The Gender Gap in Consumption & Savings

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Overview

Why study consumption in relation to gender?

- Gap in understanding potentially differential impact of macroeconomic policy on genders
  - UN Women emphasize need for "rethinking macroeconomic policy for gender equality"(Heintz 2015)

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  - gender stereotypes and norms
  - preferences and differences in risk aversion (Borghans et al. 2009)
  - labor market outcomes (and household labor division)

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$\rightarrow$ Through differences in consumption patterns across gender, different policies may influence men and women differently.

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3. What could be driving this gap?
   → **Income inequality and children can explain the majority of this gap**

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   → **Heterogeneity by income level and consumption category**

3. What could be driving this gap?
   → **Income inequality and children can explain the majority of this gap**

→ Develop a static partial equilibrium model of consumption, savings, and human capital investment to illustrate the channels at play

Related Literature

- **Consumption inequality:** M. Aguiar and Bils 2015, M. A. Aguiar, Bils, and Boar 2020, Attanasio and Pistaferri 2016, Krueger and Perri 2006, Bruce D Meyer and James X Sullivan 2008
  → Introduce gender as a channel that links income inequality to consumption inequality

- **Gender in macro:** Lise and Seitz 2011, Malghan and Swaminathan 2021, Adda, Dustmann, and Stevens 2017, Doepke and Tertilt 2019, Bacher 2021, Albanesi and Prados 2022, Siassi 2019, Love 2010
  → Individual consumption and savings between men and women, not households

- **Child penalty:** Kleven, Landais, and Søgaard 2019, Goldin, Kerr, and Olivetti 2022, Andrén 2003
  → Impact of children on consumption and wealth inequality

Summary of results

- Trends in the gender consumption gap:
  1. persistent gap in consumption expenditure levels over the past 35 years
  2. consumption gap trend similar to unadjusted wage gap
  3. consumption gap driven by lowest income bracket
- Drivers of the gap:
  - the interaction between gender, income, and children
  - differences in the consumption bundle across income groups
- Large gender gap in saving in poorest quintile, reversed gap as income increases

Data: Consumer Expenditure Survey

Consumer Expenditure Survey (U.S. Bureau of Labor Statistics)

- Available continuously since 1984, yearly repeated cross-section
- Representative sample
- Detailed income data (individual and household level) and consumption expenditure data (household level)

[1] see Lise and Seitz 2011 on division of consumption across couples households

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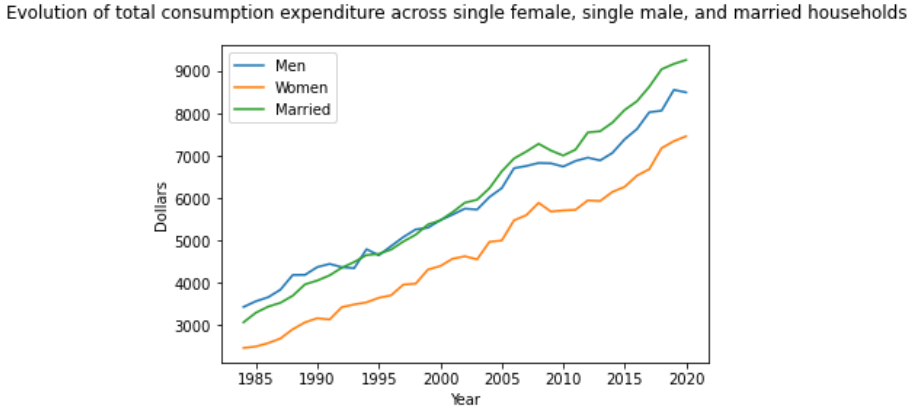
- Available continuously since 1984, yearly repeated cross-section
- Representative sample
- Detailed income data (individual and household level) and consumption expenditure data (household level)
  $\rightarrow$ focus on *single households*:
  1. to abstract from allocation of consumption across families[1], and focus on individual decision-making
  2. relevance of single households in the economy (28-32% of US households, rising trend worldwide) Trend
  3. potential sample selection Summary statistics

[1] see Lise and Seitz 2011 on division of consumption across couples households

Consumption inequality by gender

Scaled consumption: (as in James X. Sullivan and Bruce D. Meyer 2020): using a scale factor equal to $s/(\bar{s})$, where $s = 1/(\text{number of adults} + \text{number of children} * 0.7)^{0.7}$.



Consumption and Wage Gaps

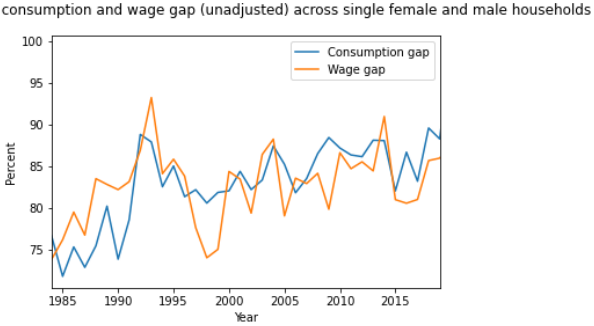


Figure: Sample includes salary workers ages 21-64 with at least 26 weeks of employment. Values are exp(D), where D is the female mean log wage(consumption) minus the male mean log wage(consumption)[2]

The average raw gender consumption gap tracks very closely to the raw wage gap.

[2] as measured by Blau and Kahn(2017)

The Consumption Gap by Income

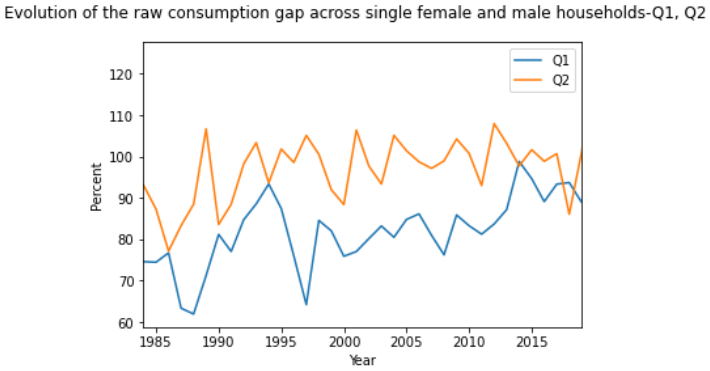


Figure: Sample includes salary workers ages 21-64 with at least 26 weeks of employment. Values are exp(D), where D is the female mean log wage (consumption) minus the male mean log wage(consumption)

The average gender consumption gap is much larger for the lowest income households.

The gender consumption gap: Takeaways

Trends in the gender consumption gap:

1. persistent (slowly narrowing) gap in consumption over the past 35 years
2. consumption gap trend similar to unadjusted wage gap
3. consumption gap driven by lowest income bracket

The gender consumption gap and income: Empirical strategy

Main specification

$$c_{i,t} = \beta_0 + \beta_1 Female_i + \beta_2 y_{i,t} + \beta_3 Child + \delta_i + \gamma_t + \epsilon_{i,t} \quad (1)$$

Where:

- $c_{i,t}$: log expenditure $C_{i,t}$
- β_1: average association of being a woman on $y_{i,t}$
- δ_i: individual control variables: age, race, education, marital status
- γ_t: time dummy

Explaining the Consumption Gap

Raw consumption

Table

	(1) Consumption (Scaled)	(2) Consumption (Scaled)	(3) Consumption (Scaled)
Woman=1	-0.206***	-0.151***	-0.0717***
	(0.00275)	(0.00251)	(0.00250)
Income (after tax)		0.264***	0.271***
		(0.00175)	(0.00174)
Children=1			-0.348***
			(0.00268)
Observations	307713	307713	307713
Adjusted R^2	0.484	0.587	0.611

Note: Table 1 reports the results of specification 2 where the dependent variable is log raw consumption or log scaled consumption. Controls: marital status, age, education, and year controls. Standard errors in parenthesis are clustered at the household level.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The gender consumption gap and income: Empirical strategy

Main specification

$$c_{i,t} = \beta_0 + \beta_1 Female_i + \beta_2 y_{i,t} * Female + \beta_3 y_{i,t} + \beta_4 Child + \delta_i + \gamma_t + \epsilon_{i,t} \quad (2)$$

Where:

- $c_{i,t}$: log expenditure $C_{i,t}$
- β_1: average association of being a woman on $y_{i,t}$
- β_2: marginal difference in consumption between men and women associated with a 1% increase in income
- δ_i: individual control variables: age, race, education, marital status
- γ_t: time dummy

Explaining the Consumption Gap Across the Income Distribution

Quantile regressions

	(1) Consumption (Scaled)	(2) Consumption (Scaled)
Woman=1	-0.230***	-0.0550**
	(0.0244)	(0.0246)
Income (after tax)	0.259***	0.272***
	(0.00213)	(0.00217)
Woman=1×Income (after tax)	0.00775***	-0.00209
	(0.00245)	(0.00245)
Children=1		-0.349***
		(0.00244)
Observations	307713	307713
Adjusted R^2	0.585	0.610

Standard errors in parentheses

Explaining the Consumption Gap (2)

	(1) Consumption (Scaled)	(2) Consumption (Scaled)
Income (after tax)	0.254***	0.259***
	(0.00197)	(0.00195)
Children=1		-0.343***
		(0.00295)
Observations	180009	180009
Adjusted R^2	0.603	0.630

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

(a) Single women

	(1) Consumption (Scaled)	(2) Consumption (Scaled)
Income (after tax)	0.272***	0.283***
	(0.00247)	(0.00252)
Children=1		-0.334***
		(0.00453)
Observations	127704	127704
Adjusted R^2	0.544	0.560

Standard errors in parentheses

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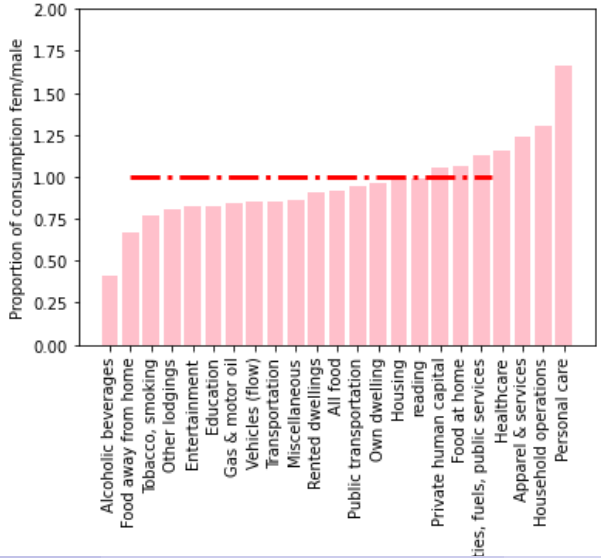
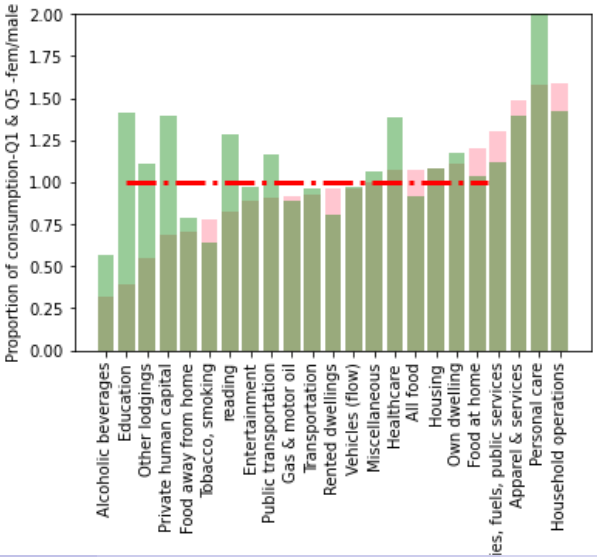
(b) Single men

Table: The child consumption gap

The gender consumption gap, by category



The gender consumption gap, by category and income



The gender consumption gap and income

Table: Consumption categories

	(1) Food at home	(2) Food away	(3) Housing	(4) Transportation	(5) Vehicles	(6) Rent	(7) Utilities
1.fem	0.623***	-0.152**	0.583***	-0.228***	-0.490***	0.101	0.951***
	(0.0661)	(0.0616)	(0.0811)	(0.0706)	(0.0629)	(0.0742)	(0.0651)
Income	0.105***	0.358***	0.219***	0.334***	0.588***	-0.157***	0.224***
	(0.00682)	(0.00663)	(0.00838)	(0.00739)	(0.00656)	(0.00767)	(0.00670)
1.fem#c.Income	-0.0680***	-0.00411	-0.0621***	0.0283***	0.0631***	-0.0227**	-0.0952***
	(0.00824)	(0.00775)	(0.0101)	(0.00881)	(0.00764)	(0.00914)	(0.00809)
N	307108	307108	307107	307028	307108	307075	307108
adj. R^2	0.016	0.075	0.019	0.043	0.197	0.064	0.029

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The gender consumption gap and income

Table: Consumption categories

	(1) Entertainment	(2) Personal care	(3) Apparel	(4) Alcoholic beverages	(5) Tobacco
1.fem	0.102*	-0.401***	0.335***	-0.408***	-0.300***
	(0.0589)	(0.0396)	(0.0544)	(0.0478)	(0.0434)
Income	0.302***	0.185***	0.197***	0.221***	-0.0292***
	(0.00626)	(0.00387)	(0.00548)	(0.00528)	(0.00456)
1.fem#c.Income	-0.00268	0.0759***	0.00276	-0.00646	0.0149***
	(0.00741)	(0.00504)	(0.00682)	(0.00602)	(0.00526)
N	307108	307108	307108	307108	307108
adj. R^2	0.058	0.049	0.034	0.090	0.029

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Takeaways

The role of children

1. Children explain the majority of the consumption gap even after controlling for income
2. Children generate a consumption gap regardless of gender

Consumption basket composition

1. Disparities in the average consumption basket across men and women are highest in the lowest income households
2. Low level of expenditure on education in the poorest households, *reversal* in higher income households
3. Differences in average consumption are offset outside of the lowest income group

Assets and liabilities

Savings

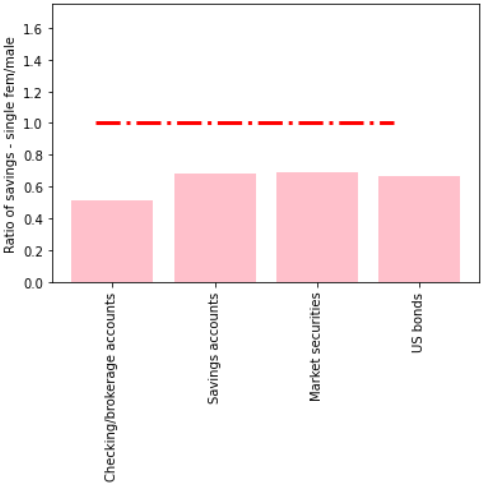
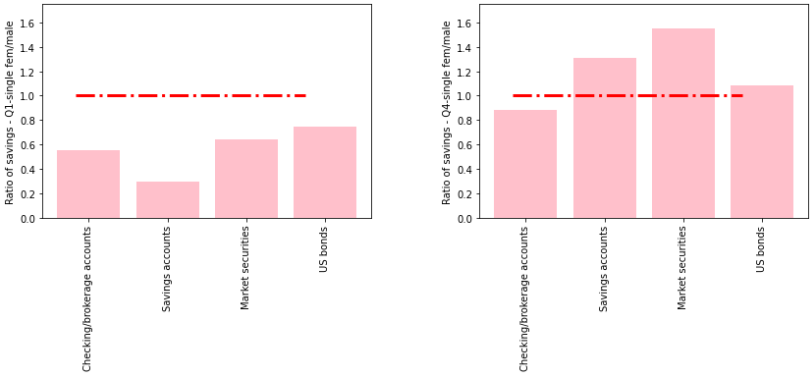


Figure: Ratio of average savings of women to men, 2001-2019

Savings: A reversal

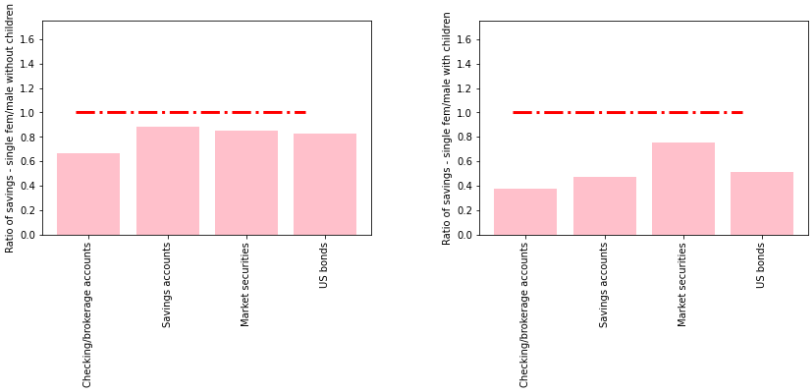


(a) Lowest income quintile

(b) Fourth income quintile

Figure: Women save less than men in the least rich income brackets, and save more in the 50th percentile up. Except for within the lowest quintile, women borrow more than men

Savings and children



(a) Without children

(b) With children

Figure: There are gender differences in savings and asset holdings even when controlling for having children

Takeaways

Assets

Assets:

1. In the **lowest income quintile**, women save and accumulate **less** wealth than men
2. As income increases, women save more and hold more assets than men (after Q3)

Liabilities

1. Women hold more housing debt than men
2. **Except for the lowest income quintile**, women hold more debt in total

A Model of Single Households

Model

Need a model that can explain the following facts:

- The existing consumption gap between men and women
- The role of income and wealth in explaining the gap
- The role of children in explaining the nature of the gap

→Today: Simplified static partial equilibrium model
→Later: dynamic general equilibrium model that can also explain the implications of a gender consumption gap on overall inequality

Model

- OLG, agents live for 3 periods, make choices in 2 periods

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Model

- OLG, agents live for 3 periods, make choices in 2 periods
- 2 types of agents: men and women $g \in \{m, f\}$
- Men and women differ only in the (exogenous) probability of having children η^g in period 2: $\eta^f \geq \eta^m$
- Sources of consumption inequality tied to having children:
  - minimum expenditure on human capital $\underline{h}$
  - children $\rightarrow$ more expensive to supply labor

Model Timing

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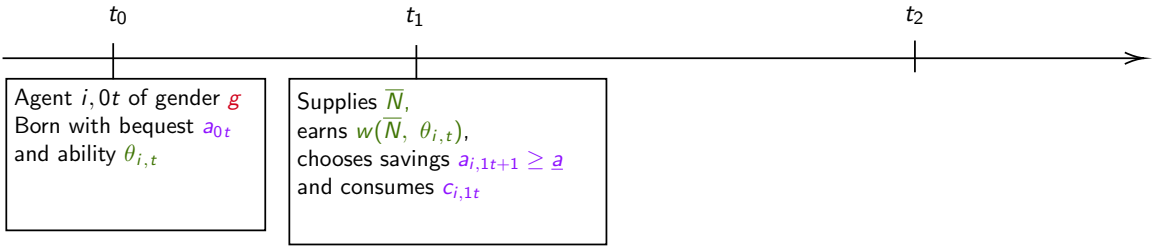

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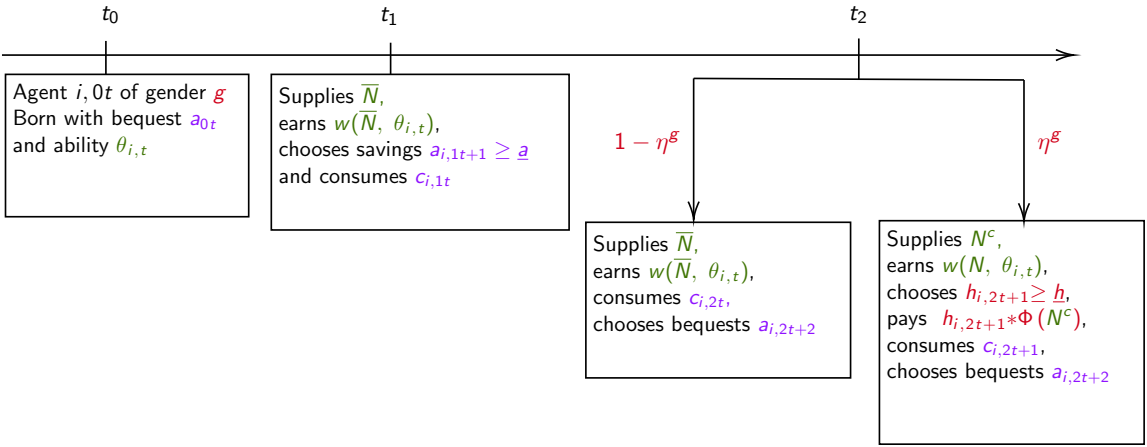

Role of Human Capital

- In the model, expenditure on human capital $h^g_{i,2t}$ is featured 3 times:
  1. as the minimum required expenditure on children
  2. as investment into the productivity of the children, from which parents derive utility
  3. as a child penalty factor: working more hours makes human capital expenditures more expensive
- Lise and Seitz 2011 define "public" (joint) expenditures as expenditures on housing, utilities, and household durable goods
- Doepke and Tertilt 2019 use expenditure on children's clothing as a proxy for human capital investment

Problem of the Young

$$\max_{c^g_{i,1t}, a_{i,1t+1}} u(c^g_{i,t}) + \beta \mathbb{E}[u(c^g_{i,2t+1}) + \nu(a^g_{i,2t+2}, \theta_{t+1}(h_{i,2t+1}))]^3 \tag{3}$$

subject to:

$$a^g_{i,1t+1} + c^g_{i,t} = R a^g_{i,1t} + w^g_{i,t}(\bar{N}_{i,t}, \theta_{i,t}) \tag{4}$$

$$a^g_{i,t} \geq \underline{a} \tag{5}$$

[3] $\nu(a^g_{i,2t+2}, h_{i,2t+1}) = \nu_1(a^g_{i,2t+2}) + \nu_2(\theta_{t+2}(h_{i,2t+1}))$ represents both a bequest motive and a motive for investing in the productivity of the child. Evolution of θ_{t+1} will be a function of θ_t and $h_{i,2t+1}$.

Problem of the Old: No Children

With a probability $1 - \eta^g$, an old agent solves:

$$\max_{c^g_{i,2t+1}, a_{i,2t+2}} u(c^g_{i,2t+1}) + \nu(a^g_{i,2t+2}, h_{i,2t+1} = 0) \tag{6}$$

subject to:

$$a^g_{i,2t+2} + c^g_{i,2t+2} = R a^g_{i,2t+1} + w^g_{i,2t}(\bar{N}_{i,2t}, \theta_{i,t}) \tag{7}$$

$$a^g_{i,t} \geq \underline{a} \tag{8}$$

Problem of the Old: With Children

With a probability η^g, an old agent solves:

$$\max_{c^g_{i,t}, h^g_{i,t}, a_{i,t}, N^g_{i,t}} u(c^g_{i,t}) + \nu(a^g_{i,2t+2}, \theta_{t+1}(h_{i,2t+1})) \tag{9}$$

subject to:

$$a^g_{i,2t+2} + c^g_{i,t} + \Phi(N_t) * h^g_{i,2t} = R a^g_{i,t} + w^g_{i,t}(N^g_{i,t}, \theta_{i,t}) \tag{10}$$

$$a^g_{i,t+1} \geq \underline{a} \tag{11}$$

$$h^g_{i,t+1} \geq \underline{h} \tag{12}$$

$$N^g_{i,t+1} \leq \bar{N} \tag{13}$$

Solution: Functional Forms

To obtain an analytical solution, assume:

- $u(c) = bc - dc^2$
- $w(N, \theta) = N * \theta$
- $\Phi(N) = 1 + \phi * N$
- $\nu(a^g_{i,2t+2}, h_{i,2t+1}) = log(a^g_{i,2t+2}) + log(\mathbb{E}[\theta_{3t+2}(h_{i,2t+1})])$

Solution: By Backward Induction

FOC of Old without children:

$$[a_{2t+2}] : -b + 2dc_{2t+1} + \frac{1}{a_{2t+2}} + \mu_a = 0 \tag{14}$$

Interior solution:

$$c^{*nc}_{2t+1} = 0.5Ra_{2t+1} + 0.5\theta_t\bar{N} + \frac{1}{4d}(b - \sqrt{8d + [b - 2d(Ra_{2t+1} + \theta_t\bar{N})]^2}) \tag{15}$$

Solution: By Backward Induction

FOCs of Old with children:

$$[a_{2t+2}] : -b + 2dc_{2t+1} + \frac{1}{a_{2t+2}} + \mu_a = 0 \tag{16}$$

$$[h_{2t+1}] : -(1 + \phi N_{2t+1})(b - 2dc_{2t+1}) - \mu_n = 0 \tag{17}$$

$$[N_{2t+1}] : (-h_{2t+1}\phi + \theta_t)(b - 2dc_{2t+1}) + \mu_h = 0 \tag{18}$$

Interior solution:

$$h^*_{2t+1} = \frac{\theta_t}{\phi} \tag{19}$$

$$N^*_{2t+1} = \frac{a^*_{2t+2}}{\theta_t} - \frac{1}{\phi} \tag{20}$$

$$c^{*c}_{2t+1} = 0.5Ra_{2t+1} - 0.5\frac{\theta_t}{\phi} + \frac{1}{4d}(b - \sqrt{8d + [b - 2d(Ra_{2t+1} - \frac{\theta_t}{\phi})]^2}) \tag{21}$$

Solution: Problem of Young

$$\max_{c^g_{i,1t}, a_{1t+1}} u(c^g_t) + \beta\eta^g V^c(a^c_{1t+1}) + \beta(1-\eta^g)V^{nc}(a^{nc}_{1t+1})$$

subject to:

$$a^g_{1t+1} + c^g_{1t+1} = Ra^g_{1t} + w^g_{1t}(\bar{N}_{1t}, \theta_{i,t})$$

FOC:

$$[a_{2t+1}] : u'(c_{1t}) = \mu_a + \beta(\eta^g \frac{\partial}{\partial a_{2t+1}} V^c(\theta_t, a^c_{2t+1}, h_{2t+1}, N_{2t+1}, a^{nc}_{2t+2}) + (1-\eta^g)\frac{\partial}{\partial a_{2t+1}} V^{nc}(\theta_t, a^{nc}_{1t+1}, a^{nc}_{2t+2})) \quad (22)$$

Results

If the marginal utility of leaving bequests is sufficiently lower for people without children($\frac{\partial \nu_1(a^{*nc}_{2t+2})}{\partial a_{2t+2}} > \frac{\partial \nu_1(a^{*c}_{2t+2})}{\partial a_{2t+2}}$ [4]), then:

Consumption- Savings Differences

1. $c^{*nc}_{2t+2} \geq c^{*c}_{2t+2}$
   Consumption in the second period is higher for people without children that start the period with the same level of savings.

[4] Condition is necessary because even though $\frac{\partial(a^{*c}_{2t+2})}{\partial a_{2t+1}} > \frac{\partial(a^{*nc}_{2t+2})}{\partial a_{2t+1}}$, the sign of $(a^{*c}_{2t+2} - a^{*nc}_{2t+2})$ is ambiguous.

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Consumption- Savings Differences

1. $c^{*nc}_{2t+2} \geq c^{*c}_{2t+2}$
   Consumption in the second period is higher for people without children that start the period with the same level of savings.
2. $\frac{\partial}{\partial a_{2t+1}} V^c \geq \frac{\partial}{\partial a_{2t+1}} V^{nc} \rightarrow \frac{\partial a^*_{2t+1}}{\partial \eta^g} \geq 0$
   Women have a higher marginal propensity to save than men

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Results 2: The role of productivity

The role of productivity

1. $\frac{\partial N^*}{\partial \theta_t} < 0$, $\frac{\partial N^*}{\partial a_{2t+1}} > 0$
   Being more productive decreases the amount of labor a single parent supplies, whereas being wealthier increases it

Results 2: The role of productivity

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1. $\frac{\partial N^*}{\partial \theta_t} < 0$, $\frac{\partial N^*}{\partial a_{2t+1}} > 0$
   Being more productive decreases the amount of labor a single parent supplies, whereas being wealthier increases it
2. $\frac{\partial a^{*c}_{2t+2}}{\partial \theta_t} < 0$, $\frac{\partial a^{*nc}_{2t+2}}{\partial \theta_t} > 0$
   Higher skill levels allow people with children to consume more and leave less bequests for their children

Conclusion

1. There exists a persistent gender gap in total consumption between single men and women
2. Differences in the level of consumption can be explained by differences in income, and having children
3. There is a rich heterogeneity in consumption patterns interacted with income levels. The consumption gap is highest for the poorest individuals.
   $\rightarrow$Implications for inequality

Next steps

1. Improve empirical strategy to better identify the sources of differences across gender $\rightarrow$ Use PSID data (Panel Study of Income Dynamics) to understand how consumption inequality propagates across generations due to gender and children.
2. Improve model and quantify it

The End

Sample Summary Statistics

Income Quintile	# of women	Mean age, women	# of men	Mean age, men	Women w/ children	Men w/ children
1st	39,986	52.3	17,410	48	20,749	2,688
2nd	27,871	58.1	16,455	50.8	11,328	2,872
3rd	21,482	52.4	16,265	45.8	6,272	2,452
4th	17,739	49.3	17,061	44.2	3,206	1,654
5th	13,603	49.7	19,230	45.2	1,326	1,026
Full sample	120,627	53.1	86,421	46.7	42,881	10,692

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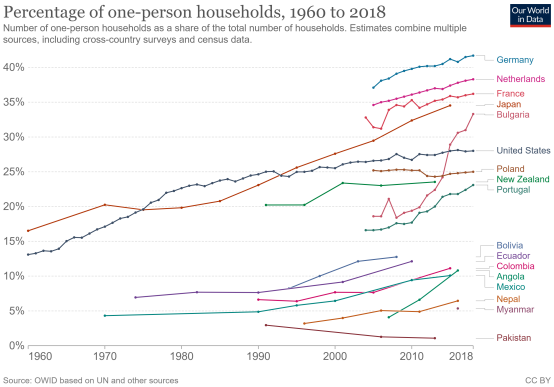
Rising trend of single households



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Raw Consumption vs. Scaled Consumption

Table

	(1) Raw Consumption	(2) Raw Consumption	(3) Raw Consumption	(4) Consumption (Scaled)	(5) Consumption (Scaled)	(6) Consumption (Scaled)
Woman= 1	-0.0631***	0.00595**	-0.0313***	-0.206***	-0.151***	-0.0717***
	(0.00290)	(0.00252)	(0.00256)	(0.00275)	(0.00251)	(0.00250)
Income (after tax)		0.335***	0.332***		0.264***	0.271***
		(0.00197)	(0.00197)		(0.00175)	(0.00174)
Children= 1			0.163***			-0.348***
			(0.00260)			(0.00268)
Observations	307713	307713	307713	307713	307713	307713
Adjusted R^2	0.446	0.612	0.617	0.484	0.587	0.611

Note: Table 5 reports the results of specification 2 where the dependent variable is log raw consumption or log scaled consumption.

Controls: marital status, age, education, and year fixed effects.

Standard errors in parenthesis are clustered at the household level.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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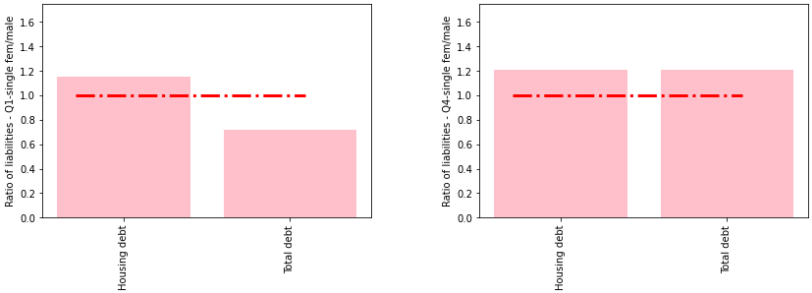
Quantile Regressions

Borrowing



(a) Lowest income quintile

(b) Fourth income quintile

Figure: Women in the lowest income quintile accumulate higher levels of household debt

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Assets and liabilities

Table: Assets and liabilities

	(1) Liquid	(2) Stocks	(3) Total assets (+ hval)	(4) Total assets	(5) Mortgage debt	(6) Total debt	(7) Net worth
1.fem	-0.864***	0.689***	-0.563*	-0.721***	0.872***	-0.775***	-0.728**
	(0.263)	(0.182)	(0.319)	(0.279)	(0.121)	(0.154)	(0.343)
Income	1.207***	0.554***	1.378***	1.293***	1.114***	0.542***	1.266***
	(0.0295)	(0.0211)	(0.0347)	(0.0316)	(0.0130)	(0.0158)	(0.0367)
1.fem#c.Income	0.0851***	-0.101***	0.0700*	0.0646*	-0.0630***	0.165***	0.0959**
	(0.0321)	(0.0233)	(0.0384)	(0.0340)	(0.0155)	(0.0194)	(0.0411)
N	57755	67071	56401	56401	307108	138515	44117
adj. R^2	0.340	0.122	0.300	0.355	0.139	0.088	0.327

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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