

RESEARCH ARTICLE

The gender pay platform gap during the COVID-19 pandemic and the role of platform gender segregation in Australia

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Abstract

Progress towards pay equity between men and women in the Australian economy stalled during the COVID-19 pandemic, highlighting once again the gendered impact of the pandemic. However, little is known about the impact of the pandemic on the gender pay gap in the platform economy. Drawing on data from an Australian survey of platform workers ($n = 947$) during the early months of the pandemic (2020), this research investigates how the pandemic impacted the gender pay gap across different platform types—care, delivery and driving, microwork, and marketplace—and the platform economy overall. The findings show that the gendered segregated nature of platform work compounded by the uneven impact of the COVID-19 pandemic on particular types of platform work increased the pay gap between men and women. This research also sought to examine the mechanisms behind the gender pay gap, finding that human capital differences and platform gender segregation largely explain the gender pay gap on platforms in Australia. There was an association between parenthood and earnings, but this is moderated by

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human capital and platform type, suggesting that differences in earnings amongst parents are explained by these factors. The research finds that the gender gap across the platform economy increased by six percentage points, indicating that the gendered impact of the COVID-19 pandemic also affected the platform economy.

KEYWORDS

COVID-19, gender inequality, gender pay gap, gender segregation, gig economy, platform economy

INTRODUCTION

The gender¹ pay gap in Australia as of May 2023 is 13%,² which equates to women earning \$252.30 *less* each week than men on average. This marks the narrowest gender pay gap recorded, occurring after the initial phase of the COVID-19 pandemic (2020–2021). During this period, the gender pay gap briefly widened, fluctuating between 13.4% and 14.2%, interrupting a period of sustained progress throughout the latter part of the previous decade (Workplace Gender Equality Agency [WGEA], 2023). However, these figures do not include the platform economy as the gender pay gap is based on employee earnings data. There is currently no national data on the gender pay gap, which includes digitally-mediated workers who secure work from platforms like Airtasker or Uber in Australia because this type of work is not captured in the national statistics. However, there is a small albeit growing body of evidence in other Western countries that suggests the gender pay gap that exists in the traditional labour market extends to platforms like Uber (Cook et al., 2018) and microtask platforms like Amazon MTurk (Adams, 2020). This research focuses on the extent of the gap in the Australian platform economy and how the COVID-19 pandemic has impacted it.

The early phase of the pandemic (2020–2021), which included multiple lockdowns and shelter-in-place orders that shut down cities, was very uneven in its impact, affecting some sectors of the economy more than others and some groups of people more than others. In the Australian labour market, women were particularly impacted by the COVID-19 pandemic because they were over-represented in sectors like retail and hospitality which were among the most affected by lockdowns (ABS, 2021). They also faced increased work at home with greater time spent caring for children and family members as well as increased household labour (Craig & Churchill, 2021a, 2021b, 2021c). There is no Australian research on the impact of the pandemic on the platform economy yet, but the growing international evidence suggests a

¹The term ‘gender pay gap’ is used here in line with current research on the topic, but it should be acknowledged that research on the gender pay gap usually refers to the sex pay gap because the data uses binary measures of gender. This research included a more inclusive measurement of gender in the survey, but all respondents identified as male or female.

²This figure is based on full-time adult average weekly ordinary time earnings from the Australian Bureau of Statistics. The figure is derived from calculating the difference between average men's weekly ordinary time earnings and women's weekly ordinary time earnings divided by men's weekly ordinary time earnings (ABS, 2023).

similar unevenness in the way the COVID-19 pandemic affected the platform economy. Delivery riders and drivers on platforms like UberEATS seemed to have benefited (Raj et al., 2020) because of increased demand while remote work platforms (i.e., microwork and some marketplace platforms) experienced short-term decreases in available work (Stephany et al., 2020). There is some evidence to suggest that job losses in the wider economy prompted many to enter the platform economy—some for the very first time to supplement incomes (Lew et al., 2021; Muszyński et al., 2022; Polkowska, 2021; Ravenelle et al., 2021).

In light of this, there is reason to expect that the impact of the COVID-19 pandemic on the platform economy was also gendered. Like the traditional labour market, the platform economy is a site of gender inequality and is very gender-segregated (Churchill & Craig, 2019; Gerber, 2022; James, 2022; Milkman et al., 2021; Warren, 2021). Women tend to make up the majority of workers on marketplace and microtask platforms where the types of work they do are largely carried out online and are highly flexible. In contrast, men make up the majority of workers on delivery and driving platforms (Churchill & Craig, 2019). Given that gender occupational segregation contributes significantly to the gender pay gap in the traditional labour market, this research sought to understand how the gender pay gap differed across platform types and how this changed during the early days of the COVID-19 pandemic in 2020. As much of the previous research on the pay gap has been single case studies focussed on one platform, the role of platform gender segregation has not been sufficiently studied.

This article addresses this gap using unique Australian data from an online survey of platform workers ($n = 947$) in early 2020. First, the article examines the gender pay gap across four platform types—(1) care, (2) delivery and driving, (3) microwork, and (4) marketplace—before and during the COVID-19 pandemic. It then uses OLS regression modelling techniques to examine the mechanisms behind the gender pay gap—parenthood, human capital, and platform gender segregation to measure the overall gap across the platform economy before and during the pandemic. The findings show that platform gender segregation contributes significantly to the gender pay gap across platforms: women have lower median hourly earnings across male-dominated and most female-dominated platforms. There is also some evidence that human capital differences between men and women contribute to the gender pay gap on platforms. Parenthood does explain some of the gender gap, but this is moderated by human capital factors and platform type. Ultimately, the research finds that the gender gap across the platform economy increased by six percentage points, suggesting women workers in the platform economy were not immune to the impact of the pandemic.

The article is organised as follows: a brief discussion of the gender pay gap in Australia followed by a discussion of international evidence on the gender pay gap across platforms. This is followed by a theoretical discussion of the drivers of the pay gap and how they may be understood and applied to the platform economy and then a discussion of the COVID-19 pandemic and its impact on the platform economy. The research directions and hypotheses are outlined followed by a discussion of data, analytic approach, and findings. The article concludes with a discussion of the findings and future research directions.

BACKGROUND

As Table 1 illustrates, researchers have found that the gender gap in earnings ranges between 7% and 38% across digital platforms. Most of the research has focussed on microtask or crowdwork platforms like Amazon MTurk where workers undertake a variety of short

TABLE 1 Gender pay gap across platforms, review of literature.

Author (year study was published)	Platform	Gender gap
Liang et al. (2018)	Freelancer	20%
Adams (2020)	MTurk	20%
Cook et al. (2018)	Uber	7%
Litman et al. (2020)	MTurk	10.5%
Foong et al. (2018)	UpWork	23.2%
Adams and Berg (2017)	Crowdwork	18%
Barzilay and Ben-David (2016)	Crowdwork	38%

data-related tasks remotely (e.g., identifying and categorising images). Some of this research has varied in terms of its findings. For example, in terms of weekly earnings on the Amazon MTurk platform, Adams-Prassl and Berg (2017) found a gap of around 23% between men and women while Litman et al. (2020) found a smaller gap of 10.5% although this figure is likely an underestimation of the true gender gap because Litman and colleagues (2020) were unable to directly measure the speed of task completion which can affect earnings. Follow-up work by Adams (2020) found a 20% gap between men and women in terms of hourly earnings despite no gender differences in task selection or type of task, accumulated experience, and piece rates.

The gender gap in platform earnings is not restricted to microwork platforms. For example, on UpWork, a marketplace platform offering a range of tasks from copy editing to more technical and creative work like graphic design, the gender pay gap in hourly earnings is around 23% (Foong et al., 2018). On a similar platform, Freelancer, research showed that the gender gap is about 20% (Liang et al., 2018). On Uber, men are estimated to earn about 7% more per hour (Cook et al., 2018). Barzilay and Ben-David (2016) undertook an analysis of an unnamed global online platform that facilitated crowdwork, finding that women's hourly rate was 38% lower than men's across that platform, noting that there were significant differences across tasks. The gap was widest amongst 'legal' tasks where women earned 63% less and smallest in 'design' where women earned 5% less than men.

THEORISING THE GENDER WAY GAP ACROSS THE PLATFORM ECONOMY

In explaining the gender pay gap in the traditional labour market, economists and sociologists have attributed the causes to several factors: differences in levels of human capital investment—educational attainment, experience and tenure in the labour market and skill level between men and women; occupational segregation; and workplace discrimination. Most of the research on the gender gap across platform work has tended to focus on human capital differences and parenthood as key explanatory factors. In this section, common explanations of the gender pay gap in the traditional labour market are integrated with previous research relating to the platform economy.

In the traditional labour market, differences in human capital—levels of educational attainment, qualifications, and labour market experience—are often cited as critical determinants of the gender pay gap because historically men have held higher levels of

qualifications and had more work experience which resulted in higher pay (Goldin, 2022). The gender pay gap persists because workplaces are gendered sites of inequality rife with discrimination that results in lower pay for women. Even when women and men have comparable qualifications, skills, and experience men still earn more (Blau & Kahn, 2000). However, the evidence about human capital differences driving the gender pay gap in the platform economy is mixed. While Adams-Prassl and Berg (2017) found that human capital differences, such as education and experience, accounted for almost two-thirds of the gender pay gap on crowdwork platforms, Litman and colleagues (2020) found that experience did not explain much of the gap. Moreover, Litman and colleagues (2020) found that even though men were more experienced than women, two-thirds of the total work carried out on Amazon MTurk was done by those with little experience (Litman et al., 2020). They also found that women do not choose specific tasks according to the nature of the work or duration and they did not also find any evidence of schedule-related explanations. On other platforms like Uber, however, experience does play a part in explaining the gender gap in earnings (Cook et al., 2018).

Human capital theory has been relied upon to argue that because of the gendered division of labour within the family where women have historically undertaken (and continue to do) the majority of unpaid labour in childcare and housework they have less opportunity to accumulate experience in the labour market. Moreover, human capital theory argues that women expect to move in and out of the labour force over time because of their caring roles and as a result have a lower incentive to invest in further education and training. From this perspective, women's increased time spent on reproductive labour like care and housework may also reduce their hours and effort into paid labour which may result in reduced productivity and wages (Becker, 1985). Platform researchers have also considered the effects of being a parent on earnings and the evidence is mixed. Adams-Prassl and Berg (2017) and Litman et al. (2020) found that women's earnings on Amazon MTurk were lower regardless of whether they were a parent. However, Adams' (2020) follow-up found evidence of a gender wage gap amongst mothers on Amazon MTurk, noting that mothers reported that their domestic responsibilities affected their ability to complete tasks successfully and without interruption.

The focus on single or specific platforms as case studies in much of the research on the gender pay gap across platforms has meant that researchers have not considered how occupational segregation plays a part in the gap in earnings. In the traditional labour market, increases in both women's educational attainment and workforce participation (ABS, 2018) over recent decades has meant that education, experience, and skills are less salient factors in driving differences between men and women in earnings because there are fewer differences between them across these characteristics (England, 2005). Thus, the gender gap in earnings persists because the gap expands with age and differs across occupations (Blau & Kahn, 2000; Charles & Grusky, 2004). Research has found that the higher the proportion of women who work in an occupation the lower the average pay within it (Blau & Kahn, 2003; Levanon et al., 2009) and men in women-dominated occupations earn more, which contributes to the gender pay gap (Budig, 2002). While economists contend that this is because women *prefer* or *choose* to enter these lower-paying occupations or because they are more 'mother-friendly' jobs (England, 2005, p. 227), sociologists, on the other hand, contend that these occupations are lower-paying because they are not as valued as highly as those dominated by men and consequently pay less (England, 2005; Levanon et al., 2009). This is what is known as the 'devaluation thesis' which argues that society devalues women and sees them as lesser when compared to men, and by extension, any activity done largely by women is valued as lesser

(England et al., 2002). These outdated notions are perpetuated by decision-makers like managers and supervisors and become institutionalised within the wider organisation (i.e., pay scales) (England, 2005). An example of this is care work, which pays less than other similar work requiring the same skills and experience.

Much like the traditional labour market, the platform workforce in Australia is heavily gendered. Women are more likely to secure work from care, marketplace, and microwork platforms whereas men are more likely to secure work from delivery and driving platforms (Churchill & Craig, 2019).³ How this type of gender segregation shapes the gender pay gap in the Australian platform economy is of interest to this research.

THE IMPACT OF THE COVID-19 PANDEMIC ON PLATFORMS

Like the traditional labour market, there is some growing evidence to suggest that the impact of the COVID-19 pandemic on the platform economy was very uneven. Some platforms saw both increased demand for services and a resultant supply of workers and a decrease in others. For example, research suggests that the pandemic had a negative impact on transportation platforms like Uber and Lyft (Batool et al., 2021) which is probably due to dampened demand for passenger services as a result of lockdowns and shelter-in-place orders that significantly restricted movement. In contrast, other research suggests that platform delivery drivers and riders benefited. For example, in the United States, orders on UberEATS increased during the pandemic among small restaurants (Raj et al., 2020). Moreover, many saw delivery driving and riding as an attractive alternative or solution to pandemic job loss—both in the United States and Europe (Lew et al., 2021; Ravenelle et al., 2021) and Europe (Muszyński et al., 2022; Polkowska, 2021).

There is less evidence about what happened across other platform types, but during the beginning of the pandemic in March 2020, there was a significant decline in demand for online labour (e.g., work secured from microtask and marketplace platforms) relative to the same period in both 2019 and 2018 but this decline reversed sharply from mid-April 2020 onwards. The decline was sharpest amongst platform work that specialised in creative, multimedia, sales, and marketing work (Stephany et al., 2020). Longitudinal research from Reynolds and Kincaid (2023) that a third of Amazon MTurk workers increased their hours during the pandemic in response to decreases in household income and work time.

RESEARCH DIRECTIONS AND HYPOTHESES

In Australia, the impact of COVID-19 on the traditional labour market was heavily gendered. The industries most affected by lockdowns were largely female-dominated, such as education and training, and accommodation and food services (ABS, 2021). Young women were also more likely to be un- and under-employed relative to their male counterparts as well as older men

³This is in contrast to Milkman et al.'s (2021) work which categorised delivery work as female-dominated work in the platform economy. However, Milkman and colleagues' definition is very encompassing as it includes grocery shopping or work that might be conceptualised as care work in this research.

and women (Churchill, 2021). Furthermore, women were more likely to be casual employees than men (Parliamentary Library, 2020) which limited their access to more generous government income support. The impact of COVID-19 on women was further felt in the private sphere as women's time spent caring for others—children, and other family members—as well as time spent on housework significantly increased during lockdowns (Craig & Churchill, 2021a, 2021b, 2021c).

How platform work was organised and distributed across gender during the COVID-19 pandemic has largely been absent from the current research on the platform economy during the pandemic. The current evidence base is small, which is surprising given that there has been significant attention paid to the gendered nature of the pandemic in the traditional labour market. Dunn et al. (2021) found significant gender differences in their small panel study of online freelancers, noting that women were more likely to report increased variability in earnings and decreased hours during the pandemic. Reynolds and Kincaid (2023) found that work-life-family conflict during the pandemic led to decreased work hours and pay but they do not unpack these findings by gender.

Expectations and hypotheses

Taking these theoretical explanations of the pay gap presented earlier alongside the context of COVID-19's impact on the labour market and households, several hypotheses about how the gender pay gap may have changed during the early days of the pandemic can be made.

Hypothesis 1 (H1). The gender gap will have narrowed during the pandemic on care, marketplace and microtask platforms.

The gender gap is expected to have narrowed during the early days of the COVID-19 pandemic across care, marketplace and microtask platforms because women make up the majority of the workforces on these platform types (Churchill & Craig, 2019) and it is expected during the early days of the pandemic women will have been less available to work on these platforms because of the increased care and household labour during the early days of the pandemic (Craig & Churchill, 2021a, 2021b, 2021c). This is consistent with international research from Dunn et al. (2021) who found women online freelancers were more likely to report increased variability in earnings and decreased hours during the pandemic.

Hypothesis 2 (H2). The gender pay gap will have widened on delivery and driving platforms.

The gender pay gap in earnings across delivery and driving platforms is expected to have increased during the early days of the pandemic because men make up the majority of delivery and driving platform workers in Australia (Churchill & Craig, 2019) and will have likely benefited from the increased demand for services provided by delivery and driving platforms, such as food delivery, during lockdowns. This is in line with international evidence which found an increase in demand for food delivery platform work during the pandemic (Raj et al., 2020).

Hypothesis 3 (H3). Parenthood will explain some of the gender gaps before the pandemic but will explain a greater proportion of the gender pay during the pandemic.

Parenthood is expected to explain some of the gender gap in earnings across all platforms as some previous research has found (Adams, 2020), but it is expected that parenthood will be a more salient factor during the early days of the COVID-19 pandemic (2020) because parents, in particular mothers, experienced significant increases in time spent caregiving and domestic labour during lockdowns (Craig & Churchill, 2021a, 2021b, 2021c), which may have impacted their ability to undertake paid work in the platform economy. There is some international evidence that Reynolds and Kincaid (2023) found that parents experienced decreases in work hours and pay. Dunn et al. (2021) found significant gender differences in their small panel study of online freelancers noting that women were more likely to report increased variability in earnings and decreased hours during the pandemic.

Hypothesis 4 (H4). Men's and women's differences in education and tenure will explain some of the gender gap in earnings across all platforms before and during the pandemic.

While previous research has found that differences in human capital—levels of educational attainment and platform tenure/experience—are factors in explaining the gender pay gap across some platforms (Adams-Prassl & Berg, 2017; Cook et al., 2018) but not all. It is expected that for the pay gap across the platform economy as a whole, levels of educational attainment and experience working on the platform will be a factor in explaining the gender pay gap. It is not expected that there will be any differences in the effect of these differences before or during the COVID-19 pandemic.

Hypothesis 5 (H5). Platform type will explain some of the gender gap in earnings both before the pandemic, but will explain more of the gender gap during the pandemic.

Digital platforms are gender segregated. Men are more likely to work on delivery and driving platforms and women are more likely to work on microwork and marketplace platforms (Churchill & Craig, 2019). Previous research has found evidence of gender pay gaps on platform types like delivery and driving (Cook et al., 2018; Liang et al., 2018) as well as microwork platforms (Adams, 2020). It is expected that these differences will have an impact on the overall gender gap across earnings. This will be especially the case during the COVID-19 pandemic where the increased demand for some services like food delivery (Raj et al., 2020) and temporary declines in microwork (Stephany et al., 2020) will make these differences more significant.

DATA AND APPROACH

Data

The data used in this research comes from the second wave of *Making it Work in the Gig Economy*, an Australian survey of platform workers. The survey was administered in May 2020 during the first lockdown in Australia using a third-party survey research company Qualtrics which relied on a pre-existing data panel of Australians to ask them about their work in the platform economy. There is no data on the platform economy much less the gender pay gap

across platforms in the national statistics and other major surveys like the Household, Income, Labour, and Dynamics in Australia (HILDA) have only recently started capturing platform workers, but these samples are relatively small (i.e., less than 100 respondents). Thus, to capture these dynamics, nonprobability samples and alternative surveys are required. Participants were paid a small fee by Qualtrics for their participation. Participation in the survey was voluntary and the sample was self-selecting. The survey identified platform workers if they answered ‘yes’ to the question, ‘Do you conduct work through a digital platform? (e.g., Airtasker, Uber, Gumtree, Deliveroo, Freelancer, Fiverr, etc.)’. Participants were given a list of digital platforms to choose from as well as the opportunity to record any that were not listed under ‘other’ to identify the types of platforms they secured work from (see Notes in Table 2).

TABLE 2 Descriptive statistics (means, proportions).

	Men	Women
Hours worked per week before pandemic	46.38 (3.6)	25.86 (2.87)
Hours worked per week during pandemic	49.21 (3.5)	39.12 (2.9)
Tenure		
Less than 6 months	14.76	20.75
6–12 months	21.40	29.56
Between 1 and 2 years	27.68	21.70
More than 2 years	36.16	27.99
Multiplatform worker	49.64	48.24
Platforms		
Care	21.16	18.64
Micro	21.50	15.82
Marketplace	49.15	46.05
Delivery and driving	40.61	31.64
Age	33.5 (0.7)	30.8 (0.5)
Country of birth (born of overseas)		
Australian-born	77.47	76.55
Born-overseas	22.53	23.45
Highest level of educational attainment		
Holds a degree qualification	51.88	52.82
Does not hold a degree qualification	48.12	47.18
Currently studying	43.69	47.46
Self-rated health	2.09 (0.05)	2.29 (0.5)
Parenthood status	52.56	51.00

Abbreviations: Care platforms: Care Support, [Care.com](https://www.care.com), Careseekers, ChoiceOne, First2Care, HireUp, HomeCareHeroes, Mabel, Newly, LASHD. Delivery: Deliveroo, EASI, Menulog, UberEATS, Zoom2U. Driving: Blacklane, CoSeats, Didi, GoCab, Ola, Talixo, Taixfy, Topfal, Uber. Microwork platforms: Amazon M Turk, Clickworker, Microworker. Marketplace: Airtasker, DesignCrowd, Fiverr, Freelancer, Gumtree, UpWork, WeGoLook.

The final sample comprised 947 individuals, including 443 men and 504 women, and the sample characteristics are described in Table 2.

Approach

To examine the gender gap in platform earnings before and during the pandemic, this research undertook: (1) descriptive analysis of the median hourly earnings before and during the pandemic across the four platform types—care, delivery and driving, marketplace, and microwork and (2) OLS regression of earnings before and during the pandemic. Descriptive analysis was undertaken to show both the differences between and changes within men's and women's hourly earnings before and during the pandemic across the four platform types. OLS regressions of logged weekly earnings were then undertaken to estimate the overall gender pay gap net of sociodemographic differences between men and women. The regression coefficients from the OLS model were exponentiated to facilitate interpretation. All analyses were undertaken in Stata 17 SE.

Dependent variable

The dependent variable was hourly earnings across all platforms worked, which was derived from questions about reported weekly earnings across all platforms divided by weekly hours across platforms. The survey asked respondents to report their average weekly hours and earnings for platforms in a typical week before the onset of the COVID-19 pandemic (pre-March 2020) and during the COVID-19 pandemic (May 2020). The median hourly earnings were used for the descriptive analyses and a natural logarithm of hourly earnings was used in the regression analyses to address the skewness of earnings and to assist with interpreting the coefficients.

Independent variables and controls for regression models

Several independent variables were included in the analysis. *Gender* was included as a binary, measuring men (0) and women (1). There were no other genders reported in the sample despite survey options to select other genders. *Average hours worked on platforms per week* were measured both before and during the pandemic. *Tenure* captured how long respondents had been securing work from platforms: less than 6 months (0); 6 to 12 months (1); Between 1 and 2 years; (3) More than 2 years; *Multi-platform workers* captured respondents who secured work from more than one platform at the same time. *Platform type* was measured by a series of binary variables capturing respondents who worked on care platforms,⁴ marketplace platforms, driving platforms, microwork platforms and delivery platforms (see Table 2 notes for how these were grouped). Sociodemographic controls were included. *Age* and *Age squared* were included

⁴Care platforms offer a wide array of care support services, including personal care support like: assistance with personal hygiene, personal handling and medications as well as social support like companionship, assistance with household chores and maintenance, and transport.

as continuous variables. *Country of birth* was a binary variable capturing those born in Australia (0) and those born overseas (1). *Highest level of education* was captured using a binary variable where (0) indicated the respondent did not hold a tertiary-level qualification (e.g., Bachelor's level qualification) and (1) indicated the respondent held a Bachelor's level qualification or higher (Masters, PhD). *Health status* was a continuous variable capturing respondents' self-assessed health status on a range where (1) indicated 'poor' health and (5) indicated 'excellent' health. *Parenthood status* was a binary measure capturing whether respondents were parents of a child under the age of 17 (1) or not (0).

RESULTS

Median hourly earnings across platforms before and during COVID-19

In Table 3, the median hourly earnings for men and women across platform types are presented. Before the COVID-19 pandemic, the median hourly earnings for men across care, marketplace and delivery and driving platforms were all higher than women. Across these platforms, the gender gap in hourly earnings ranged from 17.9% to 18.9%, which was wider than the gender pay gap in the traditional labour market at the time (Workplace Gender Equality Agency [WEGA], 2023). The only platforms in which women outperformed men in terms of median hourly earnings before the pandemic were microtask platforms where women earned almost 17% more than men per hour. Turning to median hourly earnings during COVID-19, there was a similar pattern to pre-COVID-19 earnings. Men continued to earn more than women across care, marketplace, delivery and driving platforms during the COVID-19 pandemic, but there were changes in the gender gap across these platforms. In line with Hypothesis 1, the gap in hourly earnings between men and women on care platforms was significantly reduced from 18.6% before COVID-19 to 5.9% during the pandemic. This is because men's hourly earnings decreased while women's hourly earnings went up during the pandemic relative to earnings before the pandemic. Contra to Hypothesis 1, the gap between men and women in median hourly earnings on marketplace platforms went from 17.9% before the pandemic to 33.7%. This significant increase was largely attributable to women's median earnings decreasing from \$43.86 per hour before the pandemic to \$38.70 per hour. Men's median hourly earnings decreased by less than a dollar throughout the early days of the

TABLE 3 Men's and women's median hourly earnings (\$) and gender gap (%) across platform type before and during COVID-19.

Platform type	Before COVID-19			During COVID-19		
	Men	Women	Gap (%)	Men	Women	Gap (%)
Care	51.95	43.80	-18.60	48.32	45.62	-5.90
Marketplace	51.70	43.86	-17.90	50.49	37.76	-33.7
Microtasks	41.30	49.65	16.80	43.34	38.70	-12.0
Delivery and driving	69.04	58.09	-18.90	78.43	52.72	-48.76

Note: Author calculations.

Source: Making it Work in the Gig Economy (2020).

pandemic. In line with Hypothesis 1, the gender gap on microwork platforms during the pandemic was 12% whereas before the pandemic women were earning almost 17% more per hour than men. This is because women's median hourly earnings decreased by over \$10.00 per hour during the pandemic and men's hourly earnings increased by two dollars an hour. On driving and delivery platforms, the gender pay gap was almost 30% during the pandemic up from around 19%. This is in line with Hypothesis 2. This is because men's median hourly earnings stayed mostly the same during the pandemic at around \$69 per hour whereas women's earnings decreased by almost six dollars an hour.

OLS estimates of logged hourly earnings

Having found differences between men and women in terms of earnings before and during COVID-19, OLS regression modelling techniques were applied to the data to estimate the gender gap in logged hourly earnings. In Table 4, the estimates from the OLS regressions of logged weekly earnings across all platforms before and during the COVID-19 pandemic are presented. The key independent variable was gender and the gender coefficient in each model indicates how much more or less women earn than men. To aid the interpretation of the results, the gender coefficient was transformed into a percentage figure by exponentiating the coefficient and subtracting it by 1. To test the hypotheses presented earlier, a series of models were estimated, beginning with just the gender coefficient in Models 1A and 1B. In Models 2A and 2B, gender and a variable indicating whether the respondent was a parent of a child or children under the age of 17 were included to test the association between parenthood and earnings before and during COVID-19. In Models 3A and 3B, variables measuring human capital were included like highest level of educational qualifications, average weekly hours worked in the platform economy, and tenure in the platform economy. In the final models, Models 4A and 4B, platform type was included and in Models 5A and 5B, sociodemographic controls were included.

In Models 1A and 1B, the estimates for logged earnings before and during the COVID-19 pandemic are reported with gender as the sole predictor. Gender was significant in both models ($\rho < 0.001$). Before COVID-19, women on platforms earned 35% ($-0.35 = \text{EXP}(-0.43) - 1$) less than men and during the pandemic, this increased by six percentage points to 41% ($-0.41 = \text{EXP}(-0.47) - 1$) during the COVID-19 not accounting for human capital, platform type or socio-demographic differences.

In Models 2A and 2B, parenthood status was entered into the model. Being a parent was associated with higher earnings before ($\beta = 0.48$, $\rho < 0.001$) and during ($\beta = 0.53$, $\rho < 0.001$) the pandemic. This is an interesting finding and counter to some previous research which has found that being a parent or experiencing work-family conflict is associated with lower earnings on microwork platforms like Amazon MTurk (Adams, 2020; Reynolds & Kincaid, 2023). Gender and parenthood explained only 5% of the variance in logged average weekly earnings both before and during the pandemic. The gender coefficient in Model 2A indicates that women earned 30% ($-0.30 = \text{EXP}(-0.37) - 1$) less than men before the pandemic and 32% less during ($-0.32 = \text{EXP}(-0.40) - 1$) after accounting for parenthood status. The inclusion of parenthood in the models decreased the magnitude of the gender coefficient by 16% between Models 1A and 2A and 32% between Models 1B and 2B after accounting for parenthood, suggesting being a parent does explain some of the gender pay gaps both before and especially during the pandemic. This indicates support for Hypothesis 3.

TABLE 4 OLS regression estimates for gender pay gap across platforms before and during the COVID-19 pandemic (Models 1A to 5B).

	Model 1 A		Model 1 B		Model 2 A		Model 2 B		Model 3 A		Model 3 B		Model 4 A		Model 4 B		Model 5 A		Model 5 B	
	Before	During	Before	During	Before	During	Before	During	Before	During	Before	During	Before	During	Before	During	Before	During	Before	During
	β	Sig.	β	Sig.	β	Sig.	β	Sig.	β	Sig.	β	Sig.	β	Sig.	β	Sig.	β	Sig.	β	Sig.
Intercept	6.85	***	6.80	***	6.59	****	6.53	***	6.15	***	5.93	***	6.15	**	5.82	***	6.39	***	6.00	***
Gender																				
Men																				
Women	-0.43	***	-0.53	***	-0.37	***	-0.43	***	-0.27	**	-0.33	***	-0.23	***	-0.27	***	-0.21	***	-0.26	***
Parenthood status																				
Does not have children																				
Has children					0.49	***	0.53	***	0.21	**	0.25	***	0.09		0.12		0.04		0.10	
Education																				
Less than degree																				
Degree or higher									-0.12		-0.16	*	-0.11		-0.20	**	-0.08		-0.14	
Hours per week									0.01	***	0.01	***	0.01	***	0.01	***	0.01	***	0.01	***
Tenure																				
2 or more years																				
Between 1 to 2 years									0.19		0.22	**	0.07		0.10		0.10		0.12	

(Continues)

TABLE 4 (Continued)

	Model 1A	Model 1B	Model 2A	Model 2B	Model 3A	Model 3B	Model 4A	Model 4B	Model 5A	Model 5B
	Before	During	Before	During	Before	During	Before	During	Before	During
	β	β	β	β	β	β	β	β	β	β
	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
Born in										
Australia										
Born overseas									0.01	-0.26 **
Indigenous status										
Not indigenous										
Identifies as Indigenous									0.24	0.05
Studying status										
Is not a current student										
Is currently studying									-0.05	0.01
Self rated health									-0.12 **	-0.08 ***
R^2	0.02	0.02	0.16	0.15	0.40	0.41	0.49	0.50	0.51	0.54
N	947	947	947	947	947	947	947	947	947	947

Note: ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Source: Making it Work in the Gig Economy (2020).

In Models 3A and 3B, highest level of education attained, average hours worked per week across all platforms and tenure in the platform economy were entered into the model to test the association between human capital and logged average weekly earnings and whether this moderated the association between gender and logged average weekly earnings before and during the pandemic. Holding a degree-level qualification was significant only during COVID-19 and was associated with lower earnings on average per week. Expectedly, increases in weekly average hours were associated with increases in average weekly earnings before and during the pandemic ($\rho < 0.001$). In terms of tenure, before the pandemic, those with little work experience in the platform economy (less than 6 months) were associated with lower earnings ($\beta = -0.28, \rho < 0.05$) and this result held during the pandemic as well ($\beta = -0.29, \rho < 0.05$). Those who had been in the platform economy for somewhere between 1 and 2 years were associated with greater average weekly earnings during the pandemic ($\beta = 0.22, \rho < 0.05$). The inclusion of these variables increased the explanatory power of the models with 40% of the variance in earnings explained by gender, parenthood, and human capital factors. In line with Hypothesis 4, the results suggest that some human capital factors, particularly working hours and tenure explained some of the differences in earnings. There was also a reduction in the magnitude of the gender coefficient by 15 per cent between Models 2A and 3A and 11% between Models 3A and 3B after accounting for human capital differences and parenthood. Women earned 23% ($-0.23 = \text{EXP}(-0.27) - 1$) less than men on platforms before and 28% ($-0.28 = \text{EXP}(-0.33) - 1$) during the pandemic.

In Models 4A and 4B, a series of binary variables capturing the platform types (i.e., care, driving and delivery platforms) respondents secured work from was also included to account for differences across platforms. Respondents who used care platforms ($\beta = 0.56, \rho < 0.001$) and delivery and driving platforms ($\beta = 0.48, \rho < 0.001$) were associated with higher average weekly earnings than those who did not use these platforms during the pandemic. Care ($\beta = 0.35, \rho < 0.001$) and delivery and driving ($\beta = 0.53, \rho < 0.001$) were also associated with higher average earnings during the pandemic but the magnitude of the coefficients suggests that respondents who used delivery and driving platforms during the pandemic were associated with higher earnings than on care platforms, which is the opposite of the pre-pandemic results in Model 4A, reflecting perhaps the increased demand for these services during the pandemic. With the inclusion of platform types in both models, parenthood status was no longer significant, indicating that any differences associated between parenthood and earnings were explained by platform type contra to the expectations of Hypothesis 3 that parenthood would explain some of the gender gap in earnings. After accounting for parenthood status, human capital and platform type differences, women earned 20% ($-0.20 = \text{EXP}(-0.23) - 1$) less before the pandemic and 24% ($-0.24 = \text{EXP}(-0.27) - 1$) during the pandemic, which supports Hypothesis 5.

In Model 4A and 4B, sociodemographic controls (e.g., age, education, health, etc.) were included. After controlling for sociodemographic differences, women before the pandemic earned 18% less ($-0.18 = \text{EXP}(-0.21) - 1$) than men and during the pandemic the gap increased by five percentage points to 23% ($-0.23 = \text{EXP}(-0.26) - 1$). In sum, these results suggest that the gender gap in weekly earnings from digital platforms increased by five percentage points during the pandemic.

DISCUSSION

Drawing on novel data from an Australian survey of men and women who secure work from digital platforms during the beginning of the COVID-19 pandemic in 2020, this research sought to understand the mechanisms driving differences in gendered earnings across platforms and

the gender gap overall in the platform economy before and during the COVID-19 pandemic. The impact of COVID-19 was uneven on the platform economy impacting some types of platforms more than others, resulting in a widening of the gender pay gap. To date, the evidence base about the gender gap in platform labour earnings has been limited to single platform case studies. This approach however limits our understanding of how different platforms may create or exacerbate gender inequalities, including the gender pay gap. Many workers need to source work from more than one platform (McDonald et al., 2019). To address this, the research looked beyond singular platforms and instead focussed on platform types—care, delivery and driving, marketplace and microtask platforms—to see the extent of the gender pay gap and the impact of COVID-19 on the gap.

The results suggest that platform gender segregation played a role in determining the gender pay gap in the platform economy both before and during the pandemic. Platform gender segregation is like occupational gender segregation in the traditional labour market in that there is a tendency for men and women to work on different platform types, which contributes to the gender pay gap because male-dominated platforms tend to pay better than female-dominated platforms just like male-dominated occupations pay better than female-dominated occupations in the traditional labour market. In the Australian platform economy, care and delivery and driving platforms are male-dominated and marketplace and microwork platforms are female-dominated (Churchill & Craig, 2019). Before the pandemic, women mostly earned less on both male- and female-dominated platforms (although not microwork platforms). Moreover, men's earnings on care platforms were considerably lower than their earnings on delivery and driving platforms, although the type of work they do on both platforms is largely similar. This is consistent with the devaluation of care work thesis in the traditional labour market (England et al., 2002). However, men's earnings on care platforms were more similar to their marketplace earnings which often involve maintenance work or repairs which may also be done as part of their work on care platforms. This type of segregation across platforms contributed to a widening of the gender pay gap across most platforms because the COVID-19 pandemic impacted platform work differently and these differences were gendered. The international evidence suggests that female-dominated microtask and marketplace platforms which specialise in on-demand/online labour experienced short-term decreases in the supply of work and male-dominated platforms work like delivery and driving was mixed—decreases in driving but increases in delivery.

In Australia, this research found that the gender pay gap increased across most platform types, including male-dominated platforms like delivery and driving and female-dominated platforms like marketplace and microwork platforms. This is because men's hourly earnings increased on delivery and driving as well as microtask platforms. In the case of marketplace platforms, hourly earnings stayed relatively the same whereas women's hourly earnings across delivery and driving, marketplace and microtask platforms all decreased relative to their pre-pandemic hourly earnings. In some ways, women went backwards during the early part of the pandemic on digital platforms. Before the pandemic, women earned 17% more than men on female-dominated microwork platforms, however, during the pandemic they ended up earning 12% less an hour than men. The gender gap did close substantially on care platforms during the pandemic because men's hourly earnings decreased during the pandemic while women's stayed roughly the same.

In the case of delivery and driving platforms, it is likely men were able to take advantage of the increased demand for delivery services during the early days of the pandemic. However, the results also suggest that men gained an advantage on microtask platforms during the pandemic

and maintained their hourly earnings on marketplace platforms—both female-dominated platforms. This is similar to how men tend to get better paid than women in female-dominated occupations in the traditional labour market (Budig, 2002). This kind of phenomenon has previously been explained by the idea of the ‘glass escalator’ whereby men enjoy ‘hidden’ advantages (i.e., seen as more competent or being a better leader) because of masculine privilege when they work in female-dominated professions (Williams, 2013) and thus ride an escalator to higher wages (Budig, 2002). However, there is no glass escalator in the platform economy because most of the work in the platform economy is controlled by the platform and/or algorithms. There are some other possible explanations. The types of work men undertake on marketplace platforms usually involve physical labour (e.g., house maintenance and repairs, gardening, moving) (Churchill & Craig, 2019) and even though there were restrictions in place this work may have continued, operating as a kind of informal market. Similarly, in the case of care platforms, men usually undertake more ancillary tasks like transport and maintenance (Churchill & Craig, 2019) but may have been prevented from doing so because of particular restrictions around vulnerable populations who use care platforms during lockdowns. A loss of income in the traditional labour market may have motivated them to join microwork platforms that involve low-skilled work, which is easy to access. In the case of women, the decreases in hourly earnings on marketplace and microtask platforms, which are female-dominated, may reflect the temporary decreases in the demand for this work in the early months of the pandemic (Stephany et al., 2020). Caring responsibilities may have also played a factor, which increased during the pandemic (Craig & Churchill, 2021a, 2021b, 2021c). This would have severely lessened women’s ability to undertake work delivery and driving on platforms. Similarly, caring responsibilities while working on microwork and marketplace platforms may have impacted the number of tasks or speed of tasks women undertake. Adams (2020) previously found that task speed and interruptions impacted mothers’ earnings on Amazon MTurk. Returning to Williams’ (2013) metaphor, these findings overall suggest that the escalator slowed down for women platform workers during the pandemic.

In terms of the overall gender pay gap in the Australian platform economy, the gender pay gap increased by six percentage points during the beginning of the COVID-19 pandemic. Before the pandemic, the gap was estimated to be 21% and rose to 26% during the early months of 2020. These figures account for differences in human capital—education, average hours worked and tenure; parenthood status; platform type; and sociodemographic differences and are slightly larger than previous research which has found a gap in earnings between 18% and 23% on platforms. They are also significantly larger than the gender gap observed in the traditional labour market (Workplace Gender Equality Agency [WGEA], 2023).

This research was also able to unpack the mechanisms behind the overall gender pay gap because of its unique data set, moving beyond single case studies. Platform gender segregation was also a salient factor in explaining the gender gap across all platforms. While some human capital factors, that is, average hours worked and tenure in the platform economy were associated with earnings before and during the pandemic, the effect of human capital factors on the gender gap before and during the pandemic was moderated by platform type, suggesting some of the human capital explanations were explained by platform type. In the case of parenthood, it was rendered nonsignificant by the inclusion of platform type. This result during the pandemic is especially interesting given increased care and domestic labour demands. Overall, this suggests that the effect of parenthood on earnings before and during the pandemic was explained by the different platform types of parents work on. Follow-up analyses not reported here but available upon request found that parents’ earnings increased on delivery and

driving platforms and marketplace platforms, which tended to benefit men during the pandemic. This finding is at odds with recent sociological advances which have questioned the orthodoxy of economists that the gender pay gap continues because women ‘choose’ or ‘prefer’ to work in ‘mother-friendly’ jobs which are more flexible but pay less (England, 2005). More research is needed to investigate this finding further but at first blush, this is consistent with some previous research in which women and men have nominated flexibility and caring responsibilities as motivation for entering the platform economy (Churchill & Craig, 2019; James, 2022; Milkman et al., 2021). Thus, these results may reflect some kind of selection bias.

Limitations and future directions

While the research takes an overview of the gender pay gap on platforms, it was unable to measure specific aspects of platform work, such as time spent completing tasks (instead the research just captures overall hours); how many tasks were completed and the number of interruptions which may impact earnings, particularly for women on microwork platforms (Adams, 2020; Adams-Prassl & Berg, 2017). It should be noted that the survey instrument only asked about being a parent of a child under the age of 17 in the household. There may be parenthood effects for children at younger, preschool-aged children but this cannot be tested because the age of the youngest child is not captured in the survey. Similarly, there was no question in the survey that measured time caring for children or other persons in the household, which may be contributing to the gender pay gap. This research also relied on retrospective earnings estimates before the pandemic which may be biased due to the respondent’s recall. The data in this sample is relatively small and participants are self-selecting, which means the data has the potential to be biased. However, data on platform workers in Australia is not currently captured in national statistics so researchers are reliant on non-probability samples such as the one used in this research. Further repeated cross-sectional or longitudinal research is needed to investigate the lives of platform workers and especially trends in the gender pay gap across platforms.

CONCLUSION

The platform economy nor the women who secure work from it were not immune from the impact of the COVID-19 pandemic. The findings from this first-of-a-kind research suggest that women in the platform economy were affected more than women in the traditional labour market: the gender pay gap across digital platforms in Australia increased by six percentage points. In seeking to explain the gender pay gap across the wider platform economy, this research argued that there exists a gender segregation across the platform economy which operates like the occupational gender segregation in the traditional labour market to drive differences between men and women in earnings across platforms. This is what might be described by Al James (2022, p. 19) as the ‘digital reinscription of stubborn “analogue” gendered labour market inequalities’. Platform gender segregation led to an increase in the gender pay gap because the increased demand for driving and delivery services advantaged men who make up the majority of platform driving and delivery workers. Thus, one way to address the growing gender pay gap across platforms would be to increase women’s participation on lucrative delivery and driving platforms like Uber. However, delivery and driving platform

work is too often an unsafe workplace for women as they face discrimination and harassment from male customers (Kwan, 2022b; Ma et al., 2022). This is compounded by platforms that ignore women's complaints and do not enforce anti-harassment policies (Kwan, 2022b; Ma et al., 2022). This too is an 'analogue' form of gender inequality transported from the traditional labour market (James, 2022, p. 19) but the digital nature of the problem on platforms renders it invisible and obfuscates responsibility.

To overcome these problems, both digital platforms and platform workers need greater regulation and workplace protections. In Australia, there has been a concerted effort recently to address the gender pay gap and sexual harassment reporting through the *Workplace Gender Equality Amendment (Closing the Gender Pay Gap) Bill (2023)*, which will require private sector employers and Commonwealth public sector organisations with 100 or more employees to disclose gender pay gaps and report on sexual harassment and harassment from early 2024 onwards. Larger organisations with 500 or more employees will be required to have policies or strategies for six areas: (1) gender composition of the workforce; (2) gender composition of workplace governance; (3) equal remuneration between women and men; (4) availability and utility of flexible work practices for caring responsibilities; (5) consultation with employees on gender equality in the workplace; and (6) sexual harassment and harassment. However, these reforms do not extend to platform workers who by and large are classified as independent contractors in Australia and not employees. Thus, ongoing efforts by platform workers and unions to push for greater working rights and protections and in some cases have them recognised as employees are beneficial to the wider project of addressing gender inequality.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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