Female Employment, Marriage, and Child Care

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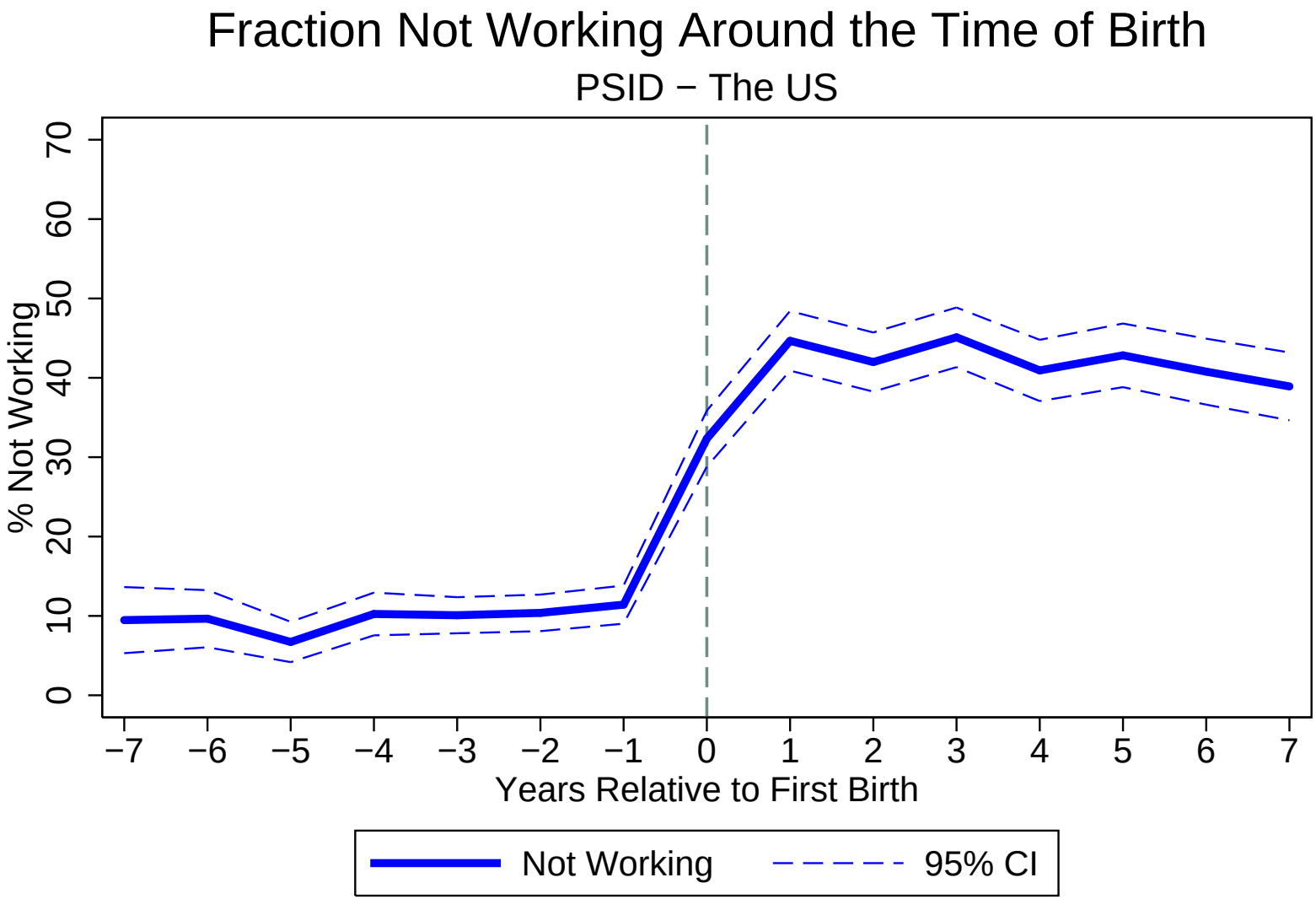
Motivation

Children and mothers' extensive margin of employment



328 women for whom data at least 3 years before and after birth are available, PSID (1968−1996)

Motivation

Children and mothers' intensive margin of employment

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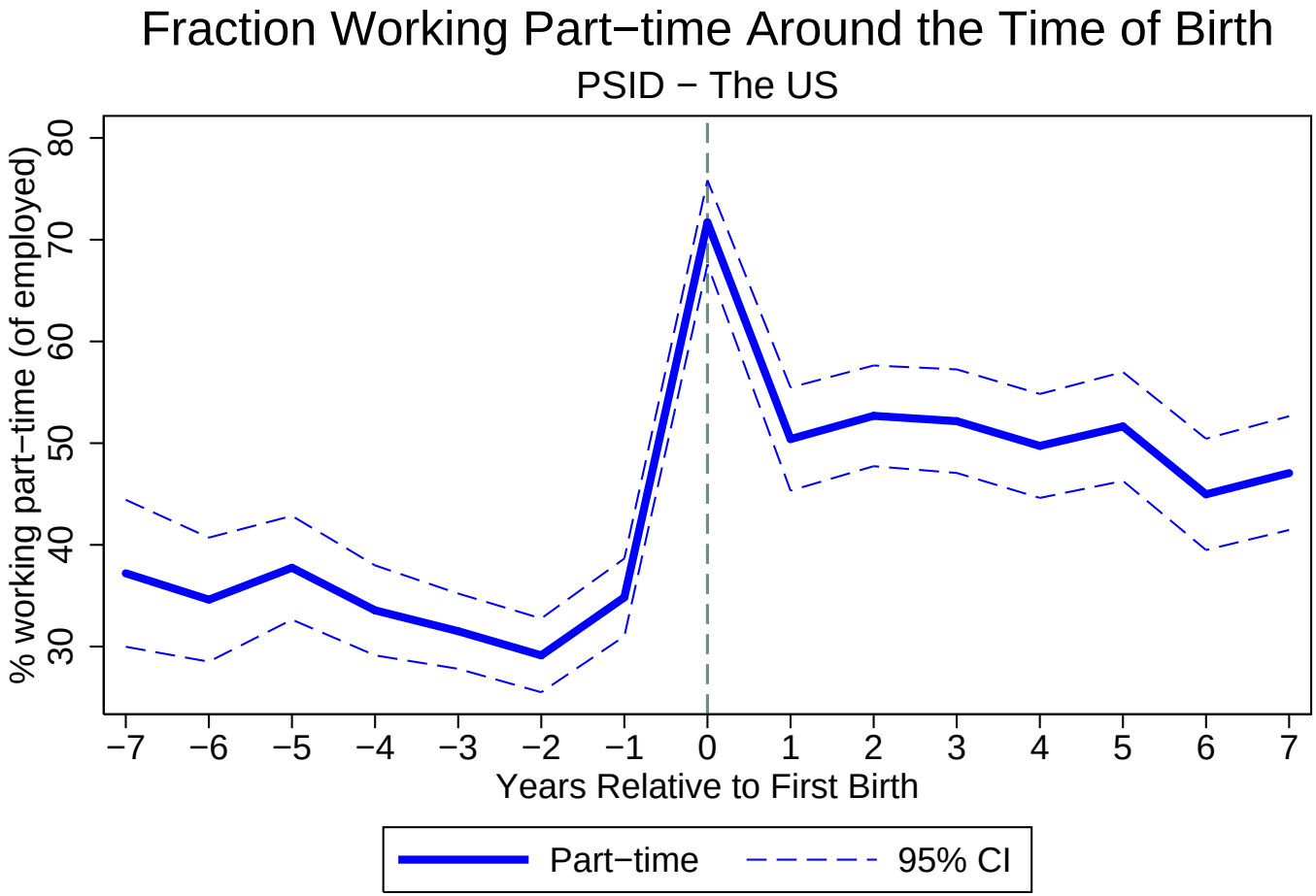
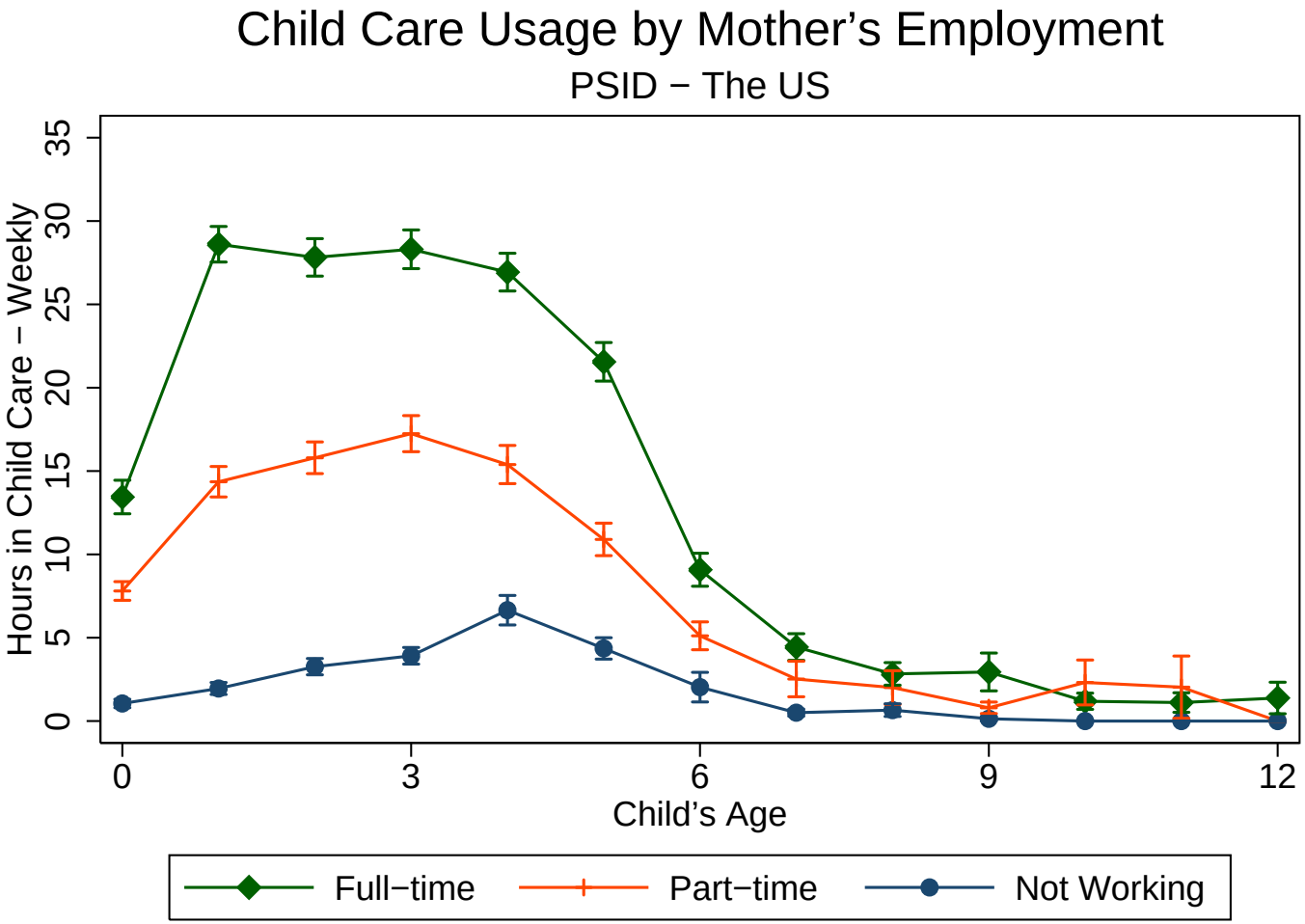


328 women for whom data at least 3 years before and after birth are available, PSID (1968−1996)

Motivation

Strong correlation between time child spends in day care and mother's employment



Motivation

- Presence of young children is associated with lower female labour supply
- Potential reasons for lower female labour supply
  - Non-working and part-time employed mothers spend more time with their children
- Potential drawbacks of lower female labour supply and not using child care: lower future wages
  - Non workers lose attachment to labour market
  - Part-time employment helps in human capital accumulation but is associated with lower hourly wages: part-time pay penalty

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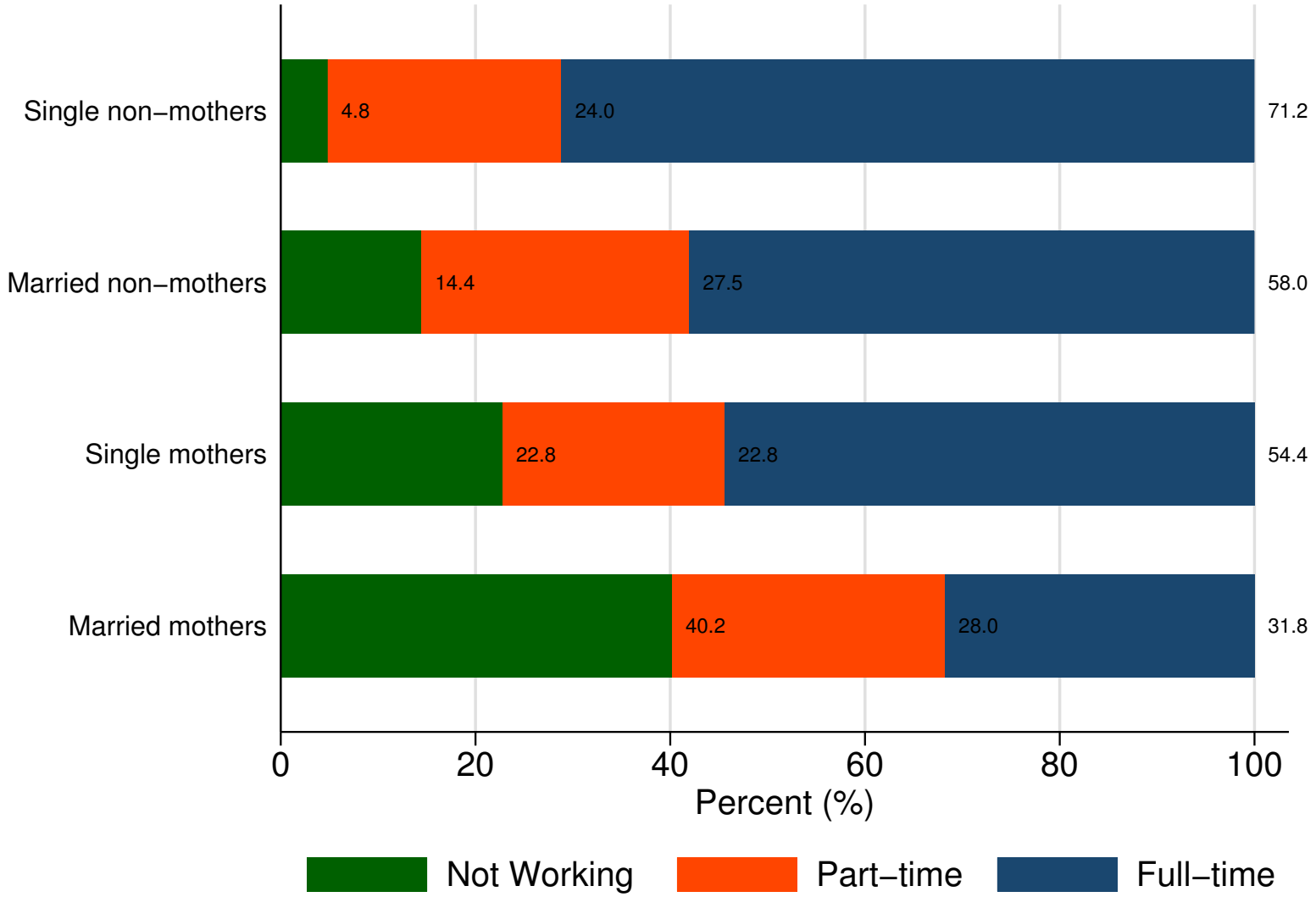
Motivation

Labour supply of married women is different from labour supply of single women



Motivation

Labour supply of married women is different than labour supply of single women

- Potential reason for lower labour supply of married women compared to single women
  - Household production specialization: Women reduce their labour supply to produce household goods; i.e. a good meal or children qualities, while men specialise in the labour market
    M_M
- Are there any consequences for this specialization? lower future wages
  - Upon divorce women might have lower income to spend on themselves and their children

Research Questions

- In a country with ungenerous family-work policies (The US), how child care subsidies affect
  1. Part-time and full-time employment decisions of married and single women?
  2. Work experiences and wages?
  3. Marital decisions?

This Paper

I develop a dynamic model:

1. Endogenous fertility, employment, marital, and child care decisions.

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   - Using (1968-1997) waves of the PSID in the United States

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I develop a dynamic model:

1. Endogenous fertility, employment, marital, and child care decisions.
2. The model is estimated using Simulated Method of Moments:
   - Using (1968-1997) waves of the PSID in the United States
3. Use the estimated model to evaluate the effect of child care subsidies on:
   - Process of human capital accumulation and wages
   - Marital decisions

Preview of Policy Experiments' Results

Child care subsidy programs:

1. Employment rates:
   - 10% $\downarrow$ in cost of child care $\Rightarrow \uparrow$ employment rate of married mothers by 0.8% and single (or divorced) mothers by 1.4%
   - 10% $\downarrow$ in cost of child care $\Rightarrow \uparrow$ employment rate of single lower educated women by 3.2%
2. Marital decisions:
   10% $\downarrow$ in cost of child care $\Rightarrow \downarrow$ fraction divorced of lower educated by 0.8% and that of higher educated by 0.3%

Key features of the model

- Endogenous part-time and full-time human capital accumulation
- Endogenous fertility
- Endogenous child care services
- Endogenous marriage and separation
- Collective household model in a dynamic framework with no commitment

C

Model

- Finite horizon model
- Men and women start their life after completing education
- In each period, individual $j = \{w, m\}$ decides:
  1. How much to work
  2. Whether to have a child
  3. How many hours of formal child care services to purchase
  4. Whether to stay single, get married or to divorce

Model: Preferences

Men and women gain utility from:

$$U_t = \alpha_c \, C_t \; + \; \alpha_q \, Q_t$$

- Private good: individual consumption (C)
- Household goods:
  - Value of a meal or clean house (Q)

Model: Preferences

Men and women gain utility from:

$$U_t = \alpha_c \, C_t \; + \; \alpha_q \, Q_t \; + \; \alpha_{qkid} \, Qkid_t$$

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- Trade-off: working and household good production

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- Trade-off: working and household good production
- When married: Q and $Qkid$ become public goods

Model: Home Production

- Time constraint:

$$l_t^j + h_t^j = T$$

Labour market hours (l), Housework hours (h)

Model: Home Production

- Time constraint:

$$l_t^j + h_t^j = T$$

- Single individuals:

$$Q_t^j = \lambda h_t^j$$
$$Qkid_t^j = \lambda[(h_t^j)^\gamma + (H_{CC,t}^j)^\gamma]^{1/\gamma}$$

Housework hours (h)
Hours of formal childcare services (H_{CC})

Model: Home Production

- Time constraint:

$$l_t^j + h_t^j = T$$

- Single individuals:

$$Q_t^j = \lambda h_t^j$$
$$Qkid_t^j = \lambda[(h_t^j)^\gamma + (H_{CC,t}^j)^\gamma]^{1/\gamma}$$

- Couples:

$$G_t = h_t^m + h_t^w$$
$$Q_t = \lambda G_t$$
$$Qkid_t = \lambda[G_t^\gamma + H_{CC,t}^\gamma]^{1/\gamma}$$

Model

- Dynamics is introduced to the model through accumulation of full- and part-time human capital

- Household members make their joint decisions using Nash bargaining

Model Discussion

1. Employment decisions depend on:
    - Tradeoff between consumption and home production
    - Returns to part-time and full-time experience
    - Marginal utility from consumption and household goods
    - Substitutability between market childcare hours and housework hours (γ)

Model Discussion

1. Employment decisions depend on:
   - Tradeoff between consumption and home production
   - Returns to part-time and full-time experience
   - Marginal utility from consumption and household goods
   - Substitutability between market childcare hours and housework hours (γ)
2. Gains from marriage:
   - Marriage allows for specialization in home production or labour market
   - Consumption of public goods (Q and Qkid)
   - Larger gains from specialization when marginal utility of household goods is high
   - Specialization is costly when divorce is highly likely

Results: Parameter Estimates

Parameter Estimates

Degree of substitution between child care and housework (γ)	0.623
Marginal utility from consumption (α_c)	0.098
Marginal utility from household production (α_Q)	0.220
Marginal utility from household production (α_{Qkid})	0.682

1. Elasticity of substitution of 2.6: Child care and housework hours are close substitutes
2. The qualities related to child, is valued more by the households than any other goods
3. Marginal utilities from household productions relative to consumption are large, implying large gains from marriage

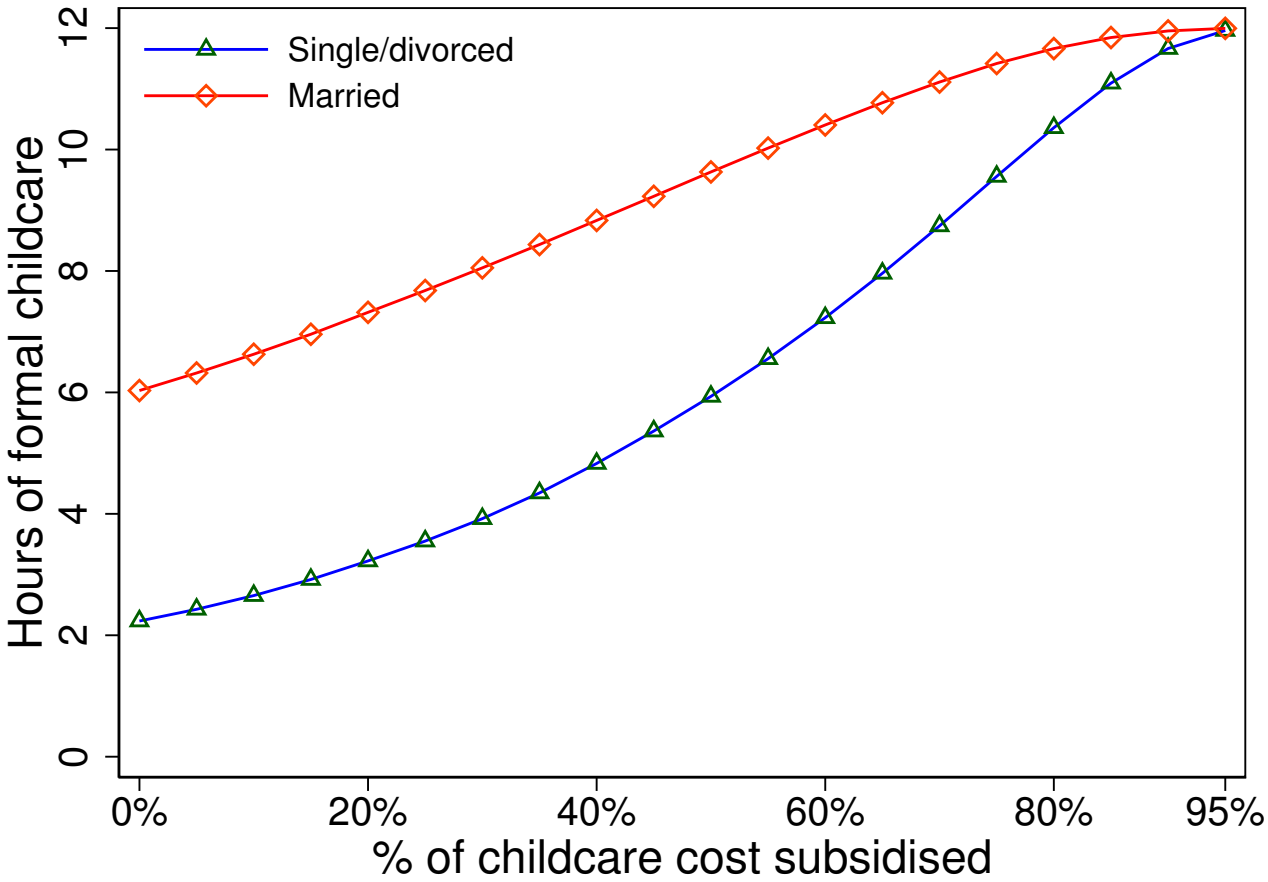
Other

Policy experiments

- I use the estimated model to evaluate how providing households with universal childcare subsidies, ranging between 5 to 95 percent of the cost of childcare, affects:

  1. Child care take-up
  2. Extensive and intensive margins of employment
  3. Marital decisions

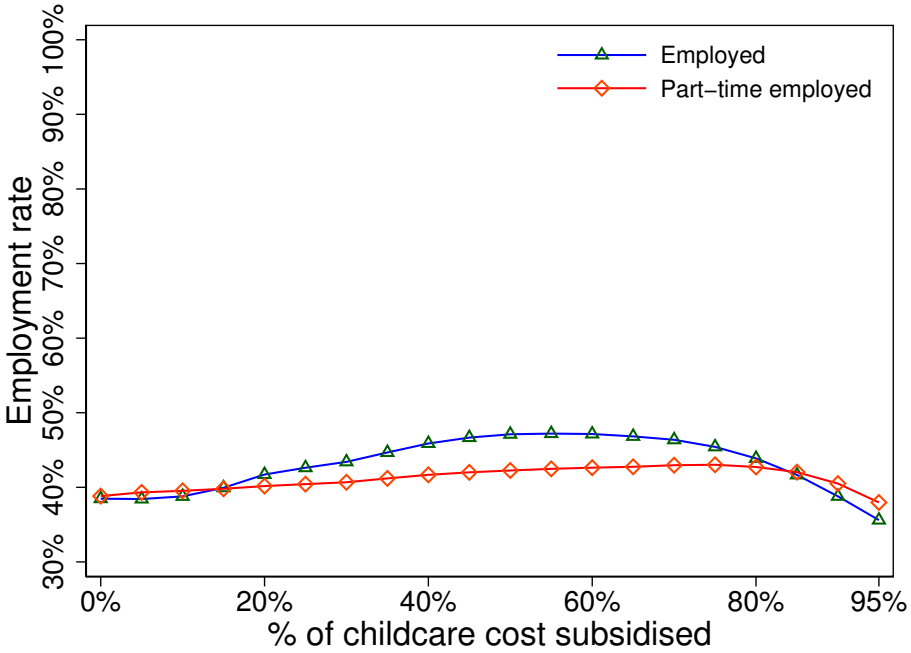
Policy Experiments: Subsidies and Child Care Take-up



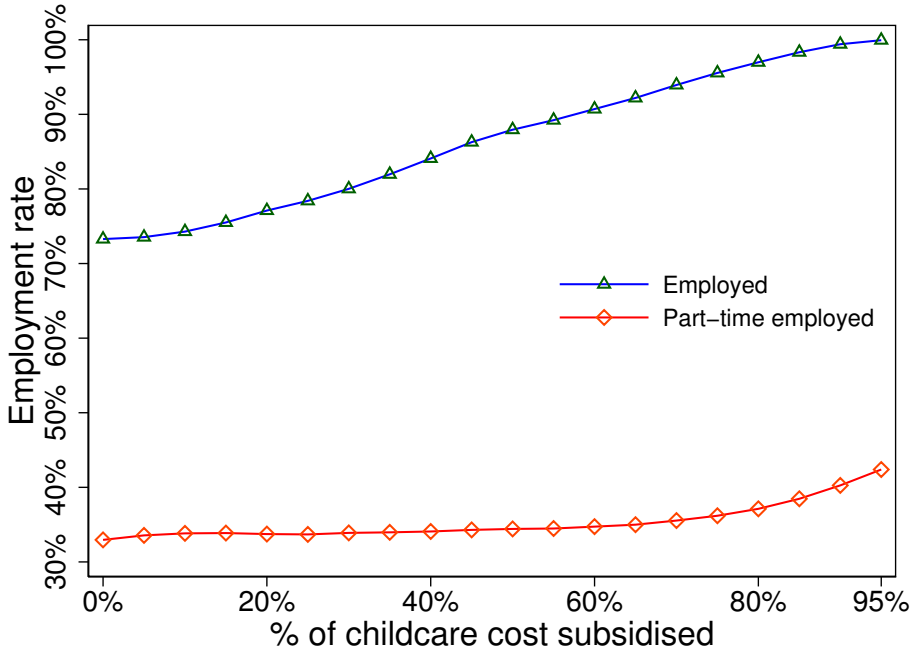
- 0% is the results from benchmark model
- 10 percent decrease in price of child care is associated with 18.7 percent increase in child care take-up of single mothers and 9 percent for married mothers

Policy: Subsidies and Female Employment

(a) Married



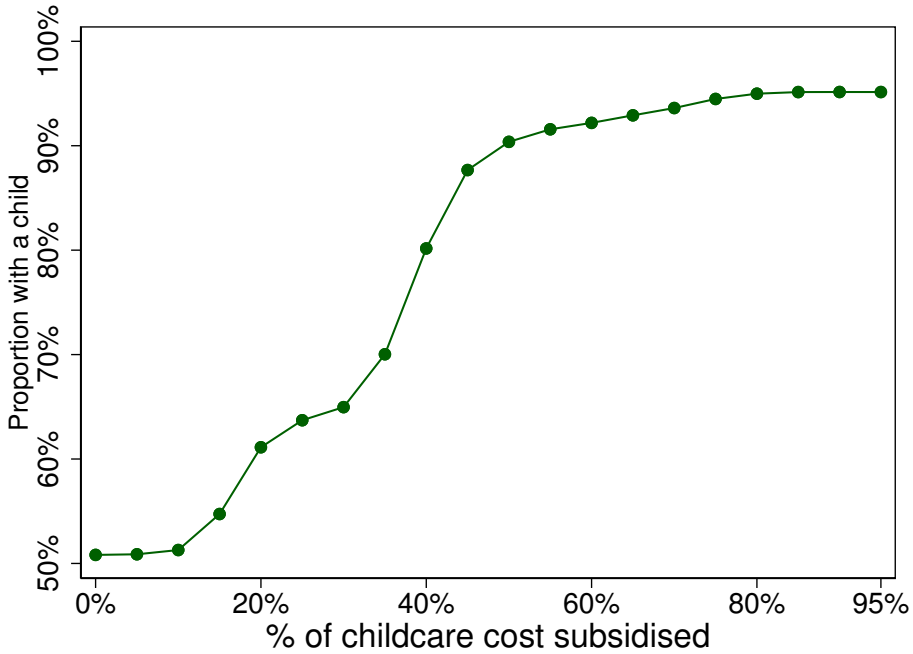
(b) Single or Divorced



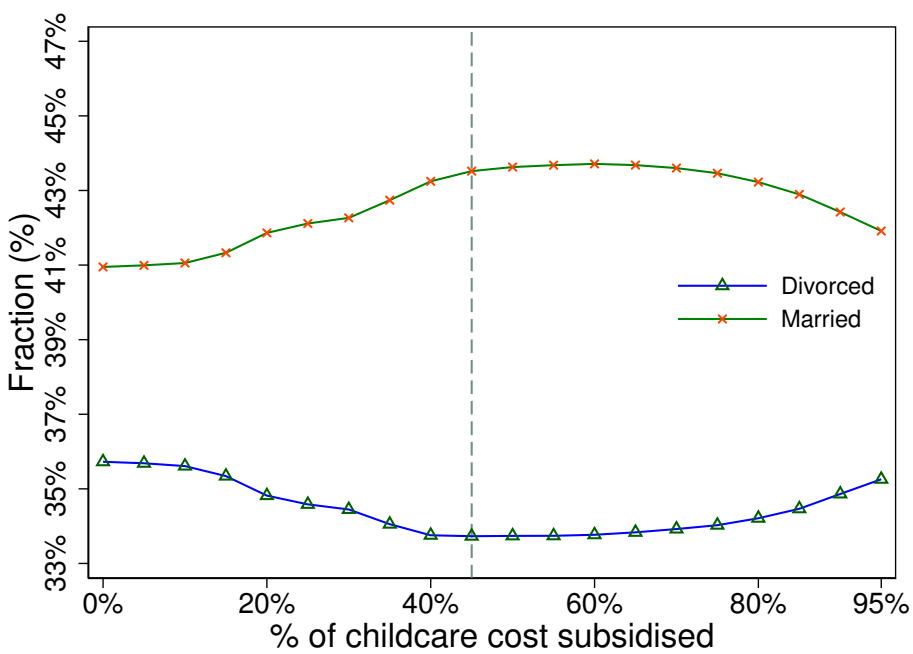
- Married mothers: A 10% subsidy increases employment by 0.8%
- Single or divorced mothers: A 10% subsidy increases employment by 1.4%
- Single lower educated: A 10% subsidy increases employment by 3.2%

Policy: Fertility and Marital Status

(a) Proportion with a child



(b) Marital Status



- 10% ↓ in cost of child care ⇒ ↓ fraction divorced of higher educated by 0.3%

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Conclusion

- I estimate a dynamic model of fertility, employment, child care, and marital decisions
  - To evaluate the effects of childcare subsidies on employment of single and married women
  - Differentiate between part-time and full-time human capital and allow for individuals to adjust their marital decisions
- The results from the policy experiments suggest that:
  - Single and lower educated women are more responsive in line with prev literature Cascio (2009); Fitzpatrick (2012)
  - Subsidies could increase the benefits of specialization within households, potentially leading to a higher proportion of married individuals

Thank you!

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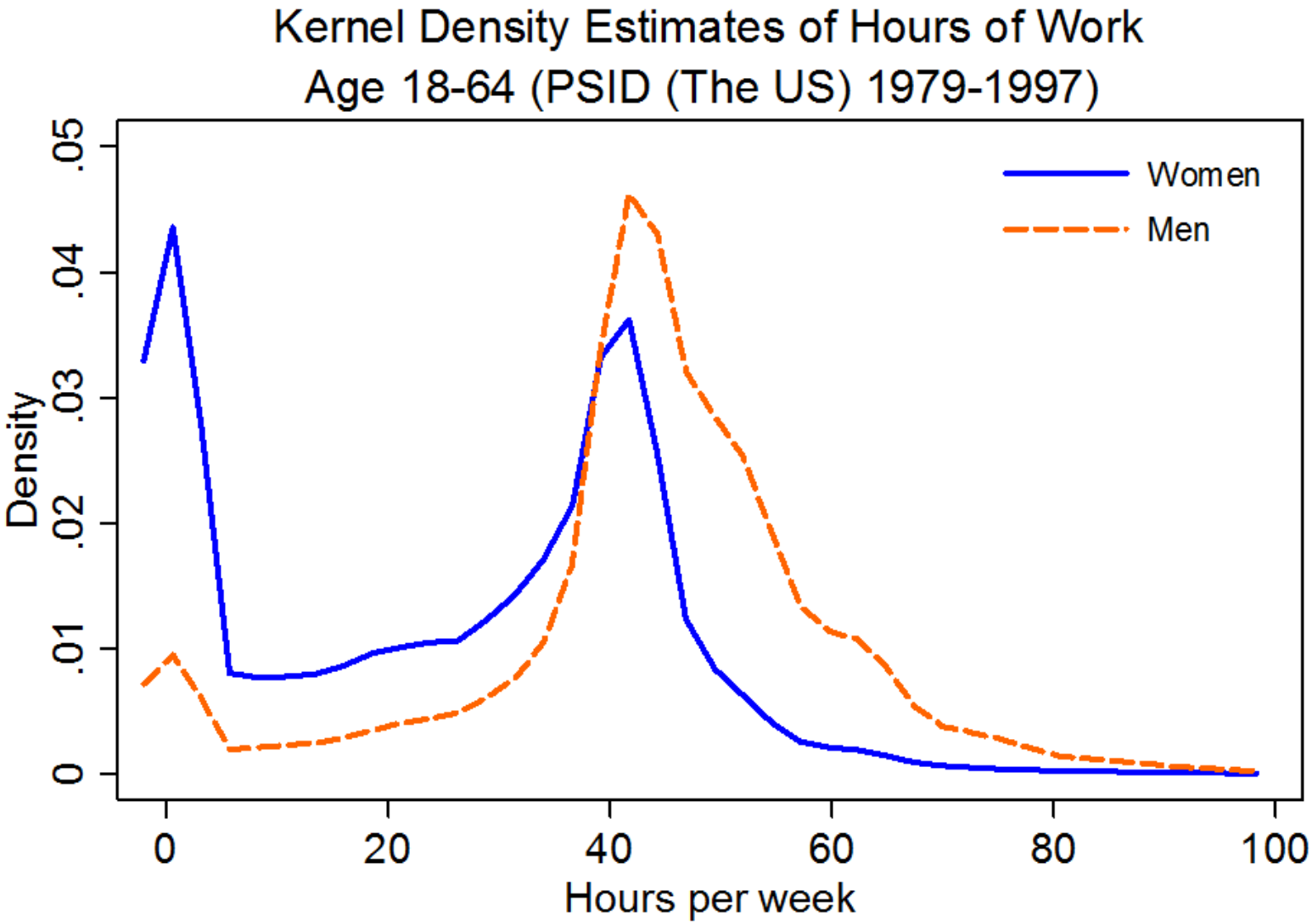
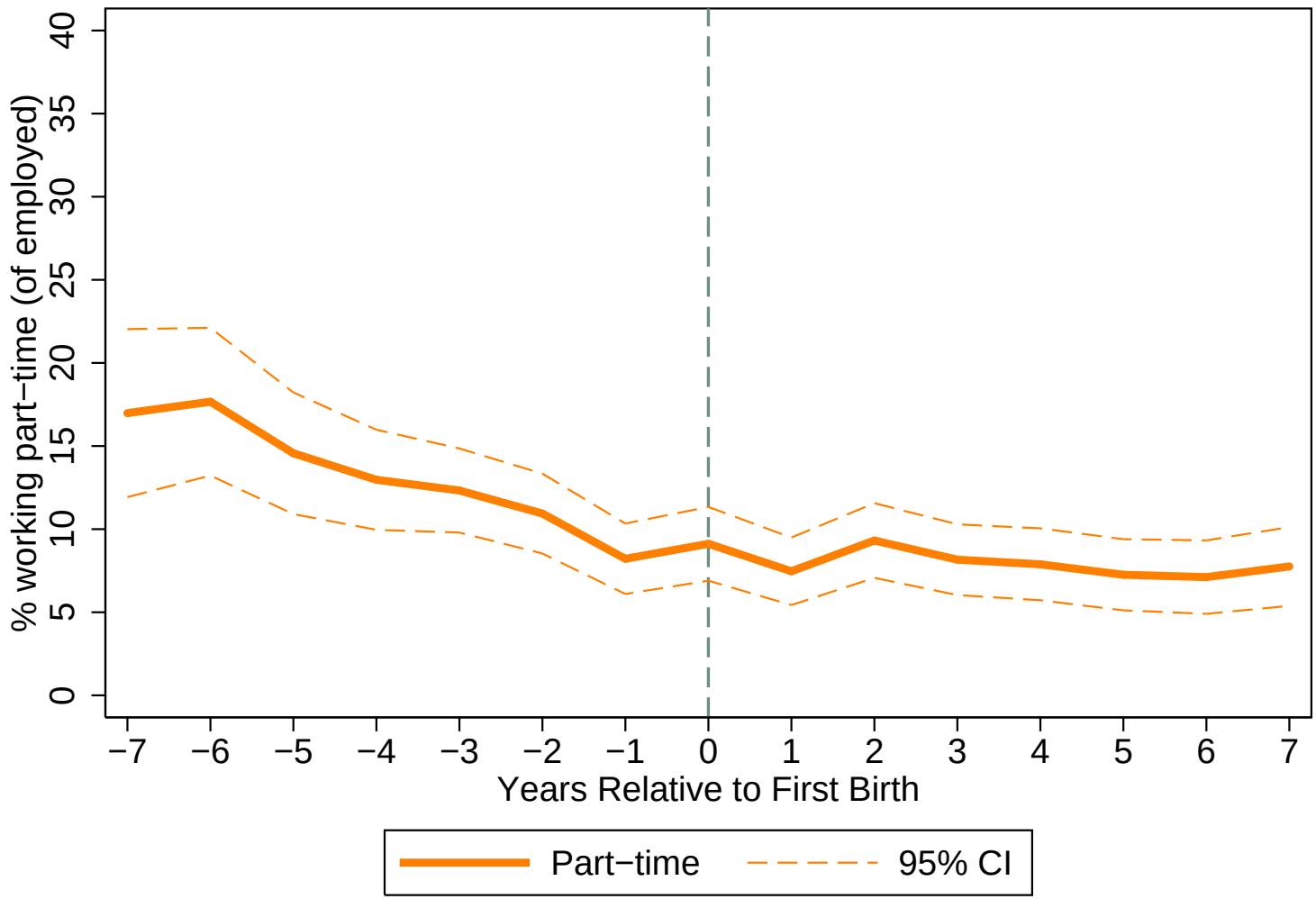


Return 10<part-time<35, full-time≥35

Part-time Employment Around the First Birth

Men

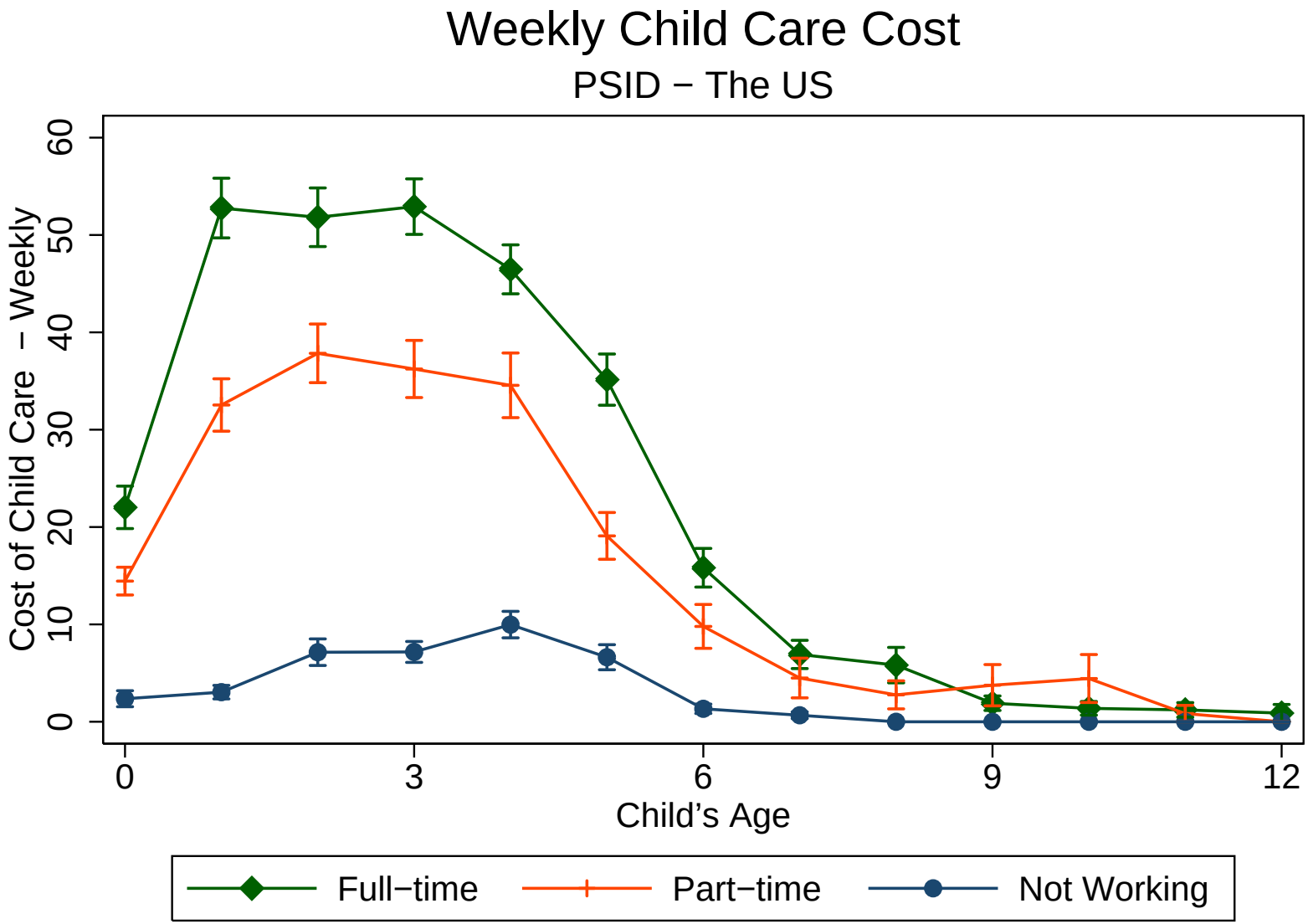
F



384 men for whom data at least 3 years before and after birth are available, PSID (1968−1996)

Child care cost by mother's employment status

Return



Why a Collective Model?

- Relaxing the unitary assumption: inconsistent with data Manser and Brown (1980), McElroy and Horney (1981) and Chiappori (1988)
- Incorporate outside options and considerations of women about human capital

Return

Wages - men

$$ln(y^m_{f,t}) = \alpha^m_{0f} + \alpha^m_{1f} X^m_{f,t-1} + \alpha^m_{2f} (X^m_{f,t-1})^2 + \alpha^m_{3f} S^m + \epsilon^m_{f,t}$$

Return

State Space

- State Space - men:

$$\Omega_t^m = \{S^m, X_{f,t-1}^m, N_t^m, \epsilon_{f,t}^m, \epsilon_{ch,t}, \epsilon_{CC,t}\}$$

- State Space - women:

$$\Omega_t^w = \{S^w, X_{f,t-1}^w, X_{p,t-1}^w, N_t^w, \epsilon_{f,t}^w, \epsilon_{p,t}^w, \epsilon_{ch,t}, \epsilon_{CC,t}\}$$

- State Space - married:

$$\Omega_t = \{S^m, S^w, X_{f,t-1}^m, X_{f,t-1}^w, X_{p,t-1}^w, N_t, \epsilon_{f,t}^m, \epsilon_{f,t}^w, \epsilon_{p,t}^w, \epsilon_{ch,t}, \epsilon_{CC,t}, \epsilon_{mar,t}\}$$

Return

Parameters

Model Parameters	Description	Estimates
λ	Marginal productivity of housework hours	0.963
Shocks		
σ_f^{2m}	Variance of full-time wage shock, men	1.062
σ_f^{2w}	Variance of full-time wage shock, women	0.576
σ_p^{2w}	Variance of part-time wages, women	0.419
σ_{mar}^2	Variance in taste for marriage	53.838
σ_{ch}^2	Variance in taste for having a child	0.385
σ_{CC}^2	Variance of child care cost	0.731
ϕ	Probability of meeting a potential partner	0.218
π_{CC}	Log Hourly child care cost	1.939
δ	Discount factor (not estimated)	0.954
θ	Bargaining weight in Nash product (not estimated)	0.5

Return

Identification of Key Parameters

1. Degree of substitution between housework hours and market hours of child care (γ):

$$Qkid_t = \lambda[h_t^{\gamma} + H_{CC,t}^{\gamma}]^{1/\gamma}$$

   - Employment rates conditional on children
   - Child care conditional on employment status

2. Cost of childcare (π_{CC}):

$$I_t = C_t - (\pi_{CC} + \epsilon_{CC,t}) \times H_{CC,t}$$

   - Formal child care take-up conditional on employment status
   - Employment rates conditional on children
   - Average childcare costs

Wage Estimates

Estimated Log Hourly Wage Equations - Women

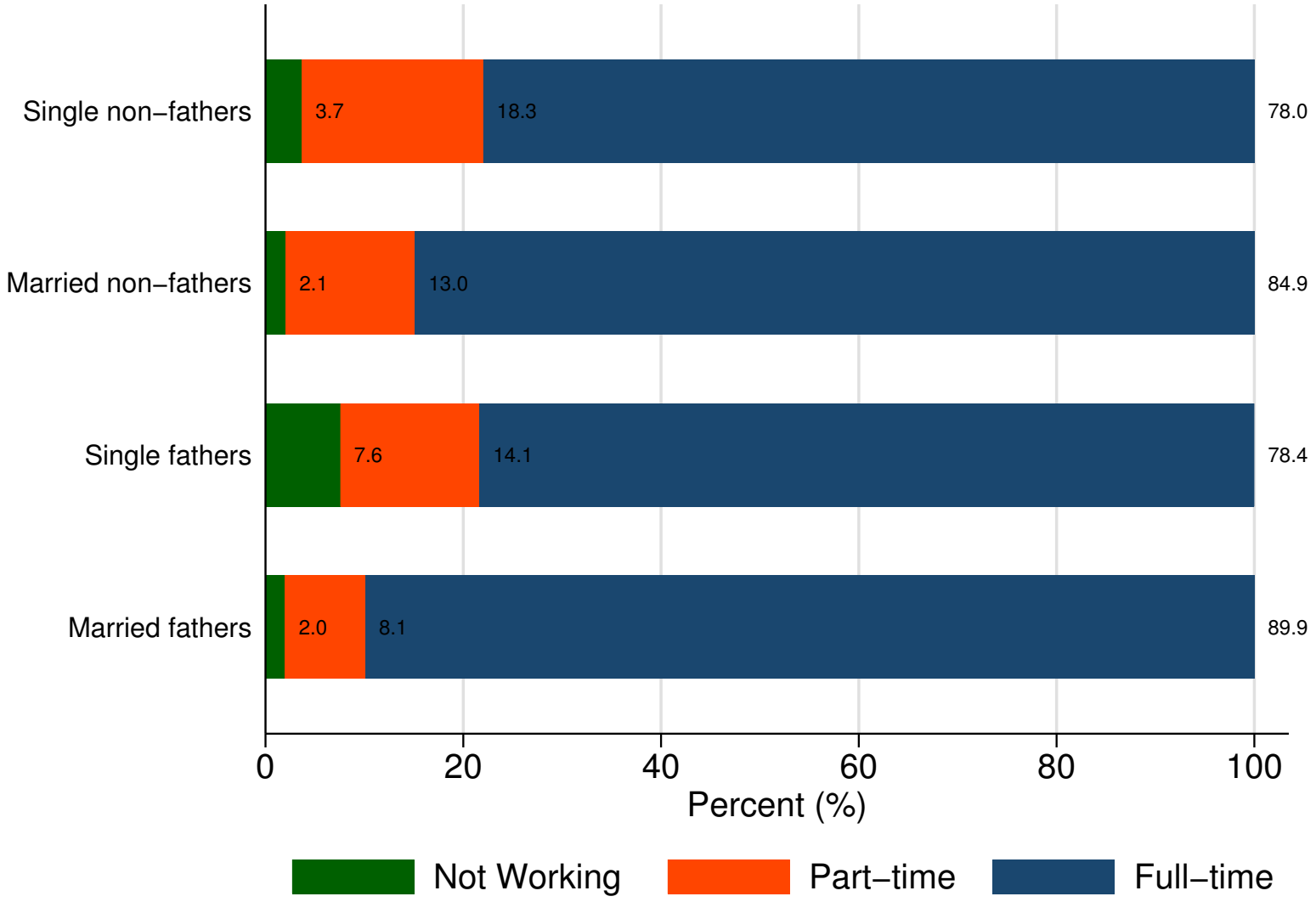
Parameters	Type of Employment Full-time	Part-time
(α_0^w)	1.1540	1.1720
Return to full-time experience (α_3^w)	0.0305	0.0212
Dec/inc return to full-time experience (α_4^w)	-0.0003	-0.0009
Return to part-time experience (α_1^w)	0.0318	0.0171
Dec/inc return to part-time experience (α_2^w)	-0.0009	-0.0002
Return to education (α_5^w)	0.4871	0.3915

return

Motivation

Evidence on specialisation: Married fathers vs. Single fathers

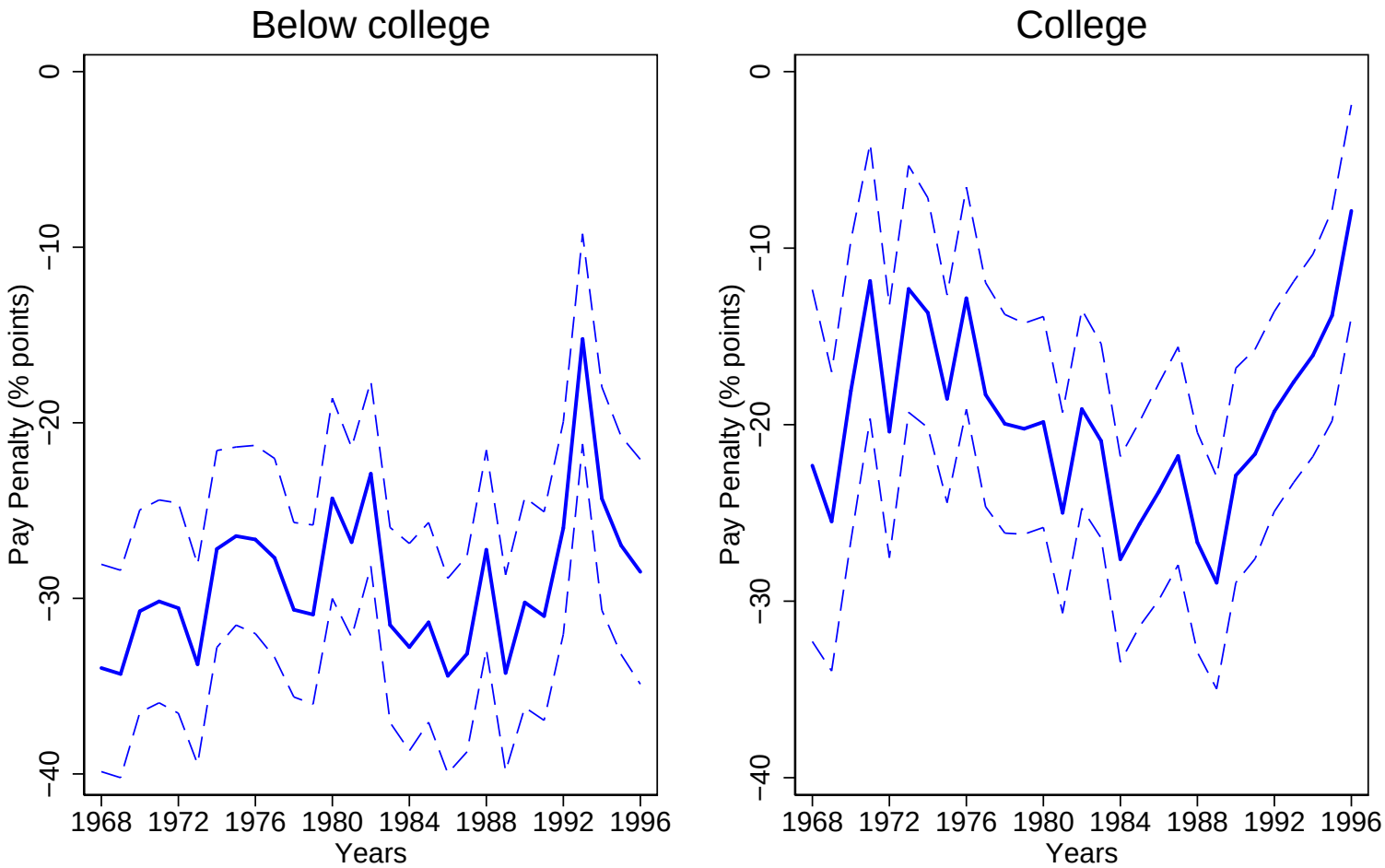
back



Motivation

Part-time pay penalty: difference between hourly wages of part- and full-time employed women

back



Model: Human Capital and Hourly Wages

- Dynamics, laws of motion:

$$X_{f,t} = X_{f,t-1} + 1\{l_t = full\} \quad ; \quad X_{p,t} = X_{p,t-1} + 1\{l_t = part\}$$

$l_t = full, part, Not\ Work$

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- Part-time wage equation:

$$ln(y_{p,t}) = \alpha_{0p} + \underbrace{\alpha_{1p}X_{p,t-1} + \alpha_{2p}(X_{p,t-1})^2}_{\text{Effect of part-time experince}} + \underbrace{\alpha_{3p}X_{f,t-1} + \alpha_{4p}(X_{f,t-1})^2}_{\text{Effect of full-time experience}} + \alpha_{5p}S + \epsilon_{p,t}$$

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- Full-time wage equation:

$$ln(y_{f,t}) = \alpha_{0f} + \underbrace{\alpha_{1f}X_{p,t-1} + \alpha_{2f}(X_{p,t-1})^2}_{\text{Effect of part-time experience}} + \underbrace{\alpha_{3f}X_{f,t-1} + \alpha_{4f}(X_{f,t-1})^2}_{\text{Effect of full-time experience}} + \alpha_{5f}S + \epsilon_{f,t}$$

Married Individual's problem

Household members make their joint labour supply and fertility decisions using Nash bargaining:

$$W_t^j(\Omega_t) =$$

$$\max_{c^j, l^j, n, H_{CC}} \left(U(c_t^m, Q_t, Qkid_t, \epsilon) + \delta \begin{Bmatrix} E[V_{t+1}^m(\Omega_{t+1}^m)|\Omega_t^m], & \text{if single} \\ E[W_{t+1}^m(\Omega_{t+1})|\Omega_t], & \text{if married} \end{Bmatrix} - V_t^m(\Omega_t^m) \right)^{\theta}$$

$$\left((U(c_t^w, Q_t, Qkid_t, \epsilon) + \delta \begin{Bmatrix} E[V_{t+1}^w(\Omega_{t+1}^w)|\Omega_t^w], & \text{if single} \\ E[W_{t+1}^w(\Omega_{t+1})|\Omega_t], & \text{if married} \end{Bmatrix} - V_t^w(\Omega_t^w) \right)^{(1-\theta)}$$

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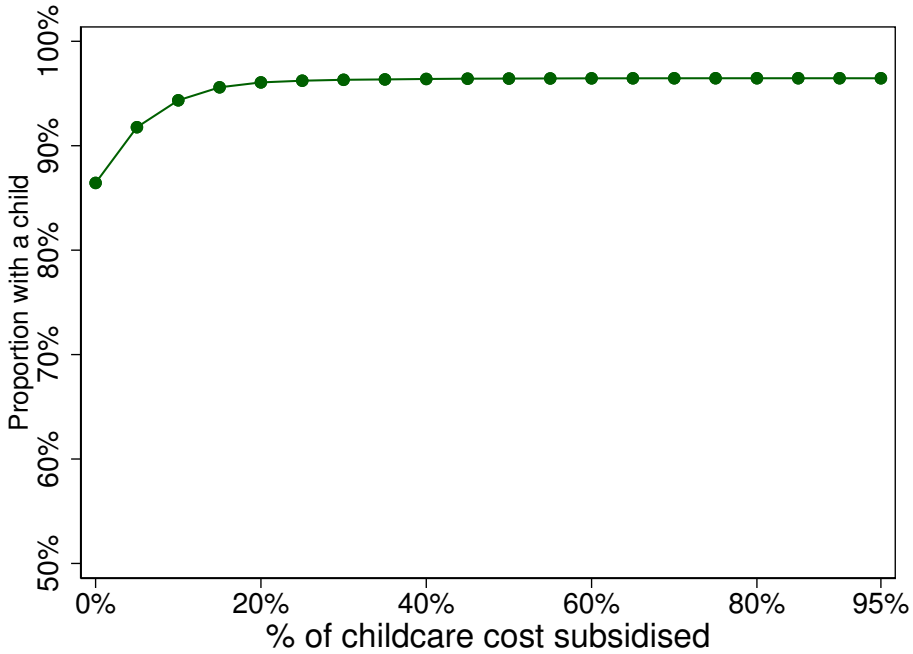
Stay single or get married?

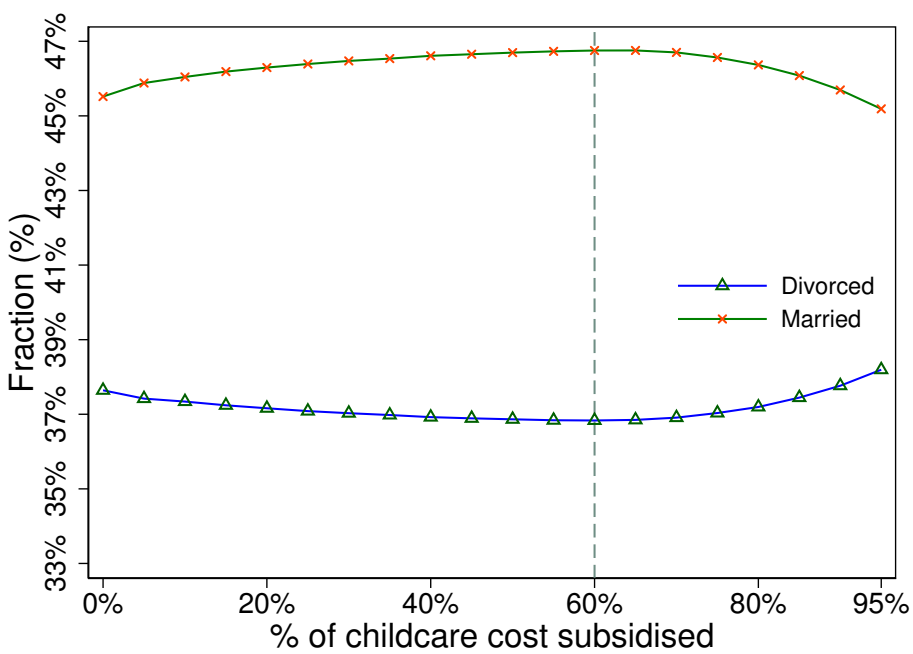
$$W_t^m(\Omega_t) > V_t^m(\Omega_t) \qquad \& \qquad W_t^w(\Omega_t) > V_t^w(\Omega_t)$$

Policy: Fertility and Marital Status

(a) Proportion with a child



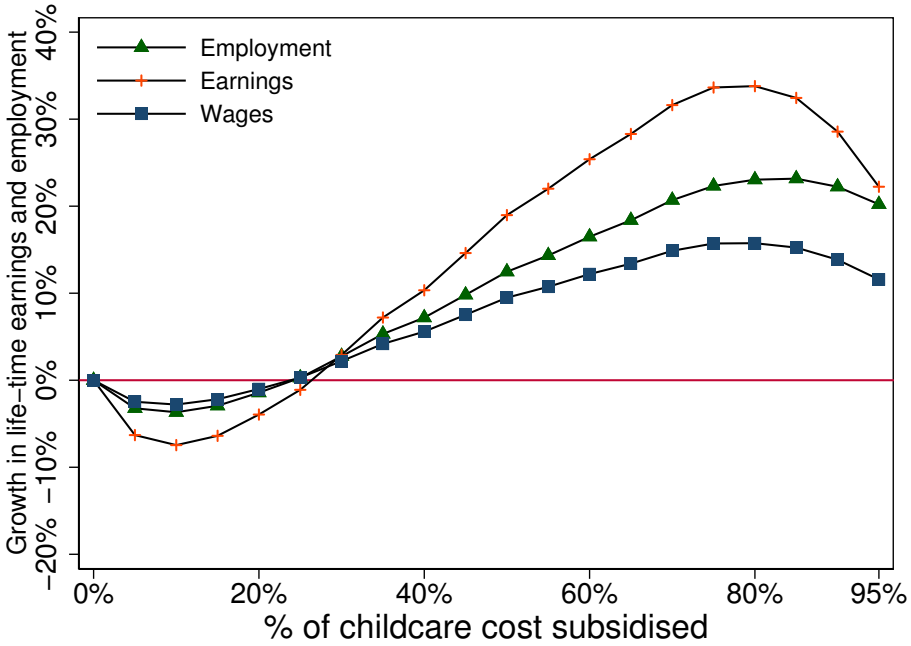
(b) Marital Status



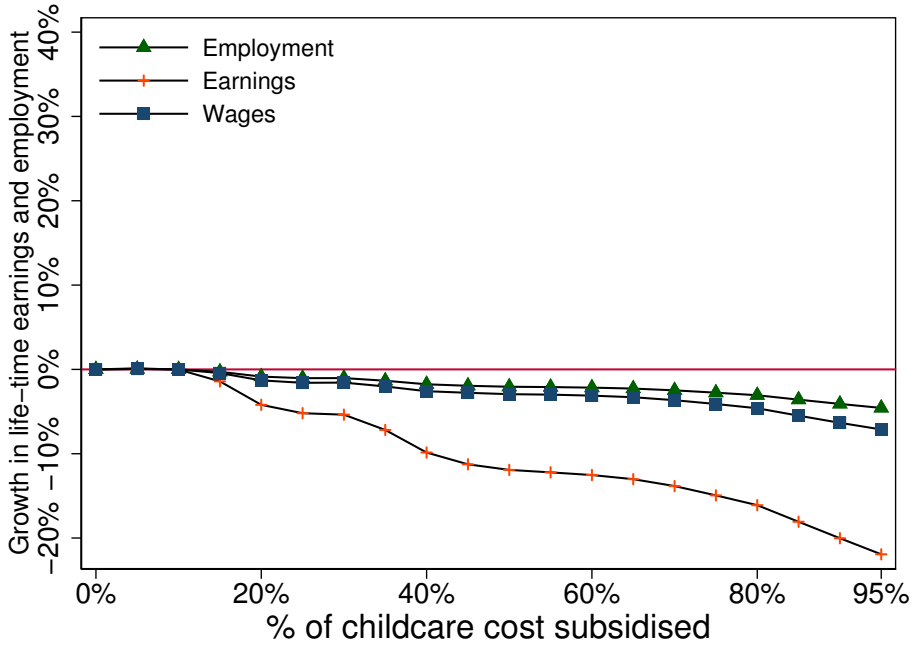
- 10% ↓ in cost of child care ⇒ ↓ fraction divorced of lower educated by 0.8%

LTI

Policy: Growth in Life-time Earnings and Wages, by education



(a) Below-college educated

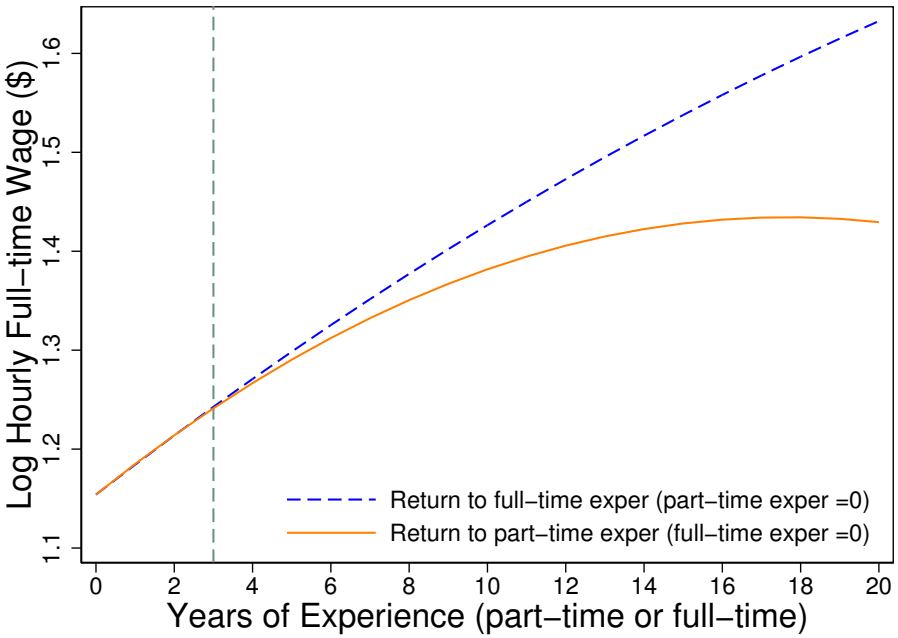


(b) College-graduates

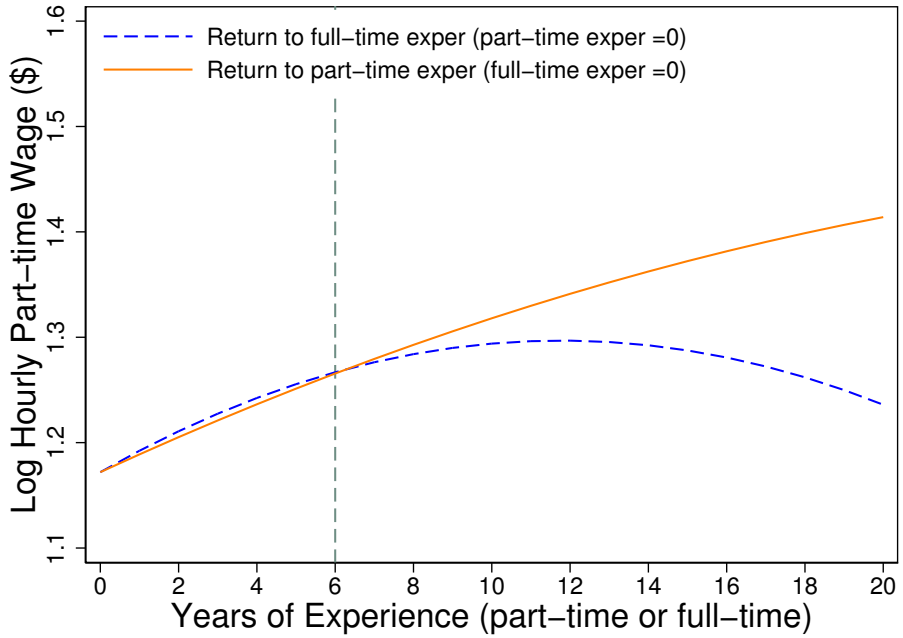
- Subsidising more than 25% of child care cost increases employment and earnings of lower educated women
- Subsidies increase part-time employment and reduce life-time earnings of higher educated women

Results: Return to Full-time and Part-time Experiences

(a) Full-time Hourly Wage



(b) Part-time Hourly Wage



1. No evidence that wage levels are different
2. The return to both experiences are larger when working full-time
3. Evidence on state dependence: the return to FT exper is larger than PT exper when FT employed and vice versa