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The family working-time model: Towards more gender equality in work and care

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<1>On-line appendix

Table A1 Descriptive statistics: actual and preferred working hours

Country	Hours category	Women					Men				
		Actual hours	Thereof by hours category desired hours				Actual hours	Thereof by hours category desired hours			
			Share in cat.	Share ¹ increasing	Avg. hours increasing	Share ¹ decreasing		Avg. hours decreasing	Share in cat.	Share ¹ increasing	Avg. hours increasing
Germany	0	0.101	0.877	25.1	0.000		0.068	1.000	39.2	0.000	
	1-24	0.300	0.523	9.8	0.187	-6.4	0.076	0.854	26.9	0.000	
	25-35	0.170	0.147	8.1	0.435	-9.4	0.092	0.538	5.4	0.035	-8.0
	>35	0.429	0.000		0.887	-17.2	0.764	0.176	4.0	0.450	11.4
	Total	1.000	0.297	11.6	0.448	-13.6	1.000	0.231	7.9	0.400	11.4
Great Britain	0	0.034	0.507	26.6	0.000		0.010	1.000	26.8	0.000	
	1-24	0.379	0.356	11.6	0.185	-8.1	0.039	0.500	17.0	0.404	11.8
	25-35	0.261	0.134	5.8	0.463	-12.7	0.126	0.323	8.3	0.484	14.6
	>35	0.327	0.014	5.0	0.713	-17.9	0.826	0.192	7.8	0.411	14.2
	Total	1.000	0.192	11.7	0.424	-14.8	1.000	0.229	9.5	0.415	14.1
Ireland	0	0.106	0.525	25.2	0.000		0.013	1.000	33.0	0.000	
	1-24	0.316	0.362	11.8	0.186	-12.3	0.067	0.720	17.5	0.000	

	25–35	0.202	0.142	9.9	0.492	-11.8	0.091	0.515	9.0	0.098	-14.3
	>35	0.375	0.028	4.7	0.772	-21.6	0.830	0.190	8.2	0.433	-16.9
	Total	1.000	0.210	14.8	0.448	-18.2	1.000	0.265	11.2	0.369	-16.9
France	0	0.058	0.725	27.4	0.000		0.000				
	1–24	0.179	0.468	11.1	0.167	-11.5	0.017	1.000	14.4	0.000	
	25–35	0.537	0.249	6.0	0.335	-12.2	0.539	0.418	5.7	0.188	-22.7
	>35	0.227	0.169	2.3	0.646	-10.3	0.444	0.498	8.3	0.337	-16.1
	Total	1.000	0.298	10.0	0.356	-11.4	1.000	0.464	7.3	0.251	-18.8
Belgium	0	0.046	0.774	24.2	0.000		0.000				
	1–24	0.308	0.399	10.7	0.083	-3.8	0.044	0.762	21.1	0.000	
	25–35	0.281	0.167	7.4	0.436	-10.0	0.037	0.476	16.4	0.000	
	>35	0.365	0.036	6.0	0.685	-13.7	0.919	0.269	6.6	0.278	-8.3
	Total	1.000	0.219	11.9	0.398	-11.9	1.000	0.298	8.8	0.256	-8.3
Netherlands	0	0.019	0.659	26.2	0.000		0.005	0.000		0.000	
	1–24	0.588	0.266	6.3	0.219	-10.8	0.026	0.272	19.0	0.225	-8.0
	25–35	0.218	0.101	5.7	0.390	-8.9	0.110	0.197	4.1	0.248	-15.9

	>35	0.175	0.026	6.0	0.706	-22.7	0.859	0.095	5.6	0.495	-13.3
	Total	1.000	0.196	7.5	0.337	-14.7	1.000	0.111	6.2	0.458	-13.4
Denmark	0	0.005	0.000		0.000		0.000				
	1-24	0.071	0.737	15.2	0.027	-15.0	0.019	1.000	14.6	0.000	
	25-35	0.405	0.192	3.9	0.234	-11.7	0.031	0.861	8.4	0.000	
	>35	0.518	0.044	6.8	0.487	-9.9	0.950	0.177	8.3	0.246	-14.1
	Total	1.000	0.153	8.2	0.349	-10.4	1.000	0.213	8.9	0.234	-14.1
Finland	0	0.010	1.000	25.2	0.000		0.020	1.000	36.3	0.000	
	1-24	0.073	0.689	20.5	0.100	-3.0	0.033	0.865	25.0	0.000	
	25-35	0.207	0.257	8.9	0.176	-7.6	0.045	0.698	7.7	0.107	-15.0
	>35	0.711	0.073	2.5	0.471	-11.3	0.902	0.246	5.5	0.285	-11.2
	Total	1.000	0.165	11.4	0.378	-10.8	1.000	0.302	9.6	0.262	-11.2
Sweden	0	0.019	0.704	40.0	0.000		0.000				
	1-24	0.112	0.524	14.9	0.175	-4.0	0.015	0.000		0.000	
	25-35	0.277	0.192	6.8	0.133	-4.7	0.071	0.437	9.7	0.184	-11.3
	>35	0.591	0.060	2.7	0.491	-10.1	0.915	0.157	4.8	0.338	-12.4
	Total	1.000	0.161	11.6	0.347	-9.2	1.000	0.174	5.7	0.323	-12.4

Cyprus	0	0.102	0.460	31.0	0.000	-	0.000					
	1-24	0.038	0.410	12.4	0.293	-18.0	0.000					
	25-35	0.104	0.223	22.2	0.588	-26.9	0.089	0.519	5.5	0.321	-33.1	
	>35	0.756	0.040	8.8	0.648	-19.7	0.911	0.128	11.1	0.469	-26.9	
	Total	1.000	0.116	20.9	0.562	-20.4	1.000	0.162	9.5	0.456	-27.3	

Notes: 1 Shares plus share of people satisfied with their working hours add up to one in each row.

Source: European Social Survey, 2010; own calculations.

Table A1 (ctd.) Descriptive statistics: actual and preferred working hours

Country	Hours category	Women					Men				
		Actual hours	Thereof by hours category desired hours				Actual hours	Thereof by hours category desired hours			
			Share in cat.	Share ¹ increasing	Avg. hours increasing	Share ¹ decreasing		Avg. hours decreasing	Share in cat.	Share ¹ increasing	Avg. hours increasing
Spain	0	0.106	0.593	28.3	0.000		0.000				
	1-24	0.111	0.688	19.6	0.038	-4.0	0.040	0.819	24.9	0.181	-15.0
	25-35	0.222	0.227	8.1	0.338	-12.4	0.108	0.267	5.8	0.240	-8.8
	>35	0.561	0.023	1.9	0.616	-15.4	0.852	0.113	14.8	0.343	-11.5
	Total	1.000	0.202	18.4	0.424	-14.7	1.000	0.158	15.3	0.325	-11.4
Greece	0	0.384	0.718	34.9	0.000		0.036	0.517	28.5	0.000	
	1-24	0.062	0.872	17.1	0.036	-14.0	0.015	1.000	43.8	0.000	
	25-35	0.079	0.597	11.6	0.203	-15.8	0.123	0.599	7.4	0.099	-29.0
	>35	0.474	0.153	9.6	0.359	-23.6	0.826	0.195	13.8	0.239	-23.9
	Total	1.000	0.450	26.3	0.188	-22.9	1.000	0.268	14.7	0.210	-24.2
Portugal	0	0.004	1.000	8.0	0.000		0.005	1.000	40.0	0.000	
	1-24	0.128	0.508	24.8	0.000		0.032	0.590	17.5	0.000	

	25–35	0.183	0.448	5.7	0.010	-23.0	0.064	0.789	7.7	0.000	
	>35	0.685	0.187	8.2	0.157	-14.6	0.899	0.395	11.0	0.130	-8.0
	Total	1.000	0.279	11.3	0.109	-14.7	1.000	0.429	11.2	0.117	-8.0
Bulgaria	0	0.051	1.000	36.4	0.000		0.007	1.000	45.7	0.000	
	1–24	0.033	1.000	21.5	0.000		0.039	1.000	24.1	0.000	
	25–35	0.031	0.841	9.0	0.000		0.044	0.822	13.6	0.079	-5.0
	>35	0.884	0.163	10.4	0.196	-15.1	0.910	0.255	10.4	0.156	-13.2
	Total	1.000	0.254	16.9	0.173	-15.1	1.000	0.314	13.3	0.146	-13.1
Czech Republic	0	0.046	1.000	34.8	0.000		0.007	1.000	48.0	0.000	
	1–24	0.046	0.553	21.0	0.332	-3.3	0.022	1.000	31.2	0.000	
	25–35	0.066	0.092	10.0	0.506	-21.5	0.009	0.553	5.0	0.447	-35.0
	>35	0.842	0.312	7.6	0.401	-27.5	0.962	0.457	10.1	0.286	-27.7
	Total	1.000	0.340	12.3	0.387	-26.0	1.000	0.474	11.6	0.279	-27.8
Estonia	0	0.021	1.000	39.2	0.000		0.000				
	1–24	0.087	0.846	25.4	0.000		0.033	0.638	47.3	0.000	
	25–35	0.103	0.467	12.6	0.303	-19.2	0.038	0.730	37.7	0.270	-16.5
	>35	0.790	0.149	25.8	0.372	-22.3	0.929	0.199	23.7	0.261	-29.6

	Total	1.00 0	0.2 60	24. 3	0.3 25	- 22. 0	1.00 0	0.2 33	27. 5	0.2 53	- 29. 1
Hungary	0	0.05 4	0.7 83	41. 8	0.0 00		0.00 0				
	1-24	0.07 4	0.8 58	21. 1	0.0 72	- 20. 0	0.01 9	0.2 70	3.0	0.1 77	-5.0
	25-35	0.06 8	0.7 29	10. 9	0.2 01	- 16. 2	0.02 4	0.8 51	19. 6	0.1 49	- 35. 0
	>35	0.80 5	0.2 63	10. 8	0.2 56	- 25. 5	0.95 7	0.4 78	14. 2	0.1 41	- 27. 7
	Total	1.00 0	0.3 66	16. 2	0.2 25	- 24. 9	1.00 0	0.4 83	14. 3	0.1 42	- 27. 4
Latvia	0	0.05 7	0.8 99	31. 8	0.0 00		0.00 2	1.0 00	40. 0	0.0 00	
	1-24	0.11 1	0.8 73	30. 9	0.0 00		0.00 4	0.0 87	20. 0	0.0 00	
	25-35	0.01 8	0.5 10	14. 8	0.0 00		0.01 3	0.6 61	14. 4	0.0 00	
	>35	0.81 5	0.0 97	7.7	0.2 70	- 11. 8	0.98 1	0.3 36	9.6	0.1 69	- 14. 8
	Total	1.00 0	0.2 36	22. 7	0.2 20	- 11. 8	1.00 0	0.3 40	9.9	0.1 66	- 14. 8
Poland	0	0.04 9	0.5 48	40. 0	0.0 00		0.00 0				
	1-24	0.11 3	0.9 63	21. 4	0.0 37	-1.0	0.06 2	0.9 07	25. 4	0.0 93	-5.0
	25-35	0.07 7	0.6 93	12. 1	0.1 75	- 29. 3	0.03 1	0.6 06	14. 7	0.3 94	- 27. 6
	>35	0.76 1	0.3 46	9.7	0.2 83	- 33. 1	0.90 8	0.5 61	15. 8	0.2 34	- 32. 6
	Total	1.00 0	0.4 52	14. 6	0.2 33	- 32. 3	1.00 0	0.5 84	16. 7	0.2 30	- 31. 7
Slovakia	0	0.03 3	0.8 50	36. 8	0.0 00		0.01 1	0.6 67	30. 0	0.0 00	

	1-24	0.048	0.719	19.9	0.281	-16.2	0.008	0.000		1.000	-13.1
	25-35	0.036	0.532	13.2	0.207	-22.7	0.010	0.404	5.0	0.596	-4.0
	>35	0.883	0.247	7.7	0.383	-20.1	0.970	0.359	10.8	0.302	-22.9
	Total	1.000	0.300	12.2	0.359	-20.0	1.000	0.360	11.1	0.307	-22.3
Over all	0	0.062	0.695	30.4	0.000		0.005	0.874	34.5	0.000	
	1-24	0.243	0.483	12.8	0.163	-8.2	0.031	0.763	22.9	0.130	-11.3
	25-35	0.246	0.227	7.5	0.357	-11.8	0.160	0.418	6.6	0.208	-18.9
	>35	0.450	0.136	8.3	0.521	-18.1	0.804	0.271	10.3	0.345	-15.1
	Total	1.000	0.277	13.5	0.361	-15.5	1.000	0.313	10.8	0.314	-15.5

Notes: 1 shares plus share of people satisfied with their working hours add up to one in each row

Source: ESS, 2010; own calculations.

<3>The econometric labour supply model

The labour supply model employed in the simulation exercise is a static structural discrete choice model, as suggested by, among others, Aaberge et al. (1995) and van Soest (1995). The advantage of the discrete-choice approach relative to traditional specifications of labour supply models with taxes and transfers (see, for example, Hausman, 1985) is that it is much easier to account for the complex non-linearities in households' budget constraints. Moreover, the discrete choice approach in combination with microsimulation provides a way to account for reasons of endogeneity of net income other than that arising from the progressivity of the income tax.

The discrete choice model is based on the assumption that a couple can choose among a finite number $J+1$ of working hours categories (J positive hours categories and non-employment). The definition of the hours categories is motivated by both economic considerations and the actual distribution of working hours in the sample. In this application, we allow each couple to choose one out of 25 hours categories that are shown in Table 2 in the main text.

Each hours category, $j=0, \dots, J$, corresponds to a given level of disposable income C_{ij} – which equals in a static setting the household consumption – and each discrete bundle of working hours (leisure) and income provides a different level of utility. The utility V_{ij} derived by household i from making choice j is assumed to depend on a utility function U of the wife's leisure, Lf_{ij} , the husband's leisure, Lm_{ij} , the household's disposable income, X_{ij} , household characteristics Z_i , and on a random term ε_{ij} :

<EQU>

$$(1) \quad V_{ij} = U(Lf_{ij}, Lm_{ij}, X_{ij}, Z_i) + \varepsilon_{ij}$$

</EQU>

If the error terms ε_{ij} are assumed to be identically and independently distributed across alternatives and households according to the Extreme-Value type I (EVI) distribution, the probability that alternative k is chosen by household i is given by the Multinomial Logit model (McFadden 1974):

<EQU>

$$(2) \quad P_{ik} = Pr(V_{ik} \geq V_{ij}, \forall j = 0, \dots, J) = \frac{\exp(U_{ik})}{\sum_{j=0}^J \exp(U_{ij})}, k \in J$$

</EQU>

The likelihood for a sample of observed choices can be derived from that expression and is maximized to estimate the parameters of the utility function U . Assuming a linear-quadratic functional form, the utility index U of family i for a particular choice category k can formally be described as

<EQU>

$$(3) \quad U_{ik} = X'_{ik}\beta + X'_{ik}AX_{ik} + \varepsilon_{ik}$$

</EQU>

with $X_{ik} = (Im_{ik}, lf_{ik}, Y_{ik})$. The components of X_{ik} are disposable household income (Y), the mother's leisure time (lf), and the father's leisure time (Im), which all vary by household (i) and choice category (k). ε_{ik} is an unobserved error term that is assumed to follow an extreme value distribution and to be independently distributed over households and choice categories. Matrix A contains the

coefficients of the quadratic terms and cross terms. Vector β contains the coefficients of the linear terms. Preferences are allowed to vary across families through taste shifters of the linear terms. In particular, we include socio-demographic characteristics such as age, nationality of the father and mother, region of residence, disability, number of children, as observable characteristics explaining the variation in household preferences.

Estimation results are presented in Table A2. Since these coefficients are difficult to interpret, we calculate labour supply elasticities in order to get a measure for the responsiveness of households with regard to financial incentives. The labour supply elasticities presented in table A3 show the change in hours worked (in percent) and the change in the labour force participation rate (in percentage points) if gross hourly wages increase by 1 percent. The elasticities that we obtain in this application are plausible and in line with previous studies (Müller et al., 2015).

Table A2 Conditional logit labour supply model

	Coefficient	Standard error
Log net income	1.44***	0.23
Log net income squared	0.12*	0.07
Log mother's leisure	1.63***	0.09
Log mother's leisure squared	0.25***	0.03
Log father's leisure	0.06	0.09
Log father's leisure squared	0.34***	0.04
<i>Interactions</i>		
Log net income		
x Age mother	0.38***	0.09
x Age father	-0.18	0.13
x German	0.67***	0.22
x East German	0.31	0.27
Log Mother's leisure		
x Age	0.04	0.04
x Age squared	13.32***	2.33
x German	-0.30***	0.08
x East German	-0.66***	0.09
x Handicapped 1–50%	-0.10	0.12
x Handicapped >50%	0.88***	0.33
x One child	0.12**	0.06
x Two children	-0.17***	0.05
x Three children	-0.25***	0.06
Log Father's leisure		
x Age	-0.16**	0.06
x Age squared	23.71***	4.52

x German	-0.21***	0.08
x East German	0.21*	0.11
x Handicapped 1–50 percent	0.39**	0.15
x Handicapped >50% <i>Crossed</i>	0.41	0.27
Net income x mother's leisure	-0.14***	0.05
Net income x father's leisure	0.19***	0.06
Mother's leisure x father's leisure	0.05	0.04
N	83,375	
ll	-8,665	
chi2	4,140	

Notes: Mother (father)'s leisure is interacted with her (his) characteristics. (East) German interacted with net income is defined as at least one spouse having that characteristic.

Source: SOEP, waves 2010, 2011, 2012 (Wagner et al, 2007); FiD, waves 2010, 2011, 2012 (Schröder et al, 2013); own calculations

Table A3 Wage elasticities

	Women		Men	
	Change in hours (in %)	Change in participation rates (in %-points)	Change in hours (in %)	Change in participation rates (in %-points)
All	0.17	0.14	0.02	0.03
East Germany	0.18	0.14	0.02	0.03
West Germany	0.14	0.14	0.04	0.04

Notes: Changes in hours are measured conditional on already being employed.

Source: SOEP, waves 2010, 2011, 2012 (Wagner et al, 2007); FiD, waves 2010, 2011, 2012 (Schröder et al, 2013); own calculations

