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Working at Home and the Gender Wage Gap

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ABSTRACT

This paper examines the impact of working at home on the wages of men and women using cross-sectional and panel data from Australia. The results show that working at home helps narrow the gender wage gap. A concerning finding is that fathers who work at home earn significantly less than other men who work at home. Policy implications are discussed.

1 | Introduction

Since the COVID-19 pandemic in 2020, working at home has become increasingly popular. In Europe, for example, among employees aged 25–64 years, 24% of women and 22% of men worked some or all their usual hours at home in 2022 (up from 13% and 12%, respectively, in 2019) (see Table 1). Working at home offers numerous benefits such as reduced commute times and schedule control (Davies and Felstead 2023; Lab and Wooden 2022; Dockery and Bawa 2014). Working at home may also affect wages, potentially offering a premium if linked to higher productivity or an efficiency wage payment, or a penalty if workers trade off wages for the ability to work at home. A penalty may also occur where working at home weakens networks, entrenches gender stereotypes, leads to reduced career opportunities or where there is a discriminatory treatment effect (Lee 2023; Bertrand 2018; Weeden 2005). If working at home impacts wages differently by gender, it follows that working at home could either exacerbate or alleviate the gender wage gap (GWG).

Given the recent surge in working at home, its spread to a wider range of occupations (Davies and Felstead 2023), evidence of segregation in opportunities to work at home by occupation and industry (Minkus, Groepler, and Drobnic 2022; Bonacini, Gallo, and Scicchitano 2024; Barrero et al. 2022; Alipour, Falck, and Schüller 2023; Dingel and Neiman 2020) and evidence that some firms may be using these new forms of working arrangements to moderate wage-growth pressures (e.g., allowing employees to trade off wages to work at home) (Barrero et al. 2022), it is timely and important that contemporary insights are provided on the link between working at home and wages, as well as its effect on the GWG (OECD 2023).

Empirical evidence on the effect of working at home on wages is mixed and much of it is based on pre-pandemic data (OECD 2023). Some observe a positive association between working at home and wages (e.g., Pabilonia and Vernon 2023; Gariety and Shaffer 2007; Weeden 2005) and lower GWGs (Arntz, Ben Yahmed, and Berlingieri 2022). Others report wage penalties (Pabilonia and Vernon 2022).

As noted, opportunities to work at home are not equally distributed. They are also gendered (Minkus, Groepler, and Drobnic 2022). In Italy, for example, women are shown to be disproportionately concentrated in jobs that either do not lend themselves to working at home or are in jobs that have very high working-at-home prospects (Bonacini, Gallo, and Scicchitano 2024). Bonacini, Gallo, and Scicchitano (2024) also show that the GWG is higher in occupations where the feasibility of working at home is high. Indeed, their counterfactual analysis of the GWG using the Blinder–Oaxaca decomposition technique (Blinder 1973; Oaxaca 1973) leads them to conclude that work-at-home feasibility has the potential to exacerbate the GWG in the future.

In this paper, we draw on data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey to contribute to the

TABLE 1 | The share (%) of employees who sometimes or always work at home, European Area and Australia, 2014–2022.

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Men (European Area)	9%	10%	10%	10%	11%	12%	20%	24%	22%
Women (European Area)	9%	11%	11%	11%	12%	13%	22%	26%	24%
Men (Australia)	17%	15%	17%	17%	17%	19%	29%	31%	31%
Women (Australia)	23%	25%	25%	24%	26%	25%	38%	43%	40%
Gender gap (percentage points)									
European Area	1%	1%	1%	1%	1%	1%	2%	2%	2%
Australia	7%	10%	8%	7%	9%	6%	9%	12%	9%

Note: Employees aged 25–64 years. Averages for the European Area (20 countries). *Source for European Area data:* Eurostat data on employed persons working from as a percentage of total employment by sex, age and professional status (lfsa_ehomp) (see https://ec.europa.eu/eurostat). *Source for Australian data:* Household, Income and Labour Dynamics in Australia (HILDA) Survey, Waves 14–22. Estimates weighted to reflect population totals.

emerging literature on working at home and its 'effects' (association) on the GWG. We believe Australia makes for an interesting case study for several reasons. For example, when compared to countries in Europe, Australia has a significantly higher share of employees who work some or all their usual hours of work at home and a large gender gap in the shares of women and men who work at home. In 2022, for example, among employees aged 25–64 years, 40% of women and 31% of men reported working sometimes or always at home (see Table 1). The duration of time spent working at home (average number of days worked at home in a survey period) in Australia is also among the highest in the world (ranked fourth after Canada, the United Kingdom and the United States) (Felstead 2024).

The paper makes several contributions to the literature on working at home and the GWG. The first is that it draws on data from before and after the 2020 COVID-19 pandemic, thus allowing a comparison of the change in the incidence in working at home and its effect on the changing GWG pre- and post- the COVID-19 shock that gave rise to new norms around working at home. The second contribution is the use of panel estimation techniques. While the paper is largely descriptive in that it is based on correlation analysis, the panel component of the paper goes some way to addressing the endogeneity problem that plagues any analysis of working at home and wages. Few studies (an exception is Arntz, Ben Yahmed, and Berlingieri 2022), use panel data when examining the effects of working at home on wages.

The remainder of the paper is organised as follows. Section 2 provides a conceptual discussion on working at home alongside a review of previous studies and theoretical predictions concerning working at home and wages. Section 3 describes the data and the empirical strategy used in the paper. Section 4 presents descriptive statistics. The results are reported in Section 5. Section 6 summarises and concludes the paper.

2 | Definitions, Theory and Previous Studies

2.1 | Definitions

In the literature, the terms 'teleworking', 'remote work', 'hybrid work', 'working from home', 'working at home' and 'homeworking' are often used interchangeably. There are, however, conceptual differences in these terms (OECD 2023; Felstead 2024) and definition matters when it comes to comparing results across studies. In the public discourse and media 'working from home' has common parlance but as Felstead (2024) explains, working from home is not the same as working *at* home. Many tradespersons, for example, may use their home as a base and therefore work from home while not necessarily working at home.

In the HILDA Survey (the database used in this paper) respondents are asked if any of their usual hours in their main job are worked *at* home (their usual place of residency). Those answering yes are then subsequently asked how many hours per week they usually work at home in their main job and whether these hours are part of a formal or informal arrangement with their employer. From this information, we are able to derive several controls for working at home including two variables relating the nature of the work at home arrangement ('Formal' and 'Informal'), a dummy variable if the employee is a hybrid ('Hybrid') worker (works some of their usual weekly hours at home) and a dummy variable if they work all of their hours in their main job at home ('HomeAll'). The descriptive statistics of these variables are presented in Section 3.

2.2 | Theoretical Predictions

Working at home has the potential to either increase or decrease the average wages of workers and, therefore, impact on the GWG. The theory is ambiguous with respect to the directional effect. In other words, it is an empirical matter. From an economics perspective there are competitive and noncompetitive reasons why wages might relate to working at home arrangements (for a more detailed discussion see Weeden, 2005 and Gariety and Shaffer, 2007). Human capital theory, for example, holds that a person's earnings are dependent upon their productivity. If working at home raises a worker's productivity above that of office-based workers (e.g., perhaps on account of fewer interruptions) then a working at home wage premium may emerge. Similarly, if working at home is a drag on productivity vis-à-vis office-based working

(perhaps because of more interruptions in the home) then working at home may be associated with a wage penalty. Competitive explanations for working at home wage differential also encompass compensatory differentials. Employees, for example, may be willing to accept a lower wage to work at home (Mas and Pallais 2017). From a noncompetitive perspective, working at home wage premiums may emerge if employers pay employees who work at home an 'efficiency wage' aimed at increasing the cost of job loss if workers who work at home are caught shirking (Akerlof and Yellen 1986).

Wage effects may also arise from compositional effects. The expansion of working at home arrangements may engender greater labour market attachment (either on the intensive or extensive margin) (Arntz, Ben Yahmed, and Berlingieri 2022). The GWG, for example, arises in part because of gender differences in the ability to work in long-hour jobs ('greedy jobs') (Goldin 2014). If working at home induces women to enter occupations with long hours this may see an increase in women's average pay and a convergence in the gender pay gap (Cortés and Pan 2019). Likewise, working at home may help retain women in work and limit the scarring effect on wages of time spent out of work (Bertrand 2018). Alternatively, Barrero et al. (2022), show that the recent shift to remote work in the United States has lessened wage growth pressures in part because of an increase in the use of part-timers and workers with physical disabilities who can work at home and because remote work has facilitated greater offshoring.

2.3 | Previous Studies

When compared to the voluminous literature on the determinants of wages and on the gender pay gap, there are relatively few studies examining the effect of work location (and specifically working at home) on the gender pay gap. Even fewer offer a post-COVID-19 perspective. The dearth of studies relates, in part, to the difficulties of identifying a causal effect (i.e., relates to the selection issues associated with the decision to work at home) and to data constraints (OECD 2023).

Available studies point to mixed effects of working at home on the gender pay gap (with results confounded on account of different concepts, such as teleworking, flexible working and working from home). Pabilonia and Vernon (2022), for example, use data from the 2017–2018 American Time Use Survey Leave and Job Flexibilities Module to study the effects of telework on wages. Of relevance to this paper, they show that mothers who telework at home most days of the week face a wage penalty compared to mothers in office-based jobs. They suggest this penalty may relate to more workday interruptions.

Two other US-based studies—one by Weeden (2005) and the other by Gariety and Shaffer (2007)—use the 2001 and 2002 US Current Population Survey to study the effect of work location (working at home) on wages. Their samples are slightly different. Both restrict their samples to employees who work full-time. In Weeden (2005) the age group studied consists of adults aged 18–64 years, while in Gariety and Shaffer (2007) the age group is restricted to aged 22–64 years. The results across both studies are consistent.

Weeden (2005) employs two 'flexible work' variables: one which relates to workers' control over their work schedule (vary start and finishing hours) and another which (like the HILDA Survey) asks employees if they work at home as part of their main job and, if affirmative, whether they have a formal arrangement with their employer. Weeden notes that the formal and informal distinction may correlate with job autonomy. She considers the flexible scheduling and the working at home effects separately. Her study uses OLS analysis with hourly wages as the dependent variable. Her analysis shows that there are large wage premiums associated with working at home and that men benefit more than women from informal working at home arrangements. She attributes this to occupational segregation and the fact that the occupations that women who work at home informally occupy are lower paid (e.g., teaching). Weeden (2005) also examines whether parental status matters given that working at home may allow employees to combine paid work with unpaid work (e.g., childcare or tasks related to running a house such as laundry). To do this she interacts her two dummy variables (one capturing whether work at home is via a formal arrangement and the other if it is via an informal arrangement) with a variable capturing the number of children the respondent has. The interactions are largely insignificant, suggesting that there are no differences in the working at home wage effects by parental status. The exception is fathers who work at home under a formal arrangement. In this interaction, the effect is positive and marginally significant (10% level). In other words, relative to childless men, fathers who work at home under a formal arrangement have marginally higher wages.

Gariety and Shaffer's (2007) study similarly finds a positive association between working at home and wages, with the premium larger for men than women. They also show that the wage premium was larger among those who had a formal arrangement and that the relationship between hours worked at home and wages was not linear. Those working less frequently (bi-weekly) at home received a higher premium than those working weekly at home.

Positive wage effects associated with working at/from home are also observed in Arntz, Ben Yahmed, and Berlingieri (2022). These authors use data from five waves of the German Socio-Economic Panel (SOEP) (1997, 1999, 2002, 2009 and 2014). The SEOP Survey asks respondents whether they sometimes work *from* home and, if so, whether they do so on a daily, weekly or monthly basis. Arntz, Ben Yahmed, and Berlingieri (2022) construct a dummy variable equal to one if the respondent works from home at least once per month. Their sample consists of employees who are observed in at least two waves. Their empirical strategy employs both an OLS and a panel estimator and, therefore, goes someway to addressing the challenge of isolating the effect of working at/from home on wages. They note, however, that they cannot claim causality as they cannot rule out parallel changes in human resource practices that may have occurred within firms at the same time and facilitated working from home. Their identification in the panel analysis comes from those who changed their work from home status (who took up working from home) during the period of analysis.

The OLS estimates in Arntz, Ben Yahmed, and Berlingieri (2022) suggest that there is no effect of working from home on the wages of childless male employees and a marginally positive significant effect on the wages of childless female employees. The marginally significant wage effect in the OLS regressions disappears when a panel estimator is used. When the sample is restricted to parents, they find no association between working from home when using OLS and positive wage effects when using a panel analysis, with the wage effect being greater for mothers than fathers. Arntz, Ben Yahmed, and Berlingieri (2002) suggest that this gender effect may be driven by the relatively stronger increase in contractual hours (and thus higher overall earnings) among mothers compared to fathers. In other words, working from home may help close the gender gap in hours (labour market attachment) with a pay-off in terms of career progression and wages in the long run (Arntz, Ben Yahmed, and Berlingieri 2022). They conclude by noting that working from home may not deliver similar hourly wage gains (premiums) for mothers and fathers.

In summary, working at home is now an important feature of work for many employees yet there is a relatively small number of contemporary studies examining how working at home is impacting on labour market outcomes such as participation, hours of work and earnings. This, in turn, hampers policy development.

3 | Data and Empirical Strategy

3.1 | Data

The data for this study are from the HILDA Survey. HILDA is a nationally representative, longitudinal, household survey with rich information on demographic and socioeconomic characteristics. It commenced in 2001 and at the time of writing the most recent data are for 2022. In each wave, employees are asked whether they work any of their usual working hours in their main job at home (their usual residence). If the answer is 'yes' there are follow-up questions, one asking how many of the usual weekly hours in the main job are worked at home and another asking if the hours worked at home in the main job are part of a formal arrangement with their employer or not. In this paper, we focus on waves 18–22 or HILDA (i.e., the period of 2018–2022).

3.2 | Sample

In the empirical analysis the sample is restricted to women and men who are classified as employees in their main job, are aged between 18 and 64 years (inclusive) and who have observable data on earnings, actual labour market experience, occupation and sector of employment in their main job. To give a sense of the representative nature of the data we describe the sampling steps for Wave 22 (conducted in 2022). The same sampling steps are applied for analytical components that involve earlier waves.

In Wave 2022, there are 8209 employees aged 18–64 years. A total of 470 observations (5.7%) are dropped on account of missing information on actual work experience (necessary for the wage equations). A further 125 observations are lost as they have zero earnings (perhaps because on unpaid leave) and/or are missing occupation, industry and sector of employment data. These exclusions render a working sample of 7614 observations (7.5% less than in the initial sample). There are 3988 (52%) women and 3626 (48%) men in the sample. When we restrict the sample to persons who work full-time (35 or more hours per week) in their main job, the sample falls to 5326 observations (42% women and 58% men).

In the panel analysis, we apply the same selection criteria and use a 5-wave panel (2018–2022). There are 39,502 observations over the 5 waves (falling to 27,321 when we restrict the sample to full-time employees). In terms of unique individuals, there are 11,414 persons with this falling to 8638 when we restrict the sample to full-timers.

3.3 | Empirical Strategy

The analytical approach involves OLS analysis and panel analysis using a fixed effects (FEs) estimator. There are pros and cons associated with each. The advantage of the OLS approach is that we may control for time-invariant characteristics such as gender in the regression. This means we can interact the working at home variables with gender and statistically test whether the wage premium (or penalty) differs by gender. Using an OLS approach, we can also use the Blinder (1973) and Oaxaca (1973) decomposition techniques to understand how gender differences in working at home affect the GWG. The limitation of the OLS approach, however, is that we cannot capture unobserved characteristics such as preferences which may correlate with decisions to work at home (or not). This means that the OLS coefficients are likely biased.

There is some debate in the literature about the importance of controlling for sample selection bias when estimating wage equations restricted to workers. If the sample of employees is not randomly selected from the population, then the OLS regressions may produce biased findings. The observed sample may be biased if they differ on unobserved characteristics such as preferences to be in paid employment or not. A common way to address potential selection bias is to first estimate a probit model of the employment probability and derive a selection bias correction term (known as the inverse Mills ratio or lambda) that can then be incorporated in the wage equation. The debate in the literature concerns the set of variables (exclusion restrictions) in the first-stage regression and the flow-on effect of to the second stage. Some argue that a poorly estimated selection model may impart more bias than might have occurred in the absence of any adjustment (Puhani 2000; Wolfolds and Siegel 2019). In this paper, we opt not to adjust for potential selection bias because of these difficulties. Our interest is on understanding whether working at home affects wages and whether the correlation or association differs by gender. We do not claim causality.

We also employ a panel approach using a FEs estimator to overcome some of the limitations described above. Importantly it allows us to control for preferences that may correlate with

decisions concerning working at home arrangements (assuming they are time invariant). There are, however, also limitations associated with the panel approach. For example, the panel approach precludes the explicit incorporation of time-invariant controls such as gender. This means that we cannot directly compare the wage premium with a common reference group (e.g., men who do not work at home). The second limitation of the panel approach is that identification arises from people who change their working at home status. This introduces a different potential selection bias in that those who change their working-at-home status may not necessarily be representative of the population. The FE estimates may also be biased if there are unobserved factors affecting the decision to change job status (e.g., changes in human resource practices within firms—a point previously noted by Arntz, Ben Yahmed, and Berlingieri 2022).

Equation (1) shows the OLS wage equation that we begin with. We use a pooled sample of men and women with interactions to statically test for gender differences in working at home wage premiums (or penalties). The dependent variable is the natural logarithm of the respondent's wage.

$$\begin{aligned}\ln(\text{Wage}_i) = \alpha_i &+ \beta_1 \text{NotHome}_i \times \text{Female}_i + \beta_2 \text{Formal}_i \\ &+ \beta_3 \text{Formal}_i \times \text{Female}_i + \beta_4 \text{Informal}_i \\ &+ \beta_5 \text{Informal}_i \times \text{Female}_i + \gamma X_i + \varepsilon_i.\end{aligned} \quad (1)$$

The main coefficients of interest are β_1–β_5, which correspond to the following variables: 'NotHome × Female' which controls for women who do not work at home. The estimated coefficient for this variable will show the wage gap between men and women who do not work at home. β_2 and β_4 will give the coefficients on 'Formal' and 'Informal'. These are controls for men working at home under formal and informal arrangements, respectively. The estimated coefficients for these variables compare men's wage returns for working at home relative to men who do not work at home. β_3 and β_5 relate to 'Formal × Female' and 'Informal × Female'. These controls capture any difference in the premium (or penalty) that women experience vis-à-vis men on working at home formally or informally. In other words, they show the GWG *within* each of the working at home arrangements (formal and informal) controlled for. To derive the wage gap between women who work at home formally and their male counterparts who do not work at home we sum the following two coefficients after estimation: $\beta_2 + \beta_3$ (i.e., sum 'Formal' and 'Formal × Female'). Similarly, to derive the GWG between women who work at home informally and men who do not work at home we sum $\beta_4 + \beta_5$ after estimation (sum 'Informal' and 'Informal × Female').

The X vector wage in Equation (1) controls for standard factors known to correlate with wages. This includes human capital characteristics (variables capturing the highest qualification attained as well as information on actual work experience [and its square]), marital status ('Partnered') and the presence of dependent children ('Child'). It also includes a set of one-digit occupational controls with the omitted group being managers and one-digit industry controls with the omitted group being retail trade. We include these occupation and industry controls to capture the fact that working at home arrangements differ by occupation and industry.[1] Also included in the X vector is a control 'Public' (which captures whether they work in the government sector with the omitted being the private sector) and a control 'Urban' (which controls for locational differences in working at-home opportunities).

In the proceeding analysis, we first present OLS results using a sample of all workers and then a sample of full-time workers. The results from this analysis are based on a pooled sample of men and women and Equation (1). We then present our panel estimates based on full-time workers. These models are estimated separately for men and women and we apply augmented models to Equation (1) to include controls for 'Hybrid' and 'HomeAll' working at home arrangements. In the panel analysis, we also examine how any wage premiums/penalties associated with working at home vary if the individual has a child. Finally, to analyse how much working at home may explain the GWG we present results from the Blinder–Oaxaca decomposition.

3.4 | Descriptive Statistics

Table 2 shows the descriptive statistics for the working samples of men and women who were employed full-time in 2019 and 2022. In the interest of space, we do not include descriptive statistics for information on qualifications, marital status, occupation, industry, sector and geographic location. This information may be found in Table A1.

A comparison of 2019 and 2022 provides a sense of how working at home has changed since the onset of COVID-19. Of note is the jump between 2019 and 2022 in the shares of employees who work full-time and who work at home under a formal arrangement with their employer. Among men the share increased from 9.4% to 22.7% and among women it was from 11.2% to 29.2%. There was very little change in the shares working at home under an informal arrangement with their employer. The variable 'Hybrid' also shows that in 2019 around 20% of men and 25% of women worked some (but not all) of their usual weekly hours at home; by 2022 this had increased to 29% for men and 37.4% for women. There was also a jump in the share of women and men working all hours at home ('HourAll'). Among men, the share increased 3.9 percentage points to 4.2%, while among women it increased 6.8 percentage points, to 7.1%.

4 | Results

4.1 | OLS Estimates

Table 3 presents the coefficients from the estimation of Equation (1) using ordinary least squares (OLS). The analysis covers the period of 2018–2022. Columns 1–5 show the results for all employees (i.e., the sample includes full-time and part-time workers). The dependent variable is the natural logarithm of hourly wages in the main job (where the latter is derived by taking usual weekly earnings in the main job and dividing by usual hours worked in the main job). The limitation of this

TABLE 2 | Select descriptive statistics.

	Men		Women	
	2019	**2022**	**2019**	**2022**
ln(Wage) (weekly wage, main job)	7.47	7.47	7.33	7.34
	(0.50)	(0.51)	(0.46)	(0.43)
Formal (= 1 if works at home under a formal arrangement with employer)	9.4%	22.7%	11.2%	29.2%
Informal (= 1 if works at home under an informal arrangement with employer)	10.9%	10.4%	14.2%	15.2%
Formal × Child	4.6%	9.4%	4.8%	9.5%
Informal × Child	4.2%	4.0%	4.3%	5.4%
Hybrid (= 1 if works some but not all weekly hours at home)	19.9%	29.0%	25.0%	37.4%
HomeAll (= 1 if works all weekly hours at home)	0.3%	4.2%	0.3%	7.1%
Hybrid × Child	8.6%	11.6%	9.0%	12.7%
HomeAll × Child	0.2%	1.9%	0.1%	2.2%
Child (= 1 if has a dependent child)	34.3%	32.9%	26.6%	27.4%
Number of observations	3423	3096	2319	2230

Note: Employees aged 18–64 years who are employed full-time in their main job (35 or more hours per week in their main job). Standard deviation in parentheses for continuous variables only. Full descriptive statistics, which includes information on other variables in the regressions (including occupation and industry at the 1-digit level) are included in Table A1). Estimates weighted to reflect population totals. Household, Income and Labour Dynamics in Australia (HILDA) Survey, Waves 19 and 22.

measure is that persons who work long hours (e.g., more than 40 per week) show up as having relatively low hourly earnings. We attempt to adjust for this through the inclusion of a dummy variable set equal to one if the respondent works more than 40 h per week in their main job ('LongHours'). In Columns 6–10 we restrict the analysis to persons employed full-time (35 or more hours per week in their main job). The dependent variable in these cases is the natural logarithm of usual weekly wages in the main job. The model is estimated without the 'LongHours' control.

We begin by describing the 2022 results based on the full sample (Column 5 of Table 3). The reference group is men who do not work at home. Relative to this group, the coefficient on the variable 'Formal' (equal to 0.122) shows that men who work at home under a formal arrangement with their employer earn 13.0% more. Note, the percent premium is calculated as [exponential(coefficient) − 1] × 100. In semi-logarithmic equations small coefficients are a good approximation of the percent effect (see Halvorsen and Palmquist (1980), for further discussion). We use this transformation for all percent effects discussed in this paper. The corresponding 2022 wage premium among men working at home under an informal arrangement was equal to 17.1% [(exp(0.158) − 1) × 100].

The interacted variable 'NotHome × Female' shows the wage gap between men and women who do not work at home. The significant negative coefficient of −0.053 shows that women who do not work at home, on average, earn 5.2% less than men who do not work at home. The significant coefficients on the other female interacted variables also point to gender differences in the wages by working at home status. The GWG among men and women who work at home under a formal arrangement is equal to 9.8% and among those working at home under an informal arrangement, it is equal to 16.0%. Finally, relative to men who do not work from home, women who work at home under a formal arrangement earn slightly more per hour. The wage premium is equal to 1.9% (calculated as the sum of 'Formal' + 'Formal × Female' coefficients). The wage differential between men who do not work at home and women who work at home informally is negative 1.6%; that is, women who work at home informally earn slightly less than men who do not work at home.

The results for full-time workers (Columns 6–10) follow a similar pattern to those for the full sample that includes part-timers. When we compare the results for 2022 in Column 5 (all employees) and Column 10 (full-time employees) we make the following observations. Relative to men who do not work at home:

i. Women who do not work at home earn 9.2% less when the sample is restricted to full-timers and 5.2% less when the full-sample is considered
ii. Men who work at home under a formal arrangement experience the same premium in both samples (13%)
iii. Men who work at home under an informal arrangement earn 24% more when the sample is restricted to full-time employees and the dependent variable is weekly wages and 17.1% more when the sample includes part-timers and the dependent variable is hourly wages
iv. Women who work at home under a formal arrangement earn 1.4% more when the full-time sample is employed and 1.9% when the sample includes part-timers. Statistically speaking there is no difference in these premiums
v. Women who work at home under an informal arrangement earn 4.1% more when the sample is restricted to full-timers and 1.6% less when the sample includes part-timers.

The differing estimates at (iii) and (v) above suggest that those working at home informally likely work a number of unpaid

TABLE 3 | Selected estimated coefficients from OLS regression on working at home status on wages with gender interactions, 2018–2022.

	All employees (full-time and part-time employees) (dependent variable = ln(hourly wage)					Full-time employees (dependent variable Y = ln(weekly wage main job)				
	(1) 2018	(2) 2019	(3) 2020	(4) 2021	(5) 2022	(6) 2018	(7) 2019	(8) 2020	(9) 2021	(10) 2022
NotHome × Female	−0.083***	−0.066***	−0.065***	−0.087***	−0.053**	−0.118***	−0.095***	−0.126***	−0.125***	−0.097***
	(0.014)	(0.015)	(0.018)	(0.017)	(0.021)	(0.018)	(0.017)	(0.018)	(0.018)	(0.029)
Formal	0.040	0.091***	0.127***	0.126***	0.122***	0.016	0.089***	0.114***	0.127***	0.123***
	(0.035)	(0.029)	(0.021)	(0.021)	(0.027)	(0.035)	(0.032)	(0.020)	(0.022)	(0.032)
Formal × Female	−0.128***	−0.107	−0.142***	−0.129***	−0.103***	−0.115**	−0.200***	−0.144***	−0.128***	−0.109***
	(0.044)	(0.080)	(0.022)	(0.022)	(0.021)	(0.053)	(0.070)	(0.025)	(0.025)	(0.025)
Informal	0.049**	0.059*	0.101***	0.073**	0.158***	0.089***	0.122***	0.125***	0.096***	0.215***
	(0.025)	(0.031)	(0.033)	(0.031)	(0.031)	(0.025)	(0.031)	(0.034)	(0.035)	(0.037)
Informal × Female	−0.135***	−0.127***	−0.165***	−0.098***	−0.174***	−0.141***	−0.145***	−0.162***	−0.091**	−0.175***
	(0.032)	(0.032)	(0.040)	(0.034)	(0.033)	(0.035)	(0.034)	(0.043)	(0.039)	(0.034)
LongHours	−0.069***	−0.028*	−0.069***	−0.056***	−0.023***	—	—	—	—	—
	(0.014)	(0.015)	(0.014)	(0.013)	(0.014)					
Observations	8296	8274	7655	7659	7614	5710	5742	5196	5342	5326
R^2 (%)	36.3	36.5	33.7	35.7	37.1	42.4	44.6	46.2	44.1	42.5

Note: Employees aged 18–64 years. The hourly wage is constructed as the natural logarithm of weekly wages in main job divided by usual number of hours worked each week in the main job. The variable 'LongHours' is equal to 1 if the respondent works more than 40 h per week in the main job. Other variables in the regression include education, actual labour market experience, marital status, whether has dependent children, sector and urban location and 1-digit industry and occupation controls. Estimates weighted to reflect population values. The full set of result from the wage models are available from the authors. Robust standard errors in parentheses. Household, Income and Labour Dynamics in Australia (HILDA) Survey, Waves 18–22.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

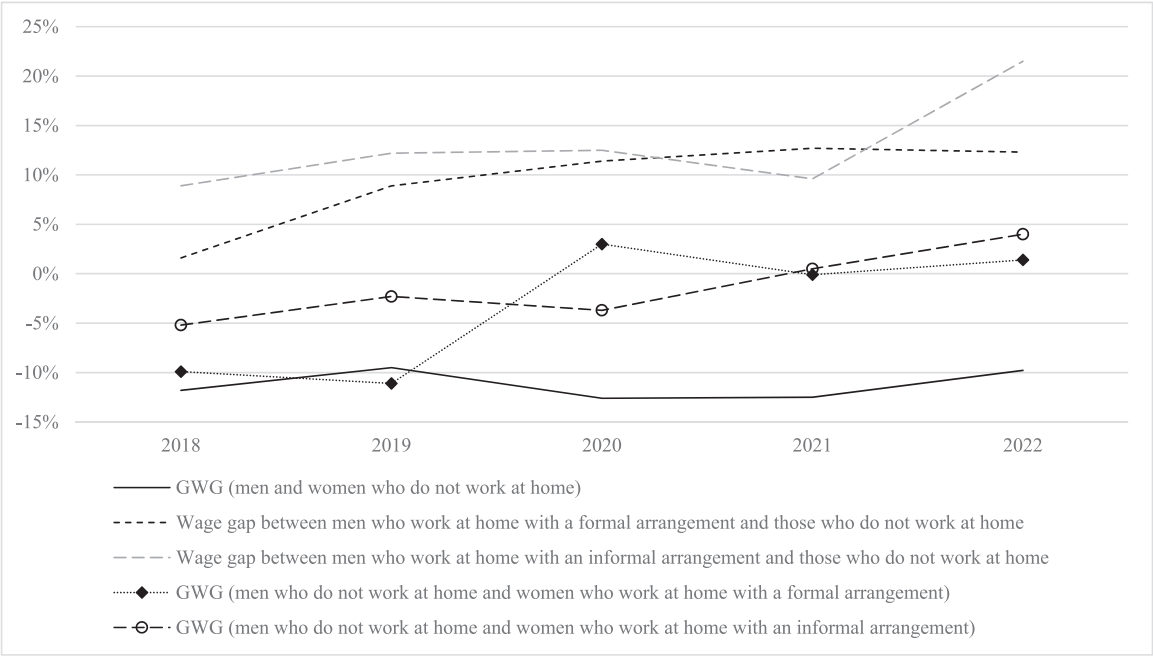

FIGURE 1 | Trends in the wage returns to working at home by nature of arrangement (formal or informal), 2018–2022. Employees aged 18–64 years who are employed full-time in their main job (35 or more hours per week in their main job). Dependent variable natural logarithm of weekly wages in main job. All relativities estimated using the regression model described in Equation (1) and are based on results in Columns 6–10 of Table 3. Full regression results for each year are available on request as well as the confidence interval bands for each data point in the figure. Estimates weighted to reflect population values. *Source:* Household, Income and Labour Dynamics in Australia (HILDA) Survey, Waves 18–22.

hours—thus depressing the premium when the dependent variable is the hourly wage (given that the hourly wage is measured as total weekly wage divided by total hours worked per week). In the remainder of this paper the analysis, therefore, focuses on full-time employees. The dependent variable is the natural logarithm of usual weekly wages in the main job.

Figure 1 (for full-timers) presents the exponentiated wage relativities on the variables reported in Table 3 in order that we may view the results graphically. The estimates are presented for each year from 2018 to 2022. The data show that when compared to estimates in 2018 and 2019 (pre-COVID-19) the wage premium attached to working at home is higher for men in the post-COVID-19 period (particularly, among those working at home informally). The GWG among men and women who do not work at home is constant at around 10%, while the GWG among men and women who work at home formally and informally has been narrowing.

4.2 | Panel Estimates

Table 4 presents the panel estimates from a FEs model. As before the focus is on persons employed full-time and the dependent variable is the natural logarithm of usual weekly wages in the main job. A 5-year panel is employed, covering the period 2018 to 2022. As previously noted, identification in the panel estimates arises from individuals who change their working at home status. An analysis of the transition matrixes (not reported) shows that among men, 33.8% who worked at home in one period were no longer working at home in the next, while 11.2% of men who did not work at home in one period started working at home in the next. Among women the shares who stopped working at home were 32.6% and the share starting was 17.4%.

In the results reported in Table 4 we have augmented the earlier analysis where we disaggregated by working at home status (formal and informal) with interactions to examine whether parental status matters. We also explore the effects on wages of working under a hybrid arrangement (some hours, but not all, at home) and cases where all hours are worked at home.

Consistent with the OLS estimates, the panel estimates for men reported in Column 2 show that men who work at home receive a wage premium vis-à-vis their counterparts who do not work at home. The premium attached to working at home under a formal arrangement is 2.8%. Among those working at home under an informal arrangement, the premium is lower at 2.5%. Both premiums are smaller than those reported earlier using OLS. This reflects, in part, the biased nature of the OLS estimates. The OLS regressions, for example, are unable to control for unobservable factors that correlate with wages and the decision to work at home.

The estimates also show that while the presence of a dependent child has no effect on the wages of men, men who are fathers and who work at home have marginally (10% significance level) lower earnings than their counterparts who work at home and who do not have dependent children (as given by the coefficient on the 'Formal × Child' interaction variable). These findings contrast with reported results in Weeden (2005) who, using US data for 2001/2002 and OLS regressions, found that fathers who worked at home under a formal arrangement had marginally

TABLE 4 | Selected estimated coefficients from FE regression on working at home on wages, 2018–2022, full-time employees.

	Men				Women			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Formal	0.019***	0.028***	—	—	0.022***	0.020**	—	—
	(0.006)	(0.008)			(0.007)	(0.008)		
Informal	0.015**	0.025***	—	—	0.021***	0.023**	—	—
	(0.007)	(0.010)			(0.008)	(0.009)		
Formal × Child	—	−0.021*	—	—	—	0.009	—	—
		(0.012)				(0.015)		
Informal × Child	—	−0.023*	—	—	—	−0.004	—	—
		(0.014)				(0.017)		
Hybrid	—	—	0.018***	0.029***	—	—	0.021***	0.020***
			(0.006)	(0.008)			(0.007)	(0.007)
HomeAll	—	—	0.017**	0.021**	—	—	0.028***	0.025**
			(0.008)	(0.010)			(0.009)	(0.011)
Hybrid × Child	—	—	—	−0.026**	—	—	—	0.002
				(0.011)				(0.014)
HomeAll × Child	—	—	—	−0.011	—	—	—	0.011
				(0.015)				(0.019)
Child	−0.014	−0.008	−0.014	−0.007	−0.071***	−0.072***	−0.071***	−0.072***
	(0.010)	(0.011)	(0.010)	(0.011)	(0.014)	(0.016)	(0.014)	(0.016)
Observations	16,121	16,121	16,121	16,121	11,197	11,197	11,197	11,197
# unique individuals	4771	4771	4771	4771	3867	3867	3866	3866

Note: Employees aged 18–64 years who are employed full-time in their main job (35 or more hours per week in their main job). The results are generated using a fixed effects (FE) panel estimator. The dependent variable is the natural logarithm of weekly earnings in the main job. Other variables in the regression include education, actual labour market experience, marital status, whether has dependent children, sector and urban location and 1-digit industry and occupation controls. Full results are available in Table A2. Robust standard errors in parentheses and clustered on the individual. Estimates weighted to reflect population values. Household, Income and Labour Dynamics in Australia (HILDA) Survey, Waves 18–22.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

higher wages than their male counterparts who did not have dependent children.

The estimates in Column 6 for women may be compared to those in Column 2 for men. When compared to women who do not work at home (the reference group in Column 6), women who work at home under a formal arrangement earn around 2.0% more and women who work at home informally earn around 2.3% more. Column 6 also shows that women with dependent children earn significantly less than their counterparts without dependent children (as given by the negative and highly statistically significant coefficient on the 'Child' variable)—unlike the case for men. Also, unlike the case for men, the presence of a dependent child (capturing the parenthood effect) has no additional effect on the premiums earned by women who work at home. This also contrasts with earlier research which found that mothers who worked at home (teleworked) experienced a wage penalty vis-à-vis office-based mothers (Pabilonia and Vernon 2022).

Columns 4 and 8 show that the fatherhood penalty associated with working at home shows up among men who work on a hybrid arrangement but not for men who work all their time at home. Among women the motherhood effect is again fully captured by the dummy variable controlling for the presence of dependent children and there is no additional motherhood effect associated with working at home status and working-at-home arrangement (hybrid or all the time).

4.3 | Decomposition Analysis

In this section the Blinder (1973) and Oaxaca (1973) decomposition technique is used to examine whether gender differences in working at home may explain, in part, the gender pay gap. The Blinder–Oaxaca decomposition technique is a commonly used technique in studies of the gender pay gap (e.g., Blau and Kahn 2017). It is a counterfactual technique which allows us to ask what the gender pay gap might be if women had the same characteristics as men (e.g., same levels of work experience, same occupational distribution). Of particular interest in this paper is what it might look like if women also had the same working at home arrangements as men. The technique is summarised in the Appendix. The focus is on the share of the GWG that may be explained by differences in the proportion of men and women who work at home (i.e. compositional differences). It is important to note that this decomposition analysis does not capture the share of the GWG

that may arise from the wage effects that women may get by increasingly working at home (e.g., wage rises because of fact that they can perhaps work more hours and take on more senior roles).

The decomposition analysis is also restricted to employees who work full-time. The results from the decomposition are presented in Table 5. We report the estimates for two select years: 2019 and 2022 (pre and post-COVID-19). Focusing on the 2022 results, at the mean there is a raw gender gap in weekly wages equal to 0.136 log points (15%). The detailed results (rows (6) and (7)) show that gender differences in working at home arrangements are important (significant) in explaining the GWG. The −0.009 coefficient in row (6) as a share of the overall raw gap is equal to −6.6% (−0.009/0.136). This shows that if women and men had the same incidence of formal working at home arrangements the GWG would be wider (by 6.6%). This arises because women have a higher incidence than men of working at home under a formal arrangement and because working at home is associated with a wage premium. In other words, if fewer women were to work at home formally (i.e., had the same incidence as working at home, formally, as men) their average earnings would be lower and the GWG wider.

The same interpretation may be placed on the coefficient estimates associated with informal work at home arrangements. If women looked like men in terms of their incidence of informally working at home the gender pay gap would further widen by 8.1%. Taken together the two working at home variables explain 14.7% of the raw GWG ([−0.009 + −0.011]/0.136). This is an upper estimate given that the estimates are based on OLS and are weighted using the male wage structure. When the female wage structure is used as the counterfactual the share of the raw GWG explained by gender differences in working at home is lower at 9.7% (see Table A5).

In 2019, gender differences in working at home (formally) had no significant effect on the GWG and the two variables taken together explained only 4.1% of the overall gap when the male wage structure is used as the counterfactual (see Table 5). This falls to 1.3% when the female structure is used (see Table A5). In summary, the 2022 cross-sectional estimates presented here suggest that working at home arrangements are helping to narrow the overall gender pay gap.

Figure 2 shows trends in this relationship over the period 2018 to 2022. That is, it shows the share of the gender pay gap explained by working at home, disaggregated by form of the arrangement (formal and informal). (The reported estimates are based on a calculation that weights using the male wage structure). The big change is from 2020 onwards. In 2021, around 17% of the overall gap could be explained by gender differences in working at home (−16% from differences in formal arrangements and −1% from differences in informal arrangements). This can, in part, be attributed to the large rise in the proportion of women working at home formally in 2021. In

TABLE 5 | Blinder–Oaxaca decomposition of the gender pay gap.

		2019		2022	
		Coefficient	**Standard error**	**Coefficient**	**Standard error**
(1)	Ln(Wage)—Men	7.472	(0.012)***	7.474	(0.014)***
(2)	Ln(Wage)—Women	7.327	(0.014)***	7.337	(0.012)***
(3)	Difference (raw gap)	0.146	(0.018)***	0.136	(0.019)***
(4)	Explained component (due characteristics)	0.035	(0.016)***	0.045	(0.016)***
(5)	Unexplained component (due coefficients)	0.111	(0.017)***	0.091	(0.019)***
	Explained component in detail				
(6)	Working at home—formal arrangement	−0.002	(0.001)	−0.009	(0.003)***
(7)	Working at home—informal arrangement	−0.004	(0.002)**	−0.011	(0.004)***
(8)	All other controls	0.041	(0.016)***	0.065	(0.016)***
	Unexplained component in detail				
(9)	Working at home—formal arrangement	0.013	(0.010)	0.009	(0.012)
(10)	Working at home—informal arrangement	0.009	(0.006)	0.014	(0.007)**
(11)	All other controls	0.038	(0.131)	−0.028	(0.094)
(18)	Constant	0.051	(0.127)	0.095	(0.099)
	% of raw gap (row 3) explained by working at home				
(19)	Working at home—formal arrangement	−1.4%		−6.6%	
(20)	Working at home—informal arrangement	−2.7%		−8.1%	

Note: Employees aged 18–64 years who are employed full-time in their main job (35 or more hours per week in their main job). The dependent variable is natural logarithm of weekly wages. Other variables in the regression include education, actual labour market experience, marital status, whether has dependent children, sector and urban location and 1-digit industry and occupation controls. Standard errors in parentheses. Estimates weighted to reflect population values. The estimates are weighted by the male wage structure. Household, Income and Labour Dynamics in Australia (HILDA) Survey, Waves 19 and 22.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

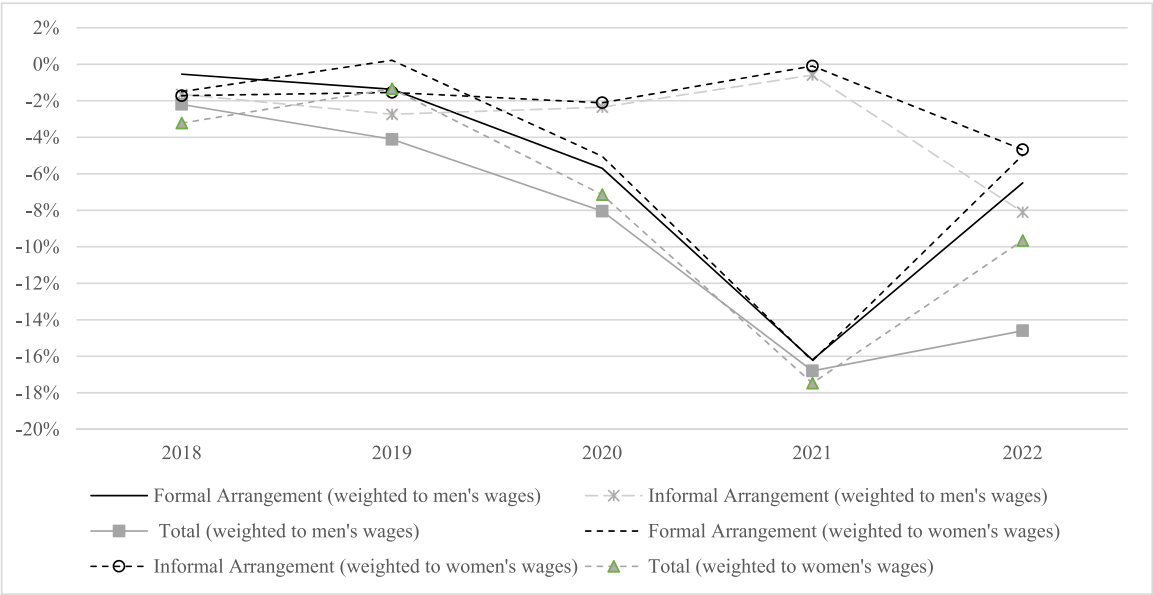

FIGURE 2 | Trends in the share of the raw gender wage gap explained by gender differences in working at home arrangements, 2018 to 2022. Sample: employees aged 18–64 years in full-time employment. The estimates are based on a Blinder–Oaxaca counterfactual decomposition. The 2019 and 2022 detailed results are reported in Tables 5 and A5. Full decomposition results for each year are available on request. *Source:* Household, Income and Labour Dynamics in Australia, Waves 18–22.

2019, 11.2% of women worked at home under a formal arrangement. In 2021 this share had increased to 41.9% and by 2022 it stood at 29.2%. The corresponding figures for men are 9.4% (2019), 26.9% (2021) and 22.7% (2022).

5 | Summary and Conclusion

Since COVID-19 there has been a marked shift towards working at home within many developed economies. There have been few studies which have examined the links between working at home and wages and how gender differences in these relationships may increase or decrease the GWG. In this paper data from the HILDA Survey covering the period 2018 to 2022 are used to examine these issues. Much of the analysis is concentrated on employees aged 18-64 years who work full-time (35 or more hours per week). The empirical approach involved OLS regressions and panel analysis using a FEs estimator.

The main findings (for full-time employees) may be summarised as follows:

i. Men and women who work at home either formally or informally earn significantly more than their counterparts who do not work at home. The same can be said for those who work at home under a hybrid arrangement (i.e., spent some of their usual weekly hours working at home) or who work all their usual weekly hours at home.

ii. In recent years the wage premium attached to working at home has increased—this is particularly the case among those working at home under a formal arrangement with their employer. We suggest it is not simply because higher-paid occupations are increasingly more likely to be done from home.

iii. While working at home is associated with higher wages for men and women, the relative size of this premium is higher for men than women; in other words, there is a sizeable gender gap in the wage premium attached to working at home.

iv. The presence of dependent children correlates with significantly lower wages for women (not men) (the motherhood penalty), however, there is no additional motherhood wage effect associated with working at home (contrary to earlier studies).

v. Fathers who work at home earn significantly less than other men who work at home (contrary to earlier studies).

vi. Working at home would appear to attenuate the size of the gender pay gap.

Several key insights flow from this study. The positive association between working at home and wages may suggest that those who work at home have higher productivity than those who do not, this is particularly the case in the post-COVID-19 context. Working at home, for example, reduces commuting time, allowing employees to potentially reallocate that time to paid work. In Australia, full-time workers in major cities spend an average of 67 min commuting daily (Productivity Commission 2021). Furthermore, since the pandemic, businesses have adopted technologies that support remote work, such as virtual meetings, which may enhance worker productivity and efficiency. Additionally, employer attitudes towards remote work have become more favourable, which could also explain the wage increases identified in this study (Productivity Commission 2021).

One area that requires further investigation is the potential fatherhood penalty associated with working at home. Are

fathers who work remotely genuinely less productive than other men, or are they facing discriminatory treatment? If the latter is true, it indicates that initiatives aimed at promoting gender equality by encouraging greater involvement of fathers in childcare may be hindered. This would be a setback for both men and women.

In summary, the findings of this paper suggest that working at home may contribute to reducing the overall GWG. Policies that support working at home could therefore positively impact women's labour market outcomes and help narrow the GWG. However, the analysis has some limitations, particularly regarding endogeneity (which we partially address by using panel data). Despite these limitations, the documented wage patterns and effects provide an important reference point for future research and open several avenues for further inquiry. Beyond the issue of the fatherhood penalty, future studies could explore the impact of working at home across the wage distribution and if wages are sensitive to the amount of time spent working at home. Other promising areas of research include examining the effects of working at home on wages within specific occupations or industries, as well as its influence on decisions regarding hours worked (intensive margin) and labour force participation (extensive margin).

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Endnote

[1]The empirical analyses also estimated the wage models without controls for occupation and industry. For the OLS and FE results, the removal of occupation and industry did not impact on the direction of the wage returns for working at home. However, for the OLS estimates, the working-at-home wage returns were considerably larger without controls for occupation and industry. There were marginal differences in the FE results when the models were estimated with and without industry and occupation. See Tables A3 and A4.

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Appendix

Blinder–Oaxaca Decomposition

The statistical decomposition technique as outlined by Oaxaca (1973) and Blinder (1973) may be used to decompose the observed GWG into two components: one that is 'explained' or due to gender differences in observed characteristics and one that is 'unexplained' due to gender differences in the coefficients. The approach requires first fitting two regressions using OLS, where the subscripts M and F denote males and female, respectively:

$$\ln(W_M) = \alpha_M + \beta_M X_M + \varepsilon_M, \quad \text{(a1)}$$

$$\ln(W_F) = \alpha_F + \beta_F X_F + \varepsilon_F. \quad \text{(a2)}$$

'ln' denotes the natural logarithm; W is a measure of the wage or remuneration; X is a vector of observed characteristics; ε is an error term; α is a constant to be estimated and β is a vector of coefficients to be estimated.

After estimation, subtracting Equations (a2) from (a1) the log GWG may be expressed as:

$$\ln(\text{GWG}) = \ln(\bar{W}_M) - \ln(\bar{W}_F) = (\bar{\mathbf{X}}_M - \bar{\mathbf{X}}_F)\hat{\boldsymbol{\beta}}_M + \bar{\mathbf{X}}_F(\hat{\boldsymbol{\beta}}_M - \hat{\boldsymbol{\beta}}_F) + (\hat{\alpha}_M - \hat{\alpha}_F). \quad \text{(a3)}$$

The term $(\overline{\mathbf{X}}_M - \overline{\mathbf{X}}_F)\hat{\boldsymbol{\beta}}_M$, is the amount of the gap that may be attributed to gender differences in the values of '$\mathbf{X}$'; that is, gender differences in observed characteristics. The component, $\overline{\mathbf{X}}_F(\hat{\boldsymbol{\beta}}_M - \hat{\boldsymbol{\beta}}_F)$, is the amount that may be attributed to gender differences in the regression coefficients, β. The term, $(\hat{\alpha}_M - \hat{\alpha}_F)$, is the amount of the gap that can be attributed to gender differences in the constant terms, α.

In the literature, there is some debate as to whether the male wage structure should be treated as the 'discrimination-free' wage structure or whether the weighting should be done using coefficients from a pooled sample. In Equation (a3) above, following Oaxaca (1973) the male wage structure is used as the counterfactual wage structure. This approach shows how much the wages of women need to increase to equal those of men. There is, as Oaxaca and Choe (2016) note, no agreed 'best practice' approach.

Table 5 in the manuscript presents the Blinder–Oaxaca results weighted using the male wage structure. Table A5 presents the results when the results are weighted using the female wage structure.

TABLE A1 | Full descriptive statistics (select waves).

	Men		Women	
	2019	**2022**	**2019**	**2022**
ln(weekly wage main job)	7.47	7.47	7.33	7.34
	(0.50)	(0.51)	(0.46)	(0.43)
ln(hourly wage main job)	3.70	3.71	3.62	3.63
	(0.47)	(0.49)	(0.43)	(0.41)
LongHours (= 1 if works more than 40 h per week main job)	44.1%	41.9%	28.0%	27.0%
Formal (= 1 if works at home under a formal arrangement with employer)	9.4%	22.7%	11.2%	29.2%
Informal (= 1 if works at home under an informal arrangement with employer)	10.9%	10.4%	14.2%	15.2%
Formal × Child	4.6%	9.4%	4.8%	9.5%
Informal × Child	4.2%	4.0%	4.3%	5.4%
Hybrid (= 1 if works some but not all weekly hours at home)	19.9%	29.0%	25.0%	37.4%
HomeAll (= 1 if works all weekly hours at home)	0.3%	4.2%	0.3%	7.1%
Hybrid × Child	8.6%	11.6%	9.0%	12.7%
HomeAll × Child	0.2%	1.9%	0.1%	2.2%
Child (= 1 if has a dependent child)	34.3%	32.9%	26.6%	27.4%
DipCert (= 1 if highest qualification is a diploma or certificate)	37.9%	36.1%	27.4%	27.3%
Tertiary (= 1 if highest qualification is a tertiary degree or higher education)	34.6%	35.0%	49.9%	50.8%
Experience (actual labour market experience)	20.19	20.26	17.72	17.57
	(12.22)	(12.33)	(11.35)	(11.13)

(Continues)

TABLE A1 | (Continued)

	Men		Women	
	2019	**2022**	**2019**	**2022**
Partnered (= 1 if married or in a de facto relationship)	70.3%	69.4%	63.3%	66.5%
Public (= 1 if employed in the public sector)	20.2%	19.5%	35.0%	33.1%
Urban (= 1 if resides in an urban area)	84.4%	82.0%	84.3%	81.4%
Professional (= 1 if occupation is a professional)	24.3%	24.7%	36.1%	37.7%
Tradesperson (= 1 if occupation is a technician or trade worker)	21.9%	21.1%	4.6%	3.9%
Service worker (= 1 if occupation is a community or personal service worker)	5.8%	5.5%	11.5%	12.5%
Clerical worker (= 1 if occupation is a clerical or administrative worker)	7.2%	8.0%	21.7%	20.1%
Sales worker (= 1 if occupation is a sales worker)	3.8%	3.0%	4.5%	4.9%
Operator (= 1 if occupation is a machinery operator or driver)	11.4%	12.3%	2.1%	1.7%
Labourer (= 1 if occupation is a labourer)	8.1%	7.1%	4.0%	3.3%
Agriculture (= 1 if works in agriculture, forestry or fishing)	1.7%	1.8%	1.0%	0.6%
Mining (= 1 if works in mining)	5.0%	5.0%	0.9%	2.0%
Manufacturing (= 1 if works in manufacturing)	12.8%	13.0%	5.0%	4.8%
Electricity, gas and water (= 1 if works in electricity, gas or water)	2.0%	2.0%	0.8%	0.7%
Construction (= 1 if works in construction)	13.9%	13.7%	1.5%	2.9%
Wholesale trade (= 1 if works in wholesale trade)	4.9%	3.9%	2.9%	1.9%
Accommodation and food (= 1 if works in accommodation or food services)	2.0%	2.4%	3.1%	2.6%
Transport (= 1 if works in transport, postal or warehousing)	6.4%	7.3%	2.5%	3.0%
Media (= 1 if works in information media or telecommunications)	1.8%	1.3%	1.2%	1.4%
Financial (= 1 if works in financial or insurance services)	4.9%	5.8%	5.8%	6.1%
Real estate (= 1 if works in rental, hiring or real estate services)	1.6%	1.1%	1.5%	1.4%
Science (= 1 if works in professional, scientific or technical services)	8.9%	9.0%	10.0%	9.2%
Administration (= 1 if works in administrative or support services)	1.9%	2.0%	2.3%	1.7%
Public administration (= 1 if works in public administration and safety)	9.2%	8.7%	8.8%	8.6%
Education and training (= 1 if works in education and training)	6.0%	5.6%	16.0%	15.9%
Health (= 1 if works in healthcare or social assistance)	5.9%	6.3%	26.6%	27.4%
Arts (= 1 if works in arts or recreational services)	2.1%	1.8%	1.2%	0.9%
Other services (= 1 if works in other services)	3.8%	4.1%	1.9%	2.8%
Number of observations	3423	3096	2319	2230

Note: Employees aged 25–64 years who are employed full-time in their main job (35 or more hours per week in their main job). Standard deviation in parentheses for continuous variables only. Estimates weighted to reflect population totals. Household, Income and Labour Dynamics in Australia (HILDA) Survey, Waves 19 and 22.

TABLE A2 | Estimated coefficients from FE regression on working at home on wages, 2018–2022, full-time employees.

	Men				Women			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Formal	0.019***	0.028***	—	—	0.022***	0.020**	—	—
	(0.006)	(0.008)			(0.007)	(0.008)		
Informal	0.015**	0.025***	—	—	0.021***	0.023**	—	—
	(0.007)	(0.010)			(0.008)	(0.009)		
Formal × Child	—	−0.021*	—	—	—	0.009	—	—
		(0.012)				(0.015)		
Informal × Child	—	−0.023*	—	—	—	−0.004	—	—
		(0.014)				(0.017)		
Hybrid	—	—	0.018***	0.029***	—	—	0.021***	0.020***
			(0.006)	(0.008)			(0.007)	(0.007)
HomeAll	—	—	0.017**	0.021**	—	—	0.028***	0.025**
			(0.008)	(0.010)			(0.009)	(0.011)
Hybrid × Child	—	—	—	−0.026**	—	—	—	0.002
				(0.011)				(0.014)
HomeAll × Child	—	—	—	−0.011	—	—	—	0.011
				(0.015)				(0.019)
Child	−0.014	−0.008	−0.014	−0.007	−0.071***	−0.072***	−0.071***	−0.072***
	(0.010)	(0.011)	(0.010)	(0.011)	(0.014)	(0.016)	(0.014)	(0.016)
DipCert	0.126***	0.126***	0.126***	0.126***	0.102**	0.103**	0.102**	0.103**
	(0.033)	(0.033)	(0.033)	(0.033)	(0.044)	(0.044)	(0.044)	(0.044)
Tertiary	0.189***	0.187***	0.189***	0.187***	0.131**	0.131**	0.131**	0.131**
	(0.061)	(0.061)	(0.061)	(0.061)	(0.055)	(0.055)	(0.055)	(0.055)
Exp	0.063***	0.063***	0.063***	0.063***	0.061***	0.061***	0.061***	0.061***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
Exp^2	−0.001***	−0.001***	−0.001***	−0.001***	−0.001***	−0.001***	−0.001***	−0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Partnered	0.033***	0.032***	0.033***	0.032***	0.008	0.008	0.008	0.008
	(0.012)	(0.012)	(0.012)	(0.012)	(0.011)	(0.011)	(0.011)	(0.011)
Professional	−0.025**	−0.025**	−0.024**	−0.025**	−0.025**	−0.025**	−0.024**	−0.024**
	(0.012)	(0.012)	(0.012)	(0.012)	(0.011)	(0.011)	(0.011)	(0.011)
Tradesperson	−0.070***	−0.071***	−0.070***	−0.071***	−0.048**	−0.048**	−0.048**	−0.048**
	(0.020)	(0.020)	(0.020)	(0.020)	(0.023)	(0.023)	(0.023)	(0.023)
Service worker	−0.041	−0.041	−0.041	−0.041	−0.051***	−0.052***	−0.051***	−0.051***
	(0.027)	(0.027)	(0.027)	(0.027)	(0.020)	(0.020)	(0.020)	(0.020)
Clerical worker	−0.053***	−0.054***	−0.053***	−0.054***	−0.064***	−0.064***	−0.064***	−0.064***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Sales workers	−0.083***	−0.083***	−0.083***	−0.083***	−0.066***	−0.066***	−0.066***	−0.066***
	(0.017)	(0.017)	(0.017)	(0.017)	(0.021)	(0.021)	(0.021)	(0.021)
Operator	−0.050**	−0.051**	−0.050**	−0.051**	−0.063	−0.064	−0.063	−0.063
	(0.020)	(0.020)	(0.020)	(0.020)	(0.042)	(0.042)	(0.042)	(0.042)
Labourer	−0.033*	−0.033*	−0.033*	−0.033*	0.011	0.011	0.011	0.011
	(0.020)	(0.020)	(0.020)	(0.020)	(0.035)	(0.035)	(0.035)	(0.035)

(Continues)

TABLE A2 | (Continued)

	Men				Women			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Agriculture	0.044	0.043	0.044	0.043	−0.041	−0.041	−0.041	−0.041
	(0.046)	(0.046)	(0.046)	(0.046)	(0.077)	(0.077)	(0.077)	(0.078)
Mining	0.192***	0.191***	0.191***	0.191***	0.133**	0.134**	0.133**	0.133**
	(0.034)	(0.034)	(0.034)	(0.034)	(0.067)	(0.067)	(0.067)	(0.067)
Manufacturing	0.014	0.014	0.013	0.013	0.013	0.013	0.013	0.013
	(0.020)	(0.020)	(0.020)	(0.020)	(0.032)	(0.032)	(0.031)	(0.032)
Electricity, gas and water	0.018	0.018	0.018	0.018	0.040	0.040	0.040	0.040
	(0.036)	(0.036)	(0.036)	(0.036)	(0.048)	(0.048)	(0.048)	(0.048)
Construction	0.017	0.017	0.017	0.017	0.078**	0.078**	0.077**	0.077**
	(0.023)	(0.023)	(0.023)	(0.023)	(0.038)	(0.038)	(0.038)	(0.038)
Wholesale trade	0.003	0.003	0.003	0.003	0.016	0.016	0.016	0.016
	(0.018)	(0.018)	(0.018)	(0.018)	(0.032)	(0.032)	(0.032)	(0.032)
Accommodation and food	−0.078	−0.078	−0.078	−0.078	−0.061	−0.060	−0.061	−0.061
	(0.061)	(0.061)	(0.061)	(0.061)	(0.042)	(0.042)	(0.042)	(0.042)
Transport	0.046*	0.046*	0.046*	0.046*	−0.015	−0.014	−0.015	−0.014
	(0.024)	(0.024)	(0.024)	(0.024)	(0.037)	(0.037)	(0.037)	(0.037)
Media	−0.047	−0.047	−0.047	−0.046	0.001	0.001	0.001	0.001
	(0.034)	(0.034)	(0.034)	(0.034)	(0.058)	(0.058)	(0.058)	(0.058)
Financial	−0.022	−0.022	−0.023	−0.023	0.048	0.048	0.047	0.047
	(0.029)	(0.028)	(0.028)	(0.028)	(0.039)	(0.039)	(0.039)	(0.039)
Real estate	0.004	0.004	0.004	0.003	−0.004	−0.004	−0.003	−0.003
	(0.029)	(0.029)	(0.029)	(0.029)	(0.048)	(0.048)	(0.049)	(0.049)
Science	0.029	0.028	0.029	0.028	−0.016	−0.016	−0.016	−0.016
	(0.021)	(0.021)	(0.021)	(0.021)	(0.029)	(0.029)	(0.029)	(0.029)
Administration	−0.011	−0.011	−0.011	−0.011	−0.056	−0.055	−0.056*	−0.056*
	(0.027)	(0.027)	(0.027)	(0.027)	(0.034)	(0.034)	(0.034)	(0.034)
Public administration	0.049**	0.048**	0.049**	0.048**	0.026	0.026	0.025	0.025
	(0.024)	(0.024)	(0.024)	(0.024)	(0.033)	(0.033)	(0.033)	(0.033)
Education and training	−0.003	−0.003	−0.003	−0.003	0.028	0.028	0.028	0.028
	(0.039)	(0.039)	(0.039)	(0.039)	(0.037)	(0.037)	(0.037)	(0.037)
Health	0.025	0.026	0.025	0.026	0.018	0.018	0.018	0.018
	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)
Arts	−0.017	−0.017	−0.017	−0.017	0.104*	0.104*	0.103*	0.104*
	(0.035)	(0.035)	(0.035)	(0.035)	(0.056)	(0.056)	(0.056)	(0.056)
Other services	0.009	0.009	0.009	0.009	0.005	0.005	0.005	0.005
	(0.024)	(0.024)	(0.024)	(0.024)	(0.037)	(0.037)	(0.037)	(0.037)
Public	−0.024	−0.024	−0.024	−0.024	0.023	0.023	0.023	0.023
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Urban	0.019	0.018	0.019	0.019	0.021	0.021	0.021	0.021
	(0.014)	(0.014)	(0.014)	(0.014)	(0.015)	(0.015)	(0.015)	(0.015)

(Continues)

TABLE A2 | (Continued)

	Men				Women			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	6.611***	6.609***	6.609***	6.607***	6.526***	6.526***	6.528***	6.529***
	(0.051)	(0.051)	(0.051)	(0.051)	(0.058)	(0.058)	(0.058)	(0.058)
Observations	16,121	16,121	16,121	16,121	11,200	11,200	11,197	11,197
R^2	0.088	0.088	0.088	0.088	0.098	0.098	0.098	0.098
Number of unique individuals	4771	4771	4771	4771	3867	3867	3866	3866

Note: Employees aged 18–64 years who are employed full-time in their main job (35 or more hours per week in their main job). The results are generated using a fixed effects panel estimator. The dependent variable is the natural logarithm of weekly earnings in the main job. Robust standard errors in parentheses and clustered on the individual. Estimates weighted to reflect population values. Household, Income and Labour Dynamics in Australia (HILDA) Survey, Waves 18–22.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

TABLE A3 | Selected estimated coefficients from OLS regression on working-at-home status on wages with gender interactions, 2018–2022, without controls for industry or occupation.

	All employees (full-time and part-time employees) (Dependent variable = ln(hourly wage)					Full-time employees (Dependent variable Y = ln(weekly wage main job)				
	(1) 2018	(2) 2019	(3) 2020	(4) 2021	(5) 2022	(6) 2018	(7) 2019	(8) 2020	(9) 2021	(10) 2022
NotHome × Female	−0.090***	−0.092***	−0.084***	−0.101***	−0.077***	−0.158***	−0.157***	−0.178***	−0.165***	−0.160***
	(0.014)	(0.015)	(0.017)	(0.016)	(0.020)	(0.018)	(0.017)	(0.019)	(0.017)	(0.026)
Formal	0.164***	0.206***	0.240***	0.218***	0.240***	0.126***	0.192***	0.218***	0.209***	0.203***
	(0.036)	(0.031)	(0.022)	(0.022)	(0.025)	(0.036)	(0.031)	(0.024)	(0.023)	(0.031)
Formal × Female	−0.139***	−0.150	−0.205***	−0.167***	−0.165***	−0.118*	−0.257***	−0.214***	−0.175***	−0.186***
	(0.045)	(0.095)	(0.023)	(0.025)	(0.023)	(0.061)	(0.078)	(0.026)	(0.028)	(0.027)
Informal	0.129***	0.139***	0.176***	0.158***	0.241***	0.167***	0.195***	0.210***	0.194***	0.276***
	(0.028)	(0.031)	(0.032)	(0.033)	(0.031)	(0.028)	(0.032)	(0.038)	(0.039)	(0.038)
Informal × Female	−0.187***	−0.170***	−0.164***	−0.164***	−0.212***	−0.211***	−0.204***	−0.146***	−0.166***	−0.213***
	(0.036)	(0.034)	(0.046)	(0.037)	(0.037)	(0.038)	(0.037)	(0.053)	(0.042)	(0.044)
LongHours	−0.015	0.031*	−0.001	−0.004	0.031**	—	—	—	—	—
	(0.014)	(0.016)	(0.016)	(0.014)	(0.015)					
Observations	8296	8274	7655	7695	7612	5710	5742	5196	5342	5326
R^2 (%)	0.270	0.268	0.244	0.284	0.291	0.296	0.316	0.314	0.324	0.308

Note: Employees aged 18–64 years. The hourly wage is constructed as the natural logarithm of weekly wages in main job divided by usual number of hours worked each week. The variable 'LongHours' is equal to 1 if the respondent works more than 40 h per week. Other variables in the regression include education, actual labour market experience, marital status, whether has dependent children, sector and urban location and industry and occupation. The set of result from the wage models are available from the authors on request. Estimates weighted to reflect population values. Robust standard errors in parentheses and clustered on the individual. Household, Income and Labour Dynamics in Australia (HILDA) Survey, Waves 18–22.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

TABLE A4 | Selected estimated coefficients from FE regression on working at home on wages, 2018–2022, full-time employees, without controls for industry or occupation.

	Men				Women			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Formal	0.019***	0.029***	—	—	0.023***	0.021**	—	—
	(0.006)	(0.008)			(0.007)	(0.008)		
Informal	0.015**	0.026***	—	—	0.022***	0.023**	—	—
	(0.007)	(0.010)			(0.008)	(0.009)		
Formal × Child	—	−0.022*	—	—	—	0.008	—	—
		(0.012)				(0.015)		
Informal × Child	—	−0.023*	—	—	—	−0.005	—	—
		(0.014)				(0.017)		
Hybrid	—	—	0.019***	0.030***		—	0.021***	0.021***
			(0.006)	(0.008)	—		(0.007)	(0.008)
HomeAll	—	—	0.016**	0.020**		—	0.029***	0.026**
			(0.008)	(0.010)	—		(0.009)	(0.011)
Hybrid × Child	—	—	—	−0.027**		—		0.001
				(0.011)	—			(0.015)
HomeAll × Child	—	—	—	−0.011		—		0.011
				(0.015)				(0.019)
Child	−0.015	−0.008	−0.015	−0.008	−0.072***	−0.073***	−0.072***	−0.073***
	(0.010)	(0.011)	(0.010)	(0.011)	(0.015)	(0.016)	(0.014)	(0.016)
Observations	16,121	16,121	16,121	16,121	11,197	11,197	11,197	11,197
# unique individuals	4771	4771	4771	4771	3867	3867	3866	3866

Note: Employees aged 18–64 years who are employed full-time in their main job (35 or more hours per week in their main job). The results are generated using a fixed effects panel estimator. The dependent variable is the natural logarithm of weekly earnings in the main job. Robust standard errors in parentheses and clustered on the individual. Estimates weighted to reflect population values. Household, Income and Labour Dynamics in Australia (HILDA) Survey, Waves 18–22.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

TABLE A5 | Blinder–Oaxaca decomposition of the gender pay gap, weighted to the female wage structure.

		2019		2022	
		Coefficient	Standard error	Coefficient	Standard error
(1)	Ln(Wage)—Men	7.472	(0.014)***	7.474	(0.014)***
(2)	Ln(Wage)—Women	7.327	(0.012)***	7.337	(0.012)***
(3)	Difference (raw gap)	−0.146	(0.019)***	−0.136	(0.019)***
(4)	Explained component (due characteristics)	−0.016	(0.023)	0.023	(0.018)
(5)	Unexplained component (due coefficients)	−0.130	(0.022)***	−0.159	(0.020)***
	Explained component in detail				
(6)	Working at home—formal arrangement	<−0.000	0.002	0.007	(0.002)***
(7)	Working at home—informal arrangement	−0.002	0.001	0.006	(0.002)***
(8)	All other controls	−0.018	0.022	0.010	(0.017)
	Unexplained component in detail				
(9)	Working at home—formal arrangement	−0.011	0.009	−0.007	(0.010)
(10)	Working at home—informal arrangement	−0.007	0.005	−0.010	(0.050)**
(11)	All other controls	−0.054	0.137	−0.047	(0.096)

(Continues)

TABLE A5 | (Continued)

		2019		2022	
		Coefficient	**Standard error**	**Coefficient**	**Standard error**
(18)	Constant	−0.013	0.025	−0.094	(0.092)
	% of raw gap (row 3) explained by working at home				
(19)	Working at home—formal arrangement	0.2%		−5.0%	
(20)	Working at home—informal arrangement	−1.5%		−4.7%	

Note: Employees aged 18–64 years who are employed full-time in their main job (35 or more hours per week in their main job). The dependent variable is natural logarithm of weekly wages. Standard errors in parentheses. Estimates weighted to reflect population values. The estimates are weighted by the female wage structure. Household, Income and Labour Dynamics in Australia (HILDA) Survey, Waves 19 and 22.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.