Flexible Work, Occupational Constraints, and the Dynamics of Female Labor Supply

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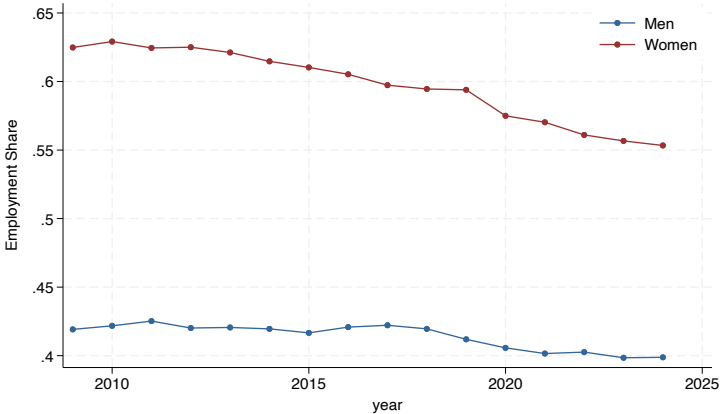
Motivation

- Women continue to have lower labor force participation and lower earnings than men
- Largely attributed to the child penalty
  - Decline in women's earnings after the birth of their first child (Kleven, Landais and Leite-Mariante, 2025).
- Literature has argued occupational structure is key
- Men are over represented in high-paying **"greedy jobs"** where returns to hours are non-linear:
  - rewards long, continuous, inflexible work schedules (Goldin, 2014)
- Greedy jobs often incompatible with childcare responsibilities
  - Leads to lost wages and slower human capital accumulation for women over the life cycle
- *How will large changes in labor market flexibility affect this division of labor?*
  - Leading case: work from home. In the future A.I disruption

Employment Shares in Linear Occupations by Year and Gender



Note: Occupations (4-digit) ranked by average annual total hours for males in 2009 in the Current Population Survey and classified as linear if they fall below the median rank.

Aggregate trends (American Time Use Survey)

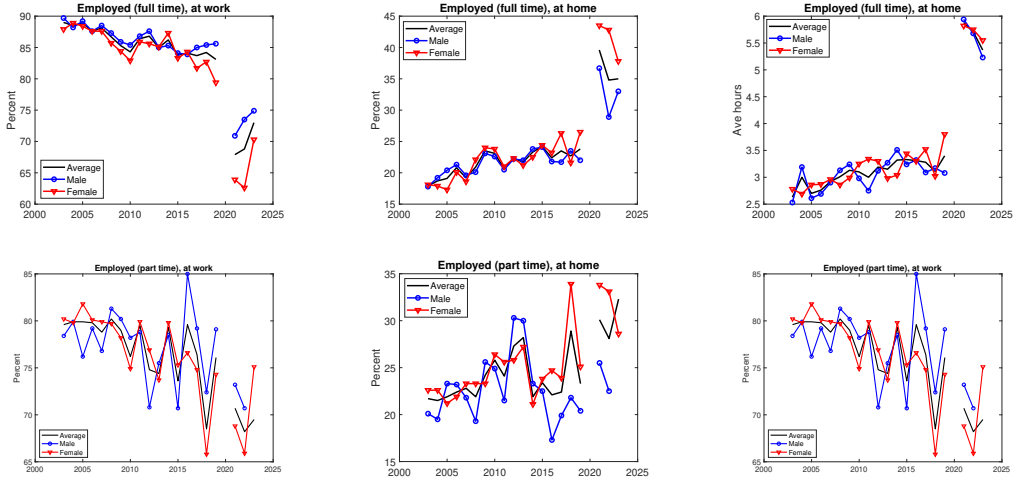


Figure 1: Aggregate work location and hours trends, American Time Use Survey. Top row: full-time employed; bottom row: part-time employed.

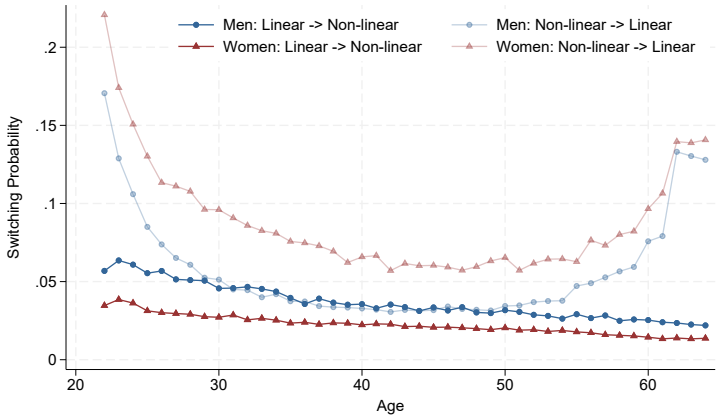
This Paper

- Remote work adoption can be seen as a permanent change in the structure of jobs.
- We study how increased work flexibility alters household occupational and labor supply choices.
- In the paper we document and analyze:
  - Changes in occupational choices of women toward high-return occupations.
  - **Long-run adjustment of the labor market:** implication for gender gaps in hours worked, human capital, and earnings over the life cycle.

Our approach:

- Build heterogeneous agent macro model with occupational choice and labor supply
- Highlight role of occupational sorting in the persistence of gender gap
- Study the effect of change in WFH flexibility.
  - **Novel:** occupational reallocation (frictional), joint household decision (impact on men), general equilibrium (demand and supply)

Switches across occupation type across life cycle by gender



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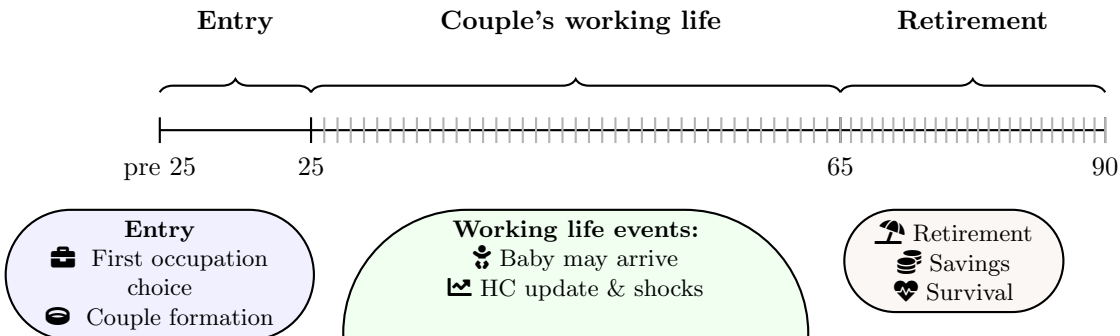
Model

The Life Cycle



Household utility function

- Each household consists of a male (m) and female (f) adult, both of age j.
- They work from $j = 1, \ldots, J^W$.
- The household is **unitary**: jointly choose $\{c, a', h_m, h_f\}$ each period
- Utility is CRRA and additively separable in hours worked. k is household size.

$$U(c, k, h_m, h_f) = k\frac{(c/k)^{1-\alpha}}{1-\alpha} - \varphi\frac{(h_m)^{1+\nu}}{1+\nu} - \varphi\frac{(h_f)^{1+\nu}}{1+\nu}.$$

Labor supply and human capital

- Each household member belongs to an occupation o
  - For now: one linear and one non-linear occupation $\mathcal{O} = \{ o,\ \bar{o} \}$
  - Switching opportunities arrive with probability $\lambda_o(j)$ subject to utility cost
- Labor supply choices:

$$h \in \{h_{\text{nil}},\ h_{\text{part}},\ h_{\text{full}},\ h_{\text{over}}\} = \{0,\ 0.5,\ 1,\ 1.25\}.$$

- Earnings in occupation o:

$$y_o(z, h, j) = \omega_o\ y_o(h, j)\, z \qquad \text{where:} \qquad y_o(h, j) = \ell^o(j)\, h^{\theta_o}$$

- Productivity z which is AR(1) with positive drift, depends positively on hours worked
- Aggregate return (wage) of an efficiency unit of labor in occupation o is ω_o
- Key 1: the non-linear occupation has higher *static* return to hours
- Key 2: individuals working more hours also reap *dynamic* returns to hours

Children

- Households enter with no or young child (28% chance of child)
- Children arrive stochastically
- Children age stochastically: 3 years in young state and 15 years in older state.
- Upon retirement, children leave and k = 2
- Only one child for consumption equivalence purposes:
  - k = 2 (no children)
  - k = 2.25 (young child)
  - k = 2.5 (older child)
- Equivalent to keeping track of the youngest child.

Childcare

Childcare has a utility cost that depends on both parents' hours and the child's age:

$$C(h_f, h_m, k) \;=\; \Phi\left[\,\phi_m(k)\,h_m \;+\; \phi_f(k)\,h_f\,\right]$$

- Captures complementarity between children and time-off work
- Younger child has higher cost: $\phi(k{=}2.25) \;>\; \phi(k{=}2.5)$
- Childcare cost higher for women: $\phi_f \;>\; \phi_m$
- WFH can scale down childcare cost: $\Phi = 1$ baseline, $\Phi_{\text{WFH}} < 1$ WFH-economy.

Value function

Maximize:

$$V_j^{o_f,o_m}(a,z_f,z_m,k) = \max_{c,h_f,h_m} \left\{ k\frac{(c/k)^{1-\alpha}}{1-\alpha} - \varphi\frac{(h_m)^{1+\nu}}{1+\nu} - \varphi\frac{(h_f)^{1+\nu}}{1+\nu} - C(h_f,h_m,k) \right.$$

$$\left. + \beta\, E\left[\lambda_o(j) V_{j+1}^{o_f,o_m}(a',z_f',z_m',k') + (1-\lambda_o(j)) \max_{o_f',o_m'} \{ V_{j+1}^{o_f',o_m'}(a',z_f',z_m',k') - \delta \} \right] \right\}$$

subject to:

$$\begin{aligned} & c + a' = aR + y^{o_f}(z_f,h_f,j) + y^{o_m}(z_m,h_m,j), \\ & z_f' = \rho z_f + f^{o_f}(h_f) + \epsilon, \\ & z_m' = \rho z_m + f^{o_m}(h_m) + \epsilon, \\ & a' > \underline{a} \end{aligned}$$

Initial Career Choice

At period 0, before forming a household, males and females choose an occupation.

Males and females evaluations of the occupations are subject to "cost-barriers" $\Omega(o_x)$:

$$\hat{V}^{o_f,o_m} = \iiint V_1^{o_f,o_m}(a, z_f, z_m, k)\, dF(a_0, z_{m,0}, z_{f,0}, k_0)$$

Individuals form expectations over how a career choice affects match, subject to taste shocks:

$$V_x = \max_{o_x \in O} \left\{ \sum_{o_{x'}} [\hat{V}^{o_x,o_{x'}} - \Omega(o_x)] \Pr(o_{x'}|o_x) \right\}$$

In the baseline we take the initial distribution from the data and estimate costs: $\Omega(o_x)$

- $\Pr(o_{x'}|o_x)$ captures occupational distribution of HH and PAM
- Marginal distributions $\Pr(o_x)$ are equilibrium objects

Retirement Age

- At $J_W + 1$, both individuals retire together and live for a maximum of J_R periods.
- Retirees receive a joint pension equal to the sum of their end-of-life permanent income, with a replacement rate ζ.
- Individual mortality risk (not gender-specific).

If one spouse dies, the household becomes single and receives $\hat{\zeta}$ of the end-of-life permanent income. If both (or the single member) die, they enjoy a warm-glow bequest:

$$W_j(a,y,d) = \max_c \left\{ \frac{(c/d)^{1-\alpha}}{1-\alpha} + \beta \Big[\xi_j^d W_{j+1}(a',y,d) + 1[d>1]\, 2\xi_j(1-\xi_j) W_{j+1}(a',y,d-1) + (1-\xi_j^d) B(a') \Big] \right\}$$

subject to:

$$\begin{aligned} & c + a' = aR + [\,\zeta \cdot 1[d>1] + \hat{\zeta} \cdot 1[d=1]\,]\, y, \\ & a' > \underline{a}, \\ & y = \mu^{o_m} \ell^{o_m}(J_W) z_m + \mu^{o_f} \ell^{o_f}(J_W) z_f. \end{aligned}$$

Aggregate production

- Labor markets are competitive
- Wages are pinned down by an aggregate production function that combines capital (K_t) with the productivity weighted labor input (L_t) in every occupation
- Within an occupation males and females are perfect substitutes
- Aggregate production is:

$$Y_t = A_t\big(\Theta_K K_t^{\frac{\varepsilon_K - 1}{\varepsilon_K}} + (1-\Theta_K) L_t^{\frac{\varepsilon_K - 1}{\varepsilon_K}}\big)^{\frac{\varepsilon_K}{\varepsilon_K - 1}}$$

$$L_t = \Big(\sum_{o=1}^{O} \Theta_o \{\int (y^o(l^m(\mathbf{s}))p^m e^m + y^o(l^f(\mathbf{s}))p^f e^f)\; d\lambda(\mathbf{s})\}^{\frac{\varepsilon_L - 1}{\varepsilon_L}}\Big)^{\frac{\varepsilon_L}{\varepsilon_L - 1}}$$

- Only matters after a shock to baseline economy
- *Today no capital in production*

Calibration

Externally calibrated parameters

Parameter		value	source
Preferences			
Discount factor	β	0.96	standard
1/EIS	α	2	standard
Hours utility curvature	ν	0.5	standard
Earnings and occupations			
Non-linear pay	θ_j^o	{ 1, 1.2-1.4 }	Aaronson and French (2004)
Prod. persistence	ρ^z	0.92	Braxton et. al (2024)
Prod. variance	σ_z	0.2	standard
Prod. drift if no work	$P(z', h = 0)/\Delta$	-0.025	PSID wage loss
Prod. drift if full time	$P(z', h = 1.0)/\Delta$	0.03	PSID wage return
Prod. drift if part time	$P(z', h = 0.5)/\Delta$	0.02	PSID wage return
Prod. drift if over time	$P(z', h = 1.25)/\Delta$	0.04	PSID wage return
Elasticity of NL-L substitution	ϵ_L	1.6	Autor et al (2008)

Externally calibrated parameters

Parameter		value	source
Demographics			
Working age periods	J^W	40	aged: 25-64
Retirement periods	J^R	25	aged: 65-90
Fertility probability	$\rho^k(j)$	-	Proportion with a child by age from CPS fertility supplement
Pension	ζ	0.4	
Single pension	$\hat{\zeta}$	$0.75\times\zeta$	
Death probability	ξ_j	-	Social Security actuarial life tables
Bequest parameters	b_0, b_1		
Interest rate	R	1.04	

Internally calibrated parameters

- We target the cost of hours with the distribution of male and female PT, FT and OT status: ϕ
- We target the parameters in the childcare cost function with employment share of males and females with children:

$$\phi^m_{young}, \phi^m_{young}, \phi^f_{old}, \phi^f_{old}$$

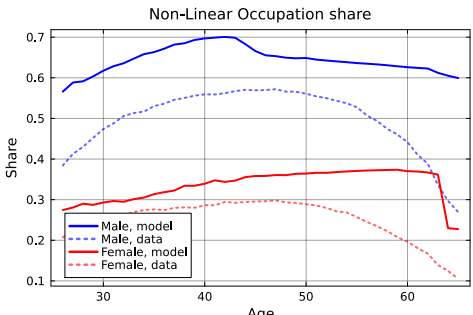
  - in practice jointly identify $\phi's$
- We target the deterministic lifecycle profiles with wage growth and the relative wage of men in the non-linear and linear sectors (Assuming concave functions):

$$\ell^o(j) = \mu_o + \gamma^1_o \text{age} + \gamma^2_o \text{age}^2$$

Targeted moments

Calibration	Data	Model
Male		
Part time	7.8	13.9
Full time	27.8	24
Over time	43	41.8
Δ Employment rate (<45) young child	11.8	7.6
Δ Employment rate (<45) old child	10.6	11.5
Non-linear wage growth age 25 to 50	84.1	68.1
Linear wage growth age 25 to 50	33.5	40.0
Non-linear wage premium	40.0	24.1
Female		
Part time	15.4	26.8
Full time	32.9	17.2
Over time	15	12.6
Δ Employment rate (<45) young child	-20.5	-17.9
Δ Employment rate (<45) old child	-17.9	-11.3

Model fit


Non-Linear Occupation share
Share
Age
Male, model
Male, data
Female, model
Female, data


Income by gender
Income
Age
M, model
M, data
F, model
F, data

Work from home gain measure (Φ)

- Harrington and Kahn (2025): WFH reduces motherhood employment penalty
- Target "on impact" one year change in motherhood penalty employment rate
  - Model baseline gap: -11.9
- Conditional on existing baseline distribution over states (no opportunity for entrants to freely switch occupation)
- Change in mothers LFP in CPS ≈ 2.27 p.p $\rightarrow$ Implies $\Phi = 0.737$
- In progress: short-run causal impact of large changes in WFH

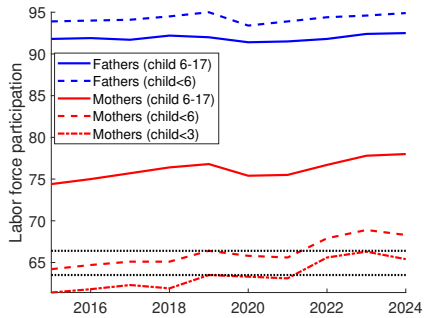
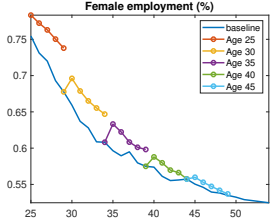
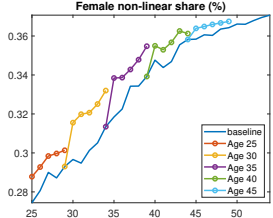


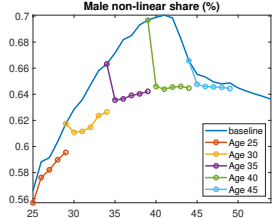
Figure 3: Source: CPS

Short to medium run (5 year) life cycle impact

- Keep initial matches and occupation fixed and allow switches
- Short-run increase in female employment and non-linear occupations
- Larger response at younger ages
- Effect size not so large

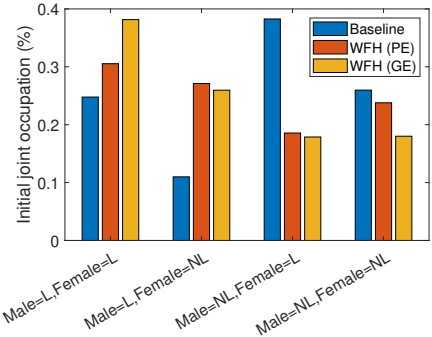


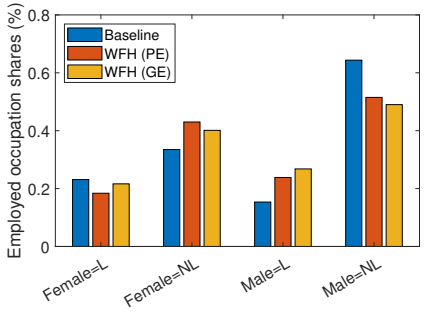




Long run: occupations adjust

- Now allow initial occupational choices to adjust → increase in female NL choice
- Men choose linear → increase in joint linear households.
- Total supply of non-linear workers pushes down NL wage and increase L wages.
- Men still have higher employment so still *more likely* to work in non-linear occupations over life cycle





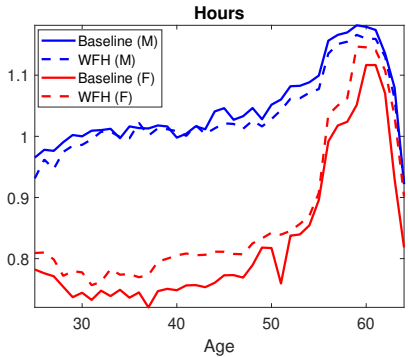
Long run: general equilibrium effects matter!

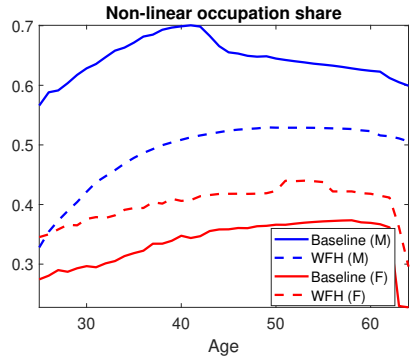
- Full reallocation leads to much larger long-run effects
- Significant shift toward female workers: higher employment, hours, working in non-linear sector
- Change in wages ($W_{NL} \downarrow, W_L \uparrow$) mutes reallocation except men NL $\rightarrow$ L

Change	Male			Female		
	5-years	P.E.	G.E.	5-years	P.E.	G.E.
Income	-3.6	-8.0	-9.2	1.2	15.7	12.8
Employment (p.p.)	-1.9	-4.5	-3.3	2.0	5.0	5.7
Employment with young child (p.p.)	0.0	-9.9	-7.8	2.7	3.9	5.4
Hours	-1.1	-1.2	-1.7	-1.6	5.5	3.5
Wages	-1.4	-1.2	-3.1	-1.9	2.3	0.2
Non-linear share (p.p.)	-1.6	-13.2	-19.5	1.3	9.9	2.3

Long run: implications for life cycle

- Women increase hours during age of peak child care costs
- New pattern of occupations over life-cycle





Conclusion and next steps

Take-away

- Work from home (and other disruptions) in the labor market are having a large effect
- Changing the balance of work between men and women
- Slow process due to frictional nature of occupational choice
- General equilibrium effects could be large

Future

- Work in progress, coming soon: time commitment shocks, asymmetric occupation switching and exposure to WFH, further occupations types...
- Full general equilibrium (including capital market)
  - Study transition dynamics
- Consider policy implications e.g. joint taxation, value of childcare, welfare

Thank you

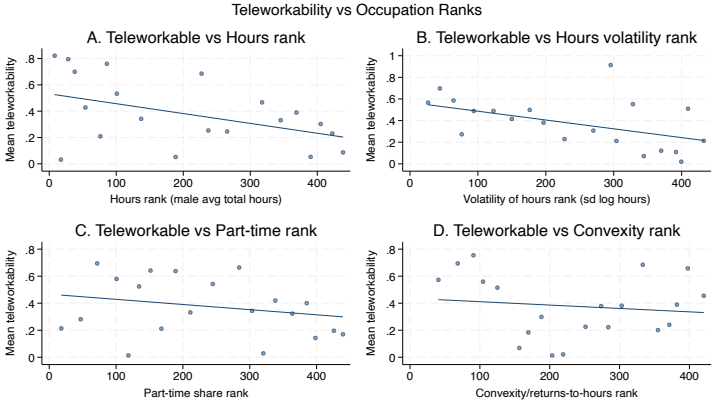
References

Goldin, Claudia, "A Grand Gender Convergence: Its Last Chapter," *American Economic Review*, 2014, p. 1091–1119.

Kleven, Henrik, Camille Landais, and Gabriel Leite-Mariante, "The Child Penalty Atlas," *The Review of Economic Studies*, 2025, *92* (5), 3174–3207.

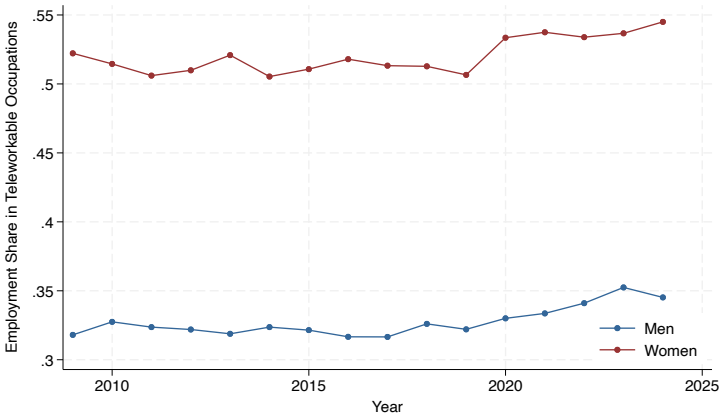
Backup

Are greedy occupations more teleworkable?



Note: Occupations are classified as teleworkable following Dingel and Neiman (2020), based on the feasibility of performing tasks remotely using O*NET data.

Employment shares in teleworkable occupations by Year and Gender



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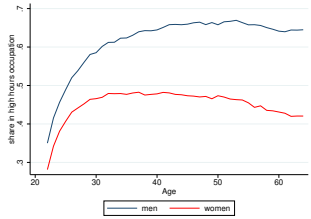
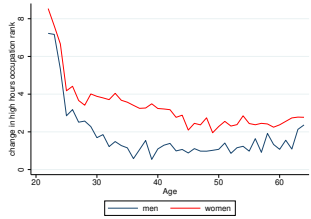
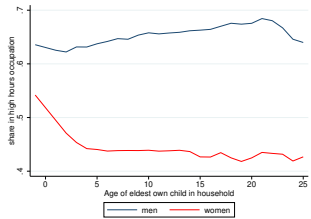
Greedy occupations and childcare



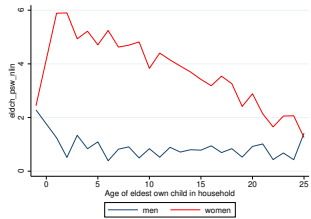
(A) Life-cycle



(B) Life-cycle



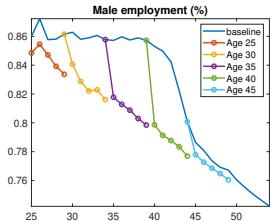
(C) Arrival of child

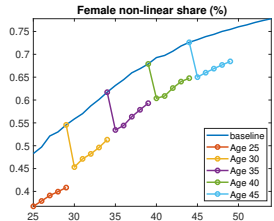


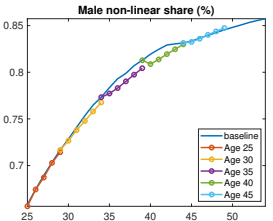
(D) Arrival of child

Occupation choice conditional on employment (SR)

- Increase in female non-linear share due to extensive margin
- Conditional on employment similar share of men in non-linear occupations

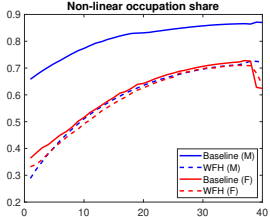


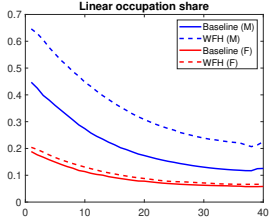


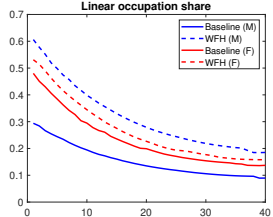


Occupation choice conditional on employment (GE)

- Large fall in share of men working in non-linear conditional on employment
- Female increase mostly due to extensive margin (small rise)
- Including employment, share of linear occupation rises for *both* men and women (Panel 3)







Within Period Timeline