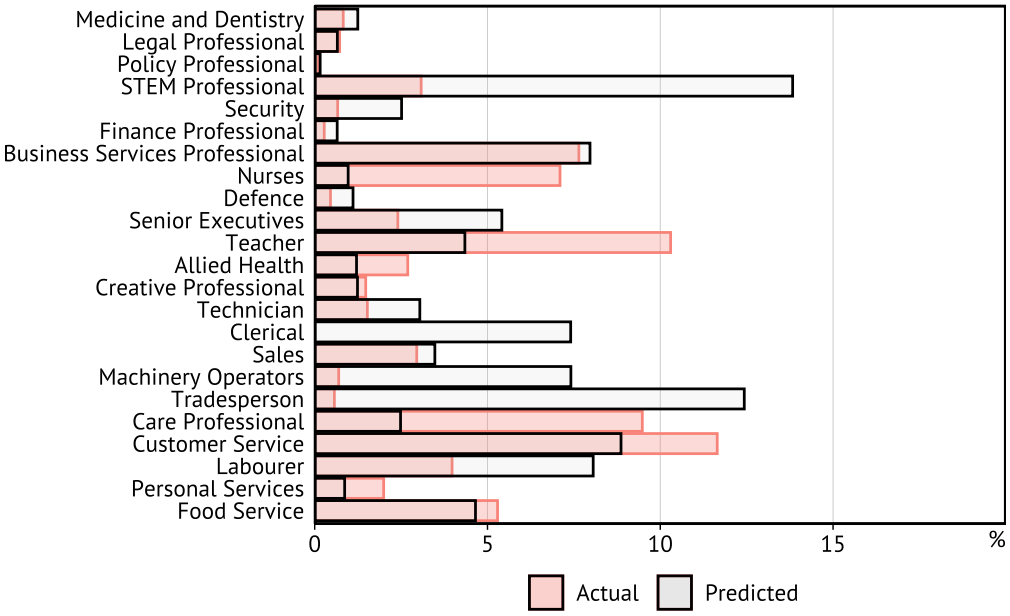
We then predict the number of women who will work in a given occupation based on their characteristics. For example, if our model predicts that having a college degree will increase the likelihood of a male working as a pilot, then the more women with university degrees, the higher the number of women working as pilots. [6]

6 Where the predicted number of women in an occupation deviates from the actual number of women, this is referred to as the 'unexplained' component. While it is 'unexplained' by the set of data we have available for each individual, it does not necessarily mean that other hypotheses have not been offered previously in similar pieces of research.

Figure 6 plots the actual and predicted distribution for women across occupations, and Figure 7A illustrates how these predicted shares change when we focus on university attendees and add ATAR into our predictive model. The differences in the predicted distribution of women across occupations and the actual distribution are quite stark. We would expect 20% of female workers to work in STEM occupations.[7] However, only 5% of women work in STEM-related occupations.

Overall, the 'between occupations' component of the gender wage gap is at most one-third of the gender wage gap, with the majority of it being 'unexplained' by characteristics in typical demographics data. Adding a richer set of controls will likely yield similar results. Even other studies using detailed survey data (Cobb-Clark & Tan, 2011) that control for assessed personality characteristics, find their statistical explanatory power low.

Figure 6: Distribution Across Occupations (Women)



* Census respondents 2016
Sources: ABS; e61

7 This is similar to the proportion of men who work in STEM occupations (FigureA.1).

5. Can we explain why women and men are paid differently when working in the same occupation?

The large majority of the gender wage gap in hourly wage is driven by gender differences in pay within occupations. But what drives these differences in pay? Do men have characteristics that make them warrant higher pay compared to women in identical occupations? The answer is no.

As shown in Figures 4 and 5 the large component of the gender wage gap is driven by differences in pay within the same occupation. These differences are not explained by differences in personal characteristics observed in the data.

For university graduates, men typically have a higher average ATAR compared to women. While their higher score explains why men often enter higher-paying fields like STEM professions, it does not explain the pay differences between men and women in the same occupations. In other words, the fact that men earn more per hour than women in the same job is not due to their higher ATAR scores. Figure 8 illustrates that in the highest-paying occupations, such as Medicine and Dentistry or STEM fields, women's academic performance matches or exceeds that of men, even though they earn less (see Figure 7).

If differences in characteristics between men and women do not drive the gender wage gap within occupations, what does? There are two potential explanations. First, there might be workers' characteristics not captured in our data. These unobserved characteristics could differ between men and women and contribute to the gender wage gap. Second, the **economic returns** on the same characteristics might differ by gender. For example, men and women might share similar traits, such as having two children and a high ATAR score, but these factors might affect their salaries differently.

We break down the unexplained gender differences in wages within the same occupation into two parts: differences in characteristics that are not available in data for the entire Australian workforce, and differences in the return of workers' characteristics. A part of the wage gap is due to gender differences in these unobservable characteristics. The remainder is explained by the different returns to hourly pay within the occupation for married workers and individuals with dependent children (Figure 9). Being married and having children negatively affects the hourly pay gap within occupations for women but not for men.

When analyzing the sample of university graduates who enrolled after 2004, for which we have university admission scores, the unobserved characteristics only explain a marginal component of the gender pay gap. Instead, most of the gap is explained by how marital status, having children, age, and ATAR scores differently impact wages for men and women.

6. Conclusion

We investigate the role of occupational sorting and wage differences within occupations in explaining the gender wage gap in Australia.

Women's and men's decisions to work in different occupations explain about one-fifth of the gender wage gap for people aged 25-65 and one-third of the gap for people who went to university after 2004.

Among university-educated individuals, women are much less likely to enter STEM high-paying professions, even among women with similar ATARs to men.

Gender differences in pay **within occupations** comprise the bulk of the hourly pay gap and do not narrow when we control for ATAR scores, job tenure, full-time status, and a wide range of other relevant personal characteristics.

Even if so much of the gender wage gap cannot be attributed to differences in occupations, or other commonly observed characteristics, it does not necessarily mean that we shouldn't encourage women to

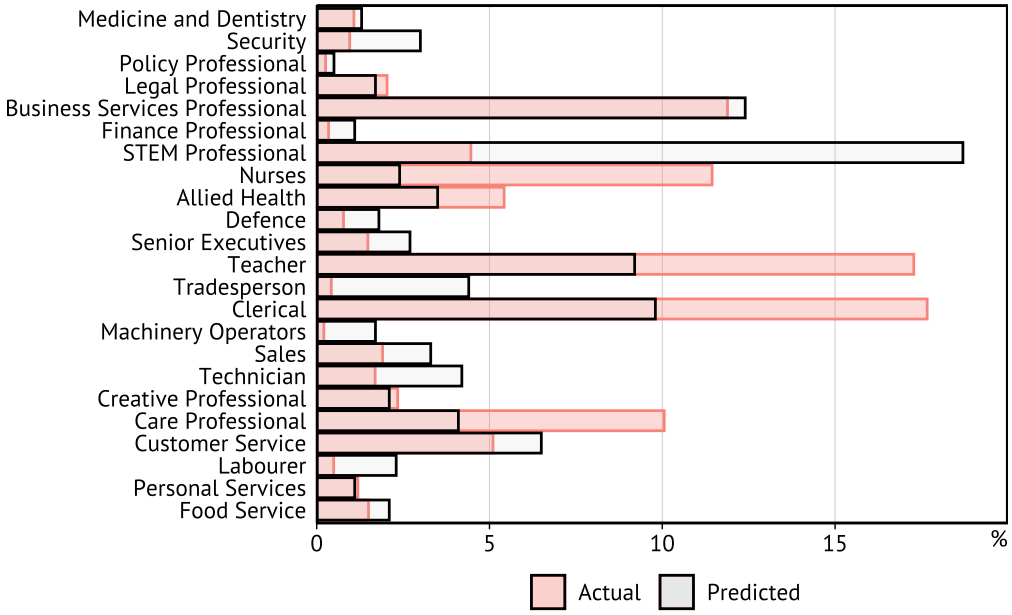
enter lucrative fields like STEM or finance. But there are no guarantees this will fully close the gender pay gap.

In reality, a broad suite of policies are needed to close the gender pay gap. The greatest opportunities for pay convergence lie in targeting the differences in pay between men and women of the same occupation. Examples of this include targeting women's access to high-paying firms (Chhaochharia et al., 2022), and addressing biases in hiring processes (Régner et al., 2019)and reducing the flexibility penalty for working mothers (Goldin, 2015).

Future research at e61 aims to further investigate the pay differences between men and women of similar occupations and abilities.

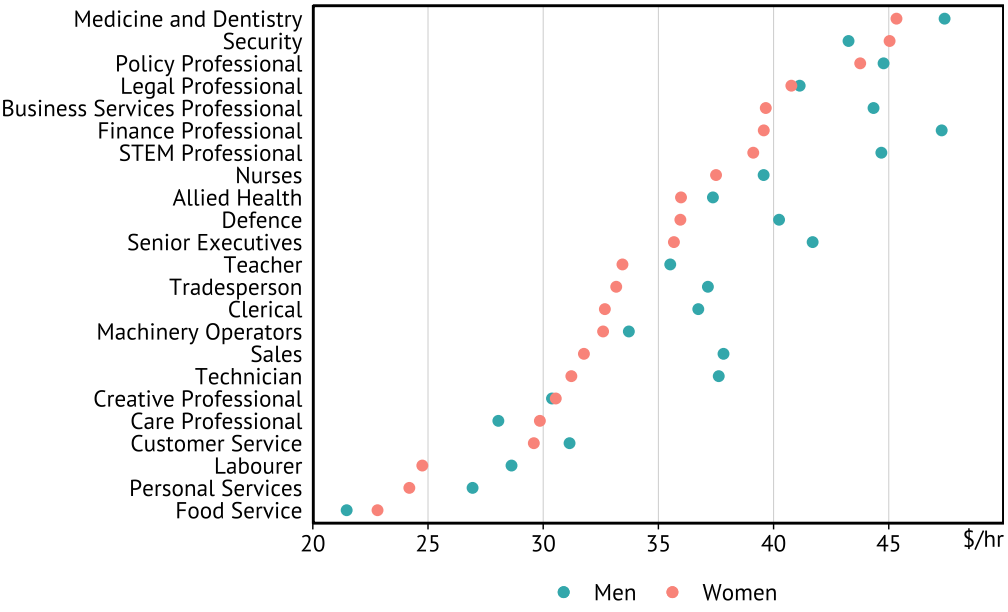
Figure 7: Actual vs Predicted Numbers of Women and Hourly Wages

A: Distribution Across Occupations.



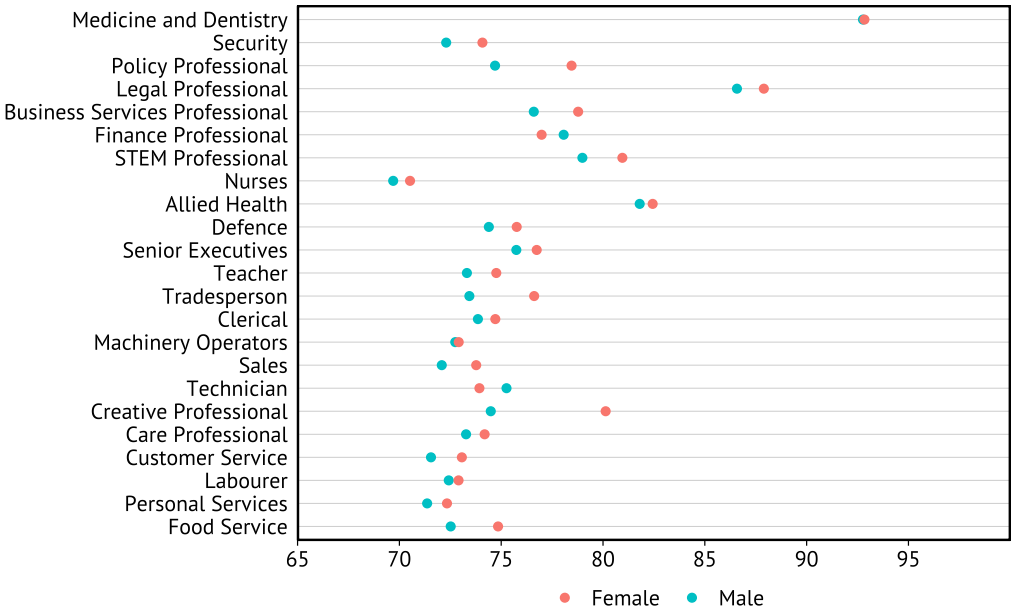
* People who started university after 2004
Sources: ABS; e61

B: Average Hourly Wages.



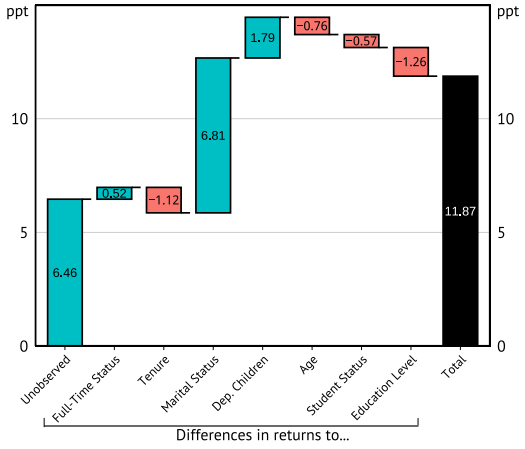
* People who started university after 2004
Sources: ABS; e61

Figure 8: ATAR of Men and Women in Different Occupations



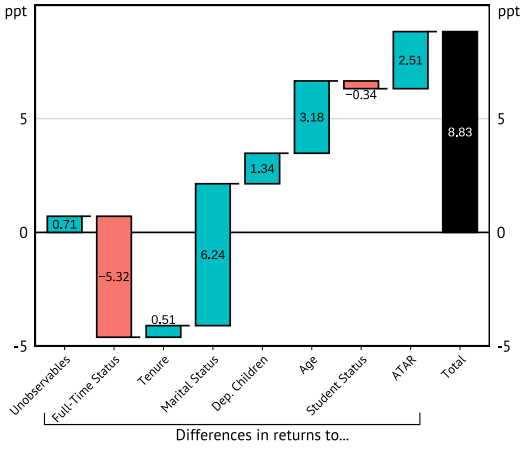
* People who attended university after 2004
Source: ABS,e61

Figure 9: Unexplained Within Occupation Component



* Census Respondents
Sources: ABS; e61

Figure 10: Unexplained Within Occupation Component (including ATAR)



* People who started university after 2004
Sources: ABS; e61

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Cobb-Clark, D. A., & Tan, M. (2011). Noncognitive skills, occupational attainment, and relative wages. *Labour Economics*, *18*(1), 1–13.

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APPENDIX A

A.1. Hourly Gender Wage Gap Decomposition

We follow the approach developed by Brown et al., 1980, to decompose the hourly gender wage gap.

We model the wage of male *m*, and female *f* workers *i* in occupation *j* as a function of worker characteristics.[8]

$$lnW_{ij}^{m} = X_{ij}^{m}\beta_{j}^{m} + \epsilon_{ij}^{m}$$
$$lnW_{ij}^{f} = X_{ij}^{f}\beta_{j}^{f} + \epsilon_{ij}^{f}$$

Brown et al., 1980 show that the overall hourly gender wage gap can be decomposed as:

$$\overline{lnW}^{m} - \overline{lnW}^{m} = \sum_{j} S_{j}^{f}\bar{X}_{j}^{f}(\hat{\beta}_{j}^{m} - \hat{\beta}_{j}^{f}) + \sum_{j} S_{j}^{f}\hat{\beta}_{j}^{m}(\bar{X}_{j}^{m} - \bar{X}_{j}^{f}) + \sum_{j} \overline{lnW}_{j}^{m}(S_{j}^{m} - \hat{S}_{j}^{f}) + \sum_{j} \overline{lnW}_{j}^{m}(\hat{S}_{j}^{f} - S_{j}^{f}) \quad (2)$$

Where S_j^m and S_j^m represent the proportion of male and female workers employed in occupation *j*, respectively. The term $\hat{S}_j^f$ is the estimated distribution of women across occupations, using the model in Equation (3).

These four components represent the within occupation, unexplained and explained parts, and across occupations, unexplained and explained parts respectively.

A.2. A Model to Predict Men's and Women's Occupations

To understand which factors predict men's and women's probability of entering into specific occupations, we need to estimate an econometric model.

We estimate the probability of individual *i* to be employed in occupation *j* with a Multinomial Logit model as follows:

$$P_{ij}^{m} = Pr(O_i = j) = \frac{e^{x'_{ji}\gamma_i^m}}{\sum_{=1}^{J} e^{x'_i\gamma_i^m}} \quad (3)$$

where x_i contains information on a worker's age, marital status, number of dependent children, level of education, whether he/she is currently studying, and ATAR.

This model is estimated separately for men and women. This allows the supply- and demand-side factors to play a different role across occupations and male and female workers. We estimate Equation (3) for males to model how males enter occupations based on their observable characteristics. We then multiply the estimated coefficients for men and the personal characteristics x_i of women in regression (3) to obtain the predicted share of women in each occupation if they entered into occupations the same way as men (referred to as $\hat{P}_j^f$).[9]

8 We use the same worker characteristics as in Equation (3), except we also add controls for worker tenure and full-time status at their company.

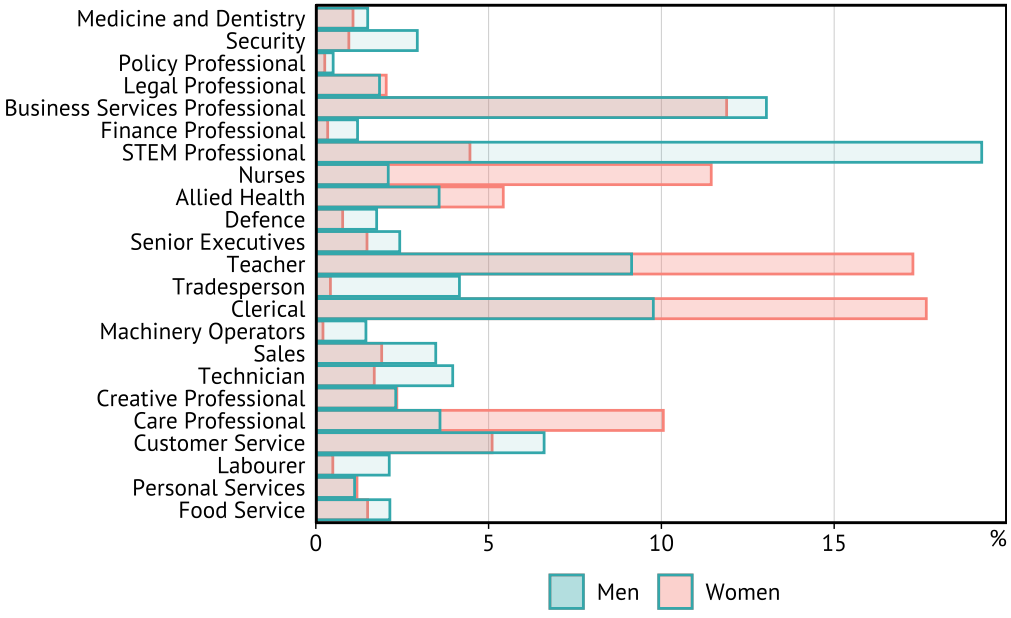
9 In addition, it is possible to derive an equivalent counterfactual distribution for men by estimating the percentage of men expected to be in occupation *j* under the same occupational allocation process experienced by women (denoted as $\hat{P}_j^m$).

A.3. Additional Tables and Figures

Table A.1: Actual and predicted distributions of men and women across occupations (%)

	Overall Sample			ATAR Sample		
	Womens		Mens	Womens		Mens
Occupation	Actual	Predicted	Actual	Actual	Predicted	Actual
Allied Health	2.7	1.2	1.1	5.4	3.5	3.6
Business Services Professional	7.6	8.0	7.3	11.9	12.4	13.0
Care Professional	9.5	2.5	2.3	10.1	4.1	3.6
Clerical	24.1	7.4	7.3	17.7	9.8	9.8
Creative Professional	1.5	1.2	1.2	2.3	2.1	2.3
Customer Service	11.6	8.9	8.9	5.1	6.5	6.6
Defence	0.5	1.1	1.2	0.8	1.8	1.8
Finance Professional	0.3	0.7	0.6	0.3	1.1	1.2
Food Service	5.3	4.7	4.6	1.5	2.1	2.1
Labourer	4.0	8.1	8.7	0.5	2.3	2.1
Legal Professional	0.7	0.7	0.5	2.0	1.7	1.8
Machinery Operators	0.7	7.4	8.2	0.2	1.7	1.5
Medicine and Dentistry	0.8	1.2	1.0	1.1	1.3	1.5
Nurses	7.1	1.0	0.8	11.4	2.4	2.1
Personal Services	2.0	0.9	0.8	1.2	1.1	1.1
Policy Professional	0.1	0.2	0.1	0.3	0.5	0.5
STEM Professional	3.1	13.8	12.8	4.5	18.7	19.3
Sales	3.0	3.5	3.6	1.9	3.3	3.5
Security	0.7	2.5	2.6	1.0	3.0	2.9
Senior Executives	2.4	5.4	5.4	1.5	2.7	2.4
Teacher	10.3	4.3	3.7	17.3	9.2	9.1
Technician	1.5	3.0	3.2	1.7	4.2	4.0
Tradesperson	0.6	12.4	14.2	0.4	4.4	4.2

Figure A.1: Distribution Across Occupations



* People who started university after 2004
Sources: ABS; e61

Table A.2: Sample Characteristics - Whole Sample 2016

	Full-Time Share		Tenure		Bachelors Share		Married Share		Dependents		Age		Student Status		Obs	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
Allied Health	0.56	0.87	5.85	6.18	0.69	0.71	0.65	0.71	1.34	1.08	37.8	41.14	0.1	0.1	83973	33089
Business Services Professional	0.77	0.94	5.64	6.04	0.64	0.6	0.66	0.75	1.33	1.13	39.49	42.5	0.09	0.06	238376	230132
Care Professional	0.48	0.66	5.4	5.56	0.31	0.41	0.59	0.66	1.81	1.16	42.36	43.73	0.15	0.15	295632	70912
Clerical	0.59	0.85	6.2	6.26	0.21	0.32	0.66	0.66	1.53	1.11	43.01	42.11	0.09	0.09	752047	228134
Creative Professional	0.66	0.82	6.07	6	0.62	0.53	0.6	0.66	1.17	0.95	40.22	40.38	0.08	0.06	46039	36697
Customer Service	0.45	0.71	5.33	5.6	0.15	0.18	0.49	0.52	1.68	1.25	36.14	36.96	0.21	0.16	363233	278401
Defence	0.79	0.94	6.78	7.66	0.46	0.27	0.58	0.6	1.22	0.84	38.72	36.91	0.13	0.1	14257	36465
Finance Professional	0.77	0.94	5.71	6.05	0.43	0.59	0.68	0.78	1.4	1.21	39.55	42.29	0.1	0.08	8601	18628
Food Service	0.36	0.57	4.15	4.09	0.14	0.15	0.43	0.44	1.68	1.24	33.55	32.41	0.28	0.25	164998	144157
Labourer	0.47	0.78	5.54	5.33	0.1	0.08	0.61	0.57	1.64	1.19	45.37	39.99	0.08	0.08	123967	274535
Legal Professional	0.76	0.92	5.46	5.74	0.95	0.96	0.64	0.72	1.27	1	38.04	42.83	0.07	0.06	22494	17090
Machinery Operators	0.67	0.87	5.76	5.81	0.07	0.05	0.56	0.67	1.52	1.1	44.69	45.31	0.06	0.03	21660	257662
Medicine and Dentistry	0.68	0.87	6.13	7.1	0.94	0.96	0.67	0.77	1.27	1.1	40.5	45.53	0.09	0.07	25743	32919
Nurses	0.48	0.72	6.84	6.29	0.68	0.71	0.67	0.7	1.62	1.12	44.52	42.77	0.1	0.12	221376	26089
Personal Services	0.45	0.6	4.74	5	0.15	0.23	0.53	0.48	1.59	1.12	34.5	34.88	0.17	0.24	62245	26171
Policy Professional	0.7	0.93	6.22	6.45	0.89	0.89	0.67	0.73	1.32	1.02	38.12	40.94	0.1	0.08	3309	4174
STEM Professional	0.75	0.94	6.15	6.25	0.77	0.61	0.68	0.76	1.25	1.13	39.99	42.28	0.08	0.05	96077	401332
Sales	0.62	0.88	5.24	5.66	0.2	0.21	0.6	0.68	1.52	1.14	39.76	41.12	0.1	0.06	92094	114107
Security	0.78	0.89	7.69	7.55	0.27	0.19	0.59	0.73	1.71	1.25	40.5	42.65	0.07	0.06	20741	82832
Senior Executives	0.72	0.9	6.72	7.1	0.4	0.36	0.72	0.82	1.41	1.17	46.47	48.79	0.06	0.03	75030	168309
Teacher	0.57	0.78	8.26	8.2	0.74	0.87	0.7	0.75	1.65	1.12	44.14	44.98	0.09	0.1	321193	114944
Technician	0.6	0.91	6.14	6.37	0.33	0.22	0.61	0.7	1.45	1.09	39.98	42.84	0.13	0.07	47515	99241
Tradesperson	0.64	0.93	5.9	6	0.18	0.04	0.58	0.66	1.37	1.15	39.59	39.48	0.11	0.06	17749	447664

Table A.3: Sample Characteristics - ATAR Sample

	Full-Time Share		Tenure		ATAR		Married Share		Dependent Children		Age		Student Status		Obs	
Occupation	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
Allied Health	0.69	0.89	5.18	5.24	82.44	81.8	0.64	0.68	0.91	0.7	32.31	33.16	0.16	0.18	2117	989
Business Services Professional	0.81	0.96	4.9	4.86	78.78	76.6	0.65	0.65	0.9	0.68	32.7	31.98	0.19	0.15	4640	3614
Care Professional	0.59	0.71	4.71	4.64	74.19	73.28	0.61	0.66	1.91	1.1	36.13	35.04	0.3	0.29	3925	996
Clerical	0.66	0.89	5.21	5.21	74.71	73.86	0.62	0.58	1.47	0.82	34.3	32.69	0.27	0.2	6895	2707
Creative Professional	0.76	0.85	4.77	4.69	80.13	74.49	0.57	0.58	0.72	0.54	32.39	32	0.14	0.09	915	641
Customer Service	0.59	0.75	5.32	5.64	73.07	71.55	0.54	0.54	1.38	0.76	33.24	32.44	0.25	0.22	1991	1831
Defence	0.81	0.94	6.41	8.26	75.76	74.39	0.57	0.64	1.09	0.77	34.57	33.67	0.25	0.33	303	488
Finance Professional	0.84	0.96	4.49	4.47	76.99	78.07	0.63	0.65	1.08	0.58	32.41	31.65	0.22	0.16	134	335
Food Service	0.47	0.63	4.23	4.09	74.85	72.52	0.48	0.46	1.51	0.72	33.56	32.61	0.33	0.25	585	594
Labourer	0.55	0.76	4.63	4.61	72.91	72.42	0.54	0.53	1.89	0.92	36.44	33.69	0.31	0.24	192	589
Legal Professional	0.87	0.97	4.33	4.4	87.9	86.58	0.61	0.62	0.69	0.47	31.44	31.42	0.11	0.11	795	511
Machinery Operators	0.7	0.84	4.88	4.56	72.91	72.74	0.44	0.6	1.28	1.06	35.44	34.55	0.23	0.24	81	402
Medicine and Dentistry	0.82	0.92	4.06	4.3	92.84	92.77	0.6	0.61	0.53	0.39	30.67	30.69	0.14	0.18	420	416
Nurses	0.47	0.72	5.83	5.87	70.52	69.7	0.66	0.67	1.8	0.98	36.17	35.93	0.2	0.25	4466	581
Personal Services	0.49	0.75	5.02	5.29	72.34	71.36	0.56	0.61	1.49	0.82	33.95	32.56	0.31	0.25	465	311
Policy Professional	0.72	0.96	5.33	5.04	78.46	74.7	0.66	0.73	1.51	0.53	32.86	31.94	0.21	0.16	101	139
STEM Professional	0.79	0.94	5.22	5.18	80.95	78.99	0.62	0.67	0.77	0.75	32.4	32.51	0.17	0.16	1741	5341
Sales	0.73	0.91	4.54	4.64	73.77	72.08	0.58	0.65	1.27	0.84	32.71	32.11	0.16	0.17	744	962
Security	0.79	0.92	7.33	6.78	74.08	72.3	0.62	0.69	1.24	0.91	33.95	33.64	0.25	0.21	373	814
Senior Executives	0.77	0.93	5.26	5.59	76.74	75.74	0.67	0.71	1.26	1.03	35.32	34.28	0.23	0.17	578	673
Teacher	0.66	0.84	6.22	6.04	74.76	73.32	0.67	0.68	1.52	0.91	34.44	32.97	0.16	0.14	6744	2533
Technician	0.65	0.91	5.22	5.24	73.93	75.26	0.6	0.63	1.11	0.93	33.7	33.5	0.27	0.28	660	1098
Tradesperson	0.61	0.9	5.48	5.42	76.62	73.44	0.61	0.69	1.1	0.9	33.15	33.8	0.3	0.26	165	1152

Table A.4: Occupation mapping from ANZSCO

ANZSCO	ANZSCO Title	Category
1111	Chief Executives and Managing Directors	Senior Executives
1112	General Managers	Senior Executives
1113	Legislators	Senior Executives
1211	Aquaculture Farmers	Labourer
1213	Livestock Farmers	Labourer
1215	Broadacre Crop Growers	Labourer
1216	Horticultural Crop Growers	Labourer
1217	Mixed Production Farmers	Labourer
1311	Advertising, Public Relations and Sales Managers	Business Services Professional
1321	Corporate Services Managers	Business Services Professional
1322	Finance Managers	Business Services Professional
1323	Human Resource Managers	Business Services Professional
1324	Policy and Planning Managers	Business Services Professional
1325	Research and Development Managers	STEM Professional
1331	Construction Managers	STEM Professional
1332	Engineering Managers	STEM Professional
1333	Importers, Exporters and Wholesalers	STEM Professional
1334	Manufacturers	STEM Professional
1335	Production Managers	STEM Professional
1336	Supply, Distribution and Procurement Managers	STEM Professional
1341	Child Care Centre Managers	Care Professional
1342	Health and Welfare Services Managers	Care Professional
1343	School Principals	Teacher
1344	Other Education Managers	Teacher
1351	ICT Managers	STEM Professional
1391	Commissioned Officers (Management)	Defence
1392	Senior Non-commissioned Defence Force Members	Defence
1399	Other Specialist Managers	Defence
1411	Cafe and Restaurant Managers	Food Service
1412	Caravan Park and Camping Ground Managers	Customer Service
1413	Hotel and Motel Managers	Customer Service
1414	Licensed Club Managers	Customer Service
1419	Other Accommodation and Hospitality Managers	Customer Service
1421	Retail Managers	Customer Service
1491	Amusement, Fitness and Sports Centre Managers	Customer Service
1492	Call or Contact Centre and Customer Service Managers	Customer Service
1493	Conference and Event Organisers	Business Services Professional
1494	Transport Services Managers	Customer Service
1499	Other Hospitality, Retail and Service Managers	Customer Service
2111	Actors, Dancers and Other Entertainers	Creative Professional
2112	Music Professionals	Creative Professional
2113	Photographers	Creative Professional
2114	Visual Arts and Crafts Professionals	Creative Professional
2121	Artistic Directors, and Media Producers and Presenters	Creative Professional
2122	Authors, and Book and Script Editors	Creative Professional
2123	Film, Television, Radio and Stage Directors	Creative Professional
2124	Journalists and Other Writers	Creative Professional
2211	Accountants	Business Services Professional
2212	Auditors, Company Secretaries and Corporate Treasurers	Business Services Professional

2221	Financial Brokers	Financial Professional
2222	Financial Dealers	Financial Professional
2223	Financial Investment Advisers and Managers	Financial Professional
2231	Human Resource Professionals	Business Services Professional
2233	Training and Development Professionals	Business Services Professional
2241	Actuaries, Mathematicians and Statisticians	STEM Professional
2242	Archivists, Curators and Records Managers	Creative Professional
2243	Economists	Business Services Professional
2244	Intelligence and Policy Analysts	Business Services Professional
2245	Land Economists and Valuers	Business Services Professional
2246	Librarians	Creative Professional
2247	Management and Organisation Analysts	Business Services Professional
2249	Other Information and Organisation Professionals	Business Services Professional
2251	Advertising and Marketing Professionals	Business Services Professional
2252	ICT Sales Professionals	Sales
2253	Public Relations Professionals	Business Services Professional
2254	Technical Sales Representatives	Sales
2311	Air Transport Professionals	STEM Professional
2312	Marine Transport Professionals	STEM Professional
2321	Architects and Landscape Architects	STEM Professional
2322	Surveyors and Spatial Scientists	STEM Professional
2323	Fashion, Industrial and Jewellery Designers	Creative Professional
2324	Graphic and Web Designers, and Illustrators	Creative Professional
2325	Interior Designers	Creative Professional
2326	Urban and Regional Planners	Policy Professional
2331	Chemical and Materials Engineers	STEM Professional
2332	Civil Engineering Professionals	STEM Professional
2333	Electrical Engineers	STEM Professional
2334	Electronics Engineers	STEM Professional
2335	Industrial, Mechanical and Production Engineers	STEM Professional
2336	Mining Engineers	STEM Professional
2339	Other Engineering Professionals	STEM Professional
2341	Agricultural, Fisheries and Forestry Scientists	STEM Professional
2342	Chemists, and Food and Wine Scientists	STEM Professional
2343	Environmental Scientists	STEM Professional
2344	Geologists, Geophysicists and Hydrogeologists	STEM Professional
2345	Life Scientists	STEM Professional
2346	Medical Scientists	STEM Professional
2347	Veterinarians	STEM Professional
2349	Other Natural and Physical Science Professionals	STEM Professional
2411	Early Childhood (Pre-primary School) Teachers	Teacher
2412	Primary School Teachers	Teacher
2413	Middle School Teachers / Intermediate School Teachers	Teacher
2414	Secondary School Teachers	Teacher
2415	Special Education Teachers	Teacher
2421	University Lecturers and Tutors	Teacher
2422	Vocational Education Teachers / Polytechnic Teachers	Teacher
2491	Education Advisers and Reviewers	Teacher
2492	Private Tutors and Teachers	Teacher
2493	Teachers of English to Speakers of Other Languages	Teacher
2511	Nutrition Professionals	Allied Health

2512	Medical Imaging Professionals	Allied Health
2513	Occupational and Environmental Health Professionals	Allied Health
2514	Optometrists and Orthoptists	Allied Health
2515	Pharmacists	Allied Health
2519	Other Health Diagnostic and Promotion Professionals	Allied Health
2521	Chiropractors and Osteopaths	Allied Health
2522	Complementary Health Therapists	Allied Health
2523	Dental Practitioners	Medicine and Dentistry
2524	Occupational Therapists	Allied Health
2525	Physiotherapists	Allied Health
2526	Podiatrists	Allied Health
2527	Audiologists and Speech Pathologists / Therapists	Allied Health
2531	General Practitioners and Resident Medical Officers	Medicine and Dentistry
2532	Anaesthetists	Medicine and Dentistry
2533	Specialist Physicians	Medicine and Dentistry
2534	Psychiatrists	Medicine and Dentistry
2535	Surgeons	Medicine and Dentistry
2539	Other Medical Practitioners	Medicine and Dentistry
2541	Midwives	Nurses
2542	Nurse Educators and Researchers	Nurses
2543	Nurse Managers	Nurses
2544	Registered Nurses	Nurses
2611	ICT Business and Systems Analysts	STEM Professional
2612	Multimedia Specialists and Web Developers	STEM Professional
2613	Software and Applications Programmers	STEM Professional
2621	Database and Systems Administrators, and ICT Security Specialists	STEM Professional
2631	Computer Network Professionals	STEM Professional
2632	ICT Support and Test Engineers	STEM Professional
2633	Telecommunications Engineering Professionals	STEM Professional
2711	Barristers	Legal Professional
2712	Judicial and Other Legal Professionals	Legal Professional
2713	Solicitors	Legal Professional
2721	Counsellors	Care Professional
2722	Ministers of Religion	Care Professional
2723	Psychologists	Care Professional
2724	Social Professionals	Care Professional
2725	Social Workers	Care Professional
2726	Welfare, Recreation and Community Arts Workers	Care Professional
3111	Agricultural, Agritech and Aquaculture Technicians	Technician
3112	Medical Technicians	Technician
3113	Primary Products Assurance and Inspection Officers	Technician
3114	Science Technicians	Technician
3121	Architectural, Building and Surveying Technicians	Technician
3122	Civil Engineering Draftspersons and Technicians	Technician
3123	Electrical Engineering Draftspersons and Technicians	Technician
3124	Electronic Engineering Draftspersons and Technicians	Technician
3125	Mechanical Engineering Draftspersons and Technicians	Technician
3126	Safety Inspectors	Technician
3129	Other Building and Engineering Technicians	Technician
3131	ICT Support Technicians	Technician
3132	Telecommunications Technical Specialists	Technician

3211	Automotive Electricians	Tradesperson
3212	Motor Mechanics	Tradesperson
3221	Metal Casting, Forging and Finishing Trades Workers	Tradesperson
3222	Sheetmetal Trades Workers	Tradesperson
3223	Structural Steel and Welding Trades Workers	Tradesperson
3231	Aircraft Maintenance Engineers	Tradesperson
3232	Metal Fitters and Machinists	Tradesperson
3233	Precision Metal Trades Workers	Tradesperson
3234	Toolmakers and Engineering Patternmakers	Tradesperson
3241	Panelbeaters	Tradesperson
3242	Vehicle Body Builders and Trimmers	Tradesperson
3243	Vehicle Painters	Tradesperson
3311	Bricklayers and Stonemasons	Tradesperson
3312	Carpenters and Joiners	Tradesperson
3321	Floor Finishers	Tradesperson
3322	Painting Trades Workers	Tradesperson
3331	Glaziers	Tradesperson
3332	Plasterers	Tradesperson
3333	Roof Tilers	Tradesperson
3334	Wall and Floor Tilers	Tradesperson
3341	Plumbers	Tradesperson
3411	Electricians	Tradesperson
3421	Airconditioning and Refrigeration Mechanics	Tradesperson
3422	Electrical Distribution Trades Workers	Tradesperson
3423	Electronics Trades Workers	Tradesperson
3424	Telecommunications Trades Workers	Tradesperson
3511	Bakers and Pastrycooks	Food Service
3512	Butchers and Smallgoods Makers	Food Service
3513	Chefs	Food Service
3514	Cooks	Food Service
3611	Animal Attendants and Trainers	Technician
3613	Veterinary Nurses	Technician
3621	Florists	Personal Services
3623	Sports Turf Managers and Trades Workers	Tradesperson
3624	Nurserypersons	Tradesperson
3625	Arboriculture Workers	Tradesperson
3626	Gardeners (General)	Tradesperson
3627	Landscape Gardeners and Irrigation Technicians	Tradesperson
3631	Senior Aquaculture, Crop and Forestry Workers	Tradesperson
3632	Senior Livestock Farm Workers	Tradesperson
3633	Shearers and Wool Classers	Tradesperson
3911	Hairdressers	Personal Services
3921	Print Finishers and Screen Printers	Tradesperson
3922	Graphic Pre-press Trades Workers	Tradesperson
3923	Printers	Tradesperson
3931	Canvas and Leather Goods Makers	Tradesperson
3932	Clothing Trades Workers	Tradesperson
3933	Upholsterers	Tradesperson
3941	Cabinetmakers	Tradesperson
3942	Wood Machinists and Other Wood Trades Workers	Tradesperson
3991	Boat Builders and Shipwrights	Tradesperson

3992	Chemical, Gas, Petroleum and Power Generation Plant Operators	Tradesperson
3993	Gallery, Library and Museum Technicians	Technician
3994	Jewellers	Tradesperson
3995	Performing Arts Technicians	Tradesperson
3996	Signwriters	Tradesperson
3999	Other Miscellaneous Technicians and Trades Workers	Tradesperson
4111	Ambulance Officers and Paramedics	Allied Health
4112	Dental Hygienists, Technicians and Therapists	Allied Health
4113	Diversional Therapists	Care Professional
4114	Enrolled and Mothercraft Nurses	Nurses
4115	Indigenous Health Workers	Care Professional
4116	Massage Therapists	Personal Services
4117	Welfare Support Workers	Care Professional
4211	Child Carers	Care Professional
4221	Education Aides	Teacher
4231	Aged and Disabled Carers	Care Professional
4232	Dental Assistants	Allied Health
4233	Nursing Support and Personal Care Workers	Care Professional
4234	Special Care Workers	Care Professional
4311	Bar Attendants and Baristas	Food Service
4312	Cafe Workers	Food Service
4313	Gaming Workers	Customer Service
4314	Hotel Service Managers	Customer Service
4315	Waiters	Food Service
4319	Other Hospitality Workers	Customer Service
4411	Defence Force Members - Other Ranks	Defence
4412	Fire and Emergency Workers	Security
4413	Police	Security
4421	Prison Officers	Security
4422	Security Officers and Guards	Security
4511	Beauty Therapists	Personal Services
4512	Driving Instructors	Personal Services
4513	Funeral Workers	Personal Services
4514	Gallery, Museum and Tour Guides	Customer Service
4515	Personal Care Consultants	Personal Services
4516	Tourism and Travel Advisers	Personal Services
4517	Travel Attendants	Personal Services
4518	Other Personal Service Workers	Personal Services
4521	Fitness Instructors	Personal Services
4522	Outdoor Adventure Guides	Personal Services
4523	Sports Coaches, Instructors and Officials	Personal Services
4524	Sportspersons	Personal Services
5111	Contract, Program and Project Administrators	Clerical
5121	Office Managers	Clerical
5122	Practice Managers	Clerical
5211	Personal Assistants	Clerical
5212	Secretaries	Clerical
5311	General Clerks	Clerical
5321	Keyboard Operators	Clerical
5411	Call or Contact Centre Workers	Clerical
5412	Information Officers	Clerical

5421	Receptionists	Clerical
5511	Accounting Clerks	Clerical
5512	Bookkeepers	Clerical
5513	Payroll Clerks	Clerical
5521	Bank Workers	Clerical
5522	Credit and Loans Officers (Aus) / Finance Clerks (NZ)	Clerical
5523	Insurance, Money Market and Statistical Clerks	Clerical
5611	Betting Clerks	Clerical
5612	Couriers and Postal Deliverers	Clerical
5613	Filing and Registry Clerks	Clerical
5614	Mail Sorters	Clerical
5615	Survey Interviewers	Clerical
5616	Switchboard Operators	Clerical
5619	Other Clerical and Office Support Workers	Clerical
5911	Purchasing and Supply Logistics Clerks	Clerical
5912	Transport and Despatch Clerks	Clerical
5991	Conveyancers and Legal Executives	Clerical
5992	Court and Legal Clerks	Clerical
5993	Debt Collectors	Clerical
5994	Human Resource Clerks	Clerical
5995	Inspectors and Regulatory Officers	Clerical
5996	Insurance Investigators, Loss Adjusters and Risk Surveyors	Clerical
5997	Library Assistants	Clerical
5999	Other Miscellaneous Clerical and Administrative Workers	Clerical
6111	Auctioneers, and Stock and Station Agents	Sales
6112	Insurance Agents	Sales
6113	Sales Representatives	Sales
6121	Real Estate Sales Agents	Sales
6211	Sales Assistants (General)	Customer Service
6212	ICT Sales Assistants	Sales
6213	Motor Vehicle and Vehicle Parts Salespersons	Sales
6214	Pharmacy Sales Assistants	Customer Service
6215	Retail Supervisors	Customer Service
6216	Service Station Attendants	Customer Service
6217	Street Vendors and Related Salespersons	Customer Service
6219	Other Sales Assistants and Salespersons	Customer Service
6311	Checkout Operators and Office Cashiers	Customer Service
6391	Models and Sales Demonstrators	Sales
6392	Retail and Wool Buyers	Sales
6393	Telemarketers	Sales
6394	Ticket Salespersons	Customer Service
6395	Visual Merchandisers	Customer Service
6399	Other Sales Support Workers	Sales
7111	Clay, Concrete, Glass and Stone Processing Machine Operators	Machinery Operator
7112	Industrial Spraypainters	Machinery Operator
7113	Paper and Wood Processing Machine Operators	Machinery Operator
7114	Photographic Developers and Printers	Machinery Operator
7115	Plastics and Rubber Production Machine Operators	Machinery Operator
7116	Sewing Machinists	Machinery Operator
7117	Textile and Footwear Production Machine Operators	Machinery Operator
7119	Other Machine Operators	Machinery Operator

7121	Crane, Hoist and Lift Operators	Machinery Operator
7122	Drillers, Miners and Shot Firers	Machinery Operator
7123	Engineering Production Workers	Machinery Operator
7129	Other Stationary Plant Operators	Machinery Operator
7211	Agricultural, Forestry and Horticultural Plant Operators	Machinery Operator
7212	Earthmoving Plant Operators	Machinery Operator
7213	Forklift Drivers	Machinery Operator
7219	Other Mobile Plant Operators	Machinery Operator
7311	Automobile Drivers	Machinery Operator
7312	Bus and Coach Drivers	Machinery Operator
7313	Train and Tram Drivers	Machinery Operator
7321	Delivery Drivers	Machinery Operator
7331	Truck Drivers	Machinery Operator
7411	Storepersons	Customer Service
8111	Car Detailers	Labourer
8112	Commercial Cleaners	Labourer
8113	Domestic Cleaners	Labourer
8114	Housekeepers	Labourer
8115	Laundry Workers	Labourer
8116	Other Cleaners	Labourer
8211	Building and Plumbing Labourers	Labourer
8212	Concreters	Labourer
8213	Fencers	Labourer
8214	Insulation and Home Improvement Installers	Labourer
8215	Paving and Surfacing Labourers	Labourer
8216	Railway Track Workers	Labourer
8217	Structural Steel Construction Workers	Labourer
8219	Other Construction and Mining Labourers	Labourer
8311	Food and Drink Factory Workers	Labourer
8312	Meat Boners and Slicers, and Slaughterers	Labourer
8313	Meat, Poultry and Seafood Process Workers	Labourer
8321	Packers	Labourer
8322	Product Assemblers	Labourer
8391	Metal Engineering Process Workers	Labourer
8392	Plastics and Rubber Factory Workers	Labourer
8393	Product Quality Controllers	Labourer
8394	Timber and Wood Process Workers	Labourer
8399	Other Factory Process Workers	Labourer
8421	Aquaculture Workers	Labourer
8422	Crop Farm Workers	Labourer
8423	Livestock Farm Workers	Labourer
8424	Mixed Production Farm Workers	Labourer
8431	Forestry and Logging Workers	Labourer
8432	Garden Labourers	Labourer
8433	Horticultural Nursery Assistants	Labourer
8434	Pest Control Technicians	Labourer
8439	Other Forestry and Garden Workers	Labourer
8511	Fast Food Cooks	Food Service
8512	Food Trades Assistants	Food Service
8513	Kitchenhands	Food Service
8911	Freight and Furniture Handlers	Labourer

8912	Shelf Fillers	Customer Service
8991	Caretakers	Labourer
8992	Deck and Fishing Hands	Labourer
8993	Handypersons	Labourer
8994	Motor Vehicle Parts and Accessories Fitters	Labourer
8995	Printing Assistants and Table Workers	Labourer
8996	Recycling and Rubbish Collectors	Labourer
8997	Vending Machine Attendants	Customer Service
8999	Other Miscellaneous Labourers	Labourer

APPENDIX B

B.1. Disclaimer

Business Longitudinal Analysis Data Environment (BLADE)

This paper uses unit record data held in the BLADE data environment which is hosted by the Australian Bureau of Statistics. The results are based, in part, on Australian Business Register (ABR) data supplied by the Registrar to the Australian Bureau of Statistics (ABS) under A New Tax System (Australian Business Number) Act 1999 and tax data supplied by the Australian Taxation Office (ATO) to the ABS under the Taxation Administration Act 1953. These require that such data are only used for the purpose of carrying out functions of the ABS. No individual information collected under the Census and Statistics Act 1905 is provided back to the Registrar or ATO for administrative or regulatory purposes. Any discussion of data limitations or weaknesses is in the context of using the data for statistical purposes and is not related to the ability of the data to support the ABR or ATO's core operational requirements. Legislative requirements to ensure the privacy and secrecy of this data have been followed. Only people authorised under the Australian Bureau of Statistics Act 1975 have been allowed to view data about any particular firm in conducting these analyses. In accordance with the Census and Statistics Act 1905, results have been confidentialised to ensure that they are not likely to enable the identification of a particular person or organisation.