Household Labor Supply Insurance Around the World

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Motivation: Intra-Household Insurance and Development

Household labor supply provides potential insurance against economic shocks

  ▷ E.g., non-working members enter labor force in response to unemployment of head

  ▷ Literature: little insurance in U.S., Europe (Lundberg, 1985; Ellieroth, 2019; Bredtmann et al., 2018)

    ▷ Possibly due to UI, broader public benefits, savings (Birinci, 2021; Bredtmann et al., 2018)

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We study household labor supply around the world

- ▷ Diverse range of countries in terms of geography, labor market institutions, income

Motivation: Wage Employment Risk and Development

Wage Work Exit Rate

Wage Work Finding Rate

Motivation: Share of Unemployed Receiving Benefits
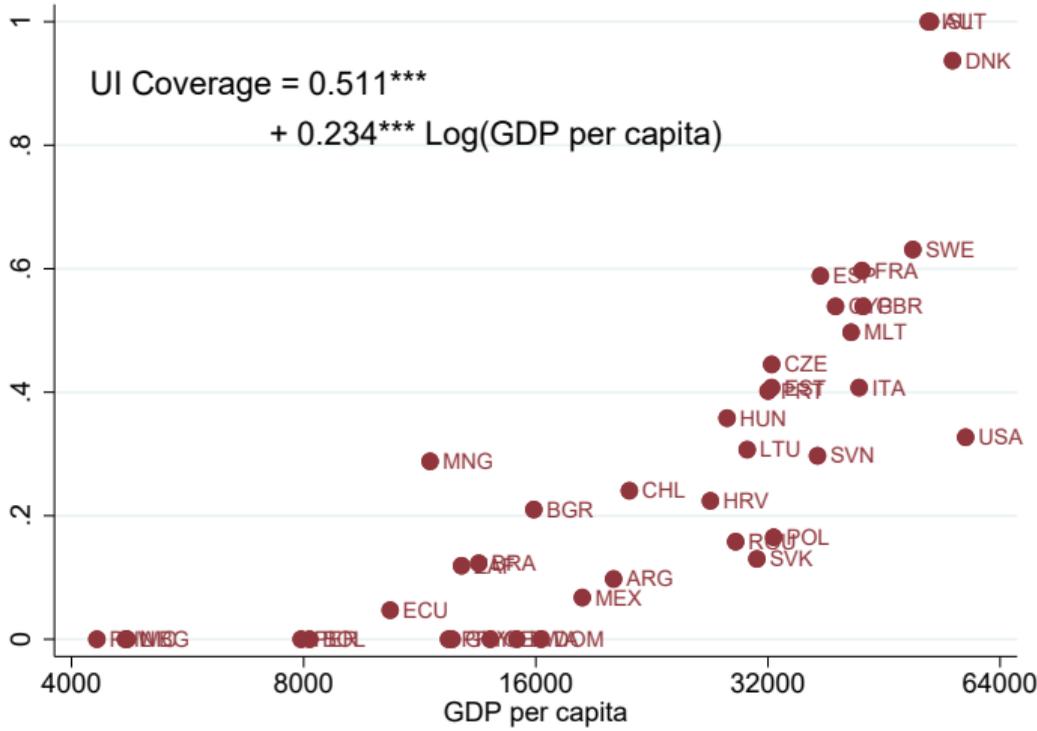
UI Coverage = 0.511***
+ 0.234*** Log(GDP per capita)

Household Insurance Around the World

Empirics: harmonized LFSs with household links for 46 countries

- ▷ Little evidence household labor supply acts as insurance
- ▷ Role for assortative matching / correlated shocks

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Theory: quantitative life-cycle model of household labor supply

- ▷ Key ingredients: search, public insurance, asset accumulation, human capital formation

- ▷ Use model to understand importance of various forces

- ▷ Understand factors that limit household labor supply

    - ▷ Missing: consumption, asset data (Townsend, 1994; Santaeulalia-Llopis and co-authors, work in progress)

[related literature]

Outline

Data Project

Consider all countries with rotating panel labor force surveys that:

- ▷ have consistent household/personal identifiers across quarters
- ▷ have rotation scheme which allows to follow same individual for (at least) two quarters
- ▷ make data available to (foreign) researchers

Harmonize the data

- ▷ Demographics, labor force status, earnings, characteristics of work, …

Use identifiers to generate a (short) panel

- ▷ Validate the matches
- ▷ Post-stratify the weights (age, sex, education, labor force status)

Dataset

Data on labor market states and flows for 54 countries

  ▷ GDP per capita $4,000 – $100,000

  ▷ Geography & institutions: US, Europe + 15 Latin American, 5 African, 4 Asian countries

Microdata

  ▷ 91 million observations (= person tracked for two+ quarters)

For more, see www.lfsdata.com

[vs. IPUMS cross-section] [employment definitions]

Dataset Features for Households

Most surveys collect a household roster

- ▷ Size, composition (number of young kids)
- ▷ Exceptions: Albania, Spain

Most surveys enumerate all prime-age adults

- ▷ Demographics, labor force modules
- ▷ Exceptions: Switzerland

Most surveys ask about interrelationships

- ▷ Link married couples
- ▷ Link heads-rest of household
- ▷ Exceptions: Denmark, Sweden

Estimating the Added Worker Effect

AWE: Wife finds work in response to husband's exit from work

For sample of employed husbands with non-employed wives, estimate:

$$WifeEntry_{iqt} = \alpha + \beta_0 HusbandExit_{iqt} + \beta_1 \log(y_{iqt}) \times HusbandExit_{iqt} + \gamma X_{iqt} + \varepsilon_{iqt}$$

- ▷ FE: country-date, kids < 4, household members age 16–65, age & education of both partners
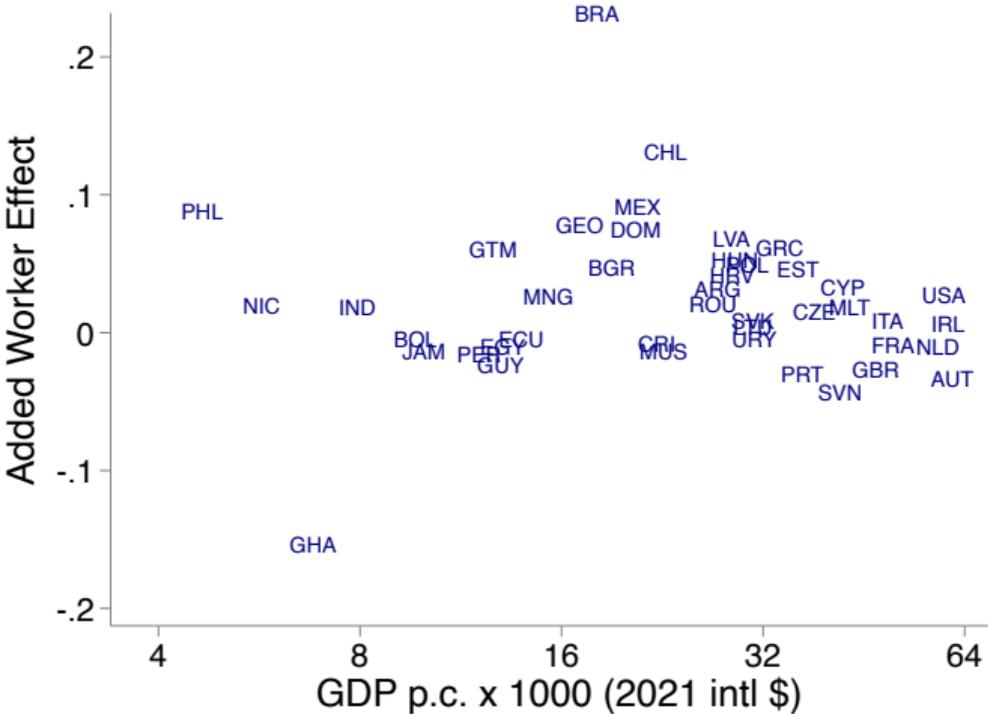- ▷ Interpretation: GDP normalized by US 2021 level.

Added Worker Effect

	Wife Enters E	Wife Enters E
Husband Exits	0.012	0.013
	(0.012)	(0.012)
Exits x Log GDP p.c.	-0.007	-0.007
	(0.011)	(0.014)
Exits x Gender Norms		-0.000
		(0.001)
R-squared	0.051	0.051
N	6,123,806	6,119,977
Countries	46	43

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Added Worker Effect, Country by Country

Estimating the Persisting Worker Effect

PWE: Wife remains employed in response to husband's exit from work

▷ More relevant as female lfpr rises (Guner et al., 2025)

For sample of employed wives with employed husbands, estimate:

$$WifeExit_{iqt} = \alpha + \beta_0 HusbandExit_{iqt} + \beta_1 \log(y_{iqt}) \times HusbandExit_{iqt} + \gamma X_{iqt} + \varepsilon_{iqt}$$

▷ FE: country-date, kids < 4, household members age 16–65, age & education of both partners

Persisting Worker Effect

	Wife Stays in E			
	All	All	Prime Age	All
Husband Exits	-0.109***	-0.105***	-0.084***	-0.051***
	(0.018)	(0.017)	(0.018)	(0.013)
Exits x Log GDP p.c.	-0.003	-0.017	0.004	0.000
	(0.015)	(0.019)	(0.016)	(0.014)
Exits x Gender Norms		0.003*		
		(0.001)		
Husband Exits x Same Industry				-0.232***
				(0.046)
Exits x Same Industry x Log GDP				-0.046
				(0.027)
R-squared	0.086	0.086	0.079	0.088
N	7,603,090	7,596,309	5,753,297	7,603,090
Countries	46	43	46	46

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Correlated shocks (Juhn & Potter, 2007)

Persisting Worker Effect, Country by Country
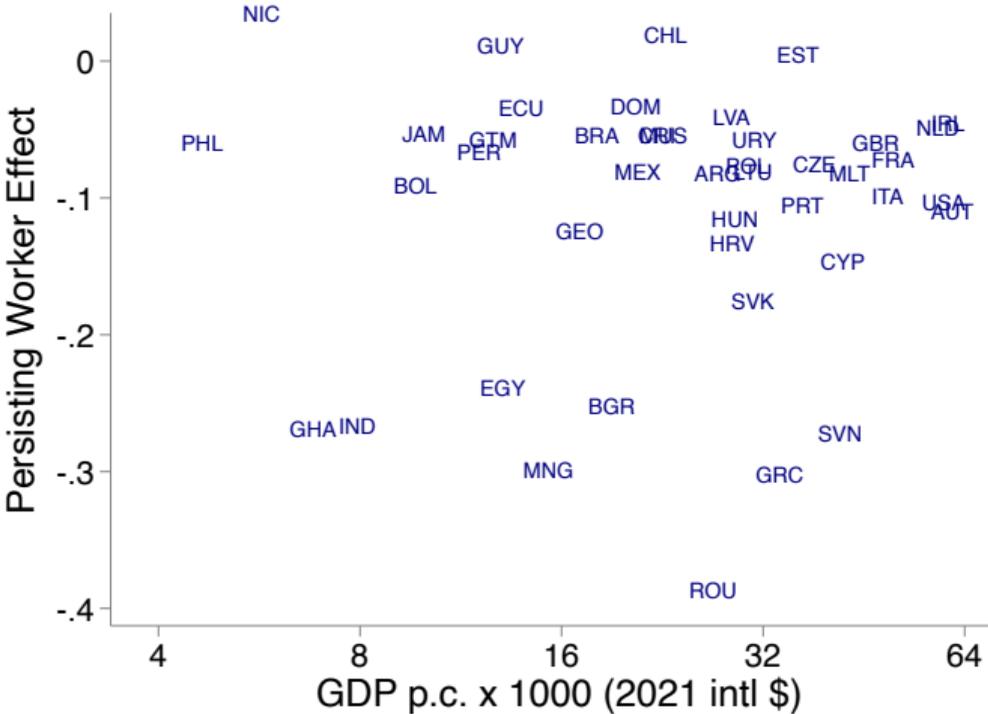
Estimating Precautionary Labor Supply

Precautionary labor supply: wives of husbands with risky jobs more likely to work?

For sample of wives with employed husbands, estimate:

$$WifeWorks_{iqt} = \alpha + \beta_0 HusbandWillExit_{iqt} + \beta_1 HusbandWillExit_{iqt} \times \log(y_{iqt}) + \gamma X_{iqt} + \varepsilon_{iqt}$$

$$WifeWorks_{iqt} = \alpha + \beta_0 P(HusbandWillExit)_{iqt} + \beta_1 P(HusbandWillExit_{iqt}) \times \log(y_{iqt}) + \gamma X_{iqt} + \varepsilon_{iqt}$$

▷ $P(HusbandWillExit)_{iqt}$: function of husband's age, education, industry, and occupation

Precautionary Labor Supply

|	Wife in E	Wife in E
Husband Exits	-0.071***	-0.070***
	(0.016)	(0.016)
Exits x Log GDP p.c.	-0.033**	-0.042***
	(0.010)	(0.010)
Exits x Gender Norms		0.001
		(0.001)
R-squared	0.144	0.144
N	13,726,906	13,716,288
Countries	46	43

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

	Wife in E	Wife in E
P(Husband Exits)	-0.335***	-0.339***
	(0.092)	(0.093)
P(Exits) x Log GDP p.c.	-0.201**	-0.176**
	(0.062)	(0.061)
P(Exits) x Gender Norms		-0.005
		(0.006)
R-squared	0.141	0.141
N	12,356,119	12,355,233
Countries	40	38

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Precautionary Labor Supply Country by Country
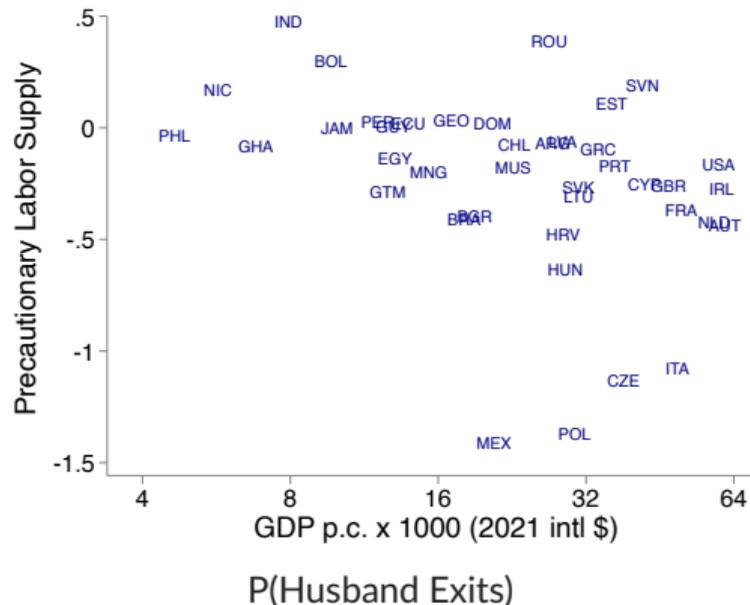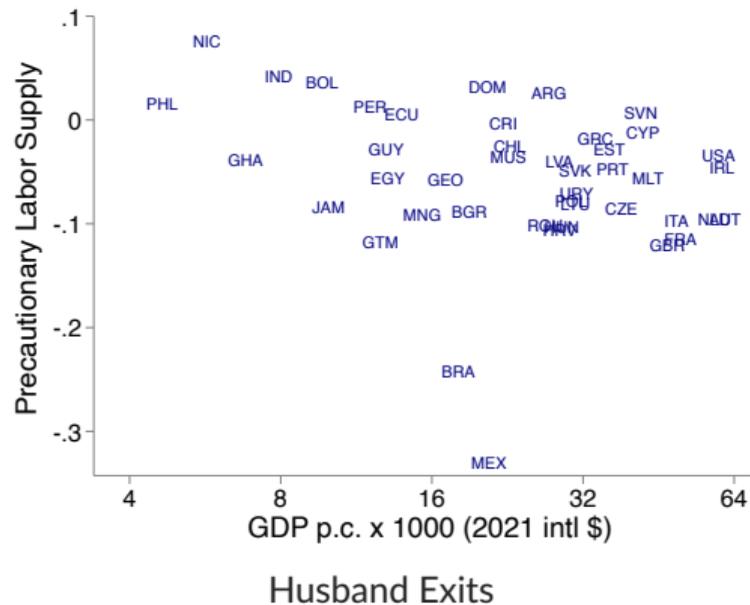
Husband Exits

P(Husband Exits)

Household Extensive Margin Response

What is the effect of changes in head's employment to other household employment?

For sample of employed heads, estimate:

$$\Delta NonHeadEmp_{iqt} = \alpha + \beta_0 HeadExit_{iqt} + \beta_1 HeadExit_{iqt} \times \log(y_{iqt}) + \gamma X_{iqt} + \varepsilon_{iqt}$$

For sample of non-employed heads, estimate:

$$\Delta NonHeadEmp_{iqt} = \alpha + \beta_0 HeadEnter_{iqt} + \beta_1 HeadEnter_{iqt} \times \log(y_{iqt}) + \gamma X_{iqt} + \varepsilon_{iqt}$$

▷ FE: country-date, kids < 4, household members age 16–65, age & education of head

Household Extensive Margin Response

	Non-Head Emp. Change	Non-Head Emp. Change
Head Exits	-0.023	
	(0.015)	
Exits x Log GDP p.c.	0.025*	
	(0.012)	
Head Enters		0.031**
		(0.009)
Enters x Log GDP p.c.		-0.017*
		(0.008)
R-squared	0.008	0.014
N	17,341,695	4,798,444
Countries	28	28

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Household Extensive Margin Response Country by Country

Household Intensive Margin Response

What is the effect of changes in head's employment to other household employment?

For sample of heads, estimate:

$$\Delta NonHeadEarnings_{iqt} = \alpha + \gamma \Delta HeadEarnings_{iqt} + \beta X_{iqt} + \varepsilon_{iqt}$$

▷ FE: country-date, kids < 4, household members age 16–65, age & education of head

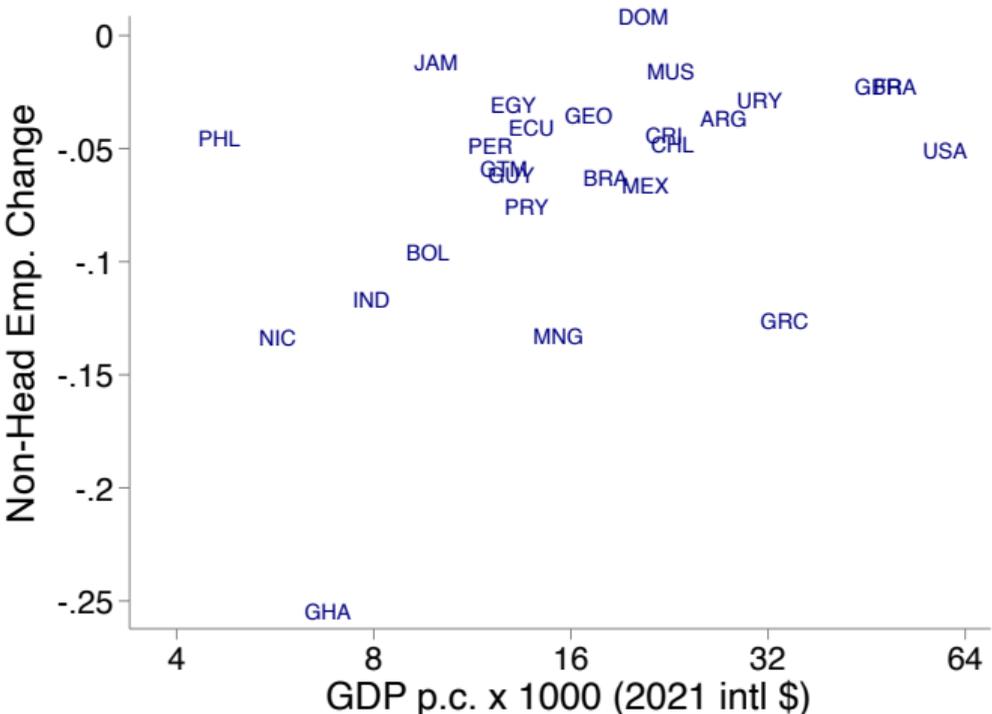## Household Intensive Margin Response

	Non-Head Earn. Change	Non-Head Earn. Change
Head Earnings Loss	0.134	
	(0.100)	
Loss x Log GDP p.c.	0.154	
	(0.080)	
Head Earnings Gain		-0.147
		(0.253)
Gain x Log GDP p.c.		-0.177
		(0.201)
R-squared	0.015	0.020
N	2,974,512	3,318,298
Countries	20	20

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Household Intensive Margin Response by Country
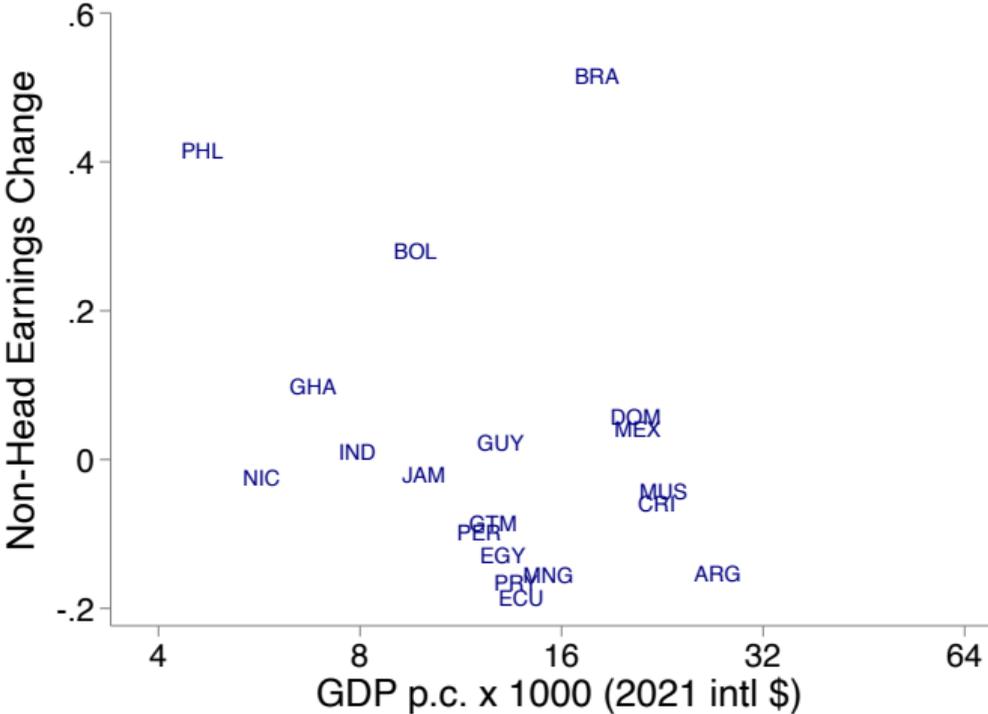
Estimating Household Precautionary Labor Supply

Precautionary labor supply: household whose heads work risky jobs more likely to work?

For sample of wives with employed husbands, estimate:

$$NonHeadEmp_{iqt} = \alpha + \beta_0 HeadWillExit_{iqt} + \beta_1 HeadWillExit_{iqt} \times \log(y_{iqt}) + \gamma X_{iqt} + \varepsilon_{iqt}$$
$$NonHeadEmp_{iqt} = \alpha + \beta_0 P(HeadWillExit)_{iqt} + \beta_1 P(HeadWillExit_{iqt}) \times \log(y_{iqt}) + \gamma X_{iqt} + \varepsilon_{iqt}$$

▷ $P(HeadWillExit)_{iqt}$: probability head exits as a function of age, education, industry, and occupation

Household Precautionary Labor Supply

	Non-Head Emp.
Head Exits	-0.052*
	(0.025)
Exits x Log GDP p.c.	-0.065**
	(0.019)
R-squared	0.404
N	17,341,125
Countries	26

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

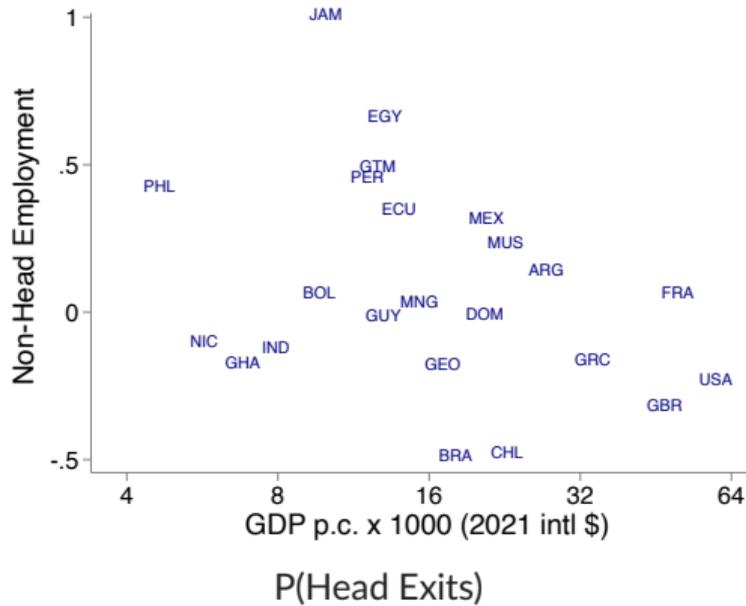|	Non-Head Emp.
P(Head Exits)	-0.180
	(0.130)
P(Exits) x Log GDP p.c.	-0.171
	(0.094)
R-squared	0.450
N	6,262,949
Countries	23

Standard errors in parentheses
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Household Precautionary Labor Supply Country by Country

Head Exits

P(Head Exits)
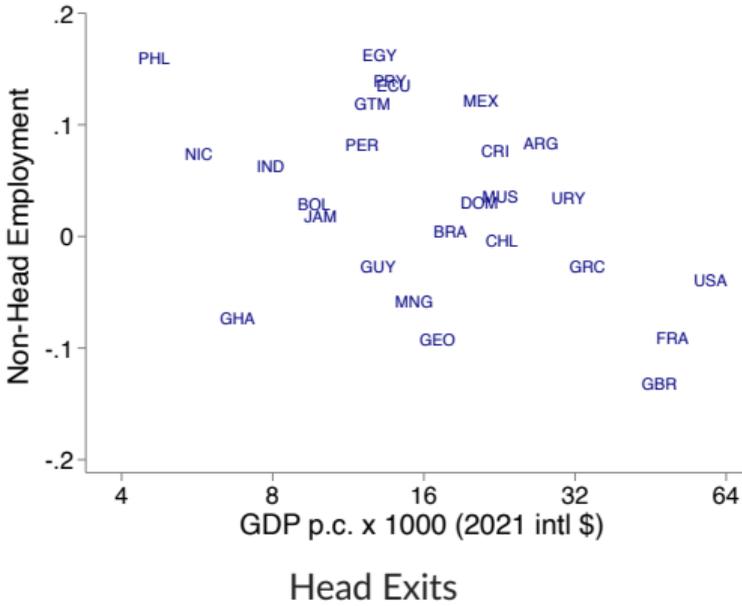
Empirics: Summing Up

Key empirical findings

▷ Little evidence household labor supply provides much insurance

▷ Evidence of correlated shocks and/or assortative matching

Questions for theory

▷ Understand factors that limit household labor supply

▷ What are the welfare implications

Outline

Households

Two-member households **(one man and one woman)** with four states: (t, jk, h, a)

1 **Age t:**

- T periods: work for $T_W < T$, retired for $T - T_W$

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- wage-employed (W), self-employed (S),
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3 Human Capital $(h = (h_m, h_w))$:

- accumulate while W (with PB $\phi_g^{up}(h)$), de-cumulate while S, B, N (with PB $\phi_g^{down}(h)$)
- in W: wages determined by human capital ($w(h_g) = h_g$)

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4 Assets a:

- ▷ risk free bond at interest rate r

Labor Market Transitions
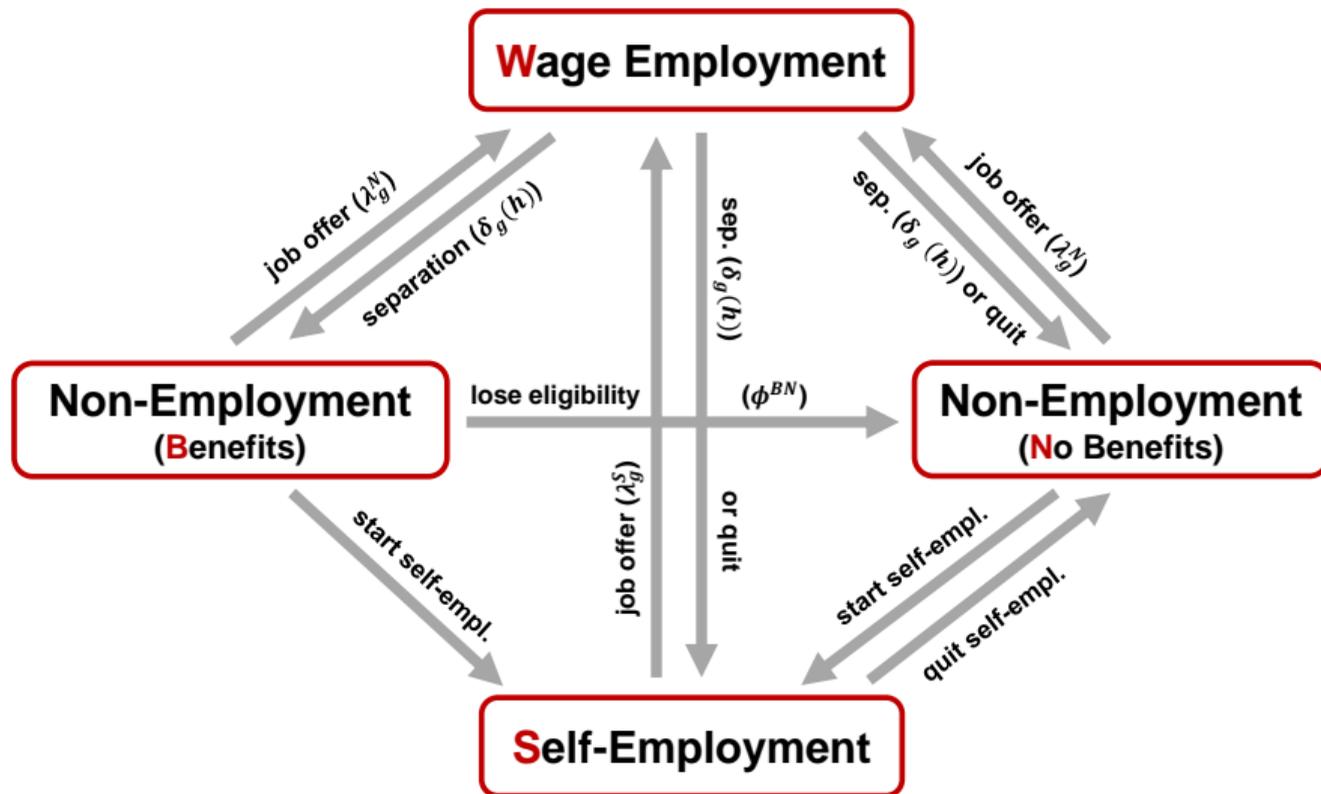
Timing
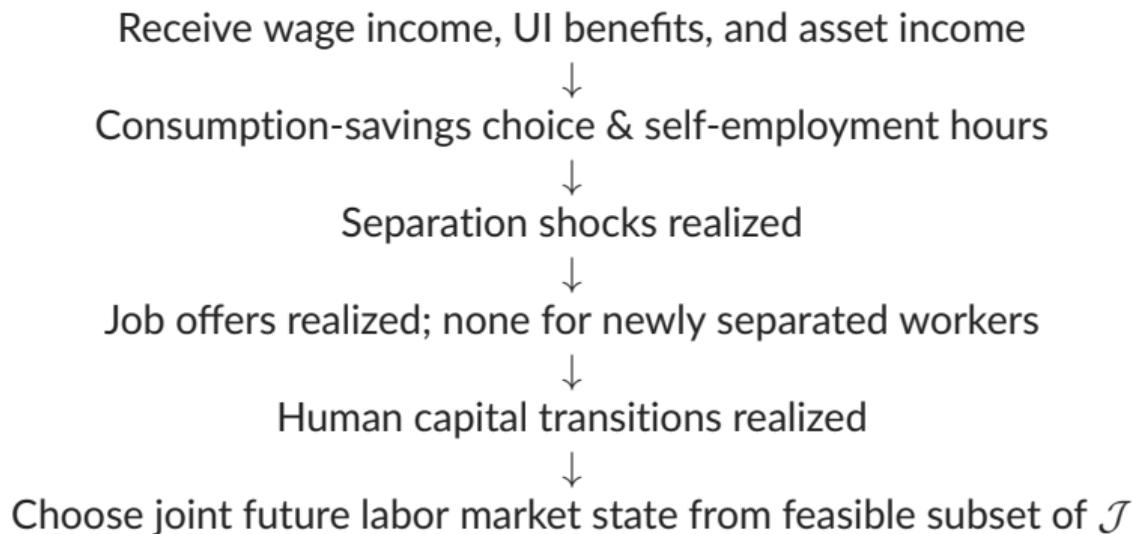
Receive wage income, UI benefits, and asset income
↓
Consumption-savings choice & self-employment hours
↓
Separation shocks realized
↓
Job offers realized; none for newly separated workers
↓
Human capital transitions realized
↓
Choose joint future labor market state from feasible subset of $\mathcal{J}$

Consumption, Savings, Self-Employment

$$V_t^{jk}(h_m, h_w, a) = \max_{a', s_m, s_w} u(c^{jk}(h_m, h_w, a, a')) + \psi_t^{jk} - v_m(s_m) - v_w(s_w) + \beta\Theta_{t+1}^{jk}(h_m, h_w, a')$$

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▷ Value pooled consumption $u(c)$

$$c^{jk}(h_m, h_w, a, a') = (1 - \tau)\Big[\underbrace{(\mathbb{I}_{j=W} w_m(h_m) + \mathbb{I}_{k=W} w_w(h_w))}_{\text{wage income}} + \underbrace{\mathbb{I}_{j=S}\hat{w}_m s_m + \mathbb{I}_{k=S}\hat{w}_w s_w}_{\text{income from self-employment}} +$$

$$\underbrace{(\mathbb{I}_{j=B} b(h_m) + \mathbb{I}_{k=B} b(h_w))}_{\text{unemployment benefits}}\Big] - \underbrace{(a' - (1 + r)a)}_{\text{net savings}}$$

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▷ Additional utility ψ_t^{jk} of employment status

▷ Disutility from self-employment hours $v_g(s_g) = \eta_g \frac{s^{1+\nu}}{1+\nu}$

Consumption, Savings, Self-Employment

$$V_t^{jk}(h_m, h_w, a) = \max_{a', s_m, s_w} u(c^{jk}(h_m, h_w, a, a')) + \psi_t^{jk} - v_m(s_m) - v_w(s_w) + \beta\Theta_{t+1}^{jk}(h_m, h_w, a')$$

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▷ Additional utility ψ_t^{jk} of employment status

▷ Disutility from self-employment hours $v_g(s_g) = \eta_g \frac{s^{1+\nu}}{1+\nu}$

▷ Continuation value $\Theta_t^{jk}(h_m, h_w, a')$ [continuation value] [choice sets]

Outline

Calibration Strategy

US calibration as a starting point for counterfactuals

Fix some parameters exogenously   [exogenous parameters]

- ▷ Model period is a quarter $\Rightarrow$ 40 years of working life $= 160$ periods
- ▷ Risk aversion, interest rate, taxes, benefits, pension, returns to self-employment ...

Calibrate remaining parameters jointly

- ▷ Asset profiles $\Rightarrow$ discount factor β [assets]
- ▷ Income profiles $\Rightarrow$ grid and appreciation of human capital h [income]
- ▷ Earnings losses after non-employment spells $\Rightarrow$ depreciation of h [earnings loss]
- ▷ Distribution over joint labor market states $\Rightarrow$ utility shifters ψ_t^{jk} [LM shares]
- ▷ Hours of self-employed $\Rightarrow$ dis-utility η_g [self-employment]
- ▷ Separations by income level $\Rightarrow$ $\delta_g(h)$ [separations]
- ▷ Average labor market transitions $\Rightarrow$ arrival rates $\lambda_g^S, \lambda_g^B, \lambda_g^N$ [transitions]

Outline

Model Comparative Statics: Household Labor Supply

	AWE	FLFP
USA (data)	1.6%	70%
Baseline model	1.7%	65%
Income levels (GDP 10%)		
Asset markets ($r = 0\%$)		
Benefits (75%)		
Benefits (none)		

Model Comparative Statics: Household Labor Supply

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Model Comparative Statics: Household Labor Supply

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USA (data)	1.6%	70%
Baseline model	1.7%	65%
Income levels (GDP 10%)	10.6%	89%
Asset markets ($r = 0\%$)	7.7%	67%
Benefits (75%)	2.0%	65%
Benefits (none)	-3.0%	65%

With no UI benefits, incentive for someone to take self-employment... but why not husband/head?

How do couples respond to husband's job loss?

Sample: husbands who exit wage work to any other status and whose wives don't work, estimate:

$$WifeEntry_{iqt} = \beta_0 + \beta_1 \log(y_{iqt}) + \gamma X_{iqt} + \varepsilon_{iqt}$$
$$HusbandSE_{iqt} = \beta_0 + \beta_1 \log(y_{iqt}) + \gamma X_{iqt} + \varepsilon_{iqt}$$

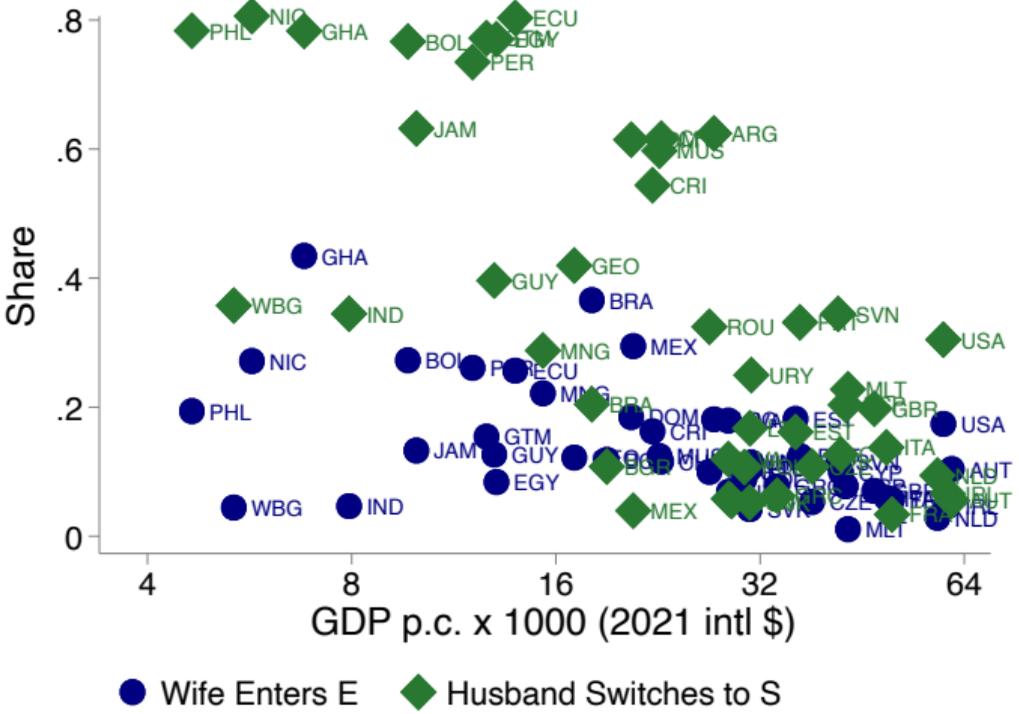▷ Controls: FE for country-date, number of kids < 4, age & education of husband & wife

Couple responses to husband's wage job loss

	Wife Enters E	Husband Switches to S	Neither
Constant	0.122***	0.227***	0.685***
	(0.015)	(0.054)	(0.048)
Log GDP p.c.	-0.032*	-0.196***	0.177***
	(0.014)	(0.032)	(0.029)
R-squared	0.031	0.206	0.196
N	113,003	113,003	113,003
Countries	45	45	45

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Couple responses to husband's wage job loss by country

Scatter plot with x-axis "GDP p.c. x 1000 (2021 intl $)" (log scale: 4, 8, 16, 32, 64) and y-axis "Share" (0, .2, .4, .6, .8). Legend: ● Wife Enters E, ◆ Husband Switches to S

Is temporary self-employment a good self-insurance mechanism?

Donovan et al. (2023): yes.

- ▷ Focus on countries where we observe workers for 3 quarters.
- ▷ Focus on workers who go W-S-W in those quarters. Earnings in S relative to W:

TABLE VII

EARNINGS REPLACEMENT RATE FOR TEMPORARILY SELF-EMPLOYED

Country	Avg. log change in earnings	Share with decline $< 60\%$
Bolivia	−0.09	0.80
Brazil	−0.06	0.81
Costa Rica	−0.41	0.58
Dominican Republic	−0.12	0.76
India	0.13	0.89
Mexico	−0.05	0.61
Mongolia	−0.15	0.90
Nicaragua	−0.37	0.43
Paraguay	−0.22	0.63
Average	−0.15	0.71

Notes. The average difference in log monthly earnings between $q = 1$ and $q = 2$ for individuals who transition W to S to W in three consecutive quarters $q = 1, 2, 3$.

Conclusion

Key empirical findings

- ▷ Little evidence household labor supply provides much insurance
- ▷ Evidence of correlated shocks and/or assortative matching

Theory: Quantitative life-cycle model of spousal labor supply

- ▷ Use model to understand channels that account for heterogeneity in spousal insurance
- ▷ So far: no UI pushes in the right direction

Related Literature

Empirical work on the added worker effect

▷ **Lundberg1985]**, Blundell et al.2016], Bredtmann et al.2018], Guner et al.2021], Mankart et al.2022] …

Quantitative search models with two-member households

▷ **Guler et al.2012]**, Mankart and Oikonomou2017], Choi and Valladares-Esteban2020], Birinci2021], Bardóczy2022], Fernández-Blanco2022], Ellieroth2023], Casella2023], Ellieroth and Michaud2024], Bacher et al.2024] …

Labor market patterns across countries

▷ Goldin1995], Olivertti and Petrongolo2014], Poschke2019], Bick et al.2018], De Magalhaes et al.2022], **Donovan et al.2023]**, Doss et al.2023], Chiplunkar and Kleinberg2023] Feng et al.2024] …

Importance of informal insurance in developing countries

▷ Rosenzweig1988], Townsend1994], Udry1994], Gertler and Gruber2002], Fafchamps and Lund2003], Angelucci et al.2018], Corno and Voena2023] …

Labor Force Participation: Our Sample vs. IPUMS

Single

Married

Employment Definitions

Wage Employed: anyone who:

  ▷ Worked in reference week for pay for an employer

  ▷ Temporarily absent from job with defined return period (vacation, sick)

Self-Employed: anyone who:

  ▷ Worked in reference week for pay as self-employed

  ▷ Worked $\geq$ 15 hours as unpaid family worker

Non-employed: anyone left over

Added Worker Effect Incorporating Unemployment

	Wife Enters			
	E	*E*	*E + U*	*E + U*
Husband Exits	0.012	0.013	0.024	0.024
	(0.012)	(0.012)	(0.014)	(0.014)
Exits x Log GDP p.c.	-0.007	-0.007	-0.005	-0.007
	(0.011)	(0.014)	(0.013)	(0.015)
Exits x Gender Norms		-0.000		-0.000
		(0.001)		(0.001)
R-squared	0.051	0.051	0.063	0.059
N	6,123,806	6,119,977	5,657,412	5,654,123
Countries	46	43	46	43

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Continuation Value

Continuation value if *WW* **today can be defined in two steps:**

1. Expectation over separations and resulting choice sets:

$$\bar{V}_{t+1}^{WW}(h_m, h_w, a') =$$
$$(1 - \delta_m(h_m))(1 - \delta_w(h_w)) \; \widetilde{V}_{t+1}(h_m, h_w, a', \mathcal{J}_{XX}^{WW})$$
$$+\delta_m(h_m)(1 - \delta_w(h_w)) \; \widetilde{V}_{t+1}(h_m, h_w, a', \mathcal{J}_{BX}^{XW})$$
$$+(1 - \delta_m(h_m))\delta_w(h_w) \; \widetilde{V}_{t+1}(h_m, h_w, a', \mathcal{J}_{XB}^{WX})$$
$$+\delta_m(h_m)\delta_w(h_w) \; \widetilde{V}_{t+1}(h_m, h_w, a', \mathcal{J}_{BB}^{XX})$$

Continuation Value

Continuation value if *WW* **today can be defined in two steps:**

2. Exogenous processes and labor supply decision:

$$\widetilde{V}_{t+1}(h_m, h_w, a, \mathcal{J}_{QR}^{OP}) =$$

$$\phi_m^{up}(h_m)\phi_w^{up}(h_w) \, \mathbb{E}_\epsilon \max_{\widehat{jk} \in \mathcal{J}_{QR}^{OP}} \left\{ V_{t+1}^{\widehat{jk}}(h_m, h_w, a) + \sigma\epsilon^{\widehat{jk}} \right\}$$

$$+\phi_m^{up}(h_m)(1 - \phi_w^{up}(h_w)) \, \mathbb{E}_\epsilon \max_{\widehat{jk} \in \mathcal{J}_{QR}^{OP}} \left\{ V_{t+1}^{\widehat{jk}}(h_m, h_w, a) + \sigma\epsilon^{\widehat{jk}} \right\}$$

$$+(1 - \phi_m^{up}(h_m))\phi_w^{up}(h_w) \, \mathbb{E}_\epsilon \max_{\widehat{jk} \in \mathcal{J}_{QR}^{OP}} \left\{ V_{t+1}^{\widehat{jk}}(h_m, h_w, a) + \sigma\epsilon^{\widehat{jk}} \right\}$$

$$+(1 - \phi_m^{up}(h_m))(1 - \phi_w^{up}(h_w)) \, \mathbb{E}_\epsilon \max_{\widehat{jk} \in \mathcal{J}_{QR}^{OP}} \left\{ V_{t+1}^{\widehat{jk}}(h_m, h_w, a) + \sigma\epsilon^{\widehat{jk}} \right\}$$

where $\epsilon \in \mathbb{R}^{|\mathcal{J}_{nm}^{\widehat{jk}}|}$ is a vector of i.i.d., mean zero extreme value shocks.

Labor Supply Choice Sets

Benefit Eligibility	Job (Offer)			
	Both	Man (m)	Woman (w)	None
Both	$\mathcal{J}_{BB}^{WW} =$ $\{W, S, B, N\}$ $\times\{W, S, B, N\}$	$\mathcal{J}_{BB}^{WX} =$ $\{W, S, B, N\}$ $\times\{S, B, N\}$	$\mathcal{J}_{BB}^{XW} =$ $\{S, B, N\}$ $\times\{W, S, B, N\}$	$\mathcal{J}_{BB}^{XX} =$ $\{S, B, N\}$ $\times\{S, B, N\}$
Man (m)	$\mathcal{J}_{BX}^{WW} =$ $\{W, S, B, N\}$ $\times\{W, S, N\}$	$\mathcal{J}_{BX}^{WX} =$ $\{W, S, B, N\}$ $\times\{S, N\}$	$\mathcal{J}_{BX}^{XW} =$ $\{S, B, N\}$ $\times\{W, S, N\}$	$\mathcal{J}_{BX}^{XX} =$ $\{S, B, N\}$ $\times\{S, N\}$
Woman (w)	$\mathcal{J}_{XB}^{WW} =$ $\{W, S, N\}$ $\times\{W, S, B, N\}$	$\mathcal{J}_{XB}^{WX} =$ $\{W, S, N\}$ $\times\{S, B, N\}$	$\mathcal{J}_{XB}^{XW} =$ $\{S, N\}$ $\times\{W, S, B, N\}$	$\mathcal{J}_{XB}^{XX} =$ $\{S, N\}$ $\times\{S, B, N\}$
None	$\mathcal{J}_{XX}^{WW} =$ $\{W, S, N\}$ $\times\{W, S, N\}$	$\mathcal{J}_{XX}^{WX} =$ $\{W, S, N\}$ $\times\{S, N\}$	$\mathcal{J}_{XX}^{XW} =$ $\{S, N\}$ $\times\{W, S, N\}$	$\mathcal{J}_{XX}^{XX} =$ $\{S, N\}$ $\times\{S, N\}$

Calibration – Exogenous Parameters

Parameter	Interpretation	Value
γ	Risk aversion	2
r	Interest rate	0.5 (2% annually)
ν	Frisch elasticity	0.5
τ	Labor income tax	0.28
b(h)	Ind. unemployment benefit	$\min\{0.5w_g(h), \$7500\}$
ϕ^{US}	Probability of losing benefits	0.5
p	Ind. pension level	$\min\{\$3000+0.25w_g(h), \$12000\}$
$\hat{w}_m, \hat{w}_f$	Return to self-employment	$6000, $4200
σ_ϵ	Gumbel shock	0.1

Calibration – Asset Levels

Key parameter: discount factor ($\beta = 0.986$)

Table: *

	Data	Model
Aggregate	44	60
Age 25-35	4	31
Age 35-45	40	60
Age 45-55	84	83
Age 55-65	146	121

Median Asset Levels (in 000s US$)

Target: Median net financial wealth in SIPP (net worth minus home and vehicle equity)

▷ Winsorize at 5th and 95th percentile

▷ In model: scaled by GDP/capita (ca. $67,000)

Calibration – Human Capital Accumulation

HC appreciation: $\phi_m^{up}(h) = 0.3 \times h^{-2}$ and $\phi_f^{up}(h) = 0.25 \times h^{-2}$

Table: *

	Men		Women	
	Data	Model	Data	Model
Average Labor Income (in 000s US$) Aggregate	19.8	19.0	13.3	10.9
Age 25-35	17.6	17.0	12.9	10.8
Age 35-45	20.6	18.7	13.5	10.8
Age 45-55	20.8	19.8	13.7	11.0
Age 55-65	19.8	20.5	13.0	10.9

Target: Mean earned income of employees from SIPP Data

▷ In model: scaled by GDP/capita (ca. $67,000)

▷ Conditional on working $\geq$ 240 hours and earning $>$ $0 per quarter

Calibration – Human Capital Depreciation

Linear depreciation: $\phi_m^{down}(h) = 0.1$ and $\phi_w^{down}(h) = 0.15$

Table: *

Table: Men

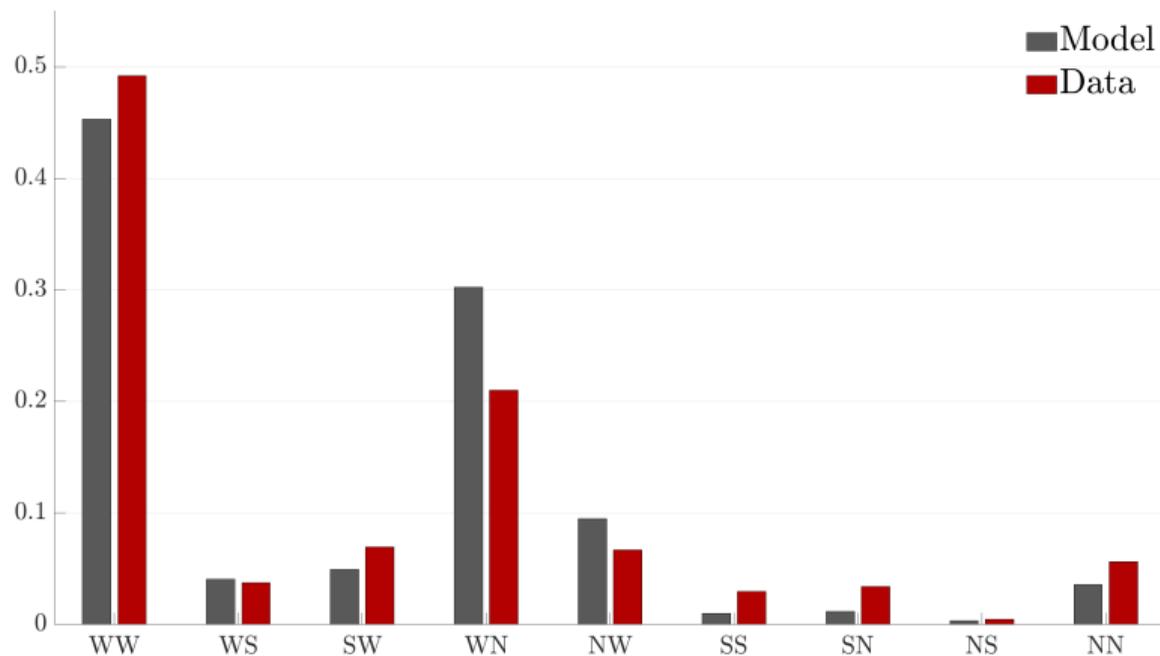|	Data	Model
Δwage_{1q}	-2.6%	-1.6%
Δwage_{2-4q}	-10.3%	-6.7%
Δwage_{5-8q}	-15.2%	-15.8%

Table: *

Table: Women

	Data	Model
Δwage_{1q}	-2.6%	-2.3%
Δwage_{2-4q}	-12.0%	-10.4%
Δwage_{5-8q}	-22.6%	-24.6%

Calibration – Labor Market Shares

Governed by parameter ψ_t^{jk}

- ▷ Data target: joint distribution of couples across labor market states

- ▷ To impose structure, we specify utility by gender and individual labor market state

- ▷ Household utility is sum of gender-specific terms:

    - ▷ Normalize $\psi_f^W = \psi_m^W = 0$
    - ▷ $\psi_m^S = 2.175$ $\psi_f^S = 1.15$
    - ▷ $\psi_m^B = \psi_m^N = 3$
    - ▷ $\psi_f^B = \psi_f^N$ is age-dependent: $2.4 + \frac{1.6 - 2.4}{1 + e^{-0.15(t-33)}}$
    - ▷ Additional utility if both spouses are non-employed: $\psi^{add} = 0.8$

Calibration – Labor Market Shares
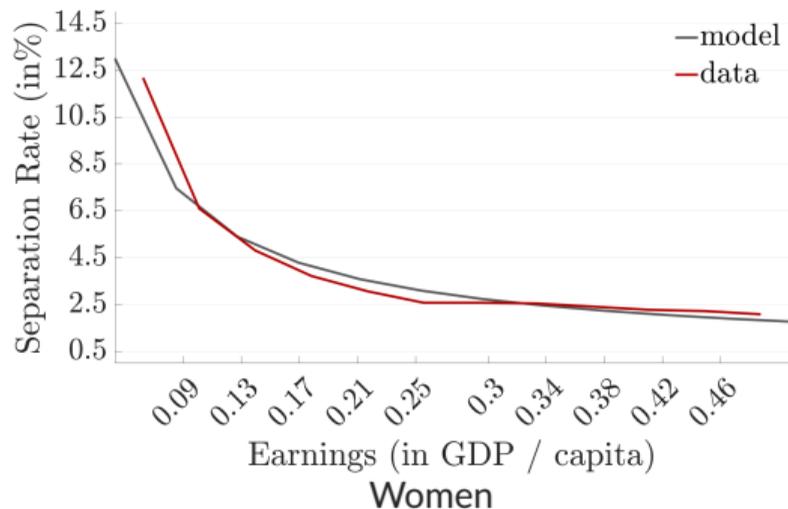
Calibration – Self-Employment

Key parameters: (dis)utility level of self-employment $\eta_m = 1.8$ **and** $\eta_f = 2.2$

- ▷ Weekly hours worked in self-employed (CPS data, contingent worker supplement)

	Data	Model
Women	33	33
Men	46	51

Calibration – Separation Rates

Key parameters: separation rates $\delta_m(h) = 0.07 \times h^{-0.75}$ **and** $\delta_f(h) = 0.13 \times h^{-0.8}$

Men

Women

Calibration – Individual Labor Market Transition Rates

Key parameters are exogenous job arrival rates:

$\lambda_m^B = \lambda_m^N = 0.15$ $\lambda_m^S = 0.07$ $\lambda_f^B = \lambda_f^N = 0.21$ $\lambda_f^S = 0.09$

	Data			Model		
	W	S	N	W	S	N
Panel I: Men						
W	0.96	0.01	0.03	0.97	0.00	0.03
S	0.05	0.92	0.03	0.06	0.75	0.18
N	0.14	0.03	0.84	0.12	0.13	0.74
Panel II: Women						
W	0.95	0.01	0.05	0.94	0.01	0.06
S	0.06	0.85	0.09	0.05	0.45	0.51
N	0.09	0.02	0.90	0.09	0.08	0.83

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