# Moving Home: Non-Market Housing and Labour Market Risk

Stephen Hennessy

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# Introduction

**New empirical evidence (Health and Retirement Study)**

- Children who lose their job are more likely to move home with parents
  - NEW Effect is present both at young adulthood and into middle age
  - Kaplan (2012): evidence for men 17-22, NLSY97
- Effect is robust to controlling for income, eldercare, and parent characteristics

**Research questions**

1. How does parental coresidence affect job market search among adult children?
2. How does welfare from coresidence interact with the optimal level of UI?

# Contribution

**Empirical:** Health and Retirement Study

- Children are more likely to move home when transitioning into unemployment
  - NEW Observed for children into middle age

**Quantitative:** structural lifecycle model of job search and coresidence

- Consumers with the option to move home search in higher-wage submarkets
- Welfare from the move home option is decreasing in the size of the UI benefit

# HRS Data Selection: Definition of Cross-wave Flows

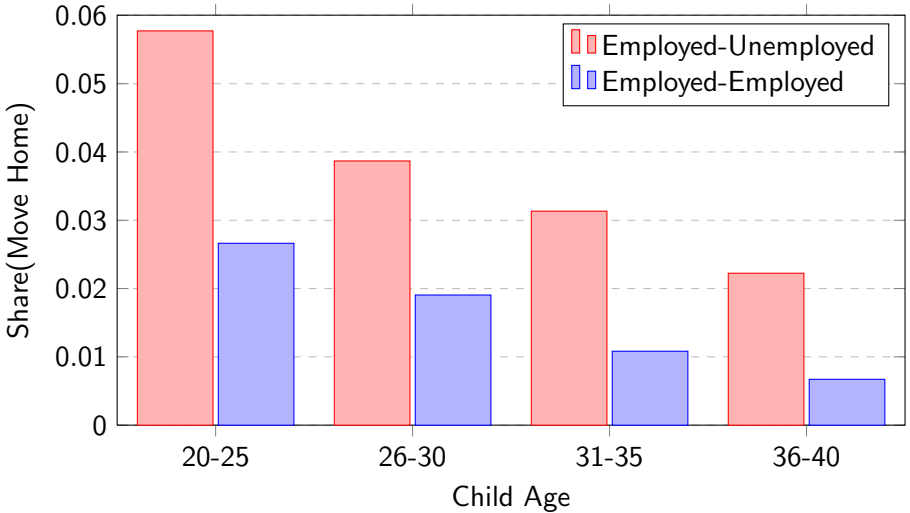
**Employment:** two types of job transitions

1. Employed-Employed: working in two subsequent waves
2. Employed-Unemployed: working in the previous wave but not in the current wave

**Coresidence:** child lives independently previously and coresides in the current wave

- If parent is a homeowner and child is not: child moves home
- If child is a homeowner and parent is not: child hosts parent
- Neither (or both) parent and child are homeowners: ambiguous coresidence

# HRS: E-U children are more likely to move home at all working ages




NLSY97 Move Out Counterfactual

# Probit: Average Marginal Effects on Share(Move Home)

**Dependent variable**: indicator for moving home after living independently

| | Child Age | | | |
|---|---|---|---|---|
| **Independent Variable** | (1) 20-25 | (2) 26-30 | (3) 31-35 | (4) 36-40 |
| Employed-Unemployed | .0312*** | .0194*** | .0169*** | .0050* |
| Transfer from Parent | .0096* | .0130*** | .0078*** | .0044*** |
| Child Income | | | | |
| <10K | *Base* | | | |
| 10-35K | -.0173*** | -.0036 | -.0137*** | -.0076** |
| 35-70K | -.0387*** | -.0051 | -.0245*** | -.0147*** |
| 70-100K | -.0205 | -.0068 | -.0268*** | -.0154*** |
| 100K+ | . | -.0039 | -.0274*** | -.0168*** |
| Child Gender (Female) | .0039 | -.0013 | -.0074*** | -.0048*** |
| Child Marital Status | -.0655*** | -.0328*** | -.0201*** | -.0134*** |
| Child Parental Status | .0162** | -.0050* | .0064*** | .0010 |
| **Mean Share(MH)** | .0301 | .0147 | .0100 | .0071 |



*** 99%, ** 95%, * 90%

# Model

# Model – Consumers

- Consumers are heterogeneous productivity, assets, and age
  - NEW option to coreside with a parent
  - Assumed to be purely altruistic: no strategic interaction b/t agents
  - **Tradeoff:** can avoid housing costs but lose out on utility from living independently
  - Independence utility subject to a Type-I extreme value shock

- When young, consumers choose:
  - Submarket (piece-rate) for search
  - Whether to coreside or live independently (up to age 40)
  - Saving for next period
- When old, consumers choose:
  - Saving for next period

# Consumer Preferences – Utility

$$U(j, a, \epsilon) = \frac{c^{1-\sigma}}{1-\sigma} + d_h \chi$$

Where:

- $j$: age
- $a$: assets
- $\epsilon$: individual-specific productivity
- $\chi$: independence utility

$d_h = 1$ when a consumer lives independently, $= 0$ when they coreside

- Beyond age 40, $d_h = 1$ for all consumers

# Consumer Preferences – Budget Constraints

**Employed:** $c + a' = (1 - \tau)\phi\epsilon_j + (1 + r)a - d_h\kappa_h$

**Unemployed:** $c + a' = (1 - \tau)b + (1 + r)a - d_h\kappa_h$

**Retired:** $c + a' = (1 - \tau)S + (1 + r)a - \kappa_h$

Where:

- $\phi$: piece-rate determined by submarket choice
- $b$: unemployment benefit
- $S$: pension benefit
- $\kappa_h$: cost of housing
- $\tau$: proportional tax on income
- $r$: interest rate
- $a'$: savings choice

# Labour Market – Workers

- Directed search in submarkets on age $j$, piece-rate $\phi$, and worker productivity $\epsilon$
- Den Haan matching function $M(u, v) = \frac{uv}{(u^\alpha + v^\alpha)^{\frac{1}{\alpha}}}$ with market tightness $\theta = \frac{v}{u}$
- Find job at rate $f(\theta) = \frac{M(u,v)}{u}$
- Provide individual-specific productivity $\epsilon$ to the firm
- Earn wage as an after-tax share of output: $w = (1 - \tau)\phi\epsilon_j$
- Proportional tax on output finances unemployment benefit $b$

# Labour Market – Firms

- Hire worker at rate $q(\theta) = \frac{M(u,v)}{v}$ after paying posting cost $\kappa_p$
- Match is destroyed in each subsequent period with probability $\delta$

**Firm's value function**:

$$V_f(j, \epsilon, \phi) = \epsilon_j(1 - \phi) + \beta(1 - \delta)V(j + 1, \epsilon, \phi)$$

**Vacancy posting decision**: $\max\{V_f(j, \epsilon, \phi) - \kappa_p, 0\} \quad \forall j, \epsilon, \phi$

Search Equilibrium

# Value Functions – Young Consumers

$$V_s(j,a,\epsilon) = \max_{\phi} \left\{ f(\theta(j,a,\epsilon)) V_u(j,a,\epsilon) + [1 - f(\theta(j,a,\epsilon))] V_e(j,a,\epsilon,\phi) \right\}$$

$$V_u(j,a,\epsilon) = \max \mathbf{E}_{\xi^c,\xi^i} \left\{ V_u^{cores}(j,a,\epsilon) + \xi^c, V_u^{ind}(j,a,\epsilon) + \xi^i \right\}$$
$$V_e(j,a,\epsilon,\phi) = \max \mathbf{E}_{\xi^c,\xi^i} \left\{ V_e^{cores}(j,a,\epsilon,\phi) + \xi^c, V_e^{ind}(j,a,\epsilon,\phi) + \xi^i \right\}$$

Where:

- $V_u^{cores}(j,a,\epsilon)$, $V_u^{ind}(j,a,\epsilon)$: consumer's value of coresiding and living independently while unemployed
- $V_e^{cores}(j,a,\epsilon,\phi)$, $V_e^{ind}(j,a,\epsilon,\phi)$: consumer's values while employed
- $\xi^{cores}, \xi^{ind}$ are Type-I extreme value shocks on the coresidence choice

# Value of Unemployment

$$V_u(j,a,\epsilon) = \max \mathbf{E}_{\xi_c,\xi_i}\left\{ V_u^{cores}(j,a,\epsilon) + \xi_c, V_u^{ind}(j,a,\epsilon) + \xi_i \right\}$$

$$V_u^{cores}(j,a,\epsilon) = \max_{a' \geq 0} \left\{ \frac{[b + (1+r)a - a']^{1-\sigma}}{1-\sigma} + \beta V_s(j+1, a', \epsilon) \right\}$$

$$V_u^{indep}(j,a,\epsilon) = \max_{a' \geq 0} \left\{ \frac{[b + (1+r)a - a' - \kappa_h]^{1-\sigma}}{1-\sigma} + \chi + \beta V_s(j+1, a', \epsilon) \right\}$$

# Value of Employment

$$V_e(j,a,\epsilon,\phi) = \max \mathbf{E}_{\xi_c,\xi_i}\left\{ V_e^{cores}(j,a,\epsilon,\phi) + \xi_c,\, V_{ind}^{e}(j,a,\epsilon,\phi) + \xi_i \right\}$$

$$V_e^{cores}(j,a,\epsilon,\phi) = \max_{a' \geq 0} \left\{ \frac{[(1-\tau)\epsilon_j \phi + (1+r)a - a']^{1-\sigma}}{1-\sigma} \right.$$
$$\left. + \beta[(1-\delta)V_e(j+1,a',\epsilon,\phi) + \delta V^s(j+1,a',\epsilon)] \right\}$$

$$V_e^{indep}(j,a,\epsilon,\phi) = \max_{a' \geq 0} \left\{ \frac{[(1-\tau)\epsilon_j \phi + (1+r)a - a' - \kappa_h]^{1-\sigma}}{1-\sigma} + \chi \right.$$
$$\left. + \beta[(1-\delta)V_e(j+1,a',\epsilon,\phi) + \delta V_s(j+1,a',\epsilon)] \right\}$$

# Value Functions – Old Consumers

$$V_r(j,a) = \max_{a'} \left\{ \frac{[S + (1+r)a - a' - \kappa_h]^{1-\sigma}}{1-\sigma} + \beta \psi_j V^r(j+1, a') \right\}$$

Where $\psi_j$ is a survival probability that increases in age

# Government

The government provides an unemployment benefit ($b$) and pension benefit ($S$) by choosing income taxes ($\tau$) such that:

$$\int \tau \epsilon_j \phi d\omega_e(j, a, \epsilon, \phi) = \int b d\omega_u(j, a, \epsilon) + \int S d\omega_r(j, a)$$

Where $\omega_e, \omega_u, \omega_r$ are stationary distributions of employed, searchers, and retirees

# Equilibrium

Given initial distributions of assets and productivity there is an equilibrium such that:

1. Consumers solve their problem by choosing a piece-rate, coresidence, and saving
2. Firms face zero expected profits for each submarket in which they post
3. Government funds unemployment and pension benefits via a proportional tax

Solution Algorithm

# Results

# Calibration: Internal

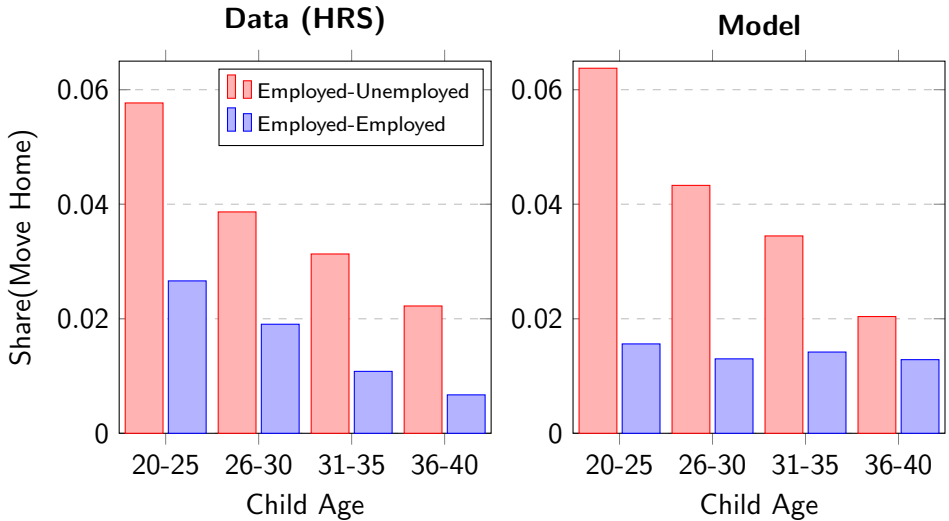
| | Parameter | Value | Target | Model | Data |
|---|---|---|---|---|---|
| $\kappa_h$ | Cost of Housing | .1171 | Rent-to-Income Ratio | *.0500* | |
| $\chi$ | Independence Utility | 4.703 | E-U Move Home Share | *.0413* | *.0413* |
| $\eta$ | EV Distribution Scale | 1.000 | Coresidence Share | *.0273* | *.1460* |
| $\kappa_j$ | Cost of Posting | .0034 | Unemployment Share[1] | *.0478* | *.0420* |
| $b$ | UI Benefit | .2454 | UI Exp. to Income Ratio[2] | *.0042* | *.0042* |
| $S$ | Social Security Benefit | .7537 | SS Exp. to Income Ratio[3] | *.0525* | *.0525* |
| $\sigma_\epsilon$ | St. Dev. Productivity | .8868 | SD Log Earnings (Age 26-30)[4] | *.9000* | *.9000* |

[1] BLS (2025) [2,3] BEA (2024) [4] Kuhn & Ríos-Rull (2013)

# Calibration: External

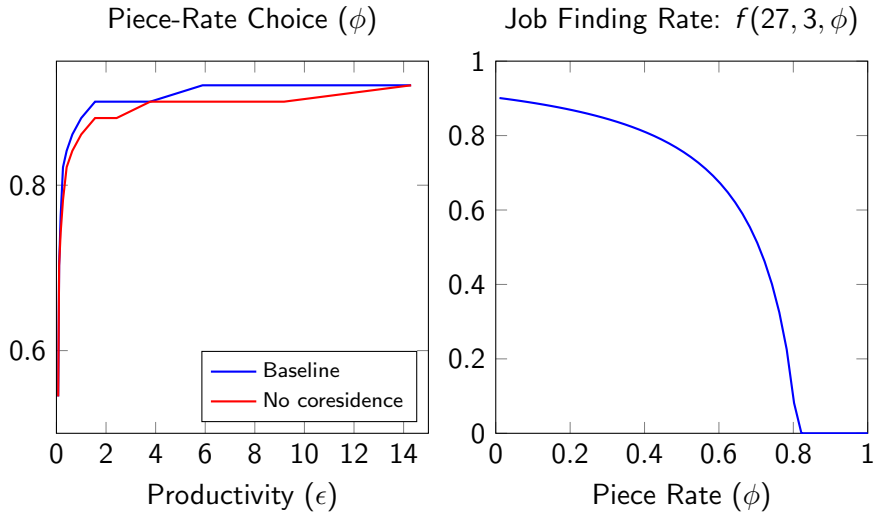
| | Parameter | Value | Source |
|---|---|---|---|
| $\alpha$ | Match Elasticity | 1.27 | Den Haan (2000) |
| $\delta$ | Job Destruction Rate | 0.0192 | E-U Share (HRS) |
| $\sigma$ | Risk Aversion | 2 | |
| $\beta$ | Discount Factor | 0.96 | |
| $r$ | Interest Rate | 0.04 | |

# Model Validation: Share who Move Home



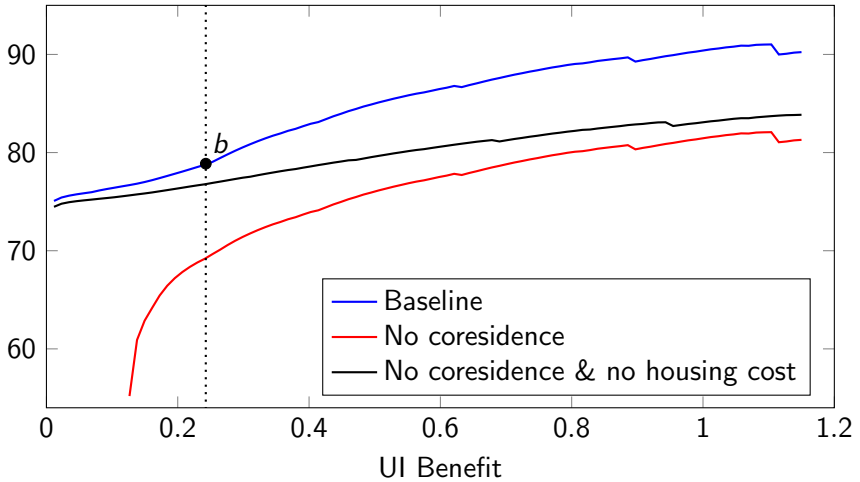

- Move home flows are larger for E-U consumers and are decreasing in age

# Ex Ante Search Choice ($j = 27, a = .16$)




- Consumers without the coresidence option search in lower piece-rate submarkets

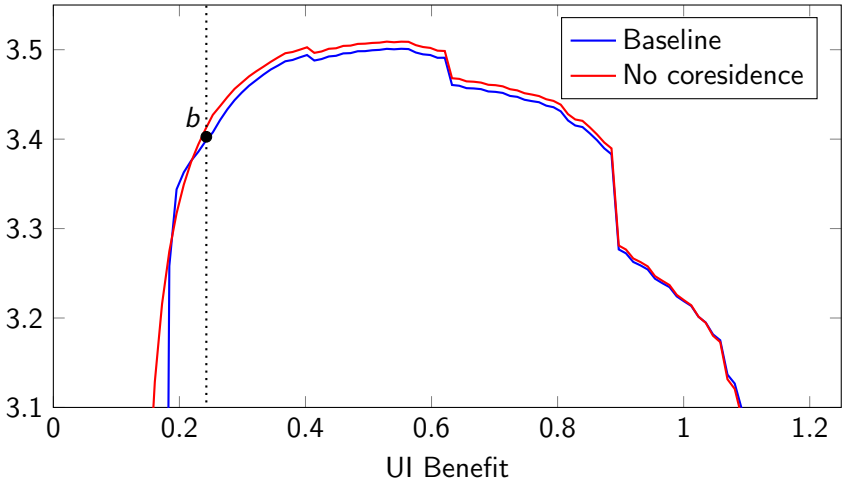
# Optimal UI Benefit: Expected Lifetime Utility




- Consumers prefer higher UI benefits until everyone selects into unemployment

Tax Rate

# Optimal UI Benefit: Equilibrium Utility




- Optimal UI under this welfare measure is roughly twice its calibrated value ($b$)

Tax Rate

# Conclusion

**Empirical observation:** E-U children are more likely to enter coresidence

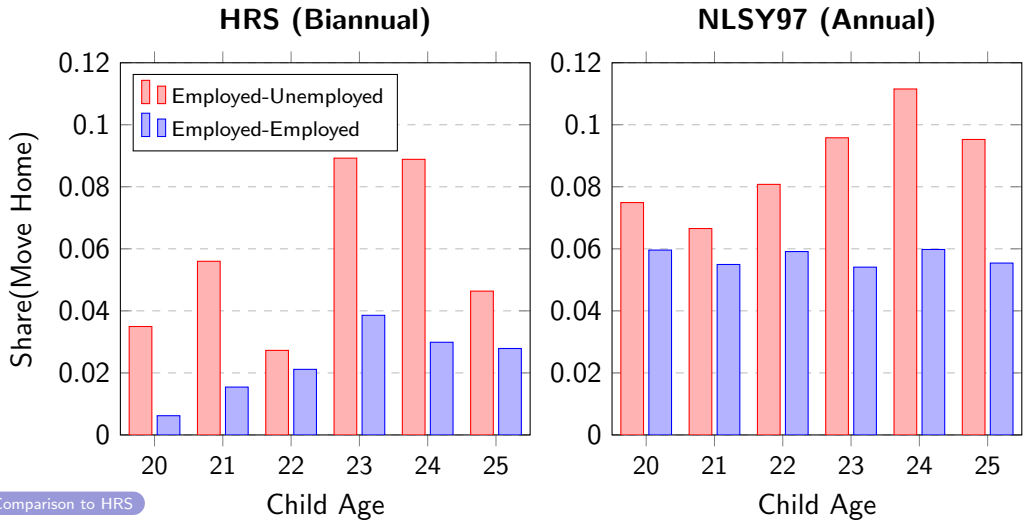
**Structural model:**

1. Children who can coreside search in submarkets with lower job-finding rates
   - Relative cost of unemployment is lower due to the coresidence option
   - Coresidence allows children to avoid housing cost $\kappa_h$
2. Welfare benefits of coresidence are largest at lower unemployment benefits
   - Suggests coresidence and UI are complementary insurance mechanisms

# Thank you

hennesss@mcmaster.ca
stephen-hennessy.github.io

# HRS v. NLSY97: E-U young adults are more likely to move home




Comparison to HRS
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# HRS v. NLSY97

Health and Retirement Study (1998-2018):

- Biannual frequency, ages 18-45
- Categorical child income, no unemployment benefits
- Coresidence and transfers in all years

NLSY97 (1998-2021):

- Annual frequency, ages 18-42
- Child income, employment, and unemployment benefits
- **Key variables:**
  1. Coresidence: available until 2009 (age 26)
  2. Transfers: available until 2002 (22); extensive margin until 2011 (age 32)

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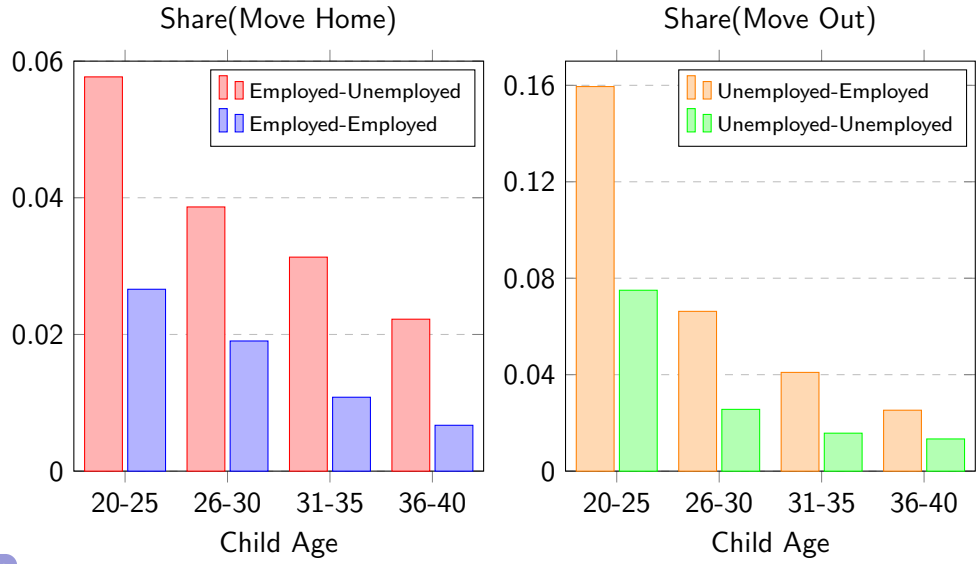
# Counterfactual: U-E children are more likely to move out

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# HRS: Coresidence

- 8% of adult children (excluding students) live with their parents
- In any individual wave, 1.3% of adult children move home
  - 0.71% move in with parents
  - 0.15% host parents
  - 0.44% are ambiguous
- Children who move home tend to be younger and have less education
- Parents of children who move home have lower incomes but higher wealth

| | Move home | Stay independent |
|---|---|---|
| Child age | 36.2 | 42.1 |
| Child education (years) | 12.4 | 13.8 |
| Parent income | $89,357 | $79,104 |
| Parent assets | $465,707 | $578,635 |

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# HRS: Transfers

Parents transfer choices and co-residence depend on child employment outcomes

- Children who have recently lost their jobs are more likely to receive transfers relative to those who stay employed
- The quantity of these transfers is also larger in both the unconditional average and intensive margin
- Job-losing children are also approximately 3.5 times more likely to move home

| | E-U | E-E |
|---|---|---|
| Extensive margin | 0.1932 | 0.1672 |
| Intensive margin | \$10,336 | \$9,740 |
| Average transfer | \$1,997 | \$1,628 |
| Share(Move home) | 0.03773 | 0.01354 |
| Share(MH & Transfer) | 0.00683 | 0.00214 |

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# Linear Probability Model: Share(Move Home)

**Dependent variable**: indicator for moving home after living independently

| | Child Age | | | |
|---|---|---|---|---|
| **Independent Variable** | (1) 20-25 | (2) 26-30 | (3) 31-35 | (4) 36-40 |
| Employed-Unemployed | .0315*** | .0202*** | .0205*** | .00814** |
| Transfer from Parent | .0091* | .0144*** | .0092*** | .0045** |
| Child Income | | | | |
| <10K | *Base* | | | |
| 10-35K | -.0186*** | -.0056 | -.0206*** | -.0208** |
| 35-70K | -.0354*** | -.0054 | -.0313*** | -.0284*** |
| 70-100K | -.0226 | -.0067 | -.0321*** | -.0286*** |
| 100K+ | -.0541*** | -.0061 | -.0334*** | -.0282*** |
| Child Gender (Female) | .0046 | -.0018 | -.0068*** | -.0058*** |
| Child Marital Status | -.0418*** | -.0312*** | -.0235*** | -.0174*** |
| Child Parental Status | .0118 | -.0044* | .0075*** | .0037* |
| **Mean Share(MH)** | .0301 | .0147 | .0100 | .0071 |

*** 99%, ** 95%, * 90%

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# Search Equilibrium

Value for a firm with a match:

$$V_f(j,\epsilon,\phi) = \epsilon(1-\phi) + \beta(1-\delta)V_f(j+1,\epsilon,\phi)$$

Free entry condition:

$$q(\theta(j,\epsilon,\phi))V_f(j,\epsilon,\phi) = \kappa_p \quad \forall j,\epsilon,\phi$$

If $V_f(j,\epsilon,\phi) < \kappa_j \rightarrow \theta = 0$ since the firm does not post in submarket $(j,\epsilon,\phi)$
Otherwise:

$$q(\theta) = \frac{\kappa_p}{V_f} = \frac{M(u,v)}{v} = \frac{u}{(u^\alpha + v^\alpha)^{\frac{1}{\alpha}}}$$

$$u = \frac{\kappa_p}{V_f}(u^\alpha + v^\alpha)^{\frac{1}{\alpha}} \Rightarrow \frac{u^\alpha}{u^\alpha + v^\alpha} = \left(\frac{\kappa_p}{V_f}\right)^\alpha$$

$$1 + \theta^\alpha = \left(\frac{V_f}{\kappa_p}\right)^\alpha \Rightarrow \theta^\alpha = \left(\frac{V_f}{\kappa_p}\right)^\alpha - 1 \Rightarrow \theta = \left[\left(\frac{V_f}{\kappa_p}\right)^\alpha - 1\right]^{\frac{1}{\alpha}} \quad \forall j,\epsilon,\phi$$

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# Solution Algorithm

Assuming an initial distribution of consumers $(\omega_s)$ at $j = 1$ $\forall a, \epsilon$

(1) Guess labour income tax rate $\tau \in \{0, 1\}$

(2) Firm: solve for $V_f(j, \epsilon, \phi)$ where $V_f(J, \epsilon, \phi) = 0$ $\forall \epsilon, \phi$
- Using $V_f(j, \epsilon, \phi)$, compute market tightness $\theta$

(3) Consumer: using $V^r(J, a) = 0$ $\forall a$, compute
- $V_r(j, a)$ $\forall a$ and $j \in \{65, ..., J-1\}$
- $V_u(j, a, \epsilon)$, $V_u^{indep}(j, a, \epsilon)$, and $V_u^{cores}(j, a, \epsilon)$ $\forall a, \epsilon$ and $j \in \{0, ..., 64\}$
- $V_e(j, a, \epsilon, \phi)$, $V_e^{indep}(j, a, \epsilon, \phi)$, and $V_e^{cores}(j, a, \epsilon, \phi)$ $\forall a, \epsilon, \phi$ and $j \in \{0, ..., 64\}$
- $V_s(j, a, \epsilon)$ $\forall a, \epsilon$ and $j \in \{0, ..., 64\}$

(4) Compute distributions for workers $\omega_s(j, a, \epsilon), \omega_e(j, a, \epsilon, \phi)$ and retirees $\omega_r(j, a)$

(5) Compute tax rate to balance the government's budget constraint; update guess

(6) Iterate on (2) – (5) until convergence

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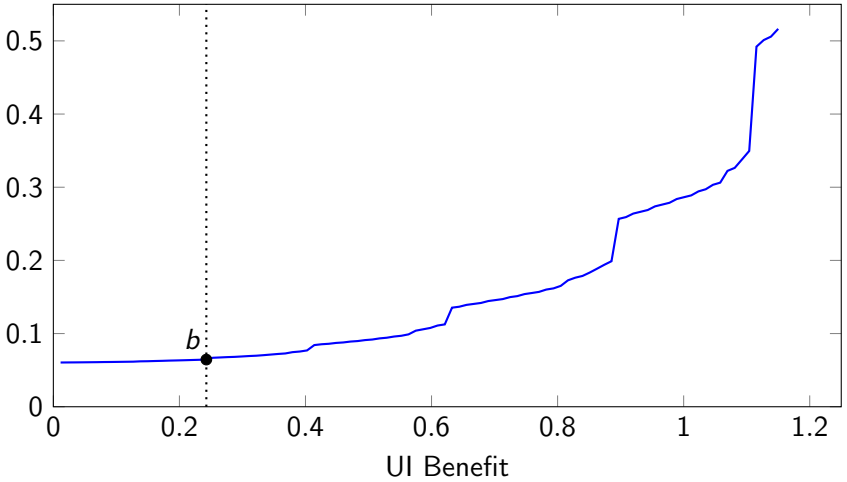
# Tax Rate: Expected Lifetime Utility

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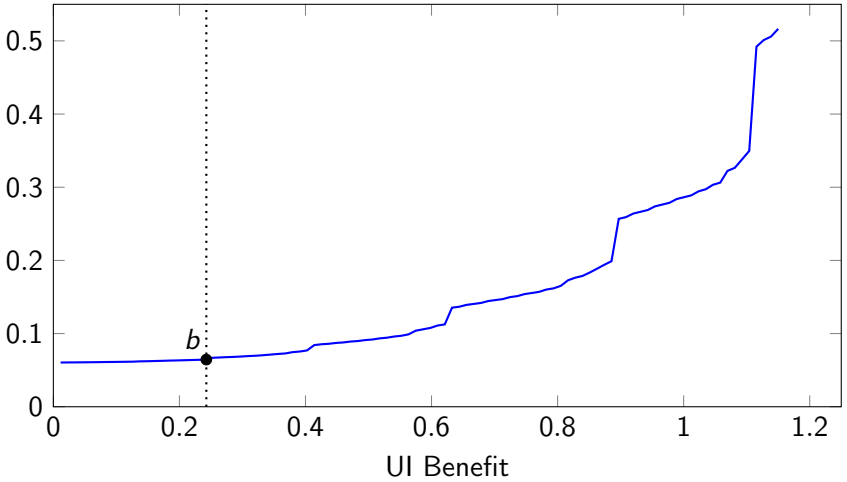
# Tax Rate: Equilibrium Utility

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