

The Gender Gap in Household Bargaining Power

A Revealed-Preference Approach

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An intra-household perspective

- In household finance, most papers start with the household as the unit of analysis
 - ▶ in models, household = individual solving the optimal portfolio problem
 - ▶ in empirical work, household = household head or average household member

An intra-household perspective

- In household finance, most papers start with the household as the unit of analysis
- Embed a fundamental disconnect between *individuals* and *households*
 - ▶ decisions of a household involve multiple members; each member has a different say.
 - ▶ Intrahousehold bargaining has been less studied in the domain of portfolio choice.

An intra-household perspective

- In household finance, most papers start with the household as the unit of analysis
- Embed a fundamental disconnect between *individuals* and *households*
- Risk preference is a key determinant of portfolio choice under standard portfolio theory
 - ▶ members of the same household often have different risk preferences

An intra-household perspective

- In household finance, most papers start with the household as the unit of analysis
- Embed a fundamental disconnect between *individuals* and *households*
- Risk preference is a key determinant of portfolio choice under standard portfolio theory
- When such disagreement occurs
 - ▶ what determines one's bargaining power?
 - ▶ within household, is there a gender gap in bargaining power? If so, what drives it?

Our approach

- We propose a revealed-preference approach and build a structural model to study these questions
 - ▶ an intrahousehold model: household risk preference = weighted average of individual risk preferences
 - ▶ more bargaining power: greater ability to incorporate one's risk preference into the household's portfolio choice
- **Revealed-preference vs. survey-based:**
- **Structural vs. reduced-form:**

Our approach

- We propose a revealed-preference approach and build a structural model to study these questions
- **Revealed-preference vs. survey-based:**
 - ▶ survey-based: who has the final say in financial matters?
 - ▶ revealed-preference: *household* portfolio allocation + *individual* risk preference → the distribution of bargaining power between spouses
 - ▶ complement the survey-based approach: what they do vs. what they say
- **Structural vs. reduced-form:**

Our approach

- We propose a revealed-preference approach and build a structural model to study these questions
- **Revealed-preference vs. survey-based:**
- **Structural vs. reduced-form:**
 - ▶ reduced-form: find an exogenous shock to an individual characteristic
 - ▶ structural: specify the underlying bargaining process explicitly
 - ▶ consider multiple channels together and *quantify* their relative importance

Summary of findings

- In Australia

- ▶ the husband's risk preference matters 50% more than the wife's for household portfolio decisions → gender gap in bargaining power
- ▶ half of this gender gap can be explained by spousal differences in individual characteristics
 - ★ income and employment status are quantitatively most important
 - ★ other attributes such as personality traits also matter
- ▶ other half explained by gender effects, which are likely a result of traditional gender norms

- In Germany and US

- ▶ confirm most of the findings in Australia
- ▶ biggest gender gap in Germany, consistent with the more traditional gender norms

HILDA 2001-2018

- Household Income and Labour Dynamics in Australia (HILDA) Survey is a nationally representative annual panel
 - ▶ each year collects a different set of variables (e.g., asset allocation is collected once every four years)
 - ▶ both household-level and individual-level information
- Household-level
 - ▶ household income, asset allocation, debt, wealth, kids, household size, etc.
- Individual-level
 - ▶ risk preference, cognitive ability, personality traits, financial head, employment, individual income, etc.

▶ cognitive

▶ personality

▶ risk

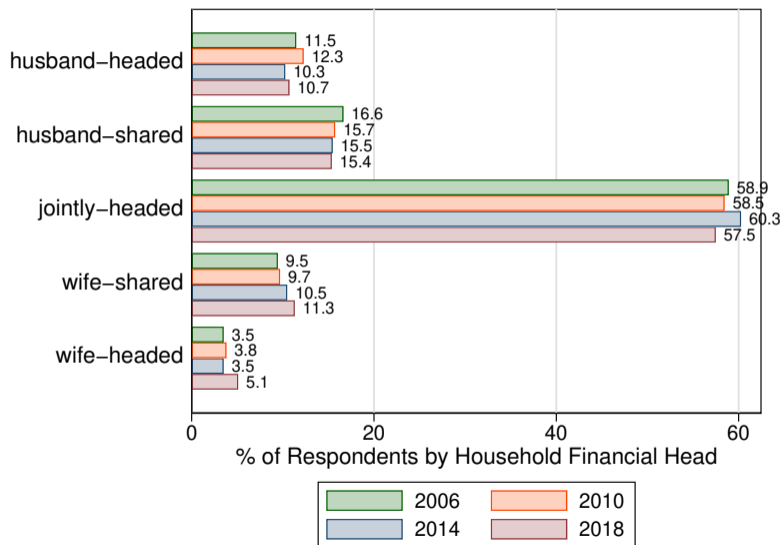
▶ financial head

Financial head

- Each spouse is asked “who makes decisions about savings, investment and borrowing in your household?”
 - ▶ responses: themselves, their spouses, or shared equally between spouses
 - ▶ survey-based approach: takes these answers as direct measures of bargaining power
- We, instead, use these responses to classify households into different structures
 - ▶ husband-headed or wife-headed: both spouses report husband (wife) as financial head (FH)
 - ▶ jointly headed – both spouses report financial decisions are “shared equally”
 - ▶ husband-shared or wife-shared: one spouse reports “husband” or “wife” and the other reports “shared equally”

▶ data

Distribution of the financial head of the household by years



Household portfolio choice

- Two assets
 - ▶ a risk-free asset with constant interest return r_f
 - ▶ a risky asset (stock) with return $r_f + \tilde{x}$, $\tilde{x} \sim N(r_x, \sigma_x^2)$
- Household i has total wealth w , in which risky asset is a and risk-free asset is $w - a$
- Mean-variance utility:

$$U_i(a) = \max_a \underbrace{w(1 + r_f)}_{\text{Risk free return}} + \left(\underbrace{ar_x - C_i}_{\text{Mean}} - \underbrace{\frac{1}{2}\gamma_i a^2 \sigma_x^2}_{\text{Variance}} \right) I(a > 0)$$

- ▶ $I(a > 0)$: dummy indicating stock market participation
- ▶ γ_i : household risk aversion; larger if more risk-averse
- ▶ C_i : a lump-sum cost, used as an absorbing term, to capture any factor other than risk aversion that also affects stock market participation.

Household portfolio choice

- Solution to the portfolio choice problem

$$a = \begin{cases} 0 & \gamma_i > \frac{r_x^2}{2\sigma_x^2 C_i} \\ \frac{r_x}{\gamma_i \sigma_x^2} & \gamma_i \leq \frac{r_x^2}{2\sigma_x^2 C_i} \end{cases} .$$

- A higher household risk aversion γ_i : less likely to participate the stock market (extensive) and hold less risky assets (intensive)
- Optimal portfolio choice also depends on household-level factors (earnings, wealth, kids, etc.) through participation costs C_i

$$C_i = c_0 + c_1 \log(\text{earning})_i + c_2 \log^2(\text{earning})_i + c_3 \log(\text{wealth})_i \\ + c_4 \log^2(\text{wealth})_i + c_5 \text{age}_i + c_6 \text{age}_i^2 + c_7 \text{education}_i + c_8 \text{cognition}_i \\ + c_9 \text{child}_i + c_{10} \text{year}_{2010} + c_{11} \text{year}_{2014} + c_{12} \text{year}_{2018}$$

Individual and household risk aversion

- Each household has a husband (h) and a wife (w)
 - ▶ heterosexual marriage to study the effects of gender
- Household risk preference $1/\gamma_i$ is a weighted average of individual risk preferences $(1/\gamma^h, 1/\gamma^w)$

$$\frac{1}{\gamma_i} = \frac{\beta^h(\cdot)}{\gamma^h} + \frac{\beta^w(\cdot)}{\gamma^w}$$

where husband bargaining power

$$\beta^h(X_t^h, X_t^w, H_t) = \frac{\exp(\tilde{\beta}(X_t^h, X_t^w, H_t))}{\exp(\tilde{\beta}(X_t^h, X_t^w, H_t)) + 1}$$

and $\beta^w = 1 - \beta^h$

- This weight $\beta^h(\cdot)$ can be interpreted as the Pareto weight in the collective model.

Bargaining power

$$\tilde{\beta}(X_t^h, X_t^w, H_t) = (X_t^h - X_t^w) \delta_x + \sum_{j=1}^5 \delta_{jt}^H I(H_t = j) + \mu + \epsilon_t$$

- $(X_t^h - X_t^w) \delta_x$ captures the contribution of the observed differences between the husband and the wife to bargaining power
 - ▶ Gender neutral
- Gender asymmetry is absorbed by the gender effect $\sum_{j=1}^5 \delta_{jt}^H I(H_t = j)$
 - ▶ $I(H_t = j)$ indicates the five types of household structure (identity of the financial head)
 - ▶ We allow gender effects to be time-varying (Zaccaria and Guiso 2020)
- μ captures the persistent household unobserved heterogeneity
 - ▶ modelled as a random effect and approximated by discrete types (Heckman and Singer 1984)

Source of bargaining power heterogeneity

	Bargaining weight (β_t^H)		Stock participation
	Mean	S.D.	
Equal weight ($\beta = 0.5$)	0.500	0.000	0.448
All heterogeneity included	0.600	0.226	0.491
Gender effect (δ_{jt}^H)	0.567	0.147	0.465
All observed variables (δ_x)	0.551	0.146	0.464
Age	0.520	0.036	0.450
Education	0.513	0.343	0.532
Employment	0.542	0.255	0.510
Earning	0.562	0.242	0.497
Extraversion	0.470	0.179	0.465
Agreeableness	0.485	0.036	0.448

Does gender norm explain inequality in bargaining weights?

- The survey measures gender norms in three items:
 - ① Division of labour: It is better for everyone involved if the man earns the money and the woman takes care of the home and children.
 - ② Share housework: If both partners in a couple work, they should share equally in the housework and care of children.
 - ③ Mother role: Whatever career a woman may have, her most important role in life is still that of being a mother.
- Responses were collected on a scale from 1 (strongly disagree) to 7 (strongly agree).
- We re-code all variables so that higher value represents a more traditional view of gender norm.

Gender norms and the bargaining weights

	Bargaining weight of husbands with gender effect only	
	(1) Only gender norms	(2) With other controls
Division of labor (husband)	0.000 (0.002)	0.001 (0.001)
Share housework (husband)	0.011*** (0.002)	0.006*** (0.002)
Mother role (husband)	-0.002 (0.002)	0.000 (0.002)
Division of labor (wife)	0.007*** (0.001)	0.002*** (0.001)
Share housework (wife)	-0.003 (0.002)	0.000 (0.002)
Mother role (wife)	0.005*** (0.002)	0.002* (0.001)
Observations	8378	8378

Other countries

- Data

- ▶ Germany: the German Socio-Economic Panel (GSOEP) survey
- ▶ US: the Health and Retirement Study (HRS)

	Bargaining weight (β_t^H)		
	Australia	Germany	US
Equal weight ($\beta = 0.5$)	0.500	0.500	0.500
All heterogeneity	0.600	0.685	0.609
Gender effects (δ_{jt}^H)	0.567	0.837	0.622
All observed variables (δ_x)	0.551	0.549	0.582

Conclusion

- We develop a household portfolio choice model allowing for intra-household bargaining
 - ▶ an average household incorporates 60% of the husband's preference but only 40% of the wife's, implying a 20% gap in bargaining power
- The gender gap is driven by observable characteristics such as income and employment, but most of it can be traced back to a gender effect
- Cross-sectionally, the gender effect is stronger in husband-headed households and weaker in households with more progressive gender norms
- Similar patterns hold in the German and US populations

Thank you!

Our model: a two-step decision procedure

- We develop a simple model in which a household follows a two-step procedure in making their portfolio choice
 - ① a household risk preference a weighted average of each member's risk preference. The bargaining weight is determined by
 - ① both economic and non-economic variables (cognitive ability, personality traits)
 - ② gender effects (the "residual" that cannot be explained by observable characteristics)
 - ② the household then makes portfolio decisions based on the household risk preference
 - ★ Other considerations are (wealth, kids, etc.) absorbed in participation cost

Our model: a two-step decision procedure

- We develop a simple model in which a household follows a two-step procedure in making their portfolio choice
- The model is estimated using **maximum likelihood method** based on data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey
 - ▶ detailed information about household asset allocation
 - ▶ a rich set of economic and non-economic variables
 - ▶ a “final say” question for both the wife and the husband
 - ▶ detailed questions about gender norms

Preview of the main findings

- Decomposition of bargaining power
 - ▶ economic characteristics: **education, employment, income**
 - ▶ non-economic characteristics: **extraversion, agreeableness (-)**

Preview of the main findings

- Decomposition of bargaining power
- Husbands have more bargaining powers than wives (0.59 vs. 0.41)
 - ▶ all observable characteristics combined account for about half of the gap
 - ▶ suggesting the existence of a **gender effect**

Preview of the main findings

- Decomposition of bargaining power
- Husbands have more bargaining powers than wives (0.59 vs. 0.41)
- The gender effect predominantly exists in husband-headed households
 - ▶ wife in wife-headed household is **less-empowered** than husband in husband-headed household
 - ▶ the gender effect is less among households with **more progressive gender norms**

Contributions to the literature

- We propose a revealed-preference framework to understand the bargaining process
 - ▶ previous studies of household financial decisions treat the household as a single decision unit (Bertaut 1998; Cocco et al. 2005; Gomes and Michaelides 2005; Wachter and Yogo 2010)
 - ▶ we apply the collective bargaining model (Chiappori et al. (1988); Chiappori (1992)) in the domain of financial decisions

Contributions to the literature

- We propose a revealed-preference framework to understand the bargaining process
- The literature on gender differences in financial decisions
 - ▶ gender gap in trading behavior and performance (Barber and Odean 2001), housing returns (Goldsmith-Pinkham and Shue 2020), stock market participation (Addoum 2017; Olafsson and Thornqvist 2018; Ke 2020; Zaccaria and Guiso 2020)
 - ▶ the gap in bargaining weights when making financial decisions

Contributions to the literature

- We propose a revealed-preference framework to understand the bargaining process
- The literature on gender differences in financial decisions
- The role of traditional gender norms in constraining women's power in intra-household decisions
 - ▶ (Ke (2020), Zaccaria and Guiso (2020))
 - ▶ our measures of gender norms are directly based on survey responses

Cognitive Ability

- The survey conducted three tests. We construct a single measure by first standardizing each of the three measures and then taking the mean.
 - ① 'Backwards digits span' test (BDS): a traditional sub-component of intelligence tests and measures working memory span. The interviewer reads out a string of digits which the respondent has to repeat in reverse order.
 - ② A 25-item version of the 'National Adult Reading Test' (NART): measures pre-morbid intelligence. Respondents have to read out loud and pronounce correctly 25 irregularly spelled words.
 - ③ 'Symbol-digit modalities' test (SDM): A test where respondents have to match symbols to numbers according to a printed key. It was originally developed to detect cerebral dysfunction but is now a recognised test for divided attention, visual scanning and motor speed. [▶ data](#)

Personality Traits

- The Big-5 personality traits were collected from respondents which measure an individual's degree of **extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience**.
- Each trait is measured on a scale from 1 to 7. A high score indicates that the personality trait describes the person very well while a low score indicates the personality trait describe you in an opposite way.
- The measures are constructed by averaging responses to the question, How well do the following words describe you?, where respondents can answer from 1 (does not describe me at all) to 7 (describes me very well).
- Several responses are averaged to construct each of the 5 personality types. [▶ data](#)

Risk Preference

- Which of the following statements comes closest to describing the amount of financial risk that you are willing to take with your spare cash? That is, cash used for savings or investment.
 - ① I take substantial financial risks expecting to earn substantial returns
 - ② I take above-average financial risks expecting to earn above-average returns
 - ③ I take average financial risks expecting average returns
 - ④ I am not willing to take any financial risks

▶ data

Summary statistics

	Mean	SD	P25	P50	P75	Husband	Wife	Diff
<i>Household characteristics</i>								
Stock participation	0.48	0.50	0	0	1			
Household earnings (1000 AUD)	120	107	53	105	160			
Financial asset (1000 AUD)	504	804	100	243	572			
Total wealth (1000 AUD)	1423	1562	565	979	1704			
Number of children	0.84	1.10	0	0	2			
<i>Individual characteristics</i>								
Age	49.38	15.02	37	49	61	50.57	48.20	2.36***
Education	13.04	2.55	12	12	15	13.09	12.99	0.10**
Employment	0.64	0.48	0	1	1	0.69	0.60	0.08***
Earnings (1000 AUD)	48	59	0	37	74	62	33	29***
Risk aversion	3.30	0.67	3	3	4	3.18	3.42	-0.24***
Cognitive ability	0.10	0.67	-0.33	0.12	0.58	0.05	0.16	-0.11***
Extraversion	4.42	1.09	3.67	4.50	5.17	4.29	4.55	-0.26***
Agreeableness	5.43	0.86	5.00	5.50	6.00	5.19	5.66	-0.47***
Conscientiousness	5.27	0.97	4.67	5.33	6.00	5.17	5.36	-0.19***
Stability	5.28	1.03	4.50	5.33	6.00	5.27	5.28	-0.02
Openness	4.21	1.00	3.50	4.17	4.83	4.27	4.15	0.12***

CARA and Mean-Variance Utility

- Assuming a CARA utility with risk aversion γ_h :

$$V_i = \max_a EU_i(a) = \max_a E\{-\exp\{-\gamma_i [w(1+r_f) + (a\tilde{x} - C_i) I(a > 0)]\}\}$$

- The risky return follows $\tilde{x} \sim N(r_x, \sigma_x^2)$
- The utility is log-normally distributed when $a > 0$
- The portfolio choice problem is equivalent to

$$\begin{aligned} & \min_a \log E\{\exp\{-\gamma_i [w(1+r_f) + (a\tilde{x} - C_i) I(a > 0)]\}\} \\ & = \min_a \left\{ -\gamma_i \left[w(1+r_f) + \left(ar_x - C_i - \frac{1}{2}\gamma_i a^2 \sigma_x^2 \right) I(a > 0) \right] \right\} \end{aligned}$$

- Rewrite the problem using mean-variance utility

$$U_i(a) = \max_a w(1+r_f) + \left(ar_f - C_i - \frac{1}{2}\gamma_i a^2 \sigma_x^2 \right) I(a > 0)$$

Equivalent to a collective model

- Assume individual i also has a mean-variance utility

$$U^j(a_j) = \max_{a_j} w_j(1 + r_f) + \left(a_j r_f - C_j - \frac{1}{2} \gamma^j a_j^2 \sigma_x^2 \right) I(a_j > 0), j \in \{h, w\}$$

- The optimal individual utility is

$$V^j = \begin{cases} w_j(1 + r_f) & \gamma^j > \frac{r_x^2}{2\sigma_x^2 C_j} \\ w_j(1 + r_f) + \frac{r_x^2}{2\gamma^j \sigma_x^2} - C_j & \gamma^j \leq \frac{r_x^2}{2\sigma_x^2 C_j} \end{cases}$$

- Then, we have

$$V_i = \beta^h V^h + \beta^w V^w$$

if

$$\begin{aligned} C_h \gamma^h &= C_w \gamma^w \\ \frac{1}{\gamma_i} &= \frac{\beta^h}{\gamma^h} + \frac{\beta^w}{\gamma^w} \end{aligned} \tag{1}$$

Correlation between responses to household investment decisions and other household decisions

Domains	Correlation savings, investment and borrowing
(1) managing day-to-day spending and paying bills	0.52
(2) making large household purchases	0.53
(3) the number of hours spent in paid work	0.22
(4) the number of hours partner/spouse spent in paid work	0.12
(5) the way children are raised	0.04
(6) social life and leisure activities.	0.04

- Investment decisions and consumption decisions are highly correlated
- Investment decisions are orthogonal to labor supply, child-rearing, and time allocation.

▶ bargaining

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