

Income Pooling and Within-Household Risk Sharing: Evidence from Data on Individual Expenditures

Fabio Blasutto
ECARES, Université Libre de Bruxelles

Sara Casella
LUISS University, EIEF

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Motivation

- Extent to which risk (e.g. income risk) is shared across groups of households central concern in macroeconomics
- The degree and sources of consumption insurance has implications for:
 - The link between wage and consumption inequality over the life cycle
 - The design of taxes, transfers, and social insurance programs
- The literature focuses on consumption insurance at the *household* level
- We emphasize *individual* insurance (husband vs. wife expenditures)
 - better suited to assess individual welfare and inequality over the life-cycle

The Mechanism

- Example: one married couple where the husband loses his job
- Literature: by how much does household consumption drops? Why?
- This paper: is husband consumption dropping more than his wife's consumption? Why?
- We focus on **limited commitment** preventing full risk-sharing
 - Spouses share risk as long as they are better off together than apart.
 - If not, they can renegotiate to ensure individual participation constraints are met.
 - Greater likelihood of renegotiation lowers individual consumption insurance.

Research questions + what we do

1. What is the degree of consumption insurance among spouses? (Data)

- Measure the pass-through of income shocks to individual consumption of spouses
- Take advantage a **natural experiment** to measure impact of outside option ↑

2. What are the sources of individual consumption insurance? (Theory+Data)

- Build a life-cycle model of singles and couples bargaining under **limited commitment** (Ligon, Thomas, and Worrall, 2002; Voena, 2015)
- Insurance decomposition: **assets** (+), **public insurance** (+), **labor supply** (+), **renegotiations** (-)

3. How does progressive taxation affect individual insurance? (Policy)

- Counterfactual experiments comparing full vs. limited commitment

Contribution and related literature

1. Consumption insurance: Cochrane (1991); Kocherlakota (1996); Ligon, Thomas, and Worrall (2002); Commault (2022); Blundell, Pistaferri, and Saporta-Eksten (2016); Wu and Krueger (2021), Denderski and Obermeier (2025) + many more

This paper: quantify the degree of **individual consumption** insurance to transitory and persistent income shocks, and investigate its sources

2. Within household allocation of individual consumption: Chiappori, Meghir, and Okuyama (2024); Cherchye, De Rock, and Vermeulen (2007); Blundell, Chiappori, and Meghir (2005); Cherchye, De Rock, and Vermeulen (2012); Lise and Yamada (2019), Bellue et al. (2026) + many more

This paper: study the **dynamics** of individual consumption allocation within couples using a limited-commitment framework, and how public **policy** can affect these

Empirical Analysis

Data: Japanese Panel Survey of Consumers (JPSC)

- Data source: **Japanese Panel Survey of Consumers (JPSC)**
- Longitudinal survey (1993-ongoing) covering five cohorts of 4120 women (born 1959–1989) and their husbands.
- Includes:
 - Labor income, time use, household composition, savings
 - **Self-reported individual, common, and child related expenditures within households**
 - Total household expenditure is also broken down into item categories

JPSC—Descriptive statistics

	All couples		
	Wife	Husband	Household
Age	37.7	40.1	
Expenditure per month (% of household total)	16,188 (6.5%)	33,498 (13.7%)	247,654
Monthly income	106,385	460,217	
Employment rate	0.596	0.981	
Children			1.75
Number of observations	34,420	34,420	34,420

- Comparable individual expenditure shares in Dutch data (Cherchye, Demuyne, De Rock, Vermeulen 2017)

Expenditure shares by person versus by category

- How do assignment shares co-move with category shares ?

$$\Delta s_{it}^{\text{assign}} = \alpha + \sum_k \beta_k \Delta s_{it}^{\text{cat } k} + u_{it}$$

- Each member's spending tracks expected categories

	Dep. var: Δ share of:		
	Common	Wife	Husband
Food	0.071***	-0.037***	-0.035***
Housing	0.094***	-0.032***	-0.062***
Utilities	0.076***	-0.036***	-0.040**
Furniture	0.053***	-0.019*	-0.034**
Education	0.097***	-0.047***	-0.050***
Clothes	-0.235***	0.176***	0.059***
Personal care	-0.196***	0.139***	0.057***

	Common	Wife	Husband
Transportation	-0.018	-0.021***	0.040***
Social	-0.103***	0.011	0.091***
Entertainment	0.009	0.017*	-0.026**
Pocket money	-0.271***	0.040***	0.231***
Communication	-0.004	-0.013	0.017
Health insurance	-0.100***	0.023	0.077***
SEs in paper. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. ("Other" = omitted baseline)			

Identification of permanent and transitory income shocks

- We employ the methodology in Blundell, Pistaferri, and Preston (2008)

- **Income process:**

$$\Delta y_{it} = \eta_{it} + \Delta \varepsilon_{it},$$

η_{it} is a **permanent shock** (random walk) and ε_{it} a **transitory shock** (uncorrelated over time).

- **Consumption response:**

$$\Delta c_{it} = \zeta_{it} + \phi \eta_{it} + \psi \varepsilon_{it},$$

ϕ and ψ measure the pass-through of each shock to consumption. ζ_{it} is a preference shock.

- **Identification:** use lags and leads of income changes as instruments to isolate η_{it} and ε_{it}
- BPP use household consumption and income; we use individual consumption and income.
- **Work in progress:** extending to BPS (2016) with endogenous labor supply.

Pass-troughs of shocks to consumption, BPP estimates

Table: Earnings to consumption pass-through, using...

	Total (1)	Husband Exp. (2)	Wife Exp. (3)	Wife share (4)
...persistent husband shocks	0.349*** (0.066)	0.429*** (0.112)	0.175 (0.147)	-0.265** (0.124)
...persistent wife shocks	0.142*** (0.040)	0.029 (0.070)	0.281*** (0.089)	0.137* (0.071)
...transitory husband shocks	0.027 (0.033)	0.060 (0.056)	0.055 (0.074)	0.020 (0.065)
...transitory wife shocks	0.040 (0.037)	0.006 (0.063)	0.038 (0.075)	0.060 (0.066)

NOTES: Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

- Interpretation: a 1% (persistent, transitory) change in income leads to a x% change in consumption

► Hand to Mouth status

► MPC

Impact of Pension Reform in Japan

- 2007 pension reform: pension contributions *accumulated during the marriage* are now split equally upon divorce
- Caused 20% increase in incidence of divorces in older couples (Hamaaki Ogawa 2025)
- Our strategy: diff-in-diff by treatment intensity (married for 15+ years, controlling for age)
- Evidence increase in wife share in older couples after the reform

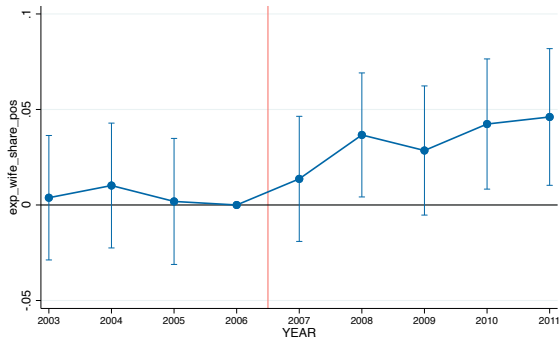


Figure: Wife share in couples married for longer goes up after increase in outside option

Taking Stock

Our findings present evidence against full individual consumption insurance.

- The pass-through of income shocks to individual consumption depends on **who** receives the shock (husband vs. wife).
- Deviations from full insurance are **larger for persistent shocks** than for transitory ones.
- Consumption reacts to a change in outside options
→ limited commitment

The Model

The Life-cycle model in a nutshell

Life-cycle model, women f and men m , initially married, retire at age 65

Decision making:

- Dynamic collective model with limited commitment
- Spouses commit to a certain sharing rule/Pareto weight and they renegotiate if needed

Decisions:

- Allocation of private consumption c and home good expenditures d
- Women's labor force participation
- Savings a
- Divorce (no remarriage)

Heterogeneity:

- Transitory and persistent earnings shocks, individual love shocks

Budget constraints include progressive taxes + borrowing constraints

Preferences and Home production

Single individual:

$$u(c_t^s, Q_t^s) = (1 - \alpha) \frac{c_t^{s1-\rho}}{1-\rho} + \alpha \frac{Q_t^{s1-\chi}}{1-\chi} - \omega$$

$$Q_t^s = (\underbrace{d_t^s}_{\text{home inputs}})^\nu (\underbrace{\phi}_{\text{time}})^{1-\nu}$$

Married individual:

$$u^C(c_t^s, Q_t, \psi_t^s) = (1 - \alpha) \frac{c_t^{s1-\rho}}{1-\rho} + \alpha \frac{Q_t^{1-\chi}}{1-\chi} + \psi_t^s - \omega \mathcal{I}(P_t^s = 1)$$

$$Q_t = (\underbrace{d_t}_{\text{home inputs}})^\nu \cdot (\underbrace{\phi}_{\text{men's time}} + \underbrace{(\phi + (1 - P_t^f)(1 - \phi))}_{\text{women's time}})^{1-\nu}$$

$$\psi_t^s = \psi_{t-1}^s + u_t^s, \quad u_t^s \stackrel{\text{i.i.d.}}{\sim} \mathcal{N}(0, \sigma_\psi^2)$$

Incentives to be in a couple

- economies of scale/children: Q
- intrahousehold specialization
- love/companionship: ψ
- risk sharing

Preferences and Home production

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Incentives to be in a couple

- economies of scale/children: Q
- intrahousehold specialization
- love/companionship: ψ
- risk sharing

Budget Constraints and Labor Income

Labor Income

$$\ln(w_t^s) = \underbrace{f_t^{\text{gender}}}_{\text{gender-specific age-trend}} + \underbrace{\epsilon_t^s}_{\text{transitory shock}} + \underbrace{z_t^s}_{\text{permanent income}}$$

$$z_t^s = z_{t-1}^s - \underbrace{(1 - P_t^s)\mu}_{\text{non-employment productivity losses (women only)}} + \zeta_t^s$$

Incentives to be in a couple

- economies of scale/children: Q
- love/companionship: ψ
- intrahousehold specialization
- risk sharing

Budget Constraints

$$\text{Single: } a_{t+1}^s + c_t^s + d_t^s = Ra_t^s + \underbrace{w_t^s(1 - \phi)}_{\text{income}} - \underbrace{\mathcal{T}((1 - \phi)w_t^s)}_{\text{taxes}}$$

$$\text{Married: } a_{t+1} + c_t^f + c_t^m + d_t = Ra_t + \underbrace{w_t^m(1 - \phi) + P_t^f w_t^f(1 - \phi)}_{\text{couple's income}} - \underbrace{\mathcal{T}((1 - \phi)\hat{w}_t^f) - \mathcal{T}(\hat{w}_t^m)}_{\text{taxes and deductions}}$$

Budget Constraints of Retirees

Before the Reform

$$\text{Single: } a_{t+1}^s + c_t^s + d_t^s = Ra_t^s + \underbrace{p_b}_{\text{basic pension income}} + \underbrace{\kappa \cdot w_{T_R-1}^s}_{\text{earnings-related component}},$$

$$\text{Married: } a_{t+1} + c_t^f + c_t^m + d_t = Ra_t + 2p_b + \kappa \cdot w_{T_R-1}^f + \kappa \cdot w_{T_R-1}^m$$

After the Reform

$$\text{Single: } a_{t+1}^s + c_t^s + d_t^s = Ra_t^s + p_b + \frac{\kappa}{2} \cdot \left(\frac{T_R}{(T - T^{\text{divorce}})} w_{T_R-1}^s + \underbrace{\frac{T_R}{T^{\text{divorce}}} \left(\frac{w_{T_R-1}^f + w_{T_R-1}^m}{2} \right)}_{\text{pension income accrued before divorce}} \right)$$

Couple's Value and Divorce Decision

Value when married:

$$V_t^M(\Omega_t) = \max_{a_{t+1}, d_t, c_t^m, c_t^f, p_t^f} \theta_t u^f + (1 - \theta_t) u^m + \beta \mathbb{E}_t \left[(1 - D_{t+1}) V_{t+1}^M(\Omega_{t+1}) + D_{t+1} \left(\theta_t V_{t+1}^{fD}(\omega_{t+1}^f) + (1 - \theta_t) V_{t+1}^{mD}(\omega_{t+1}^m) \right) \right]$$

s.t. budget constraint of the couple; if $D_{t+1} = 1 : a_{t+1}^m = a_{t+1}^f = 0.5a_{t+1}$ ($\approx$ civil code)

Divorce decision:

$$D_{t+1} = \begin{cases} 0, & \exists \theta_{t+1} \text{ s.t. } V_{t+1}^{sM}(\Omega_{t+1}) \geq V_{t+1}^{sD}(\omega_{t+1}^s) \quad \forall s \in \{f, m\}, \\ 1, & \text{otherwise.} \end{cases}$$

If stay married ($D_{t+1} = 0$): $\theta_{t+1} = \operatorname{argmin}_{\theta^*} |\theta_t - \theta^*|$ such that participation constraints are met

Quantitative Analysis

Two-Step Model Estimation

1. Outside the model

- Pre-set parameters from the literature
- External estimation of labor income processes (JPSC)
- Initial Pareto weight: wife share of individual consumption at the beginning of marriage

2. Remaining 6 parameters estimated via indirect inference (Simulated Method of Moments)

- Sample: Women younger than 65 years old initially married; data: JPSC
- We target six empirical moments, including the effect of the reform on cons. shares

► Pareto

► Parameters

Model fit

Table: Model fit and validation

Targeted Moments	Data	Model
Annual divorce rate	0.01	0.01
Reform effect on wife's cons. share	0.01	0.01
Private-exp. elasticity to total cons.	1.04	1.04
Employment rate of married women	0.59	0.59
Expenditure share of home goods	0.81	0.81
Wealth/husband's earnings	2.44	2.44
Wife's share of private consumption	0.32	0.32
Wife-to-husband earnings ratio	0.38	0.38
Non-targeted Moments	Data	Model
Wife's hours response to husband's income shocks	-1.65	-5.76

Earnings to Individual Consumption Pass-Through: **Model** vs. **Data**

Table: Earnings to consumption pass-through, using...

	Husband Exp (1)	Wife Exp (2)
...persistent husband shocks	0.521/0.429	0.377/0.175
...persistent wife shocks	0.313/0.029	0.666/0.281
...transitory husband shocks	0.058/0.060	0.012/0.055
...transitory wife shocks	-0.042/0.006	0.014/0.038

► True vs. BPP

Insurance decomposition and Policy experiments

Own share changes account for $\approx 59\% - 33\%$ of total individual volatility

Table: DECOMPOSITION OF INDIVIDUAL PRIVATE CONSUMPTION VOLATILITY

	Individual consumption vol. $\text{Var}(\Delta \log c_t^g)$	=	Household private consumption vol. $\text{Var}(\Delta \log C_t)$	+	Own share volatility $\text{Var}(\Delta \log s_t^g)$	Covariance $+ 2 \text{Cov}(\Delta \log C_t, \Delta \log s_t^g)$
<i>A. Wife</i>						
Limited comm.	0.55 (100%)		0.31 (56%)		0.31 (56%)	-0.07 (-13%)
Full comm.	0.28 (100%)		0.28 (100%)		0.00 (0%)	0.00 (0%)
<i>B. Husband</i>						
Limited comm.	0.35 (100%)		0.31 (87%)		0.03 (9%)	0.01 (4%)
Full comm.	0.28 (100%)		0.28 (100%)		0.00 (0%)	0.00 (0%)

NOTES: c_t^g is private consumption of spouse $g \in \{f, m\}$; $C_t = c_t^f + c_t^m$ is total within-couple private consumption; $s_t^g = c_t^g / C_t$ is spouse g 's share.

Persistent income shocks most important drivers

Total	Persistent, w	Persistent, m	Transitory, w	Transitory, m	Love, w	Love, m	Residual
<i>A. Total private consumption ($c_t^f + c_t^m$)</i>							
Limited commitment	0.31	0.14	0.03	0.03			
	(100%)	(45%)	(9%)	(10%)			
Full commitment	0.28	0.13	0.02	0.01			
	(100%)	(47%)	(7%)	(4%)			
<i>B. Wife's consumption share ($c_t^f / (c_t^f + c_t^m)$)</i>							
Limited commitment	0.31	0.08	0.02	0.30			
	(100%)	(25%)	(8%)	(96%)			
Full commitment	0.00	0.00	0.00	0.00			

NOTES: Shock decomposition of consumption volatility

Limited vs. Full commitment: Renegotiations weaken individual insurance

	Household consumption insurance						
	Wife labor supply						
	Passive	Active	Tax	Savings	Private Exp. share	Reneg.	Total Insurance
A. Limited Commitment							
Baseline	16.1	15.8	5.8	11.9	8.2	-1.6	56.2
B. Full Commitment							

The table shows the decomposition of the husband's insurance with respect to a husband's persistent shock. Full commitment is defined as:

Limited vs. Full commitment: Renegotiations weaken individual insurance

	Household consumption insurance						
	Wife labor supply						
	Passive	Active	Tax	Savings	Private Exp. share	Reneg.	Total Insurance
A. Limited Commitment							
Baseline	16.1	15.8	5.8	11.9	8.2	-1.6	56.2
B. Full Commitment							
Baseline	17.6	19.0	5.4	8.4	-7.0	0.1	43.6

The table shows the decomposition of the husband's insurance with respect to a husband's persistent shock. Full commitment is defined as:

Progressive taxation: crowding in or crowding out?

	<i>Household consumption insurance</i>						
	<i>Wife labor supply</i>		Tax	Savings	Private Exp. share	Reneg.	Total Insurance
	Passive	Active					
Baseline	16.1	15.8	5.8	11.9	8.2	-1.6	56.2
Progressivity +	15.7	16.3	9.0	14.6	7.1	-1.3	61.4

The table shows the decomposition of the husband's insurance with respect to a husband's persistent shock. The reform is revenue neutral.

Conclusion

Takeaways:

- We document the pass-through of income shocks to individual consumption
 - Strong departure from full risk-sharing for persistent income shocks
- We develop and estimate a life-cycle model to assess how much of these pass-throughs (and consumption volatility) are driven by limited commitment
- The model is used to explore tax policy implications:
 - Public insurance crowds out intra-household risk sharing, but not does not crowd out individual consumption insurance

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THANK YOU!

Appendix

Wife Share Distribution

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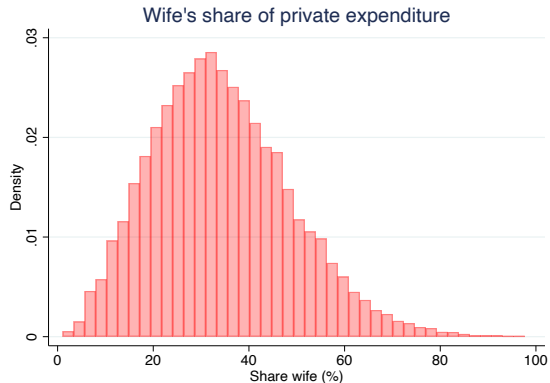


Figure: Wife share

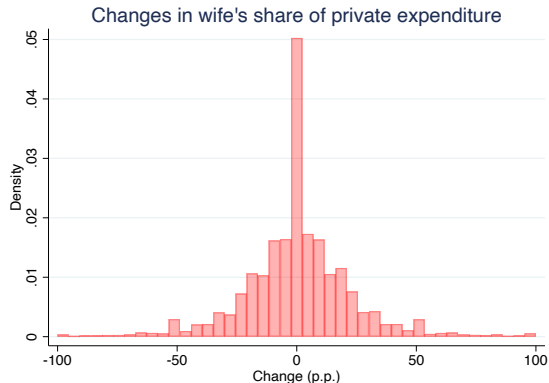


Figure: Changes in wife share

Pass-troughs from earnings to consumption

We run the regression:

$$\Delta c_{i,t} = \gamma + \beta \Delta y_{i,t} + \delta X_{i,t} + u_{i,t}$$

- $c_{i,t}$ is either wife's expenditure, husband's expenditure, or wife's expenditure share, in logs
- $y_{i,t}$ is the wife's or husband's log earnings
- $X_{i,t}$ control for household compositions and polynomials in age.

Interpretation of β : the proportion (%) of an earnings change that passes through to consumption.

Pass-through from earnings to consumption higher for affected partner

Table: Earnings to consumption pass-through, using...

	Husband Exp (1)	Wife Exp (2)	Wife share (3)
...changes husband earnings	0.234 (0.027)	0.162 (0.032)	-0.031 (0.021)
...changes in wife earnings	0.070 (0.029)	0.072 (0.023)	0.042 (0.024)

NOTES: Standard errors are reported in parentheses.

! These results mask heterogeneity in the pass-through of income changes, with transitory and permanent shocks having distinct effects

BPP pass-throughs estimates

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- Permanent shocks

$$\frac{E(\Delta c_t (\Delta y_{t-1} + \Delta y_t + \Delta y_{t+1}))}{E(\Delta y_t (\Delta y_{t-1} + \Delta y_t + \Delta y_{t+1}))} = \phi$$

IV interpretation: ϕ is identified by a regression of Δc_t on Δy_t using $(\Delta y_{t-1} + \Delta y_t + \Delta y_{t+1})$ as an instrument

- Transitory shocks

$$\frac{E(\Delta c_t \Delta y_{t+1})}{E(\Delta y_t \Delta y_{t+1})} = \psi$$

IV interpretation: ψ is identified by a regression of Δc_t on Δy_t using Δy_{t+1} as an instrument

Pass-troughs of shocks to consumption, MPCs [◀ Back](#)

Table: Marginal Propensity to Consume, using...

	Total (1)	Husband Exp. (2)	Wife Exp. (3)	Public (4)
...persistent husband shocks	0.217*** (0.041)	0.036*** (0.009)	0.007 (0.006)	0.151*** (0.041)
...persistent wife shocks	0.242*** (0.068)	0.006 (0.015)	0.032*** (0.010)	0.118* (0.064)
...transitory husband shocks	0.017 (0.021)	0.005 (0.005)	0.002 (0.003)	0.015 (0.019)
...transitory wife shocks	0.069 (0.063)	0.001 (0.014)	0.004 (0.009)	0.044 (0.059)

NOTES: Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Non-Hand to Mouth vs Hand to Mouth [◀ Back](#)

	Total	Husband	Wife	Wife share
Non hand-to-mouth households				
... Transitory husband shock	0.001	0.016	0.003	-0.009
... Transitory wife shock	0.031	0.012	-0.016	0.045
Hand-to-mouth households				
... Transitory husband shock	0.102	0.274**	0.354**	0.146
... Transitory wife shock	0.128	-0.002	0.160	0.183

NOTES: Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Impact of Pension Reform on Leisure

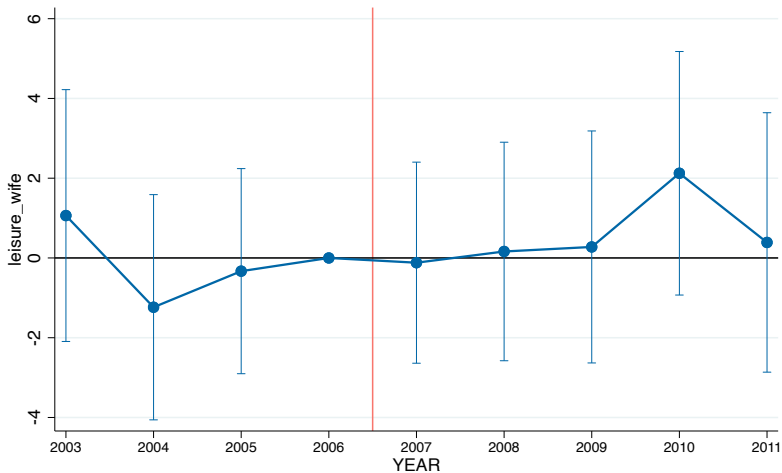
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Figure: No evidence of increase in leisure after the pension reform

Budget Constraints of Retirees

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Before the Reform

$$\text{Single: } a_{t+1}^s + c_t^s + d_t^s = Ra_t^s + \underbrace{p_b}_{\text{basic pension income}} + \underbrace{\kappa \cdot w_{T_R-1}^s}_{\text{earnings-related component}},$$

$$\text{Married: } a_{t+1} + c_t^f + c_t^m + d_t = Ra_t + 2p_b + \kappa \cdot w_{T_R-1}^f + \kappa \cdot w_{T_R-1}^m$$

After the Reform

$$\text{Single: } a_{t+1}^s + c_t^s + d_t^s = Ra_t^s + p_b + \frac{\kappa}{2} \cdot \left(\frac{T_R}{(T - T^{\text{married}})} w_{T_R-1}^s + \frac{T_R}{T^{\text{married}}} \left(\frac{w_{T_R-1}^f + w_{T_R-1}^m}{2} \right) \right)$$

Initial Pareto Weight [◀ Back](#)

- We initialize the bargaining weight so that it reproduces the observed share of private consumption allocated to the wife at marriage, $s_0^{f,p}$, in the data.

- From the first-order conditions for couples:

$$\theta_t (c_t^f)^{-\sigma} = \lambda_t \quad \text{and} \quad (1 - \theta_t) (c_t^m)^{-\sigma} = \lambda_t,$$

- One-to-one mapping between the consumption share and the bargaining weight

$$s_0^{f,p} = \frac{1}{1 + \left(\frac{1 - \theta_0}{\theta_0} \right)^{1/\sigma}}.$$

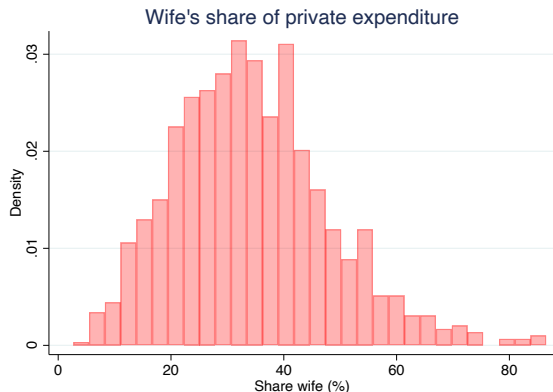


Figure: Wife share of private consumption at marriage

Parameters estimated internally [◀ Back](#)

Table: Estimated structural parameters

Estimated Parameters		Value	Target Moment
Love shock, s.d.	σ_ψ	0.040	Annual divorce rate
Initial match quality, wife	$\bar{\psi}^f$	-0.639	Reform effect on wife's cons. share
Initial match quality, husband	$\bar{\psi}^m$	0.236	Wife's share of private consumption
Female income profile, intercept	ι_0^f	-0.903	Wife-to-husband earnings ratio
Risk aversion, private goods	σ	1.808	Private-exp. elasticity to total cons.
Weight on home goods	α	0.951	Expenditure share of home goods
Disutility of employment	η	2.177	Empl. rate of married women
Discount factor	β	0.995	Wealth/husband's earnings

Value of being single

$$V_t^{sS}(\omega_t^s) = \max_{\mathbf{q}_t^s} \left\{ u(c_t^s, Q_t^s) + \beta E_t V_{t+1}^{sS}(\omega_{t+1}^s) \right\}, \quad (1)$$

s.t. budget constraint for singles

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BPP Does Well

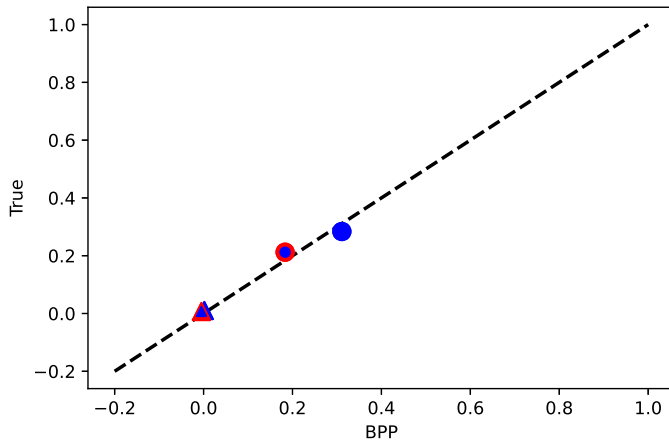
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Figure: Comparison of true wage pass-through and BPP

Reducing the Gender Wage Gap Increases Insurance

	Household consumption insurance						
	Wife labor supply						
	Passive	Active	Tax	Savings	Private Exp. share	Reneg.	Total Insurance
A. Limited Commitment							
Baseline	16.1	15.8	5.8	11.9	8.2	-1.6	56.2
Lower gender gap	25.9	19.0	4.3	1.6	8.1	-3.0	55.9
No gender gap	36.0	20.5	3.2	-8.0	8.2	-7.4	52.5
B. Full Commitment							
Baseline	17.1	16.7	5.7	10.5	-7.0	0.0	43.1
Low GWG	19.4	18.1	5.3	9.4	-6.7	0.0	45.4
No GWG	21.8	20.5	4.9	7.2	-6.5	0.0	48.0

The table shows the decomposition of the husband's insurance with respect to a husband's persistent shock.

- Other experiments: reduction in the gender wage gap, increase in alimony payments

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