The subjective costs of young children:
A European comparison

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AGE WELL ACCOUNTS

Aim:

Developing measures of child-related costs based on parents' self-reported ability to make ends meet

Why is this relevant?

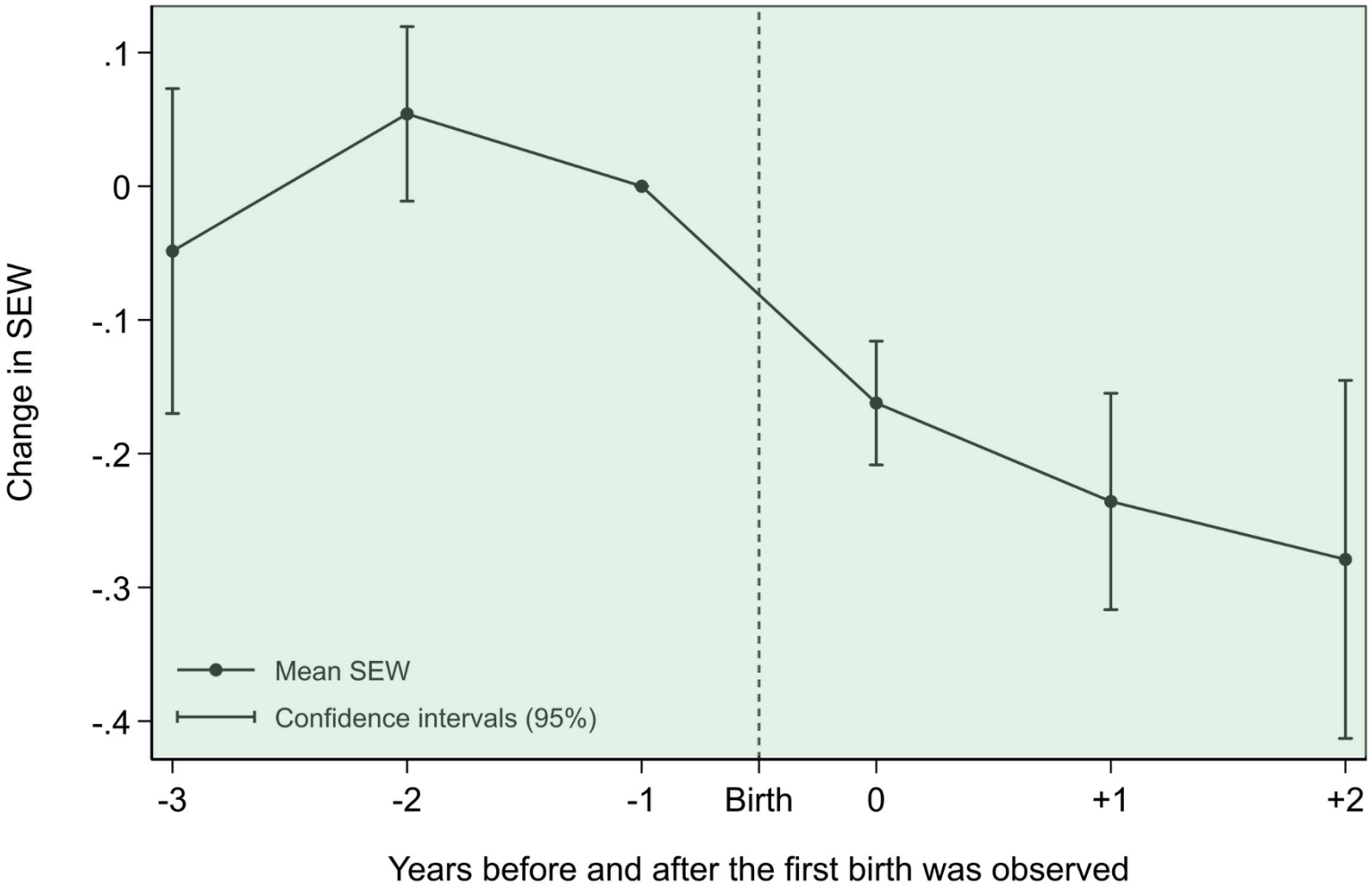
- The costs of raising children impact fertility and labour supply decisions
- European governments spend more and more to compensate these costs

Subjective economic wellbeing (SEW)

"A household may have different sources of income and more than one household member may contribute to it. Thinking of your household’s total income, is your household able to make ends meet, namely, to pay for its usual necessary expenses?"

Very easily [6]
Easily [5]
Fairly easily [4]
With some difficulty [3]
With difficulty [2]
With great difficulty [1]

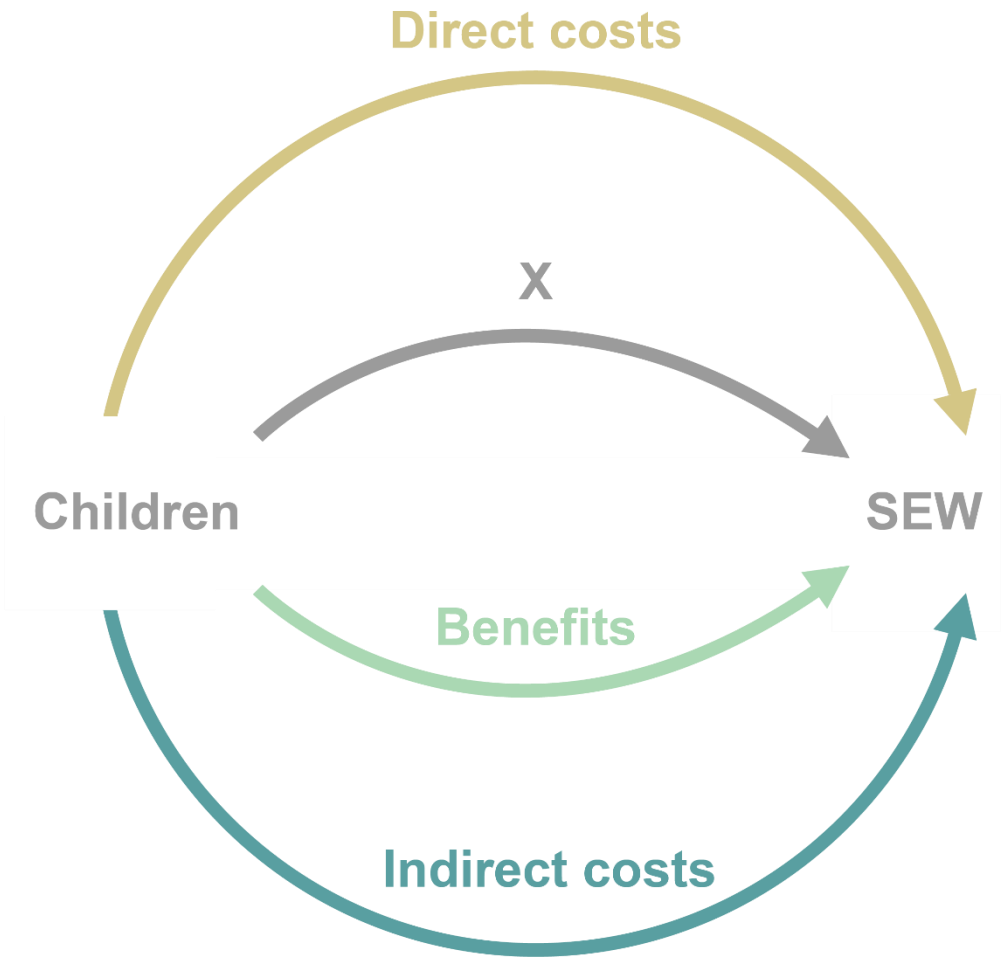
Children are costly….



Source: EU-SILC longitudinal data 2004-2015. This graph is based on the 4,709 couples in the sample that had their first child, but no additional child, during the observed period. In total, they provided 14,639 observations. SEW is set to 0 in the year before the birth was observed, which is why the confidence intervals at time -1 are not visible. Household level weights were applied.

Cost components:

Total net cost = direct costs + indirect costs - benefits



Direct costs	Higher expenses for food, diapers, a bigger house, etc.
Indirect costs	Labour income losses (opportunity costs)
Benefits	Birth grants, parental and maternity leave payments, tax deductions, etc.

Research questions:

1. How does childbirth affect parents' SEW shortly after childbirth?
2. How do direct and indirect costs contribute to the change in SEW after childbirth?
3. How do direct and indirect costs of children differ across European regions?
4. Do family-related benefits compensate for the child costs occurring shortly after childbirth?

Data:

- EU-SILC longitudinal microdata for 30 countries
- Over 260,000 observations from over 125,000 households
- 2004 to 2015
- Couples with and without children
- Only couples living without additional adults
- Women aged 16-40, men aged ≥ 16
- Maximum of four waves per couple

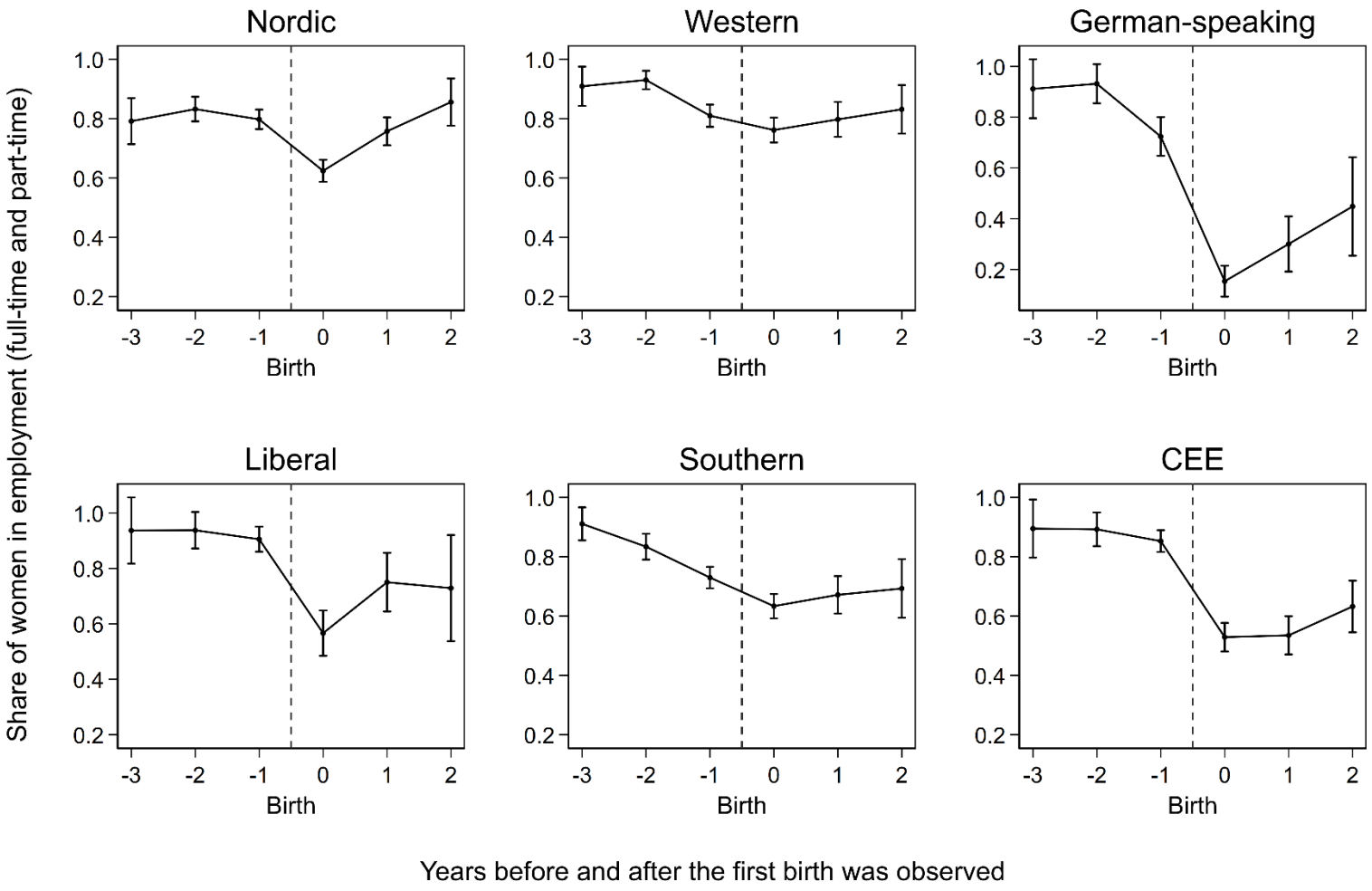
Country groups:

Cost components vary by country due to different foci in family policies, and due to differences in norms, institutions, and macroeconomic conditions

Nordic	Denmark, Finland, Iceland, Norway, Sweden
Western	Belgium, France, Netherlands
German-speaking	Austria, Switzerland
Liberal	Ireland, UK
Southern	Cyprus, Greece, Spain, Italy, Malta, Portugal
CEE	Bulgaria, Czech Republic, Estonia, Croatia, Hungary, Lithuania, Latvia, Poland, Romania, Serbia, Slovenia, Slovakia

Example for varying cost components:
Share of women in employment before and after the birth of their first child

Very selective group: Women between 16 and 40 in stable relationships that will have their first child soon / just had their first child



Source: EU-SILC longitudinal data 2004-2015. This graph is based on the 4,709 couples in the sample that had their first child, but no additional child, during the observed period. In total, they provided 14,638 observations.

Average income before and after the birth of the first child

Very selective group: Couples with women between 16 and 40 in stable relationships that will have their first child soon / just had their first child

Region	Time	Household income		Labour income woman		Labour income man		Benefits
		Absolute	%	Absolute	%	Absolute	%	Absolute
Nordic	-1	39,839	100.00%	22,379	100.00%	30,504	100.00%	203
	1	41,816	105.00%	12,227	54.60%	32,127	105.30%	9,663
Western	-1	39,347	100.00%	21,308	100.00%	28,675	100.00%	239
	1	40,528	103.00%	18,141	85.10%	29,251	102.00%	3,030
German-speaking	-1	46,647	100.00%	25,714	100.00%	36,235	100.00%	129
	1	41,262	88.50%	5,253	20.40%	39,153	108.10%	8,640
Liberal	-1	56,392	100.00%	30,670	100.00%	46,035	100.00%	36
	1	52,539	93.20%	21,998	71.70%	43,151	93.70%	4,000
Southern	-1	37,003	100.00%	17,754	100.00%	27,585	100.00%	128
	1	36,687	99.10%	13,730	77.30%	26,840	97.30%	1,459
CEE	-1	23,587	100.00%	13,394	100.00%	17,257	100.00%	15
	1	25,521	108.20%	8,801	65.70%	18,867	109.30%	4,131

Source: EU-SILC longitudinal data 2004-2015. This graph is based on the 4,709 couples in the sample that had their first child, but no additional child, during the observed period. In total, they provided 14,638 observations. The relative changes are normalised and set to 100 percent at the year before the birth was observed. All values are provided per annum and are adjusted for inflation and differences in purchasing power. Household weights were used.

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General model

$$SEW_{jt} = \beta_0 + \beta_1 CHILDREN_{jt} + \beta_2 X_{jt} + \beta_3 INCOME_{jt} + \mu_t + \alpha_j + \varepsilon_{jt}$$

$CHILDREN_{jt}$	number of children in household j at time t
X_{jt}	control variables age, age squared, and health
$INCOME_{jt}$	total net household income or labour income of both partners
μ_t	time fixed effect
α_j	time-constant error term (individual fixed effect)
ε_{jt}	error term, varies with household and time

General model

Includes couples with 0, 1, 2, 3, 4+ children

$$SEW_{jt} = \beta_0 + \beta_1 CHILDREN_{jt} + \beta_2 X_{jt} + \beta_3 INCOME_{jt} + \mu_t + \alpha_j + \varepsilon_{jt}$$

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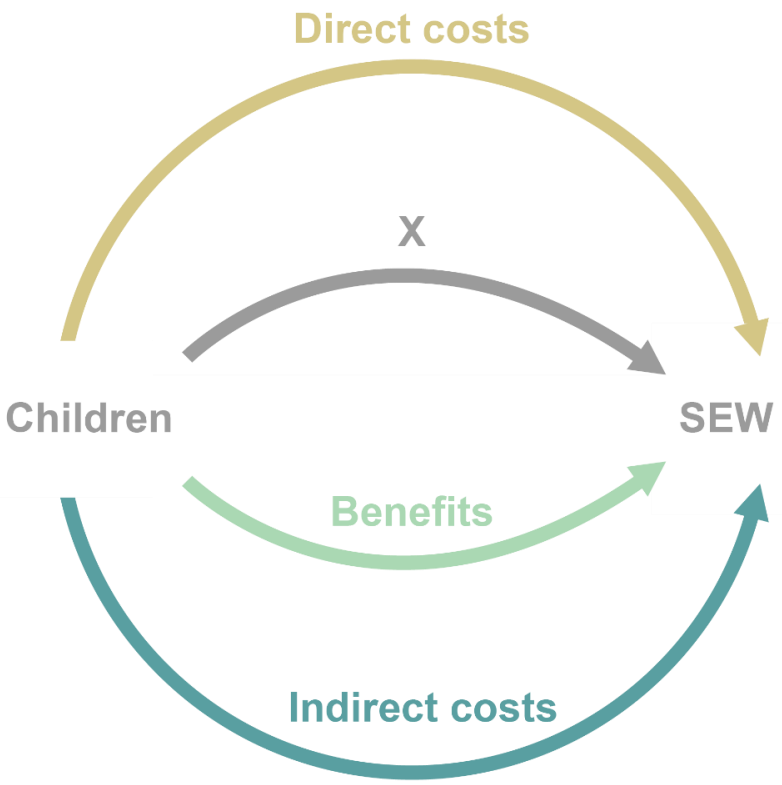
Disentangling direct and indirect costs



Model 1 **Total cost**	Model 2 **Direct costs**	Model 3 **Auxiliary**	**Indirect costs**
$T = d + i - b$ $ß_{1.1} = d + i - b$	$ß_{1.2} = d$	$ß_{1.3} = d - b$	$i = (d + i - b) - (d - b)$ $i = ß_{1.1} - ß_{1.3}$

Estimation methods: linear and ordered outcomes

1. **Linear fixed effects model with OLS**

2. **"Blow-up and cluster" (BUC) estimator (Baetschmann et al. 2011)**

   (i) Recode SEW into k-1 different dichotomisations based on k-1 thresholds ("blow up")

   (ii) Apply conditional logit estimation with clustered standard errors

Results

Cost components of first-order children in the first years after their birth

	Model 1	Model 2	
	Total net cost	**Direct costs**	**Indirect costs**
	$\beta_{1.1}$	$\beta_{1.2}$	$\beta_{1.1} - \beta_{1.3}$
Nordic	0.232	0.225	0.081
Western	0.231	0.233	0.002
German speaking	0.190	0.182	0.034
Liberal	0.198	--	--
Southern	0.152	0.155	0.011
CEE	0.179	0.178	0.039

Conclusion

- **The birth of a child reduces parents' SEW**
- **Economies of scales:** first child is costliest in most regions
- **Direct costs**
  - ➡ Dominate drop in SEW
  - ➡ Highest in high-income regions
- **Indirect costs**
  - ➡ Vary substantially by region, depending on maternal employment patterns
  - ➡ Mothers' wage losses are compensated for by other income components

Limitations

- Do expectations or general wellbeing change with the birth of a child? How does this influence SEW?
- Long term effects of children on SEW?
  Or adaptation?
- Self-selection into parenthood?

Questions?

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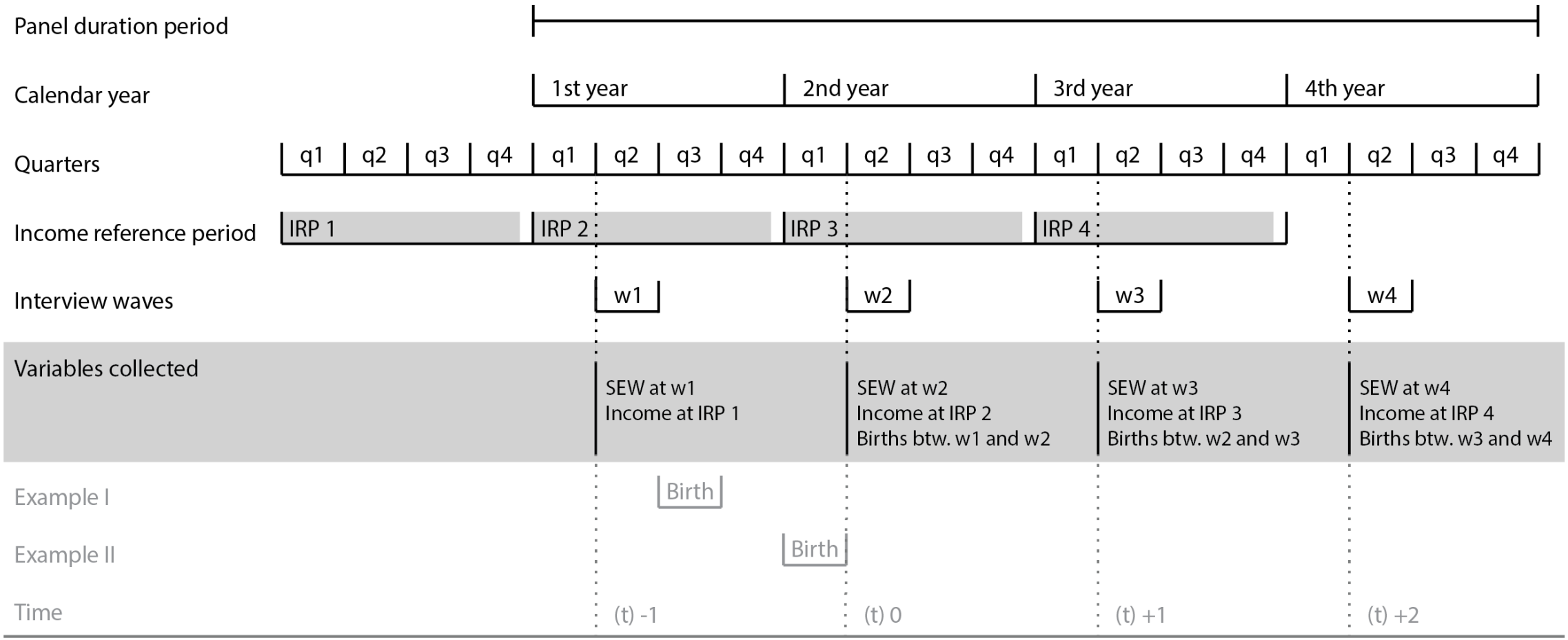
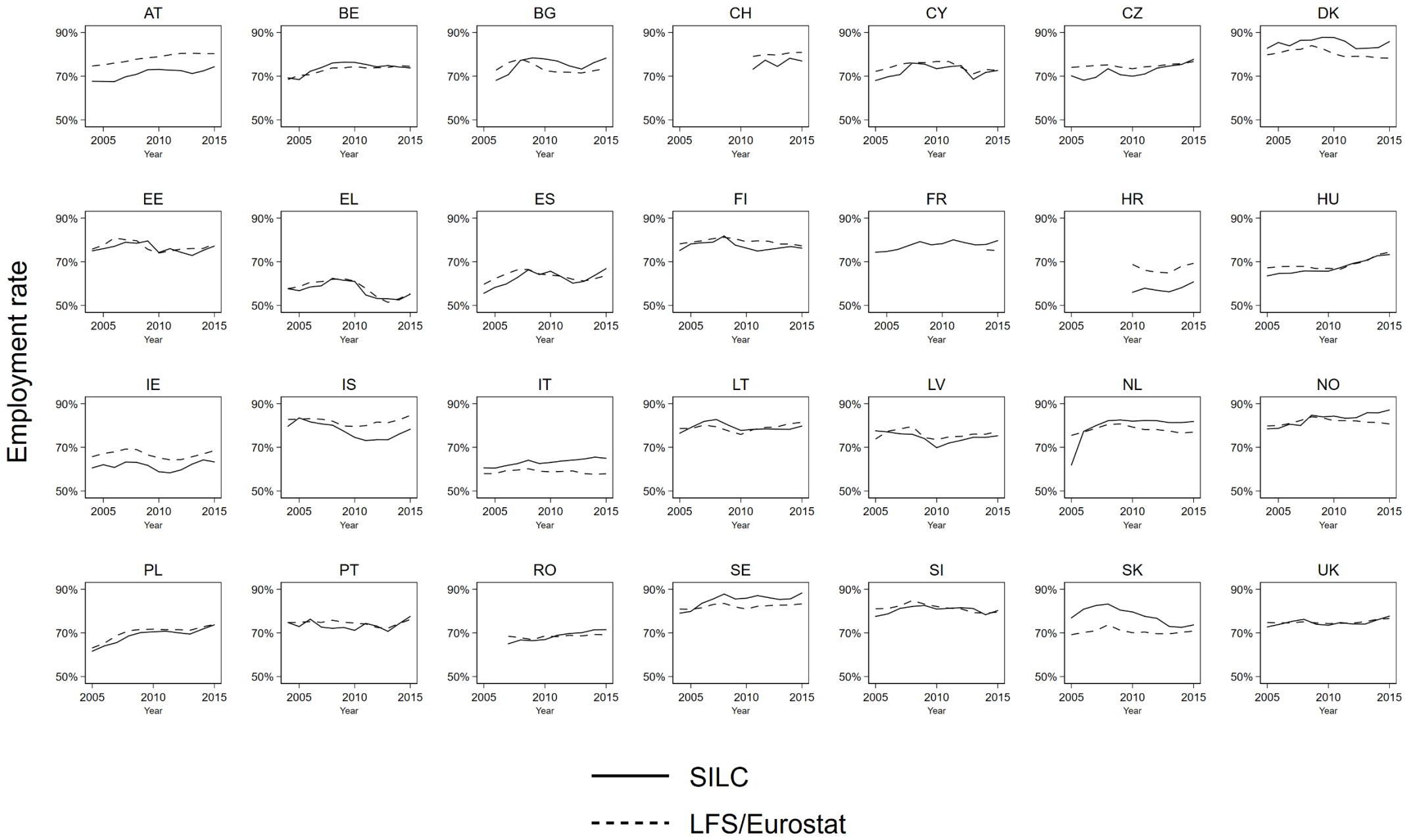
AGE WELL ACCOUNTS

Appendix

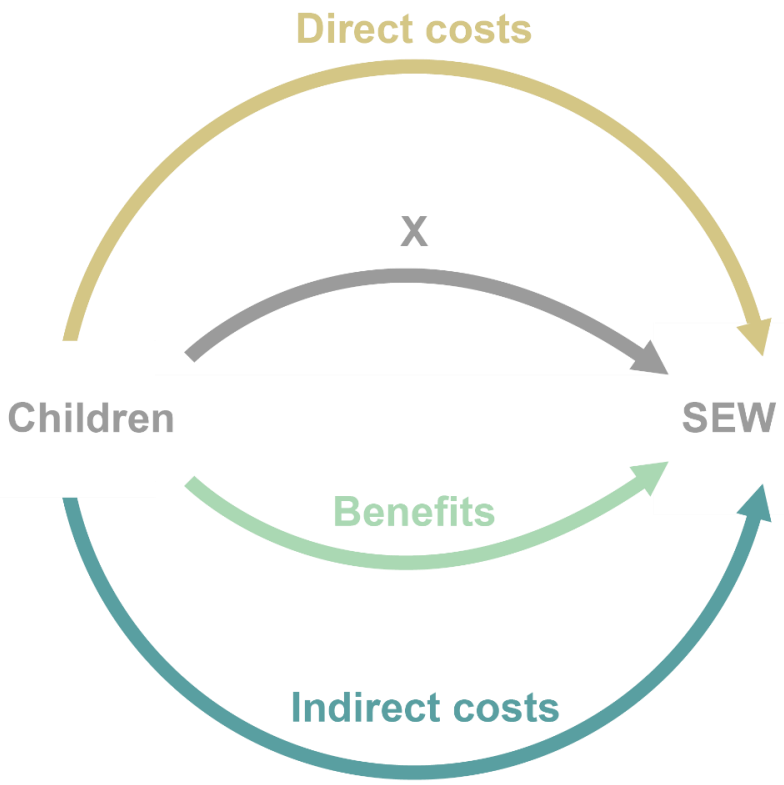

Panel duration period
Calendar year
1st year
2nd year
3rd year
4th year
Quarters
q1 q2 q3 q4 q1 q2 q3 q4 q1 q2 q3 q4 q1 q2 q3 q4 q1 q2 q3 q4
Income reference period
IRP 1
IRP 2
IRP 3
IRP 4
Interview waves
w1
w2
w3
w4
Variables collected
SEW at w1
Income at IRP 1
SEW at w2
Income at IRP 2
Births btw. w1 and w2
SEW at w3
Income at IRP 3
Births btw. w2 and w3
SEW at w4
Income at IRP 4
Births btw. w3 and w4
Example I
Birth
Example II
Birth
Time
(t) -1
(t) 0
(t) +1
(t) +2

Employment rate of women aged 25 to 54

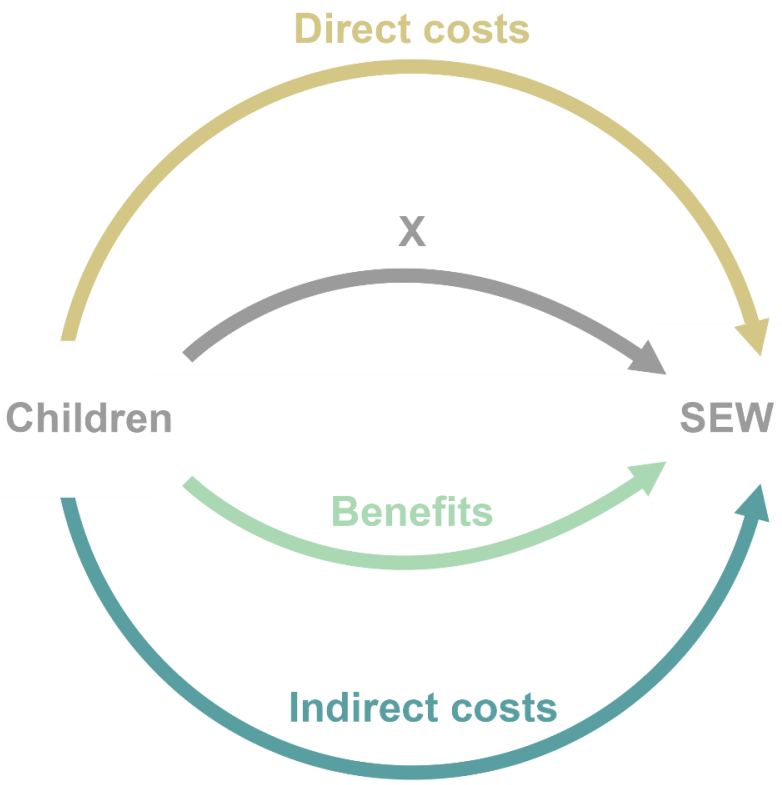


Disentangling direct and indirect costs

T = d + i – b



Disentangling direct and indirect costs
Model 1: Total net cost



Model 1

Total cost

$$T = d + i - b$$

$$ß_{1.1} = d + i - b$$

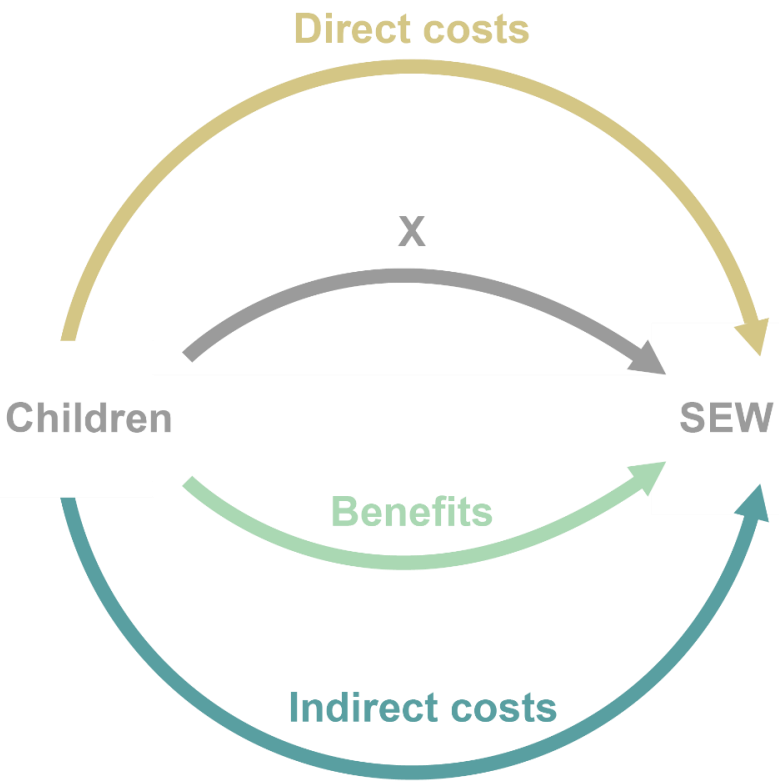
Disentangling direct and indirect costs
Model 1: Total net cost

$$SEW_{jt} = \beta_0 + \beta_{1.1}\, CHILDREN_{jt} + \beta_2\, X_{jt} + \mu_t + \alpha_j + \varepsilon_{jt}$$

Total net cost = direct costs + indirect costs – benefits

$\beta_{1.1}$ = direct costs + indirect costs – benefits

Disentangling direct and indirect costs
Model 2: Direct costs



Model 1 **Total cost**	Model 2 **Direct costs**
$T = d + i - b$	
$ß_{1.1} = d + i - b$	$ß_{1.2} = d$

Disentangling direct and indirect costs

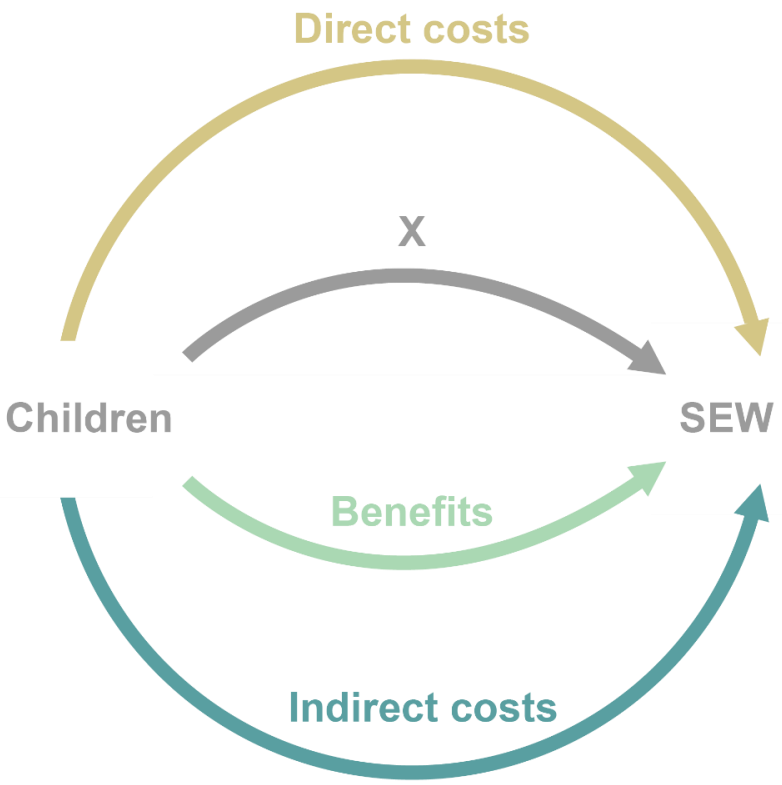
Model 2: Direct costs

$$SEW_{jt} = \beta_0 + \beta_{1.2}\,CHILDREN_{jt} + \beta_2\,X_{jt} + \beta_3\,HOUSEHOLD\ INCOME_{jt} + \mu_t + \alpha_j + \varepsilon_{jt}$$

HOUSEHOLD INCOME = LABOUR INCOME + BENEFITS

$\beta_{1.2}$ = direct costs

Disentangling direct and indirect costs
Model 3: Indirect costs via auxiliary



Model 1 **Total cost**	Model 2 **Direct costs**	Model 3 **Auxiliary**
$T = d + i - b$		
$ß_{1.1} = d + i - b$	$ß_{1.2} = d$	$ß_{1.3} = d - b$

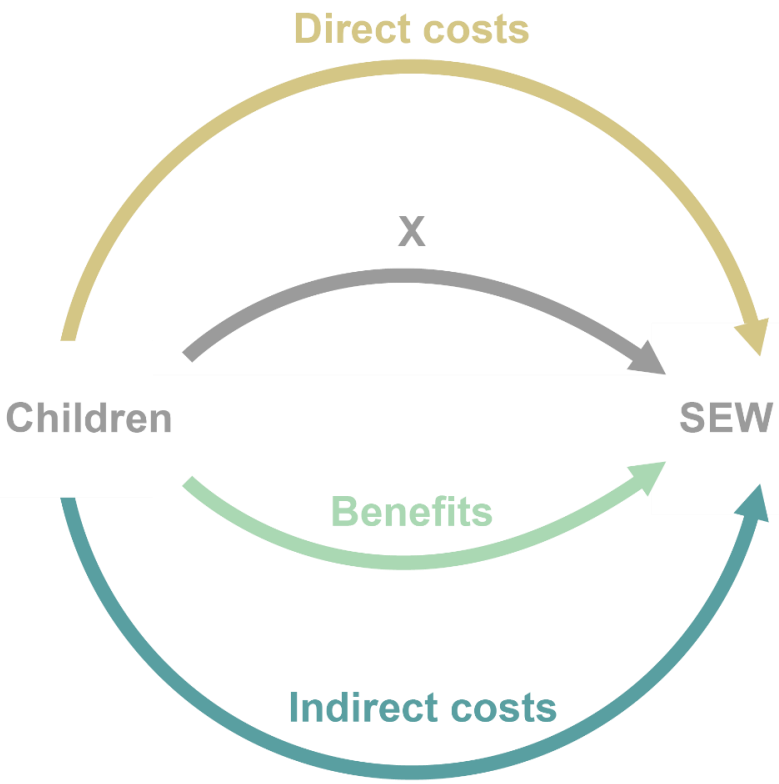
Disentangling direct and indirect costs

Model 3: Indirect costs via auxiliary

$$SEW_{jt} = \beta_0 + \beta_{1.3}\, CHILDREN_{jt} + \beta_2\, X_{jt} + \beta_3\, LABOUR\ INCOME_{jt} + \mu_t + \alpha_j + \varepsilon_{jt}$$

$\beta_{1.3}$ = direct costs - benefits

Disentangling direct and indirect costs
Model 3: Indirect costs via auxiliary



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Disentangling direct and indirect costs
Model 3: Indirect costs via auxiliary

Total cost from Model 1:	$\beta_{1.1}$	$= d + i - b$
Direct costs from Model 2:	$\beta_{1.2}$	$= d$
Auxiliary from Model 3:	$\beta_{1.3}$	$= d - b$

Disentangling direct and indirect costs
Model 3: Indirect costs via auxiliary

Total cost from Model 1: $\beta_{1.1} = d + i - b$

Direct costs from Model 2: $\beta_{1.2} = d$

Auxiliary from Model 3: $\beta_{1.3} = d - b$

By rearranging $T = d + i - b$ and inserting the estimation coefficients $\beta_{1.1}$ and $\beta_{1.3}$, we can now calculate the indirect costs of children

$$T = d + i - b$$
$$i = T - (d - b)$$
$$i = \beta_{1.1} - \beta_{1.3}$$

Disentangling direct and indirect costs
Model 3: Indirect costs via auxiliary

Furthermore, we can calculate the part of indirect costs that is not compensated for via family-related benefits—more specifically, the difference between indirect costs i and benefits b

$$T = d + i - b$$

$$i - b = T - d$$

$$i - b = \beta_{1.1} - \beta_{1.2}$$

Ordered outcomes

- Ordered variable SEW is really the collapsed version of an underlying latent variable SEW* that is continuous
  - when couples are asked to evaluate their SEW, they will pick the answer on the Likert scale that is closest to their actual value of SEW*
  - imagine thresholds μ along variable SEW* - when households cross them, the observed value of SEW changes

- Ordered variables have no unit of measurement
  - (4) is NOT twice as large as (2) - doubling of "with difficulty" not feasible
  - distance between two thresholds μ not constant

- k categories, $k-1$ cut-off points μ

$$SEW_{it} = \begin{cases} 1 & \text{if} \quad SEW*_{it} \leq \mu_1 \\ 2 & \text{if} \quad \mu_1 < SEW*_{it} \leq \mu_2 \\ \vdots & \\ 6 & \text{if} \quad SEW*_{it} > \mu_5 \end{cases}$$

Table 3: Cost components of first-order children in the first years after their birth

	(1)	(2)	(3)	(4)	(5)
Region	**Total net cost (T)**	**Direct costs (d)**	**Auxiliary**	**Indirect costs (i)**	
				total	not compensated
Coefficient(s)	$\beta_{1.1}$	$\beta_{1.2}$	$\beta_{1.3}$	$\beta_{1.1} - \beta_{1.3}$	$\beta_{1.1} - \beta_{1.2}$
Nordic	0.232	0.225	0.151	0.081	0.007
Western	0.231	0.233	0.229	0.002	-0.002
German-speaking	0.190	0.182	0.156	0.034	0.008
Liberal	0.198	$0.198^{\dagger}$	$0.198^{\dagger}$	$0.000^{\dagger}$	$0.000^{\dagger}$
Southern	0.152	0.155	0.141	0.011	-0.003
CEE	0.179	0.178	0.140	0.039	0.001

Output table, LFE estimations for CEE countries

	Model 1		Model 2		Model 3	
	b	SE	b	SE	b	SE
1 child	-0.179***	(0.028)	-0.178***	(0.028)	-0.140***	(0.028)
2 children	-0.242***	(0.037)	-0.245***	(0.037)	-0.183***	(0.037)
3 children	-0.295***	(0.055)	-0.301***	(0.055)	-0.209***	(0.056)
4+ children	-0.398***	(0.111)	-0.407***	(0.111)	-0.288*	(0.112)
Bad health woman	-0.115***	(0.033)	-0.115***	(0.033)	-0.115***	(0.033)
Health missing woman	-0.043	(0.030)	-0.043	(0.030)	-0.046	(0.030)
Bad health man	-0.130***	(0.033)	-0.128***	(0.033)	-0.126***	(0.033)
Health missing man	-0.002	(0.019)	0.001	(0.019)	0.001	(0.019)
Household income			0.006***	(0.001)		
Labour income woman					0.006***	(0.001)
Labour income man					0.005***	(0.001)
Constant	3.213***	(0.059)	3.106***	(0.059)	3.066***	(0.060)
Control variable year	yes		yes		yes	
Control variable age	yes		yes		yes	
N	71,100		71,100		71,100	
Overall R2	0.025		0.151		0.173	
SE	cluster		cluster		cluster	

The reference group for the number of children is "no child" and for health "no bad health"; income is actual yearly income in thousands of euros; SE are clustered at the household level; control variables for the survey year and age of both men and women were included in the estimations; * p<0.05, ** p<0.01, *** p<0.001