Job Flexibility and the Intrahousehold Allocation of Time and Money

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Motivation

- Flexible work arrangements may help parents balance work and family (Goldin 2014, von Gaudecker *et al.* 2023)
  - Parents, especially mothers, have preferences for such amenities (Wiswall and Zafar 2018, Maestas *et al.* 2023, De Schouwer and Kesternich 2024)
  - Driven by child rearing responsibilities (Andresen and Nix 2022, Angelov *et al.* 2016, Felfe 2012)

- **In this paper**, we aim to address **two** questions
  - Is job flexibility a determinant of intrahousehold allocation of time and money?
  - What are the impacts on children, if any?

- Through the lens of a **structural** model estimated on Dutch data
  - Collective labor supply model (Chiappori 1988; 1992, Blundell *et al.* 2005, Cherchye *et al.* 2012)
  - Job flexibility may affect production of two public goods – including *children's well-being*

Preview main results

- Job flexibility significantly influences domestic production of public goods
  - Children's well-being is a function of job flexibility
  - Particularly **fathers'** level of job flexibility matters
  - Mothers' job flexibility not so much
- Policies that may achieve greater workplace flexibility could
  - Reduce within-household gaps in **both** market work and domestic work
  - But may **negatively** affect child outcomes
  - Targeting fathers most promising in the Dutch context

Model

Setup

- Collective labor supply model (Chiappori 1988; 1992, Blundell *et al.* 2005, Cherchye *et al.* 2012)
  - Each spouse has their own preferences $u^i(e^i, l^i, u_c, u_h)$
  - Spouses bargain over allocations
  - Outcomes are **Pareto efficient**
- Households produce two domestic goods; publicly consumed
  - *Children's well-being* (u_c) and, say, *a clean and cozy house* (u_h)
  - Using time (t_j^m, t_j^f) and monetary inputs (e_j)
- Job flexibility (a^i) influences domestic production processes
  - Based on the notion of *production shifters* à la Cherchye *et al.* (2012)

Job flexibility

- Job flexibility is **multidimensional** in nature – capturing worker amenities related to
  - Timing of work: *Schedule flexibility*
  - Location of work: *Telecommuting*
  - Others: *Part-time option, shift work, ...*
- Treated as **one-dimensional** in the model
  - Create an index of job flexibility
- **Assume** it is distinct from hours of work
  - Labor supply decisions modeled separately
  - Of course, correlated (e.g., commuting time)

Job flexibility

- Job flexibility modeled as a **production shifter**:

$$u_j = u_j\left(e_j, t_j^m, t_j^f; \mathbf{a}, \mathbf{s}_j\right)$$

  - Rather general interpretation – more specific depending on parametric implementation
  - Domestic technologies of parents can vary with their job flexibility levels

- Many other possibilities and extensions (**under revision**)
  - Direct utility from job flexibility
  - Direct effect on time constraint
  - Different of dimensions of job flexibility may enter the model separately

Household problem

$$\max_{\{l^i, t_c^i, t_h^i, e^i, e_c, e_h\}} \quad \mu\left(w^m, w^f, y, \mathbf{z}\right) u^m\Big(e^m, l^m, u_c\left(e_c, t_c^m, t_c^f; \mathbf{s}_c, \mathbf{a}\right), u_h\left(e_h, t_h^m, t_h^f; \mathbf{s}_h, \mathbf{a}\right)\Big) \tag{P}$$

$$+ \Big(1 - \mu\left(w^m, w^f, y, \mathbf{z}\right)\Big) u^f\Big(e^f, l^f, u_c\left(e_c, t_c^m, t_c^f; \mathbf{s}_c, \mathbf{a}\right), u_h\left(e_h, t_h^m, t_h^f; \mathbf{s}_h, \mathbf{a}\right)\Big)$$

$$\text{s.t.} \quad e^m + e^f + e_c + e_h \leq w^m m^m + w^f m^f + y \tag{BC}$$

$$h^i + l^i + t_c^i + t_h^i = T, \qquad i = m, f. \tag{TC}$$

Empirical application

Data

- Sample of **Dutch** couples with children from two data sources
  - LISS Panel ($\approx$ 90 observations)
  - Own data collection ($\approx$ 370 observations)
- Uniquely rich data – **key features**:
  - Detailed time use and expenditure information
  - Detailed information on wages and non-wage attributes for each employed spouse
  - Demographic information on all household members

Flexibility variables

- **Schedule flexibility:** My working hours are determined
  - completely by my employer (1)
  - partly by myself; have to let employer know at least one week in advance (2)
  - partly by myself; can do this on short notice (3)
  - completely by myself (4)

- **Telecommuting:** Fraction of weekly hours of work that can be done at home

Flexibility instruments

- Workers may sort into jobs with different flexibility based on anticipated role in household
  - Endogenous with respect to subsequent choices
  - Take into account using **instruments** (control function)

- **Supervisor attitudes:** How do you think your direct supervisor would respond if you or one of your colleagues would ask for more discretion over their working schedules / for more telecommuting possibilities?
  - Negatively (1) – Positively (5)

- **Child care alternatives:** Suppose your child requires your immediate attention during working hours (e.g., sudden illness). How difficult is it for you to find help (parent, relative, friend, ...) on short notice?
  - Easy (1) – Difficult (4)

Table: Descriptive statistics

	Fathers		Mothers		Household	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Expenditures (EUR per month)						
Private expenditures	206.77	200.32	195.30	163.27		
Expenditures on children					812.31	533.28
Other household expenditures					2085.83	1029.63
Time use (hours per week)						
Market labor	43.40	9.15	31.91	9.93		
Child care	18.58	13.33	26.42	17.39		
Household chores	9.78	7.37	14.81	9.79		
Socioeconomic variables						
Age	41.94	8.03	39.58	7.36		
Education level (percentage)	48.26		53.23			
Gross wage rate (EUR per hour)	25.93	12.27	23.42	12.12		
Flexibility index	0.27	0.29	0.29	0.29		
Schedule flexibility	0.90	1.01	0.95	1.03		
Telecommuting possibilities	24.99	32.34	26.05	33.82		
Relative years of education					-0.37	3.51
Number of children					1.91	0.74
Age of youngest child					7.25	5.51
Number of households					464	

Parametric forms

- Cobb-Douglas **individual utilities** ($i = m, f$):

$$u^i = \alpha_l^i(\mathbf{d}^i) \ln l^i + \alpha_e^i(\mathbf{d}^i) \ln e^i + \alpha_c^i(\mathbf{d}^i) \ln u_c + \alpha_h^i(\mathbf{d}^i) \ln u_h \tag{1}$$

  - Taste shifters $\mathbf{d}^i$: age, college education dummy

- Cobb-Douglas **production functions** ($j = c, h$):

$$\ln u_j = \beta_e(\mathbf{a}, \mathbf{s}) \ln e_j + \beta_m(\mathbf{a}, \mathbf{s}) \ln t_j^m + \beta_f(\mathbf{a}, \mathbf{s}) \ln t_j^f \tag{2}$$

  - Production shifters $\mathbf{s}$: age youngest child, number of children, first-stage residuals

- Theoretical restrictions on utilities (u^i) and production functions (u_j) **imposed**
  - Logistic form for Pareto weight μ (Browning *et al.* 2013)

Estimation

- Estimation of the model consists of **two stages**
  - Regression of job flexibility on explanatory variables and instruments
  - Structural estimation with residual inclusion (control function)

- Outline of **structural estimation**
  1. Solve model to obtain analytical expression of demand equations
  2. Allow for unobserved heterogeneity across households
     - Additive, uncorrelated across households
     - Normally distributed
  3. Estimate system of demand equations using **maximum likelihood**

Results – Summary

- **Preferences**
  - Spouses put **equal weight** on children's well-being
    - Declines with age for both spouses
    - Higher for college educated fathers
  - Fathers put relatively more weight other domestic goods; mothers more weight on leisure
- **Technologies**
  - Both technologies vary systematically with number of children
  - Vary significantly with flexibility of father, but **not** with flexibility of mother
- **Bargaining**
  - Bargaining power **matters**: Own power increasing in own relative wage

Results – Technologies

Table: Marginal effects – Domestic production technologies

	Expenditure		Mother time input		Father time input	
	Est.	Std. Err.	Est.	Std. Err.	Est.	Std. Err.
Children's well-being u_c						
Mean	**0.149**	0.005	**0.491**	0.008	**0.360**	0.008
Mother flexibility	0.008	0.014	-0.027	0.047	0.019	0.034
Father flexibility	**-0.033**	0.011	**-0.108**	0.035	**0.141**	0.046
Other public goods u_h						
Mean	**0.459**	0.009	**0.312**	0.007	**0.229**	0.008
Mother flexibility	0.038	0.031	-0.056	0.046	0.019	0.015
Father flexibility	**-0.137**	0.030	**-0.093**	0.021	**0.230**	0.050

Results – Counterfactual

- What if parents could enjoy some **minimum level** of job flexibility?
  - Increase job flexibility to upper-quintile value if currently below
  - Separately for mothers and fathers
- Focus on two sets of outcomes
  - Gender gap in time use (market and domestic work)
  - Level of public good production
- **Disclaimer:** Does **not** consider wage-flexibility trade-offs (compensating differentials)

Results – Counterfactual

Table: Counterfactual effects of increasing job flexibility – Gender gaps

	Baseline	Mother flexibility		Father flexibility	
		Gap	**Difference**	Gap	**Difference**
Market labor (h)	-0.27	-0.23	**0.04**	-0.05	**0.22**
Child care (t_c)	0.51	0.46	**-0.05**	0.25	**-0.26**
Household chores (t_h)	0.57	0.45	**-0.12**	0.05	**-0.52**

Results – Counterfactual

Table: Counterfactual effects of increasing job flexibility – Domestic production

	Mother flexibility	Father flexibility
Domestic good production		
Children's well-being (u_c)	0.20	-3.09
Other goods (u_h)	3.74	-12.35

Conclusion

- Propose a collective labor supply model that explicitly models the role of job flexibility
- Job flexibility of **fathers** matters; less so of mothers
  - Couples where fathers have more job flexibility put more emphasis on paternal time input in domestic production
- Policies achieving more flexible work arrangements for fathers may be particularly fruitful
  - Result in more equitable division of market work and domestic chores in couples
  - May come at a cost in terms of children's outcomes (in short run)

Thank you

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Appendix

AID:A Data

- **Robustness exercise:** Do results replicate to different context?
- Sample of **German** couples with children drawn from AID:A 2023 survey
  - Advantage: rich data on $\geq$ 1.000 observations
  - Drawbacks: no expenditure information; no separation of labor and other income
- We accommodate drawbacks by simplifying the empirical model
  - Budget constraint with a single aggregate consumption good and imputed child benefits
  - Production functions only depend on parental time inputs (t_j^m, t_j^f)

Table: Descriptive statistics – AID:A sample

	Fathers		Mothers		Household	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Expenditures (EUR per month)					1425.20	502.96
Time use (hours per week)						
Market labor	45.62	7.78	32.69	10.56		
Child care	12.28	8.57	20.90	12.84		
Household chores	7.43	4.61	13.93	7.24		
Socioeconomic variables						
Age	43.86	7.00	41.18	6.30		
Education level (percentage)	54.63		55.62			
Gross wage rate (EUR per hour)	18.55	8.11	14.48	8.28		
Flexibility index	0.54	0.32	0.46	0.32		
Schedule flexibility	4.12	1.99	3.65	2.07		
Telecommuting possibilities	3.29	1.88	3.00	1.92		
WFH feasibility	72.74	26.62	71.46	22.98		
Child benefits (EUR per month)					469.15	182.31
Relative years of education					-0.26	2.94
Number of children					1.84	0.73
Age of youngest child					7.41	4.64
Number of households					1021	

Results AID:A – Summary

- **Preferences**
  - Spouses put **equal weight** on children's well-being
    - Declines with age for both spouses
    - Higher for college educated mothers
  - Equal weight on other public goods
  - Varying weights on leisure and consumption
- **Technologies**
  - **Both** technologies vary systematically with job flexibility of father
  - Children's well-being **also** varies with job flexibility of mother
  - In line with expectations given institutional context in Germany
- **Bargaining**
  - Bargaining power **matters**: Own power increasing in own relative wage
  - Child-benefits and distribution factor both significant

Results AID:A – Technologies

Table: Marginal effects AID:A – Domestic production technologies

	Mother time input		Father time input	
	Est.	Std. Err.	Est.	Std. Err.
Children's well-being u_c				
Mean	**0.588**	0.008	**0.412**	0.008
Mother flexibility	**0.159**	0.066	**-0.159**	0.066
Father flexibility	**-0.101**	0.056	**0.101**	0.056
Other public goods u_h				
Mean	**0.597**	0.008	**0.403**	0.008
Mother flexibility	-0.042	0.060	0.042	0.060
Father flexibility	**-0.132**	0.051	**0.132**	0.051