



CPB Netherlands Bureau for Economic
Policy Analysis

Comparing the effectiveness of fiscal stimuli for working parents

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Motivation

- Major changes in public spending on formal childcare and in-work tax credits in the Netherlands over the past decade
- Ongoing discussion on labour supply effects and price elasticity of childcare, in the Netherlands and abroad
- Bettendorf et al. (2012) study labour supply effects of the 2005-2009 joint reform of childcare and in-work credits using DD-analysis
- This paper: structural model to study separate effects on labour supply, use of formal childcare and government budget
- Compare effectiveness of different fiscal stimuli for working parents more generally



Outline presentation

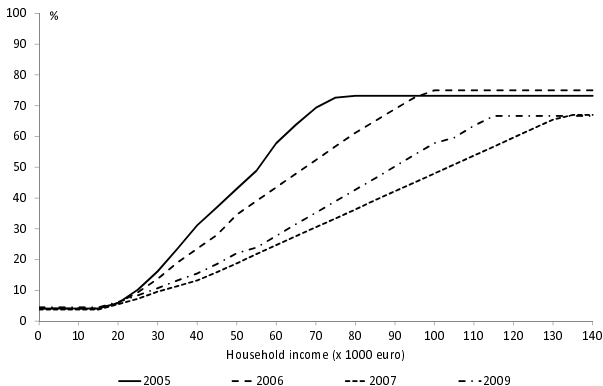
- Dutch reforms 2005-2009
- Data
- Structural model
- Policy simulations
- Conclusions
- Remaining issues



Dutch reforms 2005-2009

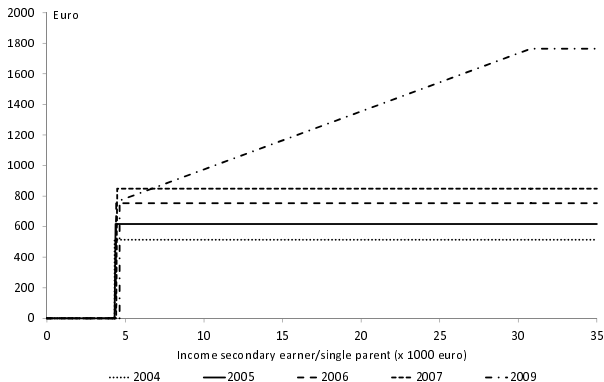


Childcare reform: Parental contribution rate for the first child, 2005-2009





EITC reform: EITC for secondary earners and single parents, 2005-2009





Data

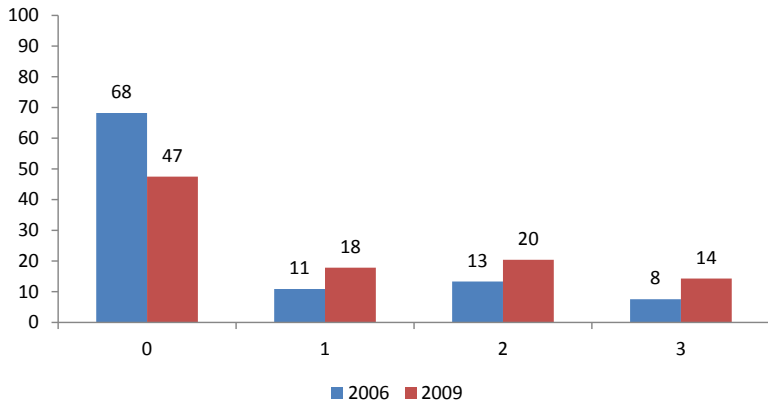


Data set

- Labour Market Panel 1999-2009 (Statistics Netherlands)
- We use data from the period 2006-2009 (childcare data)
- Full sample: 1.2 million individuals
- Data on age, ethnicity, presence of children, labour supply, wages
- But also: use and cost of formal childcare
- We focus on households with at least one child 0-11 years of age (daycare and out-of-school care)

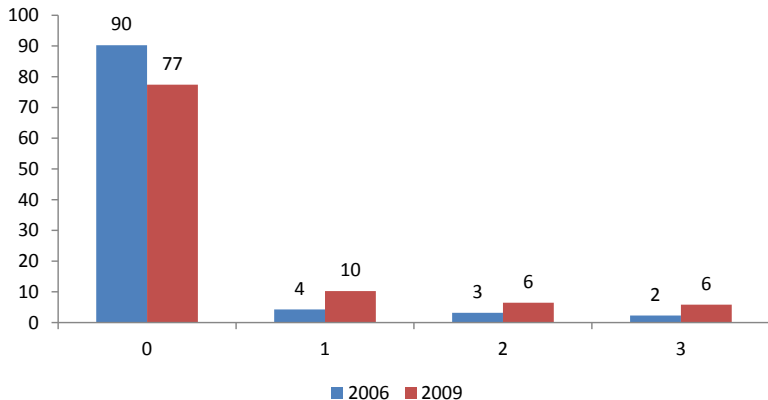


Use of formal care, 0-3 years, 2006-2009





Use of formal care, 4-11 years, 2006-2009





Structural model



Structural model: discrete choice model

- Discrete choice models have become popular for modelling labour supply
- Seminal contribution by Van Soest (1995), recent examples include Bargain et al. (2011) and Blundell and Shephard (2012)
- Discrete choice models can deal with complex budget constraints
- In real world, individuals choose from a finite set of alternatives
- To deal with unobserved heterogeneity, we use latent classes (Train, 2009)



Structural model: discrete choice model

- Unitary model
- Households choose their preferred work & formal childcare allocations from a discrete set
 - ▶ 6 levels for work corresponding to worked days per week
 - ▶ 4 levels for childcare corresponding to 0-1-2-3+ days per week distribution
- → $6 \times 4 = 24$ alternative allocations for single parents, $6 \times 6 \times 4 = 144$ for couples



Structural model: budget and time constraint

Our budget (1) and time constraint (2) take the following form:

$$y = w_i l_i - T(w_i, l_i, \mathbf{X}) - \sum_{v=1}^V [C_v(\mathbf{p}, \mathbf{c}; \mathbf{X})] + S(\mathbf{p}, \mathbf{c}, y^t; \mathbf{X}) \quad (1)$$

$$l_i + h_i \leq TC_i \quad (2)$$

- w_i = gross hourly wage
- l_i = labour supply
- $T(w_i, l_i, \mathbf{X})$ are taxes, social security contributions (MIMOSI)
- $C_v(\mathbf{p}, \mathbf{c}; \mathbf{X})$ is total cost of childcare
- $S(\mathbf{p}, \mathbf{c}, y^t)$ childcare subsidy



Structural model: log quadratic utility function

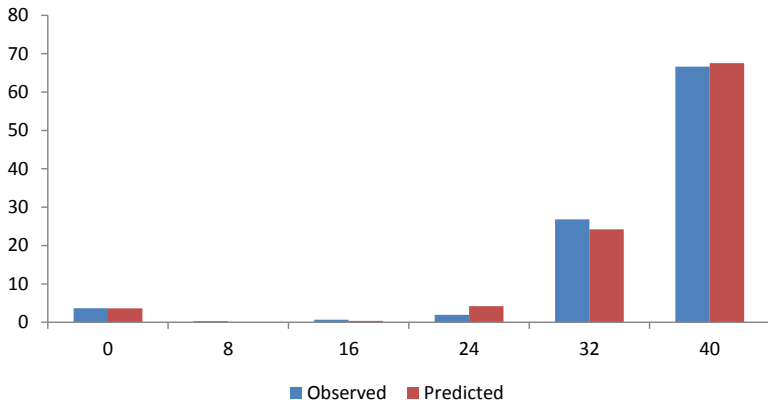
$$U = u(y, h_i, c; X) \quad (3)$$

- y is income, h_i is leisure and c is childcare
- X is a vector with observables (age, presence young children, education, region, ethnicity)

==> Estimate model by maximum likelihood/EM algorithm

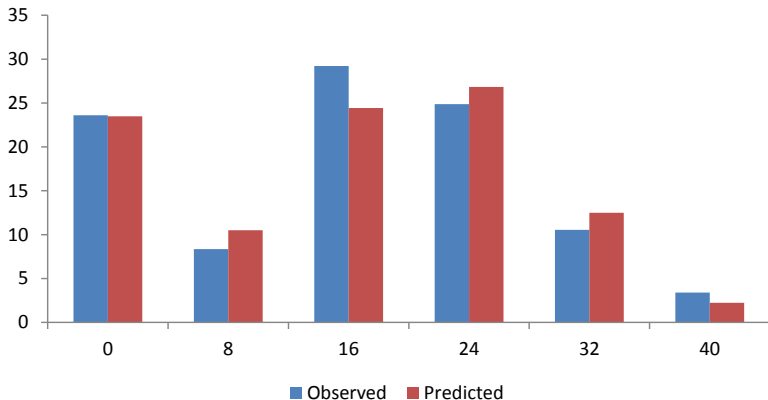


Model fit: labour supply men in couples



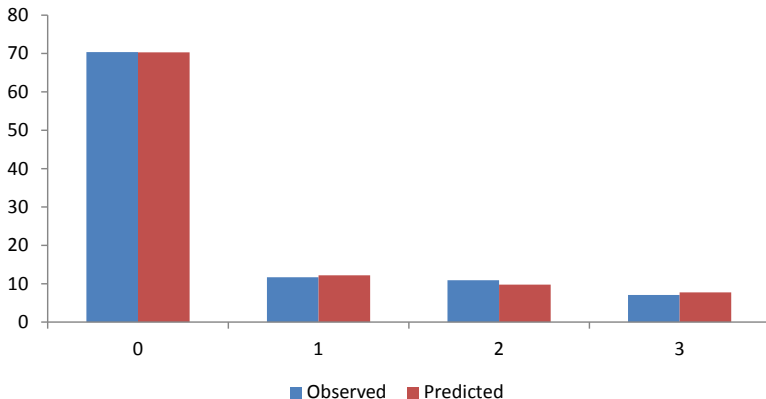


Model fit: labour supply women in couples





Model fit: use of formal childcare couples



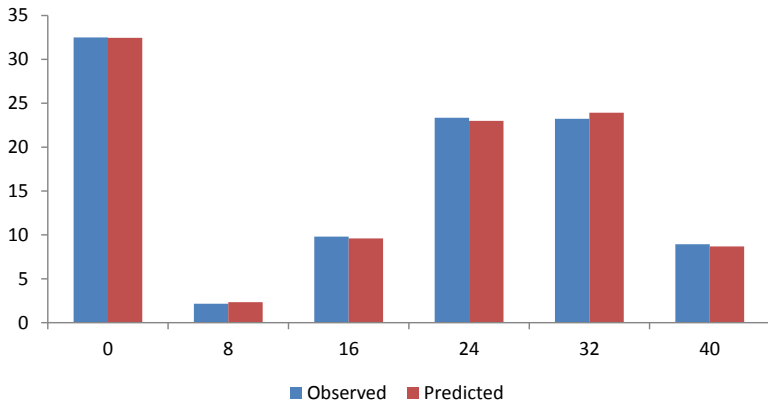


Structural model: elasticities couples

	w/o LC		/w LC	
	Men	Women	Men	Women
<i>Wage (+1%)</i>				
Own labour supply	0.07	0.30	0.03	0.28
– extensive margin	0.06	0.20	0.01	0.13
– intensive margin	0.01	0.10	0.02	0.14
Labour supply partner	-0.10	-0.01	-0.11	-0.04
Childcare	0.02	0.26	0.07	0.29
<i>Price childcare (+1%)</i>				
Childcare	-0.38	-0.38	-0.55	-0.55
Labour supply	0.00	-0.05	0.00	-0.05

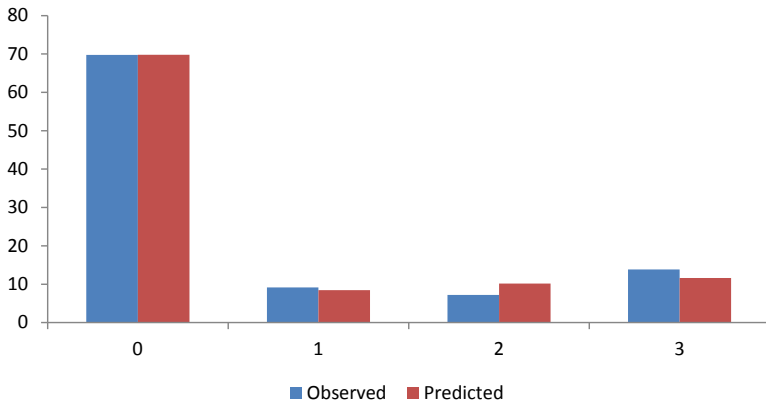


Model fit: labour supply single parents





Model fit: days of formal childcare single parents





Elasticities single parents

	w/o LC	/w LC
<i>Wage (+1%)</i>		
Labour supply	0.73	0.52
– extensive margin	0.54	0.39
– intensive margin	0.19	0.14
Childcare	0.15	-0.06
 <i>Price childcare (+1%)</i>		
Childcare	-0.55	-0.66
Labour supply	-0.04	0.00



Policy simulations:

- Effectiveness fiscal stimuli working parents
- Reform childcare and EITC 2005-2009



Effectiveness fiscal stimuli (+ 1 billion euro)

	Childcare	EITC secondary earners	EITC all workers
<i>Couples with children</i>			
Labour supply men	0.02	0.11	0.02
Labour supply women	1.86	1.34	0.44
Childcare	11.88	1.44	0.74
knock-on effects	-11%	13%	2%
<i>Single parents</i>			
Labour supply	1.80	1.80	1.80
Childcare	12.10	1.10	1.10
knock-on effects	-43%	3%	3%



Policy simulation: reforms 2005-2009

	Reforms 2005-2009			DD-analysis
	<i>Childcare</i>	<i>EITC</i>	<i>Total</i>	<i>Childcare + EITC</i>
<i>Couples with children</i>				
Labour supply men	0.05	0.05	0.10	-1.0
Labour supply women	1.51	1.99	3.50	6.6
Childcare	9.49	1.80	11.29	
<i>Single parents</i>				
Labour supply	0.19	2.62	3.13	12.0
Childcare	0.88	0.62	1.53	



Conclusions

- The model predicts well and produces elasticities in line with related studies
- We study effectiveness of fiscal stimuli for working parents:
 - ▶ EITC for secondary earners is more effective in stimulating labour supply than an EITC for all workers
 - ▶ Childcare subsidy is more effective in stimulating labour supply than an EITC for secondary earners
 - ▶ But ex-post budgetary costs are high!



Remaining issues

- Robustness checks
- Estimate different models for subsamples based on observable characteristics
- Standard errors elasticities
- Targeting of childcare subsidies and in-work tax credits



Thank you for your attention!



Structural model: preferences single parents

Income	1.923***	Childcare	0.189*
Leisure	-48.170***	*non-Western immigrant	0.588***
*age	-0.762***	*Western immigrant	0.177**
*age ²	1.016***	*child 0-3 yrs	0.411***
*child 0-3 yrs	2.889***	*urban area	0.251***
Income ²	0.101***	Childcare ²	-0.081**
Leisure ²	-138.000***	Childcare*leisure	-5.483***
Income*leisure	2.439***		
Income*childcare	-0.656***		



Structural model: preferences single parents (cont)

Fixed costs work	-3.075***	Fixed costs childcare	-1.618***
*education low	-1.642***	*education low	-1.141***
*education mid	-0.484***	*education mid	-0.613***
*non-Western immigrant	-1.225***	*non-Western immigrant	-0.340***
*Western immigrant	-0.578***	*Western immigrant	-0.127
*child 0-3 yrs	-0.519***	*child 0-3 yrs	0.541***
*urban area	-0.323***		
Individuals*alternatives	453744	Negative mu income	1%
Individuals	18906	Negative mu leisure	67%
Log likelihood	-43351	Negative mu childcare	16%



Structural model: preferences couples

Income	2.889***	Childcare	-0.263
Leisure men	-68.100***	*educlow men	-0.279**
*age	2.625***	*educmid men	-0.383***
*age ²	-0.284	*educlow women	-0.075
Leisure female	-29.060***	*educmid women	-0.465***
*age	1.263***	*child 0-3 yrs	0.575***
*age ²	-0.075	*urban area	0.523***
*child 0-3 yrs	3.955***		
		Childcare ²	-0.337***
Income ²	0.484***	Childcare*income	0.280***
Income*leisure men	2.963***	Childcare*leisure men	1.801***
Income*leisure women	0.089	Childcare*leisure women	-6.258***
Leisure men ²	-105.500***		
Leisure women ²	-137.100***		
Leisure men*leisure women	-7.889**		



Structural model: preferences couples (cont)

Fixed costs men	-8.915***	Fixed cost childcare	-2.476***
*education low	0.534***	*education low men	0.013
*education mid	0.796***	*education mid men	0.265*
*non-Western immigrant	-1.120***	*non-Western immigrant men	-0.426**
*Western immigrant	-1.309***	*Western immigrant men	0.080
		*education low women	-1.123***
Fixed costs women	-2.160***	*education mid women	0.024
*education low	-0.302***	*non-Western immigrant women	0.186
*education mid	0.051	*Western immigrant women	0.155
*non-Western immigrant	-1.027***	*child 0-3 yrs	1.539***
*Western immigrant	-0.470***	*urban area	-0.478***
Couples*alternatives	1,129,392	Negative mu income	0%
Couples	7,843	Negative mu leisure men	91%
Likelihood	-24,857	Negative mu leisure women	1%
		Negative mu childcare	60%



Elasticities by subgroup

	Single parents	Couples	
		Men	Women
No child 0-3 yrs	0.53	0.09	0.31
Child 0-3 yrs	0.65	0.06	0.28
Lower education	0.95	0.10	0.39
Middle education	0.52	0.06	0.30
Higher education	0.31	0.07	0.27
Native	0.49	0.06	0.28
Non-Western immigrant	0.88	0.19	0.51
Western immigrant	0.59	0.15	0.35
Age <38 yrs	0.66	0.05	0.29
Age ≥38 yrs	0.49	0.08	0.31
y < 16000	0.61	0.07	0.30
16000 ≤ y < 32000	0.39	0.07	0.29
y ≥ 32000	-0.05	0.06	0.27