

Gender Differences in Labour-Leisure Choices and Wages of Childless Workers

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JEL Classification:

J16 Economics of Gender; Non-labor Discrimination

J22 Time Allocation and Labor Supply

J23 Labour Demand

J24 Human Capital; Skills; Occupational Choice; Labor Productivity

J30 Wages, Compensation, and Labor Costs: General

J31 Wage Level and Structure; Wage Differentials

1. INTRODUCTION

- This paper examines whether the leisure choices and labour market outcomes differ over Australian men and women's working life in the absence of children.
- Children can directly impact on participation and hours in the workforce and may directly affect wages though lower productivity.
- In addition, children impact indirectly on labour market outcomes through impacts on human capital investment, employment and job type, work experience and other factors.

1.1. Motivation

- There is evidence to suggest that the gender income gap in many developed countries has narrowed considerably over the last 50 years, see Goldin (2014) and Olivetti and Petrongolo (2016).
- Blau and Kahn (2017) offer several explanations for this decline, such as the narrowing of the gender education gap, the decrease in labour force discrimination, and family-oriented workplaces and government policies.
- Olivetti and Petrongolo (2016) also show that while the gender income gap has declined it remains persistent.

1.2. Gender Pay Gap in Australia

- In Australia for May 2018 the average hourly wage of full-time non-managerial employees (ABS, 2017) for males was \$44.80, 14.9% above the female average of \$39.00, (ABS, 2017).
 - The average weekly hours worked paid for full-time non-managerial employees (ABS, 2017) for males was 40.1 hours, 5.5% higher than the female average of 38.0 hours.
 - These difference in wages and hours result in male average weekly earnings being 21% above the female average.
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- In Australia the gap in full-time ordinary time average weekly earnings (ABS, 2019), was declining very slowly from 20.8% in February 1996 to 17.5% in November 2004, then rose to 22.7% in November 2014 before falling to more rapidly 16.5% in November 2018.

1.3. Persistence of the Gender Pay Gap

- The primary reason put forward for this persistent gender income gap has been that females are still more likely to care for children.
- The loss of income due to children is often termed the “motherhood-penalty” or “child-penalty” and its importance has been outlined for a number of countries such as United States (Chung et al., 2017), Denmark (Kleven et al., 2018), Norway (Bergsvik et al., 2018), the United Kingdom (Kuziemko et al., 2018) and Sweden (Angelov et al., 2016).
- As the other determinants of the gender income gap have declined in importance, the proportion of the gap that can be explained by the child-penalty has risen.
- In Denmark, Kleven et al. (2018) show that child penalty accounted for 80% of the gender gap in 2013, compared to only 40% in 1980. For Australia both Reiman (2001) and Cassells et al., (2009) calculate that 60% of the gender wage gap is unexplained and not due to education, labour force history, occupational choices, industry segmentation or firm size.

1.4. This Study

- This study attempts to remove most of the child or motherhood penalty by examining those individuals who never have or want to have children.
- This avoids many of the issues associated with children that effect the labour market outcomes of mothers and fathers.
 - It avoids any under investment in employee-initiated education and training of potential parents compared to non-parents, in anticipation of future time away from or out of the labour force.
 - Or alternatively it avoids the potential increase investment in human capital as expectant parents prepare to maximise their earnings when they are working and to provide for the children upbringing and education.

- It also avoids any potential build up in hours of work by parents prior to the birth of their children to build a buffer stock of wealth for the childhood years (Andresen and Nix, 2019).
- It avoids the depreciation in human capital that can occur when parents withdraw from the labour market or reduce their working hours to care for children.
- It avoids the potential loss in productivity that can occur when parents remain at work while caring for children. A lot of previous thinking time may now be devoted to
 - Thinking about children's welfare, transportation, clothing, food, sport and other activities
- It allows the examination of whether men and women's labour supply decisions are inherently different over their life cycle in the absence of caring for children.

- While restricting the analysis to always childless individuals removes many of the labour market issues from the effects of children, it does not remove all
 - Until workers are well past their 40s, employers do not have perfect information about whether employees intend to have children.
 - They may expect, based on experience or on statistics, that many of their employees are likely to have children and that their female employees are more likely to reduce their time at the workplace or leave to care for children.
 - If employers expect to have less time to reap the benefits of any investment in their workers they are less likely to offer them training and promotional opportunities, with the potential to limit the growth in the wages.
 - In addition, they may be concerned about the depreciation of any employer human capital investment.
- Thus, even with this non-child sample, we may anticipate a difference in wages between men and women, through employers' expectations. Over time employees may gather information and revise their expectations and eventually learn as their employees age whether they will have children.

- Always childless males and female may be different to those that are have been, are or plan to be parents in addition to the presence and effects of children on human capital development.
- Always childless individuals may have different personalities, be more work focussed or hold other unobserved characteristics that influence their labour market decisions and outcomes.
- In the future employ a Heckman (1979) type correction to control for the choice of being childless and the unobserved characteristics that may be correlated with the choice of hours of work and the wage offer.

2. DATA

- This study uses Household, Income and Labour Dynamics in Australia (HILDA) Survey, Restricted Release 17.
- The survey contains data on the labour market dynamics, family life and welfare of a panel of individuals, their household members over from 2001 to 2017. In particular, HILDA contains continuous variables on usual hours of work and usual income, rather than categories of current observed hours and wages. It also provides data on occupation, industry, workplace size and type of business, job satisfaction and whether employees wish to work more or less hours.
- Each wave of HILDA samples between 13,000 to 18,000 individuals. Of which approximately 5,000 to 7,000 individuals have never had any children and 900 to 2000 sampled individuals report never having or wanting any children.
- This study makes use of the survey question that asks:
“How likely are you to have children in the future? 0 Not at all likely to 10 Highly likely.”

Figure 1 Employees 2017 - Wage v. Age

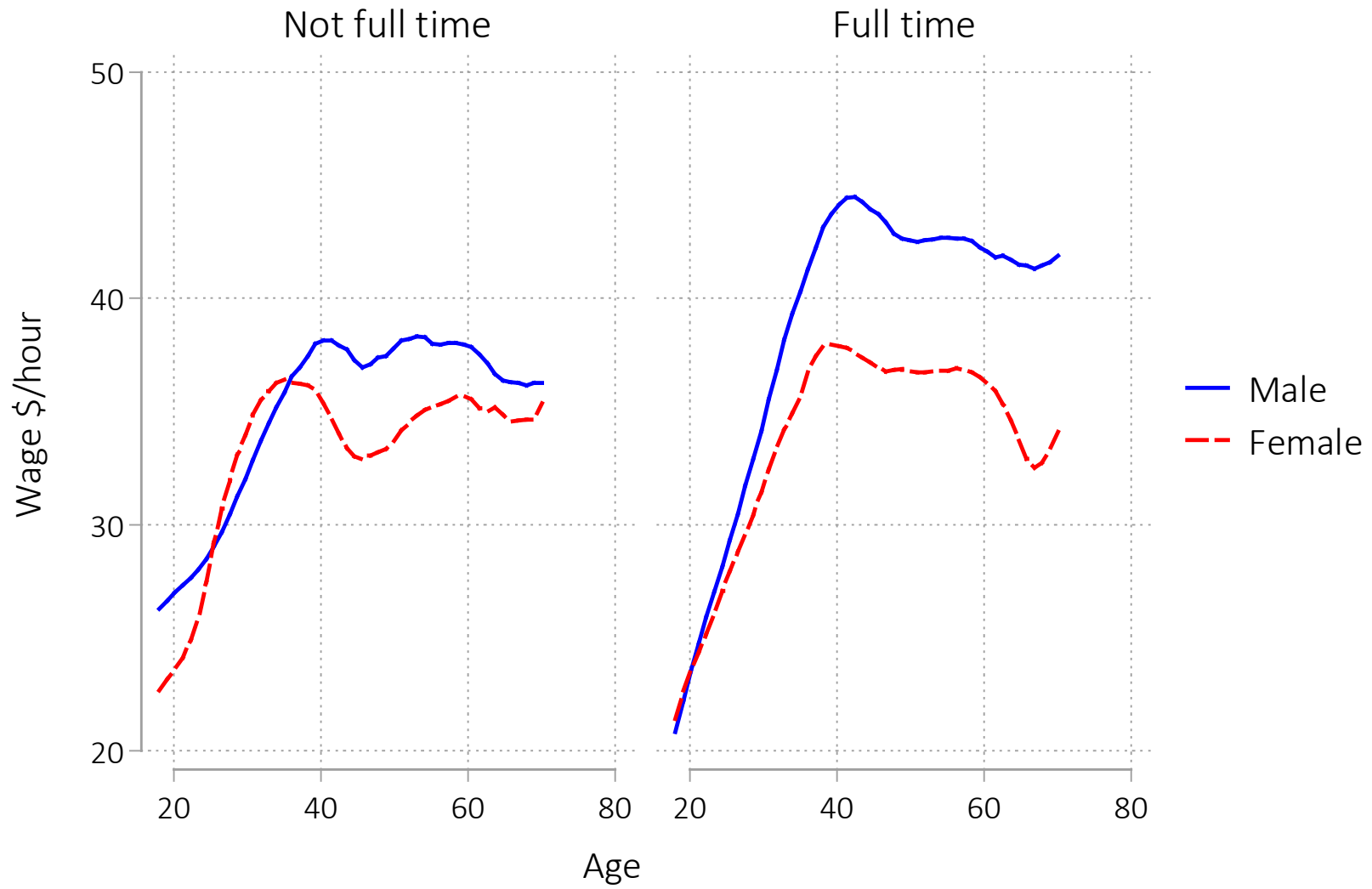


Figure 2 Employees 2017 - Hours v. Age

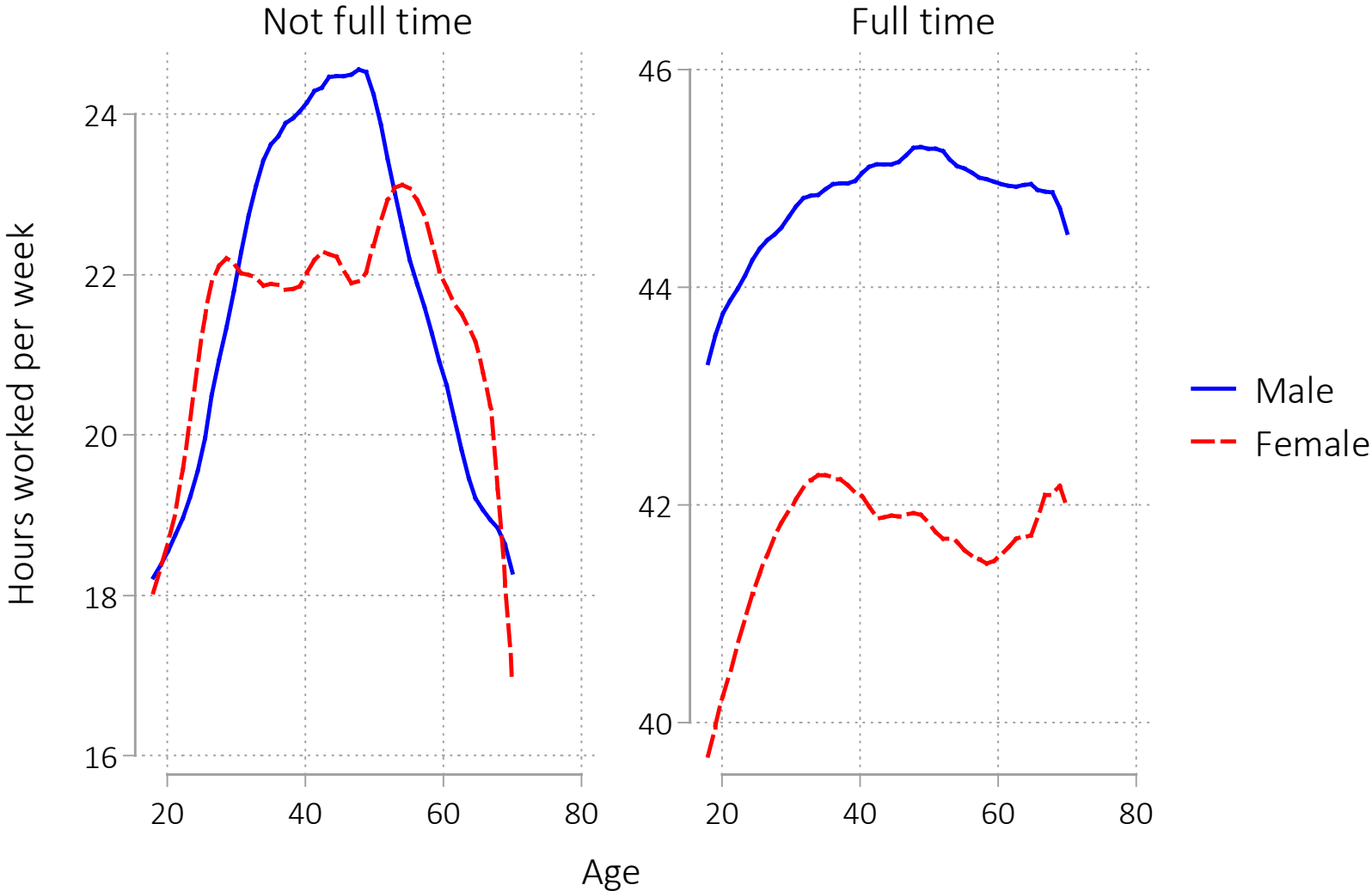


Figure 3 Employees 2017 - Wage v. FT/PT

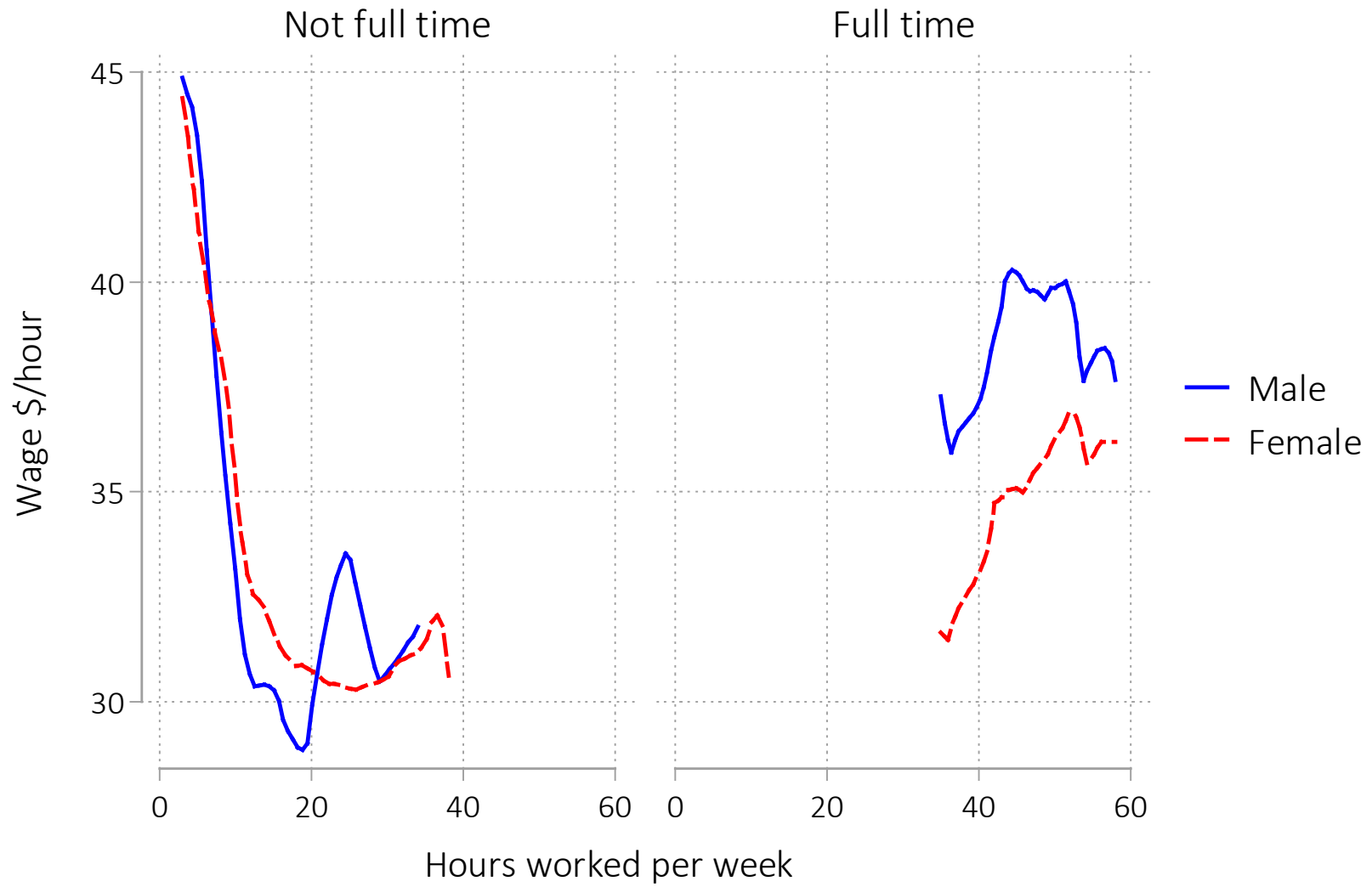


Figure 4 Employees 2017 - Wage v. Age - Childlessness

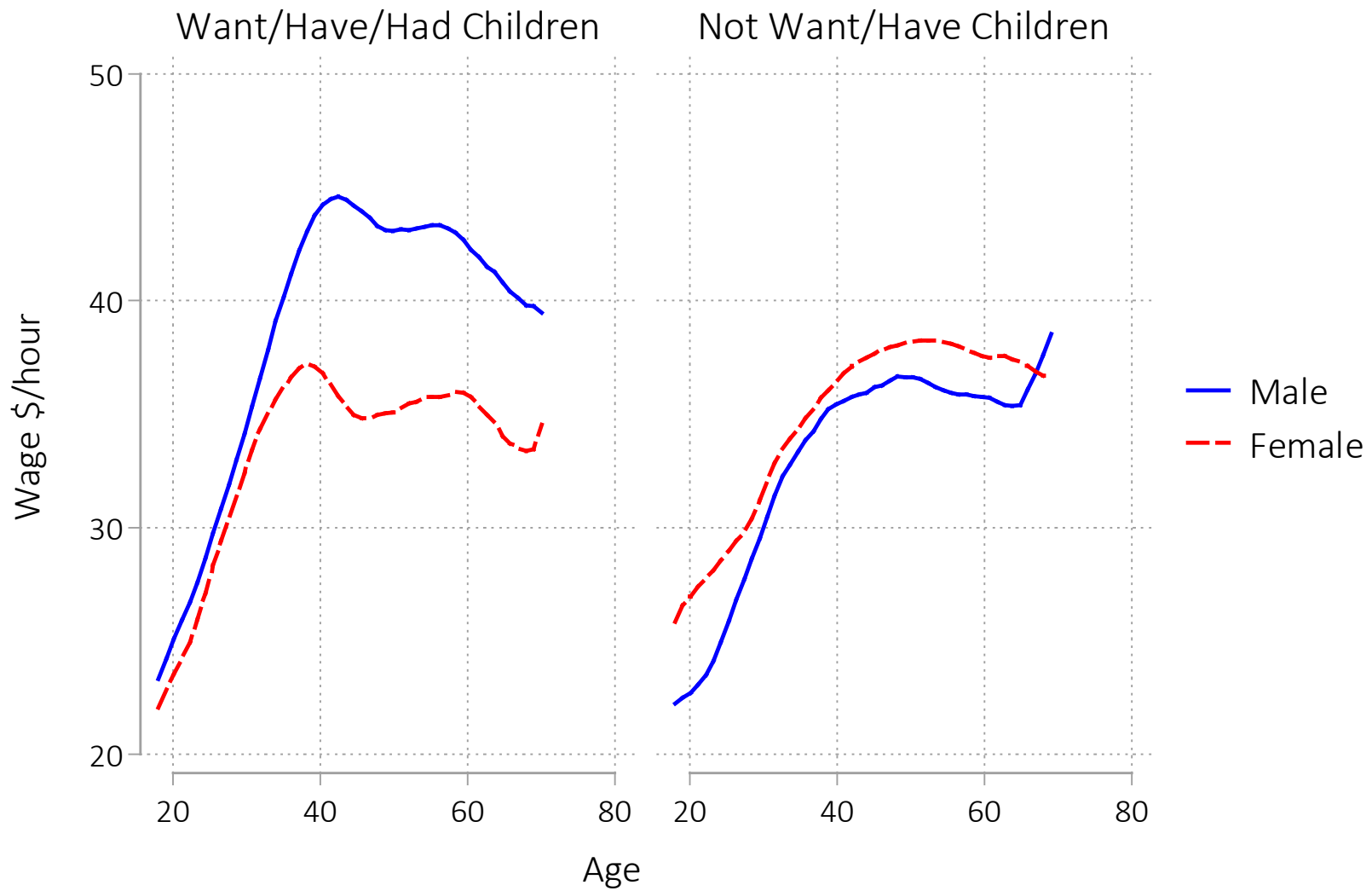


Figure 5 % Working Full Time by Age - Gender and Childlessness

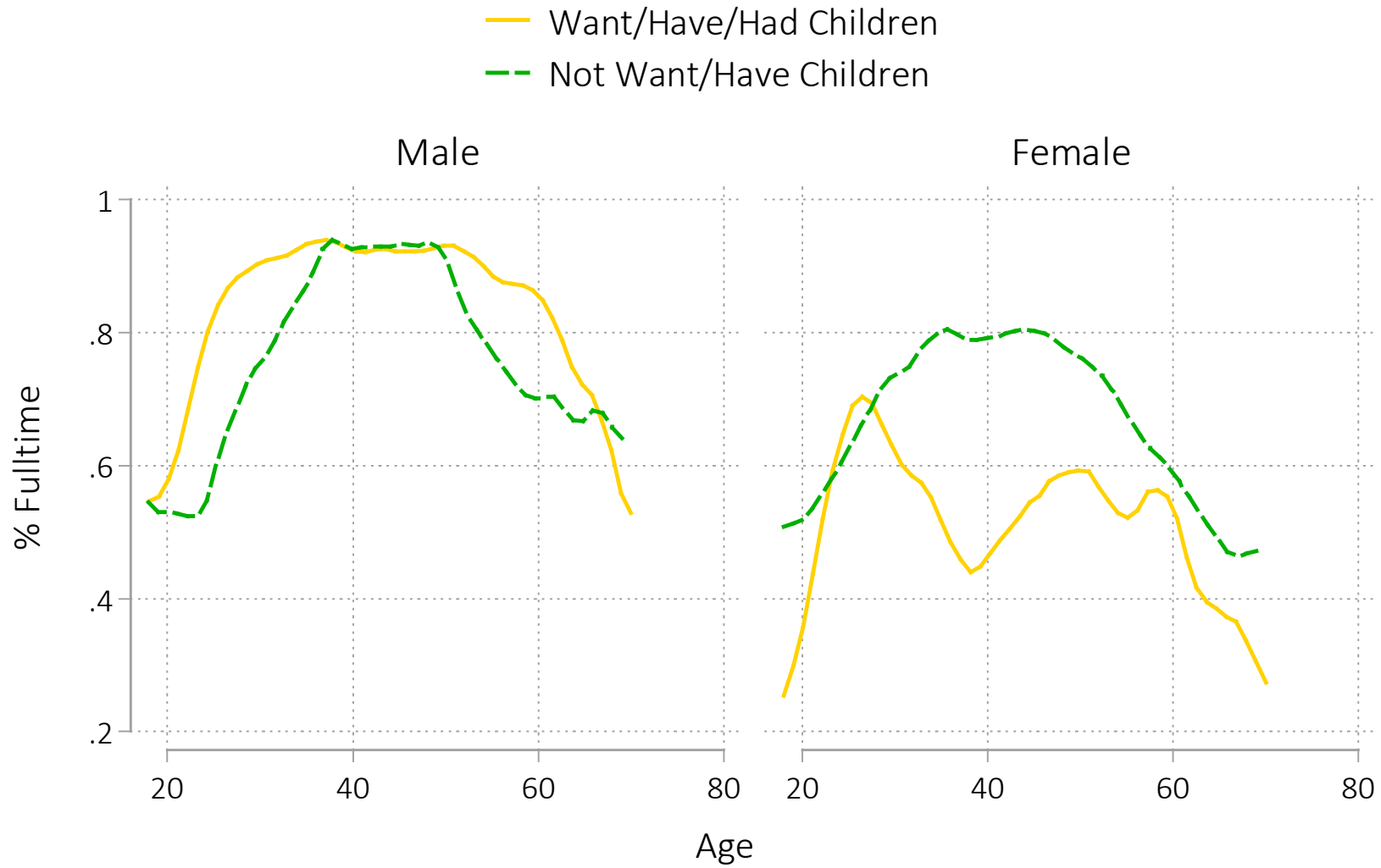


Figure 6 FT Employees - Hours v. Age - Childless

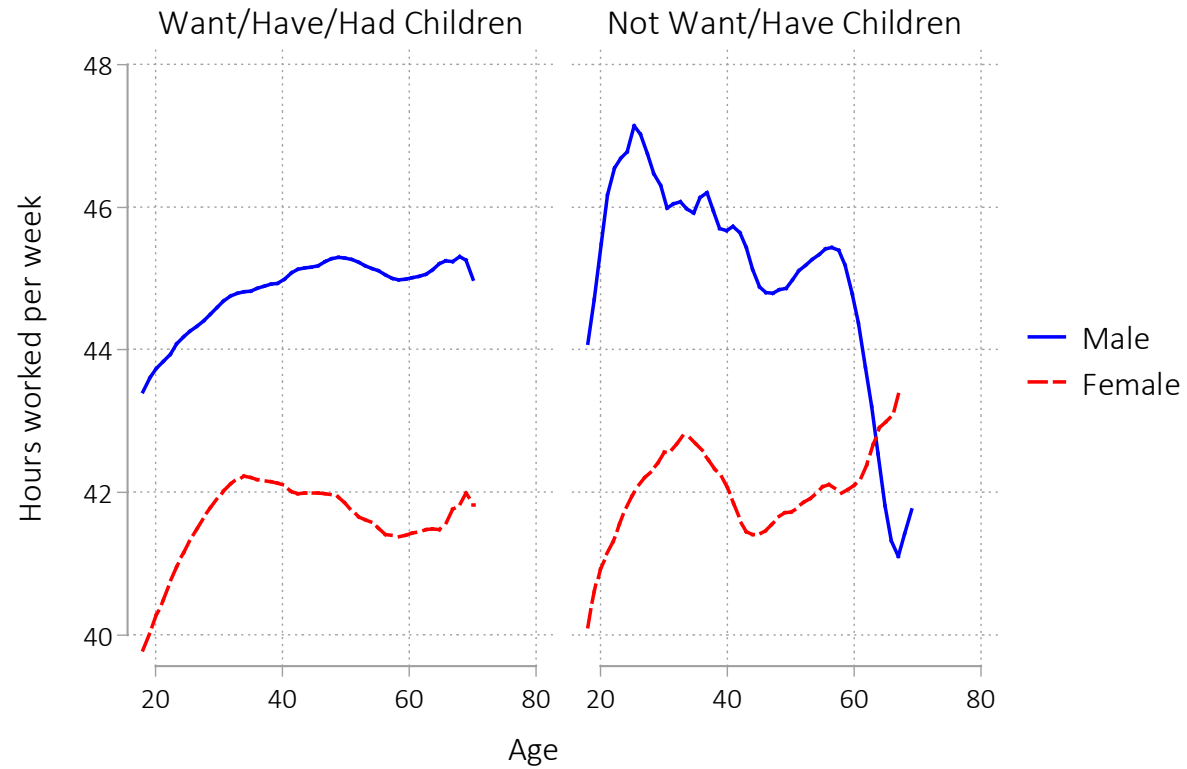


Figure 7 PT Employees - Hours v. Age - Childless

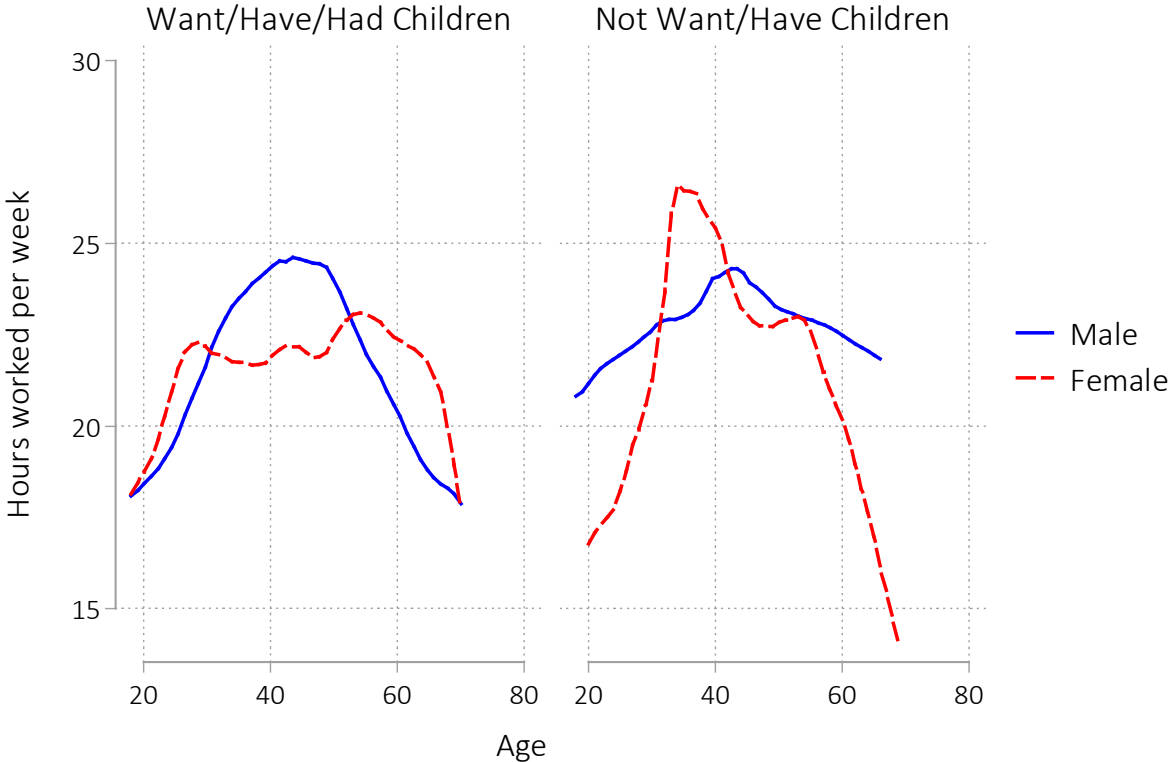


Table 1 Summary Statistics Male v. Female by Children

		Male		Female	
		Want/Have/Had Children	Not Want/Have Children	Want/Have/Had Children	Not Want/Have Children
All Respondents	Employed	71%	58%	59%	60%
	Employee	58%	48%	53%	54%
	Age	45.9	49.3	46.8	50.6
	Population	8,209,800	851,106	8,792,012	650,493
	Sample	6,517	649	7,507	663
Employees	Hours	39.7	39.0	32.0	35.3
	Fulltime	83%	78%	55%	69%
	Wage	\$38.16	\$32.19	\$32.25	\$36.28
	Population	4,767,576	406,023	4,658,961	352,700
	Sample	3,740	326	3,964	369

Table 2 Labour Force Statistics Singles/Couples

		Male		Female	
		Want/Have/Had Children	Not Want/Have Children	Want/Have/Had Children	Not Want/Have Children
Singles	Employed	68%	51%	57%	54%
	Employee	60%	45%	54%	51%
	Hours	35.6	36.4	31.7	34.0
	Fulltime	69%	72%	54%	64%
	Wage	\$29.40	\$28.77	\$28.29	\$34.50
Couples	Employed	72%	70%	61%	68%
	Employee	57%	53%	52%	59%
	Hours	41.9	42.5	32.3	37.0
	Fulltime	91%	86%	55%	74%
	Wage	\$42.82	\$36.67	\$34.66	\$38.37

Table 3 Labour Statistics by Occupation

Occupation 1-digit ANZSCO 2006	Wage	% of Employees	% Female	% Female of Not Want/Have Children
Managers	\$45.54	11.9%	39%	44%
Professionals	\$44.78	25.9%	56%	61%
Technicians and Trades Workers	\$32.54	11.6%	17%	19%
Community & Personal Service Workers	\$28.00	13.2%	71%	68%
Clerical and Administrative Workers	\$30.42	14.1%	73%	65%
Sales Workers	\$23.94	8.0%	60%	56%
Machinery Operators and Drivers	\$33.44	6.9%	12%	10%
Labourers	\$25.67	8.4%	33%	25%
Total	\$35.15	100.0%	49%	47%

Table 4 Labour Statistics by Education

History: Highest education level	Wage	% of Employees	% Female	% Female of Not Want/Have Children
Postgrad - masters or doctorate	\$47.83	9%	48%	56%
Grad diploma, grad certificate	\$47.57	7%	61%	67%
Bachelor or honours	\$41.15	20%	55%	63%
Adv diploma, diploma	\$34.28	10%	57%	54%
Cert III or IV	\$31.52	22%	41%	34%
Year 12	\$27.79	19%	47%	42%
Year 11 and below	\$27.65	12%	46%	29%
Total	\$35.15	100%	49%	47%

Table 5 Labour Statistics by Industry

Industry of main job	Wage	% of Employees	% Female	% Female of Not Want/Have Children
Agriculture, Forestry and Fishing	\$26.50	1%	31%	51%
Mining	\$56.77	2%	23%	43%
Manufacturing	\$34.65	8%	22%	12%
Electricity, Gas, Water and Waste Services	\$44.33	1%	15%	24%
Construction	\$34.82	6%	14%	7%
Wholesale Trade	\$30.95	3%	30%	23%
Retail Trade	\$24.59	9%	52%	51%
Accommodation and Food Services	\$23.19	6%	63%	36%
Transport, Postal and Warehousing	\$35.18	5%	27%	15%
Information Media and Telecommunications	\$40.85	2%	45%	43%
Financial and Insurance Services	\$43.95	4%	53%	73%
Rental, Hiring and Real Estate Services	\$32.02	2%	62%	44%
Professional, Scientific and Technical Services	\$42.41	6%	43%	41%
Administrative and Support Services	\$29.13	3%	48%	32%
Public Administration and Safety	\$41.79	6%	40%	46%
Education and Training	\$37.13	12%	70%	69%
Health Care and Social Assistance	\$36.35	18%	79%	82%
Arts and Recreation Services	\$29.96	2%	40%	38%
Other Services	\$29.39	3%	31%	49%
Total	\$35.15	100%	49%	47%

Table 6 Labour Force Years by Gender and Child Status

	Male		Female	
	Want/Have/Had Children	Not Want/Have Children	Want/Have/Had Children	Not Want/Have Children
work years	18.7	23.5	16.8	24.2
occ years	9.0	11.7	8.4	11.5
job years	6.5	8.0	6.5	8.6
out of LF years	0.8	1.2	3.5	1.3
unemployed years	0.6	1.2	0.6	0.8

3. MODELLING APPROACH

For simplicity, assume that all decisions to have children are made before, education and labour decisions.

wage(ln) per hour of work: $w_{it} = f^{ld} \left(h_{it}, y_{it}, \mathbf{Z}_{it}^w, s_{it}^*, u_{it}^w \right)$

hours of paid work per week: $h_{it} = f^{ls} \left(w_{it}, y_{it}, \mathbf{Z}_{it}^h, s_{it}^*, u_{it}^h \right)$

binary employed FT, PT: $s_{it} = f^s \left(\mathbf{Z}_{it}^s, y_{it}, v_{it}^h \right)$

years in work, occ, job: $y_{it} = f^y \left(\mathbf{Z}_{it}^s, \dots, \mathbf{Z}_{i0}^s, v_{it}^y, \dots, v_{i0}^y \right)$

$u_{it}^w, u_{it}^h, v_{it}^s, v_{it}^y$ are error terms

$$s_{it} = \begin{cases} 1 & \text{if } s_{it}^* > 0 \\ 0 & \text{if } s_{it}^* \leq 0 \end{cases}$$

Labour Demand: $w_{it} = \mathbf{Z}_{it}^w \delta^w + \beta^w h_{it} + \mu_i + \varepsilon_{it}^w$ if $s_{it}^* > 0$ (1)

Labour Supply: $h_{it} = \mathbf{Z}_{it}^h \delta^h + \beta^w w_{it} + \mu_i + \varepsilon_{it}^h$ if $s_{it}^* > 0$ (2)

$v_{it} \sim N(0,1)$, $u_{it}^w \sim N(0, \sigma_w^2)$, $u_{it}^h \sim N(0, \sigma_h^2)$, $\text{cor}(v_{it}, u_{it}^w) = \rho_w$, $\text{cor}(v_{it}, u_{it}^h) = \rho_h$

$$\begin{aligned}
E\left[w_{it} \mid \mathbf{Z}_{it}, s_{it}^* > 0\right] &= \mathbf{Z}_{it}^w \boldsymbol{\theta}^w + E\left[\varepsilon_{it}^w \mid s_{it}^* > 0\right] \\
&= \mathbf{Z}_{it}^w \boldsymbol{\theta}^w + E\left[\varepsilon_{it}^w \mid \mathbf{Z}_{it}^s \boldsymbol{\theta}^s + v_{it}\right] \\
&= \mathbf{Z}_{it}^w \boldsymbol{\theta}^w + E\left[\varepsilon_{it}^w \mid v_{it} > -(\mathbf{Z}_{it}^s \boldsymbol{\theta}^s)\right] \\
&= \mathbf{Z}_{it}^w \boldsymbol{\theta}^w + \rho_w \sigma_w \lambda_{it}
\end{aligned}
\quad \text{similarly,} \quad
\begin{aligned}
E\left[h_{it} \mid \mathbf{Z}_{it}, s_{it}^* > 0\right] &= \mathbf{Z}_{it}^h \boldsymbol{\theta}^h + E\left[\varepsilon_{it}^h \mid s_{it}^* > 0\right] \\
&= \mathbf{Z}_{it}^h \boldsymbol{\theta}^h + \rho_h \sigma_h \lambda_{it}
\end{aligned}$$

Where $\lambda_{it} = \frac{\phi(\mathbf{Z}_{it}^s \boldsymbol{\theta}^s)}{\Phi(\mathbf{Z}_{it}^s \boldsymbol{\theta}^s)} = \frac{\phi(\Phi^{-1}(\hat{P}_{it}))}{\hat{P}_{it}}$ is the Inverse Mills Ratio

$$w_{it} = \mathbf{Z}_{it}^w \boldsymbol{\theta}^w + \beta^w h_{it} + \rho_w \sigma_w \hat{\lambda}_{it} + \varepsilon_{it}^w \quad \text{if } s_{it}^* > 0 \quad (3)$$

$$s_{it}^* = 1\left[\mathbf{Z}_{it}^s \boldsymbol{\theta}^s + \mu_i^s + v_{it}\right] \quad (4)$$

Wooldridge(2002) demonstrates that 2SLS is consistent under sample selection.

Equation (3) is estimated by OLS, Random Effects Panel and Random Effects Panel 2SLS Model using \mathbf{Z}_{it}^h , \mathbf{Z}_{it}^y and $\hat{\lambda}_{it}$ as instruments for h_{it} and \mathbf{y}_{it} . Equation (4) is estimated as a Probit and Random Effects Panel Probit to provide the Inverse Mills Ratio.

4. RESULTS

Table 7 Probit FT/PT 2017 Weighted Estimates

Sample	Pr(Full Time Employed)				Pr(Part Time Employed)			
	All		Not Want/Not Have Children		All		Not Want/Not Have Children	
	1	2	1	2	1	2	1	2
Female	-0.651*	-0.989**	-1.320	-1.164	-1.116***	-0.591*	-2.495	0.431
	(0.350)	(0.393)	(1.118)	(1.313)	(0.269)	(0.353)	(1.681)	(2.340)
Not Want/Have Children	-0.151	-0.029			0.172	0.217*		
	(0.097)	(0.109)			(0.108)	(0.128)		
Female x Not Want/Have Children	0.100	0.077			-0.366**	-0.340**		
	(0.136)	(0.152)			(0.142)	(0.167)		
Female x Age	0.024	0.041*	0.062	0.058	0.082***	0.045**	0.138*	-0.015
	(0.018)	(0.021)	(0.053)	(0.062)	(0.013)	(0.018)	(0.077)	(0.114)
Female x Age ²	-0.0002	-0.0004*	-0.0007	-0.0006	-0.0008***	-0.0004*	-0.0008*	0.0001
	(0.0002)	(0.0002)	(0.0006)	(0.0007)	(0.0001)	(0.0002)	(0.0004)	(0.0007)
Sample Size	15,336	15,336	1,309	1,302	15,336	15,336	1,309	798
Pseudo R ²	0.317	0.475	0.371	0.569	0.141	0.423	0.172	0.321

Model 1 Controls: age, age², eng, cob, abt, hlth, migage, mstat, mdur, inc, mumeo, dadeo, nilfyr, nilfyr², ueyrs, ueyrs², (ku5, ku15, ku25, khad) x female

Model 2 Controls: Model 1 + ind, occ, edu

Table 8 Panel RE Probit FT/PT Unweighted Estimates

Sample	Pr(Full Time Employed)		Pr(Part Time Employed)	
	All	Not Want/Not Have Children	All	Not Want/Not Have Children
Model	3	3	3	3
Female	-1.028*** (0.205)	-1.461** (0.733)	-0.998*** (0.175)	-0.353 (0.608)
Not Want/Have Children	-0.054 (0.052)		0.207*** (0.057)	
Female x Not Want/Have Children	0.039 (0.073)		-0.254*** (0.075)	
Female x Age	0.022** (0.011)	0.058 (0.038)	0.091*** (0.009)	0.050* (0.031)
Female x Age ²	-0.000 (0.000)	-0.001 (0.000)	-0.001*** (0.000)	-0.001 (0.000)
Sample Size	168,223	14,864	168,223	14,856
Pseudo R ²	0.281	0.286	0.213	0.240

Model 3 Controls: Model 2 + year dummies + individual random effects

Table 9 Wages FT Employees 2017 - OLS and 2SLS with Selection

Sample Model	All				Not Want/Not Have Children			
	OLS 1	OLS 2	2SLS 3	2SLS 4	OLS 1	OLS 2	2SLS 3	2SLS 4
IMR	-0.184*** (0.068)	-0.149** (0.067)	0.026 (0.038)	-0.001 (0.040)	-0.415 (0.267)	-0.300 (0.265)	-0.444*** (0.152)	-0.479*** (0.162)
Female	-0.075*** (0.021)	-0.088*** (0.021)	-0.074*** (0.027)	-0.081*** (0.027)	0.012 (0.048)	-0.001 (0.047)	0.034 (0.055)	0.039 (0.057)
Not Want/Have Children	-0.127*** (0.042)	-0.132*** (0.041)	-0.170*** (0.044)	-0.210*** (0.046)				
Female x Not Want/Have Children	0.134*** (0.049)	0.140*** (0.049)	0.172*** (0.053)	0.221*** (0.058)				
Sample Size	5,704	5,704	5,704	5,704	506	506	506	506
Adjusted R ²	0.459	0.478	0.186	0.151	0.488	0.496	0.333	0.321

OLS1 Controls: age, age², region, remoteness, section, casual, union, pubemp, nemployees, jobsathi, pdmatleave, eng, cob, abt, hlth, migage, edu, occ, ind, mstat, mdur, inc, mumeo, dadeo, nilfyr, nilfyr², ueyrs, ueyrs², (ku5, ku15, ku25, khad) x female.

OLS2 Controls: OLS1 + { jobhrs, workyears, jobyears, occyears }

2SLS3 Controls: OLS2 – {mstat, mdur, inc, mumeo, dadeo, nilfyr, nilfyr², ueyrs, ueyrs², (ku5, ku15, ku25, khad) x female} which are used as IV for { jobhrs, workyears }

2SLS4 Controls: OLS2 – {mstat, mdur, inc, mumeo, dadeo, nilfyr, nilfyr², ueyrs, ueyrs², (ku5, ku15, ku25, khad) x female} which are used as IV for { jobhrs, workyears, occyears, jobyears }

Table 10 Panel Wages FT Employees - OLS and 2SLS with Selection - Unweighted

Sample Model	All				Not Want/Not Have Children			
	RE1	RE2	IV RE1	IV RE2	RE1	RE2	IV RE1	IV RE2
IMR	-0.035*** (0.008)	-0.011 (0.008)	0.013* (0.007)	-0.013 (0.009)	-0.065** (0.030)	-0.055* (0.030)	-0.007 (0.028)	-0.000 (0.032)
Female	-0.082*** (0.007)	-0.107*** (0.007)	-0.020* (0.012)	-0.049*** (0.016)	-0.060*** (0.018)	-0.077*** (0.018)	-0.062*** (0.021)	-0.065*** (0.021)
Not Want/Have Children	-0.028*** (0.007)	-0.030*** (0.007)	-0.032*** (0.011)	-0.016 (0.013)				
Female x Not Want/Have Children	0.002 (0.011)	0.005 (0.011)	-0.005 (0.016)	-0.011 (0.019)				
Sample Size	62,830	62,830	62,830	62,830	6,124	6,124	6,124	6,124
Adjusted R ²								

RE1 Controls: OLS1 + year dummies + individual random effects

RE2 Controls: OLS2 + year dummies + individual random effects

IVRE1 Controls: 2LS23 + year dummies + individual random effects

IVRE2 Controls: 2SLS4 + year dummies + individual random effects

5. CONCLUDING REMARKS

- For the full sample of 2017 and controlling for children (and many other variables), females are
 - significantly less likely to work full time or part-time.
 - significantly less likely to work part-time if they do not have/had/want children.
- For 2017 of those people who do not have/had/want children, females are no less likely to work FT than their male counterparts.
- For the full sample of 2017, OLS and 2SLS estimates suggest that the gender gap in hourly wage is significant and about 8% and that always childless males earn about 20% less per hour
- However, of those people who do not have/had/want children in 2017, there is no significant gender pay gap.

The RE panel models over 2005-2017 seem to indicate different results for the always childless.

- The RE panel probit indicates that all females are significantly less likely to work-fulltime and that being always childless does not alter this.
- The RE panel OLS and 2SLS estimates of the full sample indicate that gender gap in hourly wage is significant and about 5%.
- Unlike the 2017 estimates the RE panel OLS and 2SLS estimates of those people who do not have/had/want children, that there is a significant gender gap in hourly wage of about 6.5%.
- The difference between the results for 2017 and the panel models may be due
 - to the panel models not supporting the use of sample weights, which is particularly important when restricting the sample to the always childless.
 - differences in behaviour in 2017.

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