Does personality affect the allocation of resources within households?

Gastón P. Fernández (KU Leuven)

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PERSONALITY IS RELEVANT FOR LIFE OUTCOMES

- **Personality traits**: patterns of thought, feelings, and behavior (Borghans et al., 2008).
- Impact several aspects of our life: schooling, mortality, antisocial behavior, marital sorting, production of cognitive skills (Heckman et al., 2006, 2021; Cunha et al., 2010; Lundberg, 2011, 2012; Dupuy & Galichon, 2014).
- Economic literature focused on **labor market outcomes** (Heckman et al., 2010; Fletcher, 2013; Todd & Zhang, 2021).
- Less is known about personality traits and **intrahousehold behavior** (Flinn et al., 2018).

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- Economic literature focused on **labor market outcomes** (Heckman et al., 2010; Fletcher, 2013; Todd & Zhang, 2021).
- Less is known about personality traits and **intrahousehold behavior** (Flinn et al., 2018).

  → **Why it matters?** Intrafamily inequality and poverty, gender asymmetries, distribution of power, mortality rates of women (Dunbar et al., 2013; Cherchye et al., 2015, 2018; Calvi, 2021).

  → **Policy implication?** Interventions at early stages in life, e.g., improved childcare facilities or parental tutoring, change personality over the life-cycle (Heckman, 2005; Borghans et al., 2008; Attanasio et al., 2020).

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   → Structural relation between personality and intrafamily behavior.

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   → Structural relation between personality and intrafamily behavior.

3. (Reduced-form) relationship between **intrahousehold consumption inequality** and personality (Cherchye et al., 2020).

SUMMARY

1. Motivation
2. A model of collective consumption
3. Data
4. Personality and intrahousehold allocations
5. Implications of personality for consumption inequality
6. Conclusion

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SETTING

Couples: **partners** m and f $\left(i \in \{m, f\}\right)$.

Make static consumption decisions and spend time supplying work:

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- **Public** good (C) with associated prices (P).

  $\rightarrow$ Hicksian good (e.g., joint transport, mortgage).

- **Private** (assignable) consumption of goods (c^i) with prices (p^i).

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Preferences are represented by: $u^i(c^i, \ell^i, C; \xi)$.

Consumption inequality: relative individual cost of equivalent bundle (RICEB)

$$\text{RICEB}^i = \frac{c^i + w^i \ell^i + C}{y}.$$

HOUSEHOLD OPTIMIZATION PROBLEM

Pareto-efficient intrahousehold allocations (Chiappori, 1998; 2002):

$$\max_{c^m, c^f, \ell^m, \ell^f, C} \left[u^m(c^m, \ell^m, C; \xi) \; + \; \mu(w^m, w^f, y, \mathbf{z}) \, u^f(c^f, \ell^f, C; \xi) \right]$$

$$\begin{aligned} \text{s.t.} \quad & c^m + c^f + C + w^m \ell^m + w^f \ell^f \leq y, \\ & c^i \geq 0, \\ & C \geq 0, \\ & T \geq \ell^i \geq 0, \end{aligned} \tag{P1}$$

where:

- Pareto weight: $\mu(w^m, w^f, y, \mathbf{z})$,
- Taste shifters: ξ,
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The solution to (P1) implies a system of **household demand functions**:

$$\mathbf{g} = \mathbf{g}\left[w^m, w^f, y, \mu(w^m, w^f, y, \mathbf{z}); \xi\right] \qquad \forall \;\; \mathbf{g} \in \{\mathbf{c}, \ell, C\}.$$

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▶ Testable restrictions

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LISS DATA

Dutch longitudinal internet studies for the social sciences (LISS) panel gathered by CentERdata.

Sample selection (Cherchye et al., 2012; 2017) :

- Couples with both adults are between 25 and 65 years old,
- With or without children,
- No other member than children living at home (e.g., friends),
- Both adults work at least 10 hours per week,
- No self-employed adults.

Pooled cross-section of **1101 couples** for five different years, from 2009 to 2015.

Seven **personality traits** at the individual level:

Big Five (Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism) +
Rosenberg Scale (Self-Esteem) +
Need For Cognition Scale (Cognitive Engagement).

▸ Summary statistics ▸ Personality traits

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MULTICOLLINEARITY IN PERSONALITY TRAITS

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Table 2. Principal components

Personality:	PC1	PC2
1. Extraversion	–	
2. Agreeableness		
3. Openness		
4. Conscientiousness		+
5. Neuroticism		+
6. Self-esteem	–	
7. Cognitive engagement	–	
Eigenvalue	1.41	1.23
Variance share	28.58%	21.75%

Notes: Explained share of the observed variance: 50.33%. The table indicates the sign of those loadings that are larger than a cut-off of .8 with respect to the largest coefficient in each component (similar procedure as in Jolliffe (2002)). The largest coefficient in PC1 is self-esteem; in PC2 is conscientiousness.

PARAMETRIZATION OF HOUSEHOLD DEMAND FUNCTIONS

The system of **household demand functions**:

$$\mathbf{g}\left[w^m, w^f, y, \mu(w^m, w^f, y, \mathbf{z}); \xi\right] \quad \forall \quad \mathbf{g} \in \{\boldsymbol{c}, \ell, C\},$$

is parametrized in **budget share form** (Bobonis, 2009):

$$\omega_{jh} = \alpha_{jh} + \beta' \ln(\boldsymbol{z}_{jh}) + a_{jh}(y) + b_{jh}(y^2) + \lambda' \ln(\boldsymbol{w}_{jh}) + \xi'\delta + \varepsilon_{jh},$$

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where for household h and good $j \in \{\boldsymbol{c}, \ell, C\}$:

ω : budget share on good j,

a, b : control functions for full income (y),

$\boldsymbol{w}$: prices of leisure,

ε : additive error term,

ξ : taste shifters; the *level* of personality PC_1^i and PC_2^i,

$\boldsymbol{z}$: distribution factors; the relative personality $\frac{PC_1^f}{PC_1^m}$ and $\frac{PC_2^f}{PC_2^m}$.

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▸ Distribution of relative personality ▸ Empirical tests

PERSONALITY DRIVES INTRAHOUSEHOLD ALLOCATIONS

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Table 3. OLS estimates of the effect of personality on household consumption.

	Dependent variable: budget share				
	ω_{Cm}	ω_{Cf}	$\omega_{\ell m}$	$\omega_{\ell f}$	ω_C
$\ln(PC1^m)$	**.036**$^+$	.005	-.037	**-.123**$^+$	**.119**$^+$
	(.019)	(.020)	(.031)	(.045)	(.056)
$\ln(PC2^m)$	**.112**$^+$	.057	**-.231**$^+$	-.243	**.305**$^+$
	(.068)	(.087)	(.105)	(.152)	(.188)

Notes: Sample size of 1101 couples. Robust standard errors clustered at the household level are in parentheses. *PC*: principal component. Additional covariates: linear control function for full income and its square instrumented with household potential income; the log of spouses' wages and the interaction between them; the square of husband's wage; husband's age and its square; husband's educational level; the number of children the couple has; marital status; the log of spouses' PCs in levels and their squares; and personality ratios.

$^+$: Significant with at least 90% of confidence.

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	(.068)	(.087)	(.105)	(.152)	(.188)
$\ln(\frac{PC1^f}{PC1^m})$	**.033**$^+$	.014	-.022	**-.082**$^+$	.058
	(.016)	(.014)	(.024)	(.035)	(.044)
$\ln(\frac{PC2^f}{PC2^m})$	**.088**$^+$	.078	**-.136**$^+$	**-.218**$^+$	**.186**$^+$
	(.043)	(.054)	(.073)	(.097)	(.110)
Proportionality test	$\chi^2(4) = 0.892$ (p–value = **.911**)				
Collective test	$\chi^2(4) = 7.646$ (p–value = **.322**)				

Notes: Sample size of 1101 couples. Robust standard errors clustered at the household level are in parentheses. *PC*: principal component. Additional covariates: linear control function for full income and its square instrumented with household potential income; the log of spouses' wages and the interaction between them; the square of husband's wage; husband's age and its square; husband's educational level; the number of children the couple has; marital status; the log of spouses' PCs in levels and their squares; and personality ratios.

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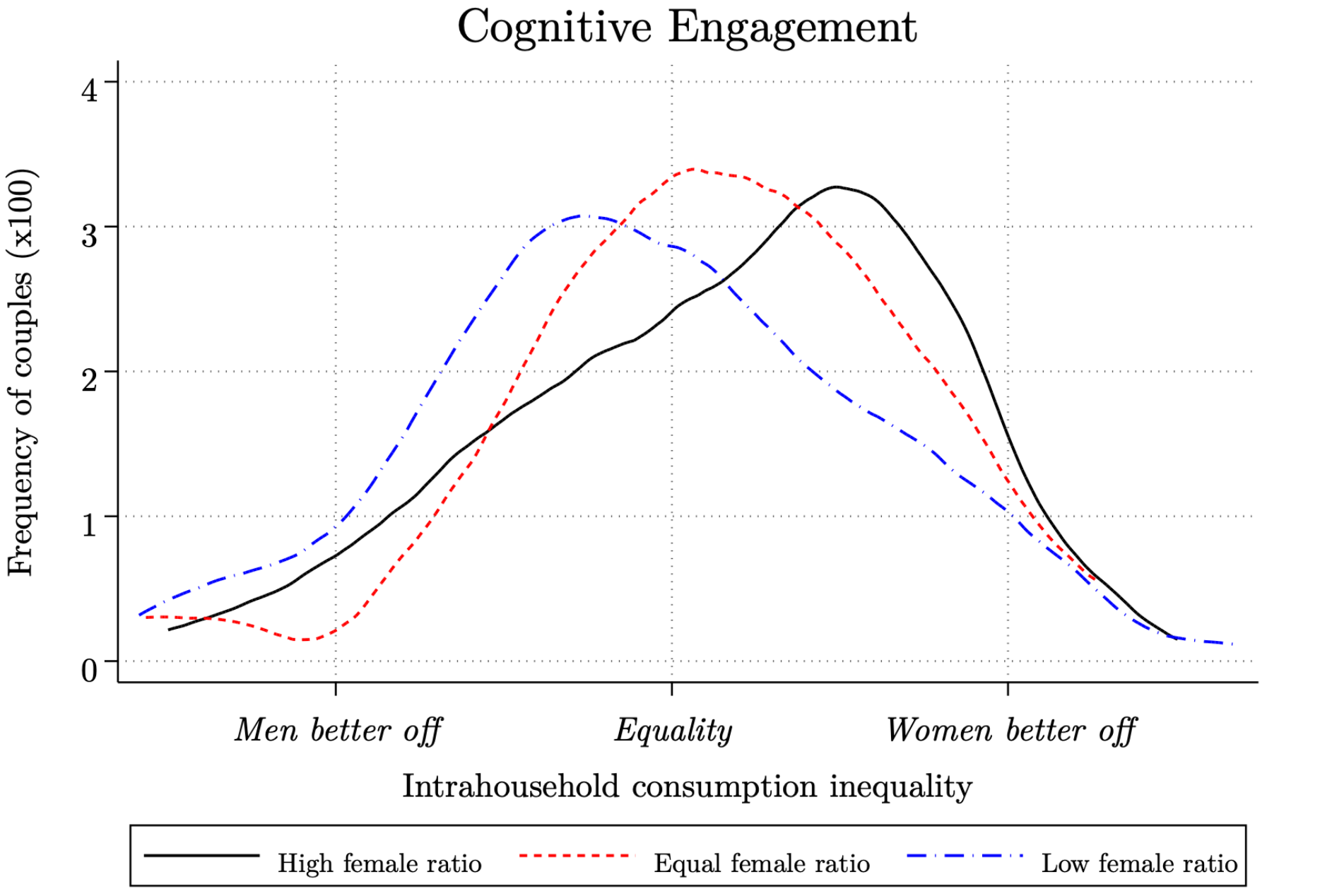
CONSUMPTION INEQUALITY AND RELATIVE PERSONALITY



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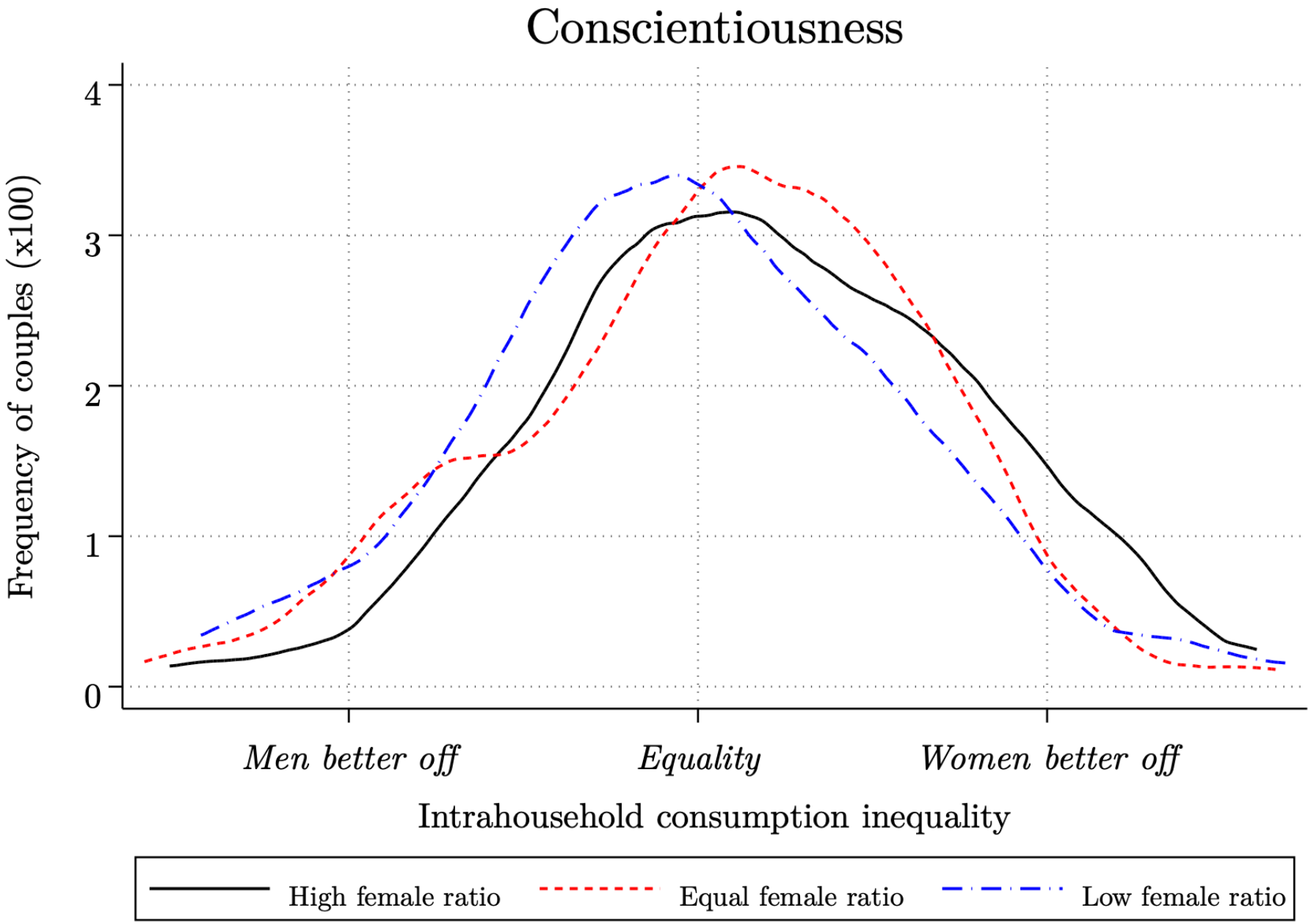

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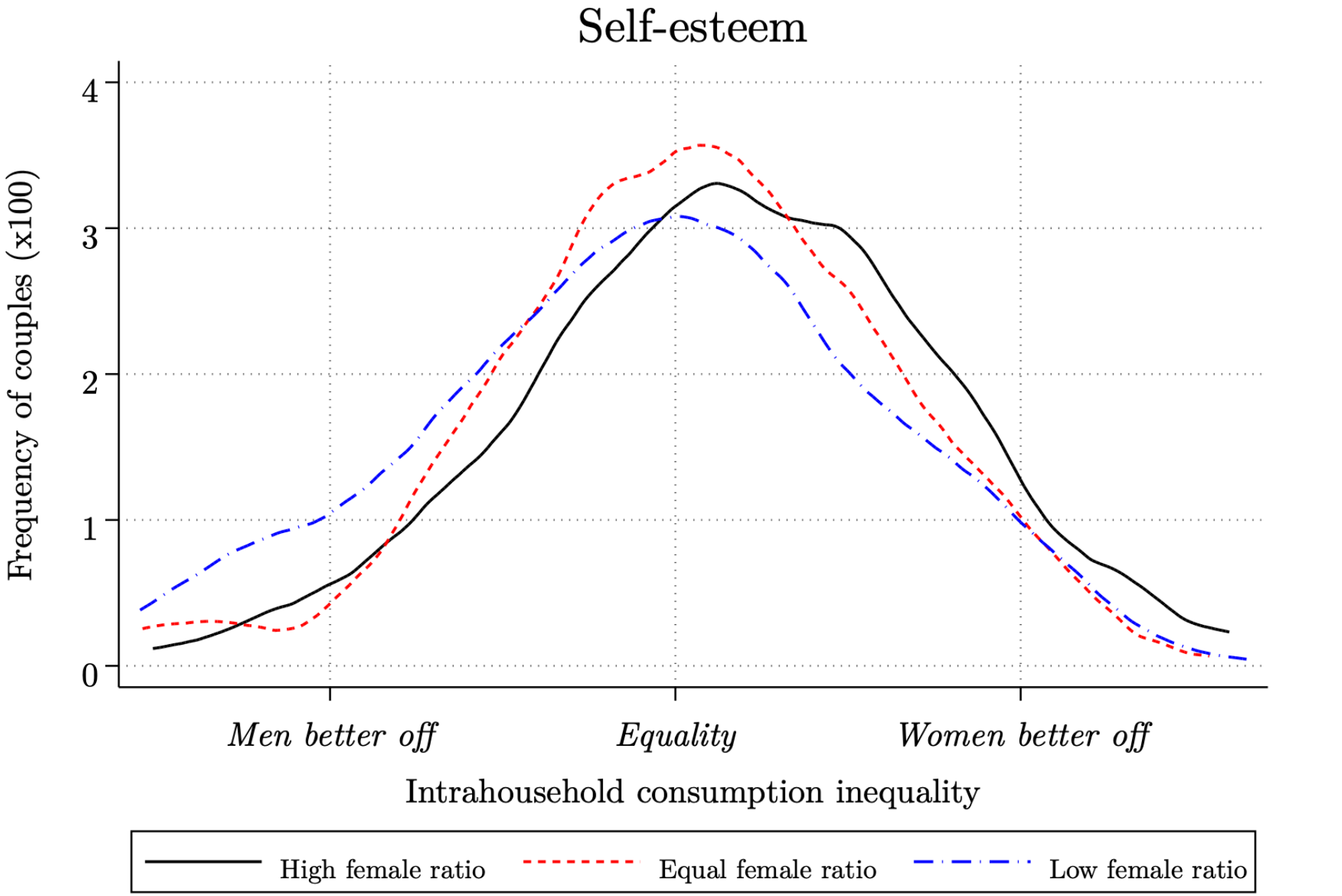

CONSUMPTION INEQUALITY AND RELATIVE PERSONALITY

	Panel A: Bootstrap statistics		**Panel B: Difference in inequality**
	t-statistic	*p*-value	
Agreeableness	-.411	.468	0.428%
Openness	-1.609	.225	1.851%
Extraversion	-1.097	.349	1.213%
Conscientiousness	**-3.506**$^{+}$	.014	**3.949%**
Neuroticism	.400	.484	0.476%
Self-esteem	**-4.022**$^{+}$	.005	**3.441%**
Cognitive engagement	**-3.776**$^{+}$	.009	**4.486%**

Notes: Panel A shows the results of a bootstrapped *t*-test of equal mean between the black and blue distributions shown in the previous figure. I estimate both the *t*-statistic and *p*-value on their bootstrap distribution over 1000 replications. Panel B shows the difference in the average intrahousehold inequality between black and blue distributions shown in Figure 2.

$^{+}$: Significant with at least 90% of confidence.

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CONCLUSION

- Theory-based evidence about the role that **personality** has in the efficient **allocation of resources**.
- Personality affects **preferences** but also the **bargaining process** inside households.
- Women relatively more conscientious, with higher self-esteem and cognitive engagement than their male partners, present a **larger fraction of intrafamily resources**.
- Structural models to investigate the underlying mechanisms in which these traits operate.

  → **Second chapter PhD:** personality traits, marriage market, and household behavior.

  → **JMP:** personality traits and the development of children.

Thank you!

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TESTABLE IMPLICATIONS

1. **Distribution factor proportionality.** Cross-equation restrictions on the household demand system $\mathbf{g}$:

$$\frac{\partial c^m/\partial z_1}{\partial c^m/\partial z_k} = \frac{\partial c^f/\partial z_1}{\partial c^f/\partial z_k} = \frac{\partial \ell^m/\partial z_1}{\partial \ell^m/\partial z_k} = \frac{\partial \ell^f/\partial z_1}{\partial \ell^f/\partial z_k} = \frac{\partial C/\partial z_1}{\partial C/\partial z_k} \qquad \forall \;\; k = 2, \ldots, K.$$

2. *z*-**conditional demand system.** Under further assumptions on $\mathbf{g}$ and $\mathbf{z}$, we get:

$$\tilde{\mathbf{g}} \;=\; \tilde{\mathbf{g}}(w^m,\; w^f,\; y,\; c^m,\; \mathbf{z}_{-1};\; \xi).$$

The restriction based on the estimation of $\tilde{\mathbf{g}}$, states that subject to the conditioning good (c^m), the demand for the remaining goods should be independent of all other distribution factors:

$$\frac{\partial \tilde{\mathbf{g}}(w^m, w^f, y, c^m, \mathbf{z}_{-1}; \xi)}{\partial z_k} = 0 \qquad \forall \;\; k = 2, \ldots, K.$$

▸ Return

SUMMARY STATISTICS

Table A1: Economic and demographic variables.

	Mean	Std. dev.	Min	Max
A. Economic variables:				
Male wage rate	13.63	3.71	6.88	29.90
Female wage rate	12.05	3.16	4.03	21.80
Male weekly hours worked	37.43	4.74	12	60
Female weekly hours worked	25.98	7.99	10	48
Full income	2820.69	576.79	1357.20	4770.11
Household private consumption	2241.59	472.04	1142.50	4089.12
Assig. male private consumption	89.97	51.78	15	453.72
Assig. female private consumption	95.25	54.11	19.38	507.66
Public consumption	579.10	229.75	102.96	1898.35
Total household consumption	764.32	256.07	173.21	2284.98
Male weekly leisure	74.56	4.74	52	100
Female weekly leisure	86.01	7.99	64	102
B. Demographic variables:				
Male age	47.39	9.76	25	65
Female age	45.46	9.90	25	65
Number of children	1.16	1.11	0	5
Male dummy low education	.20	.40	0	1
Female dummy low education	.43	.49	0	1
Male dummy middle education	.36	.48	0	1
Female dummy middle education	.23	.42	0	1
Male dummy high education	.43	.49	0	1
Female dummy high education	.32	.47	0	1

Notes: Sample size of 1130 couples. LISS waves 2009, 2010, 2012, 2015, and 2017 pooled up. All economic variables are in weekly 2015 euros.

▶ Return

SUMMARY STATISTICS (CONT.)

Table A2: Personality traits.

	Mean	Std. dev.	Min	Max
C. Personality traits:				
Male Openness	3.07	.26	1.37	3.87
Female Openness	3.07	.28	1.87	3.87
Male Extraversion	3.18	.51	1.33	4.50
Female Extraversion	3.12	.51	1.33	4.50
Male Agreeableness	3.07	.25	2.00	3.75
Female Agreeableness	3.16	.20	2.37	3.75
Male Neuroticism	2.29	.57	1.00	4.22
Female Neuroticism	2.59	.59	1.00	4.33
Male Conscientiousness	2.78	.27	1.88	3.66
Female Conscientiousness	2.85	.24	1.77	3.55
Male Self-esteem	5.98	.65	3.80	7.00
Female Self-esteem	5.85	.72	3.70	7.00
Male Cognitive engagement	4.78	.86	2.66	7.00
Female Cognitive engagement	4.39	.84	2.25	6.75

Notes: Sample size of 1130 couples. LISS waves 2009, 2010, 2012, 2015, and 2017 pooled up. All economic variables are in weekly 2015 euros.

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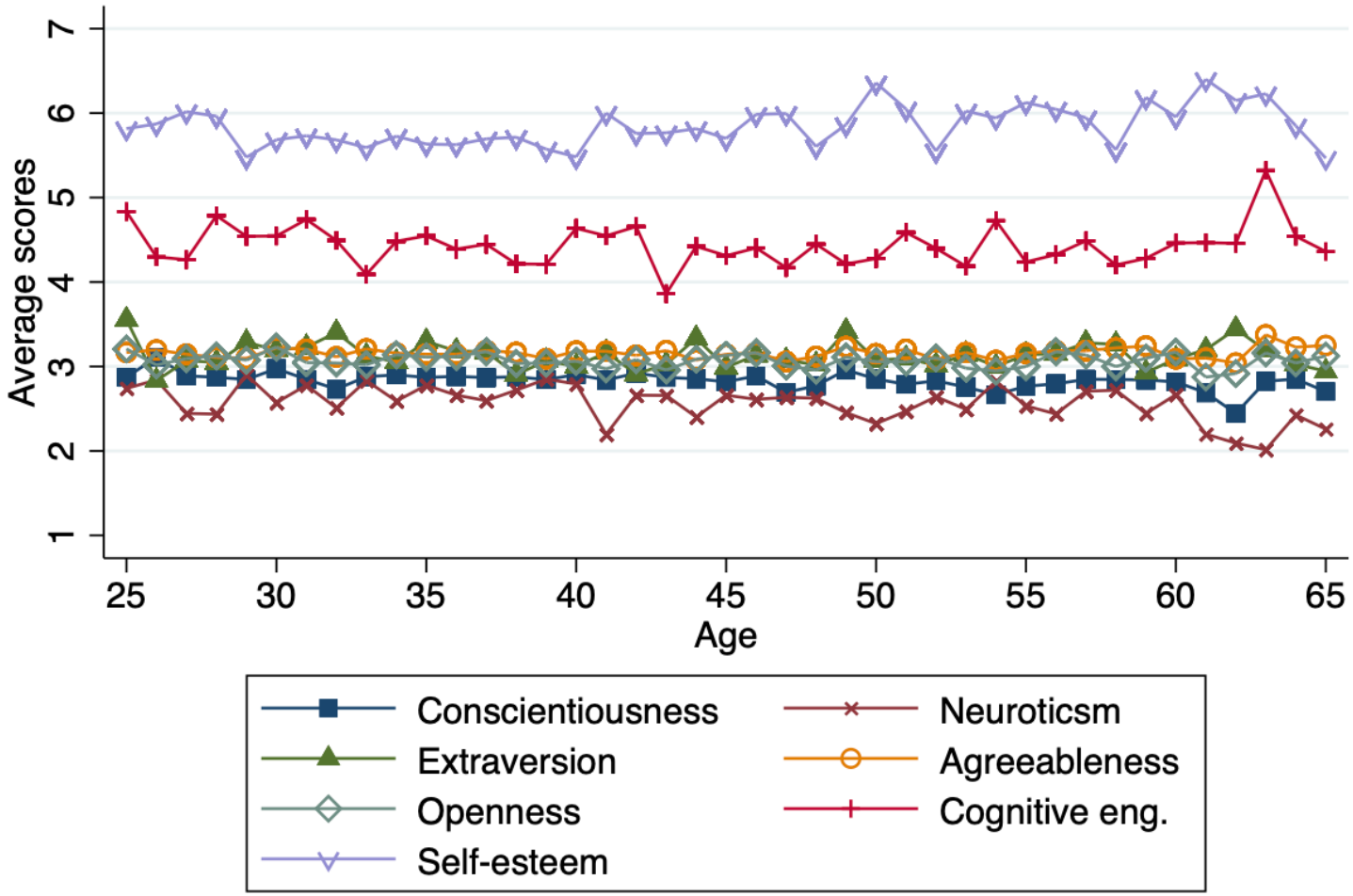
STABILITY OF PERSONALITY - WOMEN



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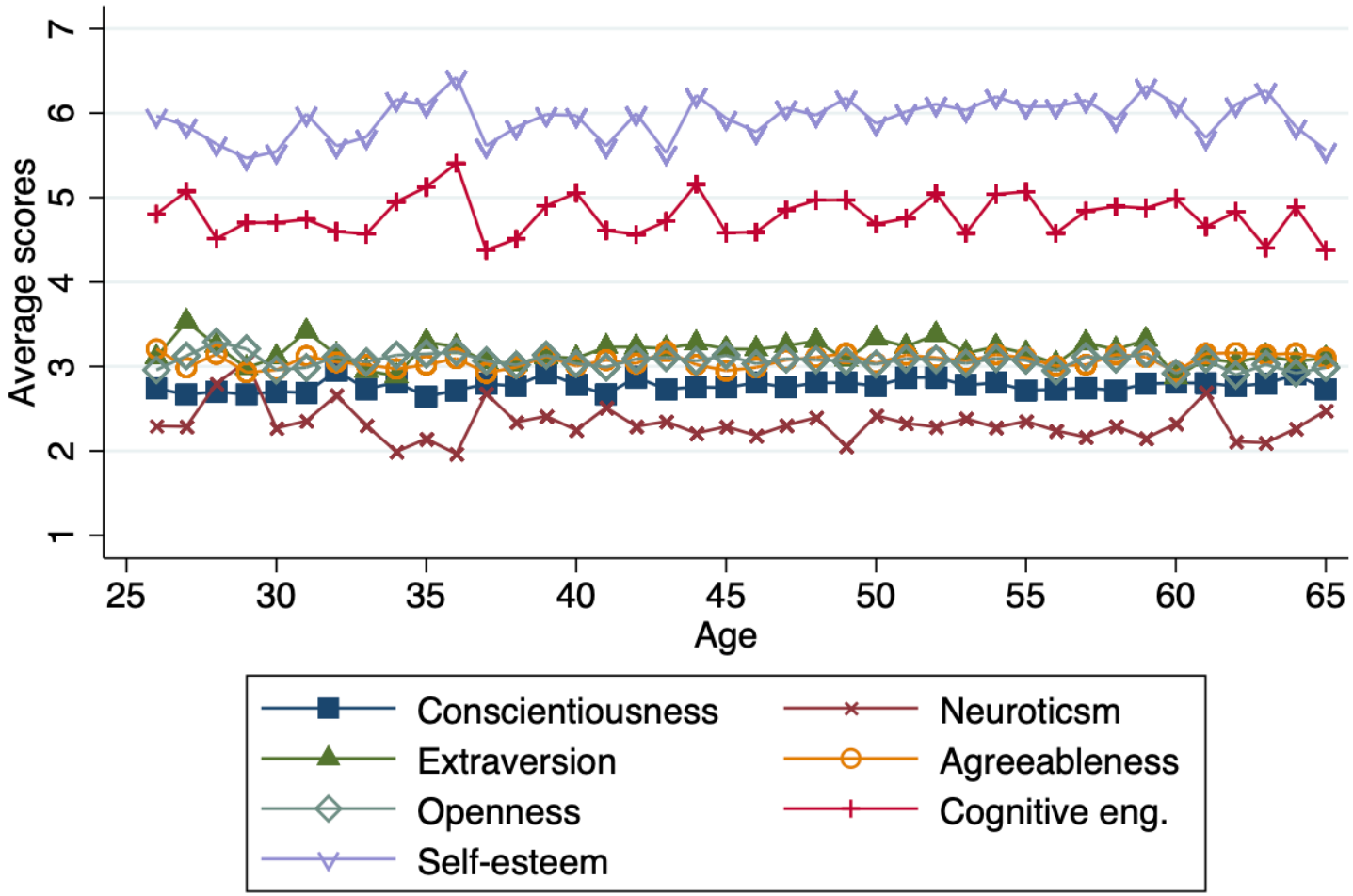
STABILITY OF PERSONALITY - MEN



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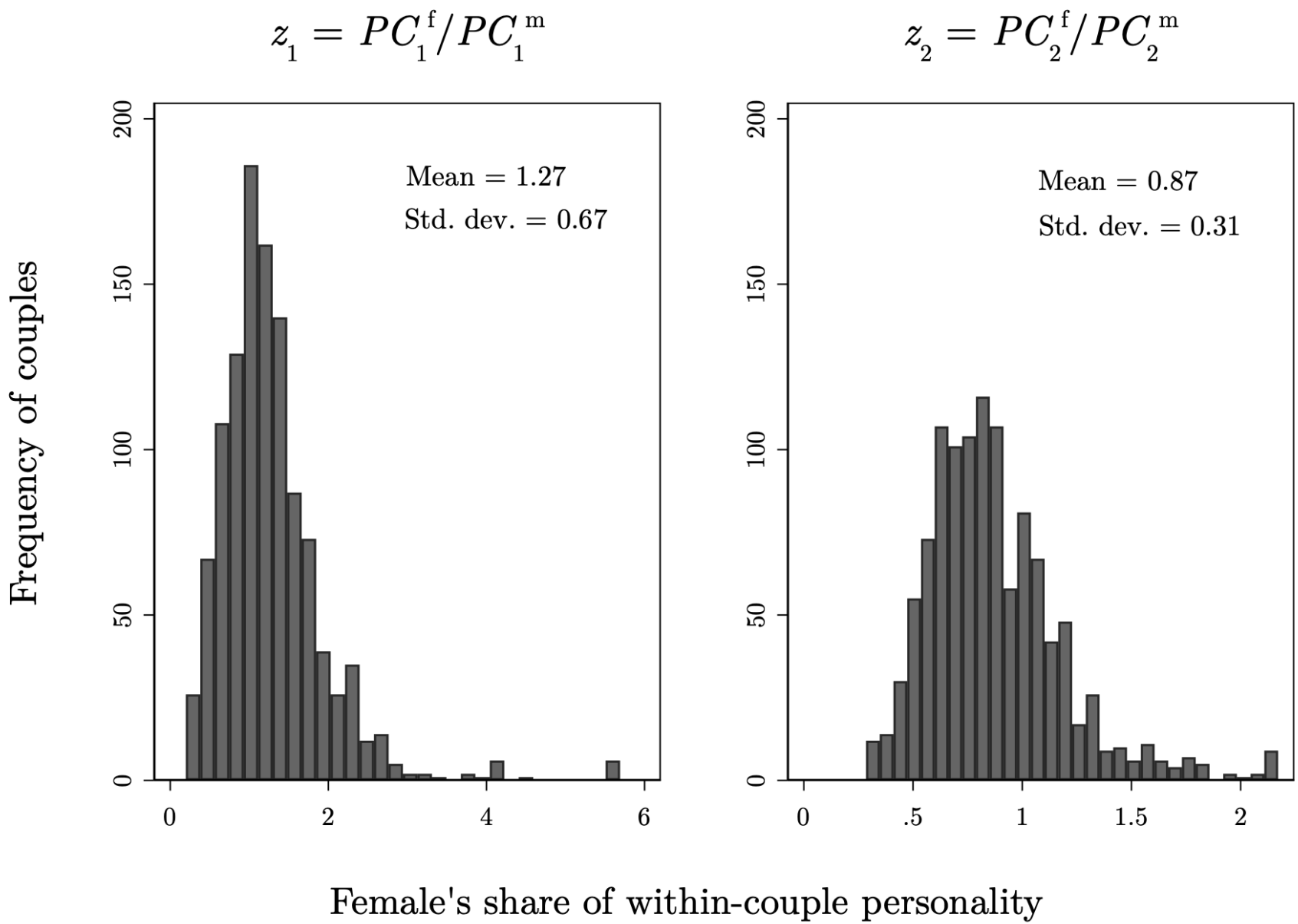
RELATIVE PERSONALITY BETWEEN PARTNERS



EMPIRICAL TESTS ON DISTRIBUTION FACTORS

H_0: Differences in personality traits between spouses ($\mathbf{z}$) impact intrahousehold allocations ($\mathbf{g}$) by only changing the bargaining process (μ).

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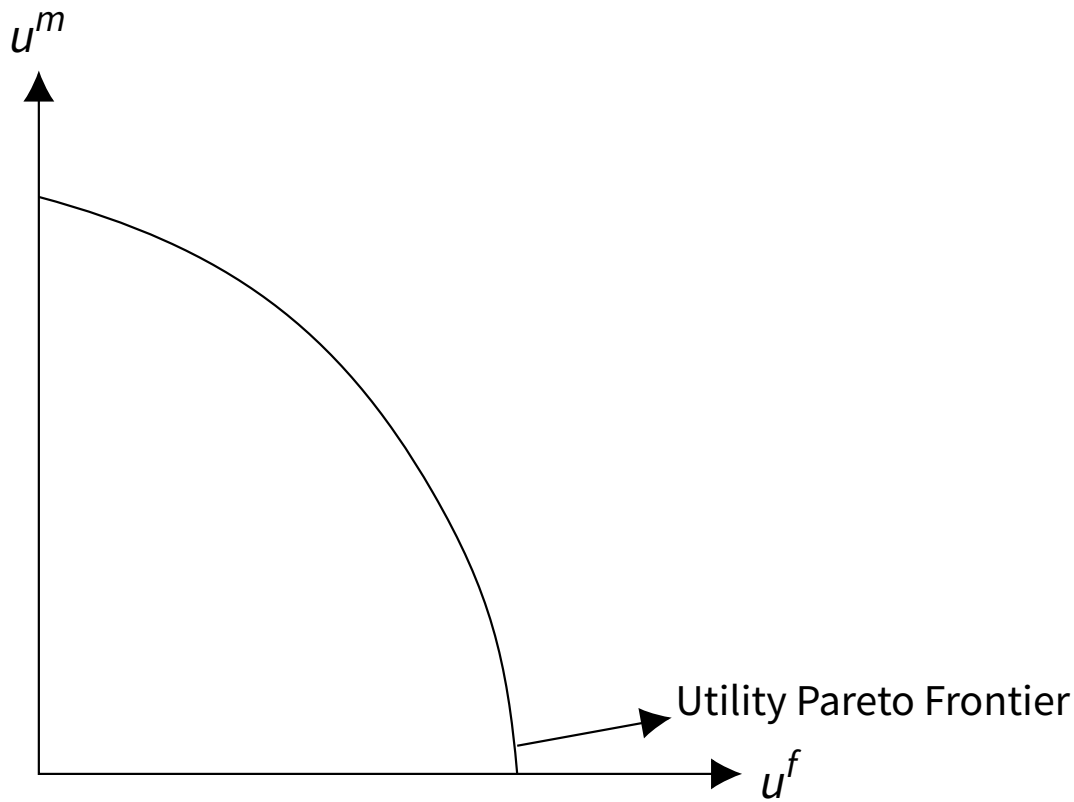

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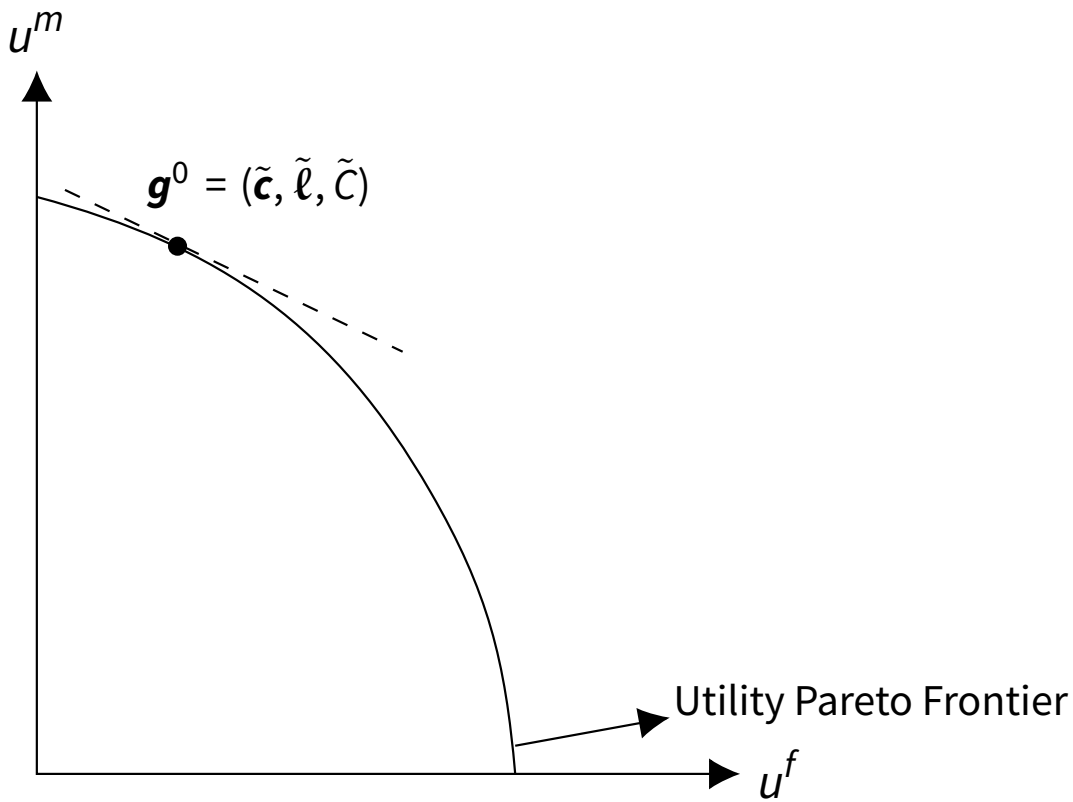

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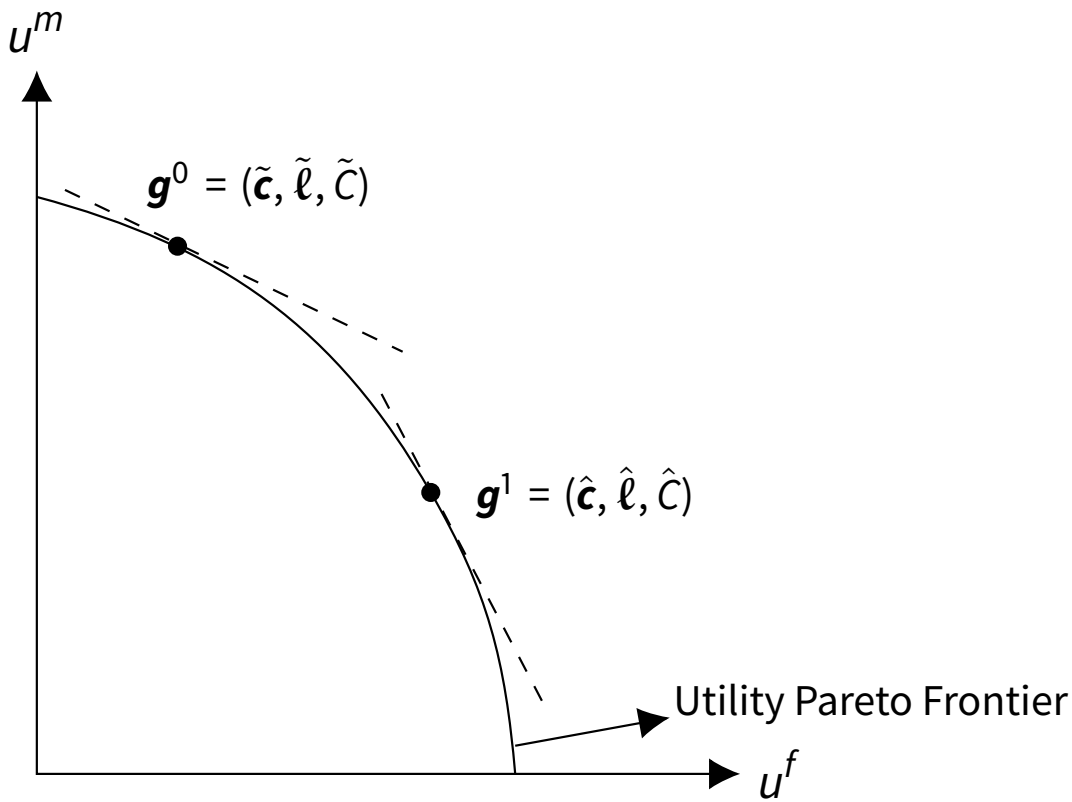

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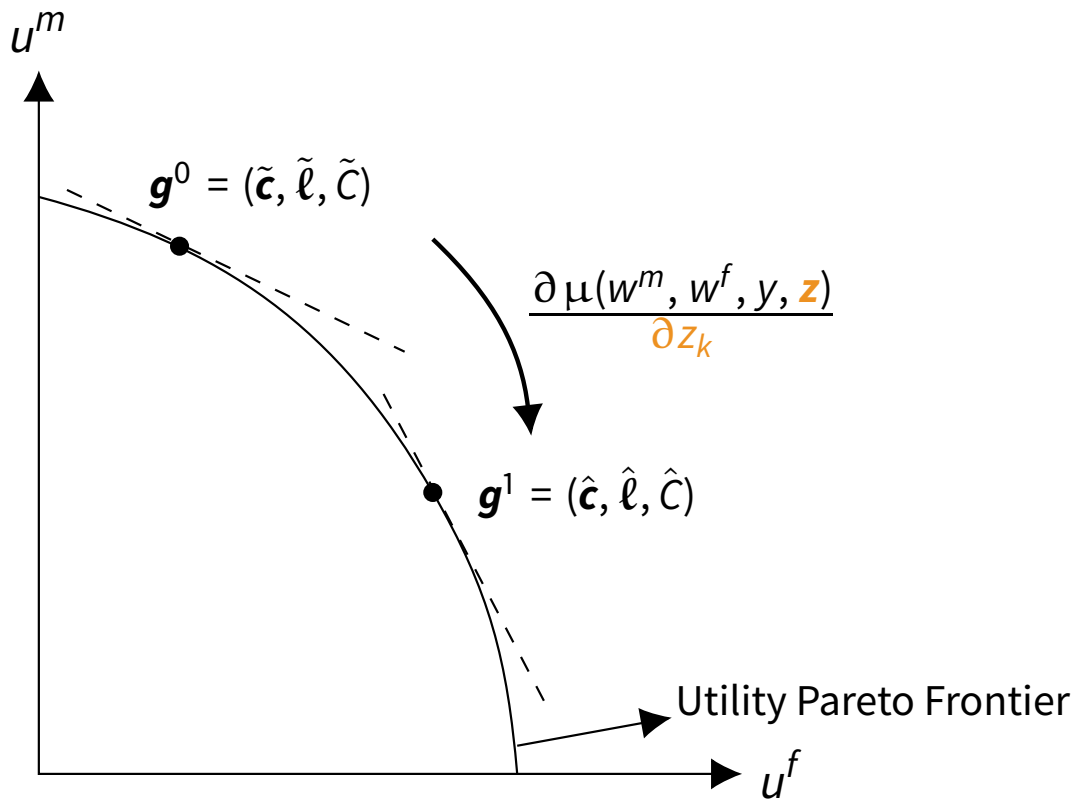
EMPIRICAL TESTS ON DISTRIBUTION FACTORS

H_0: Differences in personality traits between spouses (**z**) impact intrahousehold allocations (**g**) by only changing the bargaining process (μ).



A variation on distribution factors **z** only affects reallocations of resources by shifting the individual bargaining weights.

Return

EMPIRICAL TESTS

1. **Distribution factor proportionality.**

$$\frac{\partial \ln(\omega_j)/\partial \ln(z_1)}{\partial \ln(\omega_j)/\partial \ln(z_2)} = \frac{\partial \ln(\omega_s)/\partial \ln(z_1)}{\partial \ln(\omega_s)/\partial \ln(z_2)},$$

$$\frac{\beta_{j1}}{\beta_{j2}} = \frac{\beta_{s1}}{\beta_{s2}}.$$

2. **z-conditional demand system.**

$$\frac{\partial \ln(\omega_s)}{\partial \ln(z_1)} = \theta_s = 0 \qquad \forall \;\; s \neq c^m.$$

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