The Rise of Household Insurance

J. Mankart (Bundesbank)
R. Oikonomou (UCLouvain)
F. Pascucci (Verona/UCL)

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Intro

- US households have been increasingly using joint labour supply as an insurance device against unemployment shocks.
  - In CPS data we find a sharp rise in the AWE (the probability that an individual joins the labour force when their spouse becomes unemployed)
  - The AWE rises from 8% in the 1980s to 14% in the 2000s (and continues to rise in 2010s).

- What explains this? Several (well known) trends in US labour market: Narrowing of gender pay gap, rise in wage inequality, changes in female labour supply/demand.
    - Whereas households could be using joint labour supply to **cope with the more uncertainty** in the labour market, the narrowing of wage gap, and changes underlying the shifts in female labour supply imply **improved insurance** opportunities.

Intro

- We build a **Bewley-Aiyagari model with search, assets and dual earners**.
  - We subject the model to the structural changes that occurred since the 80s. (Narrowing of the gender gap in wages, rise in wage variance, shifts in female labour supply/demand.)
  - All these changes lead to a rise in the AWE.
    - Narrowing of the gender gap: Women can make up for a larger fraction of lost income due to unemployment.
    - Shifts in frictions/demand for jobs: 'Female jobs' become easier to find and are more stable.
    - Rise in wage variance: larger loses of permanent income due to unemployment for those that have 'good jobs'.
    - Shifts in female labour supply/preferences: Women progressively become 'more like men' in terms of their labour market attachment...

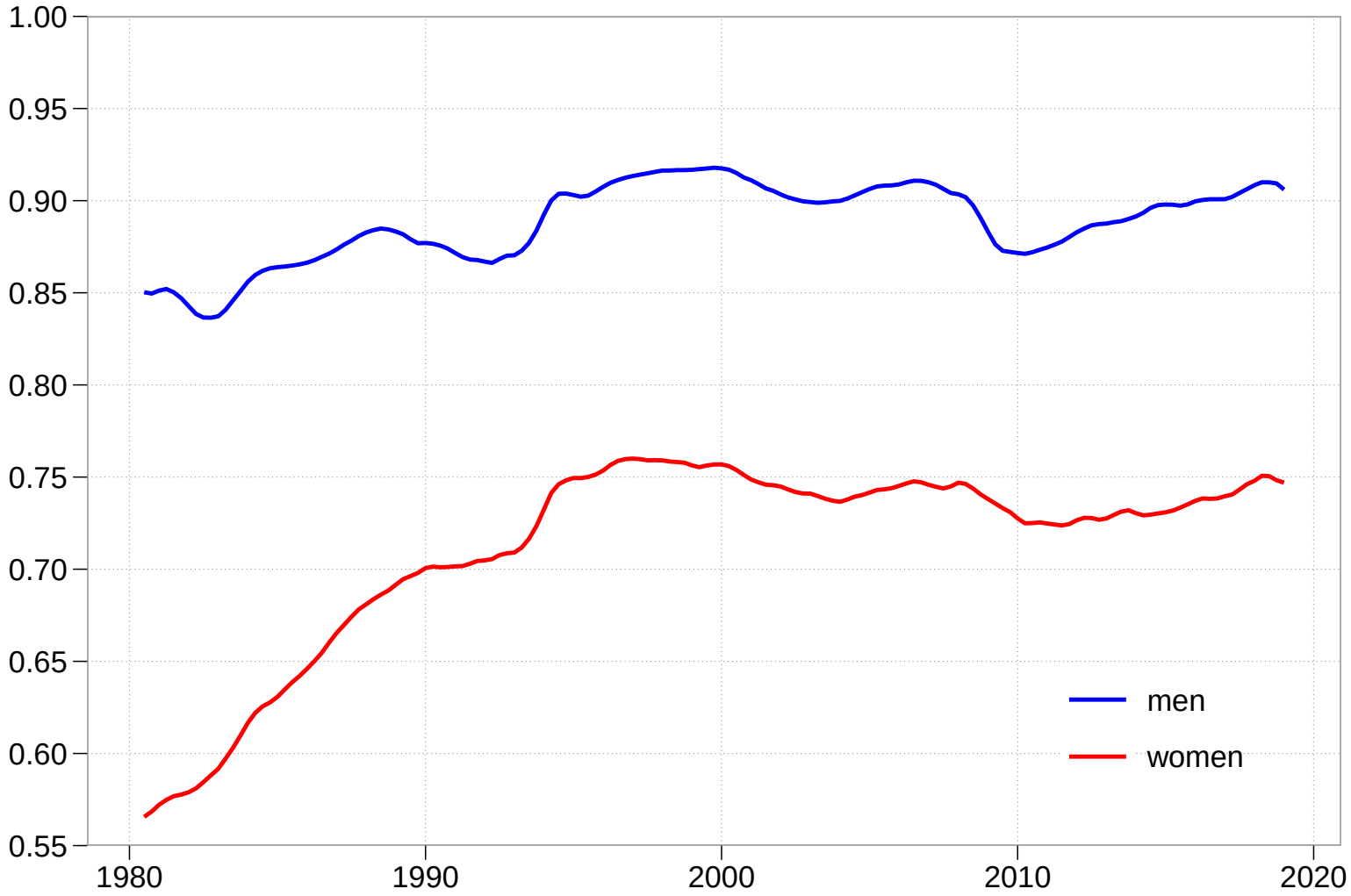
Intro

- Growing interest in understanding the role of **household labour supply as insurance**.
  - Attanasio et al (2006, 2008), Heathcote et al (2010), Blundel et al (2016), Wu and Krueger (2020), Mankart and Oikonomou (2017), Pruitt and Turner (2020) and numerous others.
    - We focus on joint labour supply as **insurance against unemployment**, and consider the **entry into the LF** margin.
- **Search theoretic models** of wage inequality.
    - Tradeoff between matching wages and outflows from unemployment (Hornstein et al (2010))
    - In our model this tradeoff is steep for men but not for women.
    - Our calibration: Men in the 1980s derive sharp disutility from non-employment, but women have a meaningful labour supply margin.
    - In the 2000s women 'become more like men'.

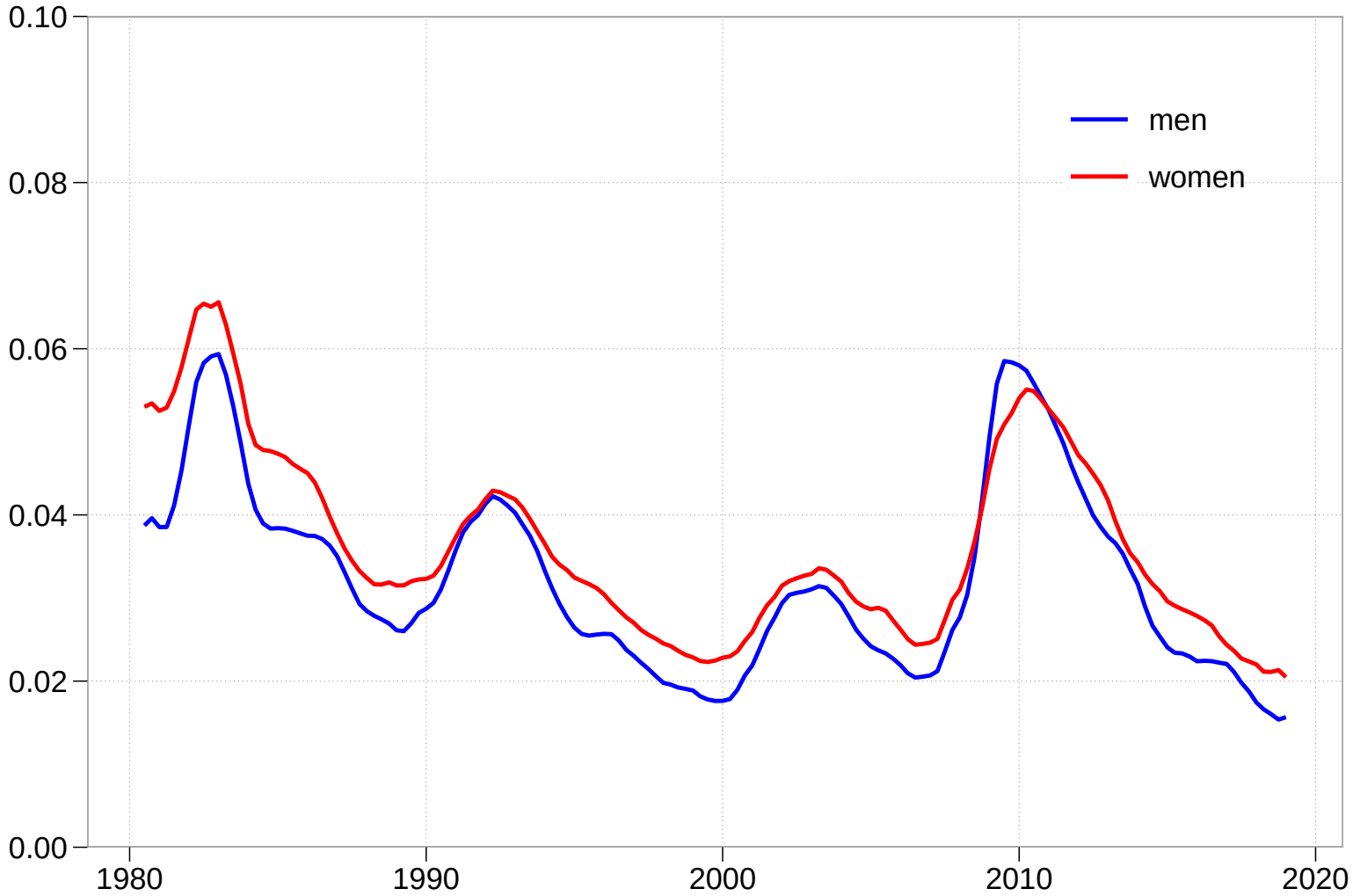
Intro

- Joint Search and the *'breadwinner cycle'* (Guler et al (2012)).
  - Is the AWE only due to insurance or also due to the 'breadwinner cycle' ?
    - Do families utilize joint search to climb the wage ladder: When the wife finds a job, the husband flows to unemployment to look for a better paying job. This would give the impression of an AWE.
    - Unable to test in data. Model seems to say insurance.
- Large empirical literature on the AWE dating back to Mincer, Heckman and McCurdy, Lundberg. Stephens (2002) and Cullen and Gruber (2002), Mankart and Oikonomou (2017, 8), Guner et al (2020), Pruit and Turner (2020).

Data: The US Labour Market, Employment Rates



Data: The US Labour Market, Unemployment Rates



Data: The US Labour Market, Transition Probabilities

Panel A: Men

	1980				2000		
	E	U	O		E	U	O
E	0.985	0.012	0.004	E	0.987	0.009	0.004
U	0.298	0.642	0.060	U	0.324	0.585	0.091
O	0.137	0.098	0.766	O	0.235	0.138	0.627

Panel A: Women

	1980				2000		
	E	U	O		E	U	O
E	0.957	0.010	0.033	E	0.971	0.007	0.021
U	0.245	0.507	0.248	U	0.267	0.490	0.243
O	0.064	0.025	0.911	O	0.068	0.026	0.906

Data: Added Workers, Monthly Regressions

	(1)	(2)	(3)	(4)
All Shocks				
1980	0.041***		0.040***	
	(0.006)		(0.006)	
1990	0.068***		0.067***	
	(0.009)		(0.009)	
2000	0.085***		0.085***	
	(0.010)		(0.010)	
2010	0.092***		0.089***	
	(0.012)		(0.012)	
Controls	No		Yes	
Observations	925,944		925,464	
Adj. R^2	0.001		0.001	

Data: Added Workers, Monthly Regressions

	(1)	(2)	(3)	(4)
Temporary Shock				
1980		0.033***		0.032***
		(0.010)		(0.010)
1990		0.020		0.020
		(0.011)		(0.011)
2000		0.028*		0.029*
		(0.012)		(0.012)
2010		0.050**		0.048**
		(0.016)		(0.016)
Permanent Shock				
1980		0.044***		0.042***
		(0.008)		(0.008)
1990		0.115***		0.114***
		(0.016)		(0.016)
2000		0.119***		0.117***
		(0.015)		(0.015)
2010		0.118***		0.114***
		(0.018)		(0.018)

Data: Added Workers, Quarterly

	(1)	(2)	(3)	(4)
All Shocks				
1980	0.077***		0.074***	
	(0.008)		(0.008)	
1990	0.102***		0.100***	
	(0.012)		(0.012)	
2000	0.131***		0.130***	
	(0.013)		(0.013)	
2010	0.140***		0.134***	
	(0.015)		(0.015)	
Controls	No		Yes	
Observations	333,964		333,455	
Adj. R^2	0.003		0.003	

Data: Added Workers, Quarterly

	(1)	(2)	(3)	(4)
Temporary Shock				
1980		0.060***		0.059***
		(0.014)		(0.014)
1990		0.059***		0.056***
		(0.016)		(0.016)
2000		0.084***		0.086***
		(0.018)		(0.018)
2010		0.079***		0.075***
		(0.021)		(0.021)
Permanent Shock				
1980		0.082***		0.078***
		(0.011)		(0.011)
1990		0.139***		0.138***
		(0.018)		(0.018)
2000		0.156***		0.153***
		(0.018)		(0.018)
2010		0.183***		0.175***
		(0.022)		(0.022)
Controls		No		Yes
Observations		333,964		333,455

Data: Added Workers

+ Robustness (Temporarily Inactive Men, Multiple U Spells).

Data: Wage moments

Table : Wage Moments

	1980	1990	2000	2010
Variance of wages of all employed				
Male	0.25	0.28	0.33	0.37
Female	0.22	0.25	0.29	0.34
Variance of wages of newly employed				
Male	0.25	0.27	0.32	0.35
Female	0.23	0.25	0.30	0.34
Gender Wage Gap	0.42	0.29	0.28	0.26
Relative mean wage of newly employed				
Male	0.28	0.31	0.34	0.37
Female	0.28	0.31	0.31	0.33

Model

We construct a search model with dual earner households and assets.

- $u(c_t)$ is utility from consuming a public good c_t.
- Labour Market states: Male spouse can be $S_m \in \{E, U\}$, female spouse can be $S_f \in \{E, U, O\}$.
- $\kappa_{U,m}$ is the disutility of unemployment for males.
- $\xi_t \kappa_{E,f}$ $\xi_t \kappa_{U,f}$ are utility costs of employment and unemployment for females. $\xi_t \sim F_\xi$ is a preference shock.

$$u(c_t) - \kappa_{U,m} \mathcal{I}_{S_m=U} - \sum_{x \in \{E,U\}} \xi_t \kappa_{x,f} \mathcal{I}_{S_f=x}$$

where I_ω is an indicator function taking the value 1 when ω is true.

Model

- Uncertainty in the labour market:
  - Exogenous Separations at rates χ_m and χ_f,
  - Job offers at rates $\lambda_{U,m}, \lambda_{U,f}, \lambda_{O,f}$
  - Job offers for employed agents at $\lambda_{E,m}, \lambda_{E,f}$
  - Wages are drawn from $F_{w,g}$ where $g \in \{m, f\}$
- Insurance opportunities
  - Households can self-insure accumulating wealth in a risk free asset a_t subject to no borrowing.
  - They receive transfer T from the government
  - They can also utilize joint labour supply.

$$\rho V_{N_m,N_f}(a_t,\xi) = \max_{S_f\in\{U,O\}}\Bigg\{\max_{c_t} u(c_t) - \kappa_{U,m} - \xi\kappa_{U,f} I_{S_f=U}$$
$$- f_c I_{S_f=U\cap N_f=O}$$
$$+ V_{N_m,S_f}(a_t,\xi)\dot{a}_t + \lambda_\xi \int_{\underline{\xi}}^{\overline{\xi}} \Big(V_{N_m,S_f}(a_t,\xi') - V_{N_m,S_f}(a_t,\xi)\Big) dF_{\xi'}$$
$$+ \lambda_{U,m} \int_{\underline{w}_m}^{\overline{w}_m} \max\Big\{ V_{E_m,S_f}(a_t,\xi,w') - V_{N_m,S_f}(a_t,\xi), 0\Big\} dF_{m,w'}$$
$$+ \lambda_{S_f,f} \int_{\underline{w}_f}^{\overline{w}_f} \max\Big\{ V_{N_m E_f}(a_t,\xi,w') - f_c I_{S_f=O} - V_{N_m,S_f}(a_t,\xi), 0\Big\} dF_{f,w'} \Bigg\}$$

where $\dot{a}_t = ra_t + T - c_t$.

$$\rho V_{E_m,N_f}(a_t,\xi,w) = \max\Bigg\{\rho V_{N_m,N_f}(a_t,\xi),$$

$$\max_{S_f\in\{U,O\}}\Bigg\{\max_{c_t} u(c_t) - \xi\kappa_{U,f} I_{S_f=U} - f_c I_{S_f=U\cap N_f=O}$$

$$+\lambda_\xi \int_{\underline{\xi}}^{\overline{\xi}} \Big(V_{E_m,S_f}(a_t,\xi') - V_{E_m,S_f}(a_t,\xi)\Big) dF_{\xi'}$$

$$+\lambda_{E,m}\int_{\underline{w}_m}^{\overline{w}_m} \max\Big\{ V_{E_m,S_f}(a_t,\xi,w') - V_{E_m,S_f}(a_t,\xi,w), 0\Big\} dF_{m,w'}$$

$$+\lambda_{S_f,f}\int_{\underline{w}_f}^{\overline{w}_f} \max\Big\{ V_{E_mE_f}(a_t,\xi,w,\widetilde{w}') - f_c I_{S_f=O} - V_{E_m,S_f}(a_t,\xi,w), 0\Big\} dF_f$$

$$+\chi_m\Big(V_{N_m,S_f}(a_t,\xi) - V_{E_m,S_f}(a_t,\xi,w)\Big) + V_{E_m,S_f}(a_t,\xi,w)\dot{a}_t\Big\}$$

where $\dot{a}_t = ra_t + w + T - c_t$.

Model

Lets skip the rest....

Calibration

The challenge with matching the data is matching simultaneously the large UE flow and the large variance of wages.

There is two ways to do this:

1. Assume a very negative value of non-working
2. Assume high efficacy of on the job search (OJS).

If OJS is very efficient, then our model can't match the ratio of wages of newly employed over overall average wage.

Experimenting with various calibrations we end up with a moderate $\lambda_{E,m}$ and high $\kappa_{U,m}$.

For women the tradeoff is less and we have a moderate $\kappa_{U,f}$.

Model Fit

Table : Model fit 1980s: data and model outcomes

Statistic	Data	Model
A: AWE and wages		
Added worker effect	0.077	0.087
Gender wage gap	0.42	0.38
Relative wage new entrants to all, male	0.28	0.26
Relative wage new entrants to all, female	0.28	0.27
Variance of wages new entrants, male	0.25	0.26
Variance of wages new entrants, female	0.23	0.21
B: Labor market flows		
EU male	0.012	0.012
UE male	0.32	0.32
EU female	0.010	0.014
EO female	0.033	0.024
UE female	0.24	0.20
UO female	0.25	0.25
OE female	0.064	0.042
OU female	0.025	0.035

Model Fit

Table : Model fit 1980s: data and model outcomes

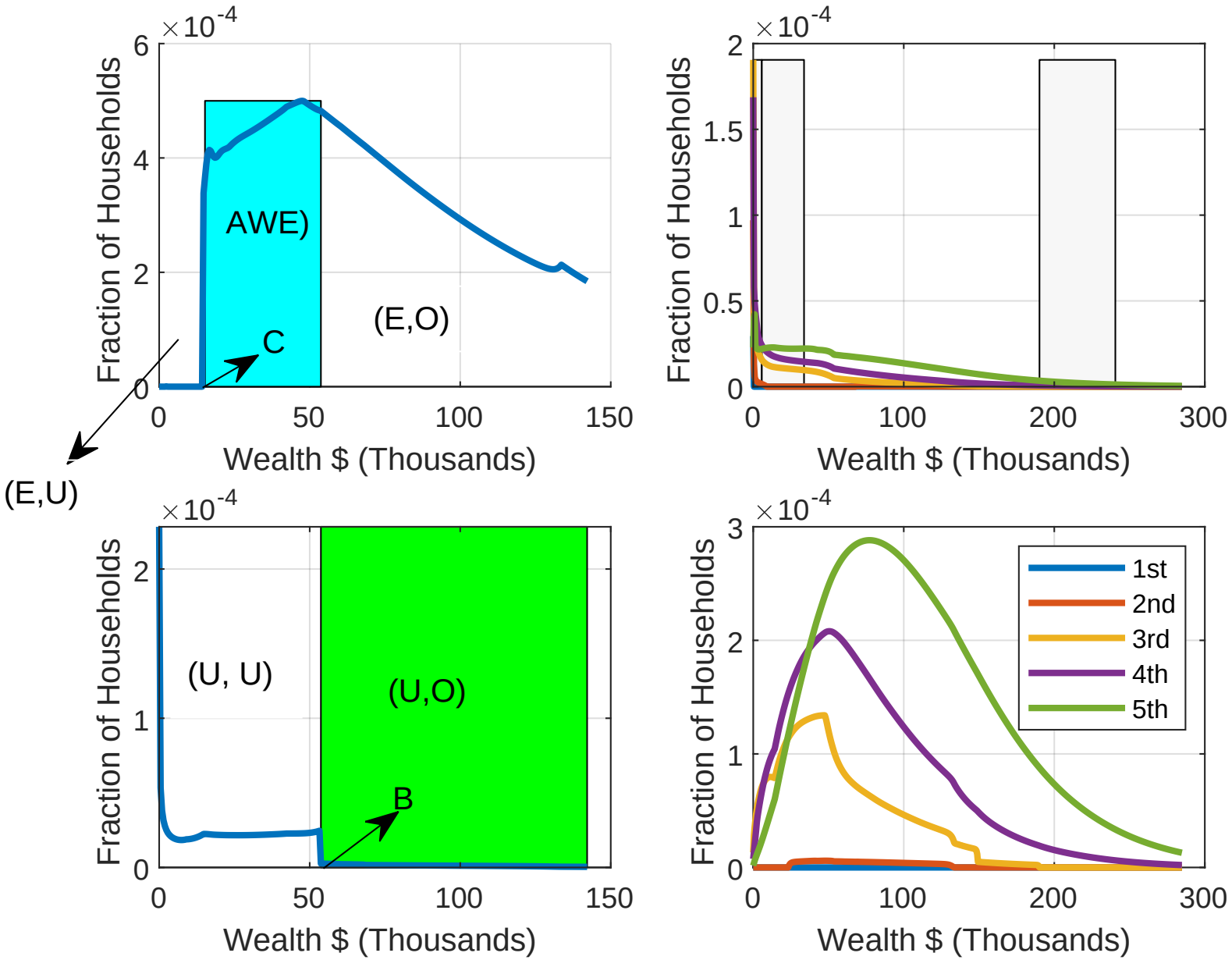
C1: Months female employed

Months	0	1	2	3	4
Data	0.31	0.04	0.03	0.05	0.57
Model	0.33	0.04	0.04	0.05	0.54

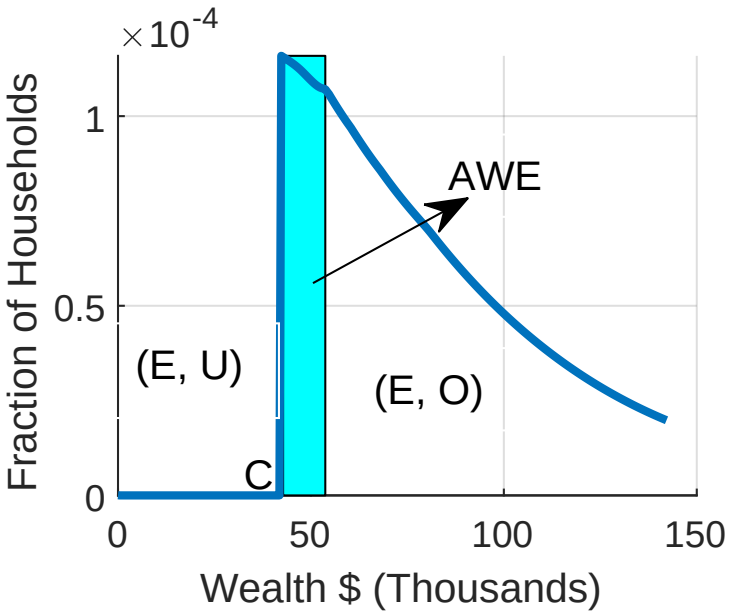
C2: Months female in LF

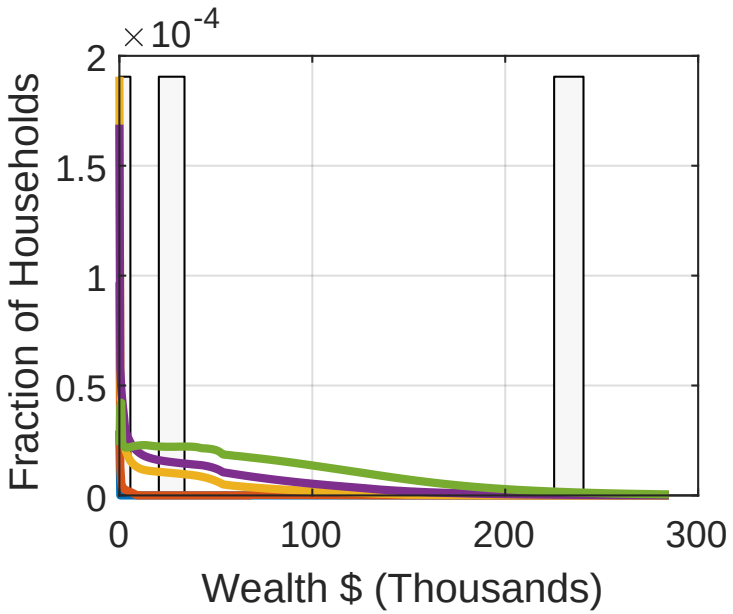
Months	0	1	2	3	4
Data	0.28	0.04	0.03	0.05	0.60
Model	0.28	0.04	0.04	0.05	0.58

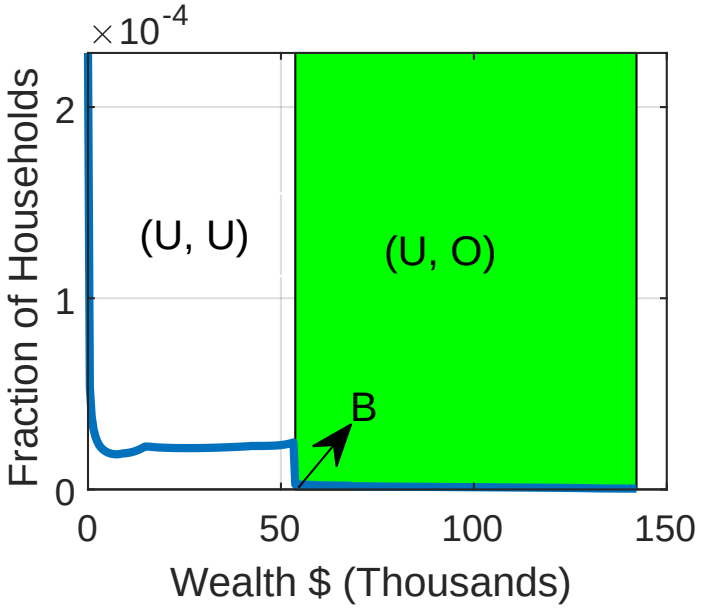
The AWE in the model

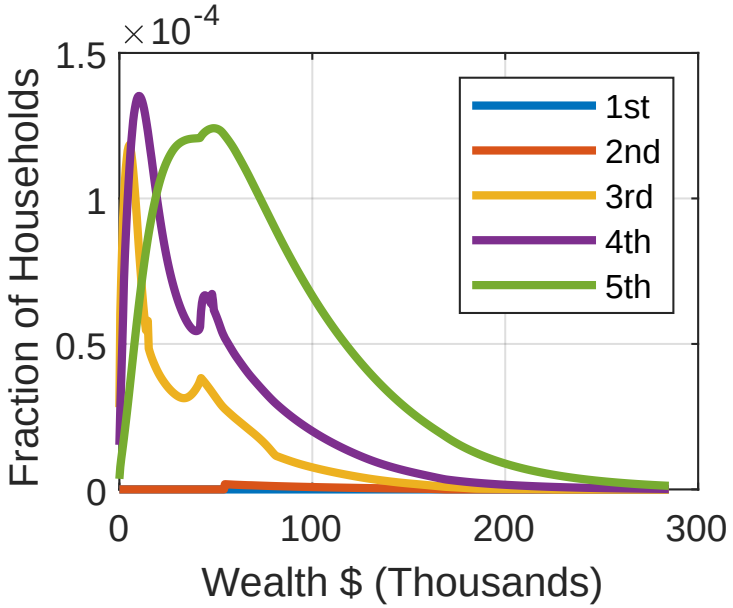


The AWE in the model









Experiments

- We subject the model to well known structural changes.
  1. **Narrowing of the Gender pay gap.** Increases the AWE because women can make up from a larger fraction of the lost male income when they join the LF. **New AWE=12.9%.**
  2. **Rise in Variance of Wages.** Higher variance implies a larger loss of income in unemployment. Markets are effectively more incomplete. **New AWE= 12.5%.**
  3. **Changes in frictions/ demand for female employment**. Jobs are on average easier to find and more stable in the 2000s, for both men and women. **New AWE= 13.5%**
  4. **Shifts in female labour supply curves (e.g. Blau and Kahn (2000)).** Hypothesis: Women are more like men in the 2000s. They have high $\kappa_{U,f}$, low $\kappa_{E,f}$ and $f_c = 0$. **The AWE rises to 12.9%.**

Experiment 2000s

Statistic	Model 2000s	Data
AWE	0.139	0.131
Wage gap	0.25	0.28
Relative wages new entrants		
male	0.31	0.34
female	0.33	0.31
Variance of wages of new entrants		
male	0.33	0.32
female	0.29	0.30
EU male	0.008	0.009
UE male	0.36	0.36
EU female	0.008	0.007
EO female	0.024	0.021
UE female	0.27	0.27
UO female	0.23	0.24
OE female	0.06	0.07
OU female	0.053	0.026

Conclusions

Does higher risk or increased insurance value of family labour supply explain he rise in the AWE?

Both!

Does the rise of the AWE tell us that markets are effectively more incomplete in the 2000s?

The shift in preferences of women could derive from home production or leisure becoming more substitutable between spouses. This would produce an increase in the AWE even under complete markets.

Calibration

Parameter	Symbol	Value	Target
	A: Exogenous parameters		
CRRA	σ	1.0	Standard
Interest rate	r	0.25%	US data
	B: Utility		
Time preference	ρ	0.3%	asset-(annual) income 1.4
3*Disutility from (un-)employment	$\kappa_{U,m}$	2.4	U_m
	$\kappa_{U,f}$	0.937	U_f
	$\kappa_{E,f}$	0.187	E_f
Utility shock value	$\{\xi_L, \xi_H\}$	$\{0.5, 1.5\}$	EO_f
Arrival rate	λ_ξ	0.4	UO_f
Fixed cost female participation	f_c	0.2	OU_f
	C: Wage offer distributions		
Male			
Mean	μ_m	1.0	Normalization
Std	σ_m	0.50	Std of wages of newly-hired
Arrival rate	$\lambda_{E,m}$	0.075	Ratio of wages of newly-hired to all
Female			
Mean	μ_f	0.46	Gender pay gap
Std	σ_f	0.75	Std of wages of newly-hired
Arrival rate	$\lambda_{E,f}$	0.08	Ratio of wages of newly-hired to all

Calibration

Parameter	Symbol	Value	Target
	D: Search frictions		
Offer Rates	$\lambda_{U,m}$	0.38	UE_m
	$\lambda_{U,f}$	0.40	UE_f
	$\lambda_{O,f}$	0.07	OE_f
Separation Shocks	χ_m	0.012	EU_m
	χ_f	0.04	EO_f

Alternative Calibrations

Statistic	Baseline model	Efficient OTJ search	Loose frictions
	A: AWE and wages		
Quarterly AWE	0.089	0.053	0.275
Gender wage gap	0.38	0.58	0.51
Variance of wages			
male		0.064	
female		0.176	
Relative wages new entrants			
male	0.26	0.43	0.26
female	0.27	0.30	0.29
Variance of wages of new entrants			
male	0.26	0.15	0.11
female	0.21	0.21	0.22
	B: Labor market flows		
EU male	0.012	0.012	0.021
UE male	0.32	0.32	0.29
EU female	0.014	0.012	0.014
EO female	0.024	0.027	0.025
UE female	0.20	0.21	0.20
UO female	0.25	026	0.26
OE female	0.04	0.04	0.04
OU female	0.035	0.019	0.028