

# Labor Supply and Childcare Choices in a Rationed Childcare Market

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## Motivation

- Recently child care issues have gained a lot of attention in the German political debate
- Several child care reforms have been undertaken in the past years (increasing the availability of child care), others are planned (reducing parents fees to existing slots)
- Child care is now hoped to be a measure to increase fertility and employment of mothers and is also discussed against the background of the poor results of German pupils in the PISA study
- The idea of this paper is to develop a model with which different reforms of the child care policy can be evaluated

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# Outline

1. Motivation
2. Institutional Background
3. The Model
4. The Data
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6. Policy Simulations
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## Institutional Background

### Characteristics of the German child care institutions:

- Low fees for slots in subsidized facilities
- Low availability of these slots in particular for:
  - children under 3 years
  - afternoon care for children of all age groups
- Near non-existence of non-subsidized child care facilities
- Private child care is available only at considerably higher cost
- Regional disparities in the availability of child care
- Many families use informal child care by grandparents
- Link between maternal employment and utilization of child care is not very strong

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<b>Costs of formal child care slots and parents' fees in Euro per month</b>				
	Children aged 0-2		Children aged 3-6	
	total costs	parents' fees	total costs	parents' fees
	part-time care			
east	not available	74	226	57
west	not available	82	295	64
	full-time care			
east	512	115	384	70
west	590	161	443	110

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<b>Availability of child care slots in subsidized facilities</b>								
	Children aged 0-2				Children aged 3-6			
	slots	per	100	% full-time slots	slots	per	100	% full-time slots
	children				children			
east	37			96%	105			98%
west	3			79%	88			18%

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Source: Schilling (2004), SOEP (wave 2002) and DJI.

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## The Model

- Labor supply and demand for child care are estimated jointly on the basis of a structural utility model
- Estimation is based on a discrete choice model (4 working hours categories, 3 child care categories)
- Structural parameters are estimated using a panel data model with unobserved heterogeneity
- The model accounts for special characteristics of the German situation, such as the rationing of subsidized child care and the utilization of informal arrangements

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## The Model (2)

- It is assumed that the mother maximizes a utility function

$$U = u(y, l, Q; D) \quad (1)$$

with  $y$ : disposable household income,  $l$ : leisure,  $Q$ : “child quality”,  $D$ : vector of demographic characteristics such as age and number of children

- “Child Quality” is defined as

$$Q = q(m, p, up) \quad (2)$$

with  $m$ : maternal care,  $p$ : paid (=formal, center-based) care,  $up$ : unpaid (=informal) care

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## The Model (3)

- Budget constraint (the household's disposable income):

$$y = t(h \cdot w, Z) - ec \cdot p \quad (3)$$

with  $t(\cdot)$ : tax-transfer function,  $h$ : hours of market work,  $w$ : gross hourly wage,  $Z$ : other gross income,  $ec$ : expected child care costs

- Expected child care costs are defined as

$$ec = c^s \cdot \pi + c^{ns} \cdot (1 - \pi) \quad (4)$$

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## Expected Child Care Costs

- In the presence of access restrictions to subsidized child care slots, parents' fees cannot be used as child care costs in the budget constraints; instead, I use "expected costs of child care" with the individual probability of getting a slot in a child care facility as weight  $\pi$
- This probability is not observed; neither the demand for formal child care nor the supply is directly observed
- The probability of getting a slot has to be estimated on basis of a partial observability model: bivariate probit model where the dependent variable is utilization of center-based child care
- The predicted probabilities of being restricted to formal child care is on average 0.37 for children less than 3, 0.10 for children aged 3-6 and 0.28 for children aged 7-10.

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## The Model (4)

- Time constraint:

$$h + m + l = m + p + up = T \quad (5)$$

- Additional assumption about the utilization of unpaid care  
(necessary because the demand for informal child care is not observed):

$$inf = \max(h - p, 0) \quad (6)$$

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## Choice Categories

Choice Category	Working hours	Paid child care	Unpaid child care	Maternal care	Pure leisure
1	0	0	0	80	0
2	8	0	8	72	0
3	20	0	20	60	0
4	37	0	37	43	0
5	0	20	0	60	20
6	8	20	0	60	12
7	20	20	0	60	0
8	37	20	17	43	0
9	0	37	0	43	37
10	8	37	0	43	29
11	20	37	0	43	17
12	37	37	0	43	0

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## Econometric Specification

- Quadratic specification of the utility function

$$U_{ikt} = X'_{ikt}\beta + X'_{ikt}A \cdot X_{ikt} + \epsilon_{ikt} \quad (7)$$

with

$$X_{ikt} = (m_{ikt}, p_{ikt}, up_{ikt}, l_{ikt}, y_{ikt})' \quad (8)$$

- Decision rule of the individual  $i$  to choose category  $k$  in time period  $t$

$$P_{ikt} = \frac{\exp(X_{ikt}\beta_i)}{\sum_{j=1}^J \exp(X_{ijkt}\beta_i)}; \quad k \in J \quad (9)$$

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## The Data

- Data base: 3 waves of SOEP (2000-2002)
- Sample: Couple households with at least one child under the age of 6 years and a full-time working father
- Sample size: 1558 households, of which 551 are observed in 1 wave, 424 in 2 waves and 583 in 3 waves (in total 3148 observations)

## Descriptive Statistics

Choice Categories			Frequency	age of youngest child	number of children	share of single mothers
	working hours	child care hours				
1	0	0	1240 (39%)	1.6	1.9	0.09
2	marginal	0	254 (8%)	2.1	1.8	0.06
3	part-time	0	251 (8%)	2.4	1.7	0.06
4	full-time	0	86 (3%)	2.9	1.9	0.17
5	0	part-time	359 (11%)	4.1	1.9	0.09
6	marginal	part-time	167 (5%)	4.1	1.9	0.06
7	part-time	part-time	339 (11%)	4.2	1.6	0.11
8	full-time	part-time	137 (4%)	3.7	1.6	0.12
9	0	full-time	48 (2%)	3.5	1.4	0.40
10	marginal	full-time	4 (<1%)	4.3	1.0	0.00
11	part-time	full-time	98 (3%)	3.7	1.2	0.21
12	full-time	full-time	165 (5%)	3.6	1.3	0.15
Total			3148 (100%)	2.7	1.8	0.11

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## Estimation Results

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<b>Elasticities of Labor Supply</b>		
	1% increase in gross hourly wage	1% increase in expected child care costs
<i>Change in participation rates (in percentage points)</i>		
All mothers	0.14	-0.04
Mothers with children <3	0.13	-0.03
<i>Change in working hours (in percent)</i>		
All mothers	0.53	-0.13
Mothers with children <3	0.57	-0.16
<i>Change in child care "participation" (in percentage points)</i>		
All mothers	0.05	-0.06
Mothers with children <3	0.04	-0.05

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## Policy Simulations

- Simulation 1:
  - All children aged  $< 3$  who have two working parents get access to a subsidized child care slot
- Simulation 2:
  - Parents' fees for kindergartens (children aged 3-6) are abolished
  - Availability is not changed

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## Results from Policy Simulations

<b>Changes in Labor Supply</b>		
	Reform 1	Reform 2
<i>Change in participation rates (in percentage points)</i>		
All mothers	1.39	0.77
Mothers with children <3	2.53	0.29
Mothers whose youngest child is $\geq 3$	0	1.37
<i>Change in working hours (in percent)</i>		
All mothers	5.58	2.33
Mothers with children <3	10.07	1.83
Mothers whose youngest child is $\geq 3$	0	2.97
<b>Changes in the Demand for Child Care</b>		
	Reform 1	Reform 2
<i>Change in participation rates (in percentage points)</i>		
All mothers	1.31	1.32
Mothers with children <3	2.38	0.51
Mothers whose youngest child is $\geq 3$	0	2.34

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## Conclusion and Policy Implication

- Reform 1 leads to a larger increase in mothers' participation rates and working hours as well as in the demand for child care
- Both reforms cost about the same amount of money (roughly 1.4 billion Euro)
- If the goal of family policy is to increase the demand for child care for children of all age groups and to increase the employment of mothers, Reform 1 should be chosen