

# Maternal and Child Time Investments and the Cognitive Development of Children

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ACE 2017

Economics of Human Development

21<sup>st</sup> July 2017

# Research question

- Rapid increase in cognitive development during early childhood (Cunha & Heckman 2008, Cunha & Heckman 2009, Cunha et al 2010)
- Early life development is a key determinant of a child's outcomes.
- What is the role of parental investment on cognitive development?
- What is the role of child's own investment on cognitive development?
- I focus on the type and duration of activity that children engage in with their mother and independently.

# Previous literature

- Most of the literature proxies for parental investment.
- Recently emerging literature using parental time use and cognitive development (**Fiorini and Keane 2014**, Del Boca et al 2014, Del Bono et al 2016).
- One study by **Del Boca et al (2017)** that takes into account child's own investments.
- I build on the models used in Todd and Wolpin (2003, 2007) and Fiorini and Keane (2014).

# Data

- Longitudinal Survey of Australian Children (LSAC).
- B cohort born between 2003-2004 and K cohort born between 1999-2000.
- Six waves.
- Rich set of controls - children's development, demographics and parental background.
- Time use diaries (TUD) available for cohort K for all waves and for cohort B for waves 1-3 and wave 6.
- Information on what the child was doing, where the child was and **who was in the same room or nearby.**

# Time use diaries - categories

Recoded categories	What was the child doing/Where was the child
Educational activities independently	read a story, talked to, sung to; colour, look at book, educational game; being taught to do chores, read etc; reading or looking at book by self <b>AND</b> alone
Educational activities with mother	as above <b>AND</b> with mother
Sleep	sleeping, napping
Media	TV, DVD, movie; tapes, CDs, radio, music; computer
Organised lessons/activities	organised lessons/activities <b>OR at</b> daycare center/playgroup
Play	quiet free play; active free play; other play; organized sport; other exercise
School/Care	<b>at</b> school, before/after school care
General care	breastfeeding; eating, drinking, being fed; bathe, dress, hair care, health care <b>etc</b>

# Weekly time allocation in hours per week

	0-1 yr olds		2-3 yr olds		4-5 yr olds		6-7 yr olds	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<b>Educational activities independently</b>	<b>0.46</b>	1.31	<b>0.29</b>	0.93	<b>0.57</b>	1.53	<b>0.39</b>	1.27
<b>Educational activities with mother</b>	<b>8.5</b>	12.8	<b>7.2</b>	6.4	<b>9.1</b>	10.5	<b>2.8</b>	2.9
<b>Sleep</b>	<b>94.3</b>	14.1	<b>80.7</b>	11.6	<b>76.1</b>	10.2	<b>72.6</b>	10.6
<b>Media</b>	<b>7.1</b>	11.4	<b>13.9</b>	9.7	<b>17.6</b>	11.1	<b>12.9</b>	8.1
<b>Organised lesson/activities</b>	<b>3.8</b>	9.5	<b>12.2</b>	17.2	<b>18.8</b>	16.3	<b>2.6</b>	7.9
<b>Play</b>	<b>16.5</b>	12.6	<b>20.2</b>	12.6	<b>18.7</b>	13.4	<b>15.1</b>	8.7
<b>School/Care</b>	-	-	-	-	-	-	<b>31.9</b>	10.2
<b>General care</b>	<b>97.7</b>	36.0	<b>60.5</b>	22.6	<b>56.9</b>	20.2	<b>51.6</b>	20.2

# Estimation

- $Y_{ia} = T_{i\{N \times a\}} \alpha_{\{N \times a\}} + CPB_{i\{M \times a\}} \beta_{\{M \times a\}} + e_{ia}$
- Endogeneity of time inputs.
- Estimate skill production function based on Todd and Wolpin (2003, 2007) and Fiorini and Keane (2014):
  1. OLS using contemporaneous inputs only.
  2. Contemporaneous inputs and lagged test score (value added model).
  3. Within child fixed effects.
  4. Contemporaneous and lagged inputs (cumulative model).
  5. Contemporaneous inputs, lagged inputs and lagged test score (value added + cumulative model).

Note: Refer to Todd and Wolpin (2003, 2007) and Fiorini and Keane (2014) for the assumptions underlying each estimator.

# Contemporaneous inputs only

	<b>CSBS (0-1 years old)</b>	<b>Vocab (2-3 years old)</b>	<b>PPVT (4-5 years old)</b>	<b>WAI (4-5 years old)</b>	<b>PPVT (6-7 years old)</b>	<b>MR (6-7 years old)</b>
<b>Educational activities with mother in hours/week</b>	0.0121***	0.0209***	0.00553	0.00594	0.0134	0.0188*
	(0.00226)	(0.00381)	(0.00451)	(0.00412)	(0.00982)	(0.0103)
<b>Educational activities independently in hours/week</b>	-0.0211	0.00977	0.0637**	0.0301	0.0481**	0.0572***
	(0.0211)	(0.0248)	(0.0296)	(0.0269)	(0.0207)	(0.0219)
<b>Observations</b>	1,513	1,572	465	490	1,060	1,079
<b>R-squared</b>	0.104	0.146	0.125	0.371	0.115	0.078

Note: Standard errors in brackets; significance levels 1% \*\*\*, 5% \*\*, 10% \*.

# Contemporaneous inputs and lagged test score

	Vocab (2-3 years old)	PPVT (6-7 years old)	MR (6-7 years old)
<b>Educational activities with mother in hours/week</b>	0.0137***	0.0113	0.0258*
	(0.00397)	(0.00953)	(0.0131)
<b>Educational activities independently in hours/week</b>	0.0264	0.0414**	0.0565*
	(0.0269)	(0.0193)	(0.0327)
<b>Observations</b>	1,370	969	712
<b>R-squared</b>	0.188	0.244	0.147

Note: Standard errors in brackets; significance levels 1% \*\*\*, 5% \*\*, 10% \*.

# Conclusion

- Previous work does not control for child's own productive time.
- Child's own productive time is not small.
- Below 4-5 years old: educational time with mother is significant.
- Mother's productive time key factor in early childhood.
- From 4-5 years old onwards: the child's own time investment is the most important.
- Child's own productive time is superior to that of the mother's from the ages of 4-5.