

When does it start? The gender gap and the university-work transition

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How to cite: Oh, N. Y.; Gardiner, G. M. (2025). When does it start? The gender gap and the university-work transition. In: 11th International Conference on Higher Education Advances (HEAd'25). Valencia, 17–20 June 2025. <https://doi.org/10.4995/HEAd25.2025.20040>

Abstract

Gender inequality persists globally, evident in the gender pay gap and women's underrepresentation in leadership roles. While much research exists on workplace equality, there is limited understanding of when and where these gaps emerge. Many economists cite human capital theory to explain these disparities, but this approach faces significant criticism. This study analyzes early indicators of gender pay and leadership gaps among students, challenging human capital explanations and offering a more nuanced view of how these gaps develop. Focusing on the university-to-work transition, it examines gendered experiences before and during early career stages. Using data from annual surveys of STEM and business graduates in an Australian University, we uncover a gender pay gap at entry-level, particularly in Business, and highlight the early underrepresentation of women in leadership programs. These findings underscore the importance of university data in understanding and addressing gendered inequalities, offering insights for policy and career preparation

Keywords: *Higher education; University-work transition; gender-gap.*

1. Introduction

Workplace gender inequality persists globally, as evidenced by the enduring gender pay gap and women's underrepresentation in leadership roles. While considerable research exists on workplace equality, there's a gap in understanding when and why these disparities emerge. Determining how early gendered gaps emerge is particularly important for students, as gender inequality considerations can have significant implications for their career. Students may encounter gender inequalities during work-integrated learning, which may negatively influence future career choices.

There have been many studies of the gender pay gap and inequity in various sectors of the workforce (Lo Sasso et al. 2020; Roy 2018; Whoodhams, Trojanowski and Wilkinson et al.

2022). However, few address the question of exactly when the gender pay gap, underrepresentation of women in leadership, and gendered attitudinal differences about employment begin. Universities act as a base for the transition of students from education to the workforce; hence university data can provide further insights and alternative perspectives on this problem.

This study analyses the results of annual surveys conducted on graduates of an Australian university who received a specialised scholarship targeting skilled students in STEM and business. The University of New South Wales' (UNSW), The Co-op program is both a scholarship and a leadership program, guiding promising students identified as likely to emerge as leaders in their chosen field. We have purposely chosen this dataset for this study as the Co-op graduate surveys offer significant insights into areas of the gender pay and leadership gaps that are under-researched due to limited data availability. Because the Co-op Program fosters leadership potential in its students, graduate surveys can be used as a proxy for leadership data, or data on graduates' progression towards leadership roles. As a result, this data offers insight into the emergence of gender pay and leadership gaps early in graduates' careers which is highly relevant to discussions of workplace gender inequality. As such, while this dataset is limited to one university program in Australia, it is not localised: it gives insight into ongoing questions about gendered inequalities in the workplace, how they emerge, and how they influence students' decisions related to career and training. In this way, Co-op surveys present a rich and scalable set of data on the presence of gender gaps among high-achieving graduates in the traditionally male-dominated sectors of STEM and business.

Our research builds upon existing literature on the gender pay gap among early-career graduates by drawing data from groups of students controlled for skills and experience (Sterling et al. 2020; Chevalier, 2007; Morgan 2008; Chia and Miller 2008). By analysing early indicators of gender pay and leadership gaps among students together, this study sheds further light on the limitations of human capital explanations of gaps and indicates a need for nuanced understandings of how gender gaps in the workplace emerge and interact with one another (Greer and Carden 2021; Ochsensfeld 2014). While previous research exists exploring the limitations of human capital explanations of gender pay gaps more broadly, they do not test these limitations using data from groups which are controlled, insofar as is possible, for skills, experience and education, nor does it explore how human capital explanations could obscure issues of gender inequality in the workplace beyond the pay gap (Tharenou, 2013, Lips, 2012, Ishikawa & , 2002).

Our study produced two main findings. First, it appears that a gender pay gap is present at the graduate entry level, and this gender pay gap is most prevalent in the Business sector, compared to other sectors such as Engineering, Science and Technology. Secondly, an underrepresentation of females in leadership track options can be found as early as enrolment in university programs.

These findings offer significant insights into the question of when gender pay and leadership gaps begin to occur, challenging human capital theory applications.

This study explores the university-to-work transition, shedding light on students' gendered experiences before entering the workforce and during early career stages. In doing so, it contributes to advancement in understandings of workplace gender inequality and how to address it, encouraging a nuanced understanding of how and when social inequalities are replicated in the workplace.

2. Hypotheses

Based on research on the gender pay gap, the gender leadership gap and critiques of the human capital theory, two working hypotheses guide analysis and discussion of this study.

Hypothesis 1: *Female Co-op graduates are likely to receive equal salary male graduates, as both groups being similarly highly career-ready and experienced.*

Based on human capital theory, graduates with similar working experience and grades should receive similar remuneration regardless of gender. Students in the Co-op program must maintain high grades and receive similar training and experience in the form of prestigious internships. As such, they graduate with very similar levels and types of human capital. As such, based on human capital theory, male and female Co-op students should receive roughly the same graduate salaries.

Hypothesis 2: *There is equal female student representation in applications for the leadership program*

From a human capital perspective, the pay and leadership gaps are explained by differences in work experience and lifestyle between men and women. The Co-op application data concerns high school students, who are unlikely to have encountered gendered factors that unevenly impact their human capital. In 2019, women represented 59.0% of all undergraduate and postgraduate university course enrolments in Australia, so there should not be a gender gap in applications based on differences in post-high school education plans. As high school students in STEM and business classes, applicants have roughly the same human capital, we hypothesise that, based on human capital theory, there should be an equal, if not slightly higher, representation of women to men in applications to the leadership program.

3. Data

A unique dataset from the Co-op Scholarship Program enabled a longitudinal case study of a signature work-integrated learning program of UNSW. UNSW is a public research university based in Australia, ranked 19th in the 2024 QS World University Ranking and 1st in Australia

for Employment Outcomes by The Australian Financial Review in 2023. The Co-op is both a scholarship and a specialised leadership program, offering three industry placements throughout university degrees.

3.1. Co-op Application Dataset (2012-2022)

The Co-op application dataset comprises information about the entire scholar application process onto the program. It consists of basic information regarding the applicant, indicators of the success of the application process, and enrolment details of applicants. Sample size of the data shown in Table 1.

Table 1. Co-op applicants dataset sample (2012-2022)

	All	Business	Engineering	Science	Technology
Frequency					
Male	6002	3019	2595	1002	1761
Female	3637	2280	1180	515	974
%					
Male	0.62	0.57	0.69	0.66	0.64
Female	0.38	0.43	0.31	0.34	0.36

3.2. Co-Op Graduate Exit Survey Dataset (2008-2022)

The Co-Op exit survey dataset comprises information about scholars who have completed the UNSW Co-op Program including job status after the program, starting salary as well as survey responses regarding pre-defined factors considered in choosing an employer. Sample size shown in Table 2.

Table 2. Co-op graduate exit survey dataset sample (2007-2022)

	ALL	Business	Engineering	Science	Technology
Frequency					
Male	496	206	115	18	155
Female	341	179	52	9	101
%					
Male	59.26	53.51	68.86	66.67	60.55
Female	40.74	46.49	31.14	33.33	39.45

4. Methodology

To test the hypotheses on gender differences between male and female scholars (Ethics approval code HC220392), comparison will be based on their relative proportion differences in three stages:

The first stage involved considering male and females as two separate populations and calculating the proportion of each.

$$Proportion_{Male} = \frac{No\ of\ Males\ with\ Attribute\ A}{No.\ of\ Males\ applicable\ for\ Attribute\ A} \quad (1)$$

The second stage involved calculating the proportion difference between Male and Female populations.

$$Difference = Proportion_{Male} - Proportion_{Female} \quad (2)$$

The last stage involved testing the statistical significance for the differences between Male and Female populations at a 10% level.

5. Results

5.1. Hypothesis 1

A gender pay gap is evident at the graduate commencement level.

There is a significantly higher proportion of Males (35.08%) occupying the highest salary bracket (\$80,000+) as opposed to 28.15% for females (**Figure 1**). Conversely, a higher proportion of Females occupy the middle and lowest salary bracket of \$65,000-\$80,000 and \$0,000-\$65,000. The statistical difference results are provided in Table 3.

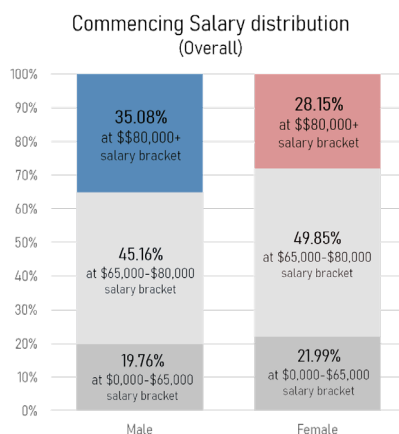


Figure 1. Graduate Gender Pay gap

Table 3. Graduate Gender pay gap statistical difference.

	Difference	Z-test statistic	p-value
\$0,000 to \$65,000	-2.2%	-0.78	0.4325
\$65,000 to \$80,000	-4.7%	-1.34	0.1815
\$80,000+	6.93%	2.11	0.0351

Partitioning the data into 5-year intervals shows that the gender pay gap has not improved over time (Results will be provided upon request).

Further, sectoral analysis shows that the gender pay gap is most prevalent in the Business sector and the remaining sectors of Engineering, Science and Technology showed insignificant results (Results will be provided upon request).

5.2. Hypothesis 2

In understanding whether there is less female representation in leadership based on hypotheses 2 this study has found that women are heavily underrepresented as early as the application stage for the Co-op Program. Roughly twice as many Males (62.27%) as Females (37.73%) applied for the UNSW Co-op Program between 2012 to 2022 (*Figure 2*). Further partitioning the data to gain insight on whether there has been improvement in female representation across time and across sector shows that there is no improvement of Female representation, as the proportion of Female applicants hardly changed (Results will be provided upon request).

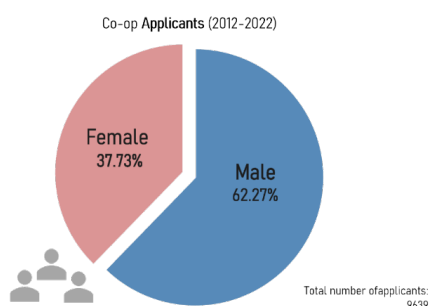


Figure 2: Gender Representation in leadership program

6. Conclusion

The longstanding issue of gender pay gap and leadership gaps and their presence at the university enrolment and graduation levels is alarming. The findings of this study are particularly notable as they reveal a significant gender pay gap among a relatively controlled and high-achieving university graduate cohort as well as heavily underrepresented female students in leadership programs as early as the university application stage.

The results discussed in this paper are valuable in revealing how early workplace inequalities based on gender emerge, demonstrating a need for institutions to develop effective policy interventions to address these gaps. Higher education could play a pivotal role in instilling equal practices in the labour force at large, targeting workers at an early age to produce life-long value of gender equality. The data analysed in this study exemplifies the valuable contribution higher education institutions can and need to make, especially through Work Integrated Learning, where students are exposed to work environment early during their studies. Though this dataset is limited to a single work integrated learning program in one Australian school, its implications are nonetheless far-reaching, both as an insight into the origins of gender inequality, and a demonstration of an underutilised area of study

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