Labor Supply and Child Outcomes Following the Great Expansion of Child Care in Sweden

Jonathan Gruber, MIT
Mårten Palme, Stockholm University
Per Pettersson-Lidbom, Stockholm University

Long-term project

- Started in the fall of 2005
- No finished paper but presented at many seminars (e.g., NBER Summer Institute 2008)
- We have been waiting for more outcome data
- Still early to evaluate the expansion of childcare on future child outcomes (cohorts born 1974 -1988)

Swedish Child Care

- Almost completely publicly financed
- Municipality spending on child care is 2% of GDP
  - U.S.: total spending on child services is 0.6%
  - Finland: spending on child care is 1.1%
- More than 80% of kids 1-5 are in public child care
  - 85% of 2 year olds
 - Highest rate in developing world

Expansion of Swedish child care
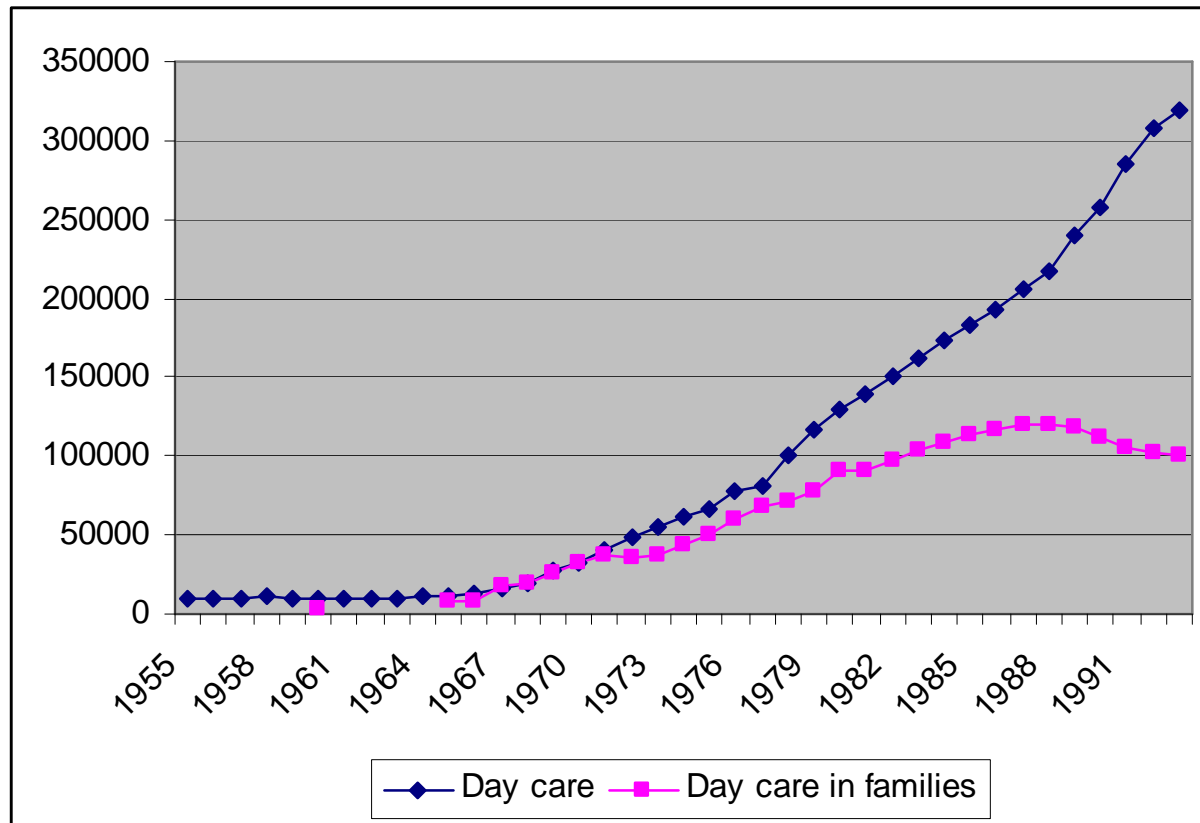
Child care data

- Cohort averages on child care utilization for all cohorts born 1974-1988
- Data from 280 local governments
- Pseudo-panel data (N=270, T=15)
- Pseudo-panel data analysis faces challenging identification issues (e.g., Deaton 1986)
- Local government fixed effects + cohort fixed effects same as IV (Moffitt 1993)

Large variation in childcare utilization across local governments
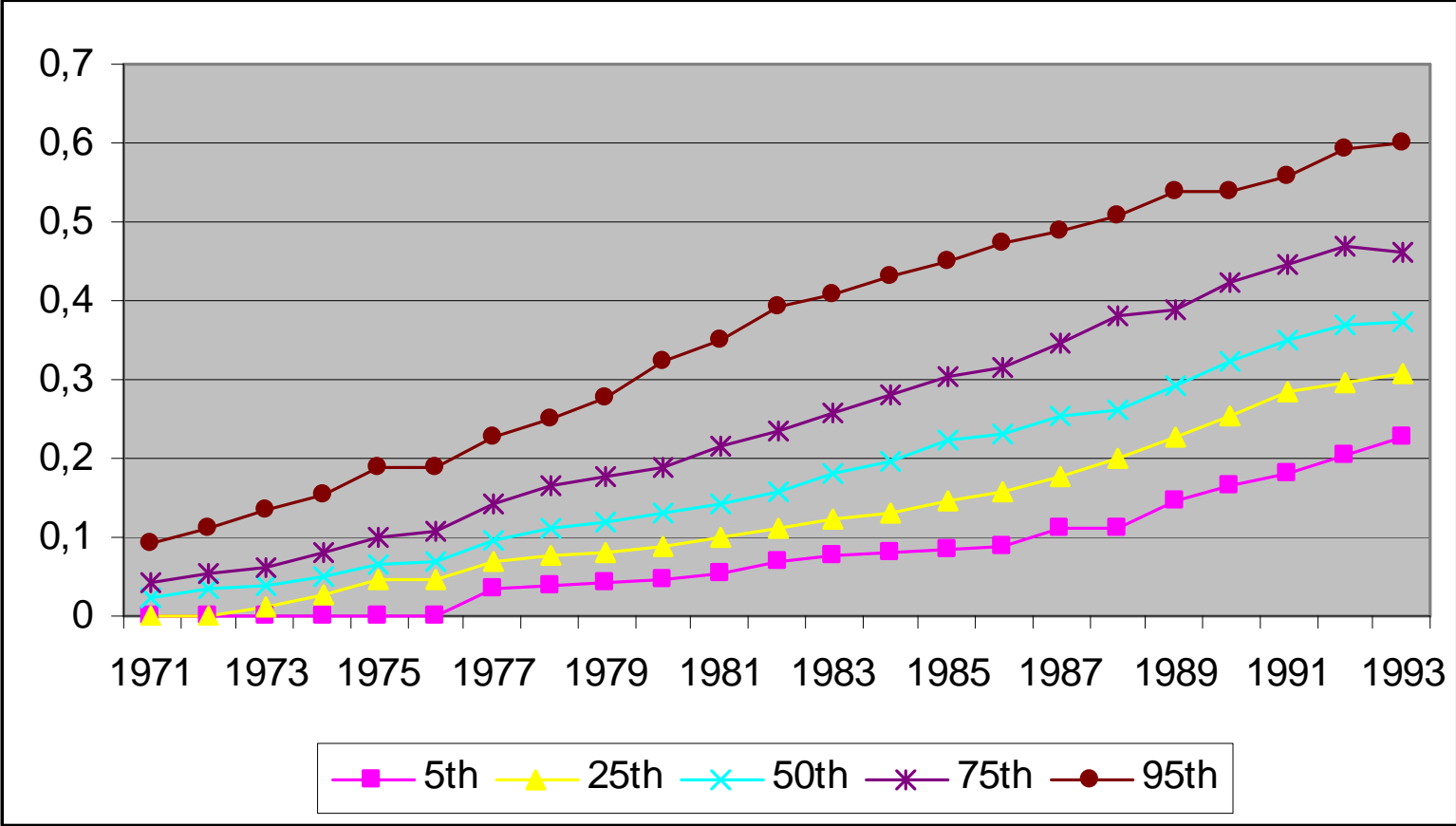
Identification strategy

- Left-wing parties prefer more publicly provided daycare than right-wing parties

- We exploit close elections to isolate exogenous source of variation in party control of government (Pettersson-Lidbom 2001, 2008)

- A cohort will have different exposures to left-wing party control (day care exposure) depending on year and place of birth.

- "Instrument" = number of years with left-wing party control of government

Identification strategy

"First stage"

- Share of cohort in daycare= β_0+ $\beta_1 D_1$+$\beta_2 D_2$ +…+ $\beta_7 D_7$+v
  - D_1 =1 if one year with left-wing party control
  - D_2 =1 if two years with left-wing party control
  - D_7 =1 if all years with left-wing party control
- Also include cohort fixed effects (year effects), local government fixed effects and polynomials in vote shares
- Identification based on variation within-local governments with close elections
- Pseudo-panel data requires large time-series variation for identification and power (Wooldridge 2008)

Government turnovers 1974-1994

Number of turnovers	Number of local governments
0	122
1	30
2	43
3	41
4	29
5	13
6	8
7	0

- Elections held every third year→ at most 7 turnovers

- Almost 50 % of the local governments will not contribute to the identification since they have no turnovers
- Power issues!

Data for Analysis

- Another advantage of looking at Sweden – very comprehensive longitudinal data
- Use data on cohorts born 1974 and 1988
- Census data on age, sex, and municipality of birth - match external data on:
  - Grades in last year of compulsory schooling – percentile in grade distribution
  - Labor earnings in 2000-2006

More on Data

- Day care utilization: data on share of children in day care for each municipality in each birth cohort from 1974-1988
  - 284 municipalities
- But each child can potentially go to day care for up to seven years before starting school
- So take weighted average for cohort of share in child care ages 0-6

More on Data

- Also want to look at labor supply outcomes of mothers
- Data from tax returns on total labor income of mothers over 1974 to 1988.

Empirical Strategy (I)

- Problem: municipalities with more day care may differ in many ways that can impact child outcomes

- Key insight: left wing governments are more likely to promote public child care

- Of course, areas with left with governments differ in many ways

Empirical strategy (II)

- An IV strategy that combines a RD design with municipality-fixed effects

- Instrument: degree of exposure to left-wing government

  > 7 different intensities (0, 1,…,6) → 6 dummy variables or 1 if linearity is imposed

- Instrument as good as random conditional on vote shares and municipality fixed effects

  > Identifying variation comes from close elections and government turnovers, i.e., comparisons of different cohorts within the same municipality that randomly received different exposures to left-wing governments (differential exposure to child care)

- Instrument may not be excludable

  > 1. Control for other left-wing governments policies and future exposure to left-wing government (age 7-16)
  > 2. Only look at the reduced form

Empirical Strategy (II)

- So try to control for this in two ways
- First, include municipality fixed effects – use change in partisan control
- Second, use RD – control for vote share and identify off changes around 50%

Empirical Strategy (III)

- Main independent variable: LEFT, the share of ages 0-6 spent with left-wing government

- First step: Regress child care utilization on indicator for LEFT, controlling for:

  - Cohort fixed effects
  - Municipality fixed effects
  - LEFT vote share

Empirical Strategy (IV)

- Consider alternative model where control for number of years of left-wing government control – along with vote share in each year of youth

- Standard errors clustered at municipality level

"First Stage" Results (I)

- Table 1: Means
- Table 2: Results for child care
  - Each year of exposure to LEFT raises share of cohort in child care by 0.5 percent
  - So exposure from ages 0-6 would raise share in child care by 3.5%
- Result about 80% as large controlling for cubic in vote share – insensitive to higher order polynomials

"First Stage" Results (II)

- Two types of concerns
- First, are there other factors changing at this same time that drive move to LEFT – even conditional on vote shares?
- Control for:
  - Population size and composition
  - Average mother's and father's education
  - Average per capita income

"First Stage" Results (III)

- Second, did the move to the LEFT cause other changes that influence outcomes – e.g. improved schooling as well as more child care?

- Control for

  - Income tax rate

  - Secondary school spending

  - Teacher/pupil ratio

- All these controls have little effect – coefficient back to about 0.5

"First Stage" Results (IV)

- Show further details by allowing for year-specific effects of child care exposure
  - Effect grows with more years
  - Seven years: 4 percentage points – comparable to average LEFT estimate
- Alternative approach: control explicitly for left share when cohort is older
  - Separate child care from older age effects
  - No effect on estimates
  - Coefficients themselves insignificant

Mother's Earnings Results

- Table 3: use female earnings to capture full labor supply response
  - Municipality mean (including zeros) is SK92,000
- First, run OLS on day care
  - Find that each percentage additional children in day care leads to an increase in earnings of SK89.
- Then, reduced form on LEFT
  - SK 340 effect of LEFT
  - Double to get implicit IV: SK680 per percentage point
- Remaining columns – vary specification as in Table 2
  - Results very robust
  - Central estimate is SK250 per percentage point

Female Earnings Results (II)

- Elasticity implications
  - Year of child care costs SK75,000
  - One percentage more in child care: SK750/kid
  - Government subsidizes 92%: SK690/kid
  - Average of 1.36 kids – so subsidy of SK900/mom
  - This is roughly 1% of earnings
  - LEFT raises earnings by SK250 and childcare by 0.5 percentage points
  - So implies that earnings increases 0.55% per childcare point (250*2/92000)
  - So implied elasticity of 0.55 – somewhat higher than previous estimates – in line with higher female LS estimates from this era

Female Earnings Results (III)

- What about implications for net cost of subsidies?
  - Average marginal rate roughly 50%
  - One percentage more children in child care costs the municipality SK690
  - But moms earn SK500 more per 1.3 kids, or 380/kid
  - So tax revenue increase offsets 28% of costs

Female Earnings Results (IV)

- What does it do to distribution?
  - Does this allow rich wives to work more, widening inequality?
  - Or does it promote inequality by allowing lower income families to have two incomes?
- Table 4: 90-10 differential in incomes
  - Strong negative impact
  - LEFT leads to drop in differential of about SK850
  - Percentage point increase in child care lowers differential by SK1700
  - Differential on average is SK155,000
  - So elasticity of differential with respect to child care of roughly 1 – very equalizing

Child outcome - Education

	(1)	(3)	(5)
Grades	-.098	-.143	-.124
	(.106)	(.103)	(.106)
Highest education level	-.0151	-.0095	-.0070
	(.0052)	(.0038)	(.0042)
Probability of at least secondary education	-.0034	-.0021	-.0023
	(.0019)	(.0016)	(.0016)

Child outcome – labor earnings

	(1)	(2)	(3)
Log labor earnings in 2006	-.0040	-.0014	-.0014
	(.0043)	(.0032)	(.0031)
Log labor earnings 2000-2006*	-.0069	-.0070	-.0045
	(.0038)	(.0038)	(.0036)
Labor earnings in 2006	-8.603	-4.452	-4.630
	(6.482)	(4.943)	(4.831)
Labor earning 2000-2006*	-8.737	-3.624	-3.957
	(5.308)	(4.732)	(4.829)

Child outcome - health

	(1)	(2)	(3)
Birth weight	.7263	.7248	.4241
	(1.5808)	(1.5723)	(1.5467)
Days in hospital care	.0233	.0310	.0276
	(.0988)	(.0967)	(.0992)
Log of days in hospital care	.010	.010	.010
	(.009)	(.010)	(.010)
Prevalence of psychological diagnoses	-.0001	-.0001	-.0001
	(.0001)	(.0002)	(.0002)

Child outcome - criminality

	(1)	(2)	(3)
Share suspected	.0004	.0001	-.0001
	(.0009)	(.0009)	(.0072)
Share convicted	.00002	-.0003	-.0004
	(.0010)	(.0010)	(.0010)
Years in prison	-.0001	-.0003	-.0005
	(.0008)	(.0008)	(.0008)

Conclusions

- Huge social experiment in Sweden – enormous government-funded expansion of day care

- Clear evidence that it increased female earnings and lowered inequality

- Suggestive evidence of negative long run effect on children – but insignificant