Does formal 0-3 years old child care availability boost employment rate of mothers ? Panel data based evidence from Belgium

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1. Outline of the paper

- Background :

  In 2003, a multi-annual program aimed at increasing the availability of formal child care for 0-3 years old children was started in Wallonia

- Question :

  Did this program increased the employment rate of mothers ?

- Methodology :

  A difference-in-differences approach based on municipality-level panel data, using the fact that the increased availability of child care widely varied across municipalities

- Main result :

  The program had a significant effect on the employment rate of mothers, but smaller than expected, most likely due to a crowding-out effect

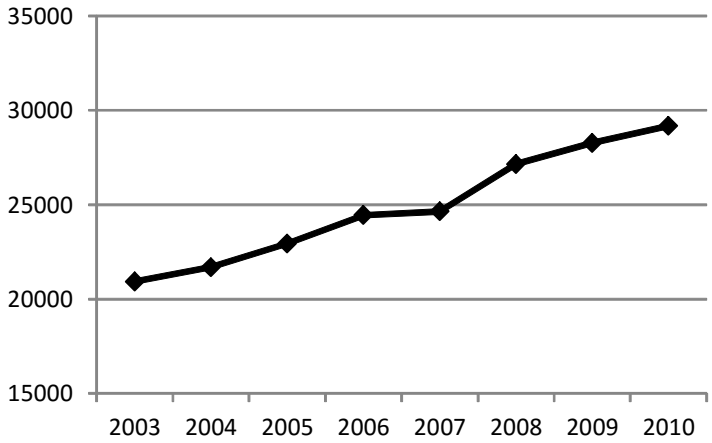
2. Policy change

- Sources of the 2003 program:
  - A consensus to consider that the supply of formal child care were insufficient
  - The availability of new budgets from the 2000-2001 institutional agreements
  - The 2002 European Union recommendation "to provide child care by 2010 to at least 33% of children under 3 years of age"

- In 2003, 20,933 places were available in Wallonia for 93,524 children, which represented a coverage rate of 22.4 %
  → about 10,000 places to create to fulfill the European Union objective

- The ONE launched in 2003 a multi-annual program, based on calls for projects, which were selected:
  - based on indicators at the municipality level (female employment rate, current coverage rate, median income, proportion of low educated women, ...)
  - to promote better universal access and positively discriminate poor municipalities

- Outcome of the multi-annual program:



Number of child care places in Wallonia

→ From 2003 to 2010:

- the number of places increased from 20,993 to 29,178 (+39.4 %)
- the coverage rate increased from 22.4 % to 29.2% (+30.0 %)

Note: this aggregate evolution hides large differences across municipalities

3. Empirical strategy

- Let y_{it} = the employment rate of mothers. Suppose only 2 years are observed and a binary policy change (binary treatment). A standard approach would be to use:

$$\hat{\delta}_{DID} = \left(\bar{y}_{.2}^{treat} - \bar{y}_{.1}^{treat}\right) - \left(\bar{y}_{.2}^{control} - \bar{y}_{.1}^{control}\right)$$

- $\hat{\delta}_{DID}$ = the FE or FD estimator of δ in the panel data model:

$$y_{it} = c_i + \gamma d2_t + \delta D_{it} + \varepsilon_{it}$$

where $d2_t$ = a time dummy and D_{it} = a binary treatment indicator

- For T periods of observation and a continuous treatment, the model becomes:

$$y_{it} = c_i + \gamma_2 d2_t + ... + \gamma_T dT_t + \delta z_{it} + \varepsilon_{it}$$

where $d2_t, ..., dT_t$ = time dummies and z_{it} = the coverage rate

- The common trend assumption may be relaxed by allowing (1) the time trend to differ across sub-regions and (2) for municipality-specific time trend effects, yielding :

$$y_{it} = c_i + g_i t + \sum_{s=1}^{S} ds_i(\gamma_{3s} d3_t + ... + \gamma_{Ts} dT_t) + \delta z_{it} + \varepsilon_{it}$$

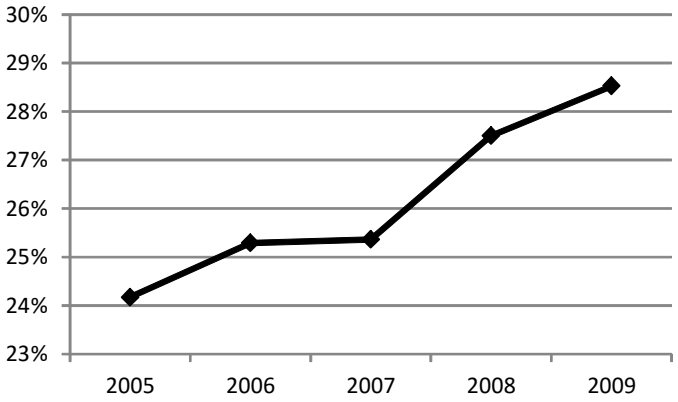
  - The municipality-specific effects c_i and time trends $g_i t$ capture the differences in the composition of the population across municipalities
  - The sub-region/time dummies capture possibly different economic conditions across sub-regions
  - The coverage rate z_{it} may be arbitrary correlated with (c_i, g_i)
  - It is assumed that z_{it} is not systematically related to other factors that those capture by (c_i, g_i) that may affect the maternal employment rate y_{it} (and that are left in ε_{it}), i.e. that z_{it} may be considered as exogenous conditional on (c_i, g_i)

- The model is estimated by a generalized version of the fixed effects generalized least squares (FEGLS) estimator

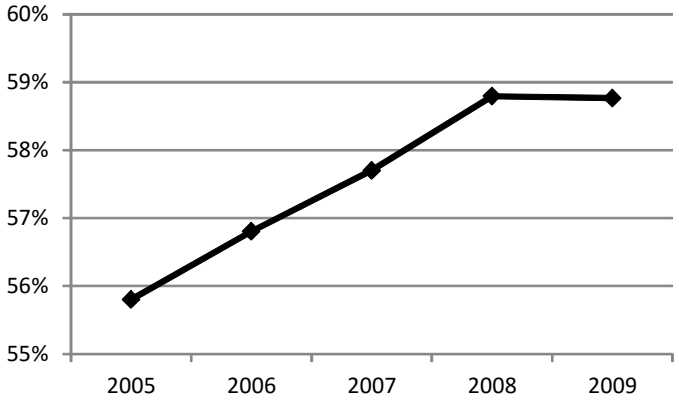
4. Data

- Period of analysis: 5 years from 2005 to 2009
- Outcome variable y_{it} = the employment rate of 18-49 years old women with at least one child under 3 years old in municipality i at period t
- Policy variable z_{it} = the coverage rate in municipality i at period t

  In practice, z_{it} is defined as the number of child care places per child over an enlarged area: the considered municipality and its surrounding (contiguous) municipalities
- Aggregate descriptive statistics:



Coverage rate in Wallonia



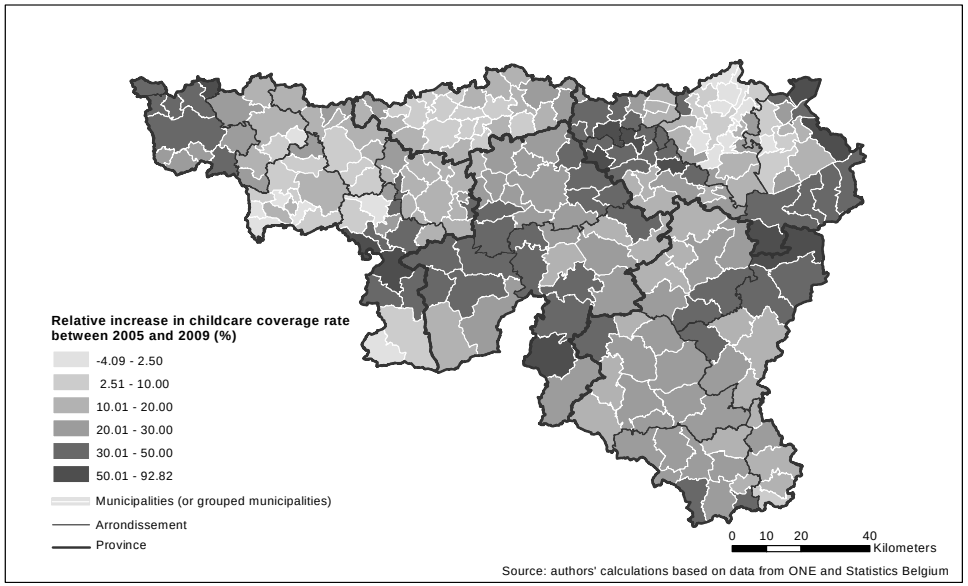
Maternal employment rate in Wallonia

- Heterogeneity in level across municipalities :

Table 1 : Child care coverage rate and employment rate of women with at least one child under age 3 across municipalities

Variable	Min.	Quart. 1	Median	Quart. 3	Max.
Coverage rate in 2005	12.48	20.33	24.62	28.38	60.53
Employment rate in 2005	20.42	52.61	64.56	71.41	83.87

- Heterogeneity in growth across municipalities :



5. Results

5.1. Benchmark results

- Generalized FEGLS estimation of:

$$y_{it} = c_i + g_i t + \sum_{s=1}^{S} ds_i(\gamma_{3s} d3_t + ... + \gamma_{Ts} dT_t) + \delta z_{it} + \varepsilon_{it}$$

- Estimate for different populations:

Table 2: Benchmark results

Variable	Women with at least one child under age 3	Men with at least one child under age 3	Women without children	Men without children
Coverage rate	0.176^{***}	0.019	0.005	0.023
	(0.065)	(0.049)	(0.057)	(0.051)

→ For 100 new places, about 18 additional mothers are induced to work

• Specification tests :

Table 3 : Women with at least one child under age 3
Specification tests

	Benchmark	Alternative specifications			
Variable	model	(1)	(2)	(3)	(4)
Coverage rate	0.176^{***}	0.164^{**}	0.190^{***}	0.184^{***}	0.198^{**}
	(0.065)	(0.071)	(0.065)	(0.071)	(0.078)
Squared coverage rate	–	0.001	–	–	0.001
		(0.003)			(0.003)
Lag of coverage rate	–	–	0.050	–	0.071
			(0.065)		(0.064)
Lead of coverage rate	–	–	–	0.029	0.058
				(0.074)	(0.072)

→ The effect seems linear

→ The strict exogeneity assumption seems to hold

- Sensitivity analysis :

Table 4 : Women with at least one child under age 3
Sensitivity analysis

	Coverage rate	
Variation from benchmark model	Parameter	Std. error
(1) No municipality-specific time trend	0.096*	0.056
(2) No different aggregate trends across provinces	0.139**	0.058
(3) Coverage rate defined without surrounding municipalities	0.070***	0.026
(4) Coverage rate defined at the level of arrondissements	0.203**	0.102
(5) Municipalities with "extreme" coverage rate excluded	0.149**	0.072
(6) Municipalities with "extreme" employment rate excluded	0.191***	0.069

→ The municipality-specific time trends and the coverage rate def. are important

- Why only 18 additional mothers induced to work for 100 new child care places ?
  - We only observe the employment rate, not the actual labor supply
  - The measurement of child care availability might not be sufficiently accurate (attenuation bias)
  - There is most likely a large crowding out effect

5.2. Extensions

- Further questions of interest :
  - Does the composition of the available child care matter ?
    (subsidized versus non-subsidized child care, collective versus familial child care)
  - Does the effect of the availability of child care differ across women ?
    (low educated women, single mothers, mothers living in rural area)

- Estimation results:

Table 5: Women with at least one child under age 3
Extensions

	Benchmark	Extensions		
Variable	Model	(1)	(2)	(3)
Coverage rate	0.176***	0.257***	0.205**	0.258***
	(0.065)	(0.083)	(0.082)	(0.091)
Part of subsidized services	–	0.019	–	0.007
		(0.044)		(0.043)
Part of collective services	–	-0.062	–	-0.053
		(0.040)		(0.040)
Coverage rate × high proportion	–	–	-0.261**	-0.237*
of low-educated women dummy			(0.130)	(0.134)
Coverage rate × high proportion	–	–	-0.117	-0.096
of single mothers dummy			(0.154)	(0.157)
Coverage rate × rural	–	–	0.298**	0.290**
municipality dummy			(0.137)	(0.137)

5.3. Aggregate effect

- What would have been the agregate maternal employment rate in 2009 if child care availability remained at its 2005 level ?

Table 6 : Women with at least one child under age 3
Aggregate effect of child care availability on employment rate

	Benchmark Model	Extended Model
Employment rate in 2005	55.80	
Employment rate in 2009	58.77	
Effect of the 2005-2009 increase of child care availability on employment rate	+0.75 [+0.20 , +1.29]	+0.87 [+0.12 ; 1.62]
Hypothetical employment rate in 2009 with child care availability of 2005	58.02 [57.48 , 58.56]	57.90 [57.15 , 58.64]

About 25% of the 2005-2009 increase of the maternal employment rate may be attributed to the increased availability of formal child care

6. Conclusion

- Main result :
  - When 100 new child care places are opened, about 18 additional mothers are induced to work
  - This somewhat moderate effect is most likely due to large crowding out effect
- Main lesson :
  - Don't expect a spectacular effect on maternal employment from an increase of the availability of formal child care
  - It does not mean that it is not worth it :
    - Supporting maternal employment is not the only goal of such a policy
    - Other (more ?) important goals are the cognitive and social development of children, as well as equity