Private Information in the Family

Suzanne Bellue Matthias Doepke Michèle Tertilt

Private Information in the Family – Historical Evidence

Humphries and Thomas (2023) in the context of British coalminers in the 19th century:

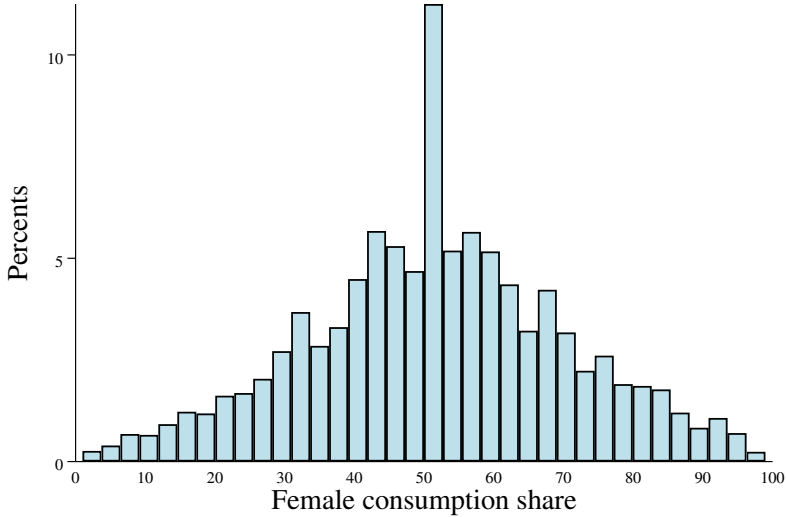
"…wives were often unaware of their husbands' earned income, and unless the "housekeeping" was adjusted, rising wages boosted men's share while the family remained stinted."

Townsend (1917) in a study of a British town in the early 20th century:

"Mr. Perrier said, 'I don't think a wife ought to know her husband's earnings. If she's got a good living wage for the house she's got nothing to grumble about."

"The wife's ignorance of the husband's wage was often equalled by his ignorance of what her children gave her. When one man was asked how much his two daughters paid in board money he said, 'They give it to Mum. I don't even know how much they give her.' "

Consumption Shares in Couples are Widely Dispersed



What Explains Variation in How Couples Share Income?

- Cherchye, Demuynck, de Rock, Vermeulen (AER 2017): consumption shares are linked to income shares in Dutch data.
- In existing models, sharing rule determined by:
  - Outside option at time of marriage.
  - Outside options over time within marriage under limited commitment (e.g., Mazzocco 2007, Voena 2015, Lise & Yamada 2019).
- **This paper: Information frictions also matter!**

Literature on Information Frictions in the Family

- **Developing-country evidence on private information within couples:**
  de Laat (2014): husbands invest significant resources monitoring their wives; Antelman (2001): only 40% disclose HIV+ status to partner; Castilla (2015): people hide winnings from spouse even at a fee.

- **Developing-country RCTs & lab experiments:**
  Whether transfers/choices are concealable matters for outcomes (Ashraf 2009, Castilla and Walker 2013, Kebede et al 2013, Hoel 2015, Schaner 2015, Aker et al 2016).

- **Theory on private information in the family:**
  Largely static non-cooperative models, specific applications (Malapit 2012, Ziparo 2014, Castilla 2014, Fon 2021, and Zhang 2024).

Do Private Information Frictions also Matter in High-Income Countries?

So far, we don't know much.

To find out, we add questions on private information to the Dutch LISS panel in 2019.

The Data

- LISS panel: Dutch survey data.
- Representative sample of the population of couples.
- Information on relative consumption in waves 2009, 2010, 2012, 2015, 2017, 2019, 2020x2, 2021.
- We added questions on private information in 2019.
- 3,264 people and both partners in 931 heterosexual couples answered the survey.
- 847 couples answered private information module AND at least one consumption survey. Each wave: 416-580 couples.

Measuring Private Information in the Family

Income

- I know how much my partner earns.
- My partner knows how much I earn.

Expenses

- I am well informed about my partner's expenses for larger discretionary items (such as apparel, accessories, electronics, and entertainment).
- My partner is well informed about my expenses for larger discretionary items (such as apparel, accessories, electronics, and entertainment).

Debt

- I am well informed about my partner's debt.
- My partner ist well informed about my debt.

Private Information in Dutch Couples

	Some private information		
	Couples		Individuals
Income	40.3	I do not know	21.8
		Partner does not know	20.1
Large expenses	22.8	I do not know	10.9
		Partner do not know	11.2
Debt	21.8	I do not know	11.5
		Partner does not know	11.4

details

How Correlated is Private Information Between Partners?

I do not know		Husband 1	Husband 0
Wife	1	9.1	15.3
	0	10.0	65.6

My partner does not know		Husband 1	Husband 0
Wife	1	7.6	11.5
	0	13.4	67.5

How to Keep Things Secret?

	Couples	Individuals
Couple has at least one separate bank account	50.6	45.8
I do not always inform partner about large expenses	40.9	25.5
We rarely or never talk about financial goals and values	27.0	16.2
I have a secret credit card	2.3	1.2

question details

Financial Disagreement in the Family

	Some financial disagreement	
	Couples	Individuals
My partner spends too much money	25.8	14.6
Finance is the most stressful facet of our relationship	25.5	16.5
My partner is not competent at dealing with money	28.7	16.6
Frequent arguments about money	16.9	11.2

details

Private Information and Models of Household Decision Making

Fully efficient household decision-making implies constant Pareto weights.

With private information, first-best allocation generally not achievable.

Two approaches for incorporating private information:

1. Direct assumptions on how information is revealed and on how public income is divided (Ziparo 2020, Zhang 2024).
2. Characterize constrained-efficient allocations (Doepke and Tertilt 2016, Fon 2020).

Example of Constrained-Efficient Income Risk Sharing

- Wife earns stochastic private income $y_f \in [\underline{y}_f, \overline{y}_f]$; husband has fixed income y_m.
- Utility functions over individual consumption c_g, and the wife's hidden consumption $\tilde{c}_f$ are:

$$u_f(c_f, \tilde{c}_f) = \log(c_f) + \phi \log(\tilde{c}_f),$$
$$u_m(c_m) = \log(c_m).$$

- Parameter ϕ captures hidden consumption opportunities and the ease of hiding income.
- In first-best allocation, c_f, c_m, and C are constant fractions of total income $y_f + y_m$.

Constrained-Efficient Income Sharing

- Constrained-efficient allocation solves:

$$\max \{E[\mu \log(c_f(y_f)) + \mu\phi \log(\tilde{c}_f(y_f)) + (1-\mu)\log(c_m(y_f))]\}$$

subject to:

$$c_f(y_f) + c_m(y_f) + \tilde{c}_f(y_f) = y_f + y_m$$

and subject to truth-telling constraint: it is weakly optimal to tell the true rather than report any other income $\tilde{y}_f \in [0, y_f]$:

$$\log(c_f(y_f)) + \phi \log(\tilde{c}_f(y_f)) \geq \log(c_f(\tilde{y}_f)) + \phi \log(\tilde{c}_f(\tilde{y}_f) + y_f - \tilde{y}_f)).$$

- Sufficient to impose a marginal truth-telling constraint at $\tilde{y}_f = y_f$:

$$\frac{c_f'(y_f)}{c_f(y_f)} \leq \phi \frac{1 - \tilde{c}_f'(y_f)}{\tilde{c}_f(y_f)}.$$

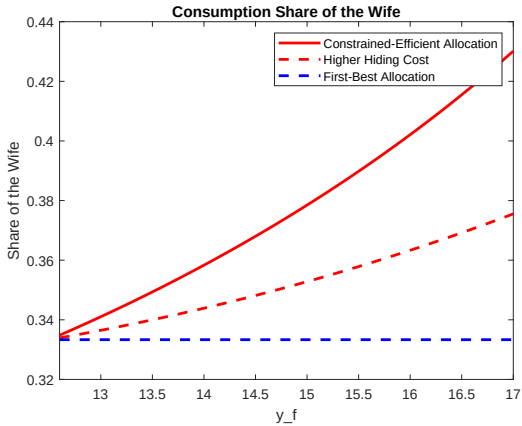
The Constrained-Efficient Outcome

- The ratio of wife's to husband's consumption is:

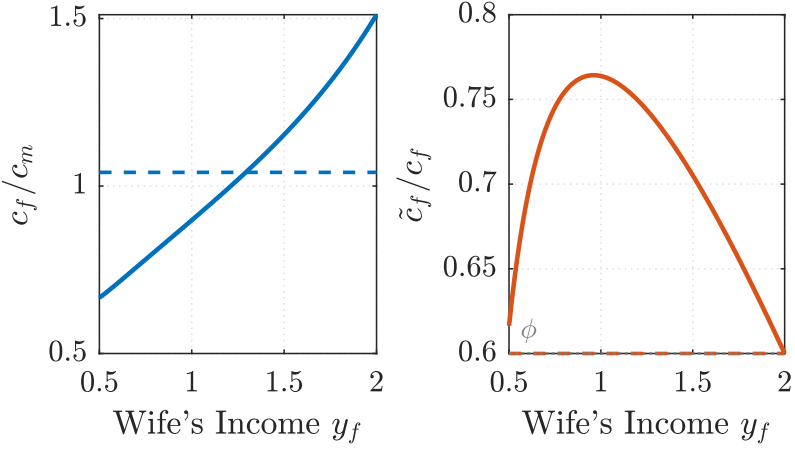
$$\frac{c_f}{c_m} = \frac{\mu + \lambda_2}{1 - \mu},$$

where λ_2 is the Lagrange multiplier on the truth-telling constraint.

- **Because the temptation to lie (and hence λ_2) increases with y_f, the wife's consumption share increases with her income.**



Consumption Ratios under FB and Constrained Efficient Outcome



Summary

Properties of the Constrained Efficient Allocation

1. The ratios of the wife's hidden to visible consumption is undistorted at the boundaries.
2. In ther interior of the income distribution, the wife's hidden consumption is higher than in the FB:
$$\frac{\tilde{c}_f(y_f)}{c_f(y_f)} > \phi$$
3. The ratio of the wife's observable consumption $\frac{c_f}{c_m}$ increases in y_f.

Beyond the Revelation Principle

- Mechanism design focuses on outcomes that rely on people reporting the truth (subject to constraints).
- Tension with survey data indicating that spouses do not know the truth.
- Revelation principle breaks down if private information frictions are combined with limited commitment (e.g., Doval and Skreta 2022).
- Even with commitment, optimal allocation can be achieved with alternative mechanisms.

Example of Implementation without Full Disclosure

- Wife earns private income $y_f \in [\underline{y}_f, \overline{y}_f]$; husband has fixed income y_m.
- Utility functions over individual consumption c_g and the wife's hidden consumption $\tilde{c}_f$ are:

$$u_f(c_f, C, \tilde{c}_f) = \log(c_f) + \phi \log(\tilde{c}_f),$$
$$u_m(c_m, C) = \log(c_m).$$

- Now parameter ϕ is stochastic and also hidden; husband does not know wife's marginal utility from hidden consumption.

Standard Revelation-Principle Implementation

- The standard approach is to write outcomes as functions of all hidden information, $c_g(y_f, \phi)$, $\tilde{c}_f(y_f, \phi)$, and maximize welfare subject to truth-telling constraints.
- Generates (as before) a female consumption share that is increasing in hidden income.
- But is there an easier way to implement the constrained-efficient outcome?
- Consider two combinations of y_f, ϕ that generate the same c_f: $c_f(y_{f,1}, \phi_1) = c_f(y_{f,2}, \phi_2)$.
- Then c_m must also be the same: $c_m(y_{f,1}, \phi_1) = c_m(y_{f,2}, \phi_2)$: otherwise, wife could gain with lie that gives her higher hidden consumption!

Alternative, Secretive Implementation

- Hence, c_f and c_m depend only total public consumption.
- Constrained-efficient outcome can be implemented by wife only disclosing the optimal $c_f + c_m$, and keeping ϕ and y_f private.
- **Such an implementation is both simpler (less information needs to be disclosed) and more in line with survey evidence.**
- Resembles the ”allowance system” that was common historically, where wife received money from husband to manage the household ($c_f + c_m$) and he kept the rest for his ”secret” consumption, e.g. British coalminers going to the pub on payday.

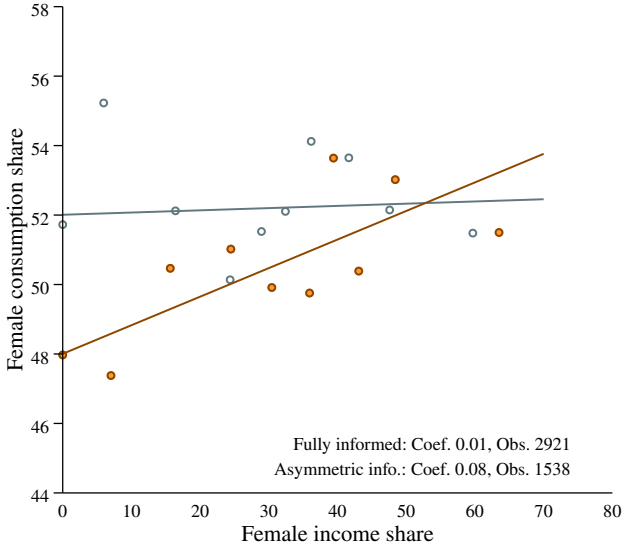
Measuring Consumption Shares in the LISS Data

LISS contains questions on private consumption expenditures.

- 2009-2012: monthly spending on eating outdoor, cigarettes, clothing, personal care, leisure, schooling, donations, other.
- 2015-2017: Only one overall question on personal expenditures.
- 2019-2021: monthly spending on eating indoors, eating outdoor, clothing, software (2020), leisure (2021), other.

We add private consumption across all categories for each individual and then compute the shares within couples.

Female Income and Consumption Shares by Couple Type



Main Regression Specification

$$Cshare_{it}^{f} = \beta_0 + \beta_1 Ishare_{it}^{f} + \beta_2 D_i^{info} + \beta_3 Ishare_{it} x D_i^{info} + X_{it} + \epsilon_{it}$$

where

- D_i^{info}: dummy whether couple is fully informed.
- X_{it}: year dummies, education dummies, age for each partner
- With and w/o couple FE.

Main Result: Consumption and Income Shares Correlated only Among Uninformed Couples

	Female consumption share			
	(1)	(2)	(3)	(4)
Female income share	0.05***	0.09***	0.05	0.19***
	(0.02)	(0.03)	(0.03)	(0.06)
Informed couples		0.03***		-
		(0.01)		-
(Female income share).(Informed couples)		-0.07**		-0.20***
		(0.03)		(0.07)
Couple fixed effect	No	No	Yes	Yes
Controls	Yes	Yes	Yes	Yes
N couples	847	847	847	847
R-squared	0.03	0.03	0.34	0.34

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Robustness

Results are robust to

- including medical expenditures in private consumption. details
- excluding 10% couples with largest mismatch on reported public expenditures. details
- using data only up to 2019 – the year in which we asked the information questions. details

How are Private-Info Couples Different from Others?

	Fully-informed couples: No		Fully-informed couples: Yes		
	Mean	Obs.	Mean	Obs.	P-val. diff.
Female age	51.7	206	61.9	364	0.00
Male age	54.2	206	64.2	364	0.00
No. years living together	24.2	202	36.7	362	0.00
% married	77.7	206	94.0	364	0.00
% only joint bank account	38.3	206	62.6	364	0.00
% of females with college degree	37.4	206	30.2	364	0.08
% of males with college degree	42.7	206	40.7	364	0.63
Household income	3928.4	206	3485.0	364	0.00

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Private Information or Limited Commitment?

- Is it really private information or is the underlying friction limited commitment? (Less committed couples may simply share less information.)

- To address this, we add proxies for commitment to our analysis:
  has a child, # of children, # years living together.

- We find that information remains highly relevant when we control for commitment.

Private Information vs. Limited Commitment

	Female consumption share					
Proxy for commitment	Has a child (2019)		# of children (2019)		# of years together	
	(1)	(2)	(3)	(4)	(5)	(6)
Female income share	0.09***	0.16***	0.10***	0.17***	0.11***	0.22**
	(0.03)	(0.06)	(0.03)	(0.06)	(0.04)	(0.09)
Informed couples	0.03***	-	0.03***	-	0.03***	-
	(0.01)	-	(0.01)	-	(0.01)	-
(Female income share)	-0.07**	-0.19***	-0.08**	-0.19***	-0.07**	-0.18***
.(Informed couples)	(0.03)	(0.06)	(0.03)	(0.07)	(0.03)	(0.07)
Committed couples	-0.01	-	-0.00	-	0.00	-
	(0.01)	-	(0.01)	-	(0.00)	-
(Female income share)	0.00	0.08	-0.01	0.03	-0.00	-0.00
.(Committed couples)	(0.03)	(0.08)	(0.02)	(0.03)	(0.00)	(0.00)
Couple fixed effect	No	Yes	No	Yes	No	Yes
N couples	847	847	847	847	821	821

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	(0.03)	(0.06)	(0.03)	(0.06)	(0.04)	(0.09)
Informed couples	0.03***	-	0.03***	-	0.03***	-
	(0.01)	-	(0.01)	-	(0.01)	-
(Female income share)	-0.07**	-0.19***	-0.08**	-0.19***	-0.07**	-0.18***
.(Informed couples)	(0.03)	(0.06)	(0.03)	(0.07)	(0.03)	(0.07)
Committed couples	-0.01	-	-0.00	-	0.00	-
	(0.01)	-	(0.01)	-	(0.00)	-
(Female income share)	0.00	0.08	-0.01	0.03	-0.00	-0.00
.(Committed couples)	(0.03)	(0.08)	(0.02)	(0.03)	(0.00)	(0.00)
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Female income share	0.09***	0.16***	0.10***	0.17***	0.11***	0.22**
	(0.03)	(0.06)	(0.03)	(0.06)	(0.04)	(0.09)
Informed couples	0.03***	-	0.03***	-	0.03***	-
	(0.01)	-	(0.01)	-	(0.01)	-
(Female income share)	-0.07**	-0.19***	-0.08**	-0.19***	-0.07**	-0.18***
.(Informed couples)	(0.03)	(0.06)	(0.03)	(0.07)	(0.03)	(0.07)
Committed couples	-0.01	-	-0.00	-	0.00	-
	(0.01)	-	(0.01)	-	(0.00)	-
(Female income share)	0.00	0.08	-0.01	0.03	-0.00	-0.00
.(Committed couples)	(0.03)	(0.08)	(0.02)	(0.03)	(0.00)	(0.00)
Couple fixed effect	No	Yes	No	Yes	No	Yes
N couples	847	847	847	847	821	821

Conclusion

(Some) Dutch couples have secrets.

Consumption shares correlated with income shares only among couples with private information.

Pattern lines up with constrained-efficient model of private information in the family.

Private information is an important friction even in high-income countries.

APPENDIX

Private Information in Dutch Couples

	Imperfectly informed							Fully informe
	Couples	Individuals						
				Strongly disagree	Somewhat disagree	Not sure	Somewhat agree	Strongly agree
Income	40.3	27.7	I know	2.8	3.0	2.0	14.0	78.2
			Partner knows	2.3	2.5	1.6	13.7	79.9
Large expenses	22.8	14.3	I know	1.5	1.3	0.5	7.6	89.2
			Partner knows	1.2	1.4	0.5	8.1	88.8
Debt	21.8	13.4	I know	4.0	1.3	1.3	4.9	88.3
			Partner knows	4.0	1.5	1.2	4.7	88.6

back

Measuring Private Information in the Family

- Which of the following statements best describes your household's financial accounts (bank checking or saving accounts)?
- How often do you NOT inform your partner (what you bought and/or how much you paid) about larger expenses for discretionary items such as apparel, accessories, electronics, and entertainment?
- How often do you discuss financial goals and values with your partner/spouse?
- I have a secret credit card or bank account that my partner does not know about.

back

Financial Disagreement in the Family

	Couples	Individuals				
	Some financial disagreement	Some financial disagreement		No strong disagreement		
		Strongly agree	Somewhat agree	Neither	Somewhat disagree	Strongly disagree
1- Partner spends too much	9.6	0.7	4.2	9.7	10.7	74.6
2- Finance most stressful facet	12.7	1.9	5.8	8.8	9.9	73.6
3- Partner lacks financial skills	14.6	3.3	4.2	9.1	19.4	64.0
(1), (2), or (3)	27.9					
		Very frequently	Frequently	Sometimes	Rarely	Never
Money arguments*	16.9	0.3	2.0	8.9	22.7	66.2

Views on the Income-Consumption Relationship

	Couples		Individuals				
	Support for positive relationship		Positive income-consumption relationship		Flat income-consumption relationship		
			Strongly agree	Somewhat agree	Neither	Somewhat disagree	Strongl disagre
Regular	16.4	If I	3.8	4.8	12.5	6.3	72.6
		If partner	3.8	5.3	12.7	7.0	71.3
Unexpected	23.2	If I	5.0	8.4	12.6	7.3	66.6
		If partner	5.4	8.4	13.3	7.8	65.1

back

How correlated is private information on large expenses between partners?

I do not know		Husband 1	Husband 0
Wife	1	3.7	6.3
	0	8.1	82.0

My partner does not know		Husband 1	Husband 0
Wife	1	3.7	8.1
	0	7.0	81.3

How correlated is private information on debt between partners?

I do not know		Husband 1	Husband 0
Wife	1	3.9	9.7
	0	5.9	80.6

My partner does not know		Husband 1	Husband 0
Wife	1	3.8	8.6
	0	6.7	81.0

back

Including medical expenditures in private consumption

	Female consumption share			
	(1)	(2)	(3)	(4)
Female income share	0.053***	0.036	0.055*	0.010
	(0.018)	(0.023)	(0.036)	(0.042)
Imperfectly informed		-0.023*		-
		(0.013)		-
(Female income share).(Imperfectly informed)		0.047		0.152**
		(0.037)		(0.075)
Couple fixed effect	No	No	Yes	Yes
Controls	Yes	Yes	Yes	Yes
N observations	4459	4459	4459	4459
N couples	847	847	847	847
R-squared	0.03	0.03	0.34	0.34

back

Excluding 10% couples with largest mismatch on public expenditures

	Female consumption share			
	(1)	(2)	(3)	(4)
Female income share	0.037**	0.018	0.052	-0.006
	(0.019)	(0.023)	(0.036)	(0.041)
Imperfectly informed		-0.027*		-
		(0.014)		-
(Female income share).(Imperfectly informed)		0.053		0.199***
		(0.037)		(0.075)
Couple fixed effect	No	No	Yes	Yes
Controls	Yes	Yes	Yes	Yes
N observations	4159	4159	4159	4159
N couples	840	840	840	840
R-squared	0.03	0.03	0.34	0.34

back

Using data only up to 2019

	Female consumption share			
	(1)	(2)	(3)	(4)
Female income share	0.043	0.005	0.052	-0.053
	(0.026)	(0.032)	(0.069)	(0.077)
Imperfectly informed		-0.041**		-
		(0.019)		-
(Female income share).(Imperfectly informed)		0.105**		0.329**
		(0.051)		(0.141)
Couple fixed effect	No	No	Yes	Yes
Controls	Yes	Yes	Yes	Yes
N observations	2401	2401	2401	2401
N couples	769	769	769	769
R-squared	0.02	0.02	0.48	0.48

back