

Income Tax Reforms as a Driver for Female Labor Supply?

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Motivation

- Remaining gender gaps in labor supply are likely to be partially caused by the current joint taxation regime (Apps and Rees, 2004 and Bick and Fuchs-Schündeln, 2018)
 - Relevance of taxation regime for married women's labor supply (see, e.g. Selin, 2014, Fuenmayor et al., 2018)
- Reform of withholding taxation to reduce asymmetry
 - Only liquidity effects (see, e.g. Lembcke et al., 2021 or Bach et al., 2022)
 - Experimental evidence of behavioral responses to withholding taxation (see, e.g. Becker et al., 2019)

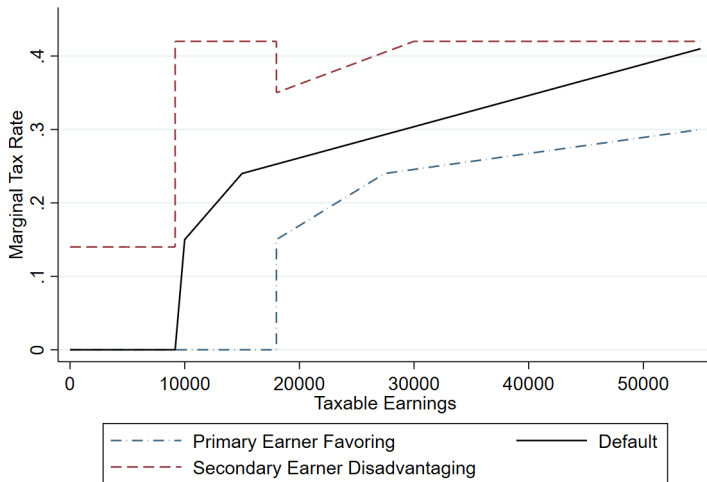
Our Approach and Results

- Investigation of planned withholding tax reform, that reduces asymmetry in taxation within couples
- Standard methodology in labor supply models ignores research on intra-couple bargaining
- Ex-ante analysis about how different assumptions on couples' decisionmaking influence labor supply reactions
- Different scenarios lead to different labor supply responses
- The most realistic scenario shows small, positive effects on total hours worked, however, small, adverse effects on labor force participation

Background - Taxation of Married Couples in Germany

- Progressive income taxation is levied in two steps:
Withholding taxation and annual income taxation
- Married couples are taxed jointly, hence tax saving is largest for couples with large income differences
- For dependent income withholding taxation differentiates several treatments:
 - **Symmetric taxation:** default option, neutral (*tax class IV*)
 - **Asymmetric taxation:** primary earner favoring (*tax class III*) and secondary earner disadvantaging (*tax class V*)
 - **Reform:** Neutral, multiplication with a factor < 1

Tax Treatments - Withholding Taxation



Source: Own Calculations on the Basis of the German Tax Tariff in 2019.

Taxation with Factor

Marginal tax rate depends on the share of own earned wage to sum of wages



Taxable Earnings of Spouse 1 fixed at 40,000€

Source: Own Calculations on the Basis of the German Tax Tariff in 2019.

Methodology

- Discrete choice labor supply model, maximization of utility by choosing a labor supply from a discrete number of categories (see, e.g. Aaberge et al., 1995, van Soest, 1995 and Hoynes, 1996)
- Two major components:
 - Simulation of effects of tax-benefits reforms, holding the labor supply constant
 - Estimation of behavioral responses
- Utility V_{ij} for **couple** i when choosing **category** j is captured by a **utility function specification** U , contingent on **disposable income** C_{ij} , **female** L_j^f and **male** L_j^m **leisure** and individual and household **characteristics** Z_i :

$$V_{ij} = U(C_{ij}, L_j^m, L_j^f, Z_i) + \epsilon_{ij} \quad (1)$$

- **Additional Information** [▶ Choice Probabilities](#) [▶ Likelihood Function](#)

Econometric Specification

- Differentiation between 3 categories for men and 6 categories for women (see, e.g. Steiner et al., 2012)

▶ Distribution Working Hours

- **Standard Approach:**

$$U(C_{ij}, L_j^f, L_j^m, Z_i, \epsilon_{ij}) = \boxed{\beta_{ci} C_{ij}} + \beta_{ci}^2 C_{ij}^2 + \dots \quad (2)$$

- **Upper Bound:** $x \in f, m$

$$U(C_{ij}^x, L_j^x, Z_i, \epsilon_{ij}) = \boxed{\beta_{ci}^x C_{ij}^x} + \beta_{ci}^{2,x} C_{ij}^{2,x} + \dots \quad (3)$$

- **Preference Estimation:**

$$U(C_{ij}^f, C_{ij}^m, L_j^f, L_j^m, Z_i, \epsilon_{ij}) = \boxed{\beta_{ci}^f C_{ij}^f + \beta_{ci}^m C_{ij}^m} + \beta_{ci}^{2,f} C_{ij}^{2,f} + \dots \quad (4)$$

Data

- Large Representative Survey; German Socio-Economic Panel (SOEP), survey year 2019
- Restriction to married and cohabiting working-age individuals who are not retired - flexible in labor supply
 - 6,726 unweighted observations or 3,363 couples

▶ Descriptive Statistics

Preliminary Results

▶ Results Male Spouse, Primary Earner Favoring

▶ Subgroups Female Spouse, Secondary Earner Favoring

	Intensive Margin (in %)	Total (in %)	Extensive Margin (in PP)
	Cond. Hrs. Effect	Uncond. Hrs. Effect	Labor Force Participation
	Standard Approach		
Secondary Earner	0.15	-0.70	-0.71
	Upper Bound		
Secondary Earner	1.71	2.98	1.05
	Preference Estimation		
Secondary Earner	0.62	0.46	-0.13

Notes: Effects are expressed in means of the subgroup.

Conclusion

- Actual decisionmaking may not be captured well by the standard approach in microsimulation models
- Depending on the assumption about decisionmaking within couples, the total effect on hours worked reaches from small negative values to large positive ones

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Choice Probabilities

◀ Back

Probability that **couple i** chooses **alternative k** over all **other alternatives j** is given by:

$$P_{ik} = Pr\{\max(V_{i1}, \dots, V_{ij}) \leq V_{ik}\} = \frac{\exp U_{ik}}{\sum_{j=0}^J \exp U_{ij}}, \forall j = 0, \dots, J \wedge k \in J \quad (5)$$

Likelihood Function

◀ Back

The joint likelihood of observing M **married couples** respectively choosing **category k indexed by i** in the sample is:

$$L = \prod_{i=1}^M \frac{\exp U_{ik}}{\sum_{j=0}^J \exp U_{ij}} \quad (6)$$

Parameters in $U(\cdot)$ are estimated to maximize the likelihood stated in Equation 6, meaning that each couple compares the expected utility derived from each hours category.

Distribution Working Hours

◀ Back

Weekly Working Hours					
	Male				
Female	0	1-34	35-41	>41	Total
0	3.26	1.44	3.5	6.36	14.55
1 - 12	0.88	0.66	3.75	4.84	10.12
13 -20	0.26	0.49	4.44	5.25	10.44
21-34	0.82	1.24	10.9	14.57	27.53
35-41	1.15	1.63	8.05	9.28	20.12
>41	0.58	0.88	6.18	9.59	17.23
Total	6.95	6.34	36.83	49.89	100

Notes: Only married and cohabiting couples with flexible labor supplies.
Relative frequencies in percent. Data: SOEP 2019.

Deskriptive Statistics

◀ Back

Selected Variables	Female Mean	Male Mean	Difference
Weekly Working Hours	26.48 (0.37)	40.26 (0.26)	-13.78 ***
Weekly Working Hours of Employed	30.99 (0.32)	43.15 (0.21)	-12.16***
Gross Hourly Wage	18.94 (1.71)	25.50 (1.17)	-6.56***
Gross Hourly Wage of Employed	22.25 (2.05)	27.38 (1.37)	-5.13**

Notes: Significance Level: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; Standard errors in parentheses.

Results Male Spouse, Primary Earner Favoring

[← Back](#)

	Intensive Margin (in Percent) Cond. Hrs. Effect	Total (in Percent) Uncond. Hrs. Effect	Extensive Margin (in Percentage Points) Labor Force Participation
Standard Approach			
Primary Earner	-0.02	-0.39	-0.37
Age below 50	-0.02	-0.42	-0.40
Age above 50	-0.02	-0.34	-0.32
Upper Bound			
	-0.02	-0.99	-0.96
Age below 50	-0.02	-1.09	-1.07
Age above 50	-0.03	-0.86	-0.83
Preference Estimation			
	0.02	-0.16	-0.17
Age below 50	0.01	-0.21	-0.22
Age above 50	0.03	-0.09	-0.12

Subgroups Female Spouse, Secondary Earner Favoring

◀ Back

	Intensive Margin (in Percent) Cond. Hrs. Effect	Total (in Percent) Uncond. Hrs. Effect	Extensive Margin (in Percentage Points) Labor Force Participation
Standard Approach			
Female Spouse	0.15	-0.70	-0.71
Age below 50	0.22	-0.63	-0.73
Age above 50	-0.02	-0.83	-0.67
Upper Bound			
Female Spouse	1.71	2.98	1.05
Age below 50	1.20	1.84	0.54
Age above 50	2.68	5.21	2.02
Preference Estimation			
Female Spouse	0.62	0.46	-0.13
Age below 50	0.42	0.05	-0.31
Age above 50	0.99	1.26	0.22